

# Lightspeed Live Capture



## User Guide

Live Capture Version 3.5

Source Manager 3.5

Live Schedule 2.1

Vantage 8.1 Update Pack 2

Windows Server 2016 | Windows Server 2019

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# Obtaining Support | Information | Assistance

Contact Telestream for support, information or assistance, as indicated below.

## Telestream Contact Information

Resource	Contact Information
Lightspeed Live Support	<p>Website: <a href="http://www.telestream.net/telestream-support/lightspeed-live/support.htm">www.telestream.net/telestream-support/lightspeed-live/support.htm</a></p> <p>Support Email: <a href="mailto:support@telestream.net">support@telestream.net</a></p> <p>US Phone: 877-257-6245</p> <p>International Phone: +1 530-470-2036</p> <p>Terms and times of support services vary, per the terms of your current service contract with Telestream.</p>
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Lightspeed Live Information   Assistance   FAQ   Forums   Upgrades	<p>Website: <a href="http://www.telestream.net/telestream-support/lightspeed-live/support.htm">www.telestream.net/telestream-support/lightspeed-live/support.htm</a></p> <p>Support Email: <a href="mailto:support@telestream.net">support@telestream.net</a></p> <p>For details about Web APIs, see the <a href="#">Live Capture Web API Reference on Telestream.net</a> or click the More menu  in the web app, select About and API Reference.</p>
Telestream, generally	<p>Website: <a href="http://www.telestream.net">www.telestream.net</a></p> <p>Sales and Marketing Email: <a href="mailto:info@telestream.net">info@telestream.net</a></p> <p>Telestream 848 Gold Flat Road Nevada City, CA USA 95959</p>
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## Return Material Authorization (RMA) Procedure

If your Lightspeed Live Server requires service of any kind, regardless of whether you purchased the Lightspeed Live Server from Telestream or an authorized reseller, contact Telestream directly for a Return Material Authorization (RMA).

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**CAUTION:** Except for the modular power supplies and disk drives, the Lightspeed Live Server is a sealed device, with no user serviceable parts inside. You should never open the top cover or attempt to upgrade or alter the server. Doing so exposes you to electrical hazard, may damage the unit, and may invalidate your warranty.

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Please contact Telestream for all internal service of the server:

- *Email:* [support@telestream.net](mailto:support@telestream.net)
- *In the US, telephone:* 1-877-257-6245
- *From international locations, telephone:* 1-530-470-2036.

Provide your organization name, and contact information, the serial number of the inoperative unit, and request a Return Material Authorization.

Before returning your Lightspeed Live Server, back up the entire contents of all server drives to protect against data loss. See [Backing up a Lightspeed Live Server](#) for details.

# Contents

## **Lightspeed Live Capture User Guide 1**

Obtaining Support | Information | Assistance 7

Return Material Authorization (RMA) Procedure 8

## **Introducing Lightspeed Live Capture 27**

Lightspeed Live Capture Overview 28

More Choices, More Flexibility 29

Media Platform Friendly 29

Fast, Parallel Open Media Processing 29

File-Based Transcoding on Lightspeed Live Servers 29

Live Capture Web Apps 30

File Loop | Slate Sources Not Supported in Capture 31

Lightspeed Live Application Program Interfaces 32

Vantage API 32

Lightspeed Live Capture Web API 32

Lightspeed Live Source Web API 32

Lightspeed Live Schedule Web API 33

Lightspeed Live Play Web API 33

Lightspeed Live Server Overview 33

Lightspeed Live Server Specifications 34

System Power 35

Drives 35

Cooling System 35

SDI Video Cards 36

Ethernet Network Interface Cards 36

SDI Source Video Formats 37

SDI Input Audio 37

GPU 38

Expansion Card Slots 38

RS-422 VTR Interface Kit Option for Capture 38

Using External Reference (REF) for SDI Payout 38

Front Panel	40
Front Panel Features	40
Rear Panel Ports and Connectors	41
SDI Video Connections	42
4-port 3G SDI Card with Ref and LTC Connectors	42
8-port 3G SDI Card with Ref and LTC Connectors	43
4-port 3G SDI Card (Discontinued)	43
8-port 3G SDI Card (Discontinued)	44
4-port 12G SDI Card (Discontinued)	45
16-port (dual 8 port) 3G SDI Cards with Reference and LTC	45
25G Fibre Channel Ethernet Connections	47
Managing System Logs	48
Controlling Logging Settings	48
Accessing Live Capture   Tape Recording Configuration Files	48
Accessing Live Capture   Tape Recording Log Files	49
Accessing the Vantage Live Service Config File	49
Accessing Vantage Live Service Log Files	50
<b>Installing   Updating   Managing a Lightspeed Live Server</b>	<b>51</b>
Installing the Lightspeed Live Server	52
Unpacking the Server	52
Rack-Mounting Your Lightspeed Live Server	53
Assembling the Rails	53
Installing Outer Rails into the Rack	54
Installing the Server in the Rack	56
Removing the Server from the Rack	57
Making Data and Signal Connections	57
Power Requirements and Connections	60
Power and General Cautions and Warnings	61
Renaming a Lightspeed Live Server	62
Managing the Windows Operating System	64
Activating Windows with the Microsoft Activation Key	64
Applying Microsoft Updates	64
Default Windows User ID and Password	64
Web App Ports and Windows Firewall Settings	64
Maintaining a Lightspeed Live Server	66
Performance Tuning a Lightspeed Live Server	67
Setting Your NVIDIA GPU to TCC Mode	70
Backing up a Lightspeed Live Server	70
Managing and Monitoring Lightspeed Live Servers	72
Installing New or Replacement Media Hard Drives	73
Rebuilding the Lightspeed Live Storage RAID	74
Replacing a Power Supply	74
Replacing the Power Supply	74
Setting NMOS Logging Levels	75
Monitoring Lightspeed Live Servers via SNMP	75
Enabling SNMP Monitoring	75



## Configuring Vantage for Use with Live Capture 77

Overview	78
Up and Running Checklist	79
In the Vantage Management Console...	79
In Source Manager...	82
In Vantage Workflow Designer...	82
In Live Capture...	82
Licensing a Live Capture Array	84
Single Server Vantage Domain Adding Live Capture	84
New Vantage Arrays Including Live Capture	84
Existing Vantage Arrays When Adding Live Capture	84
Licensing Live Schedule and RouteMaster	86
Previewing Sources and Finding Workflows	87
Previewing Sources	87
Finding Workflows	88
Using Live Stores for Capturing Files	89
Creating a Live Store in Vantage	90
Identifying Live Stores with a UNC Path	91
Executing Transport Actions Using Local & UNC Paths	91
Managing Live Storage Disk Space	92
Rule-based Space Management	92
Workflow and Job-based Space Management	92
Manual Space Management	93
Creating Labels and Variables for Use in Workflows	94
Updating Live Capture	95
Installation on Client Windows Workstations	95
Restarting the Telestream Live Source Service	95
Firewalls and Blocked Ports Limit Functionality	97
Creating a UNC Path for Resource Locations	97
Configuring Various Actions on Arrays	98
Scaling Live Capture to Include Multiple Servers	99
Best Practices for Joining Multiple Capture Servers Into a Vantage Domain	99
Joining Capture-Only Systems	100
Existing Vantage Array—Adding Live Capture Servers	101
Providing Capture Sources Unique Names	102
Best Practices for Capture Array Design	103
Connecting Web Applications to an Array	105
Configuring Vantage Client Applications for Multiple Servers	105
Using the Live Capture Web App to Manage Multiple Servers	106
Using NetBIOS Host Names	107
Correcting Connection Errors in Web Apps	109
Mac OS Procedure to Correct Thumbnail Appearance	109
Windows Procedure to Correct Thumbnail Appearance	109
Clearing Browsing Data after Updating Vantage or Live Capture	111
Managing and Using Log Files	112
Accessing Log Files	112
Changing Log Content Settings	112

Collecting Log Files for Customer Support	113
Capture Log Files	113
Telestream Live Source Service Log Files	114

## Managing your Web Apps 115

Web Application Browser Requirements	116
Efficient Use of Capture Web Apps	116
Switching Between Live Capture and Live Play	117
Switching to Live Capture Mode	117
Launching Web Applications	119
Launching the Source Manager Web App	121
Logging Out of Source Manager	121
Stopping Web Applications	121
Changing the Vantage Domain Name	122

## Capturing Live Video 123

Pre-requisites to Using Live Capture	124
Using the Lightspeed Live Capture Web App	124
Title Bar	125
Selection Panel	125
Channels Preview Panel	126
Channel Previews Toolbar	127
Configuring Custom-Ganged Recording	129
Channel Controls	131
Channel Options	133
Viewing a Channel's Recording History	134
Display and Information Panel	136
Loss of Signal Behavior	137
Limited Bandwidth Behavior	138
Channel Status Panel	139
Filtering Job Status	140
Using Triggers to Control Channel Recording	141
Topics	141
Using DAI Triggers	141
Using Manual Triggers	143
Using Recurring Segment Triggers	143
CalDAV Calendar Trigger	145
Using Web Service Triggers	145
Recorded File Location and Format	147
Selecting Output Encoders and Format	147
Deleting Captured Files	147
Using the Vantage Job Status Views Web App	148
Displaying Vantage Job Status Views	148
Using the Vantage Job Status Views Web Application	149
Configuring Job Status Views Information	150

## Capturing Tape Media 151

- Pre-requisites to Using Tape Capture 152
- Tape Capture Overview 153
- Configuring a VTR Connection 154
  - Checking VTR Connection Status 155
  - Troubleshooting the VTR Connection 155
- Tape Capture Controls and Status 157
  - Selection Panel 157
- Checking on Job Status 158
  - Filtering Job Status (Far Right) 158
- Using Workflows 159
  - Clip Panel 160
  - Log 161
  - EDL File Import and Export 161
  - Capturing a Whole Tape 162
  - Timecode Break Recording 162
  - Tapes 164
  - Clip Log 164
  - Capturing Media 165
- Using the Preview Player Panel 167
  - VTR Controls and Keyboard Shortcuts 169
- Using the Tape Capture Web App 170
  - Setting up for Clip Logging 170
  - Creating and Naming Tapes 170
  - Creating a Clip 170
  - Configuring Clip Stitching 171
  - Capturing Clips 172
  - Configuring Tape Parameters that are Bound to Variables 172
  - Setting Drop/Non-Drop Frame Characteristics 173
  - Creating a Stitched Clip 173
  - Recording an Entire Tape—Even if It Has Errors 175
- Resolving Tape Capture Error Messages 176

## Creating Live and Tape Capture Workflows 177

- Creating a Live Capture Workflow 178
  - Creating a Live Capture Workflow 179
  - Capture Action Overview and Configuration 182
  - Configuring Program Settings 183
  - Restricting Input - Frame Type and Frame Rate 186
    - Operation When Restrict Input is Enabled 187
    - Automatic Triggers Record When Restrict Input is Enabled 188
  - Expected Labels 188
  - Configuring Trigger Settings 188
    - DAI Triggers 189
    - Manual Triggers 190
    - Recurring Segment Triggers 190

CalDAV Calendar Triggers	191
Web Service Triggers	192
Using the CalDAV Calendar Trigger	193
What Happens When a Queued Event is Deleted	193
Configuring Primary and Secondary Outputs	194
Creating a Tape Capture Workflow	197
Tape Action Overview	198
Inputs	199
Expected Labels	199
Configuring Primary and Secondary Outputs	200
Settings Panel	201
Time Code Burn-in Filter	205
Creating the Tape Capture Workflow	206
Binding Variables to Configuration Controls	207
Paths for Vantage Storage Overview	208
Prototype Capture Workflow—Labels & Variables	210
Creating and Configuring the Media Creation Capture Workflow	210
Summary	214

## Managing Video Sources 215

Overview	216
Using the Source Manager Window	217
Sources Panel	217
Toolbar	218
Source Type Icons	219
Preview Panel	220
Viewing Audio Levels and Muting Audio	220
Audio and Text Tracks Panel	221
Source Information and Statistics Panel	221
User Administration	222
Launching the Group Portal	222
Creating a Group	223
Signing In	224
Creating/Updating Live Capture Users	226
Configuring Capture for SD/HD   UHD SDI Sources	228
Configuring Capture for UHD Video	228
Configuring Capture to Process SD/HD Video	229
Enabling QuadLink Loop Through	231
Port-Paired Loop Through Assignments	231
Configuring SDI Sources	233
Creating & Configuring Transport Stream Sources	239
Creating & Configuring RTMP Sources	244
Tagging AC3 Audio Embedded in PCM	247
Creating & Configuring SRT Sources	249
Creating & Configuring NDI Sources	254
Creating and Configuring ST 2110 Sources	258
Managing System Settings	263

Copying System Logs from a Live Capture System	264
Version Info   Legal Documents   Contact Methods	265
Troubleshooting	266
Can't Start the Group Portal Web App	266
Resolution	266
Can't Start the Telestream Live Source Service	266
Resolution	266

## **Scheduling Live Capture Sessions** 267

Installing the Live Schedule Web App	268
Updating the Live Schedule Web App	268
Integrating RouteMaster SDI Router Control	268
RouteMaster Licensing and Configuration	269
Configuring Live Source for RouteMaster SDI Input	270
Configuring Live Schedule	270
Live Schedule Prerequisites	270
Launching the Live Schedule Web App	271
Launching Live Schedule from the Vantage Portal	271
Logging into Vantage	271
Managing Your Live Schedule License	272
Activating a License on a Server with Internet Access	273
Activating a License on a Server without Internet Access	274
Deactivating a License Online	275
Deactivating a License Offline	275
Live Schedule Overview	275
Using the Title Bar	277
<b>Live Schedule Panels</b>	278
<b>Showing   Hiding Beta Features</b>	278
Creating and Managing Live Capture Events	279
Adding and Configuring a NewEvent	279
Starting anEvent Immediately	283
Starting   Stopping   Duplicating   Editing   Deleting an Event	283
Click one of the icons to perform these operations:	283
Starting an Event Immediately	283
Stopping an Event	283
Duplicating an Event (One to Many)	283
Duplicating an Event (One to One)	284
Editing an Event	284
Moving an Event via Drag and Drop	285
Deleting an Event	285
Managing Your Capture Event Schedule	286
Event Schedule Panel Overview	287
Using the Date/Time Toolbar	288
Using Source Routing	289
Enabling   Disabling Source Routing	289
Specifying Router Sources	290
Setting the Event Start Offset Time	290

Implementing Automated Event Deletion	291
Using the Event Schedule Panel	292
Setting the Schedule Time Scale	295
Setting the Date Configuration	295
Setting the Default Event Duration	296
Setting Variables and Labels Event Preferences	297
Monitoring Channel Status	297
Status Panel Overview	298
Viewing Channel Status and Summary Information	299
Viewing/Updating Events   Jobs by Channel	300
Viewing/Updating Source Status by Channel	302
SCHD-535 Viewing a Channel's Recording History	303
Using Variables in Events	305
Setting Schedule-level Variables	306
Setting Channel-level Variables	308
Setting Event-Level Variables	310
Using Metadata Labels in Events	312
Setting Channel-level Labels	313
Setting Event-level Labels	315
Accessing Application Information   Users Guide   Help   Legal Documents & Contacting Telestream	316
Using the Live Schedule API	317
Managing System Logs	318
Controlling Logging Settings	318
Accessing Live Schedule Log Files	318

## **Lightspeed Live Server Resource Requirements** 319

Overview	320
CPU Processor Group Assignment	321
Processes & Factors Affecting Performance	322
Primary Output Codec	322
Secondary Output codec	322
Codec/Source Input Bit Depth	322
Live Capture Web App	322
Determining the Time-Shift Buffer Duration	322
Capturing Uncompressed Media Via SDI	324
Maximum Concurrent Captures	325

## **Vantage Actions | Containers | Codecs** 327

Capture Action Output Containers	329
MP4 Output	329
Format Summary	329
Video	329
AVC   x264	329
Audio	329
MP4 Applicable Standards	329



Container Settings	329
General	329
Aspect Ratio Mode	329
Video Stream Details	330
Color Space Signaling	330
Codec	330
AVC	330
Time Code Burn-in Filter	330
x264	331
Time Code Burn-in Filter	331
Audio Stream Details	332
Language Tags	332
Codec	332
Codec: AAC	332
General	332
Codec: PCM	333
General	333
MXF OP1a Output	334
Format Summary	334
Video	334
Audio	334
Timecode	334
MXF Applicable Standards	334
Container Settings	335
General	335
Aspect Ratio Mode	336
Video Stream Details	336
Color Space Signaling	336
Codec	336
AVC	336
Avid DNxHD	337
Avid DNxHR	339
DV	339
DVCPRO HD	339
IMX	340
JPEG2000 Lossless (Comprimato)	340
JPEG2000 Lossy (Comprimato)	341
Panasonic AVC-Intra	342
Panasonic AVC-Ultra	343
Sony XDCAM	343
Uncompressed	344
x264	344
Time Code Burn-in Filter	345
HDR Metadata Filter	345
Audio Stream Details	346
Codec (PCM)	346
General	346
MXF XAVC Output	347

Format Summary	347
Video	347
Audio	347
Timecode	347
MXF Applicable Standards	347
Container Settings	348
General	348
Aspect Ratio Mode	348
Video Stream Details	348
Color Space Signaling	348
Codec	349
Sony XAVC	349
Time Code Burn-in Filter	350
HDR Metadata Filter	351
Audio Stream Details	351
Codec (PCM)	351
MPEG2-TS Output	353
Format Summary	353
Video	353
Audio	353
Container Settings	353
Video Stream Details	354
Color Space Signaling	354
Codec	355
MPEG-2	355
x264	356
Time Code Burn-in Filter	356
Audio Stream Details	357
Codec	357
AAC	357
General	357
PCM	357
General	357
Channel Map	358
QuickTime Output	359
Format Summary	359
Video	359
Audio	359
Container Settings	359
General	359
Aspect Ratio Mode	360
Clean Aperture	361
Video Stream Details	361
Color Space Signaling	361
Codec	361
Apple ProRes	361
AVC	361
Avid DNxHD	362

Avid DNxHR	364
DV	364
DVCPRO HD	364
HEVC	365
IMX	365
Panasonic AVC-Intra	365
Sony XDCAM	366
Uncompressed	366
x264	367
x265	367
Time Code Burn-in Filter	368
HDR Metadata Filter	368
Audio Stream Details	369
Codec (PCM)	369
Channel Configuration	369
QuickTime Open Output	370
Format Summary	370
Video	370
Audio	370
Container Settings	370
General	370
Important Information about Default Duration	371
Aspect Ratio Mode	373
Clean Aperture	373
Video Stream Details	373
Color Space Signaling	373
Codec	373
Apple ProRes	373
Avid DNxHD	374
Time Code Burn-in Filter	376
Avid DNxHR	377
Audio Stream Details	377
Codec (PCM)	377
HDR Metadata Filter	378
TIFO Output	379
Format Summary	379
Video	379
Audio	379
Container Settings	379
General	379
Aspect Ratio Mode	379
Video Stream Details	380
Color Space Signaling	380
Codec	380
Apple ProRes	380
AVC	381
Avid DNxHD	381
Avid DNxHR	383

DV	383
DVCPRO HD	384
HEVC	384
IMX	384
JPEG2000 Lossless (Comprimato)	384
JPEG2000 Lossy (Comprimato)	385
MPEG-2	386
Panasonic AVC-Intra	387
Panasonic AVC-Ultra	388
Sony XAVC	389
Sony XDCAM	390
Uncompressed	391
x264	391
x265	391
Time Code Burn-in Filter	392
HDR Metadata Filter	392
Audio Stream Details	393
Codec (PCM)	393
Proxy TIFO Output	394
Format Summary	394
Video	394
Audio	394
Container Settings	394
General	394
Aspect Ratio Mode	395
Video Stream Details	395
Color Space Signaling	395
Codecs	395
Apple ProRes Proxy	395
AVC	395
Avid DNxHD LB	396
Avid H.264 Proxy	396
Time Code Burn-in Filter	396
Audio Stream Details	397
Codecs	397
MPEG-1 Layer 2	397
PCM	397
Proxy MP4 Output	398
Container Settings	398
Video Stream Details	398
Color Space Signaling	398
Codec (AVC)	398
Time Code Burn-in Filter	399
Audio Stream Details	400
Codec (AAC)	400
Proxy MXF RDD 25 Output	401
Container Settings	401
Video Stream Details	401

Color Space Signaling	401
Codec (AVC)	402
Time Code Burn-in Filter	402
Audio Stream Details	403
Codec (AAC)	403
Proxy HLS Output	404
Container Settings	404
Video Stream Details	404
Color Space Signaling	404
Codec (AVC)	405
Time Code Burn-in Filter	405
Audio Stream Details	406
Codec (AAC)	406
ANC Stream Details	406
Tape Action Output Containers	407
MXF OP1a Output	407
Format Summary	407
Video	407
Audio	407
Timecode	407
MXF Applicable Standards	408
Output Settings	408
Container Settings	409
General	409
Aspect Ratio Mode	409
Video Stream Details	409
Color Space Signaling	409
Codecs	410
AVC	410
Avid DNxHD	410
DV	412
DVCPRO HD	412
IMX	413
JPEG2000 Lossless (Comprimato)	413
JPEG2000 Lossy (Comprimato)	414
MPEG-2 I-Frame	415
Panasonic AVC-Intra	415
Panasonic AVC-Ultra	416
Sony XDCAM	416
Uncompressed	417
x264	417
Time Code Burn-in Filter	417
HDR Metadata Filter	418
Audio Stream Details	418
Codec (PCM)	418
MXF XAVC Output	420
Format Summary	420
Video	420

Audio	420
Timecode	420
MXF Applicable Standards	420
Container Settings	421
General	421
Aspect Ratio Mode	421
Video Stream Details	421
Color Space Signaling	422
Sony XAVC	422
Time Code Burn-in Filter	423
HDR Metadata Filter	424
Audio Stream Details	424
Codec (PCM)	425
MPEG2-TS Output	426
Format Summary	426
Video	426
Audio	426
Container	426
Container Settings	426
Video Stream Details	427
Color Space Signaling	427
Codecs	428
MPEG-2	428
x264	429
Time Code Burn-in Filter	429
Audio Stream Details	430
Codec	430
General	430
Channel Map	430
QuickTime Output	431
Format Summary	431
Video	431
Audio	431
Container Settings	431
General Panel	431
Aspect Ratio Mode	432
Clean Aperture	432
Video Stream Details	432
Color Space Signaling	432
Codecs	433
Apple ProRes	433
AVC	433
Avid DNxHD	433
Avid DNxHR	435
DV	436
DVCPRO HD	436
HEVC	436
IMX	437



Panasonic AVC-Intra	437
Sony XDCAM	438
Uncompressed (10-bit)	438
x264	438
x265	438
Time Code Burn-in Filter	439
HDR Metadata Filter	440
Audio Stream Details	440
Codec	440
General	440
Channel Map	440
QuickTime Open Output	442
Format Summary	442
Video	442
Audio	442
Container Settings	442
General Panel	442
Important Information about Default Duration	443
Aspect Ratio Mode	444
Clean Aperture	445
Video Stream Details	445
Color Space Signaling	445
Codecs	445
Apple ProRes	445
Avid DNxHD	446
Time Code Burn-in Filter	448
HDR Metadata Filter	449
Audio Stream Details	449
Codecs	449
PCM	449
General	449
Channel Map	450
MPEG-1 Layer 2	450
TIFO Output	451
Format Summary	451
Video	451
Audio	451
Container Settings	451
General Panel	451
Aspect Ratio Mode	451
Video Stream Details	452
Color Space Signaling	452
Codecs	452
Apple ProRes	452
AVC	452
Avid DNxHD	453
Avid DNxHR	453
DV	453

DVCPRO HD	453
HEVC	454
IMX	454
JPEG2000 Lossless (Comprimato)	454
JPEG2000 Lossy (Comprimato)	455
MPEG-2	456
Panasonic AVC-Intra	457
Panasonic AVC-Ultra	458
Sony XAVC	458
Sony XDCAM	460
Uncompressed	460
x264	460
x265	461
Time Code Burn-in Filter	461
HDR Metadata Filter	462
Audio Stream Details	462
Codec (PCM)	462
General	462
Channel Map	463
Proxy TIFO Output	464
Format Summary	464
Video	464
Audio	464
Container Settings	464
General	465
Aspect Ratio Mode	465
Video Stream Details	465
Color Space Signaling	465
Codecs	465
Apple ProRes Proxy	465
AVC	465
Avid DNxHD LB	466
Avid H.264 Proxy	466
Time Code Burn-in Filter	466
Audio Stream Details	467
Codecs	467
MPEG-1 Layer 2	467
PCM	467
Proxy MP4 Output	468
Format Summary	468
Video	468
Audio	468
Container	468
Container Settings	468
Aspect Ratio Mode	468
Video Stream Details	468
Color Space Signaling	469
Codec (AVC)	469

Time Code Burn-in Filter	469
Audio Stream Details	470
Codec	470
General	470
Channel Map	470
Proxy MXF RDD 25 Output	471
Container Settings	471
Video Stream Details	471
Color Space Signaling	471
Codec (AVC)	472
Time Code Burn-in Filter	472
Audio Stream Details	473
Codec (AAC)	473
Poster Frame	473
Container Settings	473
Primary Output - Video Codecs	474
Apple ProRes	474
AVC	475
Avid DNxHD	475
Avid DNxHR	475
DV/DVCPro	476
DVCPRO HD	476
HEVC	476
IMX	477
JPEG2000 Lossless (Comprimato)	477
JPEG2000 Lossy (Comprimato)	478
MPEG-2	479
Panasonic AVC-Intra	481
Panasonic AVC-Ultra	481
Sony XDCAM	481
Uncompressed (10-bit)	482
x264	482
x265/HEVC	483
Sony XAVC	484
Primary Output - Audio Codec	485
PCM	485
Secondary Output - Video Codecs	487
AVC	487
ProRes Proxy	487
DNxHD LB	487
Secondary Output - Audio Codecs	488
AAC	488
PCM	488
Related Vantage Actions	490
Live Actions	490
Capture Action	490
Tape Action	490
Cloud Actions	491

Cloud Flip Action	491
Cloud QC Action	491
Cloud Speech Action	491
Metadata Actions	492
Populate Action	492
Transform Action	492
Flip 64 Transcode Action	492
Transport Actions	493
Copy Action	493
Delete Action	493
Deploy Action	493
Move Action	493
Common Actions	495
Compute Action	495
Construct Action	495
Decide Action	495
Forward Action	496
Receive Action	496
Synchronize Action	496
Communicate Actions	497
Message Action	497
Notify Action	497
VidChecker Action	497

## **Connecting VTR Systems 499**

4-Port Interface Kit Components	500
Installing the RS-422 Interface Box	501
Connecting a VTR to the Lightspeed Live Server	503
RS-422 Connector Pin Assignments	505
Configuring an RS-422 Port's Latency Time	506

## **Vantage Glossary 507**

# Introducing Lightspeed Live Capture

Telestream's Lightspeed Live Capture is an enterprise-class system hosted on a [Lightspeed Live Server](#) platform to deliver real-time, enterprise-class live and tape-based media capture for media and entertainment companies, corporations, government agencies, and educational facilities.

Telestream recommends that you read this chapter first, to become familiar with the Lightspeed Live Server and Lightspeed Live Capture.

Next, we suggest that you refer to [Installing | Updating | Managing a Lightspeed Live Server](#) to install your Lightspeed Live Server(s) in your facility. You can also use this chapter to manage and monitor your servers.

Finally, turn to [Configuring Vantage for Use with Live Capture](#) to configure your Live Capture system and start capturing video. The Up and Running topic describes the initial configuration tasks you should complete first.

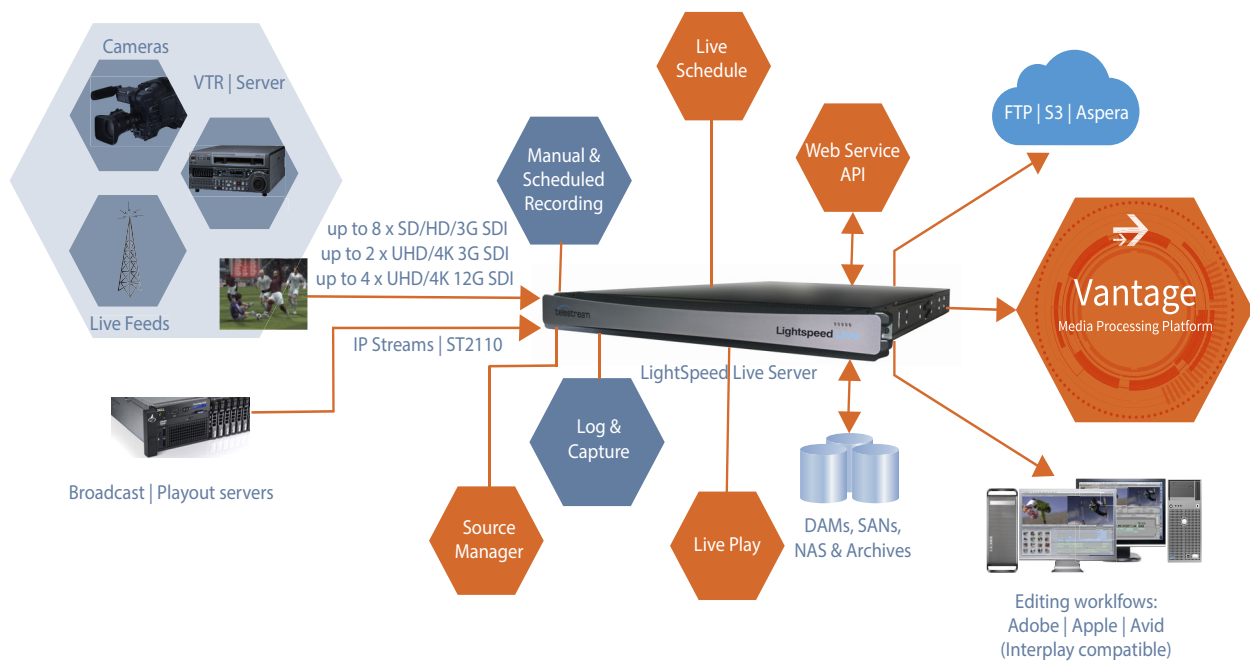
## Topics

- [Lightspeed Live Capture Overview](#)
- [Live Capture Web Apps](#)
- [Lightspeed Live Application Program Interfaces](#)
- [Lightspeed Live Server Overview](#)
- [Lightspeed Live Server Specifications](#)
- [Managing System Logs](#)

## Lightspeed Live Capture Overview

Designed for demanding enterprise-class broadcast and professional video capture applications, Lightspeed Live Capture offers premium features and exceptional performance. Lightspeed Live Capture excels at performing demanding video ingest from similar or mixed format sources, while simultaneously creating multiple high resolution and proxy files from any of its inputs.

Lightspeed Live Capture is flexible and scalable. Based on various [Lightspeed Live Server](#) capabilities, Live Capture supports up to eight 3G HD-SDI inputs with active loop through for monitoring, or up to two UHD/4K inputs with active loop through for monitoring. When equipped with 12G SDI, it supports two HD SDI or UHD/4K inputs, but does not support active loop through.



Live Capture also supports IP sources—RTMP, Transport streams, SDI, NDI, and ST 2110 (via text / HTML SDP files or NMOS)—when the Lightspeed Live Server is equipped with a 25G Ethernet NIC on supported Lightspeed Live servers—see [Lightspeed Live Server Specifications](#).

Lightspeed Live Capture is capable of capturing eight concurrent HD outputs in select formats and codecs and two UHD/4K formats in select formats and codecs. Live Capture processes video in 16-bit space to preserve source quality and encodes it in multiple video formats, creating high-resolution mezzanine concurrent H.264/AVC proxy files. Files are written directly to the Live Capture server's local RAID storage or to external shared NAS | SAN storage, or written to remote storage locations via Aspera, Signiant and other WAN accelerations products and media storage platforms.



Lightspeed Live Capture is configured, operated, and controlled via the Live and Tape Capture Web apps, and several [Lightspeed Live Application Program Interfaces](#) are provided for integration and control by other systems.

Optional editing, scheduling, and live playback web apps are also offered.

## More Choices, More Flexibility

Lightspeed Live Capture offers a variety of methods to ingest video: 24/7/365 scheduled recording of live feeds, RS-422-controlled capture from VTR, manual recording including gang control, DAI (SCTE-104) triggering (headless; no operator intervention), recurring segment creation, and automated control through a simple Web Service REST API.

Lightspeed Live Capture provides direct support for capturing video into MXF OP1a, QuickTime or Telestream's TIFO format. To maintain closed captions and other ancillary data, Lightspeed Live Capture preserves this data in MXF, QuickTime, TIFO and Avid proprietary containers.

## Media Platform Friendly

Lightspeed Live Capture creates growing files that directly support a wide variety of 3rd party Media Asset Management (MAM) and Non Linear Edit (NLE) solutions including Avid Media Central Production Management, Avid Media Composer, Adobe Premiere, DaVinci Resolve, and Apple Final Cut Pro.

## Fast, Parallel Open Media Processing

As a standalone system, Lightspeed Live Capture acquires SDI video from independent input channels or through IP connections. Multiple Live Capture servers can be joined together to create a Lightspeed Live Capture array under a common control interface.

In addition, Live Capture can be seamlessly integrated directly with Vantage, enabling unlimited workflow possibilities via Vantage's [Telestream Media Framework](#).

When integrated into Vantage, Lightspeed Live Capture workflows support [Open Workflows](#). Open Workflows enable transcoding, packaging, and deployment to occur in near real time in Vantage, as the media is being captured. These advanced media processing workflows complete within seconds following the end of media capture.

## File-Based Transcoding on Lightspeed Live Servers

File-based transcoding directly on a Lightspeed Live Server is an optional, separately licensed feature. Transcoding options enable Vantage file-based transcoding *when not in use capturing media*, enabling you to utilize your Lightspeed Live Capture Server for both live video capture and traditional file-based transcoding.

---

**Note:** Live Capture is integrated with Vantage [Telestream Media Framework](#) for ingesting live, live-linear and tape-based media for serializing streaming media into files for processing in production, post-production and broadcast workflows. In the

context of this guide, it is simply referred to as *Vantage*.

If you are performing concurrent ingest and encoding—using Open Workflows (Transcode while Ingest workflows)—transcoding must be performed on a separate server, not on the Capture server where ingest is executing.

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When you're ready to get started, proceed to the [Up and Running Checklist](#).

## Live Capture Web Apps

Lightspeed Live Capture includes several client programs implemented as Web apps:

- *Live Capture*—The Live Capture Web app ([Capturing Live Video](#)) enables you to capture live streams and save them as files.
- *Tape Capture*—For tape-based media, the Tape Capture Web application ([Capturing Tape Media](#)) enables you to capture tape-based media, typically in conjunction with a VTR.
- *Live Schedule*—Live Schedule is a Windows service-based web application ([Scheduling Live Capture Sessions](#)); an optional, separately licensed feature. Live Schedule enables you to create events you want captured for each source, and automatically starts and stops capturing video on an event-by-event basis, with optional SDI router control. Live Schedule is provided in its own installer and must be installed independently of other web apps.
- *Live Play*—Live Play (see the separate Live Play User Guide) is an optional, separately licensed product. The Live Play web app is an enterprise-class software solution that provides flexible and scalable SDI video playback on Telestream's [Lightspeed Live Server](#). Live Play enables you to perform confidence monitoring of file-based and streaming media by playing it back on-screen and via SDI.
- *Source Manager*—Source Manager ([Managing Video Sources](#)) enables you to create, configure, and manage all of your video source inputs from a central application.
- *Group Portal*—The Group Portal web app ([Configuring Lightspeed Live Server Groups and Users](#)) functionality is limited to creating users with specific privileges for managing or monitoring servers in a group according to typical roles.

Live Capture is supported by these Telestream Windows services:

- [Telestream Live Source Service](#)
- [Telestream Schedule Service](#) (when Live Schedule is installed)
- [Telestream RouteMaster Service](#) (when Live Schedule is installed)
- [Telestream Playlist Service](#) (when Live Play is installed)

The Vantage domain installed on the Lightspeed Live Server includes these programs:

- Vantage [Management Console](#)
- Vantage [Workflow Designer](#)
- Vantage [Workflow Portal](#)

The Vantage domain also includes these Windows services:

- [Vantage Analysis Service](#)
- [Vantage Avid Service](#) (requires optional licensing)
- [Vantage Communicate Service](#)
- [Vantage Live Service](#)
- [Vantage Metadata Service](#)
- [Vantage Metric Service](#)
- [Vantage Monitor Service](#)
- [Vantage Signiant Service](#) (requires optional licensing)
- [Vantage SDK Service](#)
- [Telestream Cloud Service](#)
- [Vantage Transcode Service](#) (requires optional licensing)
- [Vantage Transport Service](#)

No other Vantage or Telestream services can be installed or executed on a [Lightspeed Live Server](#) without a specific [license](#).

## File Loop | Slate Sources Not Supported in Capture

Live Capture web apps include File Loop and Slate sources, which should never be used in production. File Loop and Slate sources are not supported for Vantage Capture workflows. For information on where sources are selected, see the Capture action's help page [Configuring Program Settings](#) topic.

## Lightspeed Live Application Program Interfaces

These Telestream web APIs enable you to monitor and control your Lightspeed Live system within a broader, web services-based system or create your own customized monitoring system.

- [Vantage API](#)
- [Lightspeed Live Capture Web API](#)
- [Lightspeed Live Source Web API](#)
- [Lightspeed Live Schedule Web API](#)
- [Lightspeed Live Play Web API](#)

You can also create a web services-based system to control streaming and capture beyond the functionality or capability of Telestream's Live Capture web applications, to meet your organization's requirements.

### Vantage API

The Vantage API is required for any workflow integration, in addition to other APIs you may require.

Vantage provides an SDK to expose the REST API, which is designed to enable third-party programs to submit jobs to Vantage workflows, monitor and manage jobs, and access job's metadata and their files, and perform other tasks in Vantage. The Vantage API is language independent and can be implemented using REST, SOAP or WCF protocols.

The Vantage API Reference is published on the Telestream web site for registered Vantage users.

### Lightspeed Live Capture Web API

The Lightspeed Live Capture Web API enables recording of live streaming media in a Vantage workflow to be controlled manually via the HTTP web service. The Capture web API is implemented in the Lightspeed Live Capture web service.

The Live Capture Web API is described in the [Lightspeed Live Capture Web API Reference](#) at the bottom of the Live Support page on the Telestream web site.

### Lightspeed Live Source Web API

The Lightspeed Live Source Web API supports the insertion of SCTE-35 and ID3 tags. Use of the Source API to insert tags can be performed during capture or stream sessions. The Source API is implemented in the Lightspeed Live Source web service.

The Lightspeed Source web API is also described in the Lightspeed Live Capture Web API Reference.

## Lightspeed Live Schedule Web API

The Lightspeed Live Schedule Web API enables scheduling, management, and query of capture events to be controlled manually via the HTTP web service. The Live Schedule web API is implemented in the Lightspeed Live Schedule web service.

The Lightspeed Schedule web API is described at `http://<LSL_Server>:6500/swagger/index.html`, where `<LSL_Server>` is the host name of the Lightspeed Live Server or keyword *localhost* when accessed locally.

## Lightspeed Live Play Web API

The Lightspeed Live Play Web API enables scheduling, management, and query of capture events to be controlled manually via the HTTP web service. The Live Play web API is implemented in the Lightspeed Live Playlist web service.

The Lightspeed Live Play web API is described at `http://<LSL_Server>:8091/help/index.html`, where `<LSL_Server>` is the name of the Lightspeed Live Server or keyword *localhost* when accessed locally.

## Lightspeed Live Server Overview

Telestream's [Lightspeed Live Server](#) is a high-performance, high-capacity Windows platform, specifically configured as a media processing platform to host Live Capture. Telestream offers several models of Lightspeed Live servers—in two, four, and eight port configurations—to meet application demands and provide improved hardware platforms as technology improves.

As of this publication, Telestream offers the C2+, C4 and C5 models. Other models are supported, but no longer offered for sale.

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**Note:** The *Lightspeed Live Server* and *Lightspeed Server* are different hardware platforms. Lightspeed Live Server hosts Telestream's Live products, including Live Capture; Lightspeed Server supports Vantage.

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The Lightspeed Live Server hosts the [Telestream Media Framework](#) with the Lightspeed Live Capture web applications, for high-performance media processing.

User guides and other documentation is provided on flash drive (optional DVD by request). The same guides are also published on the [Telestream web site](#).

For details and specifications, see [Lightspeed Live Server Specifications](#).

## Lightspeed Live Server Specifications

This table summarizes the [Lightspeed Live Server](#) platform major features.

Components	Description
Operating System	Windows Server 2016   2019—C2   C2+   C3   C4 Lightspeed Live Server
RAM	ECC DDR4 (speed and amount vary by model)
CPU	Dual Multi-Core CPUs
GPU	1 GPU
OS Drives	1 SATA SSD drive for Windows OS (top right-most slot) 1 optional OS SSD drive configured in RAID 1 (bottom right slot)
Storage Drives	SATA SSD or SAS hard drives (capacity quantity and size vary by model)
SAS Controller	Supports up to 8 SAS3 or SATA3 media drives
PCIe Option Slot	1 half-height PCIe 3.0 x8 slot or 1 full-height PCIe 3.0 x16 slot (model-dependent)
SDI Video Input/ Output	<p><b>Gen 1   C2 (Discontinued):</b> One 4-port DIN 1.0/2.3 video card plus LTC port, for four SH/HD or one QuadLink UHD Processor; affinities should be balanced, and assigned affinity value 1.</p> <p><b>C2+:</b> One 4-port DIN 1.0/2.3 video card plus LTC port and REF synch port, for four SH/HD (2-in and 2-out) or one QuadLink UHD Processor.</p> <p><b>C3 (Discontinued)   C4:</b> One 8-port DIN 1.0/2.3 video card plus LTC port for eight SH/HD or 2 QuadLink UHD. Processor affinities should be balanced. Generally, SDI 1   3   5   7 are assigned an affinity value of 1. SDI 2   4   6   8 are assigned an affinity value of 2</p> <p>OR</p> <p>One 4-port BNC video card for 2 12G SDI UHD in and 2 out, REF synch port.</p> <p><b>C4:</b> Video cards have added REF synch port.</p> <p><b>C5:</b> One half-height 8-port card and one full-height 8-port card plus LTC port and REF synch port. Cards are bonded together to provide 8 SH/HD or 2 QuadLink UHD in and out. Processor affinities should be balanced. Generally, on each card, SDI 1   3   5   7 are assigned affinity value 1 and SDI 2   4   6   8 are assigned affinity value 2.</p>
USB 3.0	2 front plane, 2 back plane USB ports

Components	Description
Ethernet	Four 10G Ethernet 10Base-T ports (back plane) C5: 2 1G Ethernet ports (back plane, lower) and 2 Ethernet 10Base-T ports (back plane, upper)
Ethernet (media)	C4: optional 25G Ethernet NIC with 2 SFP28 ports for ST 2110 processing with SMPTE 2022-7 fall back. When installed, no SDI video card can be installed.
VGA Monitor	1 VGA monitor port
AC Inputs	2 redundant AC inputs, 100-240 Volts, 4.5-9.5 Amps, 50-60 Hz.
RS-422	4-port RS-422 VTR interface kits (Capture only). Optional, purchased separately. See <a href="#">Connecting VTR Systems</a> .
Operating Environment	10 degrees C to 35 degrees C, 8-90 percent humidity (non-condensing)

## System Power

The chassis features redundant hot-swappable dual digital power supplies that automatically sense the input voltage between 100v to 240v, and operate at that voltage. Power cords plug directly into the power supply units at the back of the chassis, and the Power On/Off (0/1) button on the front energizes the unit. A green light indicates that the power supply is operating. When a power supply fails or is disconnected, an amber light on the power supply illuminates and an alarm sounds.

## Drives

The chassis supports up to eight SAS hot-swappable 2.5" disk drives. The drive bays on the left (viewed from the front) support SAS3 media drives, four of which are included as standard. These eight storage drives can be configured for RAID 0, 1, 5 or 10 (RAID 5 set at the factory). The two additional bays on the right support only SSD/SATA drives. The top right bay is reserved for the Windows OS drive, and the bay below it is available.

When replacing or adding hard drives, replace with exact manufacture and model of drive. Drives vary by model; see [Obtaining Support | Information | Assistance](#) for details.

## Cooling System

The system cooling design features eight 4-cm counter-rotating fans located in the middle section of the chassis. Fan speed is controlled by the IPMI system management software to respond to fluctuations in system temperature.

Dual air shrouds direct air flow to the CPUs and other components that require cooling. The power supply module also includes a cooling fan.

## SDI Video Cards

SDI video cards are installed in one or more [Lightspeed Live Server](#)'s PCIe card slots.

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**Note:** For C4, an optional, 2-port 25G Ethernet NIC enables ST 2110 capture. The C4 supports either an SDI card or a 25G Ethernet card, but not both in the same server.

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Each of these cards provide one port for analog Linear Time Code (LTC) for use across all SDI input signals. As of October, 2022, the 8-port cards have an added REF Synch port for synchronized SDI playback (see [Making Data and Signal Connections](#)).

- **4-SDI 3G Card (C2 | C2+; discontinued)**—provides four SingleLink 3G SDI ports enabling four SD / HD signals or one QuadLink UHD signal. Provides one LTC port. For details, see [4-port 3G SDI Card \(Discontinued\)](#).
- **4-SDI 3G Card (C2 | C2+; discontinued)**—provides four SingleLink 3G SDI ports enabling four SD / HD signals or one QuadLink UHD signal. Provides one LTC port. For details, see [4-port 3G SDI Card \(Discontinued\)](#).
- **4-SDI 12G Card (C4; discontinued)**—provides four UHD 12G SDI ports with BNC connectors, enabling two UHD input signals and two output signals. Provides one LTC port. Active loop through is not supported on a server equipped with a 12G card. For details, see [4-port 12G SDI Card \(Discontinued\)](#).
- **8-SDI 3G Card (C4 | C5; discontinued)**—provides eight SingleLink 3G SDI ports with BNC connectors, enabling eight SD / HD signals or two QuadLink UHD signals. Provides one LTC port. For details, see [8-port 3G SDI Card \(Discontinued\)](#).
- **8-SDI 3G Card with Ref and LTC (C4 | C5)**—provides eight SingleLink 3G SDI ports with BNC connectors, enabling eight SD / HD signals or two QuadLink UHD signals. Provides one LTC port and one REF port. For details, see [8-port 3G SDI Card with Ref and LTC Connectors](#).
- **Dual 8-port 3G SDI Cards with Ref and LTC (C5)**—one half-height, and one full-height card, provides sixteen SingleLink 3G SDI ports with BNC connectors across 2 cards, enabling eight input SD / HD signals and eight output signals or two UHD input signals and two output signals. Both cards provide an LTC port; the full-height card provides a REF port. For details, see [16-port \(dual 8 port\) 3G SDI Cards with Reference and LTC](#).

## Ethernet Network Interface Cards

On servers C1 through C4, four 10G Ethernet back plane ports are provided for network connectivity and video playback.

On the C4, an optional 2-port, Mellanox 25G Ethernet NIC with licensed Rivermax drivers for ST 2110 capture may be utilized. In servers equipped with a 25G Ethernet card, SDI cards are not supported.

On the C5, the two bottom Ethernet ports (RJ-45) are 1G ports. The top two Ethernet ports (with SFP28 connectors) support 10G Ethernet.



## SDI Source Video Formats

Lightspeed Live Capture supports the following SDI source formats, at indicated frame rates (A/B refers to Level A/Level B):

Source	Rate	23.98	24	25	29.97	30	50	50 A/B	59.94	59.94 A/B	60	60 A/B
SD NTSC 525i					■							
SD PAL 625I				■								
HD 720P							■		■		■	
HD 1080p		■	■	■	■	■		■		■		■
HD 1080PsF		■	■	■	■	■						
HD 1080i				■	■	■						
UHD 3840x2160p 2SI/Square Div.		■ *	■ *	■ *	■ *	■ *		■		■		■
UHD 3840x2160PsF Square Div.		■	■	■								
UHD 3840x2160PsF Square Div.		■ *	■ *	■ *	■ *	■ *		■		■		■
4K 4096x2160PsF Square Div.		■	■	■								

\* Image division and 3G level are detected automatically based on VPID data. If VPID data is not present or is incorrect, image division must be manually set. In the Source Manager web app, display the Configure Source panel (when Video Mode is specified as QuadLink Video) and set QuadLink Image Division to 2SI. See [Configuring SDI Sources](#) for details.

## SDI Input Audio

- S16-channel 24-bit Little Endian SDI embedded, 48 kHz synchronous

### Input Reference (Live Capture Only)

- *SD/HD*—Reference is derived from an internal free-run clock on each SDI input.
- *QuadLink UHD*—Reference is derived from SDI 1.

### Output Reference (Live Play Only)

- *SD/HD*—Reference is derived from internal free run clock or external Bi-Level or Tri-Level (TLS) reference source.

The signal is locked to external reference if a specific registry key is present, along with the reference video signal. See [Using External Reference \(REF\) for SDI Payout](#) for details.

---

**Notes:** All 16 channels of audio for UHD are provided on SDI 1 and SDI 5 (model-dependent).  
Sources in YCbCr 444 or RGB 444 color space are not supported. Only YUV 422 color space is supported.

## GPU

The on-board GPU accelerates video processing and H.264/H.265 media creation. Using the GPU in combination with Lightspeed Live's powerful dual CPU processors enables capturing media from multiple live sources.

## Expansion Card Slots

Each Lightspeed Live Server provides optional full- or half-height PCIe cards, installed by Telestream.

In order to ensure optimal product performance and warranty coverage, ensure that Telestream products are used in accordance with the following product policy. It is critical that this policy be adhered to when using add-in cards:

- Add-in card(s) are to be installed by Telestream, or an authorized agent, at or before commissioning.
- Only Telestream-qualified add-in cards can be used. For the most up-to-date list refer to the [Lightspeed Live Server product sheet](#) on the [Telestream.net](#) web site. Using untested and unknown add-in cards voids the product warranty.

---

**Note:** Except for externally removable power supplies and disk drives, the Lightspeed Live Server has no user-serviceable parts. To maintain your warranty, any repair or additional PCI card installation and any service inside the sealed top cover must be performed by Telestream or an authorized Telestream service technician.

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## RS-422 VTR Interface Kit Option for Capture

The optional *RS-422 VTR Interface Kit* (4-port and 8-port versions) provides the ability to connect up to four or eight VTR units to the [Lightspeed Live Server](#), and allows a VTR to be remotely controlled by the Lightspeed Tape Capture web application to facilitate conversion of tape-based media into digital video files.

## Using External Reference (REF) for SDI Payout

For Lightspeed Live servers manufactured beginning October 2022 with Corvid 44, Corvid 88, and 12G SDI video cards, an additional connector intended for timecode reference has been added. The reference connector (labeled *R*) previously used for LTC

on these cards can be used for a Bi-Level or Tri-Level Sync signal. The LTC timecode reference connector has been added at the far right of the card.

The Reference connector enables Live Play to use the sync signal for synced SDI playout in Live Play. Reference can also be used to synch looped-through outputs from Live Source Manager to external reference in Capture mode.

These Lightspeed Live Servers are pre-configured with a Windows registry setting to enable the use of Reference when so connected:

The `HKEY_LOCAL_MACHINE\SOFTWARE\Telestream\Live\UseExternalReferenceInput` registry key is set to `true`, enabling the Ref port to read a black burst / Bi-Level / Tri-Level Sync signal, as opposed to analog LTC signal. The LTC port reads the analog LTC signal. If the string is not present or it is set to anything other than `true`, then the system is configured for Reference input (R) to accept LTC, and the LTC input is ignored.

Restart the Lightspeed Live Server to make this change take effect.

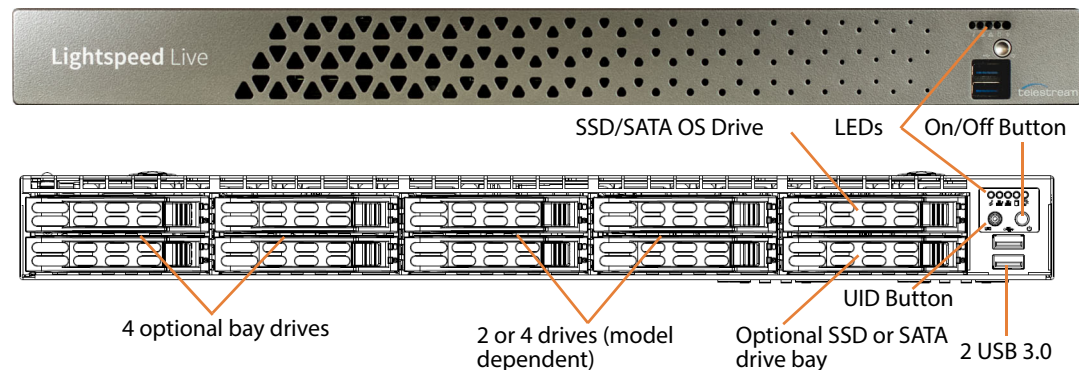
For Ref and LTC connection details, see [Making Data and Signal Connections](#).

## Front Panel

The Lightspeed Live Server has a removable front bezel. Remove the bezel to access the system interface buttons and LEDs, drives, and front USB ports.

### Front Panel Features

The front bezel provides visibility of the system monitoring LED indicators and allows pinhole access to the recessed power button. This graphic illustrates the front bezel and below, the bays exposed when the bezel is removed:



#### LEDs (left to right)

- System Overheat | FAN Fail | UID
- Network Activity (NIC1)
- Network Activity (NIC2)
- Hard Drive Activity
- Power

#### Power On/Off Button

The power button is directly below the LEDs. Press the power button to perform a normal power up/power down cycle or a hardware reboot (hold the button down for 4 seconds). A reboot abnormally terminates connected clients and systems and should be done only in the event of an unrecoverable system error. Under normal conditions, you should close all web apps and client programs and shut down the Vantage domain and log out of Windows before cycling power.

#### UID Button (hidden)

On Lightspeed Live servers with the bezel shown above, the UID button (which is mounted on the front panel immediately to the left of the power button), is hidden by the bezel. To utilize the UID button, first remove the bezel. The UID button alternately turns on and off the blue front and rear panel UID LED (far left), used to locate a particular unit among many units in a rack or server room.

On Lightspeed Live servers utilizing the former bezel, the button is accessible without removing the bezel.

## USB Ports

Two USB 3.0 ports for general use are located below the LEDs and buttons.

## Drives

The top right-most drive bay houses the SSD/SATA Windows OS drive, and the drive beneath it is an available SATA drive bay. These drives have their own controller, separate from the storage drives.

To the left of the OS drive are 8 SAS media storage drive slots containing the 4 standard and 4 optional media drives. These drives are configured for RAID 5 and have their own controller separate from the OS drive.

# Rear Panel Ports and Connectors

These are the rear panel ports and connectors:

- 2 redundant AC power connectors—connect to a 10-amp or greater AC source
- 4 10Base-T Ethernet LAN ports—connect as required to LAN
- (C5 only) 2 1G Ethernet LAN Ports and 2 10G Ethernet ports on Fibre Channel.
- 2 USB 3.0 ports—connect as required to keyboard, mouse, or other serial device. When used for RS422 VTR control, use of a hub is not permitted.
- 1 IPMI-dedicated Ethernet port that should not be used for other purposes
- 1 VGA monitor port
- 1 COM control port (not used)
- 1 3G SDI card with 2 | 4 | 8 ports  
OR
- 1 12G SDI card with 4 ports  
OR
- (C4 only) 1 25G Mellanox Ethernet NIC with 2 Fibre Channel ports
- (C5 only) 2 3G SDI card with 16 ports total.

---

**Note:** On supported servers, one SDI card or one 25G NIC is permitted—SDI and 25G NIC cards can not be installed in the same server.

---

- 1 analog LTC port
- 1 External Ref port on selected cards manufactured after October 2022.

On supported servers, additional PCIe cards can be optionally factory installed in PCIe expansion slots. For details of each backplane component/connector, see [Making Data and Signal Connections](#).

## SDI Video Connections

Each [Lightspeed Live Server](#) includes one of several models of SDI video cards. Two cards are supported in both Live Capture. For cards by server, see [SDI Video Cards](#).

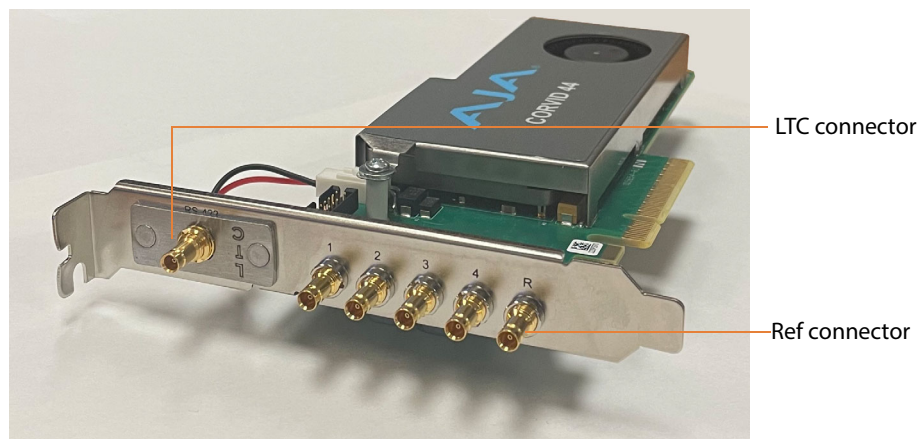
---

**Note:** On a C4 server, you can optionally install a 2-port 25G Ethernet NIC in place of the SDI card.

---

### 4-port 3G SDI Card with Ref and LTC Connectors

The 4-port 3G SDI card has 6 DIN 1.0/2.3 connectors with 6 DIN 1.0/2.3 to BNC adapter cables (shown here right side up):



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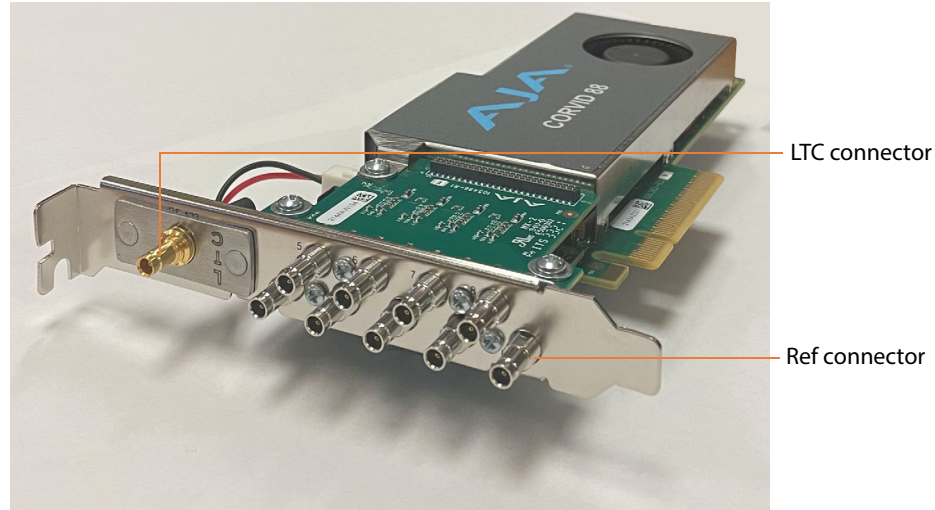
**Note:** The 4-port SDI card is inserted upside down into the backplane at the bottom right corner. Refer to imprinted labels (1 2 3 4) for SDI connection, R for Reference cable connection and LTC for LTC cable connection. The RS-422 port is unused.

---

- **4 SDI Ports (1-4):** SD/HD 3G x 1080 video formats; audio 16-channel, 24-bit SDI embedded, 48 kHz synchronous.
- **Input Reference (R):** TLS reference input.
- **Linear Time Code (LTC):** LTC timecode input.

## 8-port 3G SDI Card with Ref and LTC Connectors

The 8-port 3G SDI card has 10 DIN 1.0/2.3 connectors with 10 DIN 1.0/2.3 to BNC adapter cables:



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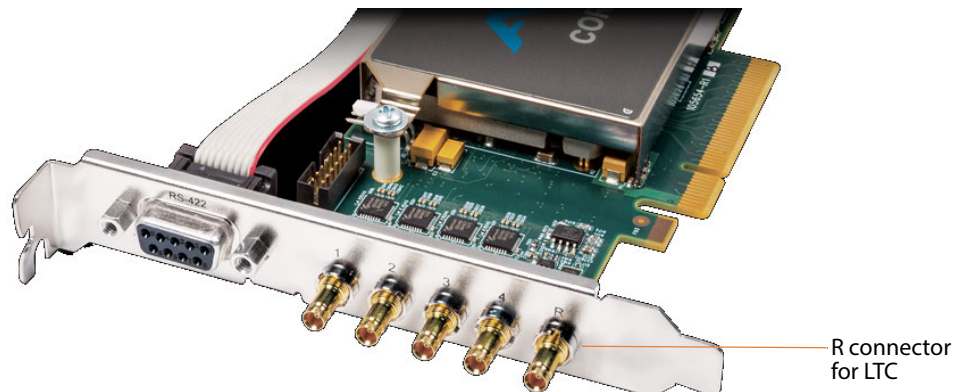
**Note:** Refer to imprinted labels (1 through 8) for SDI connection, R for Reference cable connection and LTC for LTC cable connection.

---

- **8 SDI Ports (1-8):** SD/HD 3G x 1080 video formats; audio 16-Channel, 24-bit SDI embedded, 48 kHz synchronous.
- **Input Reference (R):** TLS reference input.
- **Linear Time Code (LTC):** LTC timecode input.

## 4-port 3G SDI Card (Discontinued)

The 4-port 3G SDI card has 5 DIN 1.0/2.3 connectors with 5 DIN 1.0/2.3 to BNC adapter cables (shown here right side up):





---

**Note:** The 4-port SDI card is inserted upside down into the rear panel at the bottom right corner. Refer to imprinted labels (1 2 3 4) and R for proper cable connection. The RS-422 port is unused.

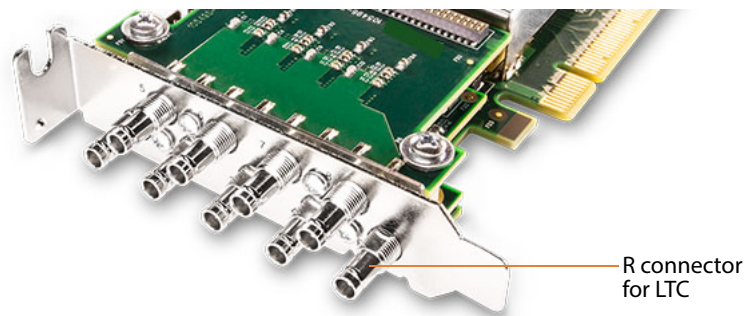
---

- **4 SDI Ports (1-4):** SD/HD 3G x 1080 video formats; audio 16-channel, 24-bit SDI embedded, 48 kHz synchronous.
- **Input Reference (R):** LTC timecode input.

### 8-port 3G SDI Card (Discontinued)

The 8-port 3G SDI card has 9 DIN 1.0/2.3 connectors, which can be converted to BNC with the included DIN 1.0/2.3-BNC converter cables. For UHD, SDI-1 through SDI-4 and/or SDI-5 through SDI-8 (model-dependent), BNC connectors can be used to provide Ultra HD input.

The UHD signal is QuadLinked—connected to all four ports (SDI-1 through 4 or SDI-5 through 8 depending on the model). All other resolutions use one port per input:



---

**Note:** Refer to imprinted labels (1 through 8) and R for proper cable connection.

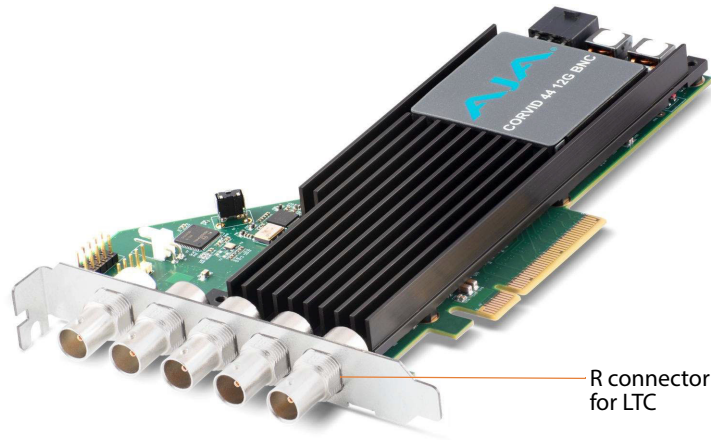
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- **8 SDI Ports (1-8):** SD/HD 3G x 1080 video formats; audio 16-Channel, 24-bit SDI embedded, 48 kHz synchronous.
- **Input Reference (R):** LTC timecode input.



## 4-port 12G SDI Card (Discontinued)

The 4-port 12G SDI card has 5 BNC connectors:



---

**Note:** Refer to imprinted labels (1 through 4) and R for proper cable connection.

---

- **4 SDI Ports (1-4):** 12G x UHD1080 video formats; audio 16-Channel, 24-bit SDI embedded, 48 kHz synchronous for 2 input operation. Active loop-through is not supported.
- **Input Reference (R):** LTC timecode input.

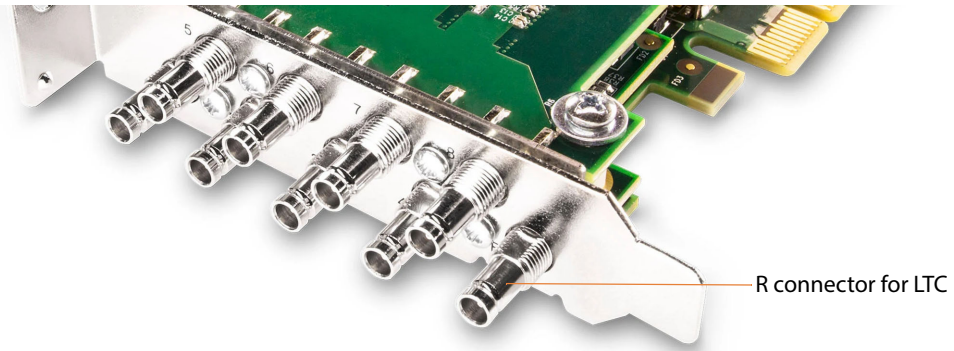
## 16-port (dual 8 port) 3G SDI Cards with Reference and LTC

Two 8-port 3G SDI cards, each provides 9 DIN 1.0/2.3 connectors with 9 DIN 1.0/2.3 to BNC adapter cables and is used for 4 input (1-4) and 4 output (5-8) on each card. LTC is provided on both cards; a REF Synch Port is provided on the full-height card and is bonded to the other, use in both cards, for synchronized SDI playout (see [Using External Reference \(REF\) for SDI Playout](#) and [Making Data and Signal Connections](#)).

In this dual-card implementation, the half-height card in the center bay is referred to as card 1 in web apps; card 0 is the full-height card in the right-hand bay.

### 8-port 3G SDI Card with LTC

This half-height 8-port 3G SDI card is installed in the top center bay on the C5 server, with 4 inputs (1-4) and 4 outputs (5-8). It has 9 DIN 1.0/2.3 connectors with 9 DIN 1.0/2.3 to BNC adapter cables, plus a 9 DIN 1.0/2.3 connector for LTC:



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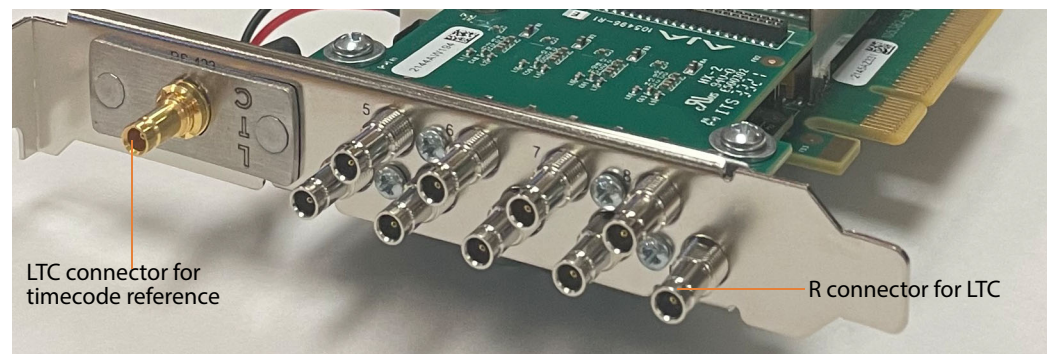
**Note:** Refer to imprinted labels (1 through 8) and R for proper cable connection.

---

- **8 SDI Ports:** SD/HD 3G x 1080 video formats; audio 16-Channel, 24-bit SDI embedded, 48 kHz synchronous. 1-4 in; 5-8 out.
- **Input Reference (R):** Provides LTC timecode input.

### 8-port 3G SDI Card with LTC and REF

This full-height 8-port 3G SDI card is installed in the bottom right bay on a C5 server, with 4 inputs (1-4) and 4 outputs (5-8). It has 9 DIN 1.0/2.3 connectors with 9 DIN 1.0/2.3 to BNC adapter cables, plus a 9 DIN 1.0/2.3 connector for LTC and one for REF:



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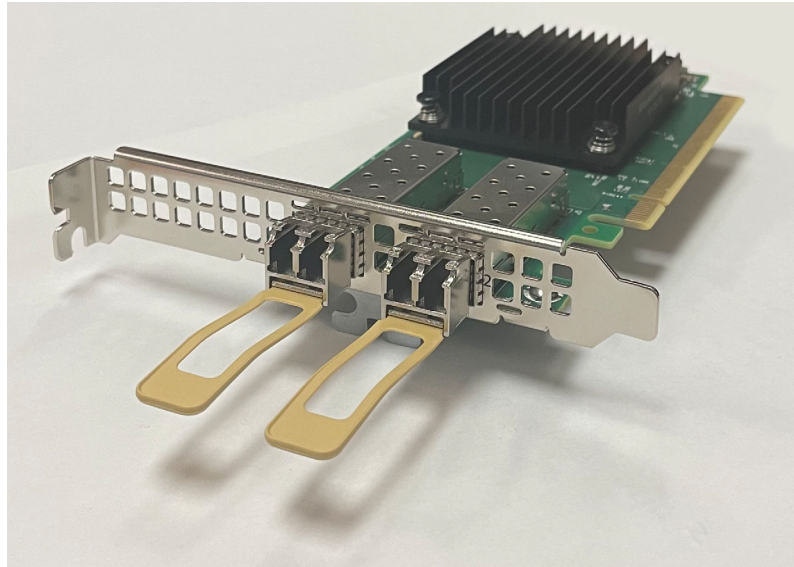
**Note:** Refer to imprinted labels (1-8) and R and LTC for proper cable connection.

---

- **8 SDI Ports (1-8):** SD/HD 3G x 1080 video formats; audio 16-Channel, 24-bit SDI embedded, 48 kHz synchronous. 1-4 in; 5-8 out.
- **Input Reference (R):** LTC timecode input.
- **Linear Time Code (LTC):** LTC timecode input, bonded to other card.

## 25G Fibre Channel Ethernet Connections

On C4 servers, this 25G Ethernet NIC card may be provided in place of the SDI card. It provides support for ST 2110 video, using two Fibre Channel ports:



## Managing System Logs

Lightspeed Live Capture log files can provide valuable information about various Live Capture operations—the [Capture action](#), and capture and tape recording processes.

The log files are intended for use by Telestream Customer Service to troubleshoot problems. Consider obtaining the log files before contacting Customer Service so you can email them to Telestream as part of the support process.

Here's how to access the logs and control the level of information that is recorded.

## Controlling Logging Settings

The information written to the log files can be changed on a program basis by editing settings in the configuration files.

---

**CAUTION:** Before making changes to configuration files, make backups by copying the existing files and saving them in a safe location.

---

These fields define the log types:

- *logconsole*—the process which writes to the console of the spawned process if the Vantage Live Service was run from the command line with the *-console* option. This should only be used under the guidance of a Telestream support engineer.
- *logfile*—the process that creates log files at *~appdata/Roaming/Telestream/<processname>/* by default.
- *elastic*—ignore; not used in Live Capture.

Keywords (from most restrictive to most verbose):

- *Off*
- *Fatal*
- *Error* (default)
- *Warn*
- *Info*
- *Debug*
- *Trace*

For details about using NLog to modify log file outputs, refer to the NLog tutorial: <https://github.com/NLog/NLog/wiki/Tutorial#log-levels>.

## Accessing Live Capture | Tape Recording Configuration Files

The configuration file for logging live capture and tape recording processes are:

- *CaptureRecord.exe.config*—specifies the live capture process logging levels.
- *TapeRecord.exe.config*—specifies the tape process logging levels.

The configuration files are in the Capture ComponentPac folder that is used for recording:

- Live Capture Location (version number may change): *C:\Program Files (x86)\Telestream\Vantage\Components\Capture.2022.1.0.6633\CaptureRecord.exe.config*.
- Tape Capture Location (version number may change): *C:\Program Files (x86)\Telestream\Vantage\Components\Capture.2022.1.0.6633\TapeRecord.exe.config*.

## Accessing Live Capture | Tape Recording Log Files

Lightspeed live and tape capture log files on a job-by-job basis per workflow are written to *C:\Windows\System32\config\systemprofile\AppData\Roaming\Telestream\Capture\*.

## Accessing the Vantage Live Service Config File

The configuration file for logging the Vantage Live Service is:

- *LiveService.exe.config*—specifies the Vantage Live Service logging levels.

The configuration file is in *C:\Program Files (x86)\Telestream\Vantage\Live\LiveService.exe.config*.

---

**Note:** After you make changes to the configuration file, you should restart the Vantage Live service to apply the change.

---

## Accessing Vantage Live Service Log Files

By default, service logs are saved to *C:\Program Files (x86)\Telestream\Vantage\Live\*.

If services are run as a domain user, they are saved to a user path. For example:  
*C:\Users\<Service\_Account\_Name>\AppData\Roaming\Telestream\*.

These log files are included:

- Devices.csv
- EventLog-Application.evtx
- EventLog-System.evtx
- LiveRegistry.csv
- Processes.csv
- Services.csv
- Stats.txt
- versions.csv

### Additional Support Log Folders

The following folders contain files with additional logging data:

#### SNMPLogs Folder

The SNMPLogs folder contains the following additional items:

- *SourceService-[date].log.txt*—The Source service log records any activity with the sources. This includes various activities, such as loss of signal, change of format, sources being added, or sources being removed.

#### SNMPLogs\traceLog Folder

The SNMPLogs\traceLog folder contains trace logs for the sources.

#### Logs Folder

The Logs folder contains the Capture Record, Capture Program, Tape Record, and other Capture-related log files.

# Installing | Updating | Managing a Lightspeed Live Server

Lightspeed Live Server models include the C2 (4 port), C2+ with added REF port, C3 (4 port), and C4 (8 port) models for hosting Lightspeed Live Capture.

This chapter describes how to install your Lightspeed Live Server into an equipment rack, make video, network and power connections, add cards, and configure it for operation. This chapter also describes how to update Live Capture to the current version.

Other topics include OS management, maintaining the server, and monitoring a Lightspeed Live Server during operation. Topics apply to all servers unless otherwise noted.

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**Note:** For Live Capture configuration and management, see [Capturing Live Video](#). For Vantage configuration for utilization with Live Capture, see [Configuring Vantage for Use with Live Capture](#).

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## Topics

- [Installing the Lightspeed Live Server](#)
- [Renaming a Lightspeed Live Server](#)
- [Managing the Windows Operating System](#)
- [Maintaining a Lightspeed Live Server](#)
- [Setting NMOS Logging Levels](#)
- [Monitoring Lightspeed Live Servers via SNMP](#)

## Installing the Lightspeed Live Server

This topic provides instructions for unpacking a Lightspeed Live server and installing it safely and securely in a computer server rack, and making the required connections.

If you purchased the optional RS422 VTR Interface Kit, you should make plans for co-installation and VTR connection in the rack in conjunction with the Lightspeed Live Server. For complete instructions on installing the RS422 VTR Interface Kit and connecting a VTR, see [Connecting VTR Systems](#).

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**WARNING:** *Only trained and qualified personnel should be allowed to install, replace, or service this equipment.*

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**CAUTION:** Except for replaceable power supplies and hard drives which may be accessed from the outside, the Lightspeed Live Server is a sealed device, with no user-serviceable parts or user-accessible expansion slots. You should never open the top cover or attempt to upgrade or alter the server. Doing so exposes you to electrical hazard, may damage the unit, and may invalidate your warranty. If you have hardware or software problems with your Lightspeed Live Server, see [Obtaining Support | Information | Assistance](#) to obtain service.

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**Note:** Before proceeding, collaborate with your network administrator to determine computer and network setting requirements.

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- [Unpacking the Server](#)
- [Rack-Mounting Your Lightspeed Live Server](#)

## Unpacking the Server

The Lightspeed Live Server arrives packed in a heavy-duty, cardboard box with foam padding surrounding the device to protect it. During unpacking, inspect the container and the contents for damage. In the event of damage, report it immediately to the freight carrier and to [Telestream Support](#).

The server is heavy. Unpack the server on a strong, well-balanced table that can support the full weight of the server and shipping container without tipping.

Inside the box are the server, optional components such as rack rails, DIN 1.0/2.3-to-BNC cables, and printed and flash-drive documentation (a DVD is available by request).

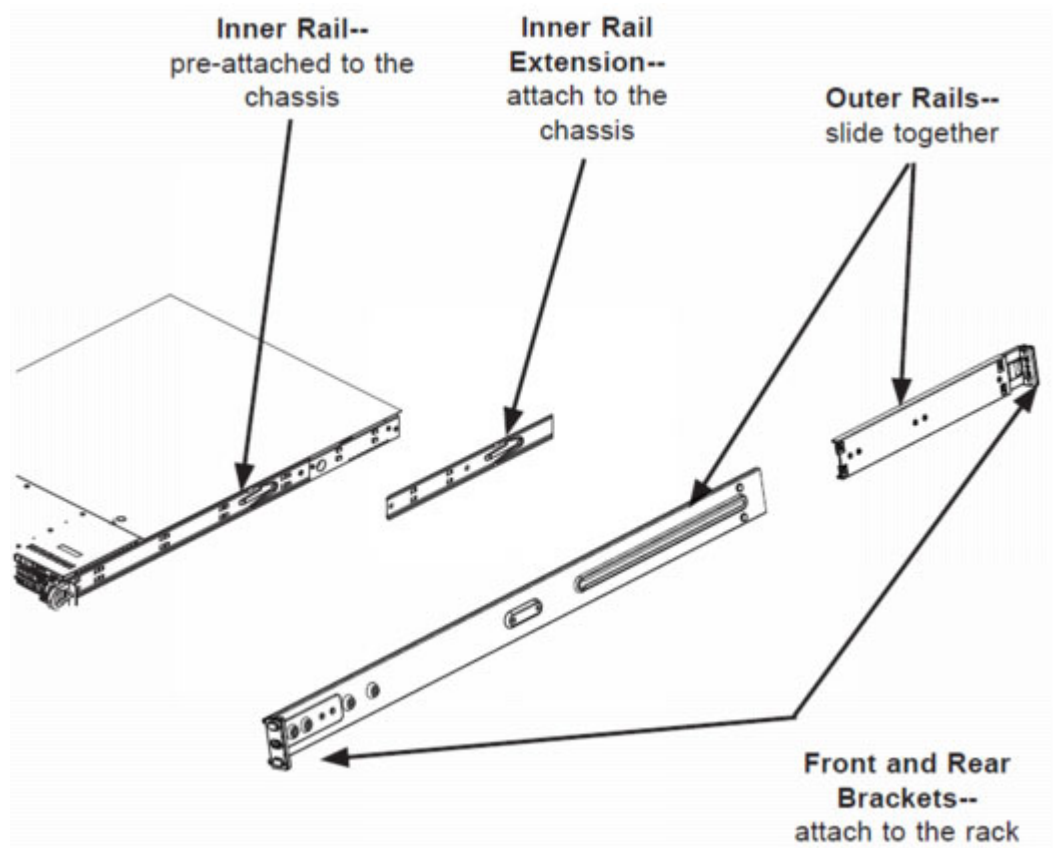


## Rack-Mounting Your Lightspeed Live Server

The Lightspeed Live Server is designed to fit into a standard 19-inch (483 mm) equipment rack with support front and rear, using supplied rack rails and rear support extensions.

### Assembling the Rails

The inner rail extensions install on each side of the chassis as shown.

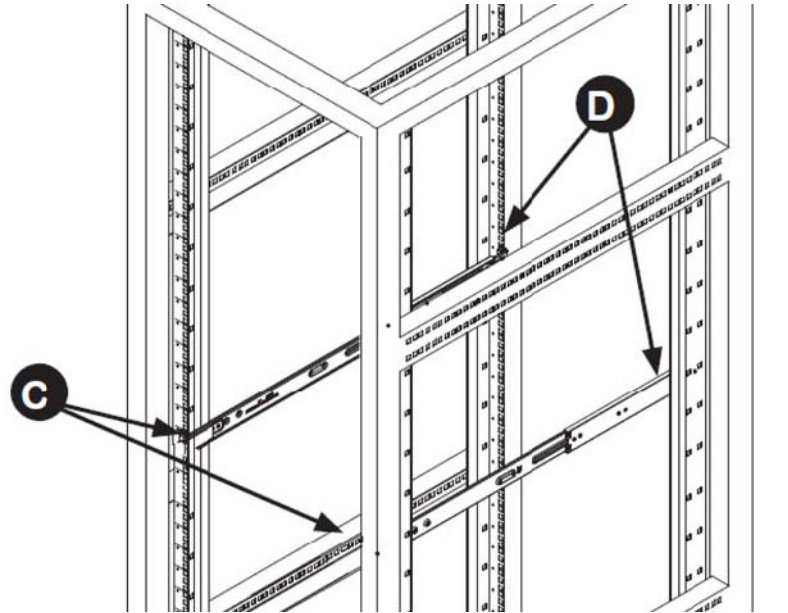


Align the extension holes with the hooks on the side rail and slide the extension forward to engage the hooks until the quick release bracket snaps into place. For added stability, you can secure the extension with a screw.

Assemble the outer rails by sliding the front and rear sections together.

## Installing Outer Rails into the Rack

Next, install the outer rails into the rack as shown in this figure:



Proceed to the appropriate topic for your rack—round hole or square hole.

### Installation in Round Hole Rack

If your rack has round threaded holes, first remove the aluminum block at the end of the rail via the 2 screws, as shown here:



Remove these two screws  
to remove the block.

1. Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack.
2. Extend the rear of the rail to align it with the holes on the rear of the rack (D).
3. Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack.

### Installation in Square Hole Rack

1. Align the square pegs on the front of the rail with the square holes in the front of the rack (C).
2. Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack.
3. Extend the rear of the rail to align its square pegs with the square holes on the rear of the rack (D).
4. Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack.

---

**CAUTION:** To prevent the server from falling and becoming damaged, be sure the rails are solidly in position and ready to support the full weight of the chassis.

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## Installing the Server in the Rack

When selecting a position in a rack to place the server, be sure to allow a minimum of 30 inches clearance at the back of the server for sufficient cooling airflow and servicing.

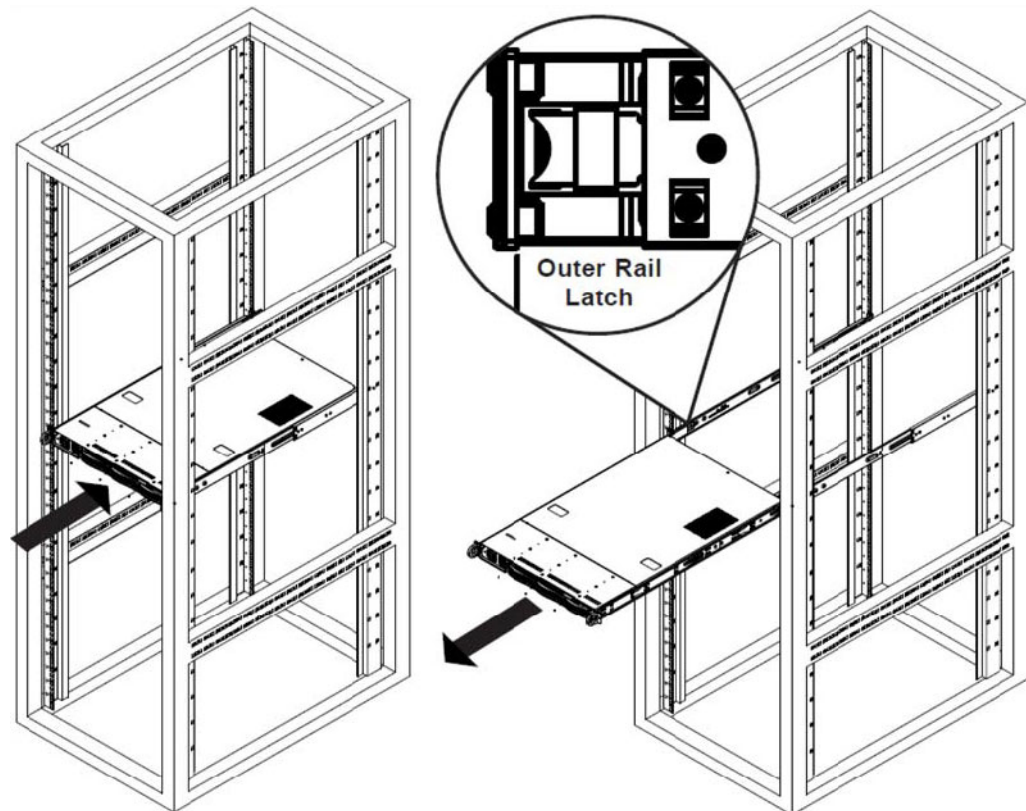
To install the server, follow these steps:

1. Slide the inner rail extensions forward into the front of the outer rails.
2. Support the chassis and align the back of the chassis with the front of the rails.
3. Push the chassis backward, sliding it into the rack rails, until the chassis clicks into the locked position.

---

**CAUTION:** To prevent the server from falling and becoming damaged, be sure to insert it securely in the rack before you remove support.

---



## Removing the Server from the Rack

To remove the server from the rack, press the outer rail latch shown in the figure above to release the chassis.

Slide the chassis forward off the outer rails and out of the chassis.

## Making Data and Signal Connections

This topic describes the Lightspeed Live Server data and signal connectors and how to connect to them. Follow the order of connections given here, with the server powered down, make the following data and signal connections at the back of the server unit:

- Connect input devices (keyboard and mouse) to the USB connectors (optional).
- Connect a monitor to the VGA connector (optional).
- Make built-in Ethernet LAN connections to provide network connectivity.
- If a 25G Ethernet NIC is installed, connect to your 25G media LAN via SFP28 connectors.
- Connect your server to your IPMI network via the MGMT Ethernet port—Telestream strongly encourages using the IPMI interface to your management network for out-of-band management and troubleshooting.
- Connect SDI video sources to the connectors on the SDI cards using the supplied DIN 1.0/2.3-to-BNC SDI cables.
- Optionally, on supported cards, connect an analog LTC timecode source to the connector marked with LTC (rightmost) on the SDI card. This port is configured for Linear Timecode (LTC) encoded with SMPTE 12M timecode data.

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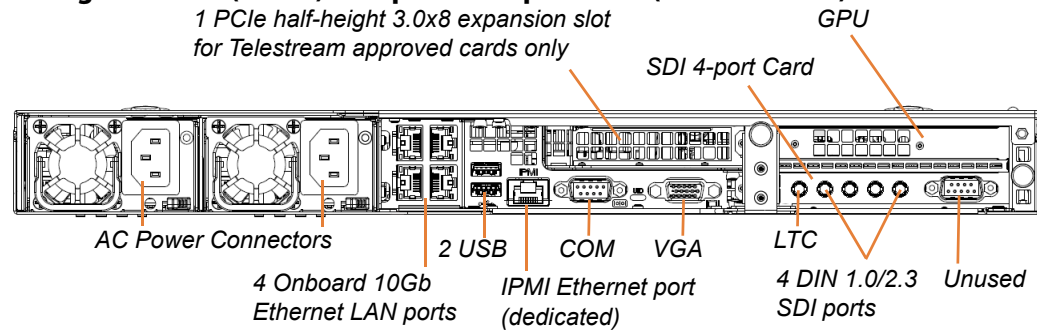
**Note:** This input is for analog LTC only and is not intended for use as a synch reference.

---

- Optionally, for C2+ | C4 (manufactured beginning October 2022) | C5 servers, connect a REF synch source to the connector marked with an R (leftmost) on the SDI card.
- Optionally, connect the *RS422 VTR Interface Kit* to a USB port. See [Connecting VTR Systems](#).

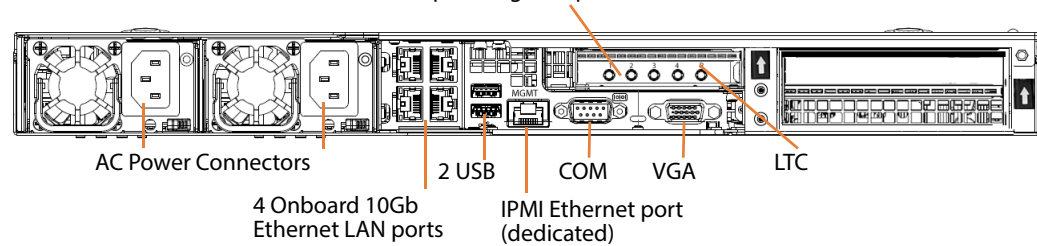
### First-generation (Gen 1) rear panel—4-port card (Discontinued)

1 PCIe half-height 3.0x8 expansion slot  
for Telestream approved cards only



### C2 (discontinued) | C2+ rear panel—2-port (2 deactivated) 3G SDI Card

SDI 4 port card - 4 DIN 1.0/2.3 - 2 SDI live & 2  
inactive or loop-through outputs



### C2+ Video Card Backplane

C2+ Lightspeed Live Servers equipped with Corvid 44, 88, and 12G cards manufactured beginning October 2022 have both LTC and Reference input ports on the backplane. Visually examine the card's backplane to verify that your server is so equipped:

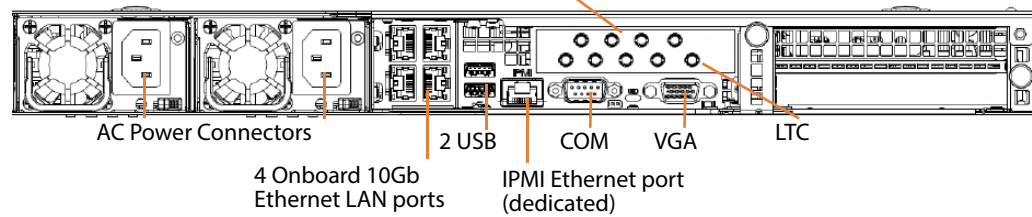


This enables you to use Reference input to sync SDI ployout and to use the second port for LTC when in Capture mode.

To utilize Reference in this manner, ensure that you have connected an analog LTC timecode source to the BNC connector marked with LTC, and you have connected a CB/TLS Synch source to the R (leftmost) port on the SDI card.

### C3 (Discontinued) | C4 rear panel—8-port 3G SDI card

SDI 8-port card - 8 DIN 1.0/2.3 SDI ports



### C4 Video Card Backplane

Lightspeed Live Servers equipped with Corvid 44 and 88 3G cards manufactured beginning October 2022, have both LTC and Reference input ports on the backplane. Visually examine the card's backplane to verify that your server is so equipped:

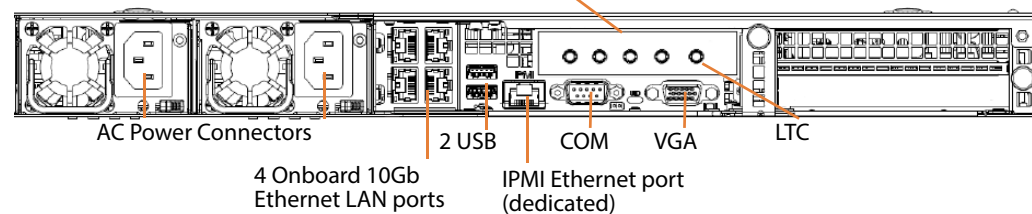


This enables you to use the standard Reference input to sync all of your SDI outputs and enables you to use the second port for LTC when in Capture mode.

To utilize Reference in this manner, ensure that you have connected an analog LTC timecode source to the BNC connector marked with LTC, and you have connected a CB/ TLS Synch source to the R (leftmost) port on the SDI card.

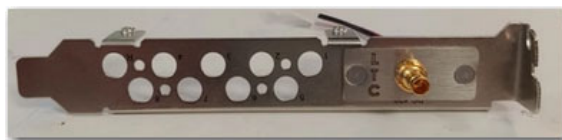
### C4 rear panel—4-port 12G SDI card

SDI 4-port card - 4 DIN 1.0/2.3 SDI ports



### C4 Video Card Backplane

Lightspeed Live Servers equipped with Corvid 44 and 88 3G cards have both LTC and Reference input ports on the backplane. Visually examine the card's backplane to verify that your server's SDI card is so equipped:



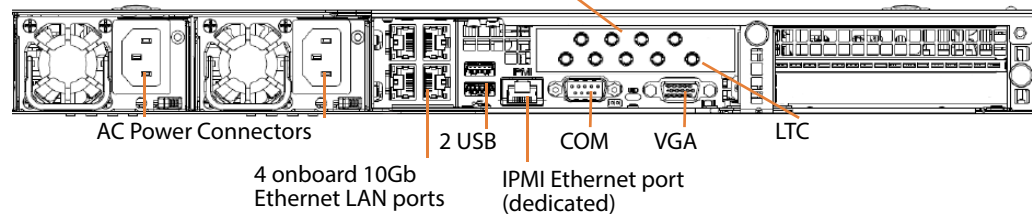


This enables you to use the standard Reference input to sync all of your SDI outputs and enables you to use the second port for LTC when in Capture mode.

To utilize Reference in this manner, ensure that you have connected an analog LTC timecode source to the BNC connector marked with LTC, and you have connected a CB/TLS Synch source to the R (leftmost) port on the SDI card.

### C3 (Discontinued) | C4 rear panel—8-port 3G SDI card

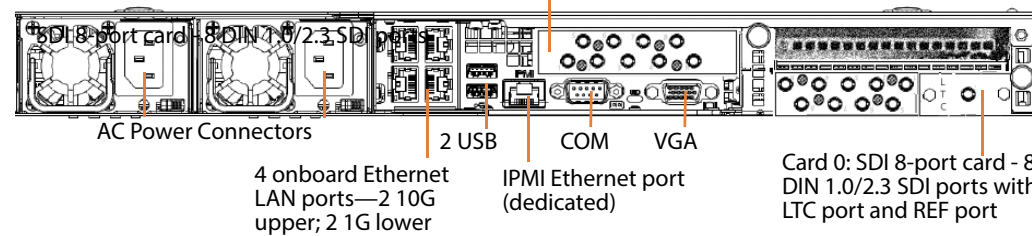
SDI 8-port card - 8 DIN 1.0/2.3 SDI ports



### C5 Lightspeed Live Server rear panel—Dual 8-port Card Set

In this dual-card implementation, the half-height card in the center bay is referred to as card 1 in web apps; card 0 is the full-height card in the right-hand bay.

Card 1: SDI 8-port card - 8 DIN 1.0/2.3 SDI ports with LTC port



## Power Requirements and Connections

After the server chassis has been physically installed and all data and signal connections made, connect the two redundant AC power cords to the back of the chassis and to an AC power source. Be certain to observe the following AC power and connection requirements and all applicable electrical codes.

The Lightspeed Live Server is rated at 100-240 VAC, 50-60 Hz, up to 10 amps. Take the following precautions to ensure a safe power connection:

- Make certain that the power source circuit can supply voltage within the specified range and current of at least 10 amps without becoming overloaded.
- Counted together, the server and other devices connected to the same power source must not exceed the total capacity of the power source circuit.

When power is connected, press the Power On/Off (0/1) button on the front of the chassis to turn the server on. To turn power off at any time, press the Power On/Off button again.



## Power and General Cautions and Warnings

Observe these precautions when connecting power and operating the server:

---

**CAUTION:** Telestream recommends connecting computer equipment to AC power through an uninterruptible power supply (UPS) with surge protection. Fluctuations in commercial supply voltage can damage unprotected electronic equipment. A high quality surge suppressor may be substituted if a UPS is not available, but it may not provide adequate electrical spike protection.

---

---

**WARNING:** *Only trained and qualified personnel should be allowed to install, replace, or service this equipment.*

*Hazardous high voltage electricity is present on the backplane when the system is operating. To prevent possible injury or death, use caution when servicing.*

*This product relies on the building's installation for short-circuit (over-current) protection. Ensure that the protective device is rated not greater than 250 Volts, 20 Amps.*

*Ensure a proper earth ground connection to the ground conductor in the AC power plug. Failure to do so could present a severe electric shock hazard that could result in injury or death.*

*When installing the product, use the provided or designated connection power cables. Using any other cables could cause a malfunction or a fire.*

*The fans might still be spinning when you remove the replaceable power supply from the chassis. Keep fingers, screwdrivers, and other objects away from openings in the housing.*

*Power supplies and other components can get very hot. Use caution when touching possibly hot components during operation and directly after unplugging.*

*This unit has two power supply connections. Both connections must be removed to completely de-energize the unit.*

---

## Renaming a Lightspeed Live Server

Lightspeed Live Capture includes Vantage, and the Vantage domain is always the same as the host name of the server (or that hosts the Vantage domain database as in the case of an array).

When Windows is installed, it automatically names the computer with a random name, beginning with WIN- and a series of alphanumeric characters. For example: WIN-S08Kh3N2EHG. To rename your Lightspeed Live Server, complete these tasks to ensure that the Vantage database is also updated with the new name:

---

**Note:** To complete this procedure, your Windows user must have permission to rename the computer, or you must get assistance from your Windows domain administrator.

Be sure to schedule renaming during a maintenance window when no jobs are running, as renaming the Vantage domain interrupts all Vantage services in the domain (During a rename, Windows services on the server are automatically renamed as well).

---

Follow these steps to rename a Lightspeed Live server:


1. Start the Vantage [Management Console](#), select the domain you're using, and log on as described in *Starting the Vantage Management Console* in the *Vantage Domain Management Guide*.
2. Select Services in the component panel, on the left.
3. For each service that you have customized (that is, it does not have default settings), document the Setup, Storage, Variables, and Qualification Rules settings for each service that you have configured.

You'll need to update the Setup, Storage, Variable, and Qualification Rule settings after the Vantage domain is renamed.


---

**Note:** When you remove Vantage services from the domain, the Storage, Variable, and Qualification rule configuration for each service is lost. The rest of the Vantage domain configuration is retained. If you are changing the machine name during initial server installation, the default configurations are in place, so this step does not apply.

---

4. Click any service in the Services details panel, then press Ctrl-A to select all services.
5. Click the Remove Service button  in the toolbar to detach all services from the domain (this does not delete the service from the server).
6. Now, open the Windows Server Manager—click the Windows Start Menu > Administrative Tools > Server Manager.
7. Click Local Server in the left panel then click on the Computer Name.
8. Display the Computer Name tab and click Change.
9. Enter the new computer name in the Computer Name text field and click OK.

This new computer name automatically becomes the new name of the Vantage domain. The server name is limited to 15 characters or less.

10. If prompted to do so, enter a Windows user name and password for an account that has permission to rename this computer.
11. Restart the server.
12. Start the Vantage Management Console, select the new domain, and log on.  
If you are not prompted to select a new domain, click on File > Change Vantage Domain, click Search, select the newly-named domain and click OK.
13. Select Services in the Component panel.
14. Click the Add Service button  in the toolbar.

---

**Note:** If you are not able to log in with the local Administrator account, check the host name listed by Windows as it may not have been updated. For example, if the original host name was *Isl-telestream* and the new one is *Isl-customer*, the user name may still be listed as *Isl-telestream\Administrator*. If so, change the host name to *Isl-customer\Administrator*, and re-enter your password.

---

15. When the Select Service dialog displays, click Machine to sort the services by machine name so that you can clearly identify the services for your server.
16. Add each of the Vantage services you previously removed—select the services you want and click OK.
17. If any Setup, Storage, Variables, and Qualification Rules settings require configuring, update them now.
18. Send the new Vantage domain name to all Vantage users and administrators so they can reconnect to the Vantage domain.

## Managing the Windows Operating System

Windows Server 2016 is pre-installed on C2, C2+, C3, and C4 Lightspeed Live Servers. See [microsoft.com](https://www.microsoft.com) for OS specifications.

- [Activating Windows with the Microsoft Activation Key](#)
- [Applying Microsoft Updates](#)
- [Default Windows User ID and Password](#)
- [Web App Ports and Windows Firewall Settings](#)

### Activating Windows with the Microsoft Activation Key

A sticker on the top surface of the Lightspeed Live Server lists license numbers. The Physical Key number is the OEM license number for the Microsoft Windows operating system. If you reinstall the OS, use this key to activate Windows again. The key typically contains five groups of five digits, for example: YFG8H-TDD97-6BR4G-F88PF-XP45J.

### Applying Microsoft Updates

The Lightspeed Live Server ships with the Windows operating system set to check for updates, but it does not automatically download or install them. Downloading and installation of critical operating system updates is the responsibility of each customer (see your system administrator).

### Default Windows User ID and Password

When the Lightspeed Live Server starts, log in with this Windows user account:

User	<i>Administrator</i>
Password	<i>telestream!1</i>

### Web App Ports and Windows Firewall Settings

The Lightspeed Live web applications use certain ports:

- Live Capture—Port 8083, 8084, and 8086.  
By default, selects any available TCP port between 1024 and 65534 for the web app's Live Preview display.
- Tape Capture—Port 8086
- Source Manager—Port 8090
- Live Schedule—Port 443 and 6500

If you use Windows Firewall, be sure these ports are open on the Lightspeed Live Server and across your network.

To open the Windows Firewall on the Lightspeed Live Server or other Windows computer, go to Start > Control Panel > Windows Firewall > Allow a program or feature through Windows Firewall > Allow another program.

Scroll through the list of programs, and click Add for each of these:

- Lightspeed Live Capture (Live Capture only)
- Source Manager
- Vantage Management Console | Vantage Workflow Designer | Vantage Workflow Portal (Capture only)

Click OK to close the programs list. The added programs display in the firewall list and you can check which networks they can use. Then close the Control Panel.

## Maintaining a Lightspeed Live Server

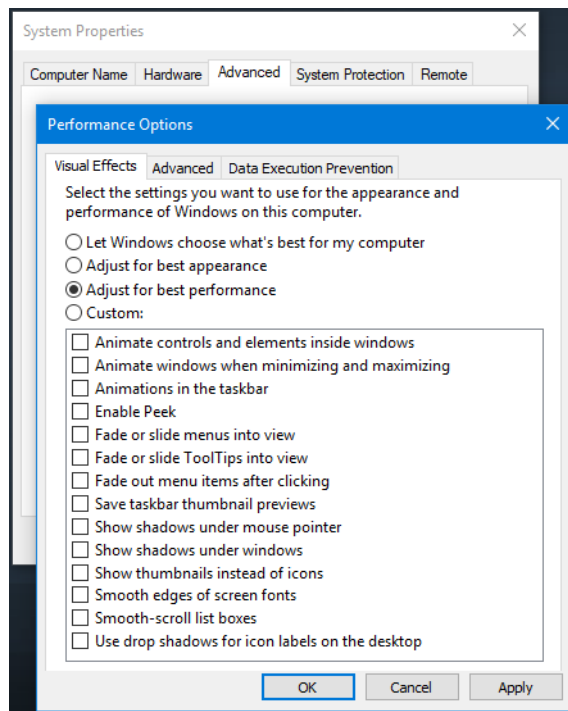
These topics describes common server maintenance tasks that you may need to perform from time to time.

- [Performance Tuning a Lightspeed Live Server](#)
- [Setting Your NVIDIA GPU to TCC Mode](#)
- [Backing up a Lightspeed Live Server](#)
- [Managing and Monitoring Lightspeed Live Servers](#)
- [Installing New or Replacement Media Hard Drives](#)
- [Rebuilding the Lightspeed Live Storage RAID](#)
- [Replacing a Power Supply](#)
- [Enabling SNMP Monitoring](#)

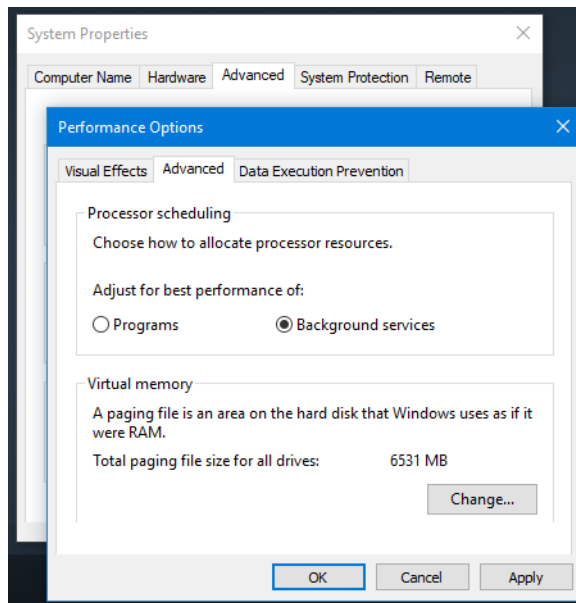
## Performance Tuning a Lightspeed Live Server

The following configurations are set at the factory to ensure best performance of your Lightspeed Live Server. The settings are supplied here in the event they have been changed and you want to restore them to their original factory settings. (For details, consult your System Administrator or a Telestream Field Sales Engineer).

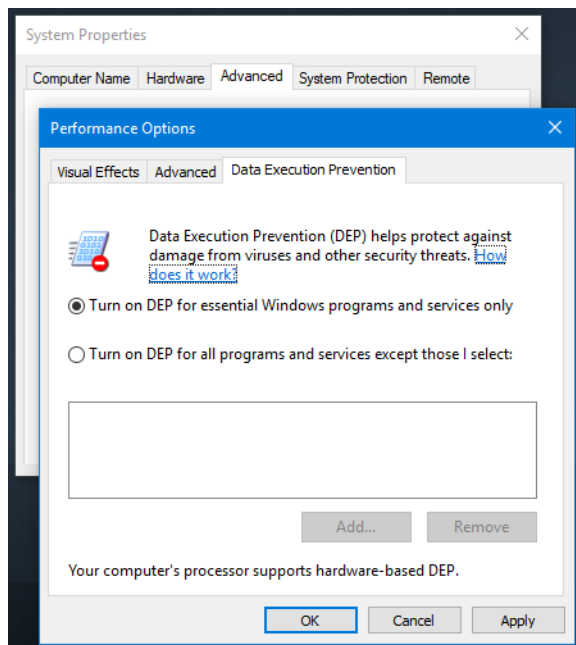
1. In Performance Options, set these Windows Performance options:
  - a. Navigate to Start > Control Panel > System > Advanced system settings > Settings button > Visual Effects tab.
  - b. Check *Adjust for best performance*.



- c. Select the Advanced tab.
- d. Check Background services for Vantage transcoding service nodes and the domain's Microsoft SQL database node. Select Programs for editorial systems and Vantage client applications that are not running other Vantage services.



- e. Select the Data Execution Prevention tab:
- f. Check Turn on DEP (*Data Execution Prevention*) for essential Windows programs and services only.



- g. Click OK in both dialogs to save your changes.



2. Set User Account Control (UAC):
  - a. Navigate to Start > Control Panel > User Accounts > Change User Account Control Settings. Set as low as safely possible, considering your exposure to Internet viruses and malware. Click OK to save your changes.
3. Set Power Options to High Performance with Sleep disabled:
  - a. Navigate to Start > Control Panel > Power Options.
  - b. Check the High Performance plan.
  - c. Check Change plan settings, and set Turn off the display to Never.
  - d. Check Change advanced power settings, and set all critical functions so that they are always ON (this usually means setting them to *never* turn off). Click OK to save your changes and close the dialog.
  - e. Click Save Changes on the Edit Plan Settings window.
4. Disable (turn OFF) any real-time software applications and processes, such as the following, that could adversely affect disk I/O performance or use excessive CPU:
  - Real-time virus scanning of media files as they are being captured.
  - Automatic software updates that can preempt real-time services.
  - Real-time file indexing.
5. Disable all unnecessary Windows services in Start > Control Panel > Administrative Tools > Services (consult your System Administrator).
6. Turn OFF all firewalls (including third party firewalls) and packet filtering, which may cause unpredictable performance:
  - a. Navigate to Start > Control Panel > Windows Firewall > Turn Windows Firewall on or off, select Turn off Windows Firewall.

If you choose to use firewalls, open them for the applications installed on the Lightspeed Live Server.
7. You may increase network throughput by increasing buffer size in your network adapter. Set your Network Adapter's transmit and receive buffers to 1024:
  - a. Navigate to Start > Control Panel > Network and Sharing Center > Change Adapter Settings > Local Area Connection > Right-click and select Properties.
8. Disable any screen savers:
  - a. Navigate to Start > Control Panel > Personalization > Screen Saver and select (None).
9. Disable disk indexing:
  - a. Right click on Start and select Disk Management from the pop-up menu.
  - b. Right-click each disk and select Properties.
  - c. In the General tab uncheck Allow files on this drive to have contents indexed in addition to file properties, unless you want some drives to be indexed.

## Setting Your NVIDIA GPU to TCC Mode

The NVIDIA GPU on Lightspeed Live servers must run in TCC mode, as opposed to default WDDM mode: The NVIDIA GPU in TCC mode disables Windows graphics and is used in headless configurations, whereas WDDM mode is required for Windows graphics.

When you update the NVIDIA driver, you must reset it to TCC mode to operate properly.

You can run a script to set TCC mode. The script is in the current version's folder. For example: `C:\V3.4-CP8.0.1-UP4-Live3.4\Installers\Nvidia\P4000 Win 2012.`

Alternatively, perform the task manually—follow these steps:

1. Open a Command window and execute `nvvidia-smi`:

```
cd C:\Program Files\NVIDIA Corporation\NVSMI\  
nvidia-smi -q
```

2. `nvidia-smi` prints the NVSMI Log.

From the results, verify that the Driver Model indicates WDDM, not TCC. If TCC is reported, the mode is correct and you can end this task.

Provided that WDDM is reported, locate and copy the GPU UUID—for example:

```
GPU UUID : GPU-4951a582-6b45-cca6-5a1c-a647130d00b1
```

3. Change the GPU mode to TCC by executing this command:

```
nvidia-smi -i GPU-4951a582-6b45-cca6-5a1c-a647130d00b1 -dm 1
```

using the GPU UUID from the previous result.

4. When the driver mode changes to TCC, you'll be prompted to restart the server.

If you're not prompted, determine the error and retry.

5. When the server restarts, run `cmd.exe` and execute this command again to verify that the NVIDIA GPU is operating in TCC mode:

```
cd C:\Program Files\NVIDIA Corporation\NVSMI\  
vnvidia-smi -q
```

TCC mode is set properly, as indicated in the Driver Model section of the log:

```
Driver Model  
Current : TCC  
Pending : TCC
```

6. Close CMD and continue return to normal operations.

## Backing up a Lightspeed Live Server

In order to protect your Lightspeed Live Server from data loss, Telestream highly recommends that you create an image of the Operating System drive (C:) drive immediately upon taking delivery of your server and that you perform periodic backups of all critical data on the server.

Several third-party disk image products are available for creating a restoration image that you can use to restore the Lightspeed Live Server's operating system drive to its original state. Using programs such as these, along with regular backups, you can restore your server back to its original shipping state with all of your critical data:

- Acronis
- Norton Ghost
- Clonezilla

Consult your IT/Systems administrator for details on creating restoration images and performing a periodic backup of your Lightspeed server's critical data.

## Managing and Monitoring Lightspeed Live Servers

IPMI View Management software provides remote network management of your Lightspeed Live Servers using IPMI messages over Ethernet LAN or a dedicated IPMI LAN. If the Ethernet connectors are used to connect to storage, you can use the IPMI LAN connector to create an IPMI network among your servers.

To download the IPMI View application and User's Guide, go to this web location:  
<https://www.supermicro.com/en/solutions/management-software/ipmi-utilities>.

Tasks you can perform using IPMI View include (see IPMI View User's Guide for details):

- Discover Lightspeed Live Servers on the IPMI network (requires IPMI LAN)
- View system event logs
- Check current sensors and monitor history of fans, voltages, temperature, and power supplies
- View firmware revision levels
- Perform various kinds of shutdowns and resets
- Blink the UID LED to locate a particular unit in the rack or server room
- Set fan speed
- Manage LAN configuration, SNMP configuration, and RS232 modem
- Manage users, passwords, and privileges
- Set up paging of users in the event of malfunctions
- Establish Text Console Redirection or KVM Console Video Redirection for remote system control via text display or full graphic display
- Access virtual media
- Set up server management groups
- Update firmware.

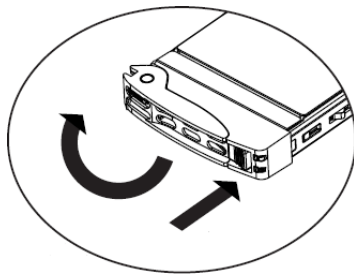
For detailed instructions about using any of these system management features, consult the *IPMI View User's Guide*.

## Installing New or Replacement Media Hard Drives

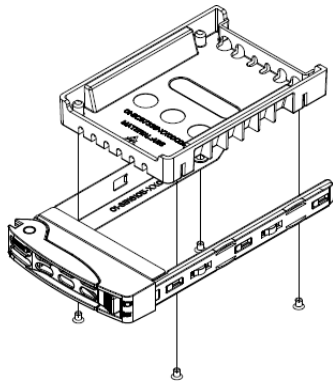
**Note:** This topic does not apply to the 2-port, C2 | C2+ Server. It uses a software-based RAID controller, and its two media drives are SSD drives.

Follow these steps to replace a hard drive or install a new one. Drives may be removed or replaced with power on. See [Drives](#) for new or replacement drive specifications.

1. Remove the front bezel from the chassis.
2. Press the release button on the right front of the drive carrier.
3. Use the drive carrier handle to pull the carrier out of the chassis.



4. Remove the drive or dummy drive from the carrier by removing the four M3 screws from the underside of the carrier. Retain the screws.
5. Insert the new drive into the carrier with the PCB side down and the connector facing the back of the carrier.
6. Secure the drive to the carrier with the four M3 screws retained from removal. Gently tighten but do not over tighten the screws, which could cause damage.



7. Slide the drive carrier into its bay with the drive facing up until it seats firmly in the rear connector.
8. Push the handle closed flat against the front of the carrier to secure the drive.
9. Replace the front bezel on the chassis, and go to the next topic to rebuild the RAID.

## Rebuilding the Lightspeed Live Storage RAID

**Note:** This topic does not apply to the 2-port, C2 | C2+ Server. It uses a software-based RAID controller, and its two media drives are SSD drives.

The MegaRAID Storage Manager program on the Lightspeed Live Server enables you to rebuild the storage RAID if necessary, such as when you add a new drive, or want to change drive configurations. The MegaRAID Storage Manager is located at:

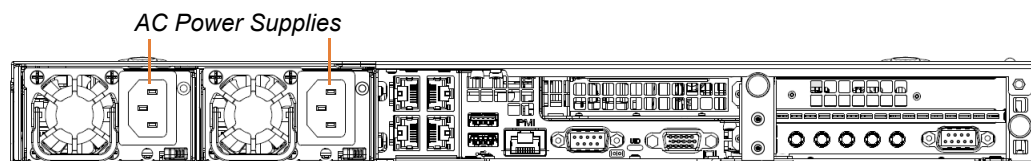
C:\Program Files (x86)\MegaRAID Storage Manager

In the MegaRAID Storage Manager folder, use the *startupui.bat* file to start the program. In the initial panel, click on the server you want to work with, then enter your credentials to log in. The MegaRAID Storage Manager application opens.

## Replacing a Power Supply

The Lightspeed Live Server includes two user-replaceable, redundant, hot-pluggable power supply modules. They automatically sense the input voltage between 100v to 240v, and operate at that voltage. Power cords plug directly into the power supply units at the back of the chassis. A green light indicates that the power supply is operating. When a power supply fails or loses power, an amber light on the power supply illuminates and an alarm sounds.

If either of the power supply modules fail, the other module supports the full load and allows the system to continue operation without interruption. The PWR Fail LED illuminates and remains on until the failed unit has been replaced. Replace with the same model. Replacement units can be ordered from Telestream. Contact Telestream Customer Support ([Obtaining Support | Information | Assistance](#)) to order parts.



### Replacing the Power Supply

1. Unplug the AC power cord from the failed power supply module.
2. Push in the locking tab at the back of the module to release it.
3. Pull the unit straight out of the chassis.

**CAUTION:** The power supply may be very hot when first unplugged and could cause burns. Handle carefully by the edges and do not touch hot components.

4. Insert the new unit into the chassis, pushing it in until it clicks firmly in place.
5. Reconnect the power cord.

## Setting NMOS Logging Levels

For Lightspeed Live Capture Servers operating in an NMOS environment, you can set the Capture server's NMOS Receiver logging levels as desired. Follow these steps:

1. Open the `C:\Program Files\Telestream\Live Source Server\NmosNodeConfig.json` file in a text editor.
2. Change the logging level—the first line of the `NmosNodeConfig.json` file to an integer value between -40 (most verbose) and +40 (least verbose—only fatal messages). The default value is 0, which is a median level of verbosity.

For example: `"logging_level": 0,`

3. Save and close the file.

## Monitoring Lightspeed Live Servers via SNMP

Management Information Base (MIB) files are provided for those organizations wanting to manage their Lightspeed Live Servers via SNMP.

Locate MIB files on the Lightspeed Live Server in this location:

`C:\Program Files\Telestream\Live Stream Server`

MIB files can also be found on the Lightspeed Live DVD or USB thumb-drive in the SNMP folder.

## Enabling SNMP Monitoring

To enable SNMP traps and configure ports, you add three lines (*add*, *target*, and *logger*) to the `SourceService.exe.config` and `LiveService.exe.config` files. For more information about log files see [Managing and Using Log Files](#).

---

**Note:** The ports must be different in each file and port 62 should not be used.

---

This example shows a typical configuration file, with the added lines in red:

```
<nlog xmlns="http://www.nlog-project.org/schemas/NLog.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <extensions>
    <add assembly="NLog.Targets.Snmp" />
  </extensions>
  <targets>
    <target name="logconsole" xsi:type="Console"
      layout="[${level}] ${message}" />
    <target name="logfile" xsi:type="File"
      archiveAboveSize="10000000" maxArchiveFiles="1000"
      fileName="${specialfolder:folder=ApplicationData}/Live/
      SNMPLogs/LiveService-${date:format=yyyy-MM-dd}-log.txt"
      layout="[${longdate}] [${level}] ${message}" />
    <target name="snmp" xsi:type="Snmp" port="163" />
  </targets>
```

```
<rules>
  <logger name="*" minlevel="Info" writeTo="logconsole" />
  <logger name="*" minlevel="Warn" writeTo="logfile" />
  <logger name="*" minlevel="Info" writeTo="snmp" />
</rules>
</nlog>
```



# Configuring Vantage for Use with Live Capture

Use this chapter to configure Vantage to inter-operate with Live Capture.

---

**Note:** Before you start using Live Capture, certain configuration tasks are required. The [Up and Running Checklist](#) describes the initial configuration tasks.

---

## Topics

- [Overview](#)
- [Up and Running Checklist](#)
- [Licensing a Live Capture Array](#)
- [Licensing Live Schedule and RouteMaster](#)
- [Previewing Sources and Finding Workflows](#)
- [Using Live Stores for Capturing Files](#)
- [Creating Labels and Variables for Use in Workflows](#)
- [Updating Live Capture](#)
- [Restarting the Telestream Live Source Service](#)
- [Firewalls and Blocked Ports Limit Functionality](#)
- [Creating a UNC Path for Resource Locations](#)
- [Configuring Various Actions on Arrays](#)
- [Scaling Live Capture to Include Multiple Servers](#)
- [Providing Capture Sources Unique Names](#)
- [Best Practices for Capture Array Design](#)
- [Connecting Web Applications to an Array](#)
- [Using NetBIOS Host Names](#)
- [Correcting Connection Errors in Web Apps](#)
- [Clearing Browsing Data after Updating Vantage or Live Capture](#)
- [Managing and Using Log Files](#)

## Overview

Configuring Vantage for use with Live Capture includes setting up certain features and creating Vantage Capture/Tape workflows to capture streaming media and save it as a file. These one-time configuration tasks are required in your Vantage domain before you can use Lightspeed Live Capture.



The program used to perform configuration tasks is the Vantage [Management Console](#), which typically has an icon on the desktop of the Vantage server or other computer utilized with Vantage (a *node*, in Vantage parlance). Later in this chapter you'll learn how to use the console to perform the tasks.

Workflows are designed and managed using another Vantage program—Vantage [Workflow Designer](#)—which is also launched from a desktop icon. We will guide you step by step in creating and activating a simple Live Capture workflow that detects your sources, encodes them, and places your captured files into a storage location.

Once a Live Capture workflow is activated you're ready to start capturing. Capture control is manually performed using the Lightspeed Live Capture web application. User-written programs utilizing the Lightspeed Live Capture Web API can also be used to control capture operations.

## Up and Running Checklist

Lightspeed Live Capture servers are delivered with Live Capture and the Vantage Media Processing Platform (often referred to simply as *Vantage* in this guide) installed.

This checklist includes all of the configuration tasks you should complete to get your Live Capture system up and running on premises, whether you perform the work yourself or a Telestream Customer Service representative or Field Engineer performs the work for you. Follow the links to the how-to topics for step-by-step instructions.

- 1. Install and Connect your Lightspeed Live Server**—First, install your Lightspeed Live Server in a rack, make all physical connections, and add it to your Windows domain. See [Installing | Updating | Managing a Lightspeed Live Server](#) for details.

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**Note:** Do not perform the remaining tasks in this checklist until you have installed your Lightspeed Live Server, hooked it up to your video sources and connected it to your Windows network ([Installing | Updating | Managing a Lightspeed Live Server](#)). For Telestream support, see [Obtaining Support | Information | Assistance](#).

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## In the Vantage Management Console...

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**Note:** To learn how to perform any of these tasks, display the panel you want to use and click the question mark (?) button in the upper right corner of the console to display the topic in the *Vantage Domain Management Guide*.

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**Note:** To launch the Vantage [Management Console](#), you can use the desktop icon.

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- 1. Add Your Capture License to Vantage**—Choose Licenses (in the left panel) to display the Licenses tab and add the Capture license to the Vantage domain, which is located on the desktop in the License folder.
- 2. Restart Vantage Client Programs**—Restart the Management Console, and any other Vantage programs that may be running.
- 3. Enable User Administration**—Configure Vantage for user management:
  - a.** Choose Settings & Options in the left panel. On the General tab, check Enable user administration to enable it (required).
  - b.** Check Use Windows Active Directory for Users to add and maintain Vantage users from your network's Active Directory instead of creating them manually in Vantage. (It must part of the domain—if its part of a work group, this feature is unavailable).
- 4. Enable Open Workflows**—Also in the General Tab, check Enable Open Workflows. [Open Workflows](#) enables serial actions in a workflow processing the growing output of a Capture or Tape action concurrently, reducing total workflow time.

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**Note:** Open Workflows is an optional, licensed feature, which can be enabled in a Vantage domain. If your Live Capture system has been joined to a Vantage domain, all

Open-capable actions in Capture and Tape workflows (those utilizing Capture or Tape actions) can operate in open mode, regardless of whether Vantage is specifically licensed to support open workflows or not.

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**5. Create User Accounts**—Each Capture user should have their own Vantage user account—they should not use the administrator account. This enables administrators to track utilization and improves system efficiency by reducing resource usage. Create at least one account: select Users in the left panel. To add a new account (either via Active Directory or directly in Vantage), click the New User icon in the tool bar and complete the fields.

For testing, create one sample new user: *LiveCaptureUser*.

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**Note:** User accounts can also be used to control access to the Management Console, Workflow Designer, Workflow Categories, and Channel Groups. Or, they can prevent Lightspeed Tape Capture users from competing for the same resources.

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**6. Configure Service Logons**—By default, all Vantage and Telestream services are configured to use the *Local System* account. This account only provides access to files on the local Vantage domain server.

If Vantage requires access to input or output folders on other servers (which is likely), you should create a user account for Vantage in your Windows domain, and grant access to the Vantage user account on the target server. All services must use the same account. Attempting to run them in different accounts results in failures.

You can configure Vantage services to log on with specific accounts in the Vantage Management Console or in Windows via the Services MSC.

Telestream services must be updated directly via the Services MSC, because it is not a Vantage service; thus, its not listed in the Management Console.

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**Note:** For a full discussion of Windows authentication and service user account requirements, see these Vantage Installation Guide topics: Windows Authentication Guidelines and Setting the Vantage Windows Log On ID for Services.

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During workflow creation, you also must specify Open Workflows at both the workflow and the action level:

- **Workflow Level**— in Workflow Designer's workflow details panel above the action selector panel, check the Open Mode option.
- **Action Level**—on each action, right-click and choose *Workflow Mode > Open*.

**7. Create a Vantage Live Store**—Choose Storage > Vantage Stores to create at least one Vantage Store (Live). Create a Live Store on the Vantage server's local D drive in a Windows folder you choose or create: See [Using Live Stores for Capturing Files](#) for a detailed discussion and configuration details.

**8. Create Network Folders | Vantage Folders**—This is optional, based on your workflow requirements for network server file access.

**a. Network Folders**—If you plan to access network servers for input or output files, create/identify each location. The location should be capable of the I/O required for sustained reading/writing of live media. This may be a folder on the Lightspeed Live Server's D drive (media drive) or a NAS/SAN. In the Capture and Tape web apps, you can direct the Primary and Secondary outputs to one of these Vantage Address Book folders.

**b. Vantage Folders**—Now, create [Vantage folder address](#) records in the Vantage Address Book to identify locations by name—Vantage Folders make it easy to specify the location during workflow design. Select Storage > Vantage Folder Address Book and add Vantage Folders.

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**Note:** Telestream recommends that you create one Vantage Folder initially; you can create others as required for your workflows.

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**9. Authorizations**—Optional; if Windows credentials are required for Vantage services when they access network locations in another Windows domain or workgroup, create Authorization records for the services to use as necessary: Click Settings & Options, display the Authorization tab and create authorization records.

**10. Create a Channel Groups Nexus**—Vantage uses the concept of a *nexus* generally, to organize and identify related resources and enable client applications to filter them. In the context of Capture, these resources are Vantage workflows. When you create a Live Capture workflow, you can associate it with a specific Channel Group. There is a unique nexus for each capture action—Capture and Tape.

In Capture web apps, you select one of your Channel Groups to display only those Vantage workflows in this group. Next, you choose a workflow in the channel group to use for the task you're currently performing.

At least one nexus is required. The type of nexus you create depends on the web apps you plan to use.

Open Workflow Design Items > Nexus Definitions in the left panel to display the Nexus Definitions panel and create at least one Channel Group nexus:

- Live Capture workflows (using a Capture origin action) require a Capture nexus and jobs are submitted (capture operations are started) directly from the Capture web app.
- Tape Capture workflows (using a Tape Capture origin action) require a Tape Capture nexus and jobs are submitted (capture operations are started) directly from the Tape Capture web app.

For testing, create a nexus named *Capture Nexus*.

**11. Restart the Vantage Live Service**—To apply these settings for use in Capture, restart the Vantage Live Service: Display the Services tab and choose Live. Place it in maintenance mode (click the yellow down arrow in the toolbar) and then return it to Online, by clicking the green arrow.

## In Source Manager...

Open Chrome and perform these configuration steps on each Live Capture server:

1. Start the Source Manager web app (<http://localhost> | <Remote Host Server Name>:8090).
2. Rename the SDI Sources if required, then configure them (for details, see [Configuring SDI Sources](#)).
3. Create and configure Transport Stream/RTMP sources (if any are required)—[Creating & Configuring Transport Stream Sources](#) | [Creating & Configuring RTMP Sources](#).

## In Vantage Workflow Designer...

You should create and configure at least one workflow for each Live Capture application you plan to implement (Live Capture | Tape Capture).

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**Note:** Only one Tape or Capture action is allowed in A Live Capture workflow. Multiple Tape/Capture actions in a single workflow is not supported and results in workflow failure.

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For testing purposes, create a Live Capture workflow and configure it as described here. The simplest workflow has a single Capture action and uses a manual trigger, in order to activate a recording from the Live Capture Web App.

1. Create a new workflow, named *Live Capture Test*.
2. Add a [Capture action](#) from the Live category.
3. Open the [Inspector](#) and configure the following:
  - Source: Select any live source you have connected to the Capture server.
  - Channel Group: Capture Nexus (created earlier).
  - Trigger: Manual
  - Primary Output: QuickTime
  - Nickname: Original
  - Output Location: Vantage Store > LiveStore (created earlier).
4. Save and close the inspector.
5. Activate your workflow so that you can utilize it in Live Capture. In the Monitor Status tab, the Live Capture workflow you've activated should be listed, and state should indicate *In Process*.

See [Creating Live and Tape Capture Workflows](#) for prototype workflows.

## In Live Capture...

Now, you're ready to test the system... follow these steps:

1. Open Chrome and go to *http://localhost|<Remote Host Server Name>/Vantage*.
2. Locate your target Vantage domain, enter the default user ID *Administrator* (no password) to log in.
3. In the Vantage web portal, open the Live Capture web app.
4. Select your nexus.
5. Click Live Capture and note that there is an active channel for the workflow that you activated.
6. Begin capturing video.

The active feeds display a preview thumbnail in the Channels panel of the Live Capture web app (*http://localhost/Vantage/LiveCapture.../channels/*). A Live Capture workflow configured with a manual trigger or a recurring segment trigger can be activated directly from this window.

## Licensing a Live Capture Array

A Vantage Array license is required for each Vantage and Live Capture server connected together in a multi-server Vantage domain—referred to as a Vantage [array](#).

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**Note:** License files may contain one or more license policies, and there may more than one license file in a Vantage domain. The number of license files is immaterial; only the license policies within the file(s) are relevant. License installation is described in the Domain Management Guide.

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License files are added to the Vantage domain, where the license policies are extracted from the file(s) and stored in the Vantage database for utilization. You use the Vantage Management Console to add, view, and manage licenses.

- A Live Capture license includes a Vantage array license—one license per server.
- All Vantage servers joined together with Live Capture servers in an array also require an array license for each Vantage server. If you have a stand-alone Vantage domain and are joining it to a Capture server, you require an array license for it.

The following examples illustrate the requirements for licensing Vantage domains including Live Capture servers, except for those systems purchased as a single server.

### Single Server Vantage Domain Adding Live Capture

A single server Vantage domain is being joined to a Lightspeed Live Capture server—this requires two array licenses. For this system you order a single-server array license for the Vantage server. You receive a license file containing array licenses for both servers; one for the Vantage server and one for your Lightspeed Live Capture servers.

### New Vantage Arrays Including Live Capture

**Example 1:** A new system consisting of two Lightspeed Live Capture servers and two Vantage servers in one domain (a Vantage 2-server array) requires four array licenses. For this system you order a two-server array license for the Vantage servers. You receive a license file containing array licenses for all four servers; two for the Vantage servers and two included with your Lightspeed Live Capture servers.

**Example 2:** A new system consisting of five Lightspeed Live Capture servers and three Vantage servers in a Vantage array requires eight array licenses. For this system you order a three-array license for the Vantage servers. You receive a license file containing array licenses for all eight servers; three for the Vantage servers and five for your Lightspeed Live Capture servers.

### Existing Vantage Arrays When Adding Live Capture

**Example:** You are adding Lightspeed Live Capture servers to an existing Vantage domain that already has array licensing. Thus, no additional array licensing is required. However, you should update the existing Vantage license file to include the additional Live Capture server.



In a mixed Vantage/Capture array no Transcoding services can be running on the Capture systems or failures of both Vantage and Capture jobs will occur. Remove the Vantage Transcode service from Live Capture servers via the Vantage Management Console.

## Licensing Live Schedule and RouteMaster

Live Schedule is an optional, licensed web app. Unlike some other web apps, Live Schedule is not licensed in Vantage. Activating your license is performed directly in the Live Schedule web app and described in [Managing Your Live Schedule License](#).

Telestream RouteMaster is an optional, licensed router control program. It is installed by the Live Schedule installer. Contact Telestream Licensing to obtain a license with installation instructions, to enable RouteMaster on your Lightspeed Live Server.

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**Note:** If you add a new Windows user to your Lightspeed Live server and then log in using the new user ID, the RouteMaster configuration file must be copied into the new user's AppData directory to work correctly:

*C:\Users\<username>\AppData\Roaming\Rascular\RouteMaster\RouteMaster.ini.json.*  
Failure to copy this file to the new user's directory will cause Vantage web apps to fail.

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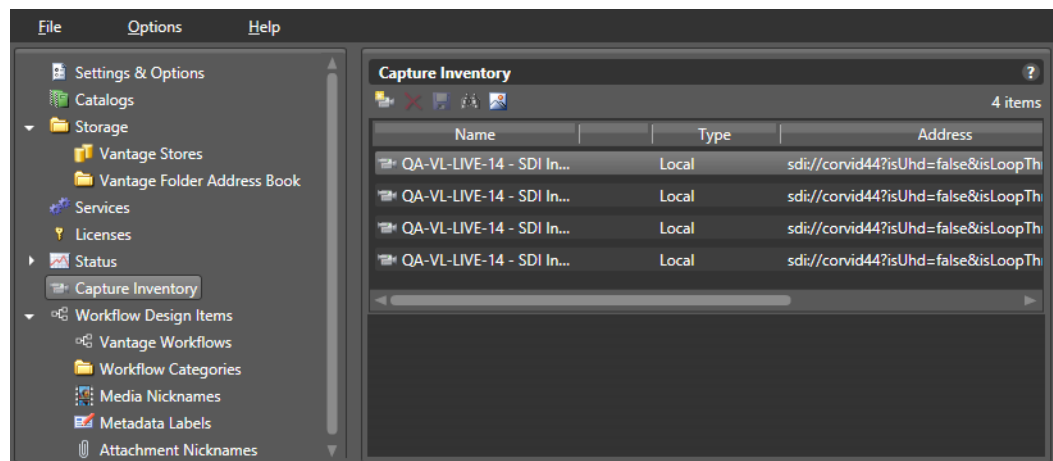
As installed by Live Schedule, the RouteMaster Service's web server is configured to communicate using `http://localhost:7777`. RouteMaster port bindings are configurable, and you can change or disable the web service in the RouteMaster Client Configuration dialog.

## Previewing Sources and Finding Workflows

The Capture Inventory panel in the Vantage Management Console (VMC) enables you to display a preview of a Capture source, and to identify workflows which are configured to use a particular source. All SDI sources on a Lightspeed Live Capture system are automatically added to the Capture inventory list.

**Note:** Source configuration is performed using Live Source Manager (see [Managing Video Sources](#)).

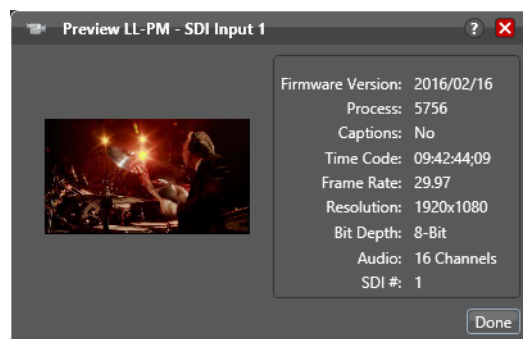
Select Capture Inventory in the left panel to display the Capture Inventory panel:




**Note:** If all input sources are not displayed after installing and starting Live Capture, restart the Lightspeed Live Server. Then, check the Capture Inventory panel again for the list of sources. The list should be populated with *all* input sources after all Live Capture servers have been restarted.

### Previewing Sources

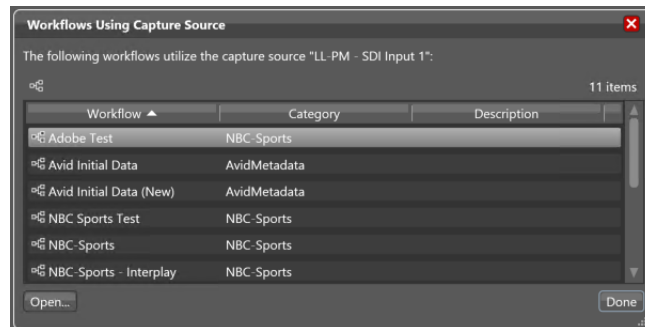
To preview a source thumbnail and details, click the Preview button in the Capture Inventory toolbar. The preview image is updated once per second.



## Finding Workflows

To determine which workflows are configured to use a specific source, click the Find Workflows button  in the Capture Inventory toolbar.

The console displays a list of associated workflows:



## Using Live Stores for Capturing Files

You use a Vantage Live Store as a managed output location for Primary and Secondary Capture output. *Live stores* in Vantage are only used by Capture workflows, and are the only type of store that you can use in Capture | Tape workflows.

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**WARNING:** To ensure that Vantage Live Stores manage captured media in real time—including deleting expired media in a timely manner by deleting files to preserve disk space—it is very important that Live Stores are configured correctly. Failure to do so may result in running out of storage and failure of Capture workflows in real time.

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Live Stores in Vantage refer to locations that automatically recycle expired media to preserve disk space in real time, improving overall system efficiency.

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**Note:** This is a practical overview of using Live Stores from the Capture perspective. The creation, configuration, and management of stores, including as shares, is described in the Vantage Domain Management Guide. See the Vantage Domain Management Guide > Managing the Vantage Domain.

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Each Live Store identifies a specific server and directory path (folder). Live Stores should be created on a Capture server's D drive or on a server with the I/O capacity to support real-time write operations for best efficiency and overall system effectiveness. You can also create Live Stores on NAS or SAN storage systems.

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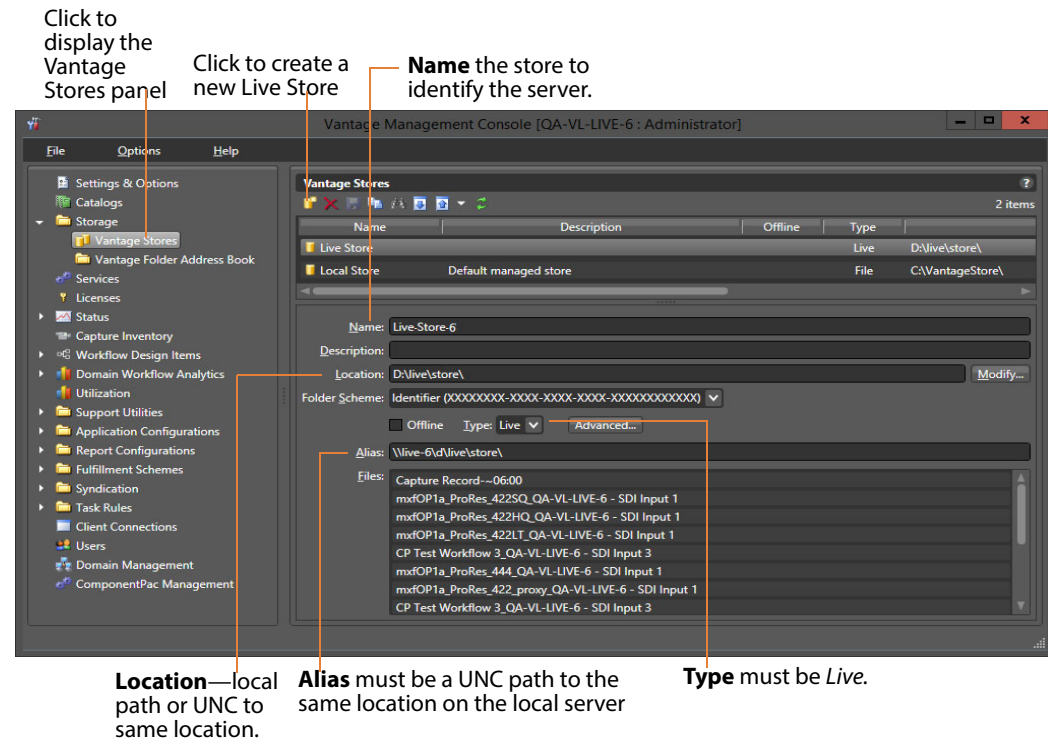
**Note:** For Network Attached Storage systems (NAS), the cardinal rule is to always create stores using UNC paths when your Capture system is an array, consisting of multiple Lightspeed Live servers.

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- [Creating a Live Store in Vantage](#)
- [Identifying Live Stores with a UNC Path](#)
- [Executing Transport Actions Using Local & UNC Paths](#)
- [Managing Live Storage Disk Space](#)

## Creating a Live Store in Vantage

Live Stores are created using the Vantage Management Console:



To create a folder for the Live Store, perform these tasks:

1. In Windows on each Lightspeed Live Capture server, navigate to the D drive and create a local path and folder for this Live Store store. Name it *LiveStore*, for example. Alternatively, use a SAN/NAS.
2. Select the *LiveStore* folder you just created and update the folder's properties: Share the folder, add authorized users—your Vantage Services users—and set read/write privileges, and set security permissions as appropriate.

**Note:** In a multi-server Capture array, the Location must be a local driver letter or UNC network path and the Alias must be a UNC path to the same location or recycling is rendered inoperative. Otherwise, the Capture action must be configured with Run On rules to ensure that the local drive is always used on each Capture server in the array.

3. Make certain that Vantage and Telestream services are using appropriate Windows user accounts for accessing network locations—see [Up and Running Checklist](#), Step 4.

## Identifying Live Stores with a UNC Path

To ensure that Live Stores are accessible to Vantage and Telestream services, specify the Location as a drive letter or UNC path, whether they are local or on a SAN/NAS. A UNC path is also required when you are using the Capture web apps hosted on an IIS server other than the Capture server.

Follow these steps to create and configure a Live Store:

1. Choose Storage > Vantage Stores in the left panel. The Vantage Stores panel lists all of the stores (two types—File and Live) in the Vantage domain. Click the New Vantage Store icon and specify the Location and Alias. Be sure to select Type: Live. For configuration details, display the Help topic (?) in the Management Console.

For example, for Capture servers LSL-01, LSL-02, and LSL-03, create these stores:

Live Store Name	Location	Store Type	Alias
LSL-01 Local Live Store	D:\LiveStore	Live	\\LSL-01\d\livestore
LSL-02 Local Live Store	D:\LiveStore	Live	\\LSL-02\d\livestore
LSL-03 Local Live Store	D:\LiveStore	Live	\\LSL-03\d\livestore

1. In the Live Store Alias field, add a UNC path (NOT a drive letter) pointing to the same path as specified in Location.
2. Create authorization records in the Vantage Management Console > Settings and Options > Authorization tab for each Live Store UNC path. Then put all Vantage services into Maintenance Mode and exit them again to apply the change.
3. When creating workflows, be sure to assign Capture actions to the Live Store corresponding to the Capture server where the action is executing. For example, assign Capture actions on *LSL-01* to the *LSL-01 Live Store (\\LSL-01\d\livestore)*.

## Executing Transport Actions Using Local & UNC Paths

If a Live Store is only defined as a local path, then the Vantage Transport service (which executes Transport actions) executing Copy or Move actions in a workflow must also run locally—on the same server as the Vantage Live Service, which executes the Capture action. While they may not be necessary, Run On rules are often added to make sure that Transport actions always execute locally.

However, if a Live Store also specifies a UNC path that is accessible to all servers in a Vantage domain, then the Transport service may run on any server in the array, assuming the domain is configured to use the Transport service authorized access to the UNC path. Details are presented in the Vantage Domain Management Guide.

## Managing Live Storage Disk Space

Capture systems can consume significant disk space during operation. In order to maintain adequate disk space, Vantage enables you to manage Lightspeed Live Server storage automatically and manually.

In typical usage, Vantage's job expiration is an automatic, continual means of controlling storage space. In addition, Vantage enables you to manually delete files from Lightspeed Live Server managed storage, via the Vantage Management Console. This is particularly useful when your Lightspeed servers are mobile—being shut down between capture events—for transport. For example, when a live music concert/event is performed, Live Capture is set up and started immediately prior to the start of the event, when recording begins. Then, after a two or three hour event, the Capture system is shut down and repacked for transport.

This results in multiple channels of 2-3 hours of recording on disk. Because the Capture system was shut down for shipment shortly after capture was complete, there was no time for the expiration rules to clean up storage.

### Rule-based Space Management

You can set up rules to govern automated file deletion parameters you set up on selected Live Stores.

In the Vantage Management Console Settings & Options > Storage Management tab, create rules that govern file deletion.

Next, in Storage > Vantage Stores, select a store, and specify the rule that applies using the Automated Cleanup menu.

### Workflow and Job-based Space Management

Workflow and job-based storage space management enables you to configure your workflows so that Vantage continually monitors jobs by age, and delete their associated files.

You can set up the following automatic space reclamation options:

- *Workflow Expiration*—in Workflow Designer, enable this setting for your workflow in its settings panel) (see Viewing and Specifying Workflow Details in the Workflow Designer User's Guide) to automatically delete files ingested or created by the job, as part of the binder deletion process.
- *Expire Failed Jobs*—in the Vantage Management Console Settings & Options > General panel (see Enabling and Disabling Expiration of Failed Jobs in the Domain Management Guide), enable the Expire Failed Jobs setting when you want failed jobs to be expired using the same expiration rules as jobs that complete successfully. Otherwise, they do not expire automatically, and binders (and file resources) are preserved until deleted manually.



## Manual Space Management

You may need to override the automatic space management settings on occasion, and perform manual cleanup.

Using the Vantage Management Console, you can manually delete files at any time. You can delete all files in Live Stores, and you can also delete Live Store files by age and by percent of free space.

Manual deletion is achieved using either of these options (Storage > Vantage Stores—right click on the target store and select Storage Cleanup or Quick Cleanup>

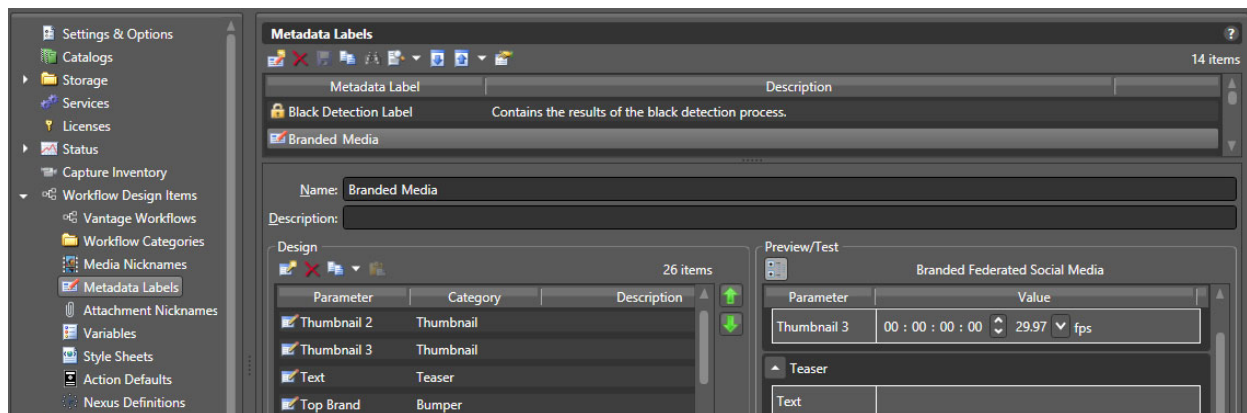
- *Storage Cleanup*—immediately deletes all files in selected stores (Quick Cleanup for multiple stores) or Advanced Cleanup by date or by percent of free store space.
- *Quick Cleanup*—immediately deletes all files in the target store. Click OK to continue.

## Creating Labels and Variables for Use in Workflows

Labels and variables can be added to [Tape action](#) and [Capture action](#) and can be viewed and modified in the Tape Capture, Live Capture, and Live Schedule web applications.

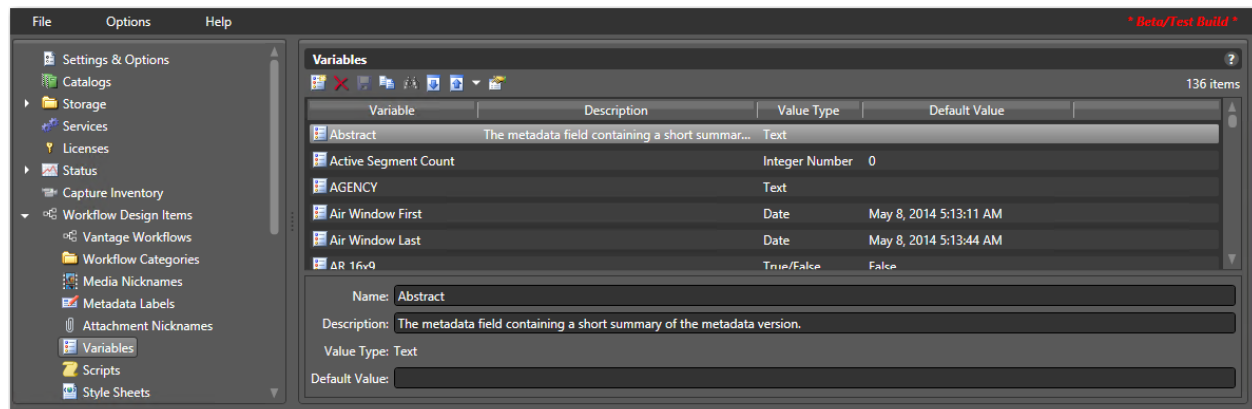
For example, you may want to create and use variables for media file parameters.

Labels and variables are managed in the [Management Console](#). After creating a label or variable, you can use them in your workflows as required. For more details, click the ? icon or display the User's Guide from the Help menu. This graphic displays the Metadata Labels panel where you create and update them.



In the console, add labels using Workflow Design Items > Metadata Labels.

See how to display the Variables panel where you can create and update them:



You can also add variables in Vantage Workflow Designer: select Items > Variables.

# Updating Live Capture

You should only update Live Capture when you are directed to do so, as instructed by periodic Telestream service bulletins.

## Installation on Client Windows Workstations

To install/update the Live web apps on Windows workstations (other than Lightspeed Live Servers), IIS is required. If IIS is already installed, you must create a configuration that supports Vantage Web Applications.

See *Installing and Configuring Vantage Web Applications* in the *Vantage Installation Guide* or the *Domain Management Guide* for details. An easy way to access the *Domain Management Guide* is to open the Vantage Management Console and click the ? in the upper right corner of the main window.

The following helpful topics are in the *Vantage Installation Guide* and the *Domain Management Guide*:

- *Server Hardware Requirements*
- *Vantage Web Applications OS*

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**Note:** After installing a Vantage or Live Capture ComponentPac update, clear the browsing data in your browser in order for web applications to operate properly. See [Clearing Browsing Data after Updating Vantage or Live Capture](#) for detailed information.

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## Restarting the Telestream Live Source Service

If you changed server settings to join an array or changed port numbers, the [Telestream Live Source Service](#) should be stopped and restarted to operate under the new settings.

For a single Capture server, shut down and restart the server.

To restart an array, follow these steps on each server in the array:

1. On each server except the Vantage database server, open the Services control panel and stop the Telestream Live Source service.

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**Note:** In Task Manager, make sure that the processes supported by the services have also terminated before continuing. It may take a minute for source processes to terminate before the Vantage Live Service can be re-started again. You may need to manually terminate the Live Source process.

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2. Now, restart the Telestream Live Source Service.
3. Shut down and reboot the Vantage domain server.

The sources from all Lightspeed Live Servers display in the Live Source Manager web app.

## Firewalls and Blocked Ports Limit Functionality

If you have firewalls and/or blocked ports you may not be able to fully access joined Lightspeed Live Servers. The servers display, but you may not be able to configure settings for Channels or see the Sources.

Telestream recommends that you disable the Windows Firewall on all computers that communicate with or support Vantage services. The default Windows Firewall configuration blocks access to a Vantage server from other Vantage components, such as other Vantage servers or workstations running Vantage client software. For more information, see *Firewall Guidelines* in the *Vantage Domain Management Guide*.

## Creating a UNC Path for Resource Locations

When multiple Lightspeed Live servers are joined together, you should specify the *Resource Location* for assets as a UNC path. This allows different servers to access the assets used for Segment Materials. See also [Using Live Stores for Capturing Files](#) for details.

## Configuring Various Actions on Arrays

A Live Capture license includes a Vantage Array license. When a Live Capture workflow executes, the Capture (an origin) action process executes on the local Live Capture server. However, other Vantage services—such as Vantage Transport and Deploy services—can run on any server that has the required resources for the service.

You can optionally implement Run on Rules to ensure that all Transport or Deploy actions run on the same server performing the capture to simplify workflows. See the Vantage User's Guide for information about Run on Rules.

### When Capturing to a Live Capture Local Media Drive

When you are using a Capture action to capture directly to a Live Store that is configured to write to a local drive, Vantage auto-generates Run on Rules for the workflow actions following the Capture action that operate on the output of the Capture action to execute directly on the same Capture server. You may also set up manual Run on Rules to make this limitation clear in the workflow.

If you specify that the capture output is to be written to a UNC folder, Run on Rules are not generated, and subsequent actions which operate on the capture output may be executed anywhere, unless you establish Run on Rules to the contrary.

For actions that do not immediately follow the Capture action, best practice is to set Run on Rules that instruct processes for actions other than Capture to run on the Live Capture server where the media resides. See *Configuring an Action's Run on Rules* in the Vantage User Guide for more information.

### When Capturing to Shared External Storage

When you are capturing to a shared external storage location, such as a NAS or SAN with Capture as part of a larger Vantage array, you can execute the transport actions on any server with available resources. In this case, Run on Rules are not required. Your system automatically chooses an available service on any server that can execute the required action.

See [Scaling Live Capture to Include Multiple Servers](#) for information about setting up an array. See also [Using Live Stores for Capturing Files](#) for more details.

## Scaling Live Capture to Include Multiple Servers

Your Lightspeed Live Capture server is factory-configured as a standalone Capture system, including a Vantage domain (Vantage services, client applications, and the Vantage database). If you plan to add multiple Live Capture servers to create an array, or add Live Capture servers to an existing Vantage array, you can do this in two ways:

- For Capture-only systems, join all Live Capture servers together by creating a system that utilizes a single Vantage domain database.
- For Capture systems that need to utilize other Vantage services and actions, such as Transcoding and Analysis, add your Live Capture servers to an existing Vantage array.

### Best Practices for Joining Multiple Capture Servers Into a Vantage Domain

Vantage database and Live Capture web application traffic can affect Live Capture server performance in a Capture array (a Capture system containing multiple Live Capture servers). Therefore, in an array, either as a Capture-only array or a Vantage domain, Telestream recommends that the Vantage database and IIS hosting the Live Capture/Vantage web applications run on a dedicated server. See images below and [Best Practices for Capture Array Design](#).

Further information regarding running the database and IIS on non-Live Capture/Vantage servers is located in the [Vantage Domain Management Guide](#).

It is also highly recommended that the process of creating a Vantage domain with Live Capture servers be performed as part of the installation and commissioning phase.



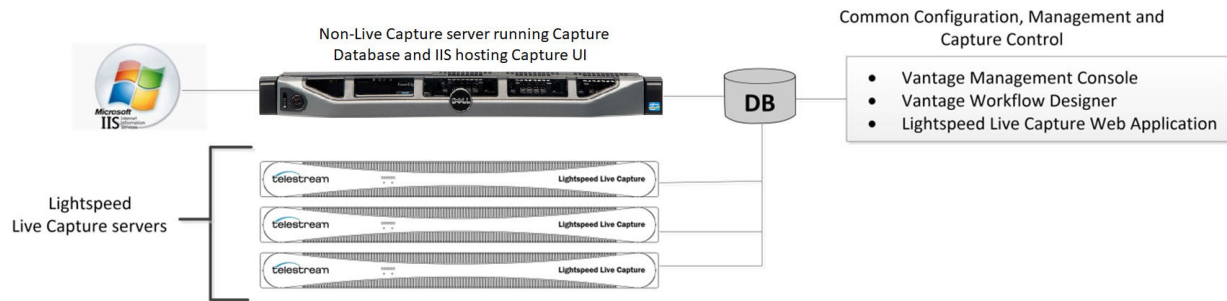
**Note:** When two or more Live Capture servers are combined into an array or joined to an existing Vantage domain, only those ComponentPacs installed on the server hosting the Vantage database are utilized.

Always verify that all of the required ComponentPacs are installed Vantage database host.

The Vantage Transcode Service should be un-installed from Live Capture servers, using the Vantage Management Console.

## Joining Capture-Only Systems

Two or more Lightspeed Live Capture servers can be joined together to form a multi-server Live Capture-only system. This allows for common configuration, management, and capture control.



To join Lightspeed Live Capture servers together, follow these steps:

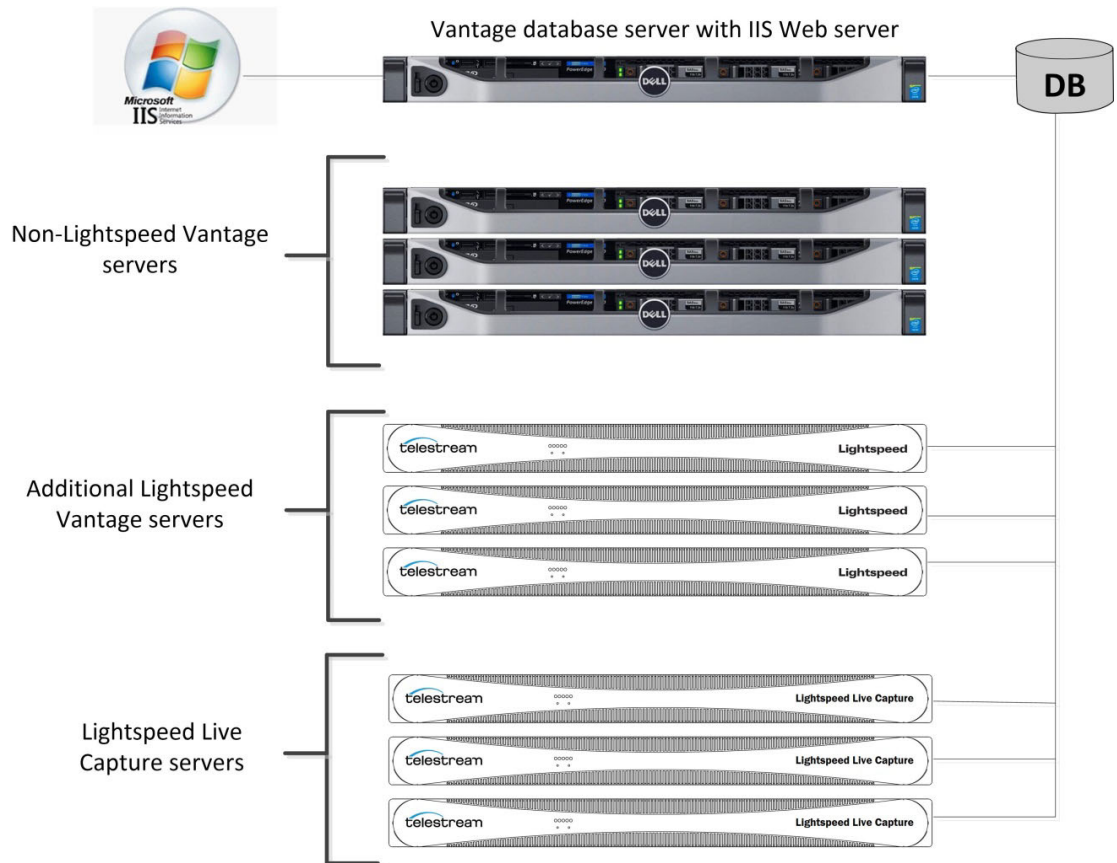
1. Select one of your Lightspeed Live Capture servers to act as the Vantage domain database server. The domain database server hosts the domain database and has all the services running on other Lightspeed Live Capture servers added to it via the Vantage Management Console.
2. Add all services running on your Lightspeed Live Capture servers to the Vantage domain, using the Vantage Domain Management Console. See the *Vantage Domain Management Guide* for details on adding services.
3. Add the appropriate multiple-server Vantage license to the domain. See the *Vantage Domain Management Guide* for details on licensing.

To configure, manage, and control your Lightspeed Live Capture system, connect the Vantage Management Console, Vantage Workflow Designer, and Lightspeed Live Capture web applications to the domain named with the same name as the database server selected in Step 1, above.

Also see, [Configuring Various Actions on Arrays](#).

## Existing Vantage Array—Adding Live Capture Servers

Joining Lightspeed Live Capture systems to an existing Vantage array allows Vantage workflows to begin with a Capture origin action that is connected to other Vantage actions and services, such as general transcoding, IPTV/VOD transcoding, analysis, third party application control, delivery options, or other service/action types.



### Adding Services

The Lightspeed Live Capture server includes Vantage services, so adding these services to an existing Vantage array is no different than adding any other Vantage service running on a separate server to a Vantage array.

**Important Note:** Joining Live Capture services to an existing Vantage array requires the appropriate Vantage array licensing. See the *Vantage Domain Management Guide* for details.

To add Lightspeed Live Capture services to a Vantage array, follow these steps:

1. Verify that the Lightspeed Live Capture services are running, all Vantage Services are running on the server, and no jobs are being processed in the local, factory-installed All-In-One domain.



2. Verify that you have configured the other (non-Lightspeed) Vantage domain server with the array, and is running. Refer to the *Vantage Domain Management Guide > Installing a Vantage Distributed Domain*, for more details.
3. Verify that the Lightspeed Live Capture server is on the same network as the existing Vantage array, with sufficient network permissions and access. Refer to the *Vantage Domain Management Guide > Network Requirements*, to configure your network.
4. Start the Vantage Management Console, and select the new Vantage array.
5. Add the services on the Lightspeed Live Capture server to the new Vantage array, just as you would do with any Vantage services running on any Vantage server. Refer to the [Up and Running Checklist](#), step 4 for configuring services with appropriate Windows user accounts.
6. Apply the appropriate Vantage Array license onto the system running the Vantage domain database. See the *Vantage Domain Management Guide* for details on licensing.

Also see [Configuring Various Actions on Arrays](#).

## Providing Capture Sources Unique Names

It is a requirement that each capture source has a unique name when multiple Live Capture servers are part of a multi-server, Capture array or part of an existing Vantage array. You should change the default source names to make them unique and identifiable in the scope of the array.

By default, Source names are *SDI [1 through n]*, where *n* is 4 or 8 depending on server. For example, SDI names for a 4-channel server are:

*SDI 1 | SDI 2 | SDI 3 | SDI 4*

If you change source names using the Source Manager, keep in mind that all sources in an array must be uniquely named so you can easily distinguish sources on one server from sources on another.

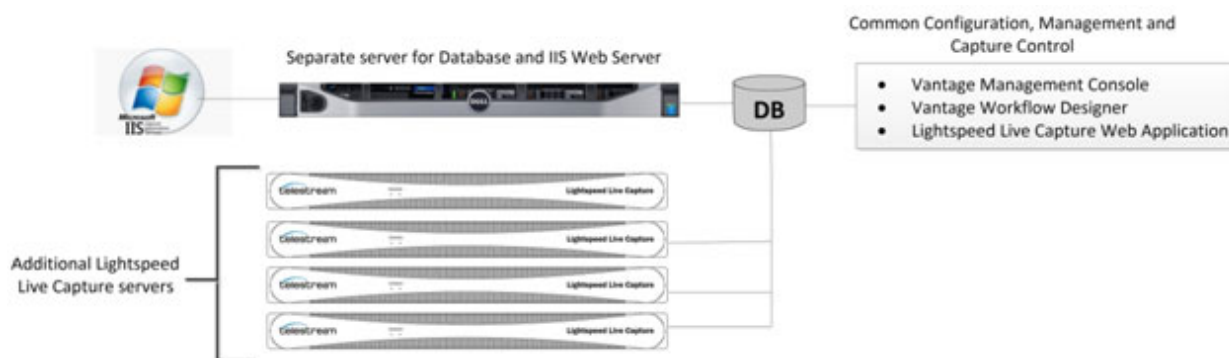
## Best Practices for Capture Array Design

The best practice for using multiple Live Capture server systems (an array) is to install and run the Vantage domain database and IIS on a dedicated server, separate from the Vantage and Live Capture servers. See the *Vantage Domain Management Guide* for details on installing a Vantage database and IIS.

When clustering two or more Live Capture and Vantage servers together, best practice is to use a separate server designated as the IIS web server to host the Live Capture web application. Ideally, the web host should be separate from the Vantage domain database since both IIS and SQL can consume a considerable amount of system resources.

The following are two example systems utilizing a dedicated Vantage database and IIS web server.

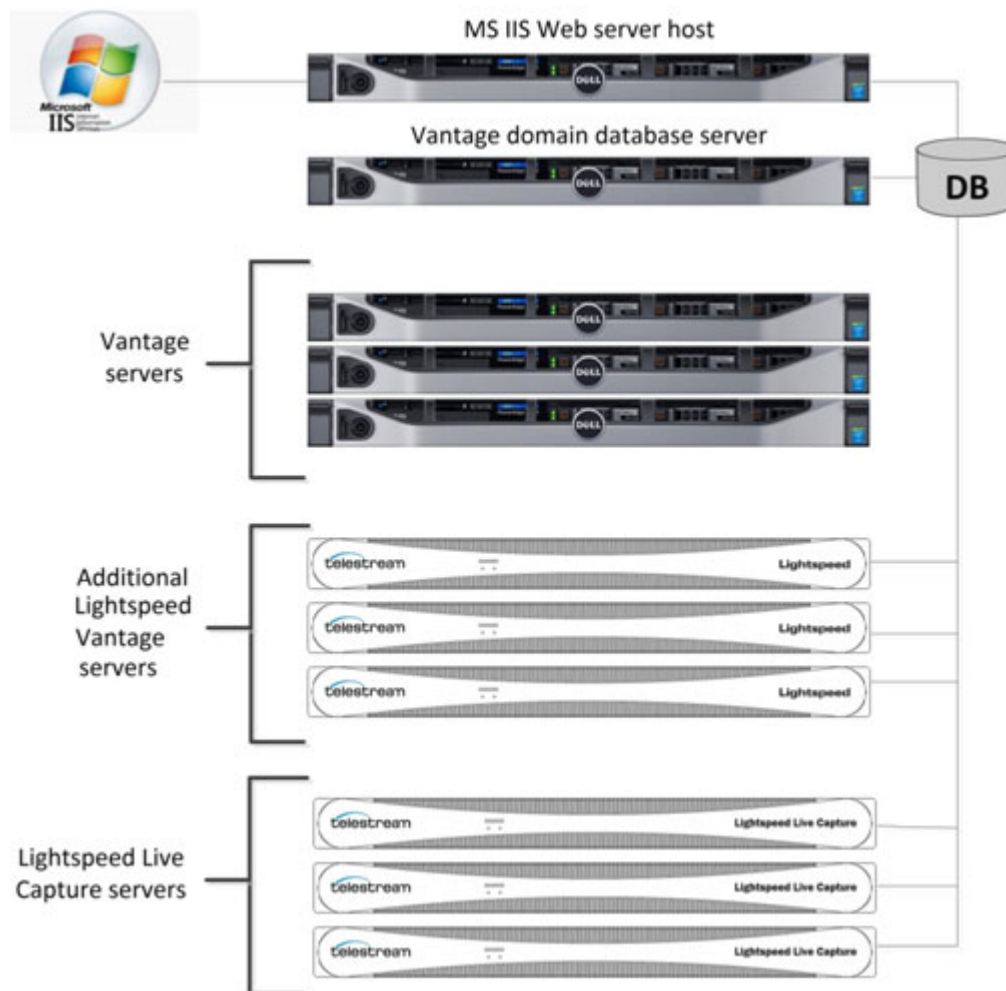
### Capture-only System



In this example, the Vantage domain database and IIS are installed together on a dedicated server. This prevents database and web server resources consumption from affecting the Live Capture servers.

### Capture Array—Separate Vantage Database and IIS Web Servers

In this example, the Vantage domain database and IIS are each installed on dedicated servers.



Since this is a large system array containing six (6) Vantage system and three (3) Live Capture servers, hosting the database and Web Server separately from all other servers running Vantage services is recommended to prevent overhead resource consumption from affecting the Live Capture and Vantage servers.

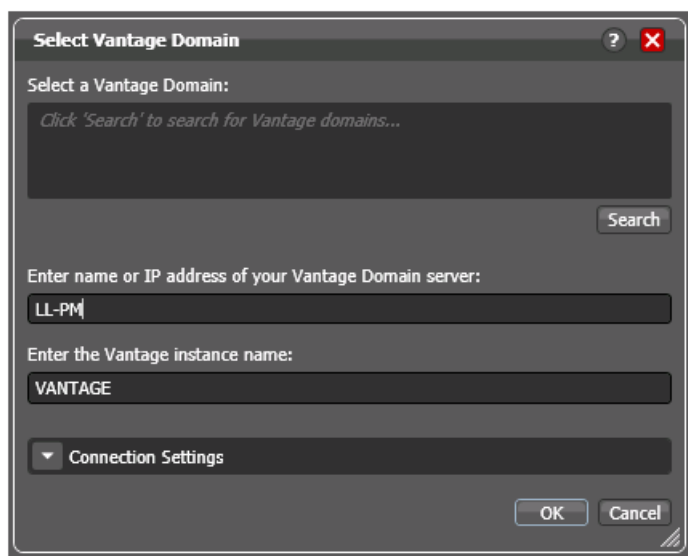
For additional information on best practices for Vantage and Vantage databases, refer to the Vantage Domain Management Guide and the publication Planning and Setting Up a Vantage Database on the [Telestream](#) web site.

## Connecting Web Applications to an Array

When you have multiple Capture server systems where the Vantage database and web server reside on specific server(s) in the multiple server configuration, the Vantage client applications and/or the Live Capture web application must be configured to connect to the appropriate server.

### Configuring Vantage Client Applications for Multiple Servers

Since the database in a multi-server system (a Vantage array) is located on a separate server, the Vantage client applications must point to that database. Do this by selecting the database server in the *Select Vantage Domain* dialog in each Vantage client application.



### Using Vantage Desktop Client Applications

First, install the *Vantage Management Console* and *Vantage Workflow Designer* client applications on any Windows system on your network. To use these client applications, you must change the Vantage Domain so they connect to the server that is running the Vantage domain database.

Select *Change Vantage Domains* from the File menu of each client application to open the *Select Vantage Domain* dialog.

---

**Note:** To learn more about the *Vantage Management Console* or *Vantage Workflow Designer*, click the ? icon to display the topic for the feature that you are using. Or, use the Help menu to open the searchable *Vantage User Guide* for general help.

---

## Using the Live Capture Web App to Manage Multiple Servers

To use the Lightspeed Live Capture web application with multiple servers, first install the Vantage web applications on the server hosting the IIS Web Service.

To open the Lightspeed Live Capture web application, use the following URL:

*http://<IIS Web service Host Name>/Vantage*

... where <IIS Web service Host Name> is the DNS name of the computer hosting the IIS Web Service.

When you are prompted to select a Vantage domain, choose the server hosting the Vantage domain database:

**Select Vantage Domain**

Vantage Domain Server:

Name or IP: LL-PM

Vantage Instance Name:

Name: VANTAGE

Connection Settings:

Specify the connection settings for accessing the Vantage SQL Server database. Normally you will use the default values, unless your Vantage administrator has specified otherwise.

☒ Use default credentials  
☐ Use custom credentials

Login: sa

Password:

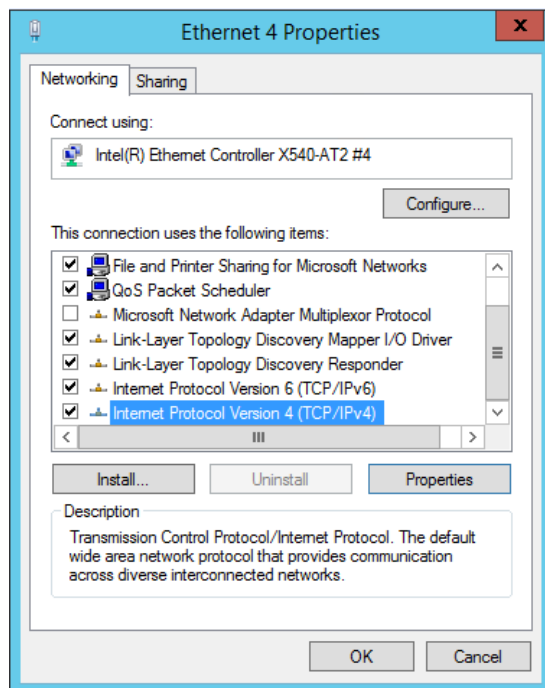
Basic OK Cancel

## Using NetBIOS Host Names

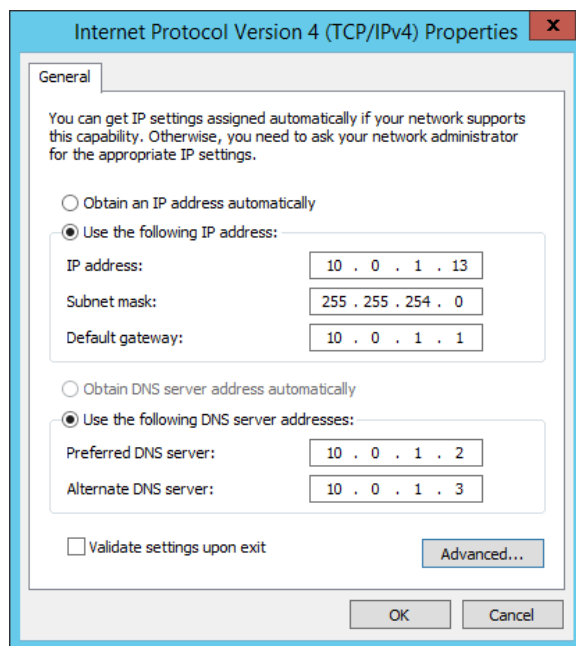
A multi-node Live Capture array can be used without an external name server, when NetBIOS is enabled in the database server and all nodes.

Configure the following settings in all servers to enable NetBIOS:

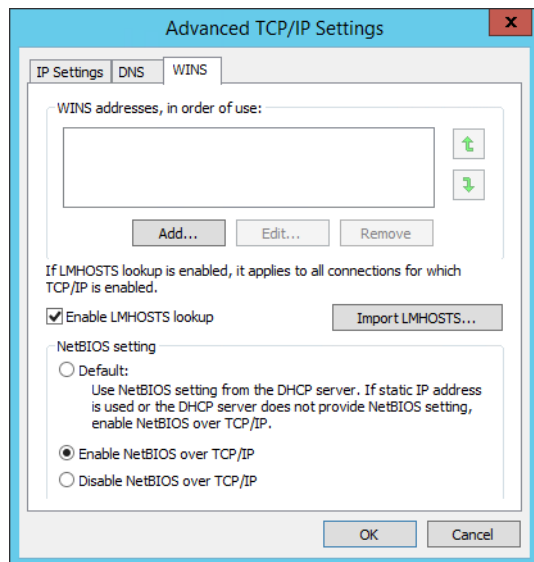
1. Open the Control Panel and select Network and Sharing Center.
2. Select the Change Adapter Settings option to open Network Connections.
3. Right-click on the network connection to change and select Properties. The Properties dialog displays:



4. Select TCP/IPv4 and click the Properties button. The TCP/IPv4 dialog displays:



5. Configure the IP Address, unique for each server.
6. Configure the Subnet Mask, Default Gateway, and the DNS server address settings. Use the same addresses for each server.
7. Click the Advanced button. The Advanced TCP/IP Settings dialog displays:



8. Select the WINS tab, then select Enable NetBIOS over TCP/IP.
9. Click OK in all dialogs to save the configuration.
10. Reboot the server you just configured, then configure all other servers.

## Correcting Connection Errors in Web Apps

When using Live Capture web applications on a workstation and connecting to a Capture server over the network, you may experience certain connection problems when you are not using DNS. For example, you may see a No Event message instead of video thumbnails.

To facilitate connections on servers | workstations that do not utilize external DNS for name resolution:

- Capture arrays require connections using host names, not IP addresses
- If external DNS is not available, host name resolution should be configured as described.

Update the *hosts* file on the computer you are using to run the web applications. This procedure describes how to correct this problem for Mac OS and Windows workstations.

### Mac OS Procedure to Correct Thumbnail Appearance

On a Mac OS computer, you add the server IP address and host name to the *~/etc/hosts* file and save it. Perform the following procedure:

1. Open the Terminal application by going to Application > Utilities and double-clicking Terminal.app.
2. Type the following command and press Return: `sudo nano/etc/hosts`
3. Enter the administrator password for the computer and press Return.
4. Move the cursor using the arrow keys and position it after all of the text in the window. Then type the IP address of your Lightspeed Live Capture server.  
For example: `102.54.94.97`
5. Press the Tab key, then type the host name of the Lightspeed Live Capture server.  
For example: `CaptureServer1`
6. Hold down the Control and O keys and press Return.
7. Press Ctrl-x to exit.
8. Flush your DNS table by executing the following command in the Terminal:  
`sudo killall -HUP mDNSResponder`
9. Quit the Terminal application.

### Windows Procedure to Correct Thumbnail Appearance

On a Windows computer, you add the IP address and host name to the *hosts* file and save it. Perform the following procedure:

1. Open File Explorer and navigate to: `C:\Windows\System32\drivers\etc.`
2. Right-click the *hosts* file and open it in Notepad.



3. On a new line, enter the IP address of your Lightspeed Live Capture server.

For example: 102.54.94.97

4. Press the Tab key.

5. Enter the host name of your Lightspeed Live Capture server.

For example: CaptureServer1

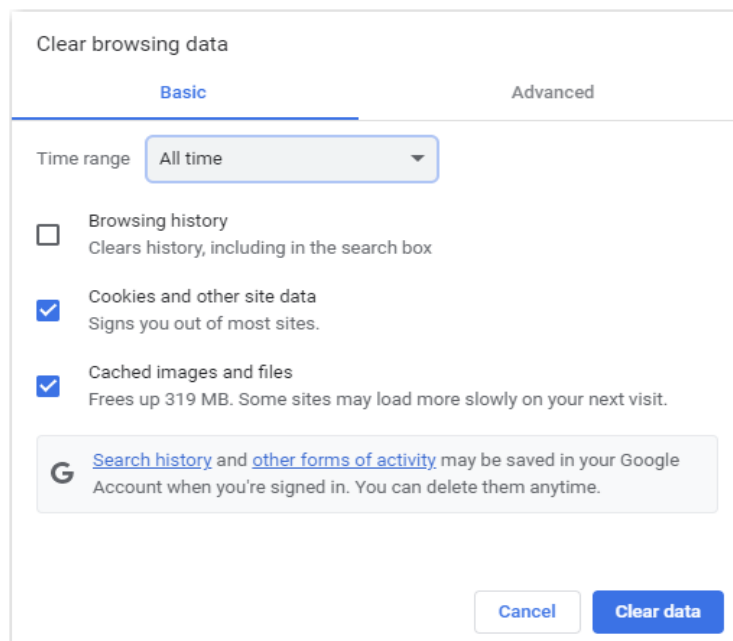
6. Save the file and close Notepad.

## Clearing Browsing Data after Updating Vantage or Live Capture

After a Vantage version upgrade or [ComponentPac](#) update is installed on your Lightspeed Live Server or other Vantage domain being used in conjunction with Lightspeed Live Capture, you should clear the browsing data in your browser in order for the Lightspeed Live Capture web applications to operate properly.

Follow these steps to clear the browsing data:

1. In Chrome, select Clear browsing data... from the More menu to display the Clear browsing data dialog.



2. Select The beginning of time from the Obliterate the following items menu, then check Cookies and other site and plugin data and Cached images and files.
3. Click the Clear Browsing Data button.

# Managing and Using Log Files

Log files can provide valuable information about the operation of Live Capture. These topics describe how to access the log files and change the level of detail to record.

## Accessing Log Files

The Vantage log files are located in one of two places:

If the Vantage services are run as *Local System*, logging configuration files are stored in the Capture ComponentPac folder. For example: `C:\Program Files (x86)\Telestream\Vantage\Components\Capture.7.1.5.999999\`.

If the Vantage services are run as a domain user, log files are stored in a user path. For example: `C:\Users\<Service_Account_Name>\AppData\Roaming\Telestream\`

Capture logs are saved to:

`C:\Windows\System32\config\systemprofile\AppData\Roaming\Telestream\Capture\`

## Changing Log Content Settings

The level of detailed information written to log files can be changed by editing settings in the configuration files that control logging file generation.

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**Caution: Before making changes to the configuration files, make backups by copying the existing files and saving them to a safe location.**

---

Configuration files:

- CaptureProgram.exe.config
- CaptureRecord.exe.config
- TapeRecord.exe.config.

Update these fields in the configuration files to change logging detail:

- logconsole
- logfile
- elastic.

Use these keywords to specify the logging level (from most restrictive to most verbose):

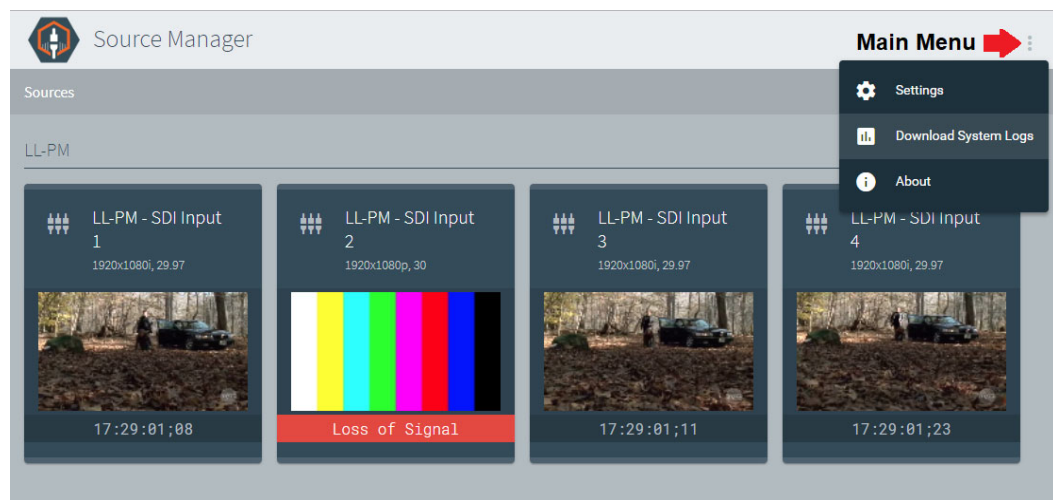
- Off
- Fatal
- Error (default)
- Warn
- Info
- Debug
- Trace.

For details about using the NLog logging platform to modify log file outputs, refer to the NLog tutorial: <https://github.com/NLog/NLog/wiki/Tutorial#log-levels>.

## Collecting Log Files for Customer Support

Log files may be helpful to Telestream Customer Support to troubleshoot system problems. You may want to manually save a copy of the log files to a safe location before making a support call so you can email them to Telestream as part of the support process.

You can also download the logs in a single zip file. Launch the Source Manager web app ([http://\[host\]:8090/](http://[host]:8090/) (default)). In the Main Menu , select *Download System Logs*.



A zip file named *support.zip* is created in your default download folder. You can open the zip file and examine the logs and forward it to Telestream Support for assistance.

## Capture Log Files

The zip file contains the Capture Record, Capture Program, Tape Record, and other Capture-related log files.

These Capture log files are included in the zip file:

- Devices.csv
- EventLog-Application.evtx
- EventLog-System.evtx
- LiveRegistry.csv
- Processes.csv
- Services.csv
- Stats.txt
- versions.csv

## Telestream Live Source Service Log Files

Source Service log files are stored in a directory named *SNMPLogs*.

The SNMPLogs folder contains certain logging data from the Source Service:

### SNMPLogs

- *SourceService-[date].log.txt*—The Telestream Live Source Service records any activity with the sources in these files. This includes activities such as loss of signal, change of format, sources being added, or sources being remove, etc.

### SNMPLogs\traceLog

This folder contains trace logs for each source.



# Managing your Web Apps

This chapter provides information about accessing and using the Vantage web portal, starting and stopping Live Capture web apps, and related topics.

## Topics

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**Note:** See [Installing the Live Schedule Web App](#) to install and use the optional Live Schedule web app.

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- [Web Application Browser Requirements](#)
- [Efficient Use of Capture Web Apps](#)
- [Switching Between Live Capture and Live Play](#)
- [Launching Web Applications](#)
- [Launching the Source Manager Web App](#)
- [Stopping Web Applications](#)
- [Changing the Vantage Domain Name](#)

## Web Application Browser Requirements

Vantage web applications are implemented for execution in Microsoft IIS. Java Script and cookies must be enabled to use Capture web applications properly.

Capture web apps are implemented for viewing in the Chrome browser, version 76.0.3809.100 or greater. Other browsers are not supported. Chrome is installed by default on Lightspeed Live servers and configured to operate properly. Windows is configured to permit Chrome to update automatically.

You can use Chrome on any workstation or other computer, regardless of the operating system, that supports Chrome.

## Efficient Use of Capture Web Apps

When a user is logged into the Capture web applications, the web app consumes network and server resource cycles, particularly while viewing multiple channels. When viewed, each channel connects a thumbnail and preview stream to that instance of the web application. Multiple users connected to the web application can degrade its performance. Therefore, care must be taken to ensure that the Live web apps do not consume resources unnecessarily when not being used.

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**WARNING: Windows IIS allows for a limited set of web socket connections to applications. Over an extended period, if Capture web apps are opened in multiple browsers, the web server and browser may exceed the connection limit. This results in thumbnails and previews not displaying in the web apps. To avoid this situation, close any browser connected to the Live Capture Portal that are not being used.**

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## Switching Between Live Capture and Live Play

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**Note:** This topic only applies to using Live Capture when Live Play is installed on the same Lightspeed Live Server.

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Live Play, an optional SDI playback application, controls the SDI ports when it is in use. When you are using Live Play, your Lightspeed Live Server operates in Live Play mode and the SDI ports are unavailable to Live Capture. When the server is in Live Play mode, you can't use Live Capture, because the Telestream Playlist service is controlling the SDI ports.

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**Note:** For optimal performance, avoid leaving Chrome open and connected on a capture server during active recordings. Instead, use the Live Capture web app from another workstation.

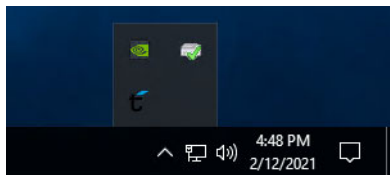
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You must switch to Live Capture mode when you want to utilize the Lightspeed Live Server for Capture operations.

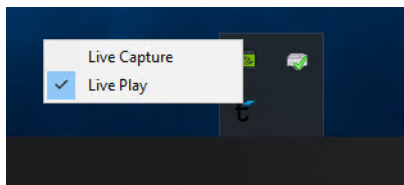
### Switching to Live Capture Mode

To switch to Live Capture mode, follow these steps:

1. In the task bar (bottom right corner of your monitor), click the caret icon.  
Your settings may alter how Windows displays background programs. Windows displays some background programs in the overflow menu:

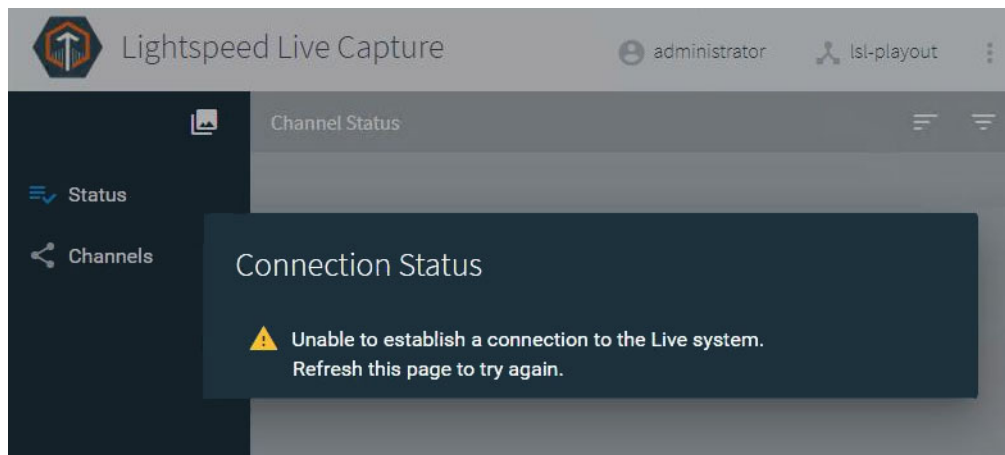


2. Right-click the Live Play Switcher—the Telestream icon—to display the Lightspeed Live mode switcher:



3. If Live Capture is checked, launch Live Capture and proceed with your work.
4. Otherwise, select Live Capture to stop the Vantage Live Service, releasing control of the SDI ports. The [Vantage Live Service](#) restarts without controlling the SDI ports, so that Live Capture can operate properly.

5. If the Lightspeed Live Server is not in Live Capture mode, the Live Capture web app displays this error:



Switch to Live Capture mode and retry.

# Launching Web Applications

**Note:** This topic applies to all Live web apps except the Source Manager web app. For details on launching Source Manager, see [Managing Video Sources](#).

Logging in to a Vantage domain from a web application is a bit different than logging in from a Vantage Windows client application, such as [Workflow Designer](#).

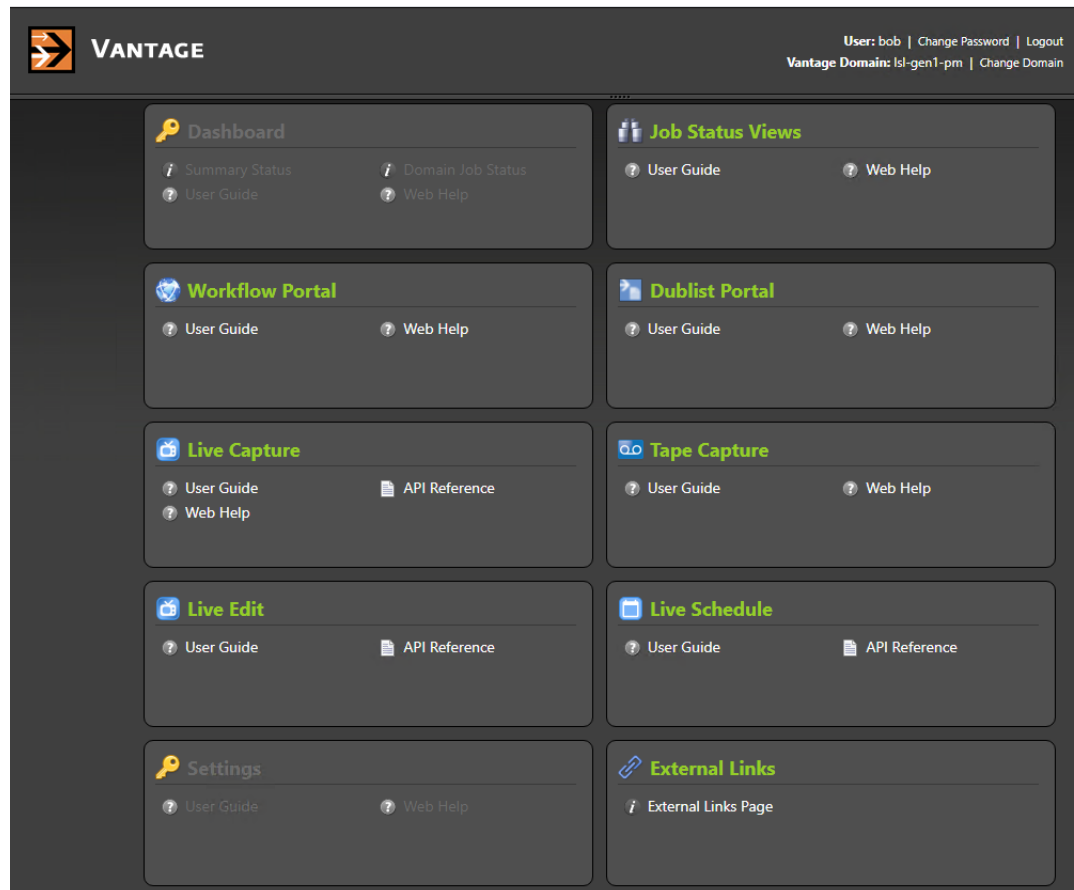
To start Capture | Tape | Live Schedule web applications (or other Vantage client web apps), do the following:

1. Display the Vantage web portal—open Chrome and enter one of these URLs:  
`http://<IISServerName>/Vantage` where `<IISServerName>` is the DNS name of the IIS server—by default, the same as the Vantage domain server

OR

If you're running Chrome directly on the Live Capture server, enter  
`http://localhost/Vantage`.

Vantage displays its web portal (also referred to as the Vantage home page).



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**Note:** If you don't know your Vantage domain's server name (by default, the server where the [Vantage domain database](#) is hosted), contact your Vantage administrator / IT department.

---

2. Click on the panel for the web app you want to launch.
  3. If you're prompted to log in to Vantage, enter your credentials.
- 

**Note:** If you're not authorized to log in, contact your Vantage domain administrator.

---

The apps that display in the Vantage web portal vary depending on your licenses. Click the web app you want to use.

The first time you open the Live Schedule web app, you must use the Vantage web portal (<http://localhost|<host name>/Vantage/>). This creates a cookie for a persistent connection to the Vantage Live Service. Opening the Schedule web app for the first time directly via the URL bypasses this process, resulting in the error *No client connection to Live server*.

---

**Note:** If you are logging into a web app from another workstation on the network, you may encounter a connection error: *No client connection to Live server*. Clear your browser cache and retry, determine if the Vantage Live Service is running and accessible, or go to <http://<host name>/Vantage> to display the Vantage web portal, and launch your web app there.

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## Launching the Source Manager Web App

The Source Manager web app (see [Managing Video Sources](#)) is installed on every Lightspeed Live Capture server.

To start the Source Manager web app and log in, enter `http://localhost:8090/` | `http://<Remote host name>:8090/` in your Chrome browser.

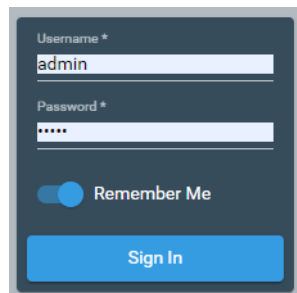
---

**Note:** Unlike Capture, Tape, and other web apps, Source Manager does not utilize the Vantage web portal ([Launching Web Applications](#)) for launching or for managing user credentials, and you can not modify Source Manager user credentials.

---

When you are accessing Source Manager locally (Chrome is running on the same Lightspeed Live Server as Telestream Live Source Service), use the keyword *localhost*. If you are accessing Source Manager remotely (Chrome is running on a computer that is not a Live Capture server), use the Lightspeed Live Server's host name.

Source Manager displays the login panel:

A screenshot of the Source Manager login panel. It features a dark blue background with white text. At the top, it says 'Username \*' followed by a text input field containing 'admin'. Below that is 'Password \*' followed by a password input field with six dots. A 'Remember Me' checkbox is checked and labeled. At the bottom is a blue 'Sign In' button.

Enter your user name and password. The default user name and password is *admin/live!*, and can not be altered. Users are defined using the Groups Portal web app ([User Administration](#)).

## Logging Out of Source Manager

To log out of Source Manager, click the User icon in the toolbar at the top right corner of the window at the far right edge of the Source Manager title bar. Source Manager logs you out and immediately displays the Log In panel.

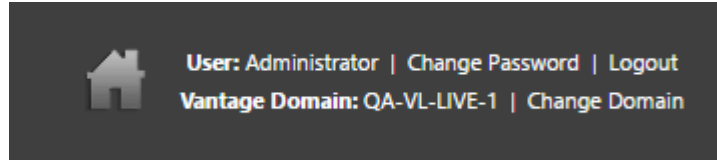
To log back in, enter your user name and password. The default user name is *admin* and the default password is *live!*, and it can not be altered. Multiple credentials are not permitted.

## Stopping Web Applications

To stop any web app you're currently using, log out and close the web tab, close the browser, or change web sites.

## Changing the Vantage Domain Name

If you have changed your Vantage server's host name (by default, it is used to name your Vantage domain), you should verify that the Lightspeed Live Capture web application is using the new domain name. The currently-connected domain name displays in the upper right corner of the web app:



If it is not connected to the correct domain, change the domain with these steps:

1. Click on *Change Domain*.
2. Click OK to log out.
3. Click Search in the dialog that displays.
4. Select the correct domain, and click OK.
5. Enter the user name and password to log into the target domain.

# Capturing Live Video

The Lightspeed Live Capture web application provides the controls, content previews, and status information to capture live video streams, encode the media and save them as media files. This chapter describes the Lightspeed Live Capture web application and how to use it. You can also use the Vantage Job Status Views web app to monitor capture jobs.

## Topics

- [Pre-requisites to Using Live Capture](#)
- [Using the Lightspeed Live Capture Web App](#)
- [Using Triggers to Control Channel Recording](#)
- [Recorded File Location and Format](#)
- [Using the Vantage Job Status Views Web App](#)

---

**Note:** You can not use Live Capture to capture SDI while simultaneously using Live Play to play out SDI on the same Lightspeed Live Server. You can only use Live Capture—placing the server in Capture mode—or use Live Play—placing the server in Play mode—at any one time.

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**Note:** For details on launching web apps and other general web app topics, see [Managing your Web Apps](#).

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## Pre-requisites to Using Live Capture

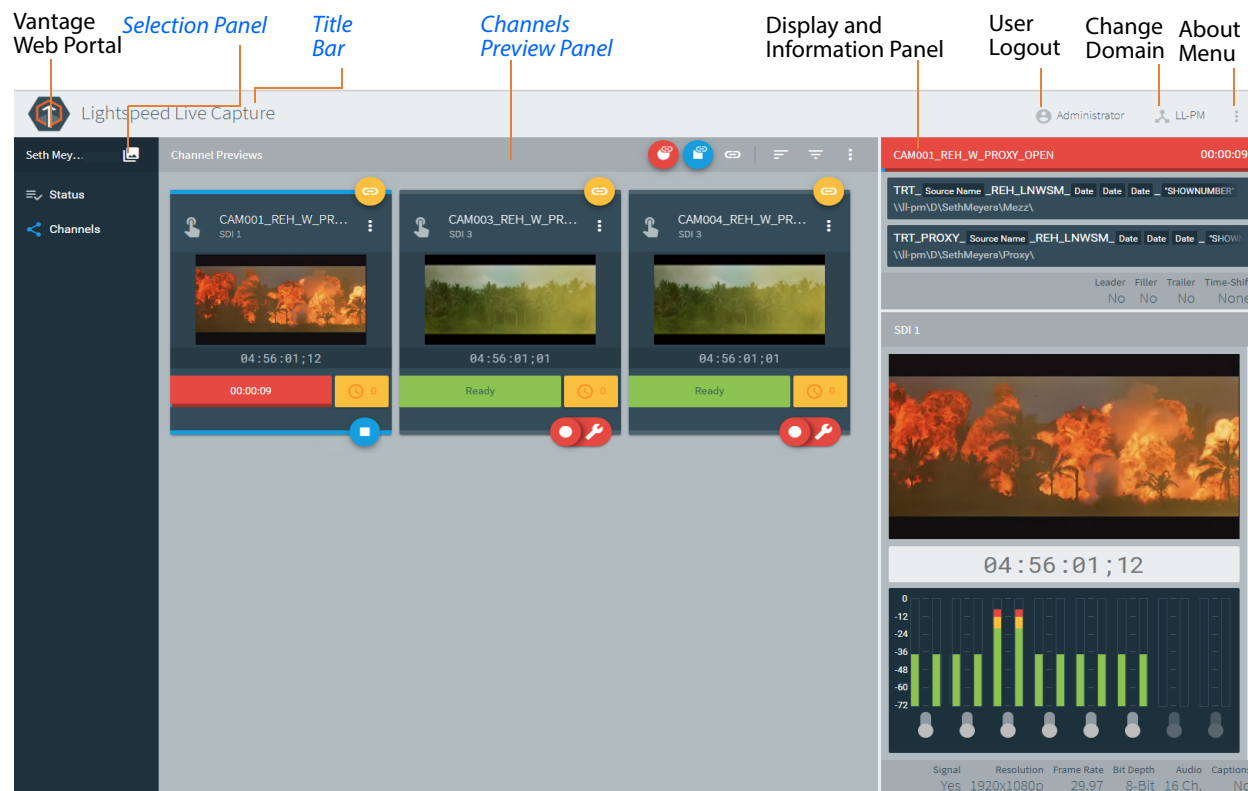
**Note:** Before you can record live video using Live Capture, some Vantage components must be set up, and you should create Vantage accounts for each user. See [Configuring Vantage for Use with Live Capture](#) for instructions. You must also create at least one Live Capture workflow and activate it—Live Capture only operates with active Live Capture workflows. See [Creating a Live Capture Workflow](#).

## Using the Lightspeed Live Capture Web App

These are the key tasks you perform in the Live Capture web app:

- Select channel groups and check their status
- Configure and manage channels: information, previews, and status
- View channel labels, variables, and recordings
- Start and stop channel recording. Control the operation of each channel manually by an operator or automatically—via Web Services, SCTE-104 (automatic—no operator intervention), Live Schedule or Recurring Segment triggers.

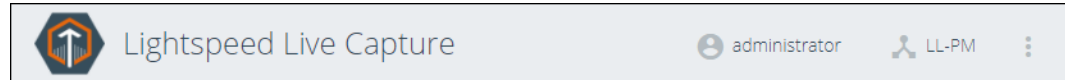
This figure represents a typical Live Capture web app interface, with modes to the left, and the Channel Preview panel with the selected channel's (far left—note the blue bars, top and bottom) details to the right:



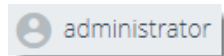


## Title Bar

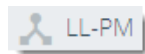
The Title bar at the top of the application provides these options:



**Home**—Click to open the Vantage web applications menu.



**User Name**—Displays the current user name. Click and select Log Out if you want to log in as a different user.



**Vantage Domain**—Displays the Vantage domain to which you are connected. Click and select Change Domain to open the dialog to select a different Vantage domain.

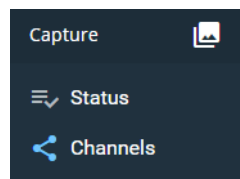


**Preferences**—Click to display the Preferences dialog, where you can check Prompt for Confirmation Before Stopping Recordings, if you want a prompt before recording stops due to your actions.

**About**—Click to display the Capture About panel, and access the User Guide (this document), application information, and support information.

## Selection Panel

The Selection panel at the far left of the application where you can select among your Channel Groups, and view Capture status, and Channels.



**Channel Groups**—Click Channel Groups to select a group from the list of available groups. This is the first selection you must make. See [In the Vantage Management Console...](#) to create at least Channel Group.



**Status**—Click Status to open the Job Status panel, which shows the status and jobs of all active workflows contained in the selected channel group. (See [Channel Status Panel](#)).

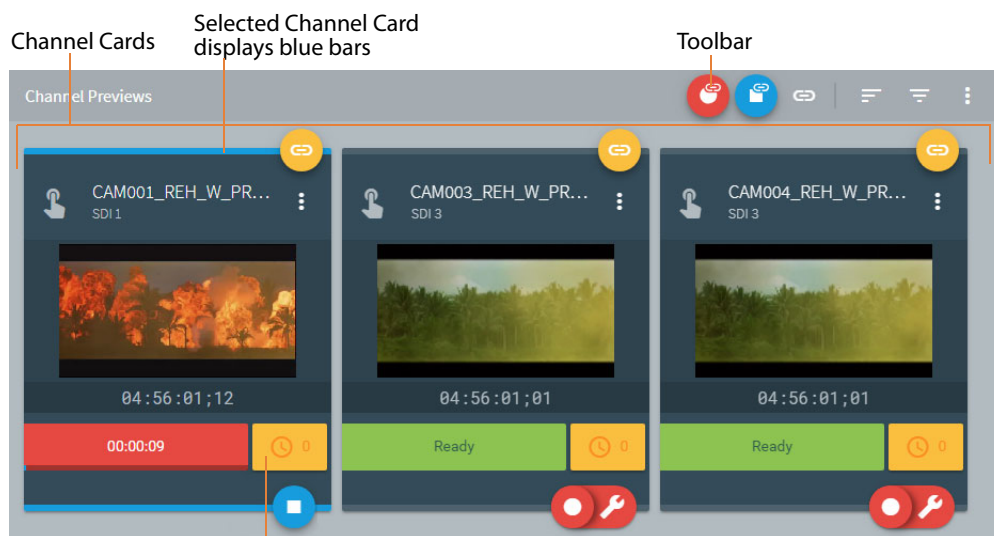


**Channels**—Click Channels to display the Channel Previews and Display panels (see [Channels Preview Panel](#)).

## Channels Preview Panel

When you select Channels, the Channel Previews panel displays a thumbnail of video on a channel card. One channel card is displayed for each active Live Capture workflow. Information, settings, and options are presented that are specified in each workflow.

- The selected channel card, indicated by blue bars on the top and bottom, plays in the Display and Information panel to the right.
- Use the toolbar and menus to control channel ganging—triggering multiple recordings at once but not necessarily all channels, channel filtering, and recording settings.
- Each channel displays a channel name and displays a thumbnail of incoming video.
- Each channel displays a gray trigger type, a yellow gang/ungang button, a red and green Recording | Ready (Stopped) bar, and a yellow queued job bar.
- The More button provides access to menus for each channel.
- The bottom right corner includes red Record and Record Options buttons for one-button recording and easy access to recording settings.



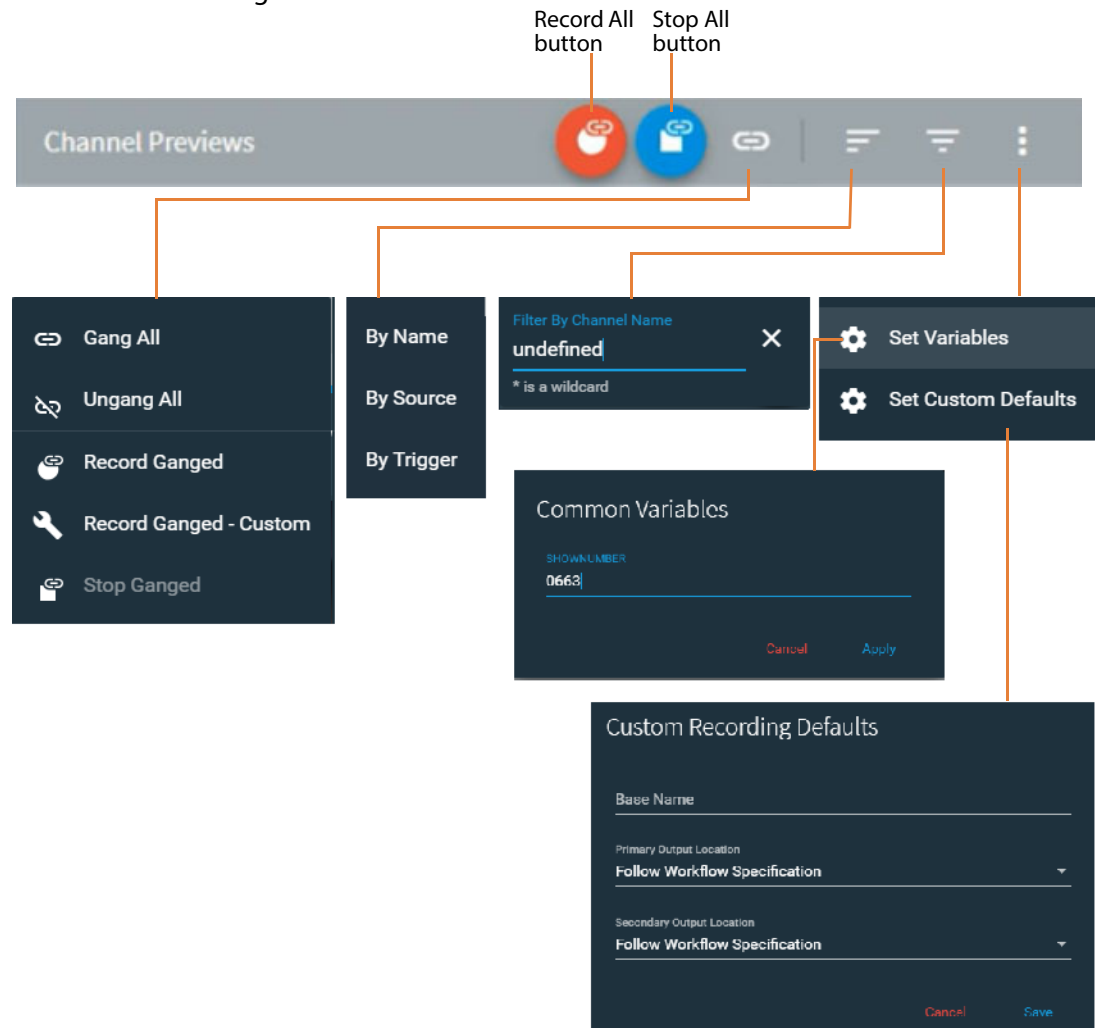
Channel Previews panel components are described in detail in the following topics:


- [Channel Previews Toolbar](#)
- [Configuring Custom-Ganged Recording](#)
- [Channel Controls](#)
- [Channel Options](#)
- [Viewing a Channel's Recording History](#)
- [Display and Information Panel](#)
- [Loss of Signal Behavior](#)

## ■ Limited Bandwidth Behavior

### Channel Previews Toolbar

The Channel Previews toolbar displays several icons, each of which displays a set of commands or settings:



 **Record All**—Click *Record All* to record the currently-ganged channels. Record All operates in two different modes depending on whether Time-Shift has been enabled in the workflow. (See the Capture action help topic for details about time-shift.) Frame-accurate gang recording may not be reliable without using time-shift.

Effect of time-shifting for manual trigger workflows (does not apply to recurring segment workflows):


- **When Time-Shift is disabled** in the workflow, all channels start recording immediately with no attempt to synchronize the start timecode.
- **When Time-Shift is enabled** in the workflow, the system attempts to synchronize all of the selected channels to the same start timecode before starting recording.


When recording starts, some portion of the frames in the time-shift buffer are added to the start of the recorded file (going back in time to included frames from the past). As a rule, add 10 seconds of time-shift for each ganged channel. For example, in an array capturing 12 channels (4 per server) each channel should be given 10 seconds of time shift (4 channels X 10 seconds per channel = 40 seconds per server). Buffer limits vary based on server, RAM, and media metrics. See [Determining the Time-Shift Buffer Duration](#) for details.

---

**Caution:** When you are gang recording with Time-Shift, you should configure all channels with a valid timecode, connected to inputs with identical frame rates and set to the same timecode source. Otherwise, channels may fail to start.

---


 **Stop All**—Click *Stop All* to immediately stop recording all ganged channels in the channel group that have not been filtered out.


 **Gang Record menu**—Select *Gang Record* to display a panel in which you can control gang recording. Gang recording allows you to trigger recording on multiple channels simultaneously without necessarily triggering all channels.


Use this menu to turn gang recording on or off for all channels (Gang All/Ungang All), start/stop gang recording (Record Ganged), and set up customized gang recording to specify which channels are ganged (Record Ganged Custom).

Frame-accurate gang recording is not reliable until you have a time shift of at least 10 seconds applied to a channel, 15 seconds is better.

See *Record All* above for details about how Time-Shift affects gang recording.

 **Sort**—Sort channel cards by Name | Source | Trigger. You can also drag & drop channels.

 **Filter**—Filter by typing portions of the workflow name to see only the channels that contain the typed characters. Use \* as a wildcard character.

 **Global Metadata menu**—Contains standard Variables and Custom Defaults.

Select Set Variables to set common variables for all channels. For example if you set a bound variable in Set Variables, the value for that variable is used in every recorded channel it is associated with, except when explicitly set in a workflow's Variable dialog.

Select Set Custom Defaults to specify a default base name for all channel files, and default global primary and secondary output locations.

Values entered and saved in the Global Metadata menu are persisted in memory as long as the browser remains open. If no persisted value is present (for example, a new variable is assigned to a workflow that has just been activated), the default value configured in the Vantage Management Console is used.

---

**Note:** Variable and Label data entered while a channel is in the Waiting state are applied to a job at the time the job is queued for recording. Variable and Label data

entered while a job is in a Recording or Pending state is applied to the next job queued.

## Configuring Custom-Ganged Recording

Select Record Ganged - Custom to display the Record panel and select which channels to include in the record operation and the settings to use for all channels.

Record

☒ MXF TC Issue Test  
SDI 1

☒ XDCAM plus Copy  
SDI 1

Primary Output Location  
Follow Workflow Specification ?

Secondary Output Location  
Follow Workflow Specification ?  
No secondary output specified.

Base Name ?

☒ Timed Recording

Start 16:05:40;15 Stop 01:05:40;15 Duration 09:00:00;00

☐ Record Duration ?

☐ Ignore Discontinuity ?

Cancel Record

**Channel Name(s)**—For each Manual Trigger or Recurring Segment Trigger, displays the name of the workflow channel and the name of the input for that channel. The channels that are checked are included in the record operation.

**Primary Output Location**—Select a Vantage folder address book entry for the destination of the primary output, or use the default location specified in the Capture action workflow.

**Secondary Output Location**—Select a Vantage folder address book entry for the destination of the secondary output, or use the default location specified in the Capture action workflow. The secondary output must be enabled in the Capture action for each channel included in the record operation for this to be active.

**Base Name**—Enter a name for the Base Name token. This name appears in the job name and is only used in the output media filename pattern when the Base Name token is added in the Filename Pattern Editor in the Capture action for this channel. The

Base Name entered is applied to all channels selected for recording. To add the Base Name token, see [Configuring Primary and Secondary Outputs](#).

**Timed Recording**—Enable Timed Recording so you can set start, stop, and duration times and options. Timed Recording is not active for channels configured to use [Using Recurring Segment Triggers](#).

- **Start** (Timecode)—If all selected channels have a common timecode, the values of Start are automatically entered. You may enter any desired timecode.

Setting Start Timecode to a value that is less than 60 seconds in the past results in a recording starting immediately. For example, if the current timecode is 02:30:00;20 and a start timecode of 02:30:00;18 is used in the job, recording begins immediately at the current timecode of 02:30:00;20.

Setting Start Timecode to a value that is more than 60 seconds in the past results in a job to be scheduled for recording in 24 hours. For example, if the current timecode is 02:30:00;20 and a start timecode of 02:29:00;18 is used, recording begins at 02:29:00;18 the next day (nearly 24 hours later).

- **Stop** (Timecode)—Specifies the timecode when recording should stop.
- **Duration**—When you enter a *Start* and *Stop* timecode, the resulting duration is automatically displayed. When Record Duration (see below) is enabled, the duration entered here is used.
- **Record Duration**—When enabled, capture recording ignores the *Stop* timecode and stops when the *Duration* you specify is reached. When disabled, recording stops when the *Stop* timecode is reached, and the Mark-OUT frame is not included in the captured file.
- **Ignore Discontinuity**—When Ignore Discontinuity is enabled, recording ignores any timecode discontinuity if detected. When not enabled, recording stops when a timecode discontinuity is detected. See [Timecode Break Recording](#) for details.

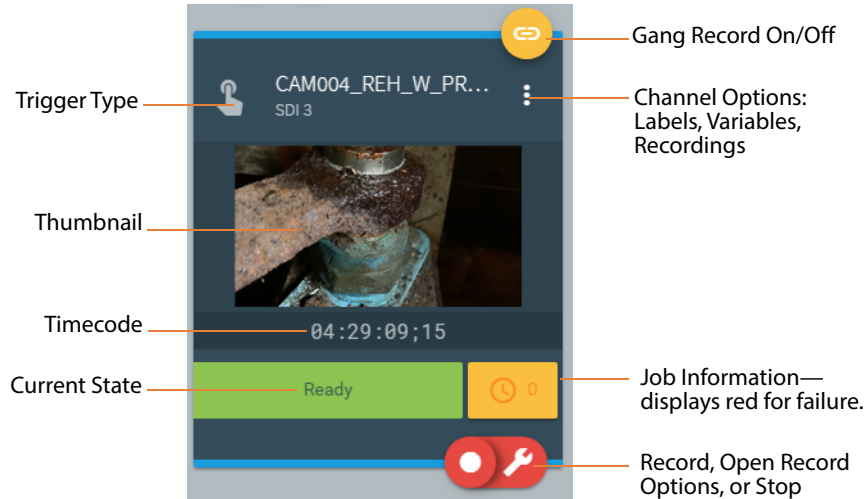
---

**Caution: When you enable Ignore Discontinuity, Live Capture suppresses time code errors—they are not displayed in the web app to alert you of a potential problem. If there are time code discontinuities on the tape, recording continues without interruption or warning.**

---

## Channel Controls

The Channel control panels provide information and controls for each channel that has an active workflow. Here is a typical representation:



**Trigger Type**—Indicates the type of trigger that controls the channel:

Icon	Trigger Type
	Manual Trigger
	DAI (Dynamic Ad Insertion) Trigger
	CalDAV Calendar Trigger
	Web Service Trigger
	Recurring Segment Trigger

**Name**—Shows the source name.


**Thumbnail**—Displays a still image of the channel input, updating about once every 3-5 seconds (depending on server usage load).


**Timecode**—Displays the current channel timecode.


**Gang Recording**—Toggles gang recording for the channel. Yellow indicates it is on, and gray is off. Only channels configured with Manual | Recurring Segment | Web Service (when Manual Override is enabled) triggers can be used in gang recording.


**Current State**—Indicates the current channel recording state by color and message:

- **Green**—Indicates the channel is ready to record, with a message of *Ready* (Manual, Recurring Segment, and DAI), *Listening...* (Web Service), or *Awaiting...* (CalDAV Calendar).
- **Yellow**—In a transition state and preparing to record or stop.
- **Red**—Recording is occurring. The elapsed duration of the recording is displayed. A blue progress bar indicates the current recording progress.

 **Channel Options**—Opens the Channel Options menu. See [Channel Options](#).

 **Queued Job Information**—Displays in yellow; the number displayed indicates how many jobs are queued to start. Click to display the Recordings panel, which displays information about the current, queued, and previous recordings. See [Viewing a Channel's Recording History](#).


 **Failed Job Information**—Displays in red when the associated job has failed due to a downstream error condition. Remains red until a new job is started; the number displayed indicates how many jobs are queued to start. Click to display the Recordings panel, which displays information about the current, queued, and previous recordings. See [Viewing a Channel's Recording History](#).

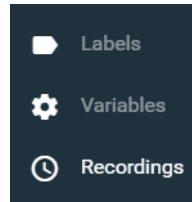
 **Record/Stop**—Click Record to immediately start recording for the channel. When recording, click Stop to end recording. You can also start recording an event in the Event calendar—click on the event's start icon (see [Starting an Event Immediately](#)).

 **Record Options**—Click Record Options to display the Record Options panel for the channel. See [Configuring Custom-Ganged Recording](#).



## Channel Options

Select the  icon on a Channel card to open the Channel Options menu.



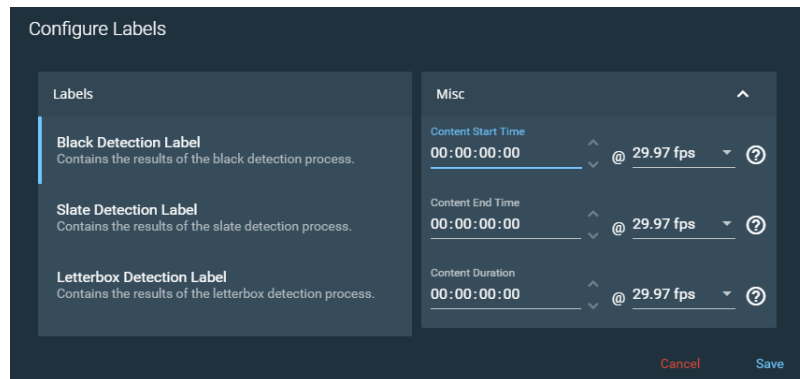
**Labels**—When you are using Labels in the Capture action for the channel, click to display the Configure Labels panel and adjust Label settings. The definition and contents of labels depends on the metadata labels you create and define in the Vantage Management Console and enable in the Capture action. Labels can be used in downstream Vantage actions or transformed into text or XML for out-of-band delivery. To add labels to a Capture action, see [Expected Labels](#).

**Note:** If label parameters are modified in the Vantage Management Console, the changes must be applied to the workflow's Capture action so that they are updated in the Live Capture web app.

To apply label updates:

1. Put the workflow into edit mode and open the Capture action inspector.
2. In Expected Labels, disable the target label(s); then re-enable them.
3. Save the action and reactivate the workflow.

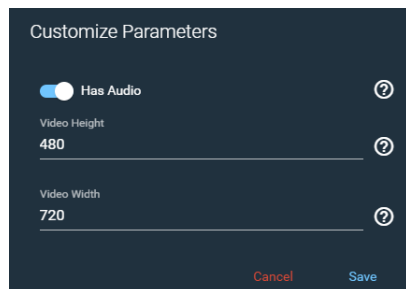
Now, the updated label(s) displays the correct information in Live Capture.



**Note:** Variable and Label data entered while a channel is in the Waiting state are applied at the time the job is queued for recording. Variable and Label data entered while a job is in a Recording or Pending state are applied to the next job queued.

**Variables**—Configuration parameters bound to Variables during Capture action setup or via the Add Variables context menu in the Capture action are displayed in the

Customize Parameters panel. You can turn selected Variables on or off, enter configuration variables or adjust specific settings.



Any variable values entered and saved are persisted in memory as long as the browser remains open. If no persisted value is present (for example, a new variable is assigned to a workflow that has just been activated), the default value configured in the Vantage Management Console is used.

---

**Note:** All configuration variable values are passed to downstream workflow actions where they can be analyzed or used in your entire workflow.

---

**Recordings**—Displays the Recordings panel, which displays information about the current, queued, and previous recordings. See [Viewing a Channel's Recording History](#) following.
















## Viewing a Channel's Recording History

The Recordings panel provides information about the selected channel—queued, in-process, stopped, or completed—and enables you to copy the output path to your clipboard for use in other applications, such as a web browser or video player.

---





**Note:** Status details for Vantage Capture workflow can also be found in the Job Status Views web app. See [Using the Vantage Job Status Views Web App](#).

You can not use multiple Capture actions in a workflow—inaccurate state information is displayed reported for the workflow Status in the thumbnail card and Status Panel.





Recordings					
Capture State	Job State	Name	Duration	Primary Output	
		1600	00:30:00 16:00:00:00 to 16:30:00:00		
		1530	00:30:00 15:30:00:00 to 16:00:00:00	1530_820.mxf \\fl-pm\Drive Store\4f523296-3051-4e...	
		1500	00:20:50 15:00:00:00 to 15:30:00:00	1500_494.mxf \\fl-pm\Drive Store\315d7163-4cf4-42...	
		Bob123456	00:30:00 15:00:00:00 to 15:30:00:00		
		Bob11234	00:14:59 14:15:00:00 to 14:30:00:00	Test Workflow SDI 4a_LL-PM - SDI ... \\fl-pm\Drive Store\ae5a9c84-5f72-424...	

The Recordings panel displays information in columns, described here:

**Capture State**—Indicates the real time state of the capture process (represented by the Capture action itself) for this channel's recording job:

Icon	Recording State
	The current recording is complete.
	In an idled state, either queued for or stopping recording.
	Recording is in progress.
	Recording has failed.


**Vantage Job State**—Indicates the real time state of the capture workflow's job in Vantage (which is set by the state of all actions in the workflow):


Icon	Job's Workflow State
	The workflow's job completed successfully.
	The job is waiting or in progress.
	The job has been stopped by the user.
	The job failed. Check the Job Status View for details of failed jobs. See <a href="#">Using the Vantage Job Status Views Web App</a> .

**Name**—Displays the job name. The name varies for different trigger types and may include information such as base name, workflow name, or capture start time entries.

**Duration**—The duration that was specified to record, or the final duration. The **Start Name**—Displays the job name. The name varies for different trigger types and may include information such as base name, workflow name, or capture start time entries.

**Duration**—The duration that was specified to record, or the final duration. The **Start** and **Stop** timecode may also be displayed.

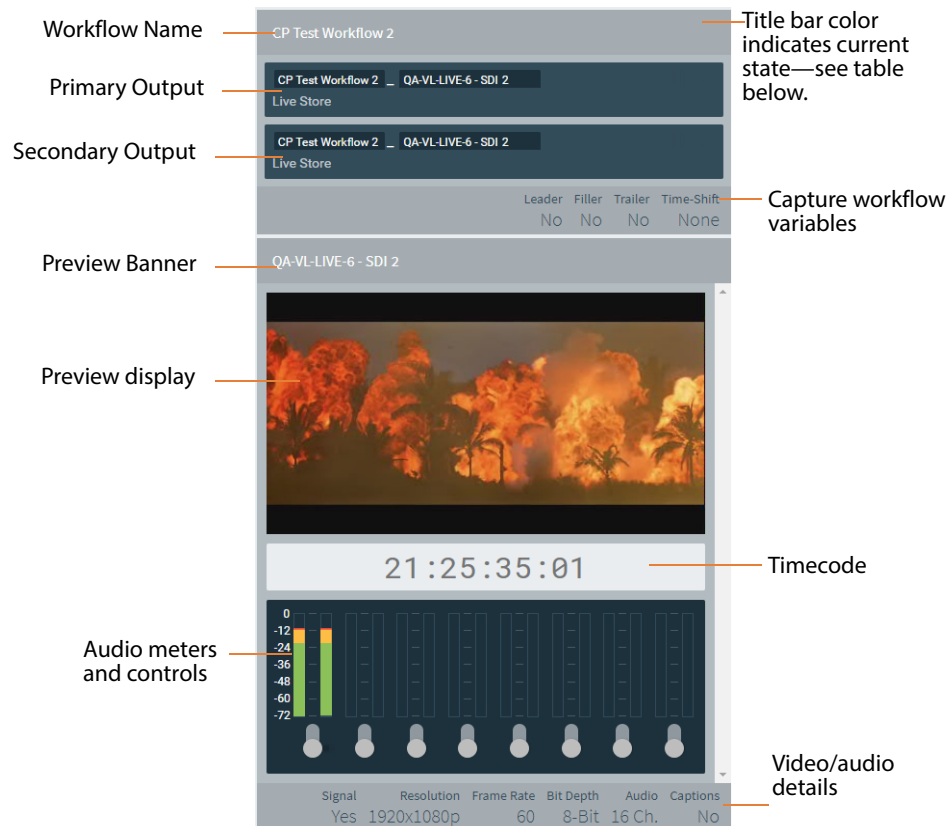
**Primary Output**—The primary output file name and location path. Click the  icon to copy the output path to your clipboard. You can paste the copied path into Windows File Explorer, then log into the Lightspeed Live Server to open the file with an appropriate application.

**Secondary Output**—The secondary output file name and location path. Click the  icon to copy the output path to your clipboard.

**Customization**—Custom settings that apply to the channel.

## Display and Information Panel




The Display and Information panel plays video and audio of the currently selected channel and provides channel status and other information, as shown in this example:



**Workflow Name**—Displays the channel workflow name.

**Primary and Secondary Filename Pattern and Output Location**—Displays the location where the output file is saved and shows the filename pattern set for the channel.

**Preview Banner**—The preview banner (directly above the Preview display) indicates the name of the workflow and the current state of the channel. When in the record state, it displays the elapsed time and a blue progress bar indicating the duration of the recording that has been captured.

Preview Banner	Current State
	Ready for recording to be initiated—displays the Vantage Domain and the source name.
	In a transition state, either queued up to record or stopping recording.
	Recording is currently underway.

**Preview Display**—Displays the content of the selected channel.

**Source File Selections**—Displays which of these variables have been enabled in the Capture workflow.

**Audio Meters and Controls**—Displays audio levels for all audio channels. The Preview Display can play just one channel pair at a time. Toggle a channel pair on to hear the audio for that pair. A level display bar shows variations in the audio level with green, yellow, and red indications and a decibel scale. Includes up to eight (8) audio pairs.

**Timecode**—Displays the current timecode.

**Video/Audio Details**—Displays video resolution, frame rate, bit depth, number of audio channels, and whether captions are present.

## Loss of Signal Behavior

**If LOS is detected on an input at start-up and the state doesn't change, then:**

The thumbnail and preview displays the LOS Video Test Pattern with LOS overlay indicating that the input channel is currently in an LOS state. The input is set to a default, un-configurable frame rate and resolution. Starting a Capture recording when the input is in this state results in a job failure with an LOS error.

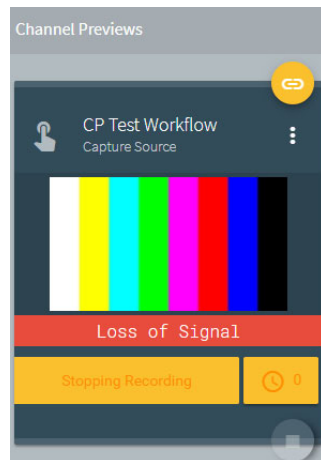
**If LOS occurs after the input had good active video and channels associated with this input are not currently recording, then:**

If Freeze on LOS is enabled the thumbnail and preview show the last frame of good video; otherwise, if Freeze on LOS is disabled the thumbnail and preview show the LOS Video Test Pattern. In either case the thumbnail and preview display an LOS overlay. The frame rate and resolution of the input is that of the previous active video. Starting a

Capture recording when the input is in this state results in an immediate job failure with an LOS error.

**If LOS occurs after the input had good active video and channels associated with this input are currently recording, then:**

If Freeze on LOS is enabled, the thumbnail and preview show the last frame of good video; otherwise, if Freeze on LOS is disabled, the thumbnail and preview displays the LOS Video Test Pattern. In either case the thumbnail and preview display an LOS overlay. The frame rate and resolution is that of the previous active video.



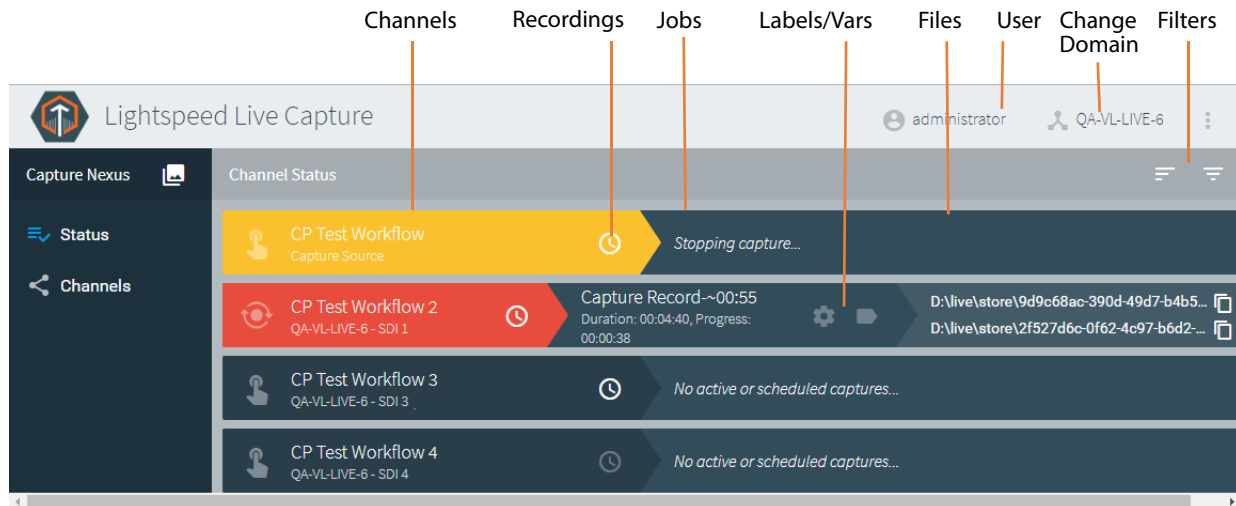
- Jobs that are recording with Ignore Lost Frames disabled in the workflow stop immediately. If the system is so configured, a new recording starts when the signal is regained. Enabling Ignore Lost Frames should not be necessary in most cases.
- Jobs that are recording with Ignore Lost Frames enabled continue capturing for their scheduled duration, and contain the frozen frame/color bar frame(s) or active video if it returns. When enabled, *all* input-related error messages are ignored without warning and capture continues.

## Limited Bandwidth Behavior

If more than one second of preview data is buffered, a message displays, advising that the available resources are limited and audio is turned off in order to play video in the preview: *"Preview is degraded due to resource limitations. See User Guide for details"*. Likely causes of the problem include network bandwidth or CPU/GPU over-saturation (not to exceed 75%; less than 60% is recommended). Taking actions to reduce the load on the network and processors may resolve the issue.

## Channel Status Panel

When you select Status in the left panel, the Channel Status panel displays the current state of each channel in the current Channel Group, including current recording job status, and the previous job history. See the descriptions below for display details and [Viewing a Channel's Recording History](#) for Recordings panel details.




**Channels**—The status display left column lists the channels in the channel group. Both the name of the channel and its description are shown. The trigger type appears beside the name.


**Jobs**—The status display middle column shows the current (pending or in-progress) job for each channel. The job's name, scheduled duration, and current progress counter are displayed.

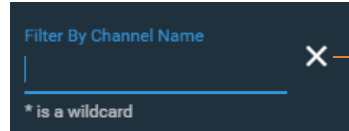
**Labels**—The Labels icon displays the Labels panel, which shows labels and associated values generated by the channel workflow.

**Variables**—The Variables icon displays the Variables panel, which shows variables and associated values used by the channel workflow.

**Captured Files**—Primary and Secondary file outputs are listed. To quickly access captured files you can click the file name and path in the right-most column. The Captured Files panel displays. Click the  icon to copy a file output path to your clipboard. You can paste the copied path into your Windows File Explorer, then log into the Lightspeed Live Server to open the file with an appropriate application.

## Filtering Job Status

 **Channels**—Select to filter the channel list by typing a portion of the channel name to see only the channels that contain the typed characters.




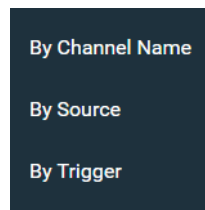
Filter By Channel Name

X

\* is a wildcard

Click X to clear the settings

 **Jobs**—Select to filter by typing portions of the job name to see only the jobs in each channel that contain the typed characters. You can also select sorting options for additional refinements.



By Channel Name

By Source

By Trigger



# Using Triggers to Control Channel Recording

The trigger type that is specified in a Vantage Capture workflow's Capture action determines the method by which channel recording is controlled—manually, by an operator, or automatically via DAI or a web service, for example. For information about selecting triggers and their options in a Capture action, see [Configuring Trigger Settings](#).

## Topics

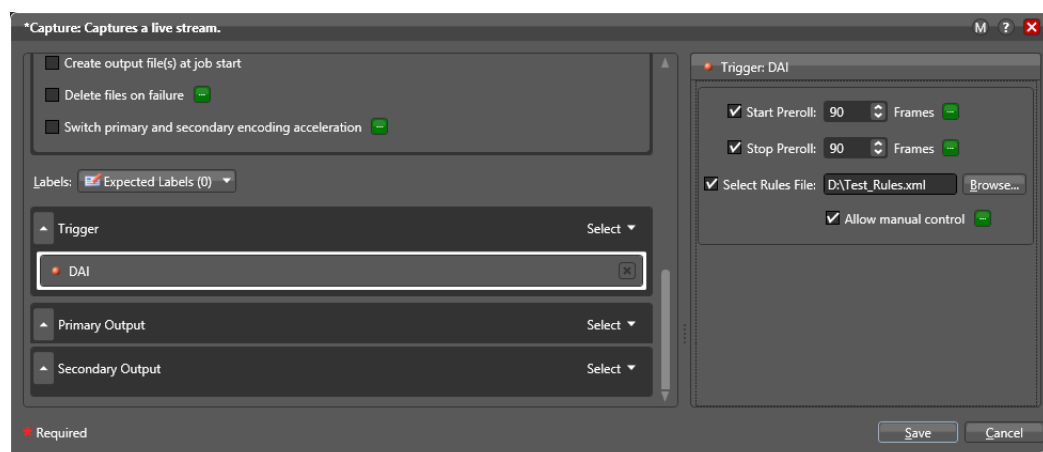
- [Using DAI Triggers](#)
- [Using Manual Triggers](#)
- [Using Recurring Segment Triggers](#)
- [CalDAV Calendar Trigger](#)
- [Using Web Service Triggers](#)

## Using DAI Triggers

The DAI (Dynamic Ad Insertion) trigger enables automatic recording to start and stop based on incoming SCTE-104 markers contained in the VANC data stream of the workflow's SDI input. Recording begins when a Start Program marker is detected and stops when an associated Stop Program marker with an Event ID that matches the Start Program's ID is detected. Channels set to DAI trigger are presented in a read-only status unless Allow manual stop is checked in the Capture action to expose a manual stop button in the web app.

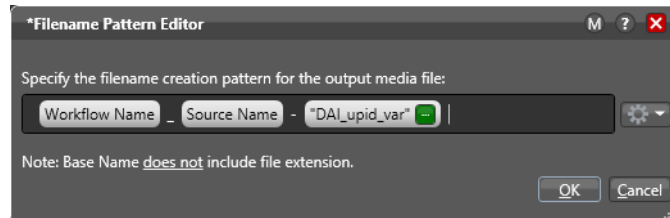
The following steps explain how to set up a DAI trigger. Steps shown here may vary according to your requirements:

1. In Workflow Designer, create a Live Capture workflow and configure the Capture action to use a DAI trigger.



2. Load the rules XML file (example shown below) into the DAI configuration (using Select Rules File) and make other DAI configuration selections. The file must include program start and end triggers and the UPID (identifier) of an ad to insert.

3. Use the Vantage Management Console > Variables panel to create a variable to extract the UPID value from the program triggers in the rules. (Using the UPID to populate a variable is optional.)
4. Use the variable in the Filename editor to capture the UPID value as part of the output base file name. (Using the UPID to populate the filename from a variable is optional.)



When the workflow operates correctly, the SCTE triggers in the source create a new job at the expected frame, the job stops at the expected frame, and the name of the inserted file matches the associated segmentation UPID.

The following example—the triggers element—illustrates a typical rules set:

```
<triggers>
  <rule>
    <description>Default Start - Program Start</description>
    <captureaction>Start</captureaction>
    <ignoreeventids/>
    <extracttovariable variablename="segmentation_upid_name">
      segmentation_upid</extracttovariable>
    <scte104>
      <multiple_operation_message>
        <time_signal_request_data>
          <pre-roll_time>0</pre-roll_time>
        </time_signal_request_data>
        <insert_segmentation_descriptor_request_data>
          <segmentation_type_id>16</segmentation_type_id>
        </insert_segmentation_descriptor_request_data>
      </multiple_operation_message>
    </scte104>
  </rule>
  <rule>
    <description>Default Stop - Program End</description>
    <captureaction>Stop</captureaction>
    <ignoreeventids/>
    <scte104>
      <multiple_operation_message>
        <time_signal_request_data>
          <pre-roll_time>0</pre-roll_time>
        </time_signal_request_data>
        <insert_segmentation_descriptor_request_data>
          <segmentation_type_id>17</segmentation_type_id>
        </insert_segmentation_descriptor_request_data>
      </multiple_operation_message>
    </scte104>
  </rule>
</triggers>
```

**Note:** SCTE-104 rules files can be complex. If you require assistance, contact Telestream Support ([Obtaining Support | Information | Assistance](#)) or your Telestream Sales Engineer for details on configuring them.

See [Configuring Trigger Settings](#) for specific DAI Trigger settings and details. You can also get help from [Telestream Support](#) in putting together workflows to enable DAI triggers.

## Using Manual Triggers

The Manual start trigger enables you to control channel start and stop operation in the Live Capture web app. Click Record to display the Record panel so you can select settings for the record operation. You can also select the Record All option in the top bar of the Channel Previews panel to start the record operation for multiple channels.

See [Configuring Custom-Ganged Recording](#) for descriptions of the Record panel controls.

Record

SDI 1b + Secondary, Var, Label  
SDI 1

Primary Output Location  
Follow Workflow Specification

Secondary Output Location  
Follow Workflow Specification

Base Name

☒ Timed Recording

Start: 12:12:30;13   Stop: 21:12:30;13   Duration: 09:00:00;00

☒ Record Duration

☒ Ignore Discontinuity

Cancel   Record

## Using Recurring Segment Triggers

The Recurring Segment trigger enables you to capture files of the duration specified in the Capture action's Recurring Segment control. Durations from 5 minutes to 8 hours are permitted. You can control when to start recording in the Live Capture web app by manually starting capture or in Live Schedule by adding an event, unless the Capture

action's Begin Recording on Workflow Activation control is also enabled, in which case, recording starts as soon as you activate the workflow.

---

**Note:** For events in Live Schedule, the recurring segment trigger workflow that you use should not have Start Recording on Activation enabled, and the optimal choice for the recurring segment scheme used in the workflow is Timecode. Events for a recurring segment trigger workflow do not indicate a Queued state—it transitions directly from Waiting to Recording at the start of the event. If any or all segments fail, Live Schedule will not indicate the failure. Event recording does not start or stop on the exact boundaries as set by the event; typically the offset is in the realm of seconds. Add an extra minute to the event duration to ensure the full range of the event is recorded.

---

---

**WARNING: If the video and timecode are not synchronized, time code discontinuities can occur. To avoid time code anomalies such as unexpected discontinuities and repeated time codes, always sync the incoming SDI frames with your chosen time code source. Failure to do so can cause recordings that stop abruptly or do not stop as expected.**

---

The first and last segments captured may be shorter than the specified duration, depending on when the recording start and stop commands are initiated.

In the Capture action, you can choose the method by which the duration is calculated, depending on your requirements.

The Timed Recording option does not apply to recurring segments. See [Configuring Custom-Ganged Recording](#) for descriptions of the Record panel controls.

Record

Recurring-1  
SDI 4

Primary Output Location  
Follow Workflow Specification

Secondary Output Location  
Follow Workflow Specification

Base Name

Timed Recording

Cancel Record

## CalDAV Calendar Trigger

A CalDAV Calendar trigger enables you to record based on events in a CalDAV-compatible calendar. Channels that are set to CalDAV Calendar trigger are displayed in a read-only status view in the Live Capture web app. For configuration details, see [Configuring Trigger Settings](#).

---

**Note:** The CalDAV Calendar trigger is specifically for use with CalDAV calendars. It should not be confused with events created in the Live Schedule web app. For details, see topics in the [Scheduling Live Capture Sessions](#) chapter.

---

## Using Web Service Triggers

Use a Web Service trigger to perform live video capture using commands from the Lightspeed Live Capture Web API. You can queue up a maximum of 16 Web Service Trigger jobs per Live Capture host server at any one time.

Channels set to Web Service trigger with Allow Manual Control disabled are presented in a read-only status view in the Live Capture web app. If Allow Manual Control is enabled, manual controls and web service data is present on the channel's thumbnail card, allowing for full manual control (see [Channel Controls](#) for additional details). For more information see [Configuring Trigger Settings](#).

The Lightspeed Live Web API Reference document is published on the Telestream website: [Lightspeed Live Capture Web API Reference](#).

## Recorded File Location and Format

When recording is active, capture files are written to the Live store, or the path specified in the Live Capture action under Output Location in the Primary Output or Secondary Output. To set the output locations see [Configuring Primary and Secondary Outputs](#).

To access the recorded files from the Live Capture web app, see [Viewing a Channel's Recording History](#) and [Captured Files](#) under the [Channel Status Panel](#) heading in this chapter.

## Selecting Output Encoders and Format

The Primary Output and Secondary Output in the Capture action enable you to select the container format and the video and audio encoders to use for the captured output. You can create multiple output configurations, and allow an operator to choose which one to use for a given capture session. See [Configuring Primary and Secondary Outputs](#) for more information.

## Deleting Captured Files

It is important to configure the Live store correctly to ensure that captured files are deleted when jobs are deleted or expired. Otherwise, obsolete recordings build up in the Live store, possibly filling up storage unnecessarily. For details about Live store configuration, see [Identifying Live Stores with a UNC Path](#).

## Using the Vantage Job Status Views Web App

Job Status Views is a web application that enables basic Vantage job monitoring and management via a web browser. You can use Job Status Views to access job information and manage jobs in your Vantage or Live Capture domain from anywhere on the LAN, or via the Internet if you provide access to your Vantage domain.

The Job Status Views web app is ideal for use when you don't have access to Workflow Designer, but want to monitor your jobs.

You can use the Job Status Views web application to do the following:

- Display information about submitted jobs, including any errors that have occurred
- Sort and filter job entries
- Highlight and identify jobs in different states
- Troubleshoot job processing issues and view error messages.

The *views* that you see in Job Status Views are defined by Vantage administrators, who control which job information displays and which job control functions (such as the ability to delete a job) are allowed.

Views may be public or private and are configured in the Vantage Management Console. Public views are available to everyone, and private views are for use by specified Vantage users. See [Configuring Vantage for Use with Live Capture](#).

## Displaying Vantage Job Status Views

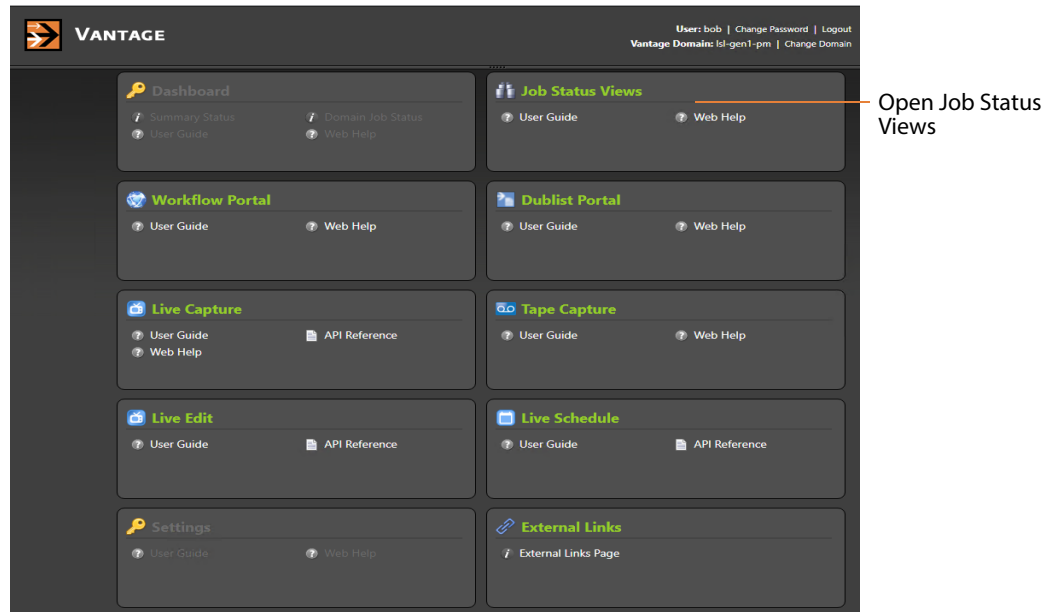
To use the Job Status Views web App for Vantage or Live Capture or Tape Capture, click the Home button in the title panel to display the Vantage web portal.

Click the Home button to display the Vantage web app





On the Vantage web portal, click the Job Status Views button.



The Vantage Job Status View web app displays in your browser.

## Using the Vantage Job Status Views Web Application

The following shows an example of information provided in the Job Status Views web application, this example is set to display All Workflows.

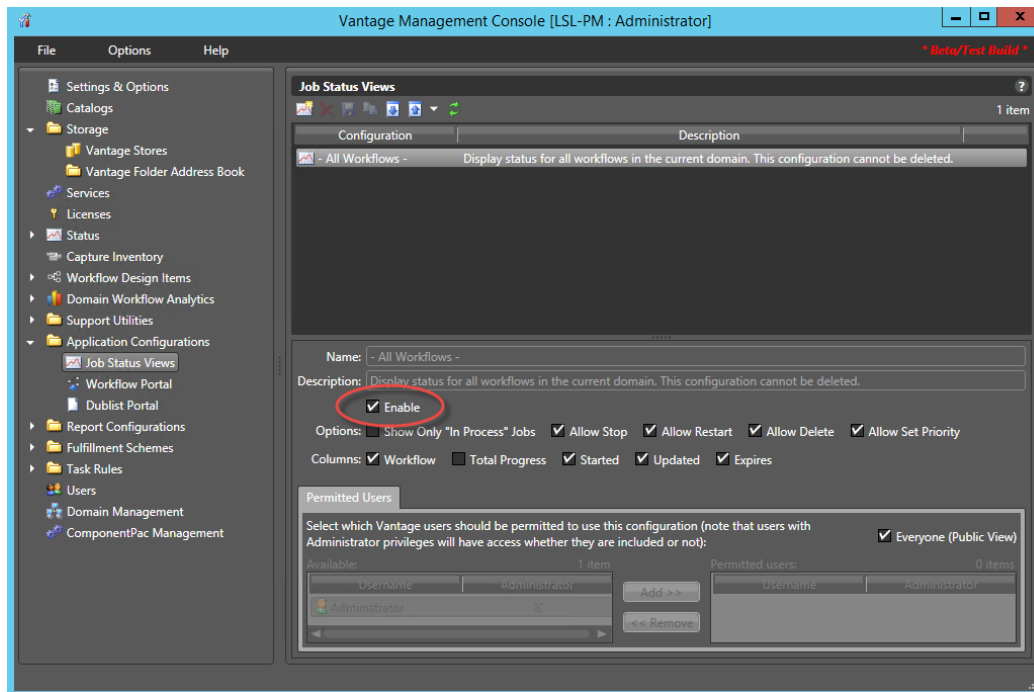
The screenshot shows the Vantage Job Status Views web application. The left sidebar contains navigation links for Public Views, Private Views, and Help. The main content area displays a table of job status information for 'All Workflows'.

Job	Workflow	Category	State	Started	Updated	Run Time	Expires
DNxHD-24P...	DNxHD-24P...	CaptureTesting	In Progress	10/14/2016 2:45:21 PM	10/14/2016 2:45:30 PM		10/15/2016 2:45:21 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	In Progress	10/14/2016 2:45:18 PM	10/14/2016 2:45:20 PM		10/15/2016 2:45:18 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/14/2016 2:33:09 PM	10/14/2016 2:33:58 PM	40 seconds	10/15/2016 2:33:58 PM
AdvancedRe...	AdvancedRec...	CaptureTesting	Complete	10/14/2016 2:33:07 PM	10/14/2016 2:34:02 PM	54 seconds	10/15/2016 2:34:02 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/14/2016 2:33:05 PM	10/14/2016 2:34:01 PM	53 seconds	10/15/2016 2:34:01 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/14/2016 2:33:02 PM	10/14/2016 2:34:00 PM	52 seconds	10/15/2016 2:34:00 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/13/2016 6:06:14 PM	10/13/2016 6:13:57 PM	7 min. 34 sec.	10/14/2016 6:13:57 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/13/2016 4:55:53 PM	10/13/2016 4:56:02 PM	1 second	10/14/2016 4:56:02 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/13/2016 4:55:53 PM	10/13/2016 4:56:02 PM	1 second	10/14/2016 4:56:02 PM
DNxHD-24P...	DNxHD-24P...	CaptureTesting	Complete	10/13/2016 4:55:53 PM	10/13/2016 4:56:03 PM	1 second	10/14/2016 4:56:03 PM
Capture253...	Capture253	CaptureTesting	Failed	10/13/2016 4:35:57 PM	10/13/2016 4:36:51 PM	53 seconds	10/14/2016 4:36:51 PM

The table shows 15 items in 1 page. Below the table, there is an 'Actions' section with a table of actions.

Action	Description	State	Progress	Machine	Resource Cost	Created	Updated
No actions to display.							

If no job status information displays in Job Status Views, you should make sure that this feature has been enabled in the Vantage Management Console. Open the Vantage Management Console and select *Application Configurations > Job Status Views*. Check the *Enable* option, shown in the red circle in the image below, then click the *Save* icon.



## Configuring Job Status Views Information

The information displayed in Job Status Views, and public or private access permissions, is configured in the Vantage [Management Console](#). For details on customizing the Vantage Job Status Views see the Configuring Job Status Views topic in the [Domain Management Guide on the Telestream web site](#).

# Capturing Tape Media

The Lightspeed Tape Capture web app enables you to capture media stored on tape. Using Lightspeed Live Capture, you can set up and control VTRs, create clip logs, and capture the clips, encode the media and save it as media files. You can also record complete tapes using Tape Capture. You can perform tape capture from most VTRs and video sources that support SDI I/O and RS-422 control.

This chapter describes the Lightspeed Tape Capture web application, and how to use it.

## Topics

- [Pre-requisites to Using Tape Capture](#)
- [Tape Capture Overview](#)
- [Configuring a VTR Connection](#)
- [Tape Capture Controls and Status](#)
- [Checking on Job Status](#)
- [Using the Tape Capture Web App](#)
- [Resolving Tape Capture Error Messages](#)

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**Note:** For details on launching web apps and other general web app topics, see [Managing your Web Apps](#).

---

Telestream recommends reviewing [Pre-requisites to Using Tape Capture](#) to ensure your system is configured properly before using Tape Capture:

## Pre-requisites to Using Tape Capture

Before you can use the Tape Capture web application to capture tape-based media, you must meet certain criteria:

- Your Lightspeed Live Server must be connected to a VTR or other compatible tape source. See [Connecting VTR Systems](#).
- Your VTR-based SDI sources must be set up. See [Configuring a VTR Connection](#).
- You should enable user administration and create Vantage accounts for each user. See [Configuring Vantage for Use with Live Capture](#) for instructions.
- You should create at least one tape capture workflow in Vantage (workflows with a Tape action) and activate it. See [Creating a Tape Capture Workflow](#).

# Tape Capture Overview

These are the key features of Lightspeed Tape Capture:

- Supports complete tape log and capture functionality in an HTML 5 browser client
- Allows logging multiple tapes and marking clips to be extracted from tape
- Captures clips from tapes into output media files with selectable container/codecs
- Supports metadata labels and variables
- Includes full VTR transport controls with standard keyboard shortcuts
- Includes audio meters with 8 selectable stereo pairs
- Allows full user account controls for administrator and general users
- Provides source input locking to prevent users from competing for the same source.

The Tape Capture web application is organized in several panels:

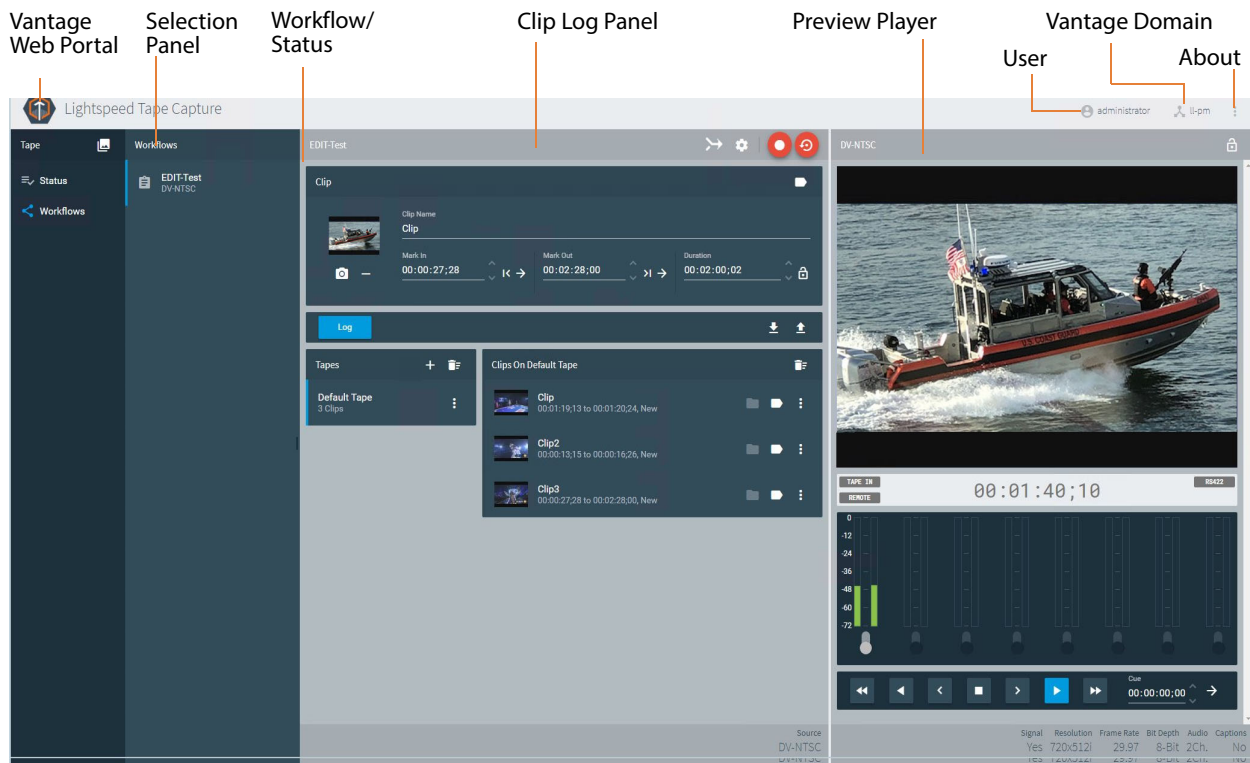
**Title Panel**—Displays the home button, Vantage domain and user name, controls to change domains, access the About menu, and to log out or log in.

**Selection Panel**—Select Channel Group and Workflows or shows Status View.

**Workflow/Status Panel**—Shows workflows (if selected) or job status (if selected).

**Clip Log Panel**—Shows and controls tapes, clips, and media.

**Preview Player Panel**—Plays video, displays audio (8 stereo), provides VTR controls.

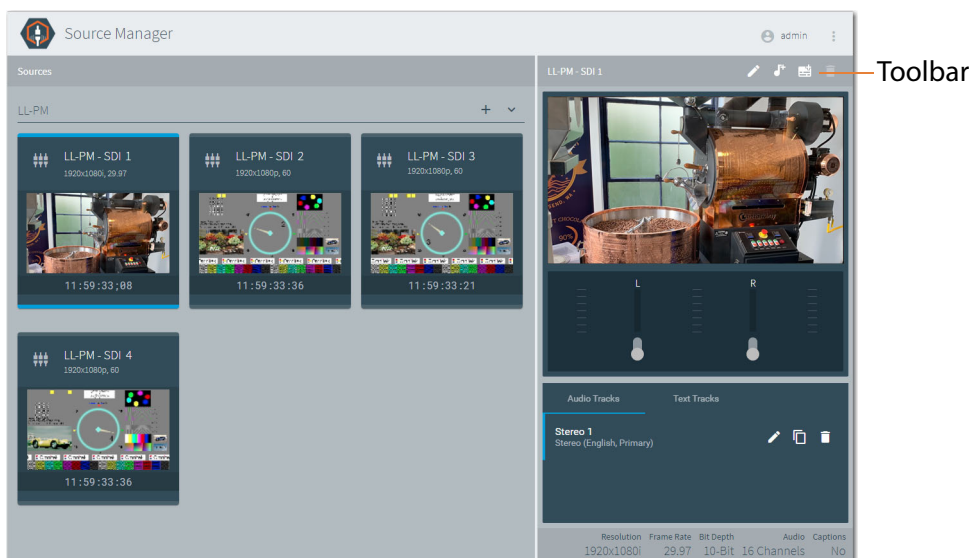


## Configuring a VTR Connection

To configure Tape Capture for VTR access, use the Source Manager web app (see [Managing Video Sources](#)) to set up your VTR-based SDI sources.

Follow these steps to configure the VTR connection (if you have additional VTRs, configure and save each SDI source connected to a VTR):

1. Make sure the VTR is properly installed and operating, and connected to one of the SDI ports on the Lightspeed Live Server. See [Connecting VTR Systems](#) for details.
2. Switch the VTR to the appropriate remote mode for operation via RS-422 control.
3. Open the Source Manager web app ([Launching the Source Manager Web App](#)) and select the SDI source you want to use for the VTR connection (SDI 1 input—here named *LLPM SDI 1*—shown selected):



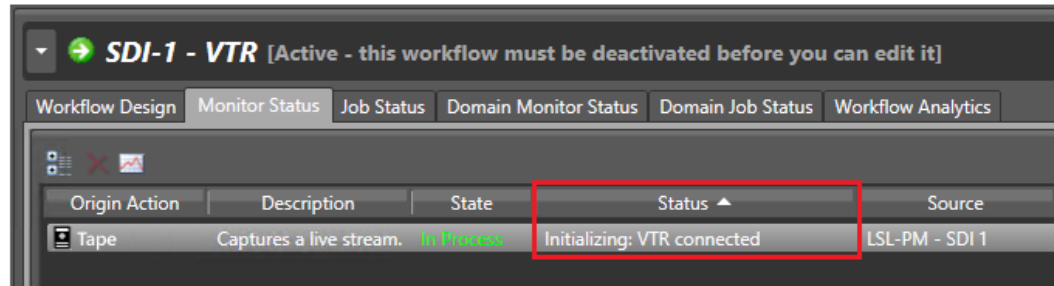
The source you select should match the terminal number to which the VTR is connected on the RS-422 interface box. For example, when it is connected to channel 1 (CH1) on the RS-422 interface box you should select the SDI 1 input in Source Manager.

When you select a source, its preview panel displays on the right, with the Tracks panel displayed below.

5. Click the Edit icon in the details panel toolbar to display the Configure Source dialog, and select *RS422* from the Timecode Source menu.
6. Make changes to other settings as appropriate for your application.
7. Click Save to update the source configuration.

## Checking VTR Connection Status

Activate your tape capture workflow in Workflow Designer, and display the Monitor Status panel—the workflow’s origin action (Tape) should display this status: *Initializing: VTR connected*:



When the VTR connection is successful, use the Tape Capture web app to set recording parameters and control the VTR to play out the media from tape.

## Troubleshooting the VTR Connection

A common problem that you may encounter is that the time code source is not set to RS-422 in the source settings (see [Step 5](#), preceding). If the time code source isn't set to RS-422 the tape capture web app displays the *Initializing: VTR not connected* error in the Status field.

If you have an active tape capture workflow running in Vantage, but its Monitor Status displays *Initializing: VTR not connected*, attempt to solve the problem using these steps:

1. Make sure that the RS-422 interface box is correctly installed, all adapters and cables are properly connected to the Lightspeed Live Server, and the VTR is powered up. See [Connecting VTR Systems](#) for instructions.
2. Check that the source of the Capture action matches the RS-422 port to which the VTR is connected. For example, when using SDI 1 input for the Lightspeed Live Server in the Capture action you must connect to Channel 1 (CH1) on the RS-422 interface box. See [Connecting a VTR to the Lightspeed Live Server](#) for a diagram and details.
3. Check that the RS-422 interface box’s serial ports are shown in the server’s Device Manager. Open the Windows Device Manager and toggle open the Ports (COM & LPT) devices. When properly connected, the ports of the RS-422 interface box displays as *USB Serial Port (COM3)* through *USB Serial Port (COM6)* as shown here:



4. Check the properties for each USB port to verify that its settings are correct:

*Bits per Second*—9600

*Data Bits*—8

*Parity*—None

*Stop Bits*—1

*Flow Control*—None

5. In Advanced... confirm that Latency Timer (msec) is set to 1. For details on adjusting this setting, see [Configuring an RS-422 Port's Latency Time](#).
6. Verify that the SDI input associated with the VTR is connected to a live SDI video source.
7. If the VTR is not connecting after performing these steps, try replacing cables.

After performing each step above, in Workflow Designer, check the workflow's Monitor Status panel again, to see if the Status has changed to *Initializing: VTR connected*.

When the VTR connection is successfully initialized, use the Tape Capture web app to set recording parameters and control the VTR to capture the media from a tape.

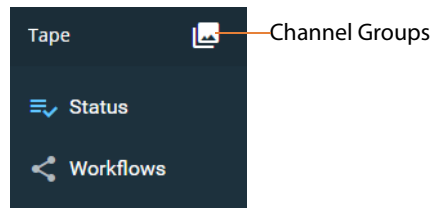



# Tape Capture Controls and Status


The Tape Capture web application provides controls, options, and status information to perform clip log and whole tape capture operations.


## Selection Panel

The Selection panel at the far left enables you to view Channel Groups, Status View, and Workflows panels.




 **Channel Groups**—Click the Channel Groups button to select a channel group. This is the first selection you must make.


 **Status**—Click Status to open the job status view panel.

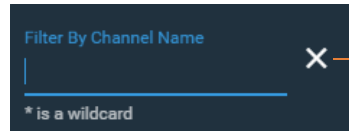
 **Workflows**—Click the Workflows button to display the active Vantage workflows in the selected channel group.

## Checking on Job Status


Click the Status button  in the menu to display the status tape capture channels/jobs.

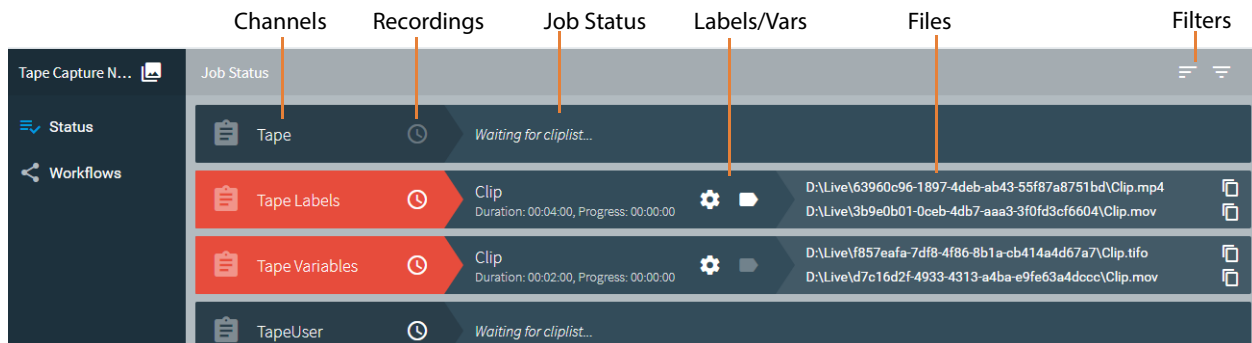
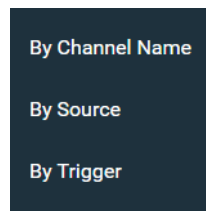
### Filtering Job Status (Far Right)

 **Channels**—Select to filter the channel list by typing a portion of the channel name to see only the channels that contain the typed characters.



Click X to clear the settings

 **Jobs**—Select to filter by typing portions of the job name to see only the jobs in each channel that contain the typed characters. You can also select sorting options for additional refinements.




**Channels**—The status display left column lists the channels (workflow) in the channel group.

**Recordings**—Click to display the channel recording list.

**Job Status**—Displays the current (pending or in-progress) job for each channel. The job's name, scheduled duration, and current progress counter are displayed.

**Labels**—The Labels icon displays the Labels panel, which shows labels and associated values generated by the channel workflow.

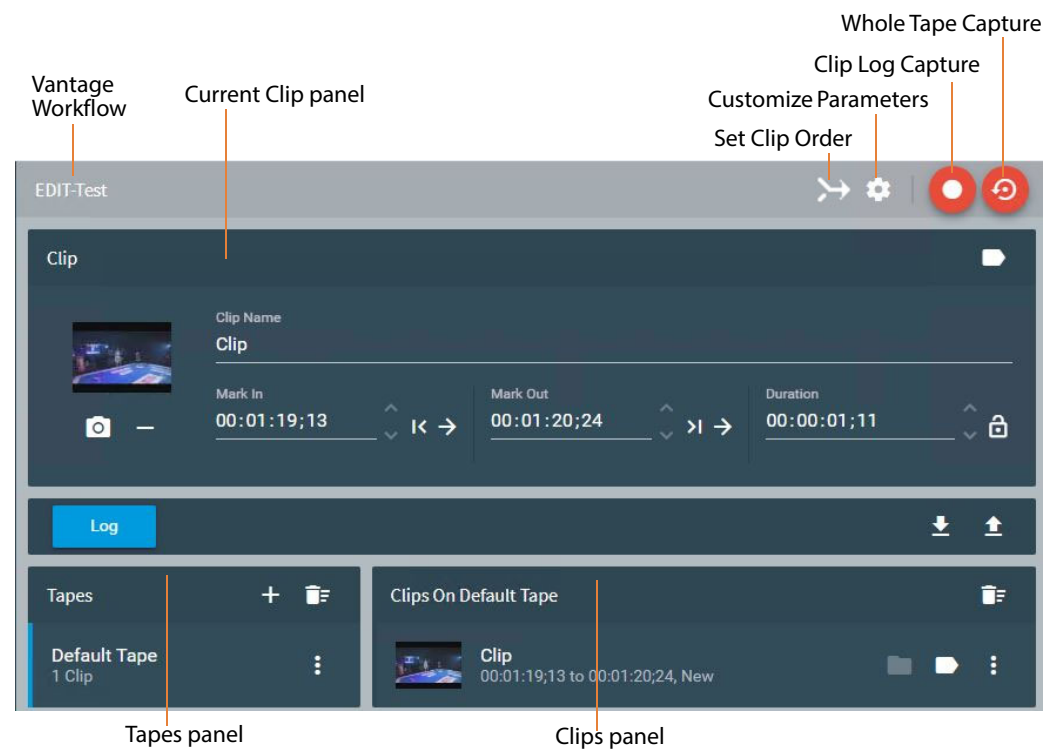
**Variables**—The Variables icon displays the Variables panel, which shows variables and associated values used by the channel workflow.

**Captured Files**—Primary and Secondary file outputs are listed. To quickly access captured files you can click the file name and path in the right-most column. The Captured Files panel displays. Click the  icon to copy a file output path to your clipboard. You can paste the copied path into your Windows File Explorer, then log into the Lightspeed Live Server to open the file with an appropriate application.

For details see the Vantage Job Status Views web app and [Using the Vantage Job Status Views Web App](#).

## Using Workflows

Click the Workflows button to display the active Vantage workflows in the selected channel group. Select a workflow to display its details:



This panel enables you to view sources, mark clips, and capture the media using this workflow, and view details about its configuration.

To create and use clip logs, Log Panel displays the clip log for the selected tape source and enables you to add new tapes and select them. You use this panel to capture tape-based media in two ways: Capture the whole tape, or create and add clips to a log that you want to extract from the tape, and use the clip log to capture clips to media files.

**Vantage Workflow**—The Vantage workflow that is assigned to execute this capture displays in the tile bar. To select another workflow for this capture operation, use the Workflow panel (see [Checking on Job Status](#)).

For details about capturing the whole tape and capturing clips, see [Capturing Media](#).

To use the Log Panel, use the default tape or add a tape and select it in the Tapes list, use the Preview Player and the current clip in the Clip Log to mark in and mark out the clip start and end points, and click Log to enter the clip into the log. Repeat as required, and when ready to capture the clips, click Capture. See below for control details.

---

**Note:** To edit a timecode, click on any time unit and change its value, and tab between units. Press Enter to return focus to the entire timecode and retain changes. Press Escape to exit timecode edits without saving changes.

---

## Clip Panel

**Clip Name**—Place the cursor in this field and enter a clip name.



**Use Current Preview Frame**—Click to use the preview frame as the thumbnail.



**Remove Thumbnail**—Click to remove the thumbnail image from the display.



**Mark In**—Click to update the Mark In point to the tape's current timecode position, or manually enter the timecode. Click the right arrow button (->) to cue the machine to the previously set mark in point.



**Mark Out**—Click to update the Mark Out point to the tape's current timecode position, or manually enter the timecode. Click the right arrow button (->) to cue the machine to the previously set mark out point.

**Duration**—The duration is calculated as the out time minus the in time. Enter a new duration in the timecode fields to change the duration. The out timecode changes to match and the in timecode remains the same.


When entering timecode in the In | Out | Duration fields, click on a pair of numbers and use the tab key to advance to the next pair of numbers in the timecode.

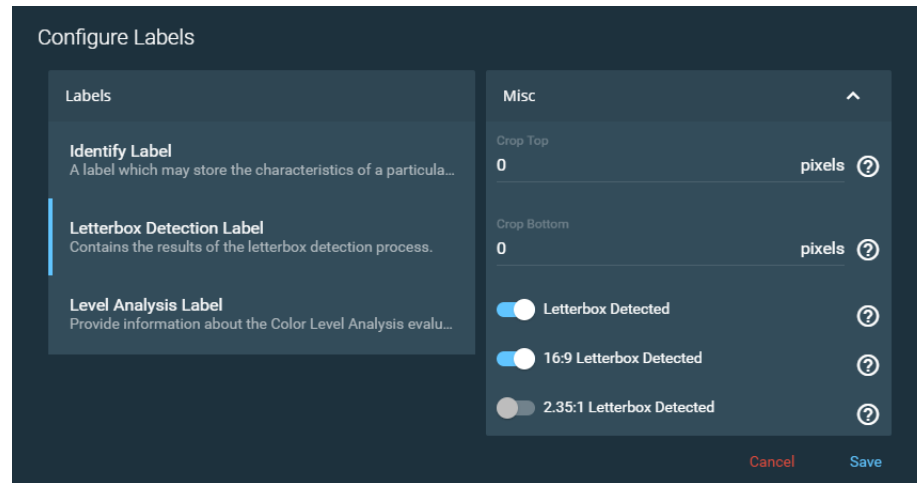


**Duration Lock**—The lock feature allows manual editing when locked, but prevents the duration from changing automatically. When locked (lock top closed), duration always remains the same even though in and out times change. When unlocked (lock top open), duration can change automatically with changes to in or out times. Manual duration entries are always allowed whether locked or unlocked.

Click to disengage the lock and allow duration changes. Entering a new in timecode changes the duration timecode but leaves the out timecode unchanged. Conversely, entering a new out timecode changes the duration timecode but leaves the in timecode unchanged.


Click again to engage the lock to protect the duration. Duration always stays the same unless entered manually. If you change the in timecode, the out timecode adjusts to match the new in time and the locked duration. If you change the out timecode, the in timecode adjusts to match the new out timecode and the locked duration.

 **Metadata**—Click the metadata button to open the Configure Labels dialog to access and modify metadata contained in any Label added to the Tape action.



The contents of the metadata depends on the metadata labels you created in the Vantage Management Console and added to the Tape action. Labels can be used in downstream Vantage actions or transformed into text or XML for out-of-band delivery. To make labels see [Configuring Vantage for Use with Live Capture](#), Step 7. To add labels to the Tape action use the Expected Labels option, see [Creating a Tape Capture Workflow](#).

## Log

 **Log**—The Log button commits the current clip to the Clip Log using the associated Mark in and Mark Out points, Duration, Label metadata, clip name, and thumbnail. Clips are associated with the currently selected Tape name.

## EDL File Import and Export

 **Import**—The import button imports a CSV-formatted clip list that has been previously created and exported to a file. The imported file populates the Clip Log.


Clips can be Imported from a CSV file using the following format:

*[Tape Name], [Clip Name], [Mark In], [Mark Out]*

Example EDL (Edit Decision List) in CSV format:

Tape 1, Clip 1, 00:11:45:00, 00:12:13:00

Tape 2, Clip 2, 00:14:15:00, 00:16:20:00

 **Export**—The export button exports the current Clip Log to a CSV clip list file that can be re-imported again later. Exported lists are named [workflowname].csv (using the associated Vantage workflow name) and are exported to the default download folder specified by the Chrome browser. You can see and set the default folder in Chrome > Settings > Advanced Settings > Downloads.

## Capturing a Whole Tape



**Capture a Whole Tape**—To capture all of the media on a tape, click the Whole Tape Capture button. Tape Capture automatically creates a single clip with mark in and mark out timecode values that instruct Tape Capture to capture the entire tape from the beginning to end. The Tape Capture web app displays a dialog—confirm that you want to capture the whole tape. When you click CAPTURE, the tape is rewound to the beginning and captures the content on the tape until EOT (End of Tape) is reached.

---

**Note:** Abort on Discontinuity is ignored when you are capturing a tape using the Whole Tape Capture button.

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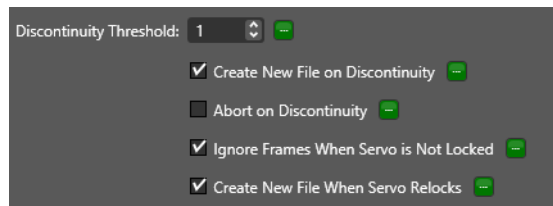
**Source Display**—The bottom of the panel displays the VTR source for the current clips.


## Timecode Break Recording

To set up a timecode break capture—a process that automatically creates a new clip file when a break in the timecode is detected—make sure that the Tape action is configured in your workflow as described below.

The Timecode Break feature creates separate files when it detects a break in the timecode. To accommodate dropped frames when the tape was recorded, set the Frame Threshold control.

In the Tape action in your Vantage workflow, set these configuration options to control timecode break recording:



You can set these options statically for every job. Or, you can bind them to variables for modification on a job-by-job basis. If you plan to modify these options directly in the Tape Capture web app, bind them to variables in the Tape action in your workflow, so that they are configurable in the Tape Capture web app; see [Binding Variables to Configuration Controls](#). Activate the workflow to display your variables here and enable, disable, or change them using the gear icon  in the Tape Capture Customize Parameters menu.

After you've set up and configured your workflow, activated it, and logged your clips, click Capture to initiate timecode break recording.

---

**Note:** The following configuration options affect how files are created in a Timecode Break workflow. It is important to understand how each option affects the files that are created. Some experimentation may be necessary to create the results desired.

---

**Discontinuity Threshold**—Specifies the minimum number of skipped frames that constitutes a discontinuity (timecode break) state. This threshold affects both Create New File on Discontinuity and Abort on Discontinuity, when enabled. Note that decremented and repeated frames always count as timecode discrepancies, and for these discrepancies, the threshold setting is ignored.

**Create New File on Discontinuity**—When checked and timecode discontinuity is detected, specifies that the current media file is closed and a new media recording file is opened. During an active capture recording, if a discontinuity is encountered, the current capture file completes and a new media file recording immediately starts.

---

**Note:** This feature is not functional in tape capture workflows where Primary Output or Secondary Output is configured to generate AVC | HEVC | MPEG2 video.

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Timecode discontinuities are defined as follows:

- Timecode increments by a value equal to or greater than the selected Discontinuity Threshold value.
- Timecode repeats. The Discontinuity Threshold value is ignored in this case.
- Timecode decrements. The Discontinuity Threshold value is ignored in this case.

**Example 1:** A timecode incrementing from 00:00:30;10 to 00:00:30;15 is detected by a threshold of 4 or less.

**Example 2:** A timecode repeating from 00:00:30;10 to 00:00:30;10 is detected.

**Example 3:** A timecode decrementing from 00:00:30;10 to 00:00:29;00 is detected.

**Abort on Discontinuity**—Ends the current recording when timecode discontinuity is detected. Mutually exclusive with *Create New File on Discontinuity*.

---

**Note:** Abort on Discontinuity is ignored when you are capturing a tape using the Whole Tape Capture button. See [Capturing a Whole Tape](#).

---

**Ignore Frames When Servo is Not Locked**—If enabled, all frames captured while the servo is in the unlocked state (as reported by the VTR) are excluded from the output file.

**Create New File When Servo Relocks**—If enabled, creates a new media file when the servo re-locks after being in the unlocked state. When a servo relock is encountered during an active capture recording, the current capture file completes and a new media file recording starts.

---

**Note:** This feature is not functional in tape capture workflows where Primary Output or Secondary Output is configured to generate AVC | HEVC | MPEG2 video.

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- If *Create New File When Servo Re-locks* is enabled and *Ignore Frames When Servo is Not Locked* is disabled, the system may create unwanted (unlocked) frames at the end of output files.

- If *Create New File on Discontinuity* is enabled and *Ignore Frames When Servo is Not Locked* is also enabled, the result may be an output file that contains a discontinuous timecode, even though *Create New File on Discontinuity* is enabled and the timecode was always incrementing. This occurs because of the system ignoring frames, regardless of the timecode, while the servo is unlocked. With this configuration, the frames captured during the period when the servo was unlocked are excluded from the output. New frames are added to the file when the servo re-locks, which causes the output file to have discontinuous timecode. To avoid this scenario, enable the *Create New File When Servo Relocks* option. In this state the re-lock of the servo starts a new file where the discontinuity in the output file would have been.
- As described above, repeating timecodes are counted as discontinuities. Most VTRs repeat timecodes when the servo is unlocked; therefore, if *Ignore Frames When Servo is Not Locked* is disabled and *Create New File on Discontinuity* is enabled, the result may be many single frame files while the servo is unlocked. This won't happen if *Ignore Frames When Servo is Not Locked* is enabled.
- With many VTRs, particularly an SRW-5800, there may be gray frames after the servo re-locks. Timecode for these frames is often invalid. Because the system is only able to respond to the status the VTR provides, it won't detect and exclude gray frames.
- No two passes of the same section of tape are likely to be identical. This occurs because the VTR can sometimes take longer than others to lock the servo after the control track is detected. Therefore, it is important to check the logs to verify whether the servo was locked while a specific frame was captured.
- For previous users of Telestream's Pipeline tape capture product, enabling all three settings above provide the cleanest results and the closest to what Pipeline did.

## Tapes

The Tapes panel enables you to create tape names and add them to the list. You can then associate clips with the names of the tapes where they originated. Do this by selecting a tape before selecting Log to log a clip or drag a clip from the Clip Log onto a tape to make the association.

**+ (Plus)**—Opens the Configure Tape dialog. Enter the name of the tape and click Save to save (or Cancel to cancel) the new tape to the Tapes list.



**Trash**—Click trash to delete all tapes from the tape list.





**Modify**—The modify (three dots) button opens a dialog to edit or delete the tape. Click Edit to view and modify tape details. Click Delete to delete the tape. Deleting a tape deletes the associated logged clips. Deleting all tapes deletes all logged clips.

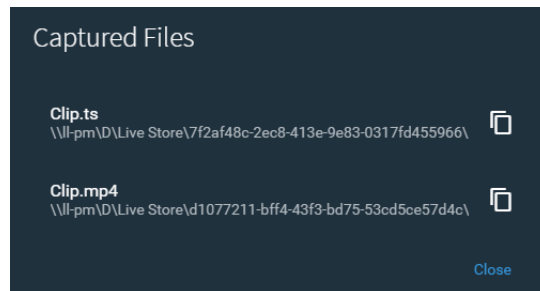
## Clip Log


The Clip Log displays a list of clips that have been marked for recording in the media output file. After you set up a clip in the Clip Panel, clicking Log adds the clip to the Clip





Log. The name displayed for the Clip Log changes depending on which tape is selected. The format of the name is: Clips On + <Name of Selected Tape>.

 **Captured Files Folder**—To quickly access captured files, click the folder icon to display the Captured Files panel. Click the  icon to copy the file output path and paste it into Windows File Explorer. Then, log into the Lightspeed Live Server to open the file with an appropriate program.




 **Metadata**—Click the Metadata button to access and modify the Labels metadata list. The contents of the metadata depends on the metadata label(s) you created in the Vantage Management Console. See Metadata above in Clip Panel for more information.

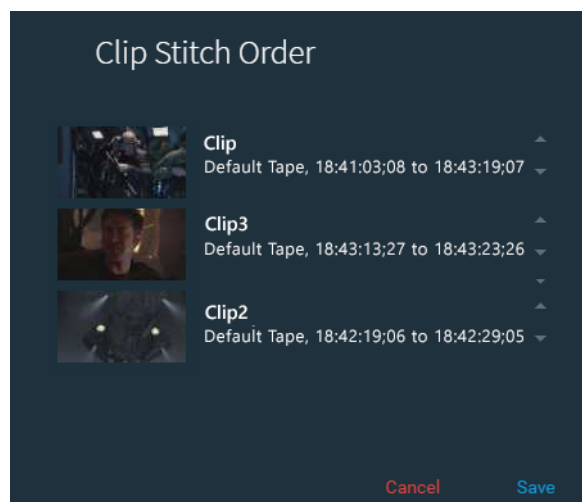
 **Modify**—Click the Modify (three dots) button to display a panel for selecting *Edit Entry* to view and modify clip details, or *Remove Entry* to remove the clip.

 **Trash**—Click the Trash icon to delete all clips from the clip log.

## Capturing Media

Use these buttons (at the top right corner of the Log panel) to alter your clip stitching order and update workflow variables.

 **Set Clip Order**—Click to display the Clip Stitch Order panel:



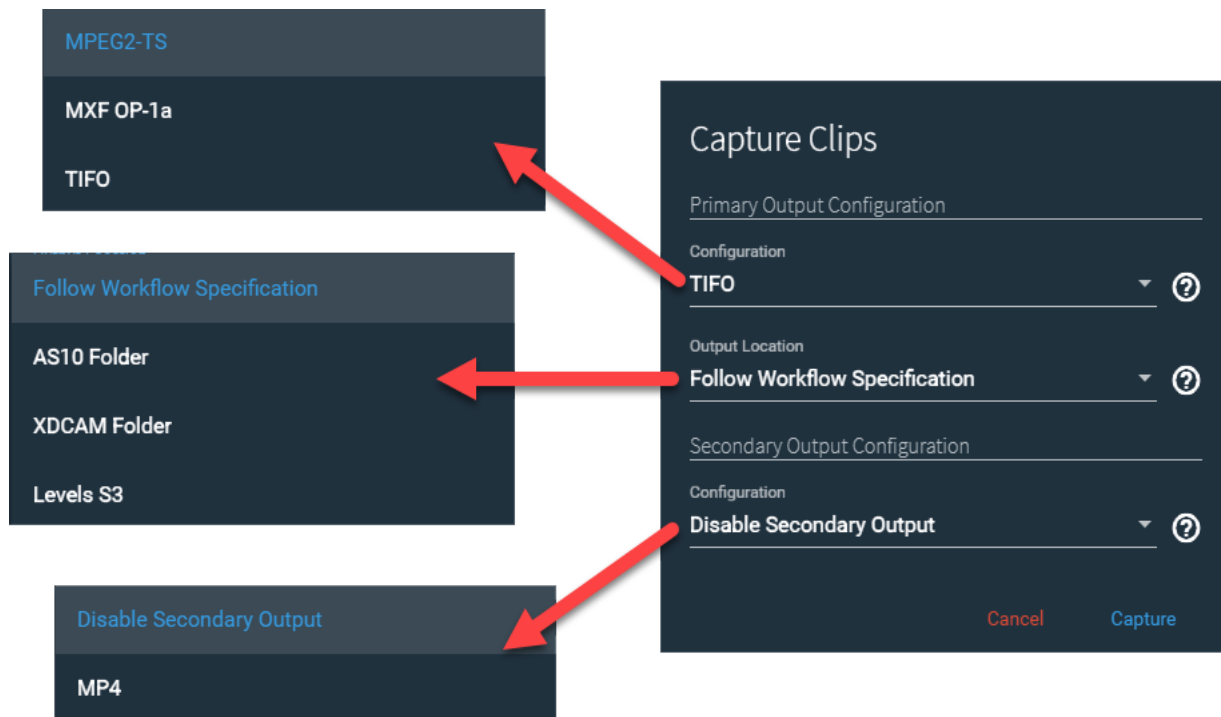
This panel displays the list of clips in the clip log. To re-arrange their order, select a clip and use the up and down arrows to re-arrange the list. Or, drag-and-drop them on their new location in the list.



**Customize Parameters**—Click the gear icon to display the Customize Parameters panel and configure Tape action parameters that are bound to a variable so that they can be edited here in Tape Capture on a job-by-job basis. Any description contained in a variable is displayed by selecting the question mark tool tip (?) next to each parameter. The question mark (?) also provides a tool-tip to explain the parameter. Also see [Configuring Tape Parameters that are Bound to Variables](#).



**Capture**—Click the Clip Log Capture button to read clips in the clip log, encode them and write the media to a media file. When you click Capture, the Capture Clips dialog displays.



From Capture Clips you can make these selections for the capture operation:

**Primary Output Configuration**—Select a container configuration that was added in the Tape action for the Primary Output. The configuration names are in alphabetical order and the full name is displayed.

**Output Location**—Select a Vantage Folder Address Book entry or select *Follow Workflow Specification* to use the location set in the Tape action workflow.

**Secondary Output Configuration**—Select a container configuration that was added or enabled in the Tape action for the Secondary Output. The configuration names are in alphabetical order and the full name is displayed.

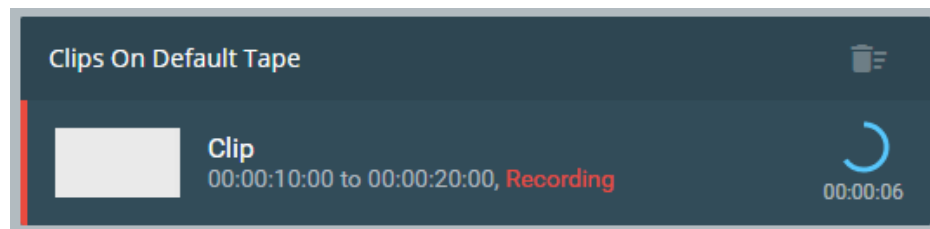
To add Primary and Secondary outputs, see [Configuring Primary and Secondary Outputs](#).

### Activate Capturing

When you click Capture in the Capturing Clips dialog, the dialog closes and Capturing starts and the blue Capture button in the top bar changes to **Capturing** during the recording operation.

### Monitoring Capturing

When a capture is in progress, the Clip Log indicates which clip is currently recording and which clips are submitted to be recorded. The time that has elapsed during the recording operation is displayed, along with a progress circle.

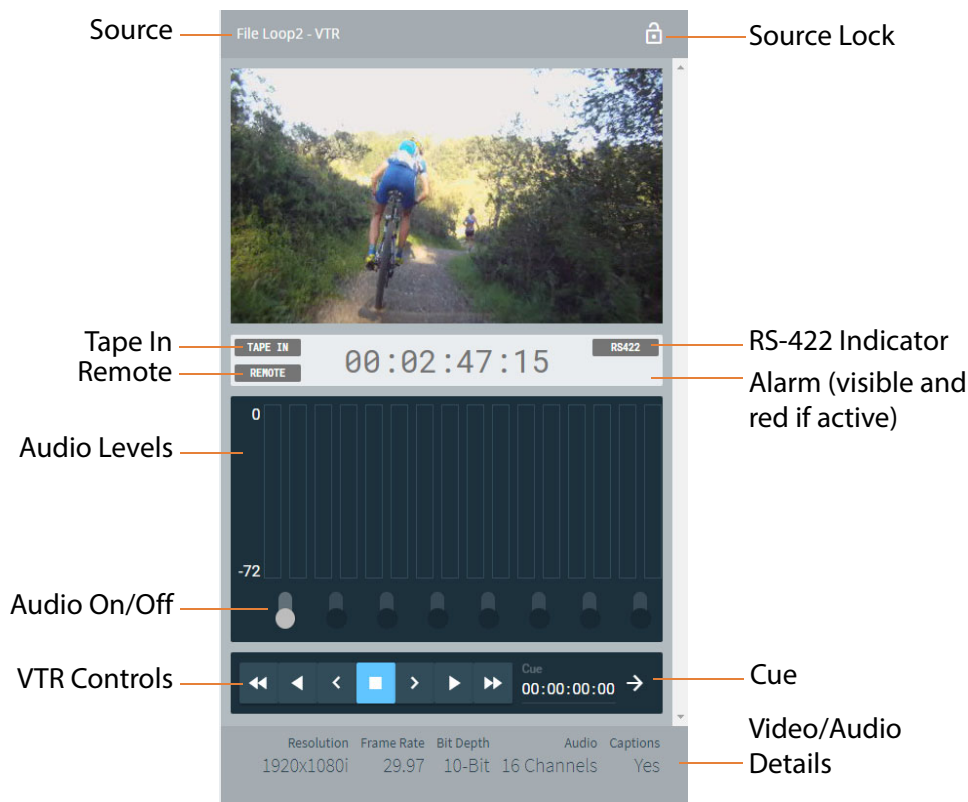


## Using the Preview Player Panel

The Preview Player panel plays video and audio from the current VTR source so that you can locate and mark clips. The player includes these features:

- Includes audio level displays and controls for up to eight (8) stereo pairs
- Shows tape source video and audio details

- Contains a full set of VTR controls with standard keyboard shortcuts.



**Source Display**—The upper left corner displays the VTR source currently playing.

**Source Lock**—Click to lock the current source to your user account. When locked, the source cannot be controlled by other users. Click again to unlock (lock top opens). Note that you can forcibly unlock a source; a dialog states the user name and domain of the person who has reserved the source. The source is automatically locked when any RS-422 transport control is in use.

**Tape In Indicator**—White indicates a tape is inserted; red TAPE OUT indicates the tape is not inserted.

**Remote Indicator**—White indicates VTR remote control; red LOCAL indicates local control.

**RS-422 Indicator**—White when Tape Capture has VTR control; red NO RS-422 when not in control (and Tape and Remote indicators are hidden).

**Alarm**—Red Alarm appears below RS-422 only if a problem occurs with the source.










**Audio Level Buttons and Displays**—Click a button to turn an audio pair on or off. When on, a level display bar shows variations in the audio level.

**Video/Audio Details**—Displays video resolution, frame rate, bit depth, number of audio channels, and whether captions are present.

**Cue**—Cues video to the timecode you enter. Enter timecode and click the arrow to cue.



## VTR Controls and Keyboard Shortcuts

The VTR controls operate in a standard fashion. Enter SHIFT+? to display the list of VTR keyboard shortcuts (shown below).

Buttons	Keyboard Shortcuts	Function
	i	Mark In
	o	Mark Out
	p	Log Clip
	j	Rewind (press 1-3 times to increase speed)
	[	Step Backward
	k	Stop
	]	Step Forward
	Space Bar	Play
	l	Fast Forward (press 1-3 times to increase speed)



## Using the Tape Capture Web App

This topic explains how to perform typical tasks using the Tape Capture web application, and presents them in the order you usually follow to capture clips. The display indicator state for on/off controls is:

-  Enabled
-  Disabled

## Setting up for Clip Logging

Before you begin logging and capturing, you must make preliminary selections:

1.  Select a Channel Group and VTR source in the upper left corner.
2.  Select Workflows and then select a specific workflow from the list.
3. Configure capturing using the steps in the next topics.

## Creating and Naming Tapes

Before you begin logging clips you want to capture, you should create tapes in the Tape Capture web app to match the tapes you plan to use in the VTR to capture clips:


1. In the Tapes panel, click the + (plus) button.
2. Enter tape information and press Enter.
3. Repeat to create as many tapes as needed for the clips you plan to capture.



The tape name is embedded in the output of the QuickTime container (and Avid MXF OP-Atom when generated by an Avid workflow via the Flip/Flip64 action) and is viewable in these applications: Final Cut Pro, Adobe Premiere Pro, and DaVinci Resolve.

In DaVinci Resolve, the Assist Using Reel Names... setting must be changed for the Tape Reel Name to display. Go to File > Project Settings > General Options and enable Assist Using Reel Names from the: and set it to Embedding in Source Clip File.

## Creating a Clip

To create a clip, make sure the VTR is connected and selected as the source, and follow these steps:

1. Insert the source tape for the clip into the VTR. The Tape In indicator on the Preview Player should be white.
2. Select a tape name in the Tapes list to associate the current clip with the tape.
3. Play or scrub the video using the VTR controls to find the point where you want your clip to start.
4.  Click the Mark In button in the Clip Panel to set the start timecode of your clip.

5. Play or scrub the video using the VTR controls to find the point where you want the clip to end.
6. Pick one of the two alternatives below as your next step:
  -  Click the Mark Out button to mark the ending timecode of your clip. The duration is calculated automatically.
  - Optionally, instead of marking an out point, you can enter a duration after marking in, and the ending timecode is calculated for you.
7.  Click the metadata button to open the Configure Labels dialog to access and modify metadata contained in any Label added to the Tape action (if any).
8. Click Log to create the clip and add it to the Clip Log.

## Configuring Clip Stitching

Clip Stitching direct-converts the source clips from multiple tapes, and arrange the clips in the order you want to stitch them in the output file. During capture, individual files are created of each clip. When capture from all tapes is complete, the output file is created with the clips in the order they were arranged in the Clip Ordering dialog.

To configure clip stitching, follow these steps:

1. Enable Clip Stitching in the Tape action, and then activate the workflow.
2. In the Tape Capture web app, create a clip list for each tape, either using manual IN/OUT/LOG or by importing an EDL. This is done for every tape to be included in the output file.
3. Select the Clip Ordering button to open the dialog that provides the ability to arrange the clips in the order that you want them to appear in the output file. The clips could be moved up/down either by drag/drop or by using up/down arrows.
4. Set the Timecode Override value, if desired. If Timecode Override is not enabled in the Tape action, the output clip has an initial timecode of 01:00:00;00.
5. Select any other configuration setting.
6. Select Capture.
  - a. The Web app captures just like it does in the non-Stitching mode, by asking for the first tape by name and wait for confirmation that the tape has been inserted into the VTR. After confirmation, the Web app controls the VTR and captures each of that tape's clips in linear TC order.
  - b. After all clips for the tape have been captured, the Web app prompts you to insert the next tape and the same process (step 6a) is executed. This process continues until all clips from all tapes have been captured into individual files.
7. When complete, the system generates an output file that contains all of the clips in the order that they were arranged in the Clip Ordering dialog.

## Capturing Clips

When your clip log is complete (the list contains all the clips you want to capture), click the Capture button to open the Capture Clips dialog. Select the Configuration method and Output Location, and then click Capture.

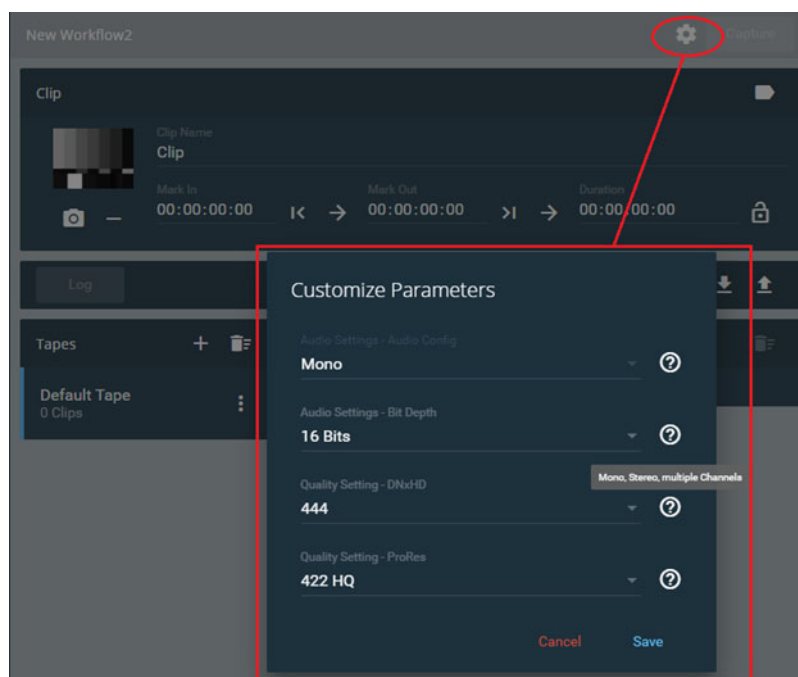
Tape Capture begins recording and capture the clips in the log into corresponding final output media files. For multiple tapes, the Tape Capture web app prompts you to insert the first tape when you start the capture.

If the *Rewind tape* setting is enabled, when all clips from the first tape are complete, Tape Capture sends the VTR a command to rewind the tape (Note that *Rewind tape* defaults to disabled.) The app also selects the next tape in the list, and indicates that a tape needs to be inserted. Then, insert the tape and press the *Capture* button to resume capture (the button displays yellow and reads *Resume*).

## Configuring Tape Parameters that are Bound to Variables

Parameters that are bound to a variable—or any variable added to the Tape action via the Add Variables menu—can be configured in the Customize Parameters dialog. To bind variables to a control, see [Binding Variables to Configuration Controls](#).

Click the gear button  next to the Capture button to display this dialog by:



The question mark (?) provides a description of the variable, if one has been added.

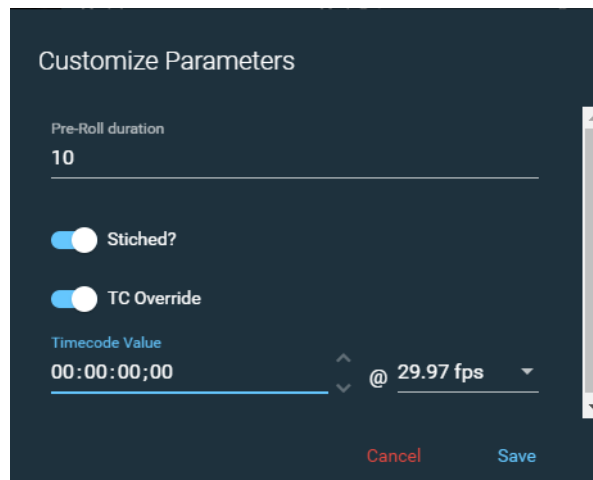


## Setting Drop/Non-Drop Frame Characteristics

You can change between drop frame and non-drop frame in the Customize Parameters dialog to change the characteristics of the captured file. For this option to be available in the Customize Parameters dialog you must have Timecode Override Enable activated in the Tape action, and have it bound to a variable. See [Creating a Tape Capture Workflow > Settings Panel](#).

To change between drop frame and non-drop frame:

1. Click the Gear icon to open the Customize Parameters dialog.



2. Enable TC-Toggle to enable timecode override.
3. Select 29.97 fps or 59.94 fps if you want to use drop frame. (Drop frame is only available for 29.97 fps or 59.94 fps.) Select any frame rate for non-drop frame.
4. Select the timecode by clicking it once or by selecting the line below it. When selected, the line and TC Override name displays in blue. (All numbers must be highlighted in white. If only one section of numbers is highlighted then you can not change between drop frame and non-drop frame.)
5. Type a semicolon ";" to set for drop frame, or a colon ":" for non-drop frame. The character should change in the timecode.
6. Click Save to save your changes and close the dialog.

When the capture is activated the output file uses the drop frame or non-drop frame characteristic you have set.

## Creating a Stitched Clip

The Clip Stitching feature allows you to create a list of clips from one or more tapes, arrange the clips in the order in which they should be stitched together, capture all the clips to individual files, and then create a stitched output file (or files) containing all captured clips in the order specified.

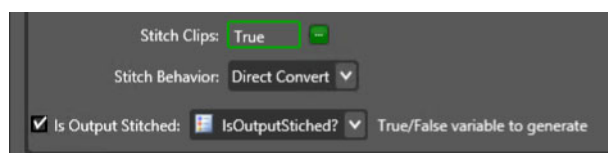
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**Note:** When clips or tapes have different frame rates, the job stops at the stitch location where the frame rate changes. Frames rates must be the same for stitch operations to complete successfully.

---

Follow these steps to create a stitched clip:

1. In Vantage Workflow Designer, open the Tape action to configure it. (See [Creating a Tape Capture Workflow](#) for more details.)
2. In the Tape action Settings panel, enable the Stitch Clips option by binding it to a True variable. (To bind variables in the Tape action, see [Binding Variables to Configuration Controls](#).)




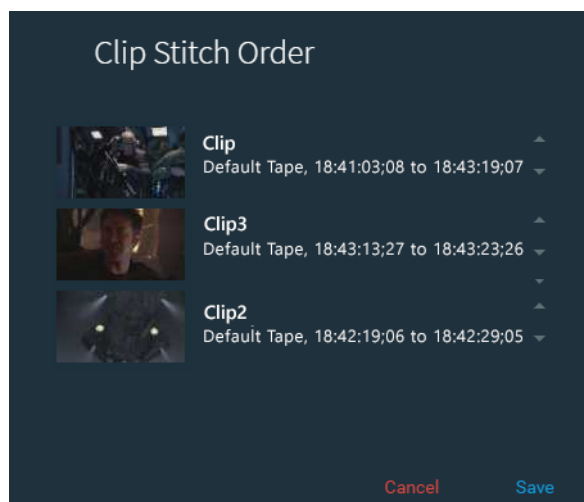
3. In the Tape action, set the Stitch Behavior to Direct Convert and enable Is Output Stitched if required. See the Tape action [Settings Panel](#).

---

**Note:** Clip Stitching is only supported for MXF OP1a, QuickTime, and MP4 outputs.

---

4. When the Tape action workflow is configured, activate the workflow.
5. In the Tape Capture web app, create the list of clips you want to log, either by using the Mark In > Mark Out > Log method, or by importing an EDL file.
6. When your Clip Log is complete, select the Clip Stitch Order button  to open the Clip Stitch Order dialog. Use the Clip Stitch Order dialog to arrange the clips in the order you want them in the stitched output file. You can re-order clips either by drag-and-drop or by using the up/down arrows next to each clip.



7. After the clips have been ordered, adjust any other parameters, as needed.

8. Click the Capture button to open the Capture Clips dialog. Select the Configuration method and Output Location, and then click Capture.
9. Tape Capture begins recording and capture the clips in the log into corresponding final output media files.  
  
With multiple tapes, Tape Capture prompts you to insert the first tape when you start the capture. When the tape completes, Tape Capture selects the next tape in the log list, and indicates that tape should be inserted. Insert the tape and click the Capture button to resume the capture (the button displays yellow and displays Resume).
10. Once all individual clips have been captured from all tapes, the system automatically creates a primary output of individual clips and a stitched clip, or clips, depending on your workflow settings.
11. The primary and secondary files can be processed by any downstream action in the same way they are in the non-stitched mode.


## Recording an Entire Tape—Even if It Has Errors

Use the Whole Tape Capture button to record the entire tape, even if it has various errors, such as discontinuities in timecode, loss of the tape control track, or if alarms are triggered in the VTR.

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**Note:** Abort on Discontinuity is ignored when you are capturing a tape using the Whole Tape Capture button.

---

To record the entire tape and ignore errors, click the Whole Tape Capture button . Tape Capture automatically creates a single clip and enters Mark In and Mark Out timecode values that instruct the Tape Capture web app to capture the entire tape from the beginning of the tape to the ending of the tape. A dialog displays to confirm that you want to capture the whole tape. When you click CAPTURE, the tape is rewound to the beginning and captures the content on the whole tape until EOT (End of Tape) is reached.

Alternatively, without using the Whole Tape Capture button, you can set the Mark In timecode to 00:00:00:00 and the Mark Out timecode to 23:59:59:00. When you start the Capture recording process, the tape rewinds to the start (no matter where it was parked) and tape playback and recording starts. When the end of the tape is reached recording stops. Abort on Discontinuity is detected when using this tape capture method.

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**Note:** The capture progress indicator does not function when capturing an entire tape, since the duration is unknown. However, you can observe the timecode display to confirm the current state. Although, with tapes that have no timecode or are without a control track the true state cannot be known. Direct observation of the VTR may be necessary.

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## Resolving Tape Capture Error Messages

A list of error messages and their resolutions is provided below.

### Loss of Signal

If you encounter a loss of signal condition while capturing a clip with Tape Capture with Ignore Lost Frames in the Tape action in your workflow disabled, the logged clip fails with this error:

*Event <Event Name> on <Channel Name> failed to capture. Loss of Signal detected. Error code = -19802. Data invalid.*

You can avoid this by enabling Ignore Lost Frames in the Tape action.

---

**Note:** Enabling Ignore Lost Frames should not be necessary in most cases. When enabled, *all* input-related error messages are ignored without warning.

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# Creating Live and Tape Capture Workflows

This chapter describes how to create, configure, and activate Vantage workflows for Live Capture. Creating and configuring workflows is performed in Vantage [Workflow Designer](#).

## Topics

- [Creating a Live Capture Workflow](#)
- [Creating a Tape Capture Workflow](#)
- [Paths for Vantage Storage Overview](#)
- [Prototype Capture Workflow—Labels & Variables](#)

The following publications provide information about topics related to creating and using Live Capture workflows, which you may want to refer to:

- [Lightspeed Live Stream User Guide](#)
- [Vantage User Guide](#)
- [Lightspeed Live Capture Web API Reference](#)

## Creating a Live Capture Workflow

Before you can use the Live Capture web applications (or an API-based program) to capture a live stream, you must create and activate a Live Capture workflow (you may have several, designed to meet different requirements), which uses the Capture action to serialize a live video source controlled from the Capture web app or from a Capture API-based program into a media file.

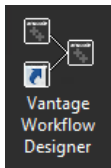
- [Creating a Live Capture Workflow](#)
- [Capture Action Overview and Configuration](#)
- [Configuring Program Settings](#)
- [Restricting Input - Frame Type and Frame Rate](#)
- [Expected Labels](#)
- [Configuring Trigger Settings](#)
- [Using the CalDAV Calendar Trigger](#)
- [Configuring Primary and Secondary Outputs](#)

## Creating a Live Capture Workflow

This topic describes the general process of creating and configuring a Capture action workflow. For configuration details, follow links or refer to online help directly in Workflow Designer.

**Note:** Only ONE Tape or Capture action is allowed in Live Capture workflows. Multiple Tape/Capture actions is not supported and results in workflow failure.

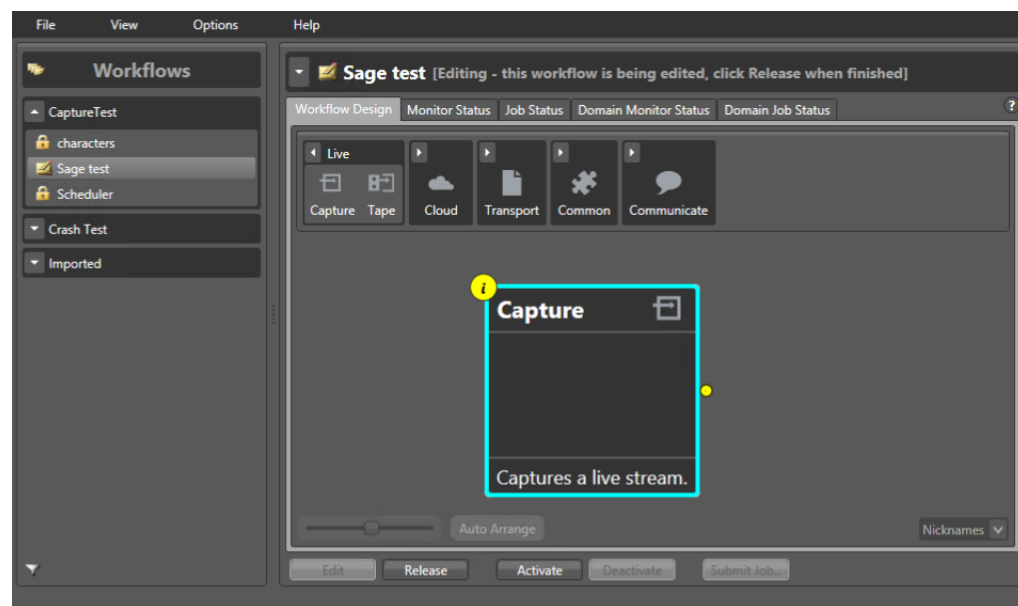
Follow these steps to create and activate a Capture action workflow:



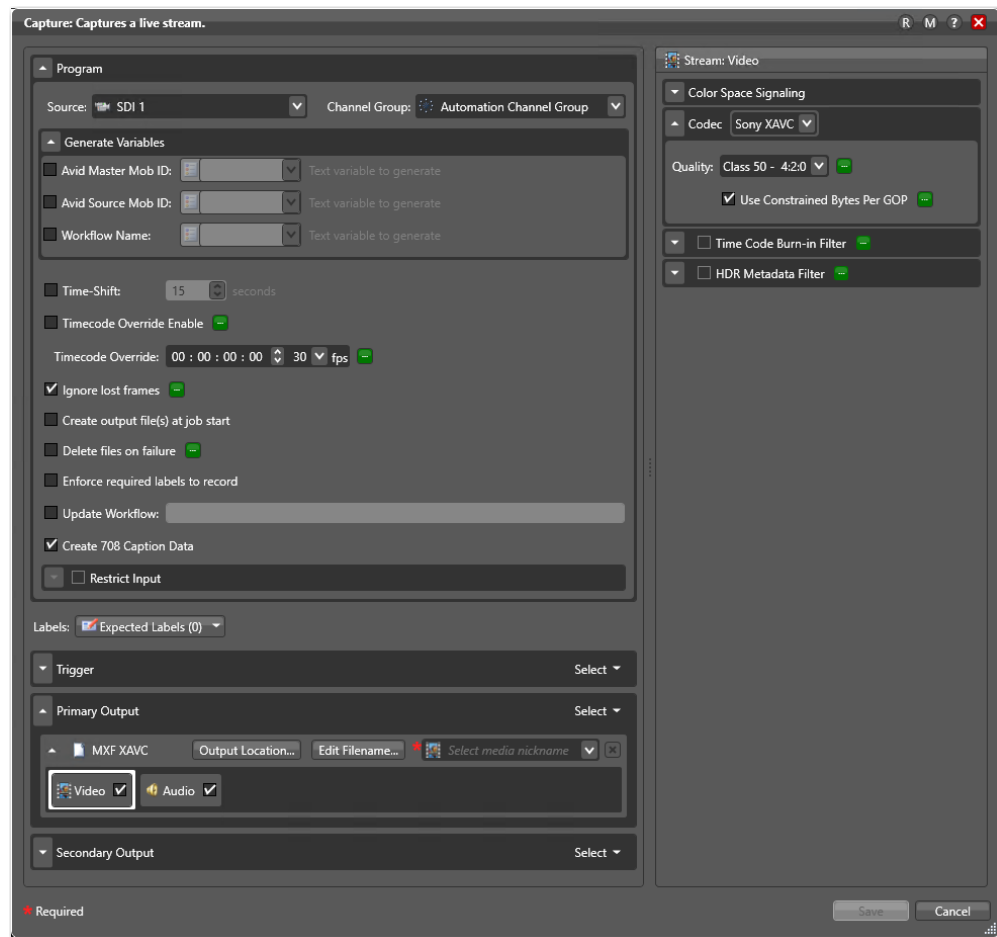
1. Launch Vantage Workflow Designer.
2. Select File > Create New Workflow and name the workflow. You may also want to create a Category (File > Create New Category), which is a folder where the workflow is stored. The default workflow naming pattern is [Workflow Name]\_[Source Name].

**Note:** To avoid workflow failures, do not use these characters in workflow names:  
` \* | \ : ; " ' < > ? /

3. In the Workflow Design panel, open the Live action category and add a Capture action to the workflow design workspace below:



4. Click the Inspector icon on the upper left corner of the action (or double-click the action) to open the Inspector.



5. Configure the action according to your requirements. For configuration details, see [Capture Action Overview and Configuration](#).
6. Click Save when you finish configuring the action.
7. Click Activate to start the workflow so that it is ready to start jobs when directed to do so by the Live Capture web app.

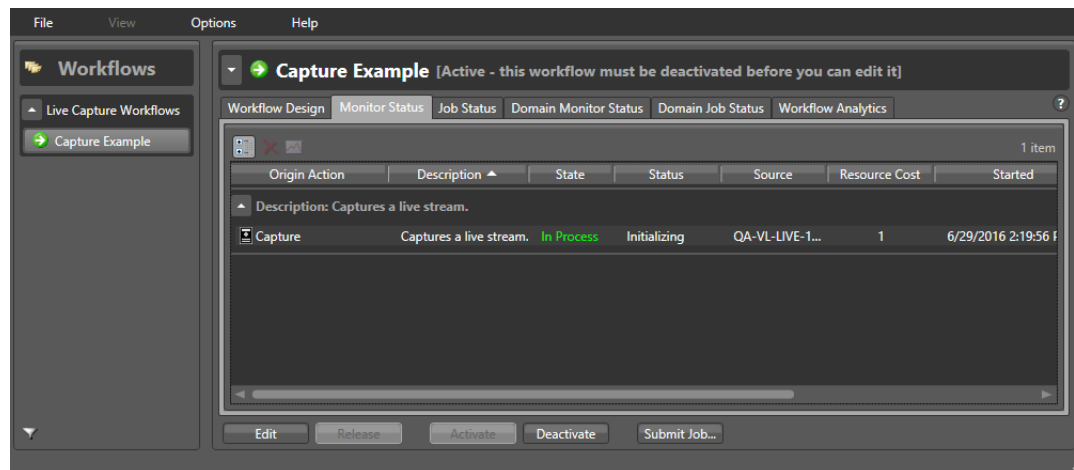
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**Note:** Job expiration is set for 24 hours and is enabled by default. For details, click the ? in the upper right to open the Vantage User Guide. See the *Viewing and Specifying Workflow Details* topic for information on adjusting the expiration time.

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8. Display the Monitor Status tab to view the status of your workflow as it operates and provide details. Double-click a workflow for details.



When you activate a workflow, it begins to operate and communicate with the Lightspeed Live Capture or Tape Capture web application to accept the input you select, encode and package it into the format you specified in the workflow, and output the captured media package to the Live store location you specified.

There are many more ways to monitor your workflow. To learn more, click the ? icon or use the Help menu to open the *Vantage User Guide*.

Now, you are ready to log into the Live Capture web app and begin using it as explained in [Capturing Live Video](#).

## Capture Action Overview and Configuration

The Telestream Live Service and the Capture action are Vantage features enabled in a Vantage domain only when hosted on a Lightspeed Live Server and appropriately licensed. The Capture action is intended for use in conjunction with Lightspeed Live Capture, for the purpose of ingesting live and live linear media directly into production, post production, and broadcast workflows and serializing it into a file for further, file-based video processing.

You use the Lightspeed Live Capture web application to start and stop capturing selected live video streams and delivering them to a Capture action workflow activated in Vantage. You can also use Lightspeed Live Capture Web API to create custom programs to control Vantage capture workflows. For details on the Web API see the [Lightspeed Live Capture Web API Reference](#) on the Telestream website.

Live Capture ingests 3G and 12G SDI SD, HD, and UHD sources, plus RTMP, Transport Stream, SRT, NDI, and ST 2110 IP sources via the Telestream Live Service, decodes it to digital baseband, and delivers it to the Vantage Capture action for encoding and serialization. Sources are defined using Source Manager, a Live Capture web app.

---

**Caution: Workflows containing more than one Capture action are not supported.**

---

The container and codec selected in the Capture action specify the encoding and format of the output file. The encoded media is captured to a primary file stored locally or copied to external SAN/NAS storage, also based on the Capture action configuration. At the same time, a secondary proxy file may also be configured and produced.

---

**Note:** Most MXF files containing IMX, XDCAM or AVC Intra, and QuickTime Open files are created in such a way that they can be opened for editing/playing while they are still growing during capture. Check with your edit/player application guide for details about supported formats.

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As an origin action, the Capture action can only be used to begin a workflow. It may optionally be the only action in the workflow. A capture workflow can also include additional actions to meet processing requirements, such as a Populate action or other transcoding (using a Flip action, for example). Or, it may contain Move or Copy actions, to replicate the output the captured file to other locations.

The Capture action can operate in normal mode or Open Workflow mode. In Open Workflow mode, successive actions in the workflow execute concurrently—as soon as the media is presented to it—dramatically speeding workflow execution. In workflows where actions execute normally (serially), the Capture action serializes the input stream and, when recording stops, passes it to the next action (if any) in the workflow, and so on through all the actions in the workflow.

A Vantage domain hosted on a Lightspeed Live server has an Open Workflows license by default. Thus, you can execute the Capture action (and any other Open Workflow actions) in open workflow mode, significantly speeding media processing. Of course, in

a workflow with a single Capture action, the use of Open Workflow mode does not change the functionality of the workflow, because there are no downstream actions to utilize the file in the context of the workflow.

To enable Open Workflow mode on an action, right-click the action and select Workflow Mode > Open. (Open Workflows must also be enabled in the workflow and in the Vantage Management Console). See user guides in Workflow Designer and the Domain Console for details.

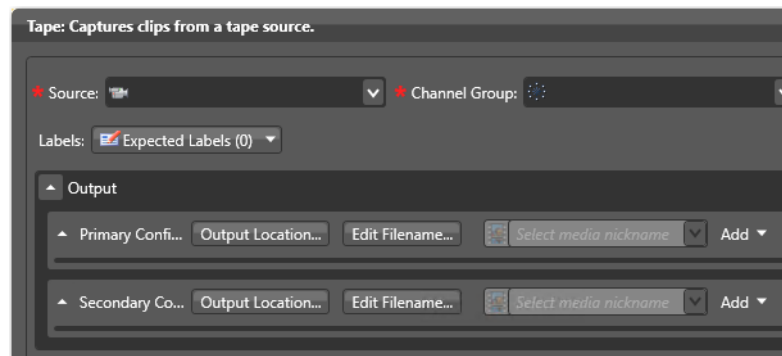
The Capture action inspector enables you to select and configure live streams for specific processing, filtering, transcoding, and output.

## Configuring Program Settings

**Note:** For details on the Web API see the [Lightspeed Live Capture Web API Reference at the bottom of the Live Support page on the Telestream website](#).

Use the Program panel to configure the Capture action to meet your requirements.

The Program panel displays the source selection, variables to generate, and controls.



**Source.** Specifies the input source to use. For information on Source Inputs, refer to [Managing Video Sources](#).

**Note:** If your Lightspeed Live Server hosts both Capture and Lightspeed Live Stream, the File Loop and Slate sources may display in the Source menu. These are NOT supported for use by Capture workflows and are reserved for use only in Lightspeed

Live Stream. The actual name of the sources created in Live Stream may be altered by the user, and may not be specifically called *File Loop* or *Slate*. Consult the Lightspeed Live Stream User Guide for details.

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**Channel Group.** Specifies the name of the Group this workflow is associated with. You can add multiple workflows to each channel group you create, and then use channel groups in your Capture web apps to filter workflow selections, narrowing your view of workflows to those that are relevant to your work or focus. Channel Groups, which are referred to as Nexus definitions in the Vantage Management Console, are created and managed using the Workflow Design Items > Nexus Definitions tab.

**Generate Variables.** Open this panel to specify which variables to generate for use in downstream actions:

**Avid Master Mob ID 1 and 2 | Avid Source Mob ID 1 and 2.** Check to update and publish the selected text variables to provide 1 or 2 sets of Master Mob ID and/or Source Mob ID for use in a downstream Media Creation action, for Interplay check-in of assets.

**Workflow Name.** Check to update and publish the selected text variable to provide the name of this workflow.

**Primary and Secondary File Path.** Check to update and publish the selected text variable to the full paths for the primary and secondary container output.

**Primary and Secondary Folder Path.** Check to update and publish the selected text variable to provide the folder path for the primary and secondary container output.

**Primary and Secondary Filename.** Check to update and publish the selected text variable to provide the file name for the primary and secondary container output.

**Time-Shift.** When enabled, allows ganged crash records to start all jobs on the same frame if time shift is applied, for manual trigger workflows only. This does not apply to recurring segment workflows, which have staggered start times. In a Capture workflow with Time-Shift enabled, the source input media frames are stored in a FIFO RAM buffer. This allows Lightspeed Live Capture to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source input's media frames, when recording is initiated, each frame stored in the Time-Shift buffer is available to be added to the captured file.

The number of seconds set for Time-Shift in Capture actions associated with this source should be less than or equal to the Max Time-Shift set in the Live Capture Source Manager web app. See *Managing and Configuring Sources* in the *Lightspeed Live Capture User Guide* for more information on setting Max Time-Shift.

Generally, for HD up to 30fps, the total for all source Time-Shift buffers combined should not exceed 80 seconds. At rates above 30 fps, the total should not exceed 60 seconds. For UHD, the maximum should not exceed 10 seconds.

**Timecode Override Enable.** Check to enable override of the Input Source timecode with the one you enter in the Timecode Override control. When enabled, Timecode

Override will override the Input Source timecode during a capture with the one specified and put this timecode at the beginning of the output file.

**Timecode Override.** Specifies the timecode value. Enter the timecode to put at the beginning of the output file when Timecode Override Enable is checked.

**Ignore Lost Frames.** When enabled, allows capture to continue recording if a Loss of Signal | FIFO overrun/overflow | Loss of RS422 condition is encountered or if video format changes are encountered. If disabled, the capture will stop when it encounters these conditions. Enabling Ignore Lost Frames should not be necessary in most cases. For LOS details, see [Loss of Signal Behavior](#).

**Delete files on failure.** When enabled, the output files are deleted when a job fails or the workflow is deactivated while capturing. When not enabled, output files from failed jobs are retained. Depending on the cause of the failure and type of file being captured, the output files from failed jobs may be usable to the point where capture stopped.

**Enforce Required Labels to Record.** When checked, when recording is started in the Capture web app, recording starts only if all label fields marked as required are not empty. If recording is prevented, an error displays indicating that the required label fields are empty. Update the fields in the label and retry. This feature is applicable to recordings started manually from the Capture Web app only.

**Update Workflow.** Avid-related. Check to pass a metadata label to the target metadata update workflow (which you must specify in the text field), which communicates with Avid Interplay to update Properties. See the Avid Integration Guide > Creating a Capture-to-Interplay-with-Metadata Workflow topic for implementation details.

**Create 708 Caption Data.** (Default: enabled) When checked, 608 data is up-converted to 708 caption data. When unchecked, 608 data is not converted. The primary use case to disable this option is for SD broadcast formats that generally should not include 708 captions.

When creating QuickTime / QuickTime Open media using the 608 caption track in a QuickTime container, Create 708 Caption Data should be disabled.

**Process Stagger Duration.** (Default: disabled) When several jobs are submitted to Live Capture at the same time - particularly immediate (aka crash) recordings - the surge in resource requirements may cause one or more recordings to fail. Supply a unique value greater than zero for each Capture workflow to cause jobs that are submitted to the other workflows during the stagger duration period to have a delayed initialization.

For crash recordings, non-zero Process Stagger Durations are intended to delay the start time of some jobs, when multiple jobs are submitted simultaneously.

For example, crash recording jobs are submitted to three workflows in rapid succession:

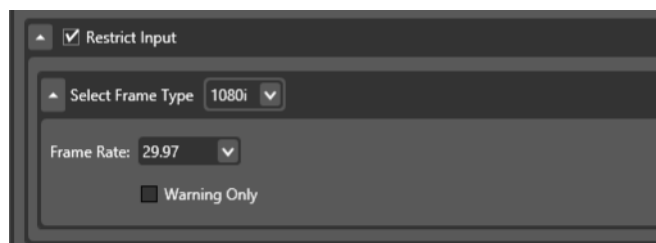
- Workflow 1, with a Process Stagger Duration value of 3 seconds,
- Workflow 2, with a Process Stagger Duration value of 5 seconds,
- Workflow 3, with a Process Stagger Duration value of 0 seconds,

In this example, Workflow 1 will initialize upon submission, and Workflow 2 initialization is delayed by 3 seconds, because of the Process Stagger Duration value entered for workflow 1. Workflow 3 initialization is delayed by 5 seconds, because of the Process Stagger Duration value entered for workflow 2.

The Process Stagger Duration delays the initialization of the capture process, but not necessarily the start time of a timed job. Assuming a timed recording is submitted with an adequate buffer for initialization for all Capture Record processes to complete (approx. 30 seconds to one minute,) the recording will be frame accurate with respect to the starting time code.

## Restricting Input - Frame Type and Frame Rate

When enabled, the Capture workflow is restricted to a specific combination of frame type and frame rate. This setting applies only to the Manual trigger or any trigger that has Allow Manual Control enabled.



**Select Frame Type.** Specifies the frame type/size to use for the restriction.

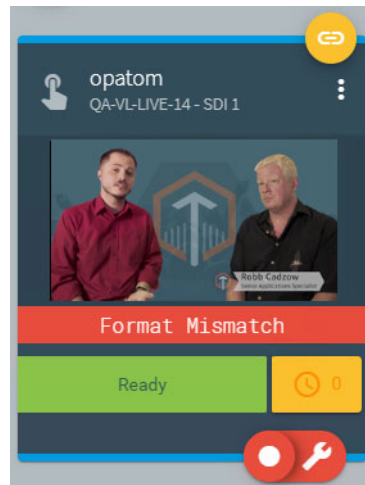
**Frame Rate.** Specifies the frame rate to use with the selected frame type.

The following are the available combinations of frame type and frame rate:

- 2160p-4K: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- 2160p-UHD: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- 1080i: 25, 29.97, 30
- 1080p: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- 720p: 50, 59.94, 60
- 625i-PAL: 25
- 525i-NTSC: 29.97

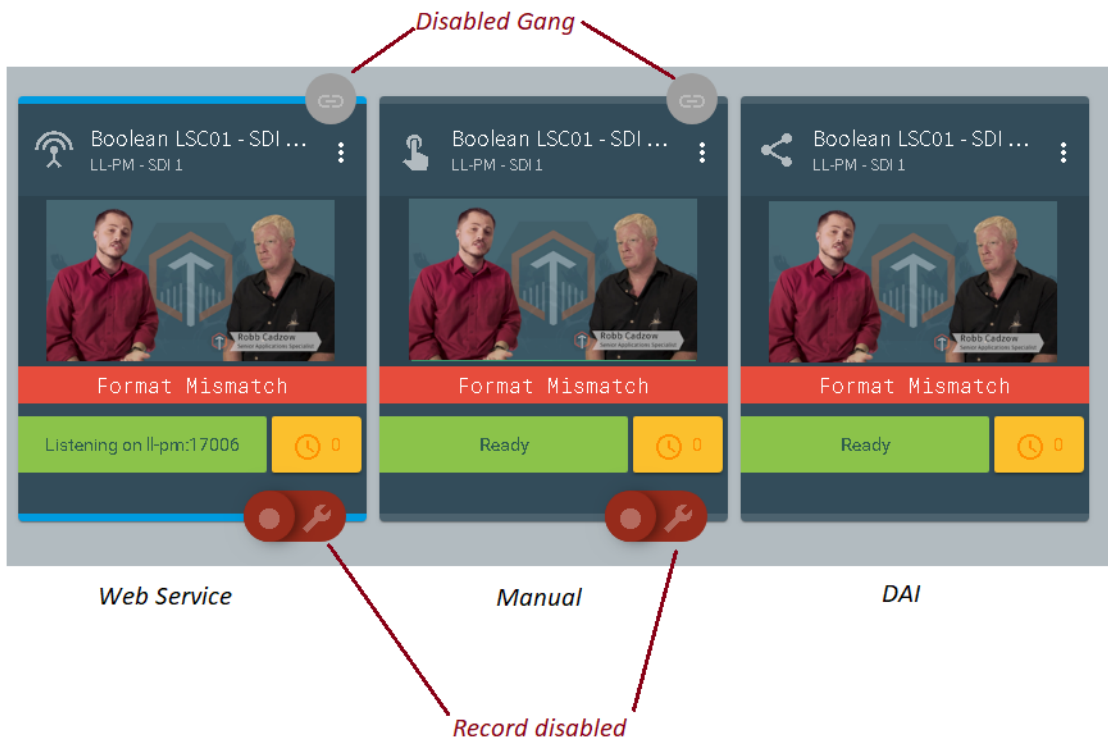
**Warning Only.** When enabled, you can start and stop manual recordings in the Capture Web app with settings that do not match the selected restrictions. The warning

message Format Mismatch is displayed on the channel thumbnail card in the Live Capture web app, but recording will continue.



## Operation When Restrict Input is Enabled

When Restrict Input is enabled AND Warning Only is NOT enabled, the Record button and Gang Record icon are disabled when settings do not match. No recording can be started via the Capture web app. This restriction applies to the Manual trigger and any trigger that has the Allow Manual Control option enabled.



When Restrict Input is enabled AND Warning Only is IS enabled, manual recordings can be started and completed with settings that do not match the selected restrictions. The warning message Format Mismatch is displayed on the channel thumbnail card in the Capture web app, but recording will continue.

### Automatic Triggers Record When Restrict Input is Enabled

Automatic triggers, such as Web Service, DAI Trigger, and CalDAV Calendar will record even when Restrict Input is enabled and settings do not match UNLESS they have the *Allow Manual Control* option enabled. See [Operation When Restrict Input is Enabled](#) above for behavior when the Allow Manual Control option is enabled.

## Expected Labels

Enable Labels to enable operators to update label values in the Live Capture web application and process them in the Capture action or downstream in the workflow. Labels can be used in downstream Vantage actions, typically to update or add properties in Interplay, or transformed into text or XML for out-of-band delivery.

Labels that are enabled can be configured in the Live Capture web app Channel Options > Configure Labels dialog. Label creation and design is performed in the Vantage Management Console.

For more information on creating labels, search the *Lightspeed Live Capture User Guide* for *Create Labels and Variables for the Tape and Capture Actions*. To update Labels in the Live Capture web application, search for *Channel Options*.

---

**Note:** If label parameters are changed or modified in the Vantage Management Console, the changes need to be applied to Capture actions that use them, so that they display correctly in the Live Capture web app.

To apply label updates to a Capture action, you must:

1. Put the workflow into edit mode and display the Capture action inspector.
2. In Expected Labels, disable the target label(s); then re-enable them.
3. Save the action and re-activate the workflow.

The updated label(s) will now display correctly in the Live Capture web app.

---

## Configuring Trigger Settings

Use the Trigger panel to select the method you want to use to start and stop live video input, and configure settings for the trigger operation.

You can implement the following triggers:

**Select.** Choose DAI | Manual | Recurring Segment | CalDAV Calendar | Web Service. Proceed to the appropriate topic for configuration details, following.



## DAI Triggers

The DAI (Dynamic Ad Insertion) Trigger enables automatic recording to start and stop based on incoming SCTE-104 markers contained in the VANC data stream of the workflow's SDI input. Recording begins when a Start Program marker is detected and stops when an associated Stop Program marker with an Event ID that matches the Start Program's ID is detected. See more details below.

Single, unique files are created for each Capture event.

---

**Note:** A Time-Shift buffer of 10 seconds is required when using the DAI Trigger.

---

**Start Preroll.** Enable to set the number of frames to pre-roll the start trigger.

**Stop Preroll.** Enable to set the number of frames to pre-roll the stop trigger.

### Default Start Behaviors for DAI Trigger

A recording is started by the Capture action when one of the following is seen attached to a sample on the source:

- SCTE splice insert data with Splice\_Insert\_Type = 3.
- SCTE time signal data with a segmentation type ID of 0x10 indicating Program Start.

### Default Stop Behaviors for DAI Trigger

A recording is stopped by the Capture action when one of the following is seen attached to a sample on the source with the corresponding Event ID:

- SCTE splice insert data with Splice\_Insert\_Type = 1.
- SCTE time signal data with a segmentation type ID of 0x11 indicating Program End.

**Allow Manual Stop.** When enabled, DAI jobs can be manually stopped via the Lightspeed Live Capture web application.

**Select Rules File.** Browse to select the XML rules file used to enable automatic recording to start and stop based on SCTE-104 markers.

---

**Note:** SCTE-104 rules files can be complex. Best practice is to contact a Telestream Sales Engineer for details on configuring them correctly.

---

### Issuing a Stop Command Using the Web API

If a DAI SCTE-104 triggered recording should be stopped immediately and *Allow Manual Stop* has not been enabled, you can issue the following Lightspeed Live Web API Source command:

```
http://[IP of system hosting the SOURCE Input]:[15000]/
InsertScte35Message?source=[SOURCE
GUID]&scte35Message=ProgramEnd&eventID=0
```

The SOURCE GUID can be obtained by using the *GetSource* command. See the [Lightspeed Live Capture Web API Reference at the bottom of the Live Support page on the Telestream website](#) for details on this command.

## Manual Triggers

Select *Manual* to trigger capture of live video manually, using the Record button in the Lightspeed Live Capture web application.

---

**Note:** If you are using the Lightspeed Live Capture web application to control capturing, you must set the Trigger option to *Manual* so the web app can control the recording of input channels.

---

## Recurring Segment Triggers

The Recurring Segment trigger enables you to capture files of the time duration specified, from 5 minutes to 8 hours. You control when to start recording directly in the Live Capture web app, unless *Begin recording on workflow activation* is selected, in which case, recording starts as soon as you activate the workflow.

Repeating segments are created based on your specified segment duration calculation method and the specified duration. The first and last segments captured may be a shorter time than the specified duration, depending on when the recording start and stop commands are initiated.

**Segment Duration.** Specifies the time duration of recurring segments: 5 min. | 10 min. | 15 min | 20 min. | 30 min. | 1 hr. | 2 hr. | 3 hr. | 4 hr. | 6 hr. | 8 hr. The default is 5 minutes.

---

**Note:** When you set the Primary Output of your workflow to use a QuickTime Open container, you should also set the Default Duration in the QuickTime Open general configuration to the same duration as the segment duration.

---

**Duration Calculation Method.** Specifies the method used to determine start and end points per segment: Midnight | Timecode | Duration.

**Midnight** - Segments are created on evenly-divided time boundaries starting at midnight, based on the duration selected. For example, if you specify a 15 minute segment, there are 96 divisions. The first segment stops at the next 15 minute boundary, and all repeating segments start and stop at 00:00, 00:15, 00:30, and 00:45. If you specify a 2 hour segment, there are 12 divisions, and the first segment stops at the next 2 hour boundary, and all repeating segments start and stop at 02:00, 04:00, 06:00, etc.

When capturing a recurring segment, Capture attempts to start new segments at the exact start of a minute, and the job name reflects this in the naming convention: record-HH:MM:SS:00. If the start time is only an estimate, the name reflects the estimated start time of the segment, and the delineation for seconds is omitted from the name: [base name]-~HH:MM. If the service fails to retrieve a time code but the source is not in a LOS state, the name is [base name]-initial.

1 hour example:

Recurring Segment duration=1 hour

Segment 1 start=current timecode

Segment 1 end= xx:00:00:00 (where xx is the next hour, mark out point exclusive)

Segment 2 start=xx:00:00:00 (where xx is the next hour, mark in point inclusive)

The result is that all segments are the selected duration based on timecode, except the first segment and the last segment, if it is ended arbitrarily.

**Timecode** - use when you want the start time code of the first segment to be the current timecode, and then advance the timecode by the segment duration you specified to determine the segment end point.

For example:

Recurring Segment duration=1 hour

Current Timecode = 08:00:03;22

Segment 1 start = 08:00:03;22

Segment 1 end = 09:00:03;22 (exclusive out point)

The result is that the duration of all segments are determined by timecode, except the last one if it is ended arbitrarily.

**Duration** - use when you want the duration of each segment to be measured in frames, rounded to the nearest whole frame (an integer value). It is calculated using the specified segment duration at the video frame rate, taking into account drop frame or non-drop frame. This ensures that all segments have the same frame count. For example, a 5 minute duration segment at 29.97 is 8991 frames.

**Enable File Count Naming Pattern.** When checked, a numeric string is added after the base filename string, based on the number of digits you specify. The string starts at 1 and increments for each segment recorded.

**Number of digits in the file name.** Specifies the number of digits in the incrementing file count string being applied to the current segment filename. For example, if you set it to 4, files are specified as `basefilename.0003.mxf`.

## CalDAV Calendar Triggers

The CalDAV Calendar Trigger enables you to record based on events on a CalDAV-compatible calendar. For detailed instructions, see *Using the CalDAV Trigger* below.

---

**Note:** When using the CalDAV Calendar Trigger you must set your TimeCode Source in the *Vantage Management Console* to either *Computer Clock* or *Source*. When using *Source*, you must have time-of-day timecode in your source that matches the time set in your Lightspeed Live server.

---

**Calendar.** Enter the URL to the CalDAV calendar you want to use.

**Username.** Enter the email address you use for your CalDAV calendar.

**Password.** Enter the password you use to sign in to your CalDAV calendar.

**Send Calendar Status Notification Emails.** Check this option if you want to have an email sent when Capture is able to successfully connect to the CalDAV calendar upon workflow activation, or when connection to the URL goes online, and when the calendar goes offline. The email goes to the address configured in the Vantage Management Console for the *Administrator Email Address*. If you have not received a notification email, check your spam folder, and then check your Vantage configuration.

---

**Note:** The email address for notifications must be properly configured in the *Vantage Management Console > Settings & Options > Email* tab. See the *Vantage Domain Management Guide* for detailed instructions.

---

**Allow Manual Control.** (*Use caution when enabling the Manual Trigger control.*) When enabled, manual control via the Lightspeed Live Capture web application is allowed. Jobs can be immediately started using the manual controls in the same way as with the Manual Trigger.

In addition, scheduled jobs that have been added to the schedule record queue can be stopped and removed from the job queue. When a manual stop is issued, all scheduled jobs that are currently queued or are in the process of being recorded will be removed from the schedule queue. Jobs currently recording will be stopped and removed from the queue. New events added to the calendar will be added to the queue if they are within the 1-hour queue window.

If a CalDAV Calendar Trigger workflow is deactivated then reactivated, any scheduled events on the calendar that are within the 1-hour schedule queue window will be added to the scheduled capture queue regardless of any previous manual control.

## Web Service Triggers

Select Web Service to trigger live video capture in a custom program, using commands from the Lightspeed Live Capture Web API. You can queue up a maximum of 16 Web Service trigger jobs per Live Capture host server at any one time.

For details on the Web API see the [Lightspeed Live Capture Web API Reference at the bottom of the Live Support page on the Telestream website](#).

**Port.** Specify a port number for the web service input that will trigger Live Capture or leave the default, which is 17000. When running multiple Capture workflows simultaneously, you must use unique ports. The program interacting with each workflow must be configured to use the same port number for execution of Capture operations.

---

**Note:** Do not use port numbers 8083, 8084, 8089, 8090, 15000, or 18000 for the Web Service input port. An error message does not appear when activating a workflow set to these ports, but the Web Service Trigger will not function.

---

**Create Metadata Log.** When enabled, metadata log files are created that include frame numbers, the timecode value of each frame, and RS422 status (when RS422 is enabled). The log file is written to the output location along with the primary output.

**Allow Manual Control.** *(Use caution when enabling the Web Service manual control.)* When enabled, manual control via the Lightspeed Live Capture web application is allowed (in addition to capture via the Web API). Jobs can be immediately started using the manual controls in the same way as with the Manual Trigger.

In addition, web service jobs that have been added to the web service record queue can be stopped and removed from the job queue. When a manual stop is issued all web service jobs that are currently queued or are in the process of being recorded will be stopped and removed from the web service queue.

## Using the CalDAV Calendar Trigger

The CalDAV Calendar Trigger enables you to capture video based on events in a CalDAV calendar. When using CalDAV Calendar Trigger:

- Each event must be at least 15 minutes in duration, or greater.
- Event durations are restricted to a maximum of 9 hours. Events that are longer will stop recording automatically at 9 hours duration.
- Event names cannot contain an accent grave character or any of the following characters: \* | \ ; " ' < > ? /

---

**Note:** You must use a calendar that is dedicated to *only* contain events that are used for Lightspeed Live Capture. All events in the calendar are used for Live Capture, no matter what name they are given or other purpose they are intended for.

---

## What Happens When a Queued Event is Deleted

If an event on the calendar has been added to the Capture queue (events are queued up when they are within 1 hour of their start time) and is subsequently deleted from the CalDAV calendar, its job status is reported as Complete in the *Workflow Designer* and the *Job Status Views* application.

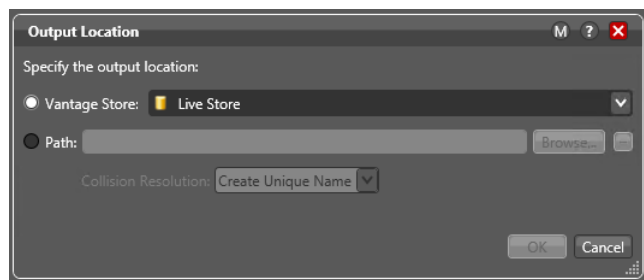
- In the case where the deleted event had not yet started capturing, a 0K (zero K) sized file associated with the job will remain in the workflow's output folder location.
- In the case where the deleted event was in a capturing state when it was deleted, a playable file associated with the job will remain in the file's output folder location.

See *Using the Job Status Views* in the *Lightspeed Live User Guide* for more information on using this application.

## Configuring Primary and Secondary Outputs

The output location, file name and nickname settings are set once for all primary and secondary outputs. Select the output location where the captured file should be written, optionally edit the file name using tokens or variables, and specify the output nickname for use by downstream actions operating on the file.

**Output Location.** Click Output Location and select from these choices.



- *Vantage Store:* Write the output to a Live Store. Select any available Live Store from the drop down list.

Telestream recommends creating a Live Store in Vantage and using it as the output location for efficient Capture operations. See Capture User Guide > Using Live Stores for Capturing Files for details.

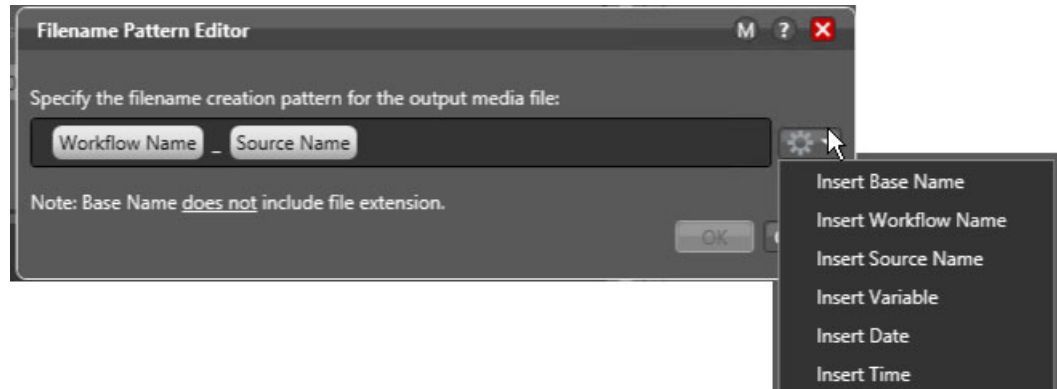
- *Path:* Write the output to a specific Windows file system server and directory. Manually enter a Windows share (UNC path) or drive letter (not recommended on Vantage arrays) or click Browse to navigate and select the location. Or, click the green Browse button and select a variable which supplies the fully-qualified path.

---

**Caution:** In rare instances, two capture processes writing to the same path location folder may result in one file overwriting the other. To prevent this, the best practice is to use a unique folder location for each workflow, or append a Time token (set to mmm) to the file name in a workflow (configured in Edit Filename), which returns the current millisecond, thus altering the file name.

---

**Edit Filename.** Displays the Filename Pattern Editor and specifies the pattern for the file you are creating. Default: Workflow Name - Source Name. Use the menu on the right to select one or more tokens to insert to create the exact filename pattern you require.



Available tokens:

- Base Name: Customizes the output file name with a name you enter in the Live Capture web application, or when passing a name token from the Web API or CalDAV Calendar trigger.
- *Workflow Name*: Adds the name of the workflow as part of the file name.
- *Source Name*: Adds the name of the live source as part of the file name.
- *Variable*: Choose and add a variable to the file name.
- *Date*: Adds the date as part of the file name.
- *Time*: Add the time as part of the file name.

---

**Note:** The time applied to the Time token represents the time that the output file is created. Files are initialize at different times based on the Trigger type being used.

---

The variable token is replaced by the value it holds when the action executes. The variable should be set prior to execution of this action. For example, if a variable token named */SCI/* is given the value *12H4JA678*, wherever the */SCI/* variable token appears in the filename pattern it is replaced with that value.

**Select Media Nickname.** Click the menu to select the nickname (or enter it manually) for this new package file.

**Add.** Create a new Configuration Template, by first choosing the template's output container format from the Add menu. Specify a container type, enter a unique name in the container's Config Name field and configure container details in the panel on the right. Now, click on the video and audio streams on the left and configure them as well, in the panel on the right. Add all of the output configurations that you want to have available in the Live Capture web app.

After logging clips, click the Capture button in the Live Capture web app to select the primary output container format you want to use for the capture operation.

**Delete.** Click the X icon on the right to delete the output from this action.



## Creating a Tape Capture Workflow

Before you can use the Tape Capture web application or API to capture tape-based media to a file, you should create and activate one or more tape capture workflows as needed, each of which uses the Tape action to make a video source available for Capture web app or API control.

---

**Note:** Only ONE Tape or Capture action is allowed in Live Capture workflows. Multiple Tape/Capture actions is not supported and results in workflow failure.

---

The following topics explain this workflow and how to create it:

- [Tape Action Overview](#)
- [Expected Labels](#)
- [Configuring Primary and Secondary Outputs](#)
- [Settings Panel](#)
- [Creating the Tape Capture Workflow](#)

## Tape Action Overview

The Telestream Live Service and the Tape action are Vantage features in a Vantage domain running on a Lightspeed Live server. The Tape action is used in workflows created for ingesting tape-based media via SDI in the Live Server and serializing it to files for further video processing.

You use the Lightspeed Live Tape web application to select sources and control recording during playout. You can also use Lightspeed Live Capture Web API to create custom programs to control Vantage capture workflows. For details on the Web API see the [Lightspeed Live Capture Web API Reference](#) on the Telestream website.

The Tape action is used to start SDI tape capture workflows created in the Vantage domain installed on the Lightspeed Live server. The Tape action inspector enables you to select and configure VTR sources for processing, filtering, transcoding, and output. You can also use the action to add metadata labels.

The container and codec selected in the Tape action allow configuration of the encoding and format of the capture operation. The encoded media is captured to a primary file stored locally or copied to external storage.

---

**Note:** Most MXF files containing IMX, XDCAM or AVC Intra, and QuickTime Open files are created in such a way that they can be opened for editing/playing while they are still growing during capture. Check with your edit/player application guide for details about supported formats.

---

As an origin action, the Tape action can be used in Vantage to begin a workflow, and can be the only action in the workflow. A tape capture workflow can include additional actions, such as a Copy or Move action, which can be optionally used to output the captured file to an additional location.

Use the Lightspeed Tape Capture web application to control VTR sources from the VTR Preview Player panel, log clips from tapes, and capture logged clips from tape to files. For information about the Live Capture web application, please see the *Lightspeed Live Capture User Guide*. The Lightspeed Live Tape Capture Web API can also be used to create custom programs to control tape capture workflows.

This action is open workflow capable if the Open Workflows license is installed; right-click the action and select Workflow Mode > Open. Open Workflows must also be enabled for the current workflow and in the Vantage Management Console Settings.

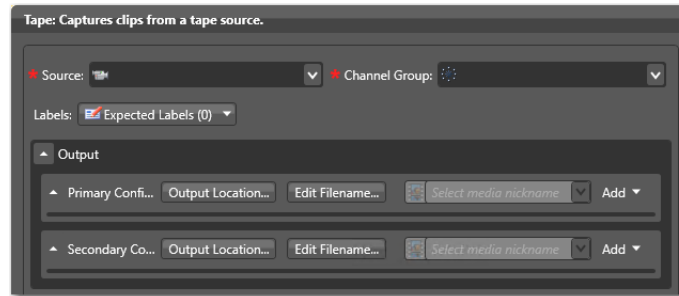
---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Inputs

The inputs are listed individually at the top of the inspector.



**Source.** Select the input source to use from the Source menu. For more information on Source Inputs, refer to [Previewing Sources and Finding Workflows](#).

### When Live Stream and Capture are Used on the Same Server

This caution only applies when Live Stream and Live Capture are used on the same Lightspeed Live server:

---

**Caution: Capture does not support Slate or File Loop inputs. If your server is configured with both Capture and Lightspeed Live Stream the 'File Loop', or 'Slate' sources may display in the Source drop-down menu. These are NOT supported for use by Capture workflows and are reserved for Lightspeed Live Stream. The actual name of the sources created in Live Stream can be any name you've given them, and may not be called File Loop, RTMP, and so on. Please consult the Lightspeed Live Stream User Guide for additional details.**

---

**Channel Group.** Specifies the name of the Group this workflow is associated with. You can add multiple workflows to each channel group you create, and then use channel groups in your Capture web apps to filter workflow selections, narrowing your view of workflows to those that are relevant to your work or focus. Channel Groups, which are referred to as Nexus definitions in the Vantage Management Console, are created and managed using the Workflow Design Items > Nexus Definitions tab.

## Expected Labels

Enable Labels to enable operators to update label values in the Tape Capture web application and process them in the Capture action or downstream in the workflow. Labels can be used in downstream Vantage actions, typically to update or add properties in Interplay, or transformed into text or XML for out-of-band delivery.

Labels that are enabled can be configured in the Tape Capture web app Channel Options > Configure Labels dialog. Label creation and design is performed in the Vantage Management Console.

For more information on creating labels, search the *Lightspeed Live Capture User Guide* for *Create Labels and Variables for the Tape and Capture Actions*. To update Labels in the Live Capture web application, search for *Channel Options*.

---

**Note:** If label parameters are changed or modified in the Vantage Management Console, the changes need to be applied to Capture actions that use them, so that they display correctly in the Tape Capture web app.

To apply label updates to a Capture action, you must:

1. Put the workflow into edit mode and display the Capture action inspector.
2. In Expected Labels, disable the target label(s); then re-enable them.
3. Save the action and re-activate the workflow.

The updated label(s) will now display correctly in the Tape Capture web app.

---

## Configuring Primary and Secondary Outputs

You use the Primary and optional Secondary Output panels to create configuration templates that you can select in the Tape Capture web app.

The output location, file name and nickname settings are set once for all primary and secondary configurations. Select the output location where the captured file should be written, optionally edit the file name using tokens or variables, and specify the output nickname for use by downstream actions operating on the file.

Configuration templates can be added to each output type and consist of a container format and the video and audio codecs to be use for the captured output. There is no limit to the number of configuration templates you can create.

**Output Location.** Click Output Location and select from these choices:

- *Vantage Store:* Write the output to a Live Store. Select any available Live Store from the drop down list.

Telestream recommends creating a Live Store in Vantage and using it as the output location for efficient Capture operations. See Capture User Guide > Using Live Stores for Capturing Files for details.

- *Path:* Write the output to a specific Windows file system server and directory. Manually enter a Windows share (UNC path) or drive letter (not recommended on Vantage arrays) or click Browse to navigate and select the location. Or, click the green Browse button and select a variable which supplies the fully-qualified path.

---

**Caution:** In rare instances, two capture processes writing to the same path location folder may result in one file overwriting the other. To prevent this, the best practice is to use a unique folder location for each workflow, or append a Time token (set to mmm) to the file name in a workflow (configured in Edit Filename), which returns the current millisecond, thus altering the file name.

---

**Edit Filename.** Displays the Filename Pattern Editor and specifies the pattern for the file you are creating. Default: Base Name. Use the menu on the right to select one or more tokens to insert to create the exact filename pattern you require.

Available tokens:

- *Base Name:* Select to add the base (clip) name as part of the file name. The Base Name token is populated with the Clip Name selected in Clip Panel of the Tape Capture user interface.
- *Workflow Name:* Select to add the name of the workflow as part of the file name.
- *Source Name:* Select to add the name of the live source as part of the file name.
- *Variable:* Select to choose and add a variable to the file name.
- *Date:* Select to add the date as part of the file name.
- *Time:* Select to add the time as part of the file name.

The Variable token is replaced by the value it holds when the action executes. The variable should be set prior to execution of this action. For example, if a Variable token named ISCI is given the value `12H4JA678`, wherever the ISCI variable token appears in the filename pattern it is replaced with that value.

**Select Media Nickname.** Specifies the nickname for this media.

**Add.** Create a new Configuration Template, by first choosing the template's output container format from the Add menu. Specify a container type, enter a unique name in the container's Config Name field and configure container details in the panel on the right. Now, click on the video and audio streams on the left and configure them as well, in the panel on the right. Add all of the output configurations that you want to have available in the Tape Capture web app.

After logging clips, click the Capture button in the Tape Capture web app to select the primary output container format you want to use for the capture operation.

**Delete.** Click the X icon on the right to delete the output from this action.

## Settings Panel

Specify settings to use for each output configuration. Binding any of these parameters to variables will make those parameters configurable from within the Tape Capture web app.

**Ignore Lost Frames.** When enabled, allows capture to continue recording if a Loss of Signal | FIFO overrun/overflow | Loss of RS422 condition is encountered or if video format changes are encountered. If disabled, the capture will stop when it encounters these conditions. Enabling Ignore Lost Frames should not be necessary in most cases. For LOS details, see [Loss of Signal Behavior](#).

**Pre-Roll Duration.** Specifies the number of seconds that tape rolls before a scheduled recording begins. You can also assign a variable defined elsewhere in the workflow.

---

**Note:** Setting Pre-Roll Duration to 0 (zero) may have a use in some cases, such as capturing digital sources. A 0 (zero) setting could cause issues when capturing from tape sources. The default Pre-Roll is 3, which often works fine for a tape source.

---

**Post-Roll Duration.** Specifies the number of seconds that tape rolls after a scheduled recording ends. You can also assign a variable defined elsewhere in the workflow. Note that the VTR stops only after all frames have been captured, so post-roll may continue longer than the duration you specify.

**Timecode Override Enable.** When checked, activates and overrides the Input Source timecode with the one entered in the Timecode Override control. When enabled, Timecode Override overrides the Input Source timecode during a capture with the one specified and puts this timecode at the beginning of the output file. All clips in the Tape clip list will have their timecode overwritten by this timecode.

**Timecode Override.** Specifies the timecode value to use to put at the beginning of the output file when Timecode Override Enable is active.

**Discontinuity Threshold.** Specifies the minimum number of skipped frames that constitutes a discontinuity (timecode break) state. This threshold affects both Create New File on Discontinuity and Abort on Discontinuity, when enabled. Note that decremented and repeated frames always count as timecode discrepancies, and for these discrepancies, the threshold setting is ignored.

See [Timecode Break Recording](#) and [Timecode Discontinuity Definition](#) in the *Using the Tape Capture Web Application* chapter for discontinuity details.

**Create New File on Discontinuity.** When checked and timecode discontinuity is detected, specifies that the current media file is closed and a new media recording file is opened. During an active capture recording, if a discontinuity is encountered, the current capture file will complete, and a new media file recording will immediately start.

Time code discontinuities are defined as follows:

- Time code increments: If time code increments by a value equal to or greater than the selected Discontinuity Threshold value.
- Time code repeats: The Discontinuity Threshold value is ignored in this case.
- Time code decrements: The Discontinuity Threshold value is ignored in this case.

Example 1: A time code incrementing from 00:00:30;10 to 00:00:30;15 would be detected by a threshold of 4 or less.

Example 2: A time code repeating from 00:00:30;10 to 00:00:30;10 would be detected.

Example 3: A time code decrementing from 00:00:30;10 to 00:00:29;00 would be detected.

**Abort on Discontinuity.** When enabled, capture aborts when a timecode discontinuity is detected as specified by the Discontinuity Threshold or when the VTR servo is not locked.

---

**Note:** Create New File on Discontinuity and Abort on Discontinuity options are mutually exclusive; when both are checked, Abort on Discontinuity takes precedence. That is, if discontinuity is detected, the job is aborted.

---

**Ignore Frames When Servo is Not Locked.** If enabled, all frames captured while the servo is in the unlocked state (as reported by the VTR) are excluded from the output file.

**Create New File When Servo Relocks.** If enabled, creates a new media file when the servo relocks after being in the unlocked state. When a servo relock is encountered during an active capture recording, the current capture file will complete, and a new media file recording starts.

If Create New File When Servo Relocks is enabled and Ignore Frames When Servo is Not Locked is disabled, the system may create unwanted (unlocked) frames at the end of output files.

If Create New File on Discontinuity is enabled and Ignore Frames When Servo is Not Locked is also enabled, the result may be an output file that contains a discontinuous timecode, even though Create New File on Discontinuity is enabled and the timecode was always incrementing. This occurs because of the system ignoring frames, regardless of the timecode, while the servo is unlocked. With this configuration, the frames captured during the period when the servo was unlocked will be excluded from the output file. New frames would then be added to the file when the servo relocks, which would cause the output file to have discontinuous timecode. To avoid this scenario, enable the Create New File When Servo Relocks option. In this state the relock of the servo will start a new file where the discontinuity in the output file would have been.

As described above, repeating timecodes are counted as discontinuities. Most VTRs repeat timecodes when the servo is unlocked; therefore, if Ignore Frames When Servo is Not Locked is disabled and Create New File on Discontinuity is enabled, the result may be many single frame files while the servo is unlocked. This will not happen if Ignore Frames When Servo is Not Locked is enabled.

With many VTRs, particularly an SRW-5800, there can be gray frames after the servo relocks. Timecode for these frames is often invalid. Because the system is only able to respond to the status the VTR provides, it will not detect and exclude these gray frames.

No two passes of the same section of tape are likely to be identical. This occurs because the VTR can sometimes take longer than others to lock the servo after the control track is detected. Therefore, it is important to check the logs to verify whether the servo was locked while a specific frame was captured.

For past users of Telestream's Pipeline tape capture product, enabling all three settings above will provide the cleanest results and the closest to what Pipeline used to do.

**Use Duration Over Markout.** Ignores mark out and rolls tape for the specified duration regardless of time code.

**Treat input as Progressive.** Assumes input is progressive even if it is interlaced.

**RS422 time code delay.** Adjusts RS422 time code by specified number of frames. RS422 time code delay can be used to compensate for VTR decks requiring adjustments to frame timing. Frames can appear early or late, depending on the type and/or age of the VTR deck used. This adjustment compensates for VTR decks that are not 100% frame accurate (or for systems with routing latency to the associated timecode). Most VTR decks do not require this offset adjustment. If you have a VTR deck that requires this adjustment it is necessary to use a trial and error process to determine the correct offset. The default is 0, the minimum is -3 frames, and the maximum is +3 frames.

**Rewind Tape.** When checked, a Rewind command is sent to the VTR after capture is complete. If there are multiple clips on a tape slated for capture, the Rewind command is sent once; after all clip capture jobs have completed.

**Stitch Clips.** When checked, stitches the aggregated content from all captured clips into a direct-converted output file. See *Stitch Behavior*, below.

**Stitch Clip Base Name.** Specifies the base name to use in job names and the *Base Name* part of the file name pattern. When blank, *StitchedClip* is the default base name.

**Stitch Behavior.** Specifies the stitched file behavior: *Direct Convert*, which can not be changed. Creates a self-contained output file for the Primary and/or Secondary outputs, which contains the aggregated content from all captured clips in the order specified by the user.

The output file can be used by a downstream action for additional processing.

**Allow Secondary Output to be Disabled.** Check to add the option to disable the secondary output in the Tape Capture web application. When selected, the "Disable Secondary Output" option is added to the Tape Capture web app Capture Clips dialog.

---

**Note:** When *Allow Secondary Output to be Disabled* is selected, no downstream processing can be done for the secondary output. With this enabled, you cannot save the workflow if it is set to process the secondary output.

---

When you need to have downstream actions process the secondary output, but you want the option to disable the secondary output in the Tape Capture web app, add the Poster Frame secondary output so that can be selected in the web app as the disabled option.

You must create one or more MP4 secondary outputs when *Allow Secondary Output to be Disabled* is selected, in order to have the option to enable and create a secondary output in the Tape Capture web app.

**Generate Variables.** Select which variables to generate:

**Is Output Stitched.** When checked, enables the ability to detect if the output is stitched or not. Select or create a True/False variable to generate, which is used in a downstream action to execute the workflow based on the result. (Use a Decide action to test the variable and perform one branch or another.)



**Primary Configuration.** When checked, generates the specified variable to enable downstream actions to determine which configuration was used in this action. The variable contains the primary configuration that was selected by an operator for this job, in the Record panel of the Tape Capture Web app, which is selected from the menu that displays all of the primary configurations you have configured here in the Tape action to be available to the operator during tape capture operations.

**Secondary Configuration.** When checked, generates the specified variable to enable downstream actions to determine which configuration was used in this action. The variable contains the secondary configuration that was selected by an operator for this job, in the Record panel of the Tape Capture Web app, which is selected from the menu that displays all of the secondary configurations you have configured here in the Tape action to be available to the operator during tape capture operations.

**Avid Master Mob ID | Avid Source Mob ID.** Check to generate variables to provide the Avid Master Mob ID and/or the Avid Source Mob ID for use in downstream actions. Then select the text variable you want to generate.

**Workflow Name.** Check to generate variable to provide the name of this workflow for use in downstream actions. Then select the text variable you want to generate.

## Time Code Burn-in Filter

Check to enable this filter and configure it. The Time Code Burn-in filter writes the current value of the time code into the video frame at the specified location and font size, typically for use in proxy files.

Controls with a green Browse button can be specified dynamically, on a job-by-job basis by assigning a variable whose value has been set in an upstream action.

**X Position.** The X position of the top-left of the timecode in the output video frame. The range is from 0 to 4096 pixels.

**Y Position.** The Y position of the top-left of the timecode in the output video frame. The range is from 0 to 2160 pixels.

**Font Size.** Sets the font size of the timecode. The range is from 6 to 120 pixels.

**Text Color.** (Default: White). Sets the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Sets the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue, or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100 per cent opacity, 0 is transparent.

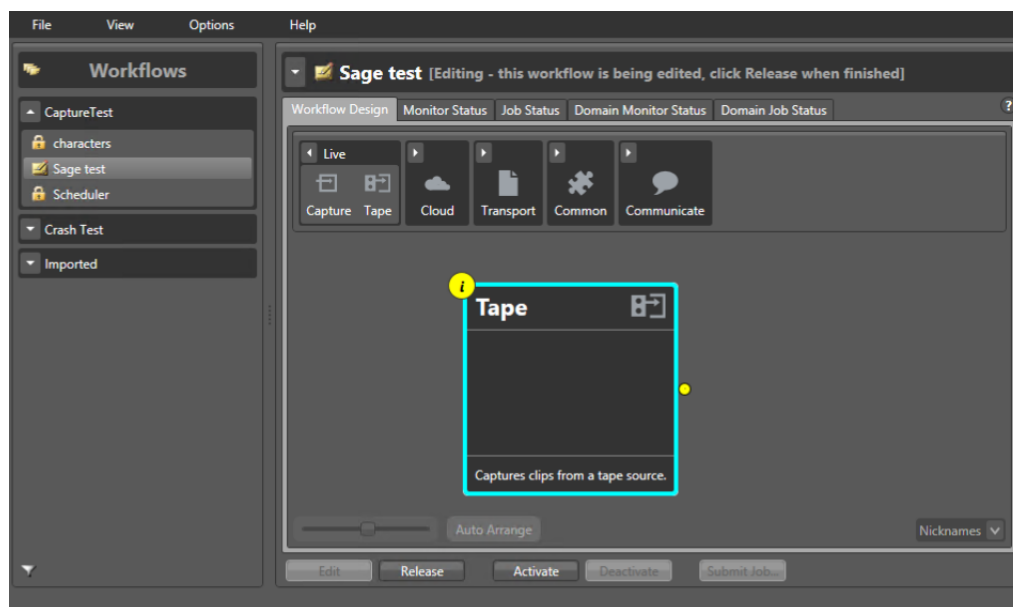
**Note:** The burned-in Timecode will always represent the actual input timecode being used by the Input Source.

## Creating the Tape Capture Workflow

Follow these steps to create and activate a tape capture workflow:

**Note:** Only one Tape (or Capture) action is allowed in Live Capture workflows. Multiple Tape/Capture actions is not supported and results in workflow failure.

1. Open the Vantage Workflow Designer.
2. Select File > Create New Workflow to start a new workflow.
3. Drag a Tape action from the Vantage Live Service group to the design area. A tape capture workflow may consist of only this one action. However, other actions can be added to perform specific additional functions. See [Vantage Actions | Containers | Codecs](#).

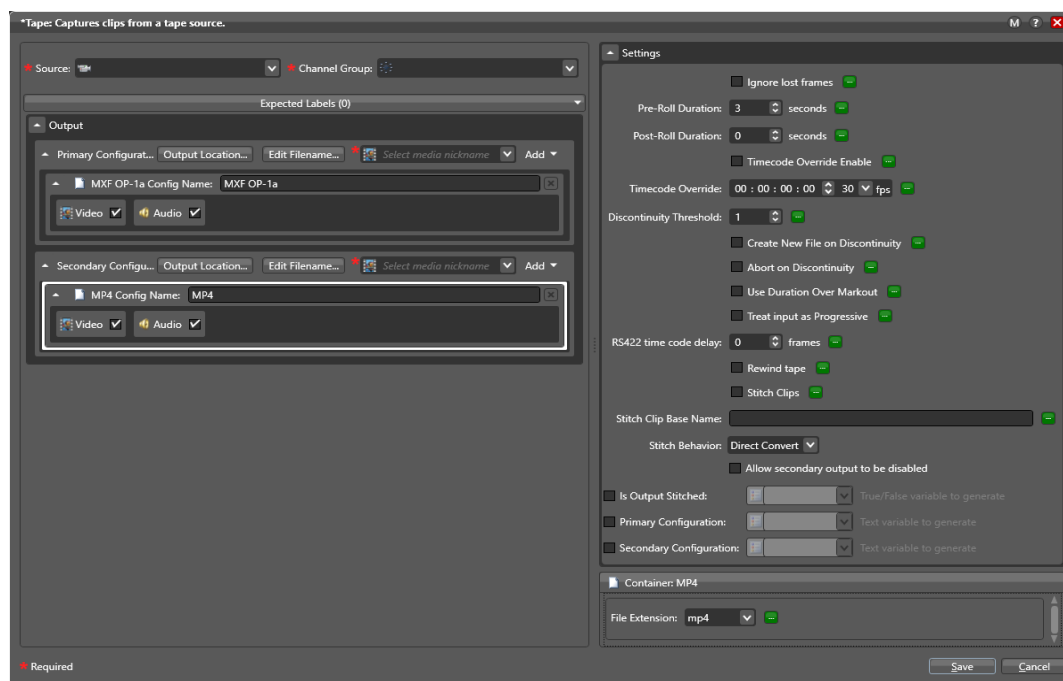


4. Open the Tape action inspector and make these selections:

**Source**—Select the source to utilize.

**Channel Group**—Select a Channel (Nexus) Group.

**Expected Labels**—Select labels you created, if any, to contain metadata. When selected, they are available to configure in the Tape Capture web application.



5. Configure the [Configuring Primary and Secondary Outputs](#) and the [Settings Panel](#) to meet your requirements. For configuration details, see [Tape Action Overview](#).

6. Click Save when you finish configuring the Tape action.

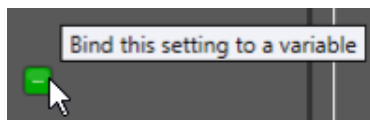
7. Click Activate to start the workflow. This workflow must be running to connect the Tape Capture Web app to the VTRs.

## Binding Variables to Configuration Controls

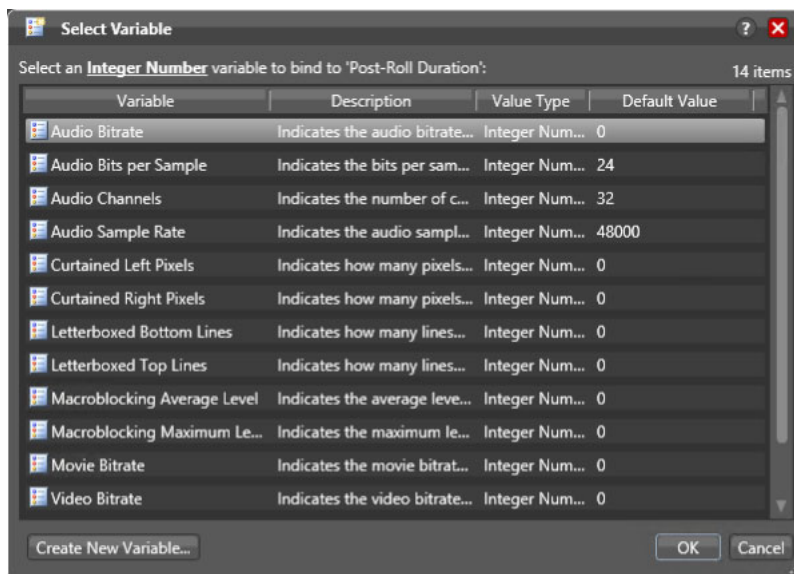
Binding variables to an action's configuration settings enables you to configure those settings directly from the Tape Capture or Live Capture web application and provide run-time values for each job you submit, rather than hard-coded, static values that never change from job to job.

**Note:** For detailed topics on creating and using Vantage variables, click the ? icon to display the Vantage Users Guide.

To bind a variable to a control where supported, click the green Variable browse button next to the control:



The Select Variable dialog displays:



Each variable that is bound to a control is displayed in and can be update in the...

- Live Capture web app Customize Parameters dialog. See [Channel Options](#).
- Tape Capture web app Customize Parameters dialog. See [Configuring Tape Parameters that are Bound to Variables](#).
- Live Schedule web app Variables dialog. See [Using Variables in Events](#).

## Paths for Vantage Storage Overview

Vantage *stores* are named locations for temporary files. They are used in Vantage to conveniently store and access working media and [attachment](#) files, and to write media and other output files. Many Vantage services require access to files; Windows clients such as Workflow Portal also read and write files. These programs (both Windows programs and services) may run on one computer. Usually, however, they are distributed on many computers in a Vantage array. In distributed Vantage arrays, file access must be managed to ensure that the all programs can function correctly.

Vantage stores can be specified on Windows computer using the following forms:

- UNC paths (shares): \\ComputerName\Sharename
- Drive-letters: C:\folder\folder

If all Vantage services, clients, Vantage stores and folders are on the same server (an [All-in-one domain](#)), you can use either form. However, Telestream recommends that you always use the UNC path form to reduce file access problems. It is a requirement when you are operating in a Vantage array.

Drive-letter paths are defined in the context of a local computer; it does not identify the computer that hosts the drive. This prevents them from being useful in arrays. For example, if you specify a Vantage store on drive C using a drive letter, and a Workflow Portal operator on a different computer tries to view files in that store, Workflow Portal searches for files on drive C on the operator's computer, not the Vantage server.

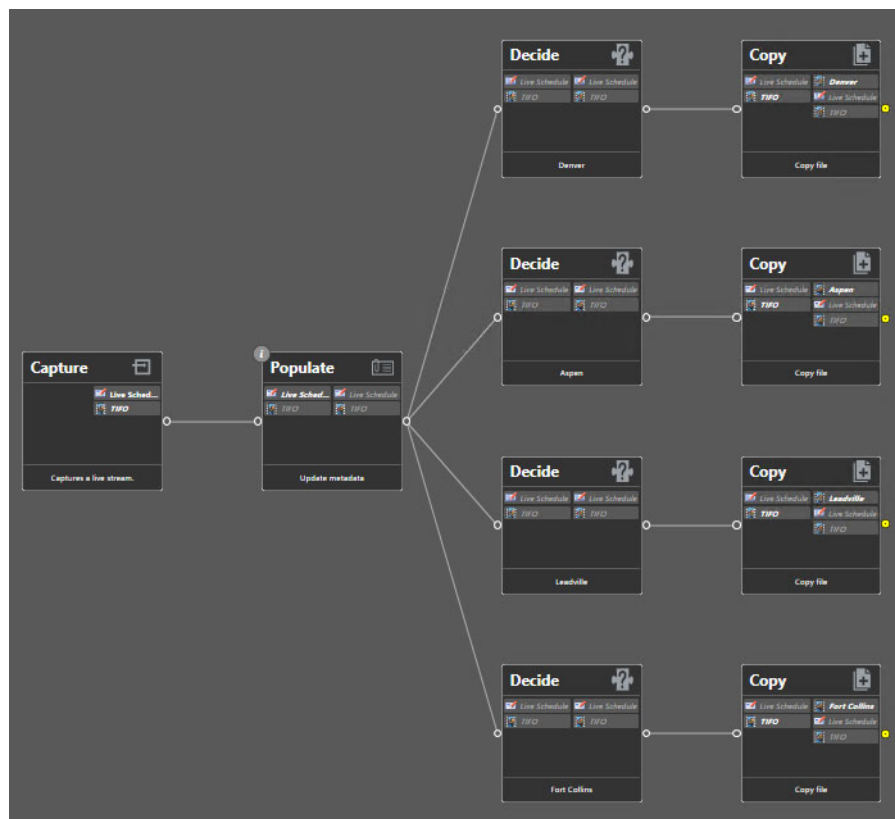
In another example, you create a workflow in [Workflow Designer](#) installed on Computer A. It has a Watch action, which is executed by a Vantage Monitor Service running on Computer B. You specify a [hot folder](#) on drive C on Computer A, where Workflow Designer is installed. When the service executes the Watch action, it attempts to locate the hot folder on Computer B's C drive, which does not exist.

When any Vantage service or client program needs to access and use Vantage storage or a directory on a different computer, you must specify the path using the UNC form. When services or clients access Vantage storage from another computer, the Vantage storage location or directory must be configured as a share, and access must be granted to the appropriate Windows users. For more information, see Windows Authentication Guidelines in the *Vantage Domain Management Guide*.

When you plan to use a SAN system, be aware that some SAN systems expose the shared drive as a letter (mapped) drive—for example, X:—that is visible in any SAN. You can utilize SAN drives via a letter drive reference, provided that each Vantage server is a SAN client and that all mount points use the same letter.

## Prototype Capture Workflow—Labels & Variables

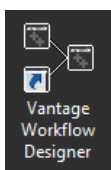
The purpose of this prototype workflow is to illustrate the use of variables, extracted from an incoming metadata label submitted with the Capture event, which captures video from cameras in four different cities.



The Capture action is configured to ingest the label when it starts a job. The Populate action extracts the label's field value and updates a variable, which is then examined in parallel Decide actions to identify the name of a city, and store the captured output in the proper city's directory.

## Creating and Configuring the Media Creation Capture Workflow

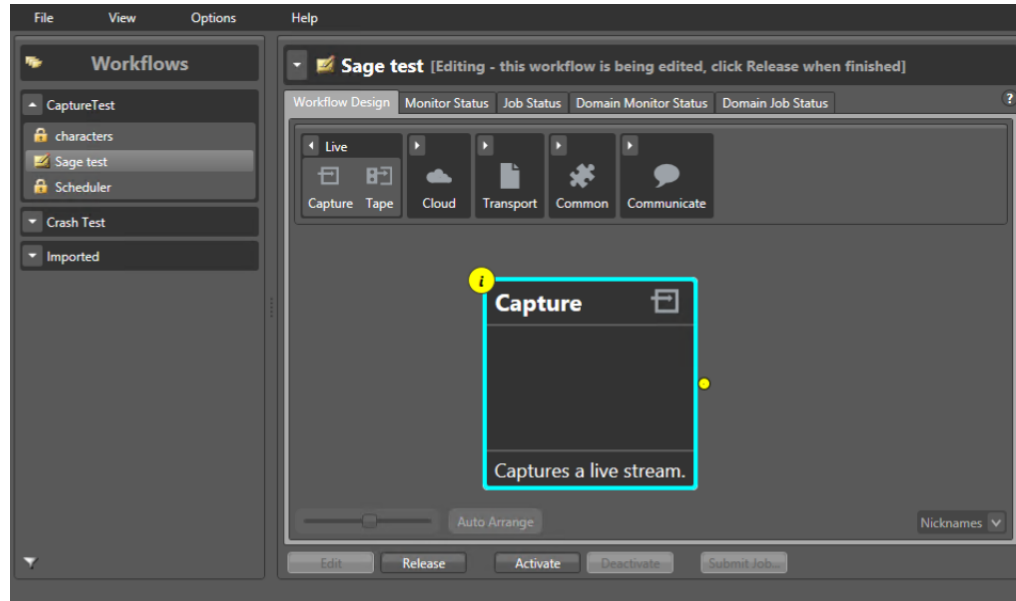
Follow these steps to create and activate the first workflow—using the Media Creation action:



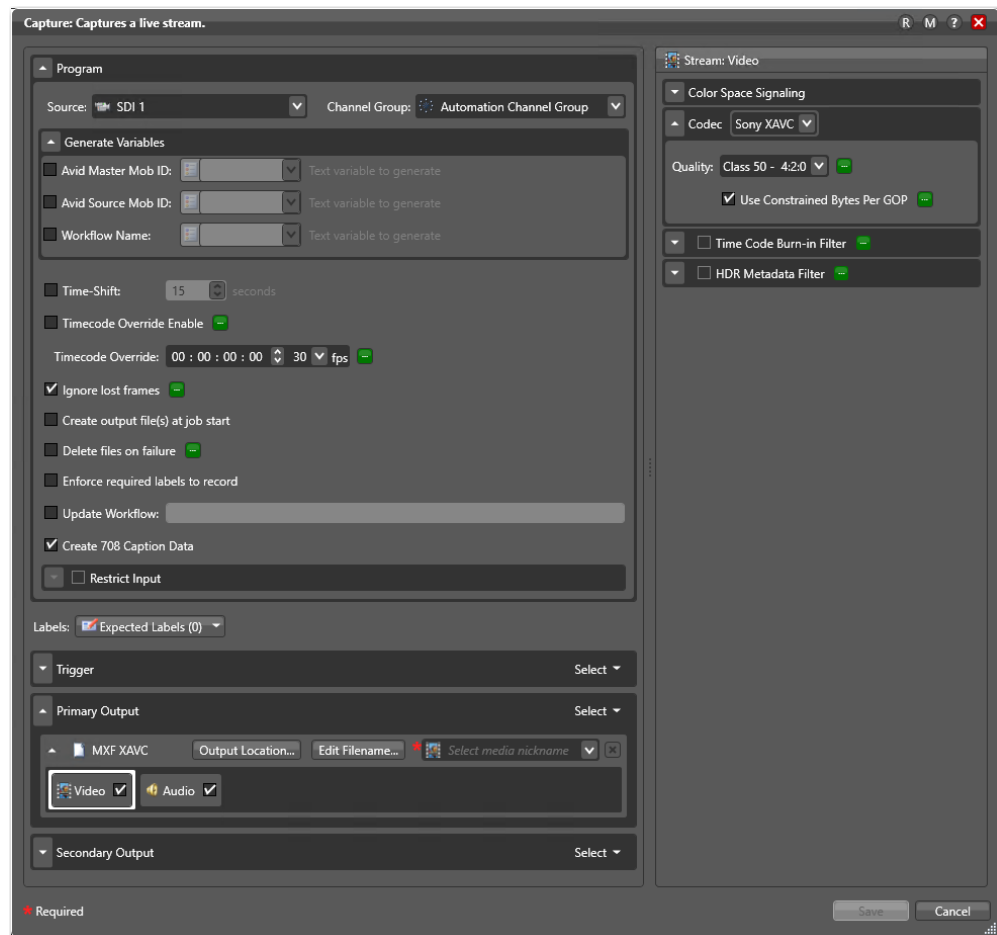
1. Launch Vantage Workflow Designer.
2. Select File > Create New Workflow and name the workflow—Media Creation Capture, for example

**Note:** To avoid workflow failures, do not use these characters in workflow names:  
` \* | \ : ; " ' < > ? /

3. In the Workflow Design panel, open the Live action category and add a Capture action to the workflow design workspace below:



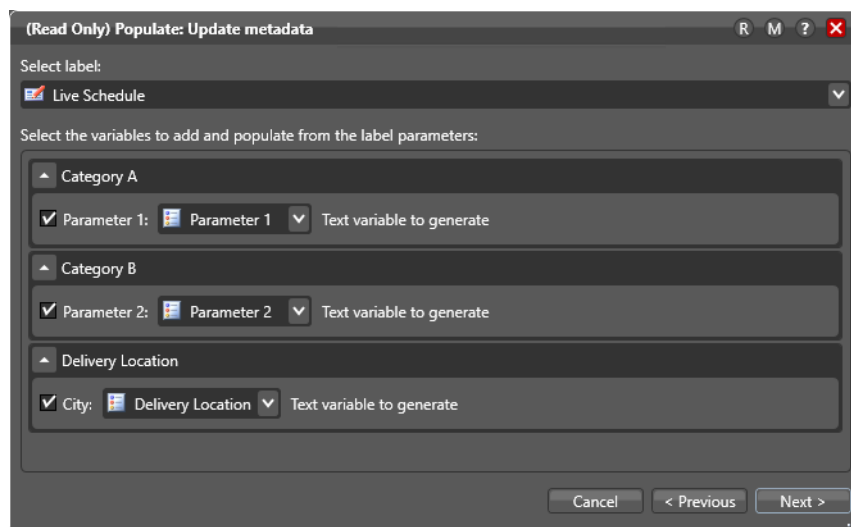
4. Click the Inspector icon on the upper left corner of the action (or double-click the action) to open the Inspector.



5. Configure the action according to your requirements. For configuration details, see [Capture Action Overview and Configuration](#).
6. Click Save when you finish configuring the action.
7. Click Activate to start the workflow so that it is ready to start jobs when directed to do so by the Live Capture web app.



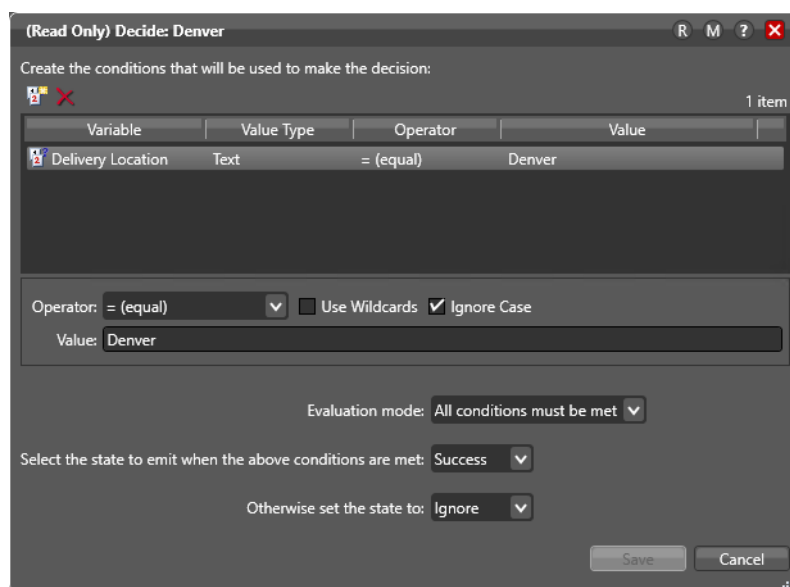
**Populate Action**—The Populate action updates specified variables from the specified fields in the incoming Live Schedule label, as shown:



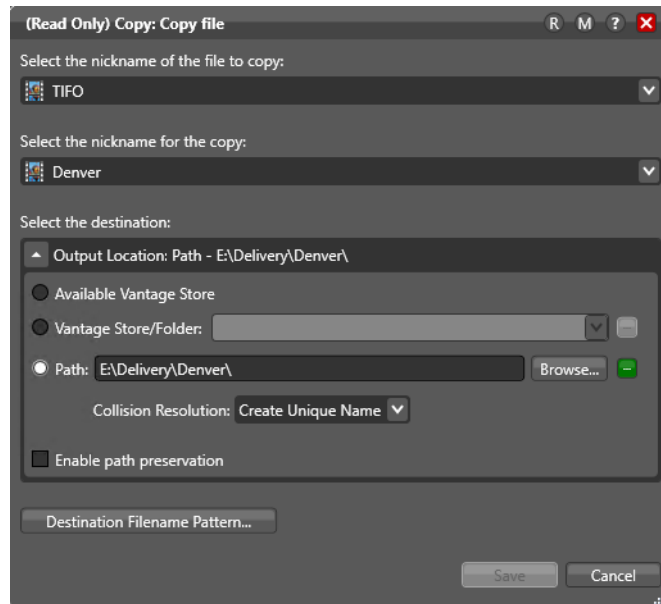
The Delivery Location's City field is what is of interest in this example. The Delivery Location variable is updated with the value in the City field.

Refer back now, to the workflow itself. There are four Decide and Copy action sets.

**Decide and Copy Action Sets**—Each Decide passes control to downstream actions in its branch only when a specific city is present in the Delivery Location variable. Here is one of the Decide actions, where it succeeds if the variable is equal to the string "Denver":



The result is true, thus it executes successfully, permitting the corresponding Copy to duplicate the file, as shown here:



In this example, the TIFO file generated by the Capture action is nicknamed *Denver*, and the file is copied to `E:\Delivery\Denver`.

## Summary

You can design and configure your Capture workflows (Capture/Tape/Edit) to process both variables and labels, and use the values that are unique to each capture job to intelligently process your captured media, as shown here delivering the captured output into a unique directory for each city where the video was shot.

# Managing Video Sources

You use the Source Manager web app to create, configure, and manage your Lightspeed Live Capture server's video source inputs. Before you can use a specific source in Live Capture, it must be configured here in Source Manager. Sources can not be edited when they are being used by an active channel in Live Capture.

You can control access to Source Manager by creating and managing users and authorities in the Group Portal web app (see [User Administration](#)).

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**Note:** When a Live Server hosts both Live Capture and Live Stream, it is important to understand that Capture's Source Manager web app and Stream's Sources panel both update the same data. Thus, changes in either app affect both products. If you must change the Source Manager web app's Web socket server port, use the Settings menu in the Live Stream web app's Network Configuration tab. After making this change, the Source Manager won't function and you can only use the Sources panel in the Live Stream web app to change source configurations.

---

## Topics

- [Overview](#)
- [User Administration](#)
- [Configuring Capture for SD/HD | UHD SDI Sources](#)
- [Enabling QuadLink Loop Through](#)
- [Configuring SDI Sources](#)
- [Creating & Configuring Transport Stream Sources](#)
- [Creating & Configuring RTMP Sources](#)
- [Creating & Configuring SRT Sources](#)
- [Creating & Configuring NDI Sources](#)
- [Creating and Configuring ST 2110 Sources](#)
- [Managing System Settings](#)
- [Copying System Logs from a Live Capture System](#)
- [Version Info | Legal Documents | Contact Methods](#)
- [Troubleshooting](#)

## Overview

Source Manager enables you to create, configure, and manage each Lightspeed Live Server's video source inputs.

For information on launching and logging in to Source Manager, see [Launching the Source Manager Web App](#). For other web app topics, see [Managing your Web Apps](#).

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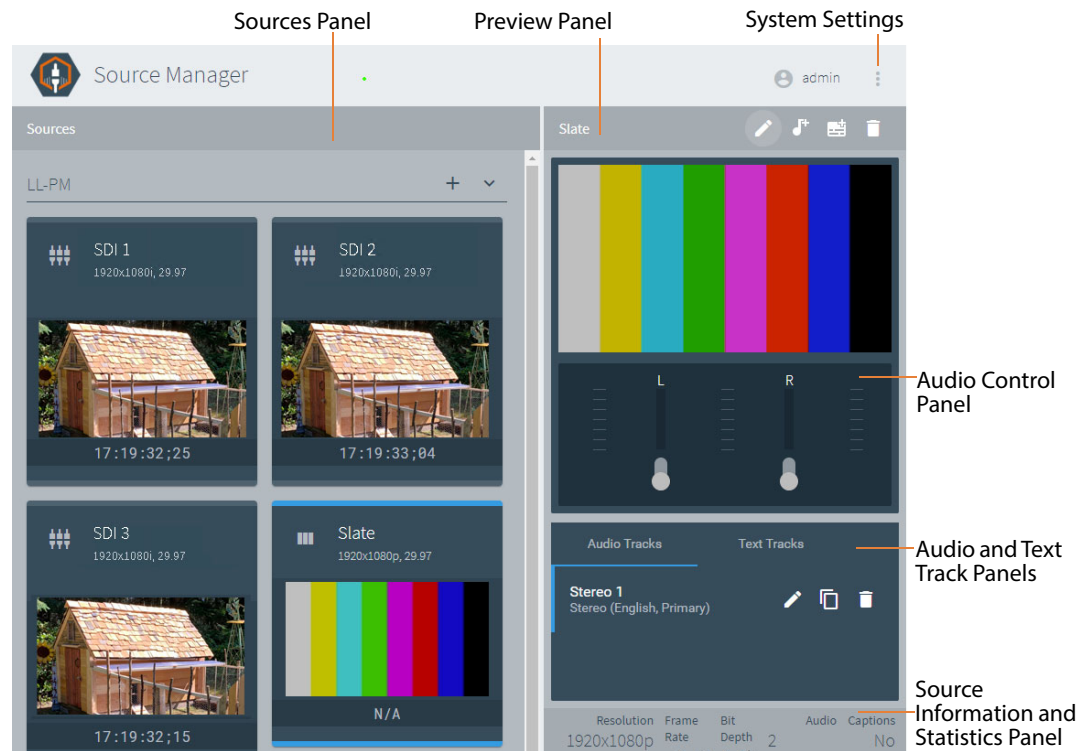
**Note:** Unlike other Capture web apps, Source Manager only operates on its host platform's inputs. Thus, if you have a Capture array, you must log onto Source Manager on each Lightspeed Live Capture server to manage that server's source inputs.

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- [Using the Source Manager Window](#)
- [Sources Panel](#)
- [Preview Panel](#)
- [Audio and Text Tracks Panel](#)
- [Source Information and Statistics Panel](#)

## Using the Source Manager Window

The Source Manager web app provides you an overview of all SDI sources on the Lightspeed Live Server—thumbnails on the left, a preview of the selected source, plus an audio and source information/status panel. In the case of a Capture array—multiple servers—the sources for each Lightspeed Live Server are displayed in a separate panel.



The main Source Manager window displays several panels:

- The left panel—the Sources panel—displays inputs referred to as *sources*; the permanent SDI sources, plus sources of other types that you’ve created (RTMP, Transport Stream, etc.).
- On the right, the top panel is the Preview panel for the selected source.
- Below the Preview panel is the Audio Control panel.
- Below the Audio Control Panel is the tabbed audio and text track panel.
- At the bottom right is the Source Information and Statistics panel.

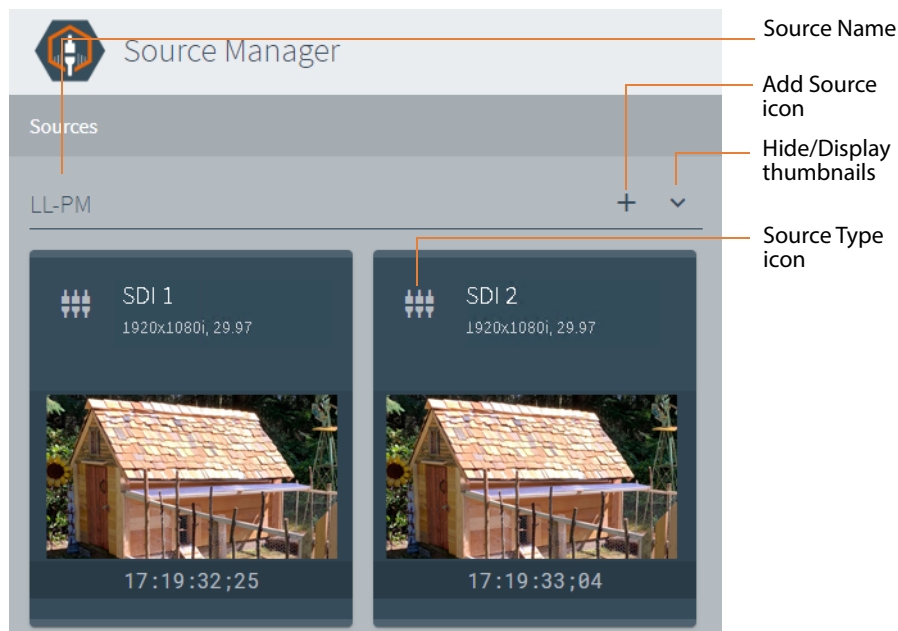
In addition, other modal panels display as you use Source Manager to perform creation and configuration tasks, and other utilitarian tasks.

## Sources Panel

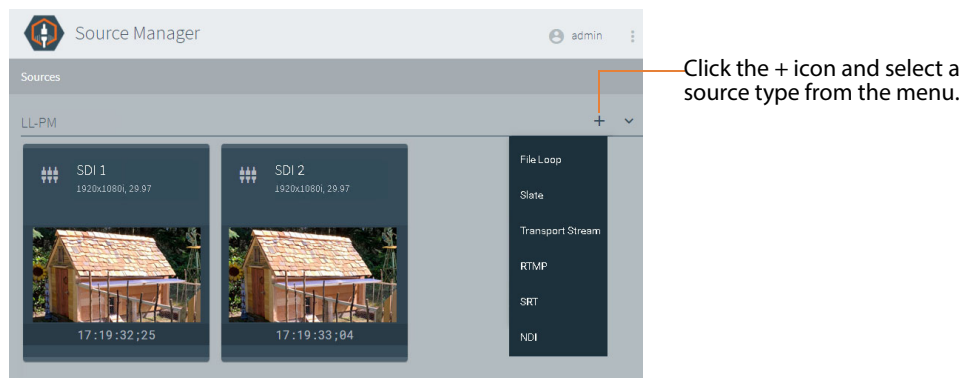
Each source in the Sources panel displays a thumbnail (which updates every few seconds) of the current input (or the LOS Video Test Pattern if no input is present), plus important details: frame size and rate, timecode, etc.

## Toolbar

The toolbar includes icons for adding sources, and displaying or hiding sources.



Click the + icon to display the Source menu and select a source type.











**Note:** File loop and slate sources are not supported in Live Capture. ST 2110 (both text and HTML files are supported) is available only on the C4 Lightspeed Live Server, when it is equipped with the Mellanox 25G Ethernet NIC and licensed Rivermax drivers required for the feature.

## Source Type Icons

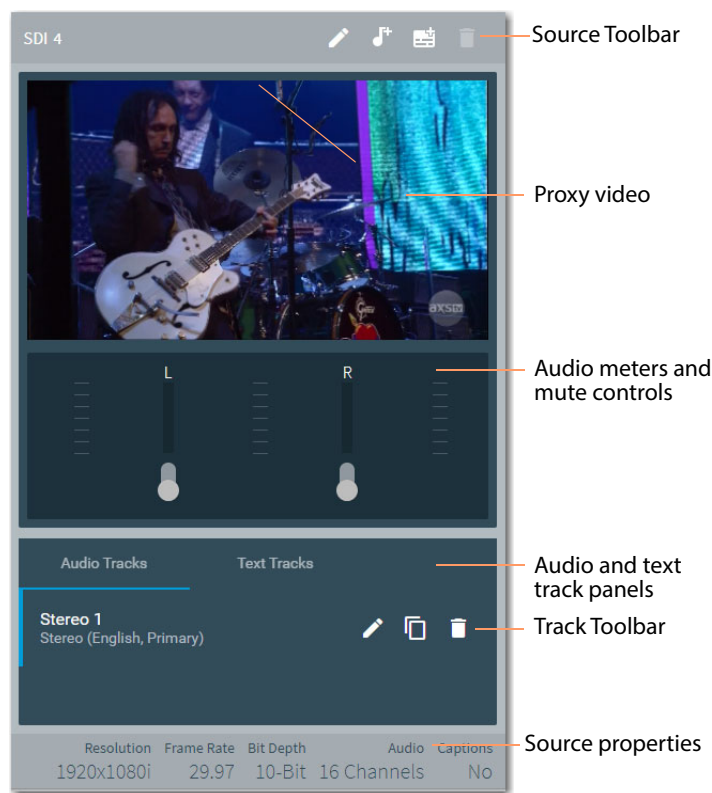
Each source's thumbnail displays an icon in the upper left corner, depicting the source type.

Source icons display in the upper left corner of each source to indicate the type of source when the source is live, or when the source is being used in a stream or there is loss of signal.

	Permanent SDI source
	Transport Stream source
	RTMP source
	ST 2110 source (only on C4 servers equipped with 25G Ethernet NIC)
	NDI source
	SRT source
	Source is currently being captured and cannot be edited or deleted.
	This source has experienced LOS (loss of signal).

## Preview Panel

You select a source thumbnail to display its preview panel, to the right:



The preview panel is comprised of a proxy preview of the current stream, with an audio panel below for mute control, and track information displayed below that.

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**Note:** The Text Tracks tab performs no useful function in the context of Live Capture. Editing, duplicating, and deleting tracks has no effect on the stream being captured in Vantage Capture workflows.

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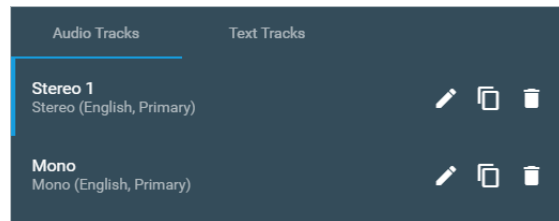
## Viewing Audio Levels and Muting Audio

You use the controls in the audio meter to enable | disable audio playback through your local speakers. The audio level meters for each channel display and adjust automatically, based on the selected track (Stereo, 5.1 Surround Sound, etc.), with channel-by-channel mute control.



## Audio and Text Tracks Panel

If there are multiple audio tracks in the stream, you can switch among them using the Audio Tracks tab.



**Note:** The Audio tracks tab enables you to select a track to play. Otherwise, it performs no useful function, with the exception of identifying AC3 audio ([Tagging AC3 Audio Embedded in PCM](#)). Editing, duplicating, and deleting audio tracks has no effect on the stream being captured in Capture workflows.

Text tracks are not used in Live Capture.

## Source Information and Statistics Panel

The Source Information and Statistics panel (at the bottom-right corner of the main window) displays real time platform performance metrics and metrics for the currently selected source:

CPU0/CPU1	Affinity	Resolution	Frame Rate	Bit Depth	Audio Channels	Captions	Firmware Version
3%/ 9%	2	1920x1080p	59.94	10	16	No	2019/05/17

**CPU0/CPU1**—Percentage of CPU utilization by processor—CPU 0 and CPU 1. If system utilization of one or the other processor approaches 100 percent, it may lead to capture failure.

**Affinity**—The processor group currently processing this source. For details, see [CPU Processor Group Assignment](#).

**Resolution | Frame Rate | Bit Depth | Audio Channels | Captions**—Video metrics.

**Firmware Version**—The firmware version in this server's SDI card.

## User Administration

You use the Group Portal web app to control access to the Source Manager web app. In the Group Portal, you create Live Capture users and assign roles for restricting utilization of the Source web app on a target Live Capture server. For example, you can assign roles for administrators, operators, schedulers, monitors, and API users.

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**Caution:** Group Portal uses the term *Group* to refer to multiple Lightspeed Live servers in an array. You are required to create a group before you can add users—however, the users are only valid for the target Lightspeed Live Server. Group Portal is also utilized in Live Stream for a range of other tasks, which are not used in Live Capture, and may cause Live Capture to fail.

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### Topics

- [Launching the Group Portal](#)
- [Creating a Group](#)
- [Signing In](#)
- [Creating/Updating Live Capture Users](#)

## Launching the Group Portal

Here's how to launch the Group Portal web application.

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**Note:** Only the Chrome web browser is supported for the Lightspeed Live web applications. It must be version 76.0.3809.100 or later.

---

On the target Lightspeed Live Server, verify that:

- The target Lightspeed Live Server (where Telestream Live Source Service) is hosted is operating in Capture mode. If not, use the Telestream Capture/Play Switcher to set it to Capture mode ([Switching to Live Capture Mode](#)). You can't start Telestream Live Source Service when the server is operating in Play mode.
- Telestream Live Source Service is running.

Launch Chrome and enter the following URL in the address field:

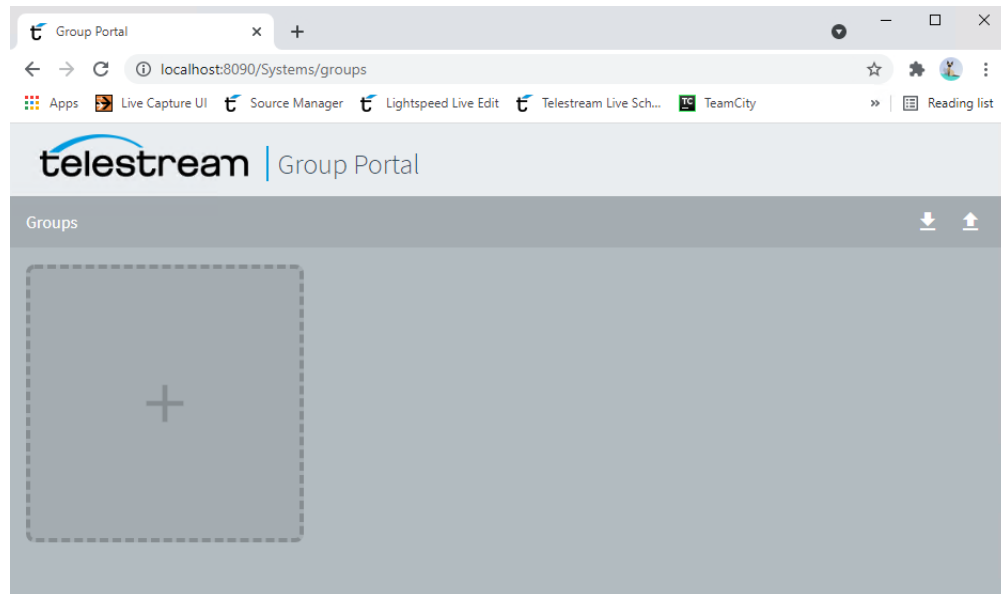
`http://localhost|<host name>:8090/systems`

If you changed the default port, be sure to use it.

When running Chrome locally on the target Lightspeed Live Server, you can use *localhost* as the host name in the URL:

`http://localhost:8090/systems`

The Group Portal web app launches and displays Group Portal window:



This window represents the first launch, without a group having been created. If you already have created a group, proceed to [Signing In](#), following.

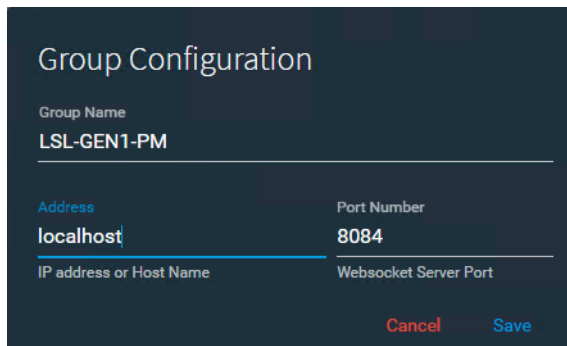
## Creating a Group

This is a one-time task:

1. Click the gray box with the plus sign to display the Group Configuration dialog.



2. Click the gray box to display the Group Configuration panel:



The Group Configuration panel is displayed with the following fields:

- Group Name:** LSL-GEN1-PM
- Address:** localhost
- Port Number:** 8084

Below the fields, the labels "IP address or Host Name" and "Websocket Server Port" are visible. At the bottom right, there are "Cancel" and "Save" buttons.

3. Name the group and specify the host:

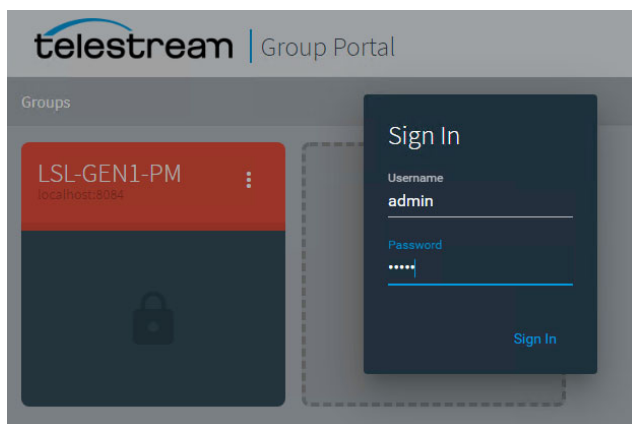
- **Group Name**—Specifies the name of the group. Typically, name the group the same name as the server.
- **Address**—Specifies the host name | *localhost* of the target Lightspeed Live Server.
- **Port Number**—Specifies the web socket server port (default: 8084).

Group Portal displays the Sign in panel.

## Signing In

Use the Sign In panel to authorize your user.

**Note:** Only users with an administrator role can log in to the Group Portal.



The Group Portal interface shows a list of groups on the left and a Sign In panel on the right. The group list includes:

- LSL-GEN1-PM** (localhost:8084)

The Sign In panel has the following fields:

- Username:** admin
- Password:** (masked with dots)

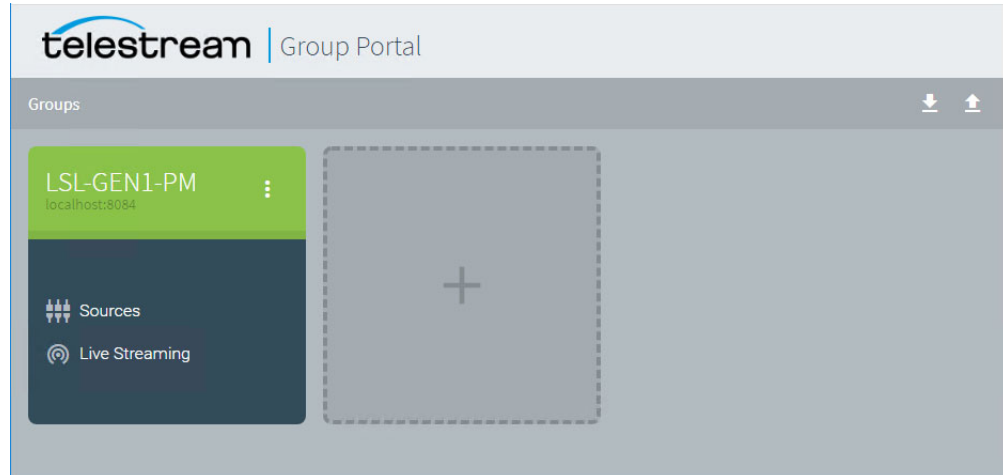
A "Sign In" button is located at the bottom right of the panel.

If you've clicked away, display the Sign In panel again by clicking the More button on the Not Authenticated panel.

Enter your credentials. The default user name is *admin*, and the default password is *live!*. If this is the first time, use the default credentials. If other admin users have been created, you can log in with those credentials.

If you have trouble starting the Group Portal web app, review the common problems in [Troubleshooting](#).

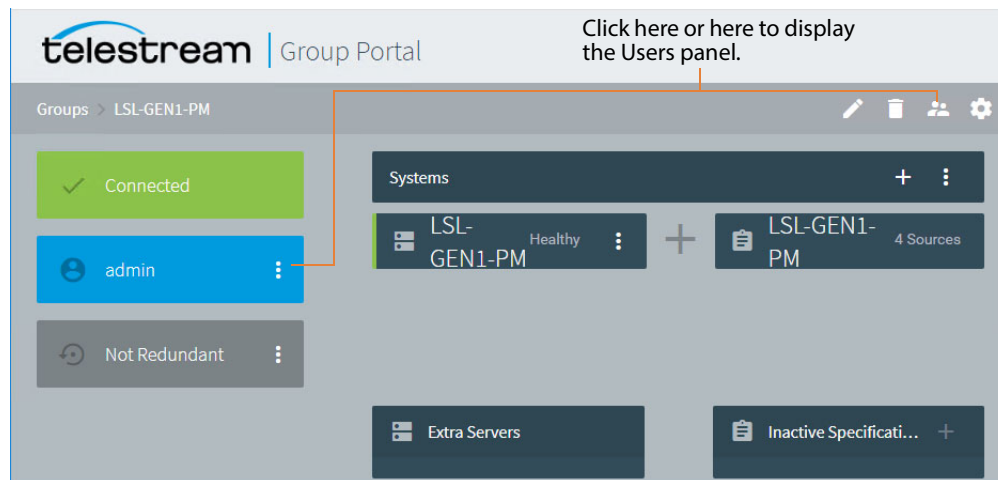
When you have logged in successfully, the group panel displays in green:




The green title bar on the group indicates a successful connection. Now, you can manage users.

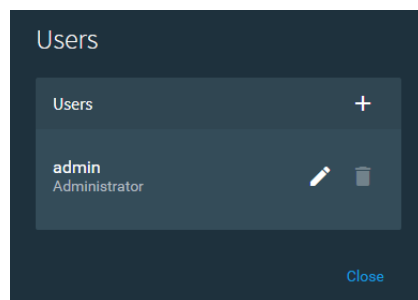
## Creating/Updating Live Capture Users

To create or update users, click on the group to display the Group Details panel:

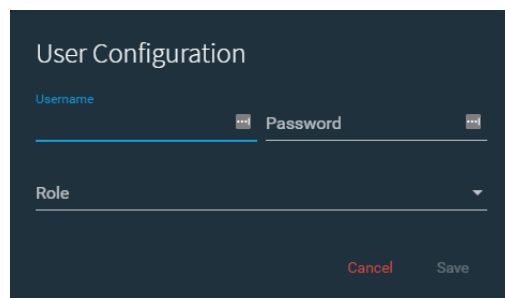


Select the Users menu  in the upper right corner or click the More menu in the Admin panel and select Manage Users).

To add a user, select Add (+). To edit, select the pencil for that user. To delete a user, select the trash icon for that user.



When adding a user, assign a Username, Password, select a Role, and click Save.



Available roles and their privileges include:

- **Administrator**—Enables users to manage users in Groups Portal, and view | create | modify sources in the Source Manager web app

- **Operator**—Enables users to view | create | modify sources in the Source Manager web app
- **Scheduler | Monitor**—Enables users to view sources in the Source Manager web app but prevents them from changing settings.

## Configuring Capture for SD/HD | UHD SDI Sources

C3 and later Lightspeed Live Servers can be configured to process a single stream of SD|HD video on each SDI port. Or, they can be configured to combine (in software) four HD SDI signals into a single UHD video stream, using a technique known as *quadlinking*.

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**Note:** Quadlinking isn't utilized on a Lightspeed Live Server equipped with 12G SDI.

---

On servers with eight input SDI ports, SD/HD and UHD can be mixed and matched: You can configure both four-port sets for two UHD signals, or one set for UHD and the other sets configured for SD/HD.

Use these procedures to configure a set of four SDI ports to quadlink UHD or in reverse, return to using SD/HD SDI on those ports. The process involves switching cables from your video source devices, re-configuring your sources via the Source Manager web app, and creating appropriate workflows and connecting them to the appropriate sources in Vantage Workflow Designer.


---

**Note:** The Vantage Live Service on the Lightspeed Live Server does not differentiate between UHD and HD/SD in SDI sources. When the server is connected to a UHD signal but *SingleLink Video* is specified for the SDI ports, the four signals of the source are processed as four separate sources. To quadlink four SDI sources to create a UHD signal, you must enable QuadLink Video Input | QuadLink Loop Thru Video Input for servers equipped with 3G SDI.

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## Configuring Capture for UHD Video

When your Lightspeed Live Server is currently set to SD/HD mode and you want to re-configure it to quadlink four SDI inputs into one UHD video stream, follow these steps:

1. Connect a valid UHD source (4 UHD cables) to the server's SDI ports (1 through 4 or 5 through 8, model dependent).
2. On 8-port servers only, if you are planning to enable video loop through, make sure to connect cables properly for QuadLink Loop Through Video Input ([Enabling QuadLink Loop Through](#)). C5 servers have 8 permanent input and 8 permanent output SDI ports; loop-through is permanently enabled and can't be changed.
3. Start the 4-port UHD source to provide signal to the Lightspeed Live Server.
4. In Vantage Workflow Designer, deactivate all Live Capture workflows using SDI sources from the Lightspeed Live Server.
5. Launch the Source Manager web app ([Launching the Source Manager Web App](#)). In the Sources panel (see [Configuring SDI Sources](#)), select your SDI port:
  - 4-port server—select SDI 1
  - 8-port server—select SDI 1 or SDI 5 (this server supports two UHD streams)
  - 8-port server for loop through—select SDI 1 or SDI 5, but not both.
6. Click the Edit icon  to display the Configure Sources panel.



7. Disable Assign Processor (if displayed in the panel—model dependent). This option must be disabled for UHD.
8. Set Video Mode to QuadLink Video Input.
9. Click Save and close the panel. The four SDI source set (1-2-3-4 or 5-6-7-8) are now QuadLinked into one UHD source.  
When you QuadLink SDI 1, then SDI 2, 3, and 4 are removed from the Sources panel and SDI 1 is renamed to include the acronym UHD. Similarly, when you QuadLink SDI 5—SDI 6, 7, and 8 are removed from the Sources panel and SDI 5 is renamed.
10. Optionally, on 8-port servers, you can implement video loop through—set Video Mode to QuadLink Loop Thru Video Input and perform the steps in [Enabling QuadLink Loop Through](#) now.
11. In Vantage [Workflow Designer](#), create (or update) a Live Capture workflow per your UHD video processing requirements and configure the Capture action to connect to the newly-named SDI input that created for this workflow. See [Creating a Live Capture Workflow](#).
12. Activate the workflow so that it is ready to start a job when it receives a stream.


## Configuring Capture to Process SD/HD Video

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**Note:** C5 Lightspeed Live servers have 8 permanent input and 8 permanent output SDI ports; loop-through is permanently enabled and can't be changed. Ignore loop through steps when performing this task on a C5 server.

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When your Live server is currently set to UHD/4K mode and you want to re-configure it to process SD/HD video, follow these steps:

1. Make sure that a valid UHD/4K source is actively providing a signal to the server's SDI ports you are using for UHD and plan to convert back to SD/HD use.
2. In Vantage Workflow Designer, deactivate all Live Capture workflows that were using the UHD/4K source.
3. In Source Manager, display the Sources panel (see [Configuring SDI Sources](#)), select the UHD/4K source (SDI 1 or SDI 5) you want to convert and then click the Edit icon  to display the Configure Sources panel.
4. Set Video Mode to SingleLink Video Input | SingleLink Video Loop Thru Input, then click Save to update the configuration and close the panel. The SDI source is converted to SD/HD and the other three SDI sources are displayed again.

---

**Note:** On the C5, Loop Thru Input is permanently set and can't be changed.

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5. If you enabled SingleLink Loop Through Video, perform the steps in [Enabling QuadLink Loop Through](#) now, and return to continue.
6. Turn off the device generating UHD/4K video and disconnect the SDI cables from the UHD/4K device.

7. Connect the SDI cables to your SD/HD device(s) as planned—making sure to connect cables properly for SingleLink Loop Through Video Input if enabled.  
In the Source Manager panel, and select each of the four SD/HD sources and configure them as appropriate. See [Configuring SDI Sources](#).
8. In Vantage Workflow Designer, create (or update) the SD/HD workflow per your processing requirements and configure its Capture action to connect to the newly-named SDI source for this workflow. See [Creating a Live Capture Workflow](#).
9. Click Activate to start the workflow so that it is ready to start a job when it receives a stream.

# Enabling QuadLink Loop Through

QuadLink Loop Through Video Input is available only on servers equipped with an 8-port 3G SDI card.

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**Note:** QuadLink Loop Through is not supported on servers equipped with the HEVC (H/W) card.

C5 Lightspeed Live servers have 8 permanent input and 8 permanent output SDI ports; loop-through is permanently enabled and can't be changed.

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Configuring an SDI source with QuadLink Loop Through causes the server to route the SDI source back out—or *loop through*—a paired SDI port, in addition to using the signal as a source. This can be used, for example, as confidence monitoring of the SDI signal into the server. QuadLink Loop Through can be enabled on SDI 1 or SDI 5.




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**Important Note:** SDI-1 input is used as the master sync when QuadLink Loop Through Video Input is enabled. All source inputs **MUST** be of the same baseband video type (frame rate and frame size) and they **MUST** share a common video reference that is frame synced and gen-locked together. Failure to meet this requirement results in a vertical offset being introduced in the sources.

If the source video type (such as frame rate or frame size) changes on SDI1 when operating in QuadLink Loop Through mode, the other inputs fail and go to LOS (loss of signal). After SDI1/5 is set back to match the other inputs, changing a setting on a source and saving it resets the source back into operation.

When you enable QuadLink Loop Through for a given SDI source, the paired SDI source for the output is automatically deleted without warning—because it is now an output on the paired SDI port. For example, you set *[host] - SDI 1* to loop through to *SDI 5*; Source Manager deletes the source instance of *[host] - SDI 5*. The previous source is unavailable to any Capture action or stream channel that was set to use that source.

SDI-1 automatically goes to SDI-2 and SDI-3 goes to SDI-4 and the source cards auto-populate correctly. See [Port-Paired Loop Through Assignments](#) for more information.

## Port-Paired Loop Through Assignments

The following pairings apply when configuring SDI input ports for Loop Through:

### For Servers with Four 3G SDI Ports

- SD/HD:
  - SDI-1 is paired with SDI-3
  - SDI-2 is paired with SDI-4
- UHD/4K:
  - No Loop Through

**For Servers with Eight 3G SDI Ports**

- SD/HD:
  - SDI-1 is paired with SDI-5
  - SDI-2 is paired with SDI-6
  - SDI-3 is paired with SDI-7
  - SDI-4 is paired with SDI-8
- UHD/4K:
  - UHD/4K Input 1 QuadLinked with SDI-1+SDI-2+SDI-3+SDI-4
  - UHD/4K Output 5 QuadLinked with SDI-5+SDI-6+SDI-7+SDI-8 for loop-through.

# Configuring SDI Sources


All SDI sources are permanent—you can't create or delete them. For each SDI source port on the server (model dependent) an SDI source display in the Sources panel.

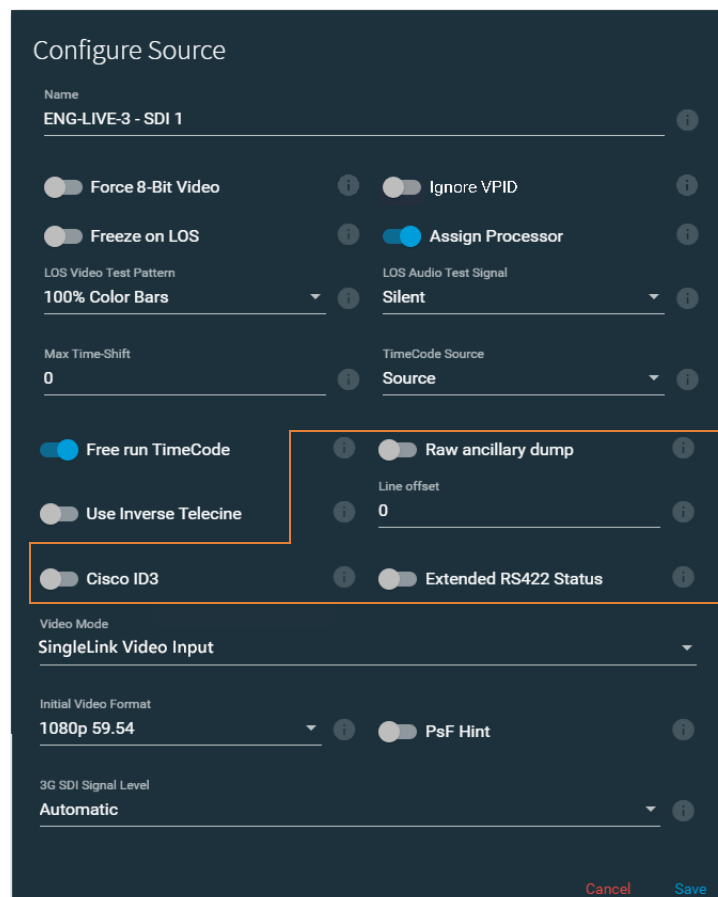
If you have implemented RouteMaster for SDI source control ([Licensing Live Schedule and RouteMaster](#)), see [Configuring Live Source for RouteMaster SDI Input](#) for selecting RouteMaster sources.

For Live Capture systems consisting of multiple servers, you should name each separate Lightspeed Live Server's SDI ports with unique names to avoid confusion—for example, add the Lightspeed Live Server name as a prefix: *Lightspeed1-SDI-1*.

**Note:** Some controls display only when you enable Advanced Mode in the System Settings panel (see [Managing System Settings](#)).

You can not edit source while it is being captured.

To modify an SDI source configuration, select it in the Sources panel to display its Preview panel. Click the Edit icon  to display its Configure Source panel:



Configure Source

Name  
ENG-LIVE-3 - SDI 1

☐ Force 8-Bit Video ☐ Ignore VPID

☐ Freeze on LOS ☒ Assign Processor

LOS Video Test Pattern  
100% Color Bars

LOS Audio Test Signal  
Silent

Max Time-Shift  
0

TimeCode Source  
Source

☒ Free run TimeCode

☐ Use Inverse Telecine

☐ Cisco ID3

☐ Raw ancillary dump

Line offset  
0

☐ Extended RS422 Status

Video Mode  
SingleLink Video Input

Initial Video Format  
1080p 59.54

☐ PsF Hint

3G SDI Signal Level  
Automatic

Cancel Save

Advanced Mode settings—enable Advanced Mode in the System Settings panel.

Make changes to the controls as required. When configuration is complete, click Save to close the panel and update the source.

**Name**—Specifies the name to use in Capture web apps where displayed. You can change source names to meet your operating requirements.

The default name for SDI ports on a single-card server has the form: *SDI [1 through n]*, where 'n' is 4 or 8 depending on the SDI card in the Lightspeed Live Server.

When hosted on a two-card Lightspeed Live server, the default name has the form: *SDI [0 | 1]:[1 through n]*, where the card number is 0 or 1, and the connector number is 1 through n, where 'n' is 4 or 8 depending on the depending on the SDI card in the Lightspeed Live Server

When you rename a source, observe these rules:

- Each source instance must be named uniquely.
- These characters are prohibited: ` \* | \ : ; " ' < > ? /
- After changing a source name you must re-configure affected Capture actions in Vantage workflows that utilize the renamed source. See [Capture Action Overview and Configuration](#).

**Force 8-Bit Video**—8-bit video should only be used with 8-bit codecs such as XDCAM. When enabled, activates 8-bit down-sampling of the SDI video. Using 8-bit sampling offers more efficient compression. Disable to utilize 10-bit video, which should be used for all 10-bit codecs such as ProRes.

**Ignore VPID**—An SDI source displays Loss of Signal when the embedded VPID data is not valid for the source. In normal use, VPID data should match the SDI source and it is expected that a new source process is created when the source changes; for example, when the frame size or frame rate changes.

If the VPID does not match the source frame rate and frame size after an upstream source is switched, you can enable Ignore VPID to ignore the VPID data to avoid loss of signal during recording.

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

#### **Assign Processor (SD/HD sources only AND server model-dependent)**

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**Note:** If this control does not display, its because processor balancing on this Lightspeed Live Server model is performed automatically, and no end-user adjustment is available. This option defaults to On (enabled) when capturing SD/HD SDI sources. You should disable it when capturing UHD/4K source.

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When enabled, all processing associated with each Capture | Tape workflow job is assigned to a single CPU on the Lightspeed Live Server's multi-core CPU. This typically prevents inefficient mapping of processes across CPU sockets during heavy loads, typically when several (or all) sources are capturing simultaneously.

Disabling this option during multi-source capturing may result in excessive CPU usage. When Assign Processor is disabled, Affinity is set to 0 ([CPU Processor Group Assignment](#)).

**LOS Video Test Pattern**—Applies only when Freeze on LOS is disabled. Specifies the test pattern to display during LOS. For details, see [Loss of Signal Behavior](#).

**LOS Audio Test Signal**—Specifies the audio signal to use during LOS.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

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**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

---

**Timecode Source**—Click the menu to choose one of the following timecode source signals for the selected SDI input:

- *Source*—Uses the timecode provided in VBI or VANC (SMPTE 12M-2/RP188) of the selected Lightspeed Live Capture's video input signal. If a valid timecode is not available or goes away, see the Free Run Timecode option below.
  - *Computer Clock*—Uses the time-of-day clock provided by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.
- 

**WARNING: If the video and timecode are not synchronized, time code discontinuities can occur. To avoid time code anomalies such as unexpected discontinuities and repeated time codes, always sync the incoming SDI frames with your chosen time code source. Failure to do so can cause recording that stop abruptly or do not stop as expected.**

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**Caution: If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock use UTC time, due to a Windows limitation.**

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- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays N/

A on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

- *Analog LTC*—Uses the timecode provided on the SDI card's LTC input (marked with an R on the SDI card). If a valid timecode is not available or goes away, see the Free Run Timecode option below.

---

**Note:** Analog LTC timecode is passed to Live Capture in input frame samples from the SDI card. When a channel is in an LOS state, the LTC timecode is not present and is passed to Live Capture at 00:00:00:00 until a valid signal is present on the input.

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- *RS422*—Uses the timecode provided by a VTR connected via RS-422 (requires the optional 4-port or 8-port RS422 VTR Interface Kit—see [Connecting VTR Systems](#)). If an input is connected to a VTR under RS422 control, RS422 must be selected.

---

**Note:** When using the CalDAV Calendar trigger you should set the Timecode Source to either Computer Clock or Source. When using Source, you must have time-of-day timecode in your source that matches the time set in your Lightspeed Live Server. See [Configuring Trigger Settings](#).

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**Free Run Timecode**—When enabled, and the timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When not enabled and the timecode is not detected or goes away, then the timecode reverts to zero (00:00:00:00) and stays at zero.

**Raw Ancillary Dump (Advanced Mode Only—see [Managing System Settings](#))**—When enabled and the output container is set to TIFO, the SDI input's ancillary data is inserted directly into the Primary Output file

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**Caution:** Do not enable this option unless directed by Telestream Support.

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**Use Inverse Telecine (Live Stream Only)**—Does not apply in Capture, because no frame-rate conversion is applied. Do not enable this control.

**Line Offset (Advanced Mode Only—see [Managing System Settings](#))**—When enabled, shifts the video by the specified line offset. Default is 0. Minimum is -4, and maximum is +4. The range is -4 to 4 lines.

**Cisco ID3 (Advanced Mode Only—see [Managing System Settings](#))**—Enable to allow the SCTE-104 information to be converted to ID3 on output.

**Extended RS-422 Status (Advanced Mode Only—see [Managing System Settings](#))**—When enabled, VTRs supporting the Extended Status Sense RS-422 command returns extended status data. The extended status data is added to log files. ().

**Video Mode (Applies only to 3G SDI Ports 1 & 5, model-dependent)**—Specifies the type of signal that is attached to SDI ports and how to process it. Changing input sources from SD/HD to QuadLink UHD/4K is comprehensive—and performed in a series of steps—described in [Configuring Capture for SD/HD | UHD SDI Sources](#).



Do not change this setting without performing one or both of the procedures. Enabling Loop Through (or reverting back) is also performed in a series of steps—see [Enabling QuadLink Loop Through](#) for the steps to take.

- *SingleLink Video Input*—Specifies that the source is either Standard Definition or High Definition video.
- *SingleLink Video Input with Loop Through*—Specifies an SD/HD source, routed back out through a paired SDI port.
- *QuadLink Video Input*—Specifies that the source is either UHD/4K video. When activated, all four SDI inputs are combined into one QuadLink UHD/4K source. All four signals of a UHD/4K source must match for UHD/4K mode to be activated, unless Ignore Format Match Check is enabled (see following). Unmatched signals also occur when any UHD/4K sources are not currently playing video.
- *QuadLink Loop Thru Video Input* —Specifies a QuadLink UHD/4K source, routed back out through paired SDI ports (8-port 3G SDI cards only).

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**Note:** Loop Through is not supported on servers equipped with the HEVC SDI card.

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**Initial Video Format**—Specifies the video format of the incoming signal. This enables capture recovery to the proper frame size (SD/HD and UHD/4K) and rate during a temporary Loss of Signal. If a recurring workflow using a source with Initial Video Format set to the house format is set to record on activation and Ignore Lost Frames is enabled, recording begins when the Capture system is powered up without user intervention—using the specified format—even if there isn’t yet a valid source to ingest.

**Ignore Format Match Check (when Video Mode is specified as UHD/4K Video Input)**—When enabled, maintains the UHD/4K source even if the signals do not have a matching signal. Only when there is no valid UHD/4K signal from all ports, does the output displays the LOS Video Test Pattern.

**Psf Hint (for UHD only)**—You should enable PsF Hint for 1080PsF25, 1080PsF29.97 and 1080PsF30 SDI sources that do not report PsF in the VPID payload so that it is processed appropriately. See [SDI Source Video Formats](#) for supported formats.

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**Note:** Live Capture always treats 23.98 | 24 PsF SDI sources as progressive.

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**3G SDI Signal Level (For 3G SDI only)**—Specifies the signal level of the SDI source. If the signal level is incorrect or mis-detected, the workflow may fail with a compressor error. 3G level is detected automatically based on VPID data. If VPID data is not present or is incorrect, image division must be manually set:

- *Automatic*—Specifies that the Capture server auto-detects between Level A and B. Choose when the signal may be unknown or switch between A | B.
- *Level A*—Specifies direct mapping of uncompressed 1080p (up to 60 fps) video at 3Gb/s.
- *Level B*—Specifies Level B-DL format; mapping dual-link HD-SDI/SMPTE 372M (1080p up to 60 fps) at 3Gb/s.

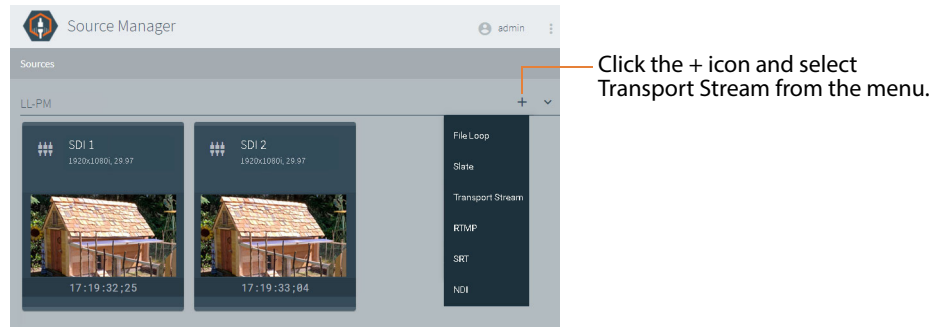
**Quad-Link Image Division** (when Video Mode is specified as UHD/4K Video Input)—Specifies the method for processing image division. Image division is detected automatically based on VPID data. If VPID data is not present or is incorrect, image division must be manually set:

- *Automatic*—Specifies that Capture automatically detects the image division mode. Use of the Automatic setting requires a valid VPID signal from the source. See [SDI Source Video Formats](#) indicating when manual selection is required.
- *Square*—Specifies that when processing QuadLink Image Division, Capture uses the square-division method where the full image is divided into four quadrants.
- *2SI*—Specifies that when processing QuadLink Image Division, Capture uses two-sample interleave (2SI) method, sending two consecutive pixels to one of the four sub-images.

## Creating & Configuring Transport Stream Sources

Capturing Transport Stream sources is an optional, licensed feature which requires a Manzanita Muxing for Capture [license](#). For licensing details, see [Licensing Live Schedule and RouteMaster](#).

To create or edit a Transport Stream source, click the Add Input icon in the Sources panel toolbar and select Transport Stream to display the Configure Source panel:





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**Note:** Lightspeed Live Capture requires that you format IP sources using standard frame sizes and frame rates. See the Technical Specifications in the [Lightspeed Live Capture product sheet](#) on the Telestream web site for supported formats.

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**Note:** The Multicast Group IP Address, Local NIC/IP Address, and Port Number can *only* be changed when you are adding a new Transport Stream source. After the source has been added, only the other settings can be edited. Some controls display only when you enable Advanced Mode. Select Settings in the main menu  to display the System Settings panel. See [Managing System Settings](#).

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Telestream recommends limiting NDI | SRT | RTMP | Transport Stream sources to eight, unless testing in your environment indicates you can support more.

When configuration is complete, click Save to close the panel and create the Transport Stream source per your specifications.

The screenshot shows the 'Configure Source' panel for a Transport Stream source. The 'Name' field is set to 'Transport Stream'. The 'Multicast Group IP Address' is empty, and the 'Local NIC/IP Address' is set to '10.0.7.0/24'. The 'Port Number' is '1234', 'Program Number' is '1', and 'Max Time-Shift' is '0'. There are several toggle switches: 'Enable SSM' (off), 'Force 8-Bit Video' (off), 'Assign Processor' (on), 'Free run TimeCode' (off), 'Compensate for Computer Clock Drift' (off), 'Freeze on LOS' (off), 'Use Inverse Telecine' (off), 'Cisco ID3' (off), 'Stream dump' (off), 'Log Timecode' (off), and 'TS Over RTP' (off). The 'TimeCode Source' is set to 'Source'. The 'LOS Video Test Pattern' is set to '100% Color Bars'. The 'Decompressor' is set to 'Default'. A callout box highlights the 'Cisco ID3', 'Stream dump', and 'Log Timecode' settings, with a note: 'Advanced Mode settings—enable Advanced Mode in the System Settings panel.' The bottom of the panel has 'Cancel' and 'Save' buttons.

**Name**—Specifies the name used to identify this source in Capture web apps, where displayed. When you rename a source, observe these rules:

- Each source instance must be named uniquely.
- These characters are prohibited: ` \* | \ : ; " ' < > ? /
- After changing a source name you must re-configure affected Capture actions in Vantage workflows that utilize the renamed source. See [Capture Action Overview and Configuration](#).

In a multi-server Capture system, when you create Transport Stream / RTMP sources on more than one server, they should be named UNIQUELY across the entire array.

**Multicast Group IP Address**—Specifies the optional Multicast Group IP address to use.

**Local NIC/IP Address**—Specifies the local NIC (Network Interface Card)/IP address identified to receive this stream. Multiple NIC cards may be present on the server.

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**Note:** When a NIC card is added, or changed from the disabled to enabled state, the Vantage Live Service must be restarted for the service to recognize it and update the Local NIC/IP Address menu. See [Stopping and Restarting Telestream Live Services](#).

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**Enable SSM**—When Source Specific Multicast (SSM) is enabled, you can enter a list of accepted source IP addresses for multicast, under Source Filter.

**Source Filter**—When you enable SSM, the Source Filter field displays. Enter a list of accepted IP addresses for the multicast sources. Separate IP addresses in the list by the return character, via the Enter/Return key.

**Port Number**—Specifies the port number to utilize.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

---

**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

---

**Force 8-Bit Video**—8-bit video should only be used with 8-bit codecs such as XDCAM. When enabled, activates 8-bit down-sampling of the SDI video. Using 8-bit sampling offers more efficient compression. Disable to utilize 10-bit video, which should be used for all 10-bit codecs such as ProRes.

**Assign Processor (SD/HD sources only AND server model-dependent)**

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**Note:** If this control does not display, its because processor balancing on this Lightspeed Live Server model is performed automatically, and no end-user adjustment is available.

This option defaults to On (enabled) when capturing SD/HD SDI sources. You should disable it when capturing UHD/4K.

---

When enabled, all processing associated with each Capture | Tape workflow job is assigned to a single CPU on the Lightspeed Live Server's multi-core CPU. This typically prevents inefficient mapping of processes across CPU sockets during heavy loads, typically when several (or all) sources are capturing simultaneously.

Disabling this option during multi-source capturing may result in excessive CPU usage. When Assign Processor is disabled, Affinity is set to 0 ([CPU Processor Group Assignment](#)).

**Timecode Source**—Sets the default timecode source. Choose one of the following timecode source signals for the selected Transport Stream source:

- *Source*—For H.264 or H.265 the source's SEI data is used, and for MPEG2 the source's GOP header timecode is used. If no valid source timecode is available, see the Free Run Timecode option below.
- *Computer Clock*—Uses the time-of-day clock provided by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.

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**Caution: If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock use UTC time, due to a Windows limitation.**

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- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays N/A on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

**Free Run Timecode**—Enabling Free Run Timecode has no effect when Compensate for Computer Clock Drift is also enabled. When enabled, and the desired timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When Free Run Timecode is not enabled and the desired timecode is not detected or goes away, the timecode reverts to zero (00:00:00:00) and stays at zero.

**Compensate for Computer Clock Drift**—Only applies when Computer Clock is specified as Timecode Source.

Regardless of how Compensate for Computer Clock Drift is set, if packets are lost and frames are dropped, the Live Source process adds frames using the last good timecode in order to compensate for the lost frames. This may cause timecode values to be repeated where a frame was lost. If your Transport Stream signal is strong, this problem should not occur.

#### **When Compensate for Computer Clock Drift is enabled**

Computer Clock Time is monitored and compared to the timecode being added to the captured file. Since the Computer Clock is not gen-locked with a true time source associated with the incoming frames it can drift over time and get out of sync with the incoming stream. When a drift of one second is reached the timecode being added to the file is re-synced to the system's Computer Clock time. This means there may be a discontinuity in the file's timecode at the point where the re-sync occurred. Enabling Free Run Timecode when Compensate for Computer Clock Drift is enabled has no effect on the process described here.

#### **When Compensate for Computer Clock Drift is Disabled**

The source process uses the Computer Clock time without compensating for drift. Over time the timecode may drift several seconds compared to the 'real' time. For example—if a recording is 6 hours long the Computer Clock drift might be many

seconds by the end of the 6 hour recording. If no frames were dropped the timecode in the output file is contiguous from start to finish.

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

**LOS Video Test Pattern**—Select the test pattern to display during LOS.

**Use Inverse Telecine (Live Stream Only)**—Does not apply in Capture, because no frame-rate conversion is applied. Do not enable this control.

**TS over RTP**—Enable to receive transport streams wrapped in RTP packets.

**Cisco ID3 (Advanced Mode Only—see [Managing System Settings](#))**—Enable to allow the SCTE-104 information to be converted to ID3 for deliver to the Capture action.

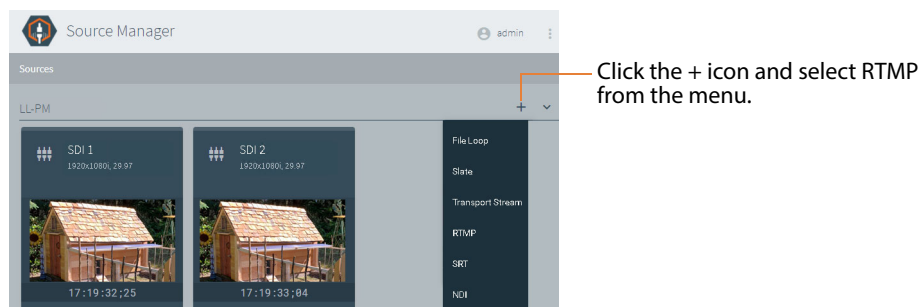
**Stream Dump (Advanced Mode Only—see [Managing System Settings](#))**—When enabled, captures the Transport Stream source to the location and file you specify, until you turn *Stream dump* off. Type the path, folder, and file name into the Stream dump field. Specify the file extension as *ts* (for example, *MyStreamDump.ts*.) If the folder you specify does not exist, the new folder and file are automatically created.

**Log Timecode (Advanced Mode Only—see [Managing System Settings](#))**—When enabled, the timecode is added to the log. (To be used only as directed by Telestream Customer Service for debugging purposes.) ()


**Decompressor**—Specifies which codec to use for source decompression:  
*Default:* Decompression is executed on the CPU.  
*Lightspeed GPU:* Decompression executed on the GPU.

## Creating & Configuring RTMP Sources

To create and configure a new RTMP source, click the Add Input icon in the Sources panel toolbar and select RTMP to display the Configure Source panel:




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**Note:** Lightspeed Live Capture requires that you format IP sources using standard frame sizes and frame rates. See the Technical Specifications topic in the [Lightspeed Live Capture product sheet](#) on the Telestream web site for supported formats. RTMP source settings can *only* be edited when you are adding one. After the source has been added, only the name and description can be changed—select it in the Sources panel to display its Preview panel, and click the Edit icon  to display its Configure Source panel.

When you require an RTMP source with different settings, add a new RTMP source and configure it accordingly.

You can not edit source settings while it is being captured.

Some controls display only when you enable Advanced Mode. Select Settings in the main menu  to display the System Settings panel. See [Managing System Settings](#).

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Telestream recommends limiting NDI | SRT | RTMP | Transport Stream sources to eight, unless testing in your environment indicates you can support more.



For Live Capture systems with more than one server, you should name each separate Lightspeed Live Server's RTMP sources with unique names—for example, add the Lightspeed Live Server name as a prefix: *Lightspeed1-RTMP*.

The screenshot shows the 'Configure Source' window for an RTMP source. The 'Name' field is set to 'RTMP'. The 'Stream Name' field is set to 'myStream'. The 'Max Time-Shift' is set to 0. There is a toggle for 'Assign Processor' which is currently turned on. The 'TimeCode Source' is set to 'Source'. There are three more toggle switches: 'Free run TimeCode' (on), 'Compensate for Computer Clock Drift' (off), and 'Freeze on LOS' (off). There is also a 'Log Timecode' toggle (off). The 'Decompressor' is set to 'Lightspeed GPU'. The 'LOS Video Test Pattern' is set to '100% Color Bars'. At the bottom right, there are 'Cancel' and 'Save' buttons.

When configuration is complete, click Save to close the panel and create the RTMP source per your specifications.

**Name**—Specifies the name used to identify this source in Capture web apps, where displayed. When you rename a source, observe these rules:

- Each source instance must be named uniquely.
- These characters are prohibited: ` \* | \ : ; " ' < > ? /
- After changing a source name you must re-configure affected Capture actions in Vantage workflows that utilize the renamed source. See [Capture Action Overview and Configuration](#).

**Stream Name**—Specifies the name (default: *myStream*) of this RTMP stream source.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

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### **Assign Processor (SD/HD sources only AND server model-dependent)**

**Note:** If this control does not display, its because processor balancing on this Lightspeed Live Server model is performed automatically, and no end-user adjustment is available.

This option defaults to On (enabled) when capturing SD/HD SDI sources. You should disable it when capturing UHD/4K.

---

When enabled, all processing associated with each Capture | Tape workflow job is assigned to a single CPU on the Lightspeed Live Server's multi-core CPU. This typically prevents inefficient mapping of processes across CPU sockets during heavy loads, typically when several (or all) sources are capturing simultaneously.

Disabling this option during multi-source capturing may result in excessive CPU usage. When Assign Processor is disabled, Affinity is set to 0 (zero) ([CPU Processor Group Assignment](#)).

**Timecode Source**—Specifies the default timecode source. Choose from the following timecode source signals:

- *Source*—For H.264 or H.265 the source's SEI data is used; for MPEG2 the source's GOP header timecode is used. If no valid source timecode is available, see Free Run Timecode below.
- *Computer Clock*— by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.

---

**Caution: If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock use UTC time, due to a Windows limitation.**

- 
- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays N/A on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

**Free Run Timecode**—Enabling Free Run Timecode when Compensate for Computer Clock Drift is enabled has no effect. When enabled, and the desired timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When Free Run Timecode is not enabled and the desired timecode is not detected or goes away, the timecode reverts to zero (00:00:00:00) and stays at zero.

**Compensate for Computer Clock Drift**—Only applies when Computer Clock is specified as Timecode Source.

Regardless of how Compensate for Computer Clock Drift is set, if packets are lost and frames are dropped the Live Source process adds frames using the last good timecode in order to compensate for the lost frames. This may cause timecode values to be repeated where a frame was lost. If your Transport Stream signal is strong, this problem should not occur.

#### **When Compensate for Computer Clock Drift is enabled**

Computer Clock Time is monitored and compared to the timecode being added to the captured file. Since the Computer Clock is not gen-locked with a true time source associated with the incoming frames it can drift over time and get out of sync with the incoming stream. When a drift of one second is reached the timecode being added to the file is re-synced to the system's Computer Clock time. This means there may be a discontinuity in the file's timecode at the point where the re-sync occurred. Enabling Free Run Timecode when Compensate for Computer Clock Drift is enabled has no effect on the process described here.

#### **When Compensate for Computer Clock Drift is Disabled**

The source process uses the Computer Clock time without compensating for drift. Over time the timecode may drift several seconds compared to the 'real' time. For example—if a recording is 6 hours long the Computer Clock drift might be many seconds by the end of the 6 hour recording. If no frames were dropped the timecode in the output file is contiguous from start to finish.

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

**LOS Video Test Pattern**—Applies only when Freeze on LOS is disabled. Specifies the test pattern to display during LOS.

**Log Timecode (Advanced Mode Only—see [Managing System Settings](#))**—When enabled, the timecode is added to the log. ()

**Decompressor**—Specifies which codec to use for source decompression.

*Default:* Decompression is executed on the CPU.

*Lightspeed GPU:* Decompression executed on the GPU.

## **Tagging AC3 Audio Embedded in PCM**


If the audio in a source is AC3, you must indicate it as such, so that the Vantage Capture workflow can process it properly.

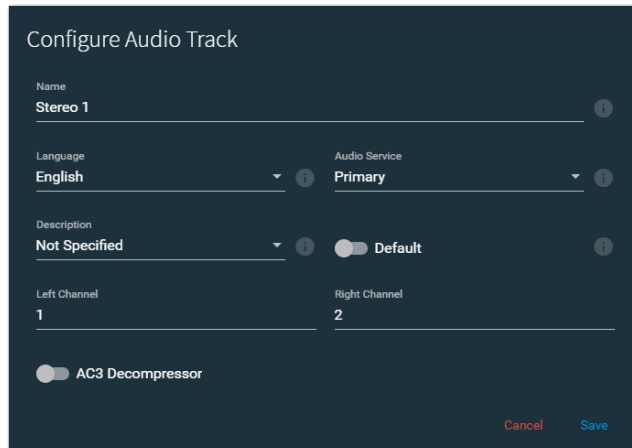
---

**Note:** The only audio track setting that applies to Live Capture is the AC3 Decompressor. No other settings apply.

---

To identify a track as AC3, follow these steps:

1. Select the source to display its preview panel.
2. Click the Audio Tracks tab and select the track you are working on.
3. Click the Edit icon  to display the Configure Audio Track panel:



The 'Configure Audio Track' dialog box is shown with a dark blue background. It contains the following fields and controls:

- Name:** Stereo 1
- Language:** English (dropdown menu)
- Audio Service:** Primary (dropdown menu)
- Description:** Not Specified (dropdown menu)
- Default:** A toggle switch that is currently turned off.
- Left Channel:** 1
- Right Channel:** 2
- AC3 Decompressor:** A toggle switch that is currently turned off.
- Buttons:** Cancel (red text) and Save (blue text) at the bottom right.

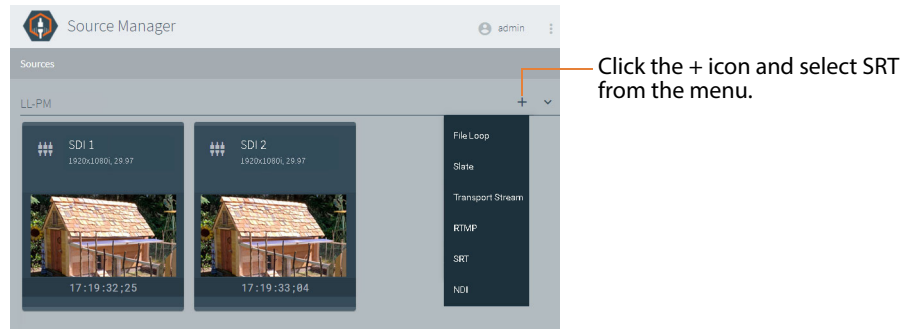
4. Enable the AC3 Decompressor control and click Save.

When enabled, AC3 audio embedded in PCM is decoded at the source level and passed on as PCM, for use directly in the primary or secondary outputs and the Preview panel of a Live system. When the AC3 Decompressor is enabled, the affected source's Live Source process restarts automatically.


## Creating & Configuring SRT Sources

Live Capture supports SRT (Secure Reliable Transport)—an open-source video streaming transport protocol—that provides secure, low-latency streaming performance over noisy or lossy networks such as the public Internet.

To create and configure a new SRT source, click the Add Input icon in the Sources panel toolbar and select SRT to display the Configure Source panel:




**Note:** Lightspeed Live Capture requires that you format IP sources using standard frame sizes and frame rates. See the Technical Specifications topic in the [Lightspeed Live Capture product sheet](#) on the Telestream web site for supported formats.

SRT source settings can *only* be edited when you are adding one. After the source has been added, only the name and description can be changed—select it in the Sources panel to display its Preview panel, and click the Edit icon  to display its Configure Source panel.

When you require an SRT source with different settings, add a new SRT source and configure it accordingly.

You can not edit source settings while it is being captured.

Some controls display only when you enable Advanced Mode. Select Settings in the main menu  to display the System Settings panel. See [Managing System Settings](#).

Telestream recommends limiting NDI | SRT | RTMP | Transport Stream sources to eight, unless testing in your environment indicates you can support more.

For Live Capture systems with more than one server, you should name each separate Lightspeed Live Server's SRT sources with unique names—for example, add the Lightspeed Live Server name as a prefix: *Lightspeed1-SRT*.

When configuration is complete, click Save to close the panel and create the SRT source per your specifications.

**Name**—Specifies the name used to identify this source in Capture web apps, where displayed. When you rename a source, observe these rules:

- Each source instance must be named uniquely.
- These characters are prohibited: ` \* | \ : ; " ' < > ? /
- After changing a source name you must re-configure affected Capture actions in Vantage workflows that utilize the renamed source. See [Capture Action Overview and Configuration](#).

**Description**—Practical description that identifies the SRT source.

**SRT Caller Mode**—Enable this option to establish an SRT link between your SRT source and destination device when required, where this device is the caller.

**SRT Stream Address**—SRT sources are created in Listener mode by default. When Caller Mode is enabled, specify the IP address of the listener device.

### AES Encryption

Enable to implement AES encryption on this source.

### AES Encryption Passphrase

When AES encryption is enabled, supply a pass phrase (10-79 characters).

### AES Encryption Key Length

When AES encryption is enabled, specify the key length from the menu.

**Port Number**—Specifies the port number to utilize for both listener and caller mode.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

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**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

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**Force 8-Bit Video**—Forces a 10-bit source to be down-sampled to 8-bit. Unlike SDI sources which are inherently 10-bit but are rendered to either 8- or 10-bit frames by the AJA card, the ST 2110 source data may be any bit depth supported by the standard. The bit depth is specified in the video SDP file. Force 8-bit works regardless of whether NMOS is enabled or not. NMOS wraps an SDP description, and Live Source manager can convert it to a 10-bit or an 8-bit video format internally.

8-bit video should only be used with 8-bit codecs such as XDCAM. Using 8-bit sampling offers more efficient compression.

### Assign Processor (SD/HD sources only AND server model-dependent)

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**Note:** If this control does not display, it's because processor balancing on this Lightspeed Live Server model is performed automatically, and no end-user adjustment is available. This option defaults to On (enabled) when capturing SD/HD SDI sources. You should disable it when capturing UHD/4K source.

---

When enabled, all processing associated with each Capture | Tape workflow job is assigned to a single CPU on the Lightspeed Live Server's multi-core CPU. This typically prevents inefficient mapping of processes across CPU sockets during heavy loads, typically when several (or all) sources are capturing simultaneously.

Disabling this option during multi-source capturing may result in excessive CPU usage. When Assign Processor is disabled, Affinity is set to 0 ([CPU Processor Group Assignment](#)).

**Timecode Source**—Specifies the default timecode source. Choose from the following timecode source signals:

- *Source*—For H.264 or H.265 the source's SEI data is used; for MPEG2 the source's GOP header timecode is used. If no valid source timecode is available, see Free Run Timecode below.
- *Computer Clock*—by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.

---

**Caution: If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock use UTC time, due to a Windows limitation.**

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- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays N/A on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

**Free Run Timecode**—Enabling Free Run Timecode when Compensate for Computer Clock Drift is enabled has no effect. When enabled, and the desired timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When Free Run Timecode is not enabled and the desired timecode is not detected or goes away, the timecode reverts to zero (00:00:00:00) and stays at zero.

**Compensate for Computer Clock Drift**—Only applies when Computer Clock is specified as Timecode Source.

Regardless of how Compensate for Computer Clock Drift is set, if packets are lost and frames are dropped the Live Source process adds frames using the last good timecode in order to compensate for the lost frames. This may cause timecode values to be repeated where a frame was lost. If your Transport Stream signal is strong, this problem should not occur.

#### **When Compensate for Computer Clock Drift is enabled**

Computer Clock Time is monitored and compared to the timecode being added to the captured file. Since the Computer Clock is not gen-locked with a true time source associated with the incoming frames it can drift over time and get out of sync with the incoming stream. When a drift of one second is reached the timecode being added to the file is re-synced to the system's Computer Clock time. This means there may be a discontinuity in the file's timecode at the point where the re-



sync occurred. Enabling Free Run Timecode when Compensate for Computer Clock Drift is enabled has no effect on the process described here.

**When Compensate for Computer Clock Drift is Disabled**

The source process uses the Computer Clock time without compensating for drift. Over time the timecode may drift several seconds compared to the 'real' time. For example—if a recording is 6 hours long the Computer Clock drift might be many seconds by the end of the 6 hour recording. If no frames were dropped the timecode in the output file is contiguous from start to finish.

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

**LOS Video Test Pattern**—Applies only when Freeze on LOS is disabled. Specifies the test pattern to display during LOS.

**Use Inverse Telecine (Live Stream Only)**—Does not apply in Capture, because no frame-rate conversion is applied. Do not enable this control.

**Cisco ID3 (Advanced Mode Only—see [Managing System Settings](#))**—Enable to allow the SCTE-104 information to be converted to ID3 on output.

**Decompressor**—Specifies which codec to use for source decompression.

*Default:* Decompression is executed on the CPU.

*Lightspeed GPU:* Decompression executed on the GPU.

## Creating & Configuring NDI Sources

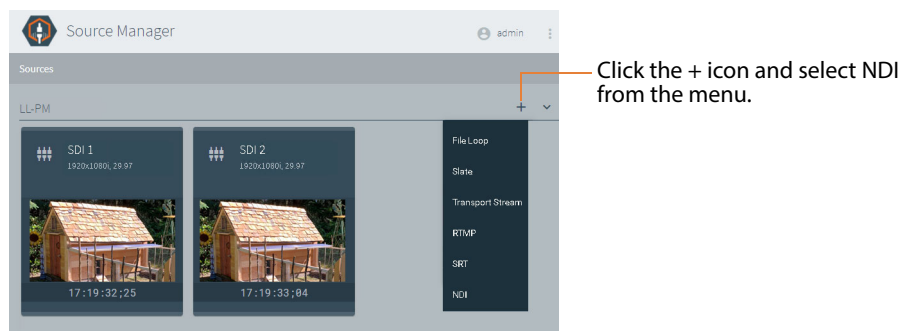
NDI (Network Device Interface) is a royalty-free software specification to enable video-compatible products to communicate, deliver, and receive high-definition video over gigabit Ethernet networks in a high-quality, low-latency, frame-accurate manner and suitable for switching in a live production environment.

Video is limited to HD and 16 audio channels.


Live Source supports a Loss of Signal state to maintain the channel when there is no active signal from an established NDI source, but the video (frame rate, frame size, bit depth, etc.) and audio (channel count, bit depth) cannot change when the signal is re-established.

NDI Access Discovery Method requires TCP port 5960.

To create and configure a new NDI source, click the Add Input icon in the Sources panel toolbar and select NDI to display the Configure Source panel:




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**Note:** Lightspeed Live Capture requires that you format IP sources using standard frame sizes and frame rates. See the Technical Specifications topic in the [Lightspeed Live Capture product sheet](#) on the Telestream web site for supported formats. NDI source settings can *only* be edited when you are adding one. After the source has been added, only the name and description can be changed—select it in the Sources panel to display its Preview panel, and click the Edit icon  to display its Configure Source panel.

When you require an NDI source with different settings, add a new NDI source and configure it accordingly.

You can not edit source settings while it is being captured.

Some controls display only when you enable Advanced Mode. Select Settings in the main menu  to display the System Settings panel. See [Managing System Settings](#).

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Telestream recommends limiting NDI | SRT | RTMP | Transport Stream sources to eight, unless testing in your environment indicates you can support more.

For Live Capture systems with more than one server, you should name each separate Lightspeed Live Server's NDI sources with unique names—for example, add the Lightspeed Live Server name as a prefix: *Lightspeed1-NDI*.

The screenshot shows the 'Configure Source' dialog box. It contains the following fields and controls:

- Name:** A text field containing 'NDI'.
- Description:** An empty text field.
- Source:** A dropdown menu.
- Max TimeShift:** A numeric input field set to '0'.
- TimeCode Source:** A dropdown menu showing 'Computer Clock'.
- Freeze on LOS:** A toggle switch that is currently turned off.
- Free run TimeCode:** A toggle switch that is currently turned off.
- LOS Video Test Pattern:** A dropdown menu showing '100% Color Bars'.
- LOS Audio Test Signal:** A dropdown menu showing 'Silent'.
- Buttons:** 'Cancel' and 'Save' buttons at the bottom right.

When configuration is complete, click Save to close the panel and create the NDI source per your specifications.

**Name**—Specifies the name used to identify this source in Capture web apps, where displayed. When you rename a source, observe these rules:

- Each source instance must be named uniquely.
- These characters are prohibited: ` \* | \ : ; " ' < > ? /
- After changing a source name you must re-configure affected Capture actions in Vantage workflows that utilize the renamed source. See [Capture Action Overview and Configuration](#).

**Description**—Practical description that identifies the NDI source.

**Source**—Specifies the identity of the NDI source.

Live Capture supports NDI Access Discovery Method (active polling). This method supports discovery both within the same subnet or across subnets. If the NDI sources are on the same subnet as the Live Capture server hosting Source Manager, the Source control in the NDI Source Configuration panel auto-populates with the list of NDI sources that are discoverable.

If the NDI sources are not on the same subnet, the implementation supports two kinds of configurations:

- Add the IP of the NDI source using the Access Manager application in NDI Tools
- OR

- Enter the IP address of the NDI source in `C:\Program Files\Telestream\Live Source Server\NdiSources.config` and restart the Telestream Live Source Service.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

---

**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

---

**Timecode Source**—Choose one of the following timecode source signals for the selected source:

- *Source*—Uses embedded VITC timecode in the source ancillary stream, if present. If a valid timecode is not available or goes away, see the Free Run Timecode option below.
- *Computer Timecode*—Uses the time-of-day clock provided by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.

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**Caution:** If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock should use UTC time, due to a Windows limitation.

- 
- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays *N/A* on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

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**Note:** When using the CalDAV Calendar trigger you should set Timecode Source to either Computer Clock or Source. When using Source, you must have time-of-day timecode in your source that matches the time set in your Lightspeed Live Server. See [Configuring Trigger Settings](#).

---

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

**Free Run Timecode**—When enabled, starts timecode from 0 if there is no embedded timecode in the source.

When enabled, and the timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When not enabled and the timecode is not detected or goes away, then the timecode reverts to zero (00:00:00:00) and stays at zero.

**LOS Video Test Pattern**—Applies only when Freeze on LOS is disabled. Specifies the test pattern to display during LOS.

**LOS Audio Test Signal**—Specifies the audio signal to use during LOS.

## Creating and Configuring ST 2110 Sources

You can only create ST 2110 sources on a C4 Lightspeed Live Server that includes a 25G Ethernet NIC. On other servers, ST 2110 sources are not supported.

---


**Note:** Lightspeed Live Capture requires that you format IP sources using standard frame sizes and frame rates. See the Technical Specifications in the [Lightspeed Live Capture product sheet](#) on the Telestream web site for supported formats.


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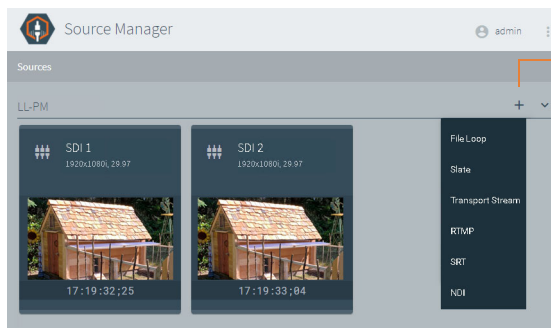
---

**Caution:** Sources cannot be doubled up; a source stream can only be used in one ST 2110 source configuration. Attempting to double up causes a collision, forcing one source process to fail.

---

To modify an ST 2110 source configuration, select it in the Sources panel to display its Preview panel. Click the Edit icon  to display its Configure Source panel.

To create an ST 2110 source (using text / HTML SDP files or NMOS), click the Add Input  icon in the Sources panel toolbar:



Click the + icon and select ST 2110 Input from the menu.

Select ST 2110 to display its Configure Source panel, shown here with NMOS enabled:

When configuration is complete, click Save to close the panel to create or update the ST 2110 source per your specifications.

**Name**—Specifies the name to use in Capture web apps where displayed. You can change source names to meet your operating requirements.

**Description**—Provide a descriptive string for this source.

**Network Interface**—Specifies the primary 25G Ethernet NIC, chosen from the menu.

**Secondary Network Interface**—Specifies the secondary 25G Ethernet NIC, chosen from the menu. May be enabled or disabled.

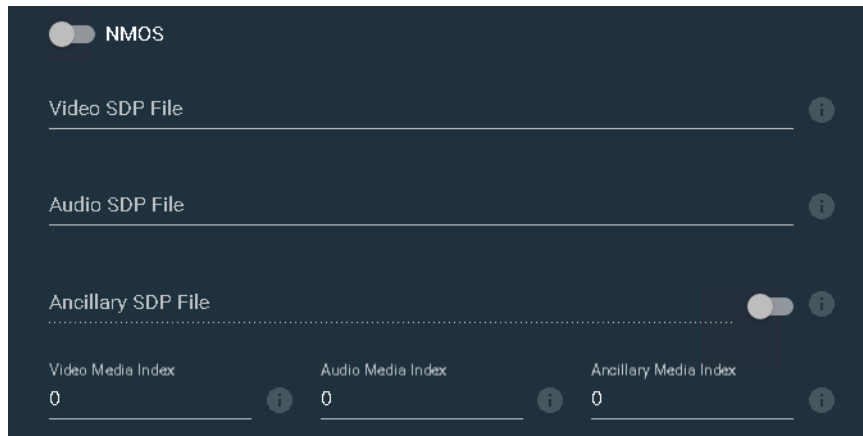
**NMOS** —If your video network utilizes NMOS (Networked Media Open Specification), enabling NMOS hides the SDP fields, and enables the Live Source NMOS node, device, and receivers (video, audio and data) to be discoverable in an NMOS registry and an NMOS browser/explorer.

To set NMS logging levels on your Capture server, see [Setting NMOS Logging Levels](#).

The Live Source NMOS Node Server (per AMWA IS-04 NMOS Discovery and Registration Specification) dynamically interfaces with the NMOS infrastructure; adding, deleting, updating or retrieving NMOS information associated with an ST2110 source (per AMWA IS-05 NMOS Device Connection Management Specification).

### When NMOS is Disabled...

When NMOS is disabled, SDP File controls display so that you can specify them:



The screenshot shows a configuration panel with a dark background. At the top, there is a toggle switch labeled 'NMOS' which is currently turned off. Below this, there are three input fields: 'Video SDP File', 'Audio SDP File', and 'Ancillary SDP File'. Each field has a small information icon (i) to its right. The 'Ancillary SDP File' field also has a toggle switch to its right, which is currently turned on. At the bottom, there are three input fields for indices: 'Video Media Index', 'Audio Media Index', and 'Ancillary Media Index'. Each of these fields has a small information icon (i) to its right. The values in the index fields are currently set to '0'.

**Video SDP File**—When NMOS is disabled, specifies the URL of the required SDP file for use with a video stream (may be either text or HTML files).

**Audio SDP File**—Specifies the URL of the required SDP file for use with audio streams (may be either text or HTML files).

**Ancillary SDP File**—Specifies the URL of the optional SDP file for use with ANC data streams. In order to receive closed captions data and VITC timecode, a valid ANC data stream is required (may be either text or HTML files). May be enabled or disabled.

**Video | Audio | Ancillary Media Index**—Specifies the index of the file.

**Force 8-Bit Video**—Forces a 10-bit source to be down-sampled to 8-bit. Unlike SDI sources which are inherently 10-bit but are rendered to either 8- or 10-bit frames by the AJA card, the ST 2110 source data may be any bit depth supported by the standard. The bit depth is specified in the video SDP file. Force 8-bit works regardless of NMOS enabled or not. NMOS wraps an SDP description, and Live Source manager can convert it to a 10-bit or an 8-bit video format internally.

8-bit video should only be used with 8-bit codecs such as XDCAM. Using 8-bit sampling offers more efficient compression.

**2022-7 HW Mode**—Enables 2022-7 hardware mode when the SDP configuration files for the incoming streams specify an associated secondary stream. In 2022-7 HW mode, processing is offloaded to a processor on the 25G Ethernet NIC. Enabling this control enables the Live Source process to use less CPU cycles and system memory.

**Freeze on LOS**—When enabled, causes the source to hold the last good frame if the signal is lost. When disabled, LOS causes the LOS Video Test Pattern to be displayed. For details, see [Loss of Signal Behavior](#).

**Initial Video Format (SD formats not supported)**. Initial Video Format enables a recording session to start before signal is established, so that a recording in progress does not get locked as loss of signal at 1080p30. This is especially useful when you are



using a workflow with recurring segments or it is set to activate on power up, or signal is lost or power is lost temporarily. When the ST2110 Source loses connection with the sender, the video is replaced with a test signal as configured in Initial Video Format.

Specifies the video format to ingest when no video signal is being received. When the signal starts or restarts (and ignore lost frames is enabled in the Live Capture workflow), the signal is recorded, provided that is the same format as initial video format you have specified.

**LOS Video Test Pattern**—Applies only when Freeze on LOS is disabled. Specifies the test pattern to display during LOS. For details, see [Loss of Signal Behavior](#).

**LOS Audio Test Signal**—Specifies the audio signal to use during LOS.

**Max Time-Shift**—Specifies the maximum duration of video that the time-shift frame buffer can hold, which is used to delay the source for workflows using this source. Specifies the duration in seconds (maximum: 10). Some limitations may exist for higher bit rates and frame rates.

---

**Note:** Live Capture's Time-Shift holds incoming source media frames in an internal FIFO buffer. See [Determining the Time-Shift Buffer Duration](#) for suggested settings for various frame sizes and rates.

When a capture workflow is activated with Time-Shift enabled, the source media is stored in the buffer, which allows Lightspeed Live to reach back in time and access media processed in the past, based on the value of the Time-Shift field. Since Live Capture's Time-Shift is always processing a source's media, when you start recording, any media stored in the buffer is available to be added to the capture file.

---

**Timecode Source**—Click the menu to choose one of the following timecode source signals for the selected SDI input:

- *Source*—Uses embedded VITC timecode in the source ancillary stream, if present. If a valid timecode is not available or goes away, see the Free Run Timecode option below.
- *Computer Timecode*—Uses the time-of-day clock provided by the Lightspeed Live Capture Server. When selected, also configure Compensate for Computer Clock Drift.

---

**Caution: If your Lightspeed Live Server's Time Zone Setting is set to a time zone that does not have Daylight Savings Time, computer clock should use UTC time, due to a Windows limitation.**

---

- *None*—Specifies zero-based timecode recording. When recording begins, the timecode is set to 00:00:00:00. If Free Run Timecode is enabled, then the timecode inserted into a QuickTime or MXF file auto-increments. Otherwise, every frame in the output file contains timecode 00:00:00:00. Capture displays N/A on the workflow thumbnail, indicating that there is no applicable timecode available, and 00:00:00:00 displays in Capture's Preview timecode window.

---

**Note:** When using the CalDAV Calendar trigger you should set Timecode Source to either Computer Clock or Source. When using Source, you must have time-of-day timecode in your source that matches the time set in your Lightspeed Live Server. See [Configuring Trigger Settings](#).

---

**Free Run Timecode**—When enabled, starts timecode from 0 if there is no embedded timecode in the source.

When enabled, and the timecode is not detected or goes away, the timecode seamlessly free-runs from the last good timecode received. When not enabled and the timecode is not detected or goes away, then the timecode reverts to zero (00:00:00:00) and stays at zero.

**Raw Ancillary Dump (Advanced Mode Only—see [Managing System Settings](#))**—When enabled and the output container is set to TIFO, the SDI input's ancillary data is inserted directly into the Primary Output file

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**Caution: Do not enable this option unless directed by Telestream Support.**

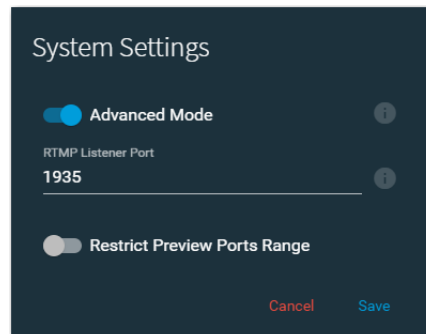
---

# Managing System Settings

Click Source Manager's main menu to select Settings | Download System Logs | About:

The main menu (a vertical ellipsis) icon is located at the top right corner of the window, at the far right edge of the Source Manager title bar.

Click main menu > Settings to display the System Settings panel:



Use this panel to configure the following per your requirements:

- **Advanced Mode**—Enables/disables advanced mode. In advanced mode, all controls display; otherwise, certain controls in source configuration panels are hidden. Advanced mode controls are identified in this guide by the phrase Advanced Mode Only.
- **RTMP Listener Port**—Specifies the RTMP listener port. Default: 1935. If you change the listener port, be certain the RTMP server is also sending to the same port. Be sure to restart the Telestream Live Source Service—see [Restarting the Telestream Live Source Service](#) for guidance.
- **Restrict Preview Ports Range**—When enabled, restricts the range of preview ports that can be automatically selected when the selection may interfere with other network traffic. Default lower and upper range: 1024 to 65534. Be sure to restart the Telestream Live Source Service—see [Restarting the Telestream Live Source Service](#) for guidance.
  - **Port Range Start | End**—Specifies the lowest and highest port to use. The Start value must be lower than Port Range End value.

Click Cancel to close the panel without saving changes. Click Save to update changes you have made.

## Copying System Logs from a Live Capture System

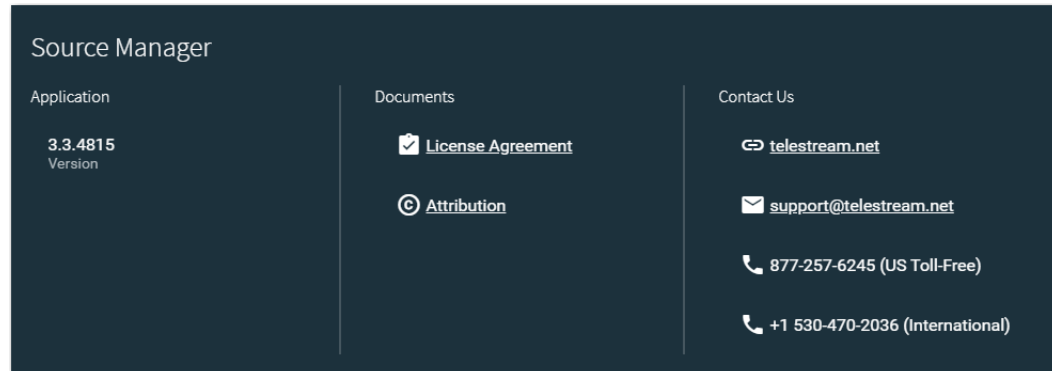
You can copy Live Capture system logs to your computer for archival purposes, for review, or in preparation for use in a customer service case (see [Managing System Logs](#)).

Click the main menu and select Download System Logs to create a zip file of the system logs on the Live Capture server and automatically copy the zip file to your computer in your user's *Downloads* directory (for example, *C:\Users\CaptainCrunch\Downloads\support.zip*). The first file is named *support.zip*. The name includes a numeric suffix (*support (n).zip*) where *n* is the next ordinal number, when multiple files are downloaded in the same folder.

When the file has downloaded, the file is displayed in a panel at the bottom of the Source Manager window. Click the file's menu for management options or click Show All (far right) to open the Downloads folder. Close the panel when done.

## Version Info | Legal Documents | Contact Methods

Click main menu > About to display Source Manager's About panel:



This panel provides the following:

- Source Manager's version number
- Legal documents—[license](#) agreements and copyright statements
- Telestream customer service contact information.

# Troubleshooting

## Can't Start the Group Portal Web App

You're trying to launch the Group Portal web app, and Chrome displays this error: "This site can't be reached".

### Resolution

Try these potential problems and retry:

- If you're using *localhost*, make sure you're on the target Lightspeed Live Server where Telestream Live Source Service is running.
- If you're using a host name, verify that it is correct for the target Lightspeed Live Server.
- Open the Services panel and verify that Telestream Live Source Service is running; start if it isn't. See [Can't Start the Telestream Live Source Service](#), following.

## Can't Start the Telestream Live Source Service

You're trying to start the Telestream Live Source Service and Windows displays this error: "Windows could not start the Telestream Live Source service on Local Computer. Error 1067: The process terminated unexpectedly".

### Resolution

Use the Telestream Capture/Play Switcher ([Switching to Live Capture Mode](#)) to switch over to Capture mode and retry.

# Scheduling Live Capture Sessions

Lightspeed Live Schedule is an optional, licensed web app that enables you to create recording sessions for Vantage Capture workflows as calendar events, and manage and monitor them as they occur.

Live Schedule implements optional SDI router control via Telestream RouteMaster, an optional, licensed feature. For details, see [Licensing Live Schedule and RouteMaster](#).

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**Note:** For details on other web app utilization topics, see [Managing your Web Apps](#).

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## Topics

- [Installing the Live Schedule Web App](#)
- [Updating the Live Schedule Web App](#)
- [Integrating RouteMaster SDI Router Control](#)
- [Live Schedule Prerequisites](#)
- [Launching the Live Schedule Web App](#)
- [Managing Your Live Schedule License](#)
- [Live Schedule Overview](#)
- [Creating and Managing Live Capture Events](#)
- [Managing Your Capture Event Schedule](#)
- [Using Source Routing](#)
- [Setting the Event Start Offset Time](#)
- [Implementing Automated Event Deletion](#)
- [Using the Event Schedule Panel](#)
- [Monitoring Channel Status](#)
- [Using Variables in Events](#)
- [Using Metadata Labels in Events](#)
- [Accessing Application Information | Users Guide | Help | Legal Documents & Contacting Telestream](#)
- [Using the Live Schedule API](#)
- [Managing System Logs](#)

## Installing the Live Schedule Web App

Follow these instructions to install the Live Schedule web app on a Lightspeed Live server hosting Live Capture. These instructions apply for installations on single-server systems as well as a multi-server array (Capture group):

1. Copy the Telestream Live Capture installer to the target server.  
OR  
On a group Live Capture system (two or more Capture servers or Capture and Vantage servers)—install the Live Schedule application on the server where IIS is installed, and hosting the Vantage Web Apps.
2. Run the installer—click the Products button and follow the installer prompts to install the Live Schedule web app.

## Updating the Live Schedule Web App

Follow these instructions to update the Live Schedule web app on a Lightspeed Live server hosting Live Capture. These instructions apply for installations on single-server systems as well as a Capture group:

1. In Windows Programs and Features, uninstall Live Schedule on each server where it is installed.
2. Copy the Telestream Live Capture installer to the target server.  
OR  
On a group Live Capture system (two or more Capture servers or Capture and Vantage servers)—install the Live Schedule application on the server where IIS is installed, and hosting the Vantage Web Apps.
3. Run the installer—click the Products button and follow the installer prompts to install the Live Schedule web app.

## Integrating RouteMaster SDI Router Control

Live Schedule may be integrated with Telestream RouteMaster for unified SDI router control, in a configuration that allows it to run as a Windows service.

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**Note:** RouteMaster is an optional, licensed program. Use of RouteMaster requires a license from Telestream. Contact [license@telestream.net](mailto:license@telestream.net) to obtain a license.

---

Here are the key features:

- When source routing ([Using Source Routing](#)) is enabled, you can configure events to control a router using the Source and Destination labels as defined by the router (crosspoint names/mnemonics) directly in event configuration (see [Adding and Configuring a NewEvent](#)).
- You can define a list of RouteMaster sources (see [Specifying Router Sources](#)) in Live Schedule Settings to constrain the sources available to an event.



- You can add keystrokes to the source routing fields of an event to enable quick selection of source routing options (see [Adding and Configuring a NewEvent](#)).
- The previous selection for a given channel persists when creating a new event in the same channel.
- You can add router destination information in the SDI source configuration (see [Configuring Live Source for RouteMaster SDI Input](#)), enabling Live Schedule to associate a channel with a specific destination.

---

**Note:** To avoid having events associated with a specific channel change the routing settings during events in progress, you should only have a single active workflow using a given source. Only one event should have router control for a given channel at a time, including queue time (set by the event start offset—[Setting the Event Start Offset Time](#)).

---

Before you can use RouteMaster, you should:

1. Obtain a RouteMaster license from Telestream (contact [license@telestream.net](mailto:license@telestream.net)).
2. Configure Telestream RouteMaster.
3. In Live Source, configure the SDI channels to be associated with RouteMaster destinations (as explained following).
4. In Live Schedule, enable source routing.

Use these topics to perform these one-time setup tasks.

## RouteMaster Licensing and Configuration

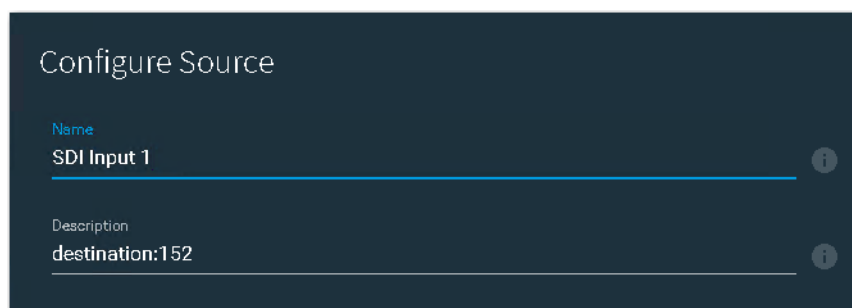
Follow these steps to enable and configure RouteMaster:

1. On the Live Capture server, copy the license file to *C:\Program Files (x86)\Telestream\RouteMaster\*.
2. In the Windows Services control panel, restart the Telestream RouteMaster Service or restart the server before configuring RouteMaster.
3. Open the Telestream RouteMaster program from the desktop shortcut (don't run the RouteMaster executable located in *C:\Program Files (x86)\Telestream\RouteMaster\*) and select Settings > Configure to display the Manage Routers dialog.
4. Enable Start Running Automatically to allow the RouteMaster Service to start after rebooting the server.
5. In the same dialog, add a physical router and use the tabs to configure it as appropriate for your environment.
6. In the Connection tab, specify the router's IP address and port, and protocol.
7. Click OK to save the router and its settings and close the dialog.

## Configuring Live Source for RouteMaster SDI Input

Follow these steps to configure Live Source (for full details, see [Configuring SDI Sources](#)) to use RouteMaster to control SDI input:

1. Before configuring Live Source Manager, open Workflow Designer and deactivate all Capture workflows.
2. Launch Source Manager in Chrome—<http://localhost:8090/sources>, for example.
3. Select an SDI input that you want to associate with a router destination and click the edit icon (pencil) to display the Configure Source dialog (partial shown):



The screenshot shows a dark-themed dialog box titled "Configure Source". It contains two text input fields. The first field is labeled "Name" and contains the text "SDI Input 1". The second field is labeled "Description" and contains the text "destination:152". To the right of each field is a small circular icon with an "i" inside, representing an information or help button.

4. In the Description field, associate the Lightspeed Live SDI input with the router connection—enter the key word *destination* followed by a colon (:) and the number of the output from the router that is connected to the Lightspeed Live SDI input.  
For example: Router output 152 is specified as `destination:152`.  
When configuring for QuadLink channels, use commas to separate the values. For example: `destination:0,1,2,3`.

---

**Note:** Some routers use 0 as the output index offset, so consider the offset when entering the value. In this case, router output 1 should be entered as `destination:0`.

---

5. Click Save to update the source specifications and dismiss the dialog.

## Configuring Live Schedule

In Live Schedule Settings ([Enabling | Disabling Source Routing](#)), enable One Source for SingleLink channels or Four Sources for QuadLink channels), to display Source Routing options in events.

Optionally, select Visible Sources to constrain the source options list that display.

## Live Schedule Prerequisites

Before you use Live Schedule and start scheduling events, make sure that:

- Live Schedule uses the time-of-day computer clock of the server hosting the Telestream Schedule Service to place events on the schedule and determine the

start and end times used during recording. The timecode source used in the Channel configuration must match this time-of-day timecode.

In the Source Manager, for SDI, specify Timecode Source as either Source | Computer Clock | LTC, synced to time of day. If recording must start and end at a precise, frame-accurate timecode, LTC or Source is preferred. For IP sources, Timecode Source must be set to Computer Clock.

- For a Live Capture array—systems with more than one Live Capture server—each server must be addressable by its server name. Name resolution should be provided through DNS or by entries in each server's hosts file.
- Each Live Capture workflow that you plan to use must be configured either with Manual or Web Service triggers. If the workflow is not so configured, it won't display in Live Schedule for assignment to a channel. (In your workflow in Workflow Designer, see the Capture action man page for details.)
- Variables and labels (both of which are optional) are defined in Vantage and implemented in a workflow's Capture action, with values set as appropriate in Live Schedule.
- The target workflow(s) are activated in Workflow Designer, so that they are ready to be triggered to start capturing source video when an event starts.

---

**Note:** If your workflow is inactive or configured incorrectly for use in Live Capture, Live Schedule won't display it for selection.

---

## Launching the Live Schedule Web App

To launch the Live Schedule web app (always in Chrome), use the same credentials as you use to open Live Capture—you can launch Live Schedule from the Vantage web portal (sometimes referred to as the Vantage home page) or you can launch it directly:

### Launching Live Schedule from the Vantage Portal

To launch Live Schedule, enter the Vantage Portal's URL:

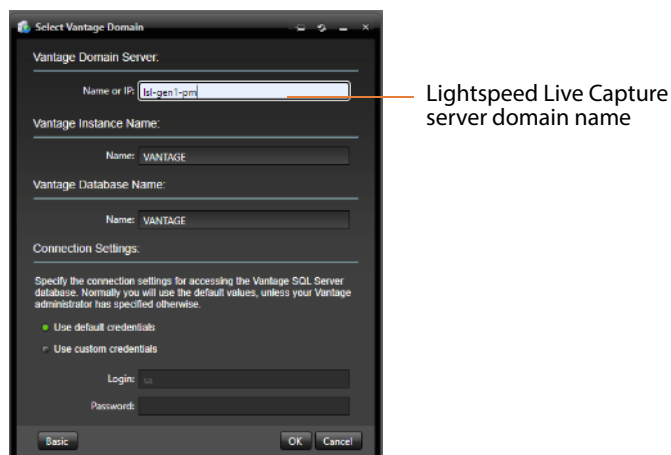
`http://localhost | <Live Capture Server host name>/vantage`

Use the keyword *localhost* when you are using Chrome directly on the Live Capture Server; use the Live Capture server's host name when you are launching Live Schedule via the network.

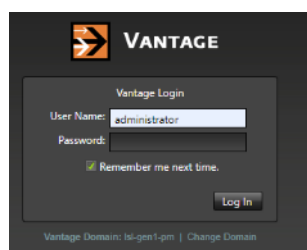
Using the Vantage Portal to access web apps establishes Vantage login information that is essential to logging in to Vantage.

## Logging into Vantage

If the Vantage credentials aren't current in Chrome, you'll be prompted to log into your Vantage domain. Enter the Live Capture Vantage domain name (use the Live Capture server name) in the Select Vantage Domain panel:



Click OK to display the Vantage login panel, where you enter credentials:



Enter your Vantage user name (and password if required), and click Log In. The default credentials are *administrator*, with no password.

Select Live Schedule from the Vantage Portal.

## Managing Your Live Schedule License

Live Schedule is an optional, licensed feature implemented as a Windows service ([Telestream Schedule Service](#)) with an embedded web app. It requires a separate [license](#), obtained from Telestream.

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**Note:** License management is only permitted by users who log into Vantage using the *Administrator* user ID.

You can activate/deactivate the [license](#) on a server with or without Internet access. For online activation, port 443 must be open.

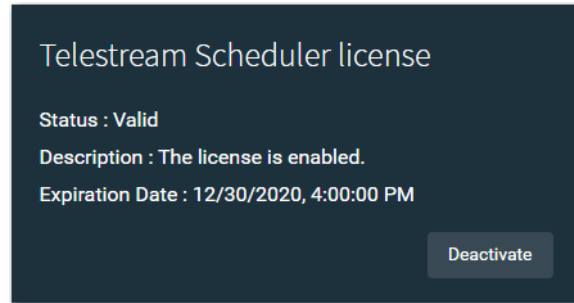
---

When the license indicator button is green, the license is activated. When it displays red, it is not activated or not present.



To manage your license, open the Live Schedule web app and display the Telestream Scheduler License panel: Click the License Indicator button—the key icon—in the tool bar (top-right corner of window).

Live Schedule displays the License panel (shown here with an active license):



## Topics

- [Activating a License on a Server with Internet Access](#)
- [Activating a License on a Server without Internet Access](#)
- [Deactivating a License Online](#)
- [Deactivating a License Offline](#)

## Activating a License on a Server with Internet Access

Follow these steps to activate a Live Schedule [license](#) when the server hosting the Telestream Schedule Service has Internet access. Activation (and all license management) is performed in the Live Schedule Web app:

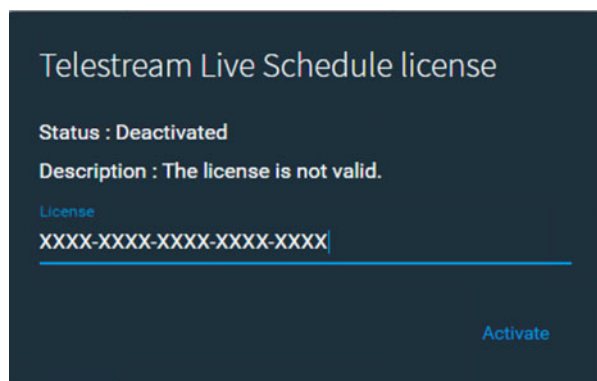
**Note:** If the license icon is green , your license is already activated.

1. Obtain a license key from Telestream—see [Obtaining Support | Information | Assistance](#).
2. Open the Live Schedule web app from the Vantage Portal in Chrome—<http://localhost/Vantage> | <http://<LiveCaptureServer>/Vantage>). For details, see [Launching the Live Schedule Web App](#).
3. Verify that you are logged in using the Vantage user ID *Administrator*. The user ID displays in the toolbar:



4. If you are not logged in as the *Administrator* user, right-click and log out. Vantage displays the login dialog—log in again, as *Administrator*—and re-open Live Schedule.

5. Click the red license key icon in the toolbar. to display the Schedule License Activation panel. (If the key is green, your license is already activated.)



6. Copy and paste in the license key you obtained from Telestream and click Activate.  
When your license has been successfully activated, the Live Schedule license panel indicates the successful activation of the license by displaying the license status as Valid and displays the expiration date. The license key icon displays green.
7. Click away from the Live Schedule license panel to close it.
8. Save a copy of the license number in case you need to re-apply it.

## Activating a License on a Server without Internet Access

Follow these steps to activate a Live Schedule license when the server where Telestream Schedule Service is installed does not have Internet access. Activation (and license management) is performed directly in the Live Schedule Web app.

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**Note:** If the [license](#) indicator (the key icon) is green, your license is already activated.

---

Follow these steps:

1. Obtain a license key from Telestream. See [Obtaining Support | Information | Assistance](#).
2. On the server hosting the Telestream Live Schedule service, open the Chrome web browser and enter this URL:  
`http://localhost:6500/license/id?key=[YourLiveScheduleKey]`.  
Live Schedule returns a string of characters similar to this:  
`GXTCI IUWUCXSGHBWUOGJWLAWUIOKXKUWUISSOGJ7FOMBNHE3DENZNGVDEGNRNHF  
DEIMBNG42UGNBNGNCTNMBNGVCX.`
3. Copy and paste this string into a text file that you can save or access on another computer or send it to the email address used on the other computer.
4. On the computer that has Internet access, open <https://cws.telestream.net/offlineactivation.aspx>.

5. Enter the string returned by Live Schedule in [Step 2](#) and click Submit.  
Telestream creates the off-line activation code and downloads it in a file.
6. Move the downloaded file to a folder of your choice on the Live Schedule server.
7. In the browser, enter this URL: `http://localhost:6500/license/activate-offline?key=[YourLiveScheduleKey]&license=[Path/To/File]`
8. Open/refresh the Live Schedule web app.  
When your license has been successfully activated, the The license key displays green. Click the key to display the Live Schedule license panel, where it should indicate the successful activation of the license by displaying the status as Valid.

Click away from the Live Schedule license panel to close it.

## Deactivating a License Online

1. Open the Live Schedule web app (see [Launching the Live Schedule Web App](#)).
2. Click the License Indicator button to display the Schedule License Activation panel.
3. Display the License panel and click Deactivate.

The license key icon should now display red.

## Deactivating a License Offline

Offline deactivation and [license](#) transfer must be arranged through Telestream. Contact Telestream Support before proceeding, and advise them that you want to deactivate your Live Schedule license, which was activated offline.

When advised, follow these steps to complete deactivation of a license which was activated off-line:

1. Remove these JSON files from the server where the Telestream Live Schedule Service is installed:
  - `C:\ProgramData\Telestream\Licenses\`
  - `C:\Windows\System32\config\systemprofile\AppData\Local\Telestream\Licenses\`
2. If you plan to activate the license on another server, contact Telestream Support to deactivate the license for you, prior to you re-activating it on another server.

## Live Schedule Overview

You use Live Schedule to create and manage media capture events on a channel-by-channel basis. Live Schedule automatically submits these scheduled events to Live Capture, where it initiates a job in the associated Live Capture workflow and the media is captured in real time, and written to a file.

Live Schedule connects to three different Windows services, which may be hosted on different Capture servers when operating in an array:

- IIS via the Web application host—This is on the same server that is running the Live Schedule Web application. IIS connects to the Vantage database. See [Launching the Live Schedule Web App](#).
- Vantage Live Service—to access Capture workflow’s job data, which may be hosted by one or more Capture servers in the array. Live Schedule automatically polls the list of servers and connects to the first Vantage Live Service it communicates with.
- Telestream Live Scheduler Service—running on the same server as the Live Schedule web application.

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**Note:** Live Schedule can be used on a single Live Capture server or on an array (a multi-server Live Capture system). From the Live Schedule perspective, multiple servers are seen as a unified system, similar to the Live Capture web application.

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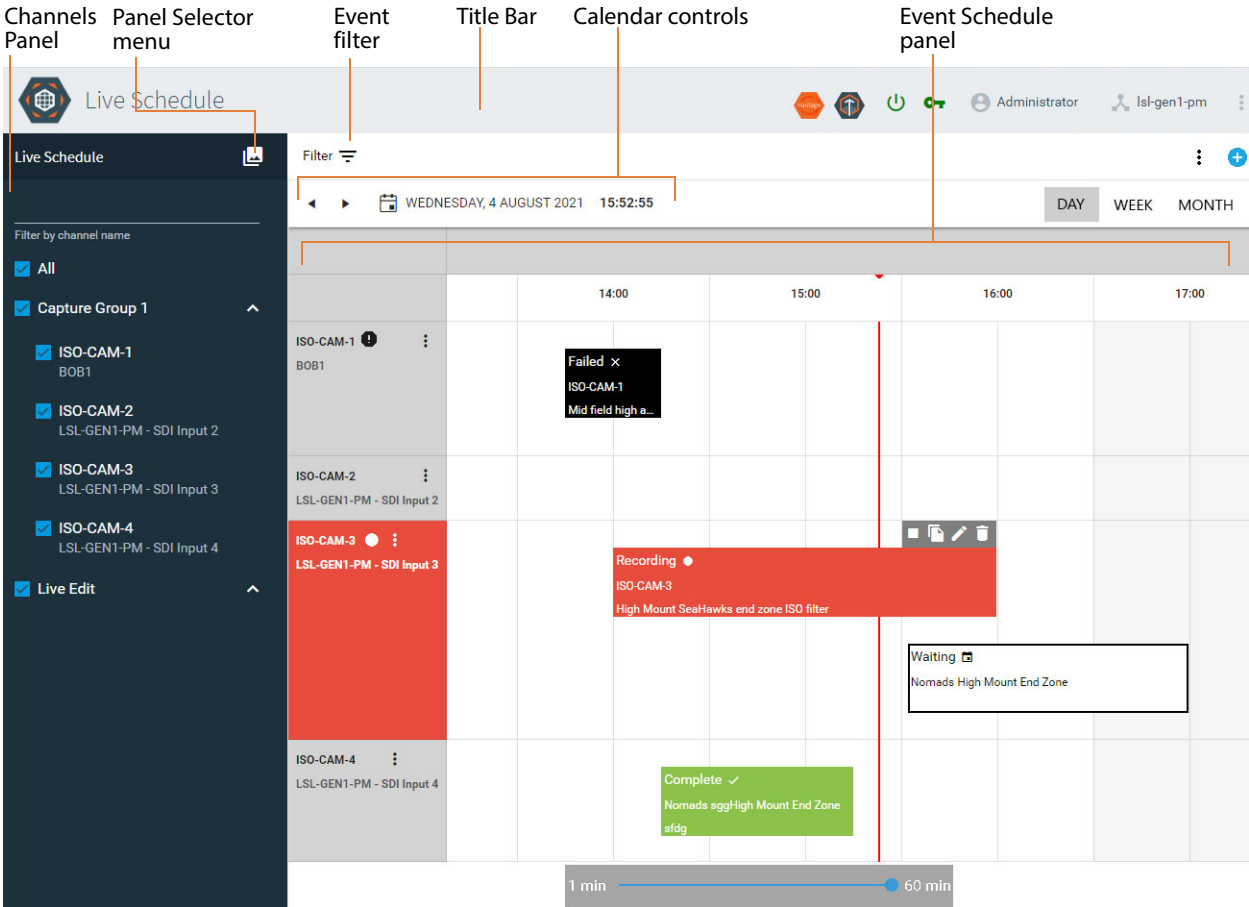
Live Schedule orchestrates capture sessions with Vantage Capture workflows; each workflow may be executed the same or on a different Lightspeed Live Server.

These are the key operational tasks you can perform using Live Schedule:

- Create a channel’s media recording schedule event by event, for each active Live Capture workflow in your Vantage domain, using a convenient, calendar interface
- Configure the event processing details to record media by time, and where to store the output media file
- Add metadata values to each event via variables and labels, which are passed to the workflow when recording starts and stored with the asset if required
- Monitor the status of active Live Capture workflows, summary statistics and details.

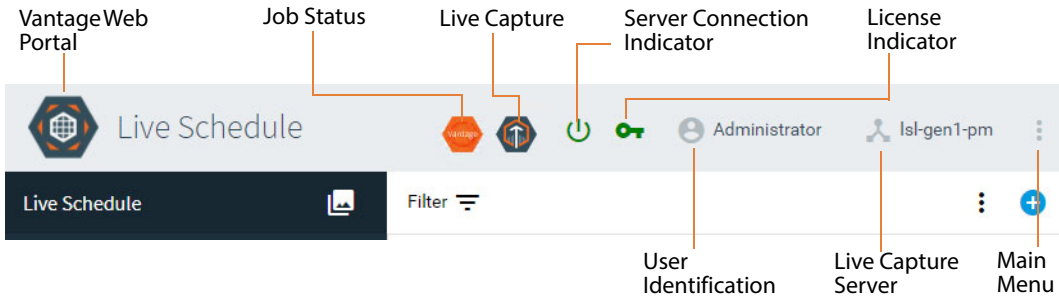


This is a typical Live Schedule window, displaying its schedule (event calendar) view:



## Using the Title Bar

Use the buttons in the title bar to manage Live Schedule and access other web apps:



**Vantage Web Portal**—Click this icon to display the Vantage web portal to access other Vantage web apps—see [Launching Web Applications](#).

**Job Status**—Click this icon to display the Vantage Job Status Views web app (see [Capturing Live Video](#)).

**Live Capture**—Click this icon to display the Live Capture web app (see [Capturing Live Video](#)).

**Server Connection Indicator**—When this icon displays green, you have a connection to the Lightspeed Live Capture server. When it displays red, the connection has failed and you should reconnect to the server before continuing work.


**License Indicator**—When the key icon displays green, your [license](#) is enabled. When it displays red, the license is expired or deactivated. Click the icon to activate or deactivate your license—see [Managing Your Live Schedule License](#).

**User Identification**—When connected, displays the identity of the Vantage user currently logged in to Live Schedule. Click here to log out of Live Schedule.

**Live Capture Server**—When connected, displays the identity of the Lightspeed Live Capture server to which the Live Schedule web app is connected.

**Main Menu**—Click to display the About panel, which displays the version of Live Schedule you're using, plus access to relevant documents, online help—the user guide, and Telestream contact information.

## Live Schedule Panels

Live Schedule has three panels: Channels, Schedule and Status. The Channels panel is on the left, and you can display the schedule calendar or status in the panel to the right (schedule shown) by clicking the Panel Selector  menu.

**Channels Panel**—Displays the channels vertically (organized by group/nexus) available on this Live Capture server (see [Monitoring Channel Status](#)). Filter channels by entering a channel name or any part of the channel name.

**Event Schedule Panel**—Displays the events currently scheduled by channel, in calendar format (see [Managing Your Capture Event Schedule](#)).

**Channel Status Panel**—Displays the status of all channels in the selected group/nexus (see [Monitoring Channel Status](#)).

## Showing | Hiding Beta Features

For any given release of Live Schedule, there may be features that are not completely tested, may not be complete or fully implemented, and are not supported—thus, they are considered *beta* features. Do not use beta features in a production environment.

To show beta features, click the main menu:



Select Show | Hide Beta features alternately.

# Creating and Managing Live Capture Events

You create events in Live Schedule to control Live Capture's operation: the time and duration to record on a given channel and where to store the resulting media file. You can add events in two ways: on an event-by-event basis—a one-time event—or as a recurring event; one that repeats on a regular basis for a specified time frame.

By default (set by the event start offset—[Setting the Event Start Offset Time](#)), at two minutes prior to an event, Live Schedule queues the event—and turns the event yellow to indicate the change—locking the channel's live source process.

---



**Note:** The time displayed in the schedule is based on the system time of the server hosting the Telestream Schedule Service. If you are scheduling capture events for another time zone, you should set your server's clock to the time zone where recording occurs or be aware of the delta between the two.

---

- [Adding and Configuring a NewEvent](#)
- [Starting | Stopping | Duplicating | Editing | Deleting an Event](#)

## Adding and Configuring a NewEvent

To add a new event, follow these steps:

1. From the Panel Selector  menu, choose Channels.
2. Click the  icon, located in the far right corner of the Channels panel  
OR  
Double-click on a time block in the schedule (to the nearest 30 minutes) in the Channel's row to display the Add Event panel. (When you add an event in this manner, the Event Name, Channel Group and Channel Name are pre-selected).

---

**Note:** You can add an event to start at any time or on any time block—including a time or time block in the past. However, you can't end an event in the past, because it will never be recorded. If you add an event that starts in the past but ends in the future, it starts immediately when you save the event. Capture events can not exceed 9 hours.

---

Live Schedule displays the Add Event panel:

The screenshot shows the 'Add event' panel with the following fields and options:

- Recurring event:** A toggle switch that is currently turned on.
- Event Name:** A text input field.
- Description:** A text area with a placeholder icon.
- Choose start time:** A time picker showing 15:26:41. Below it, a note says 'Start must be in the future'.
- Choose end time:** A time picker showing 16:26:41. Below it, a note says 'Start must be in the future'.
- Repeat:** A dropdown menu set to 'Daily'.
- Every:** A radio button selected next to 'Every'.
- Day(s):** A text input field containing the number '1'.
- Series start:** A date picker showing 7/29/2021.
- Series end:** A dropdown menu set to 'On end date'.
- Choose end date:** A date picker showing 7/29/2021.
- Channel Group:** A dropdown menu.
- Channel Name:** A dropdown menu showing 'LSL09\_HDD'.
- Source Routing:** A section with two dropdown menus: 'Source 1' and 'Destination 1'.
- Variables:** A link to view variables.
- Labels:** A link to view labels.
- Cancel:** A red button to cancel the event.
- Add:** A blue button to add the event.

### 3. Configure these controls:

**Recurring Event.** Enable to create an event that repeats at regular intervals and configure the recurring settings (marked, below in order of display). Disable to create and configure a single-capture event.

**Event Name** (required). Specifies the display string that identifies this event. Event Name is also passed to the Base name system variable to be used if the Base name is part of a File Name Pattern to control output file name formation.

When you create an event by double-clicking on a channel row, the Event Name is automatically applied and set to [Channel Name]-[Start Time]. This name can be changed if desired.

**Description.** Text to describe this event. Displays on the event, when added to the schedule.

**Choose Start Date** (Single Event Only—required). Specifies the date the event starts, selected from date picker or edited directly. Default: current date.

**Choose Start Time** (Required). Specifies the time in 24 hour format (HH:MM:SS) that the event starts. Default: current time.

**Choose End Date** (Single Event Only—required). Specifies the date the event ends, selected from date picker or edited directly. Default: current date.

**Choose End Time** (required). Specifies the time in 24-hour format (HH:MM:SS) that the event ends. Default: Duration value plus start time. Events can be scheduled for any date/time in the future. Events display in Channel Status until they complete, fail, or are removed by deletion.

You can enter the end time to auto-calculate the duration or manually enter the duration and auto-calculate the end time.

If you create an event with a start time in the past and an end time in the future, Live Schedule creates an event starting at the current time and the capture job starts immediately.

When you create an event by double-clicking on a channel's row, the Start Time is set to the half hour closest to the location on the timeline where you clicked.

**Duration** (Single Event Only—required). Default: 60 minutes. Specifies the duration of the event, in 24 hour format (HH:MM:SS). You can enter the end time to auto-calculate the duration or manually enter the duration and auto-calculate the end time.

**Repeat** (Recurring Events only). Select period of time for recurring event.

**Every** (Recurring Events only). Specifies the number of periods that the event should occur.

**Series Start** (Single Event Only—required). Specifies the date the event series starts, selected from date picker or edited directly. Default: current date.

**Series End** (Single Event Only—required). When On End Date is selected, specifies the date the event series ends, selected from date picker or edited directly. Default:

current date. When After Occurrences is selected, specifies the number of events that should occur before the series ends.

**Channel Group.** Select All, or select the Channel Group to browse. Channel Groups are defined in the Live Capture Nexus panel. This field is completed automatically if you open the Add Event panel by double-clicking on a channel row.

**Channel Name.** Specifies the Channel to utilize. This field is completed automatically if you open the Add Event panel by double-clicking on a channel row.

**Source Routing.** The Source and Destination controls only display when source routing is enabled (see [Using Source Routing](#)). Abutting events (two adjacent events, separated in time by the queue time or less—[Setting the Event Start Offset Time](#)) on a given channel cannot have a routing change: the routing change for a queued event will disrupt the ongoing event.

**Source.** Specifies the input source from your router. Manually enter the source name or select it from the menu. As you begin typing, only those sources that contain the string display, enabling you to quickly identify and select the source that you want to use.

If you have specified a limited list of sources ([Specifying Router Sources](#)), only the selected sources are available. Otherwise, all router outputs are available.

**Destination.** Specifies the label identifying the target of the router.

---

**Note:** If your preferences are set to display variables and labels directly in the dialog (see [Setting Variables and Labels Event Preferences](#)), you can specify the values directly. If the preference is disabled, click the Variables or Labels buttons at the bottom of the dialog to provide the values.

---

**Variables.** If input variables are used in the workflow, supply the value directly or click the Variables button. Live Schedule displays the Variables panel, where you select or enter values for each input variable required in the workflow. Variables can be set at three levels—see [Using Variables in Events](#) for details.

**Labels.** If labels are used in the workflow, supply the values directly or click the Labels button. Live Schedule displays the Labels panel, where you update values for each field in the selected label. You can edit label fields at two levels: At the channel level and the event level—see [Using Metadata Labels in Events](#) for details.

---

**Note:** Variables and labels can only be modified when you adding an event to the schedule or editing an event when it is waiting for execution. Once the event is queued (yellow in the calendar) or triggers a job in Live Capture, you can't update its variables or label fields.

---

4. When configuration is complete, click Add to register this event in the Live Schedule database and display it on the event schedule.

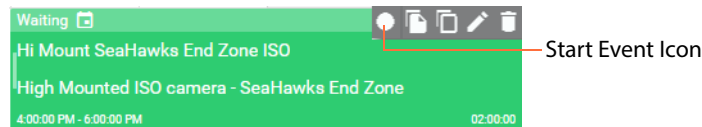
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**Note:** Prior to an event being queued, you can change the start and end times by dragging the Start/End marker to adjust it, or by opening the event and changing the start and end times directly in the panel's controls. If an event is in the Queued or

Recording state, only the end can be modified—the start can only be changed while the event is in the Waiting state. Once an event is added to the schedule, it remains until manually removed.

## Starting an Event Immediately

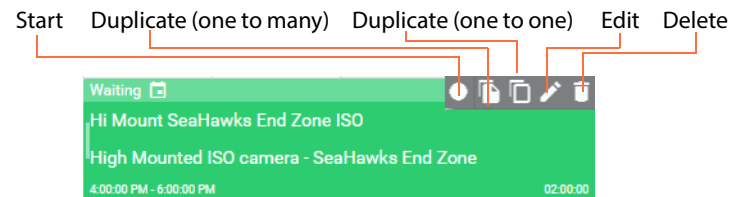
You can start an event immediately directly in Live Schedule. To do so, click on the start icon in the event's toolbar:



After the event is queued for recording, the record icon is removed.

## Starting | Stopping | Duplicating | Editing | Deleting an Event

To perform operations on an event, hover over it to display its toolbar, as shown here:



Click one of the icons to perform these operations:

## Starting an Event Immediately

You can start an event immediately directly in Live Schedule. To do so, click on the start icon in the event's toolbar. After the event is queued for recording, the record icon is removed.



### Stopping an Event

The Stop Event icon is enabled only when the event is in the recording state.

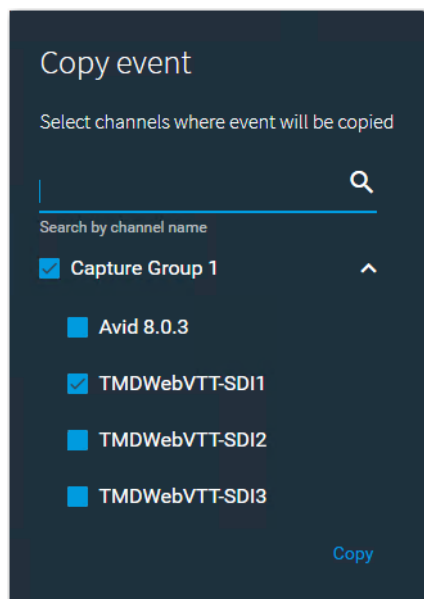
Click the stop icon to stop this event from recording. Live Schedule displays a confirmation panel. Click Yes to stop to confirm or No to cancel.



### Duplicating an Event (One to Many)

Often, when you need a new event, it's so similar to an existing one that it's easier to duplicate the existing event and make minor changes than it is to create a new one from scratch and configure it.

To duplicate an existing event, hover over the event to display its toolbar. Click on the dual-document icon to display the Copy Event panel:



Check the channel(s) where you want to replicate this event, and click Copy. Optionally, you can enter a string in the Search text field to locate an event.

Events that are copied to other channels retain their original parameter values: Start | End | Name | Description | Variable/Label (if present). Now, you can update the new event(s) as required. Also, the event name is updated automatically. You can edit these parameters after you've copied the event to the new channel, depending on the event's current state, of course.



## Duplicating an Event (One to One)

Use a one to one duplication when you want to duplicate this event to the selected channel. Live Schedule displays the Edit panel before the copy is made, to allow changes to a new event, including the group and channel. The new event is created by saving the changes to the Edit form, and the prompt to select multiple channels is not displayed.



## Editing an Event

There are several ways to edit an event when it is in a Wait state:

- Click on the Edit (Pencil) icon in its toolbar
- Double-click the event
- Click either end of the event and drag it laterally in either direction to select one or more adjacent time blocks (which display in purple).

You can change the start and end time of a scheduled event in the same way as CalDAV calendar events. Prior to an event being queued, you can change the Start and End



values by dragging the left and right sides of the event to modify the date/time stamp. The start time may be in the past, but the end time must be in the future. Once an event has been queued in Live Capture or it is already recording, only the End date/time stamp can be modified.

Live Schedule displays the Edit Event panel, which is identical to the Add Event panel ([Adding and Configuring a NewEvent](#)). Review and make changes if required, and click Edit to save it again.

## Moving an Event via Drag and Drop

You can drag and drop events when they are in the Waiting state) to another time slot in the future, or to another source—and automatically update the details. Live Schedule displays the Edit Event panel, where you can make changes or just click Edit to confirm the changes and update the event, re-positioning it in its new location.



## Deleting an Event

Click the X icon to remove the event from the system. You can delete an event in any state. However, if you delete an event during recording, in Workflow Designer, it reports the job as complete.

---

**Note:** When you delete an event during recording, the job is terminated—recording stops—and Workflow Designer reports the job as complete.

---

## Managing Your Capture Event Schedule

The event schedule is presented in calendar format. It displays each event on a channel-by-channel basis (displayed on the far left, in columnar format), using a 24-hour timeline. You can add and edit Live Capture events for each channel, filter events, and navigate through the schedule from day to week to month. Events are color-coded based on the channel they are on.

You can add capture events for any date/time, by selecting a date and time in the Add Event panel. All events display in the schedule unless you delete them.

---

**Note:** You can add an event at any time or on any time block—including a time or time block in the past. However, you can't capture an event in the past, because it will never be recorded. If you add an event that starts in the past but ends in the future, it starts immediately after you save the event.

---

Check or uncheck channel groups or individual channels in the Channel panel to hide or display only the set of channels you want to view events for at the moment. Filter the channels by entering a channel name or part of the name in the text field at the top.

These are the key operational tasks you can perform using the Event Schedule panel:

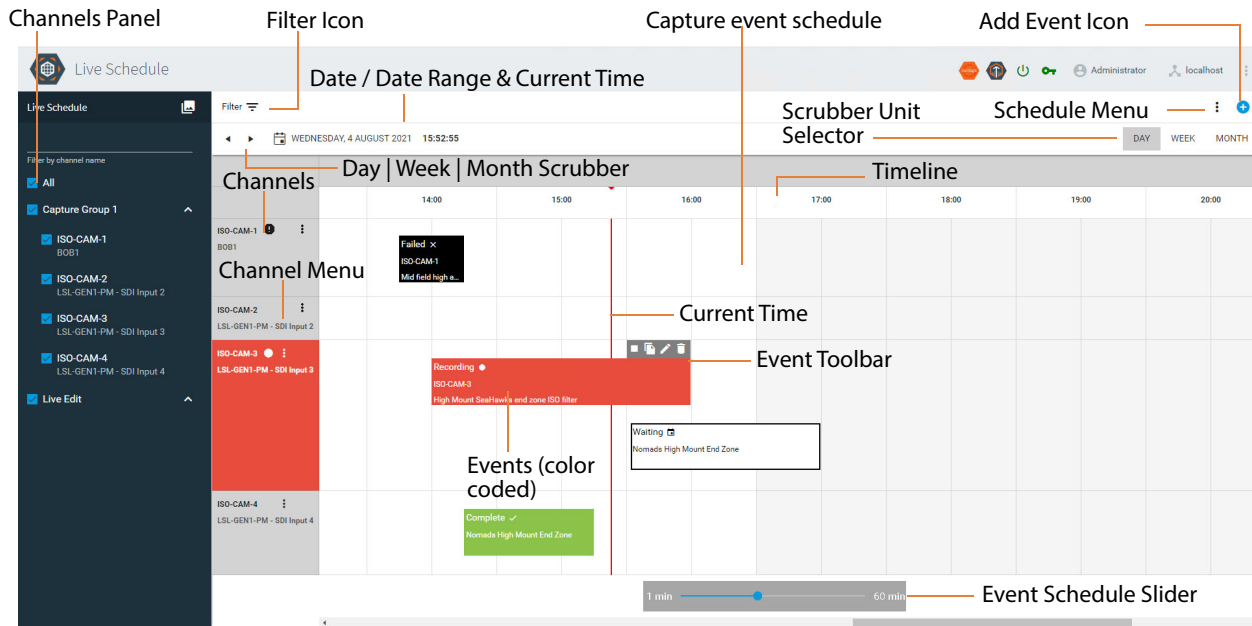
- Select channels for which you want to create recording events.
- Create media recording schedules event by event via a convenient, calendar interface, that triggers recording in Live Capture.
- Add metadata values to each event via variables and labels, which are passed to the Live Capture workflow when recording starts for the designated channel.

### Topics

- [Event Schedule Panel Overview](#)
- [Using the Date/Time Toolbar](#)
- [Using the Event Schedule Panel](#)
- [Setting the Schedule Time Scale](#)
- [Setting the Date Configuration](#)
- [Setting the Default Event Duration](#)

## Event Schedule Panel Overview

This is a typical view of the Event Schedule panel:



**Add Event Icon**—Click the (far right) to display the Add Event panel, where you configure the event you want to create (see [Adding and Configuring a NewEvent](#)).

**Schedule Menu**—Click the to update these settings:

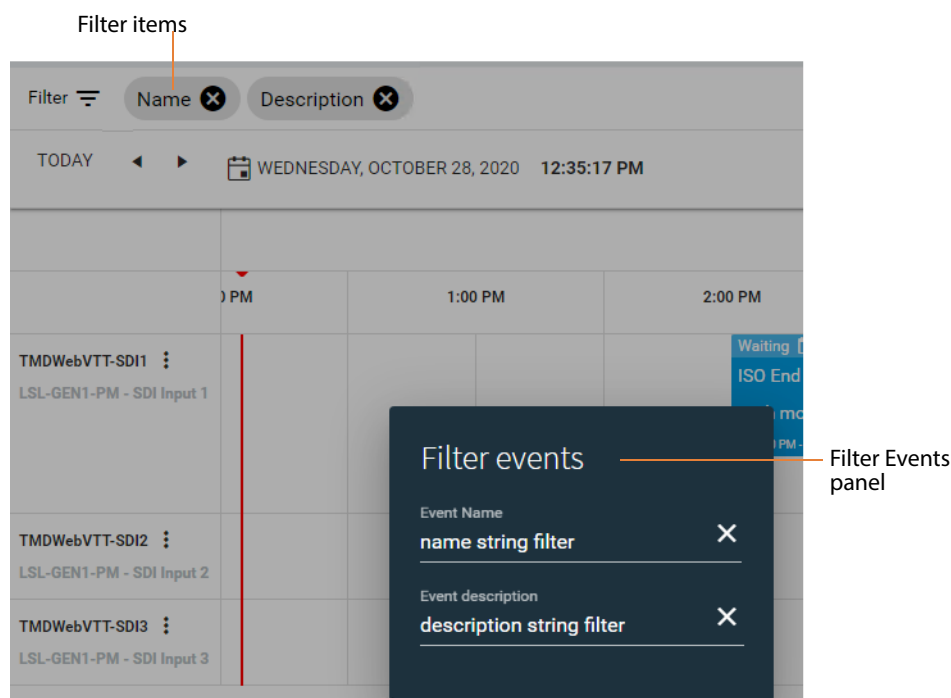
- **Set Variables**—Update runtime values for variables you want to supply to the workflow when an event starts. Common variables can be populated in the same way they're populated in Live Capture. See [Using Variables in Events](#) for details.

**Note:** As you utilize variables in Workflow Designer—for example, adding (or deleting) a variable in a workflow, the list is automatically synchronized in Live Schedule, where you can assign values dynamically for upcoming capture events.

- **Set Schedule Time Scale**—Specify the default time frame of event blocks—effectively, zooming in and out. See [Setting the Schedule Time Scale](#).
- **Set Date Configuration**—Specify how dates and time are displayed. See [Setting the Date Configuration](#).
- **Set Default Event Duration**—Specify the default length (default: 60 minutes) of each event that you create. See [Setting the Default Event Duration](#).
- **Set Interface Preferences**—Show or hide variables and labels in the Add Event dialog. See [Setting the Date Configuration](#).

**Filter Icon**—Enables you to display certain events, by your filter criteria. Displays a panel, where you can enter a string to search for events by event name and/or

description. Live Schedule displays only those events that include the search string somewhere in the text.



As you enter strings in either field, a filter ornament displays to the right of the Filter icon to remind you of the current search criteria. To clear the filter and display all events again, close the filter ornaments or delete the string from the Filter Events panel.

**Event Schedule Slider**—Enables you to zoom in or out on the event schedule's time scale (horizontal) to see the amount of detail you want.

## Using the Date/Time Toolbar

Use the controls in the toolbar to display the time period you want (see image above). You can navigate through the schedule by day, week, or month. Use the horizontal scrollbar at the bottom of the window if window is not sized so that the entire 24-hour period display. (To zoom in and out, see [Setting the Schedule Time Scale](#)).

**Left | Right Arrow Buttons**—Use the Left | Right arrow buttons or the Shift Left | Right arrow keys to jump back and forward by day, week, or month, depending on the time unit you have set.

**Calendar with Date | Date Range**—Displays the current date and time or the start of the period specified, depending on the schedule's timeline mode: Day | Week | Month.

Click the Calendar icon to display a calendar and select a specific day to display. In the calendar, click the TODAY button (top right) to go directly to the current date.

**Current Time**—Click Time of Day to return the schedule to the current date and time.

**Scrubber Time Period**—Click to specify the unit of measurement for the scrubber: day | week | month. Changing this value doesn't zoom in or out on the calendar; it affects the behavior of the scrubber and the calendar's date display.

## Using Source Routing

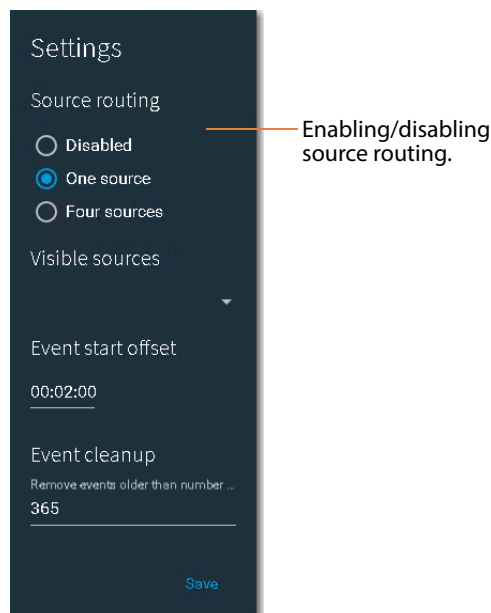
You can utilize SDI source routing when Telestream RouteMaster software is licensed and integrated ([Integrating RouteMaster SDI Router Control](#)).

## Enabling | Disabling Source Routing

To enable (or disable) source routing, click the main menu:



Select Settings to display the Settings panel:



To disable source routing, click Disabled and click Save.

To enable source routing....

Click One Source for single SDI sources

OR

Click Four Sources for QuadLink SDI sources.

When source routing is enabled, Source Routing controls display at the bottom of the Add Event panel, where you can apply routing specifications.

---

**Note:** Abutting events on a given channel—where the beginning of an event is equal to or less than the event start offset beyond the end of the previous event—cannot have a routing change: the routing change for queued event will disrupt the event and stop capture.

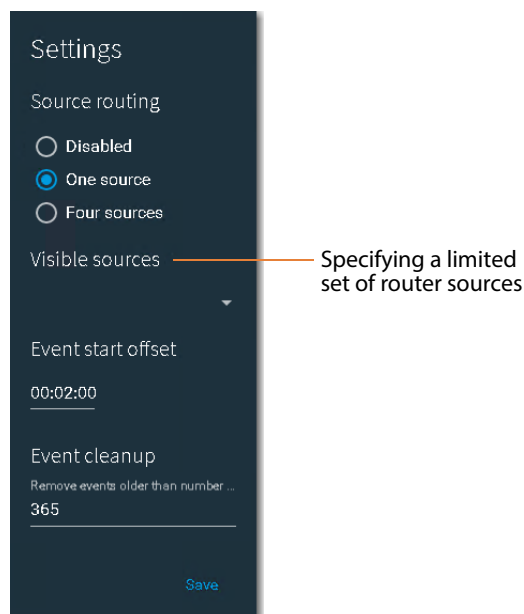
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## Specifying Router Sources

To specify the router sources from which to choose, click the main menu:



Select Settings to display the Settings panel:



To specify a limited set of the router's sources to display in events, click Visible Sources menu and check each source you want to utilize and click Save.

If none are selected, then the entire set of sources is available for selection when you are creating an event.

## Setting the Event Start Offset Time

Events are queued in Vantage by the amount of time specified as the event start offset. The capture services and processes are started at the event time specified minus the event start offset value. The offset value provides enough time to ensure that all

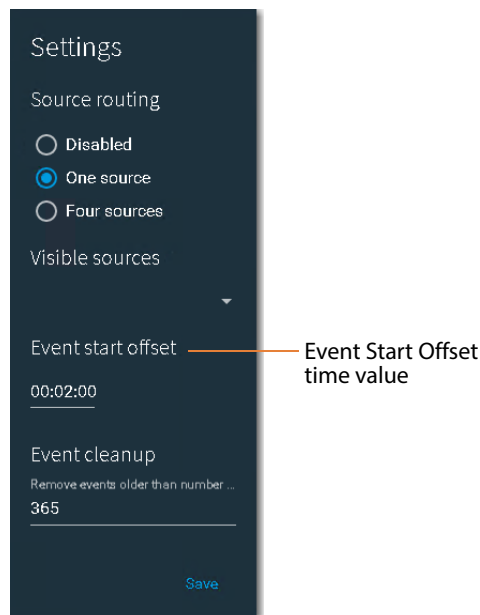
services and processes are started and stabilized, ready to capture at the moment the capture event begins.

The 2 minute default value is often required when multiple events start at the same time. Telestream recommends setting the event offset time to at least 1 minute.

To change the event time offset for each event you create, click the main menu:



Select Settings to display the Settings panel:



The default event start offset value is 2 minutes. To change it, enter a new time value in the Event Start Offset field, and save it.

## Implementing Automated Event Deletion

To adjust how long events remain in the calendar before they are automatically deleted, click the main menu:



Select Settings to display the Settings panel:

Settings

Source routing

☐ Disabled

☒ One source

☐ Four sources

Visible sources

Event start offset

00:02:00

Event cleanup — Event Cleanup period

Remove events older than number ...

365

Save

The default event cleanup value is 365 days. To change it, enter a new value in the Event Cleanup field, and save it. All events older than the new cleanup period are automatically deleted.

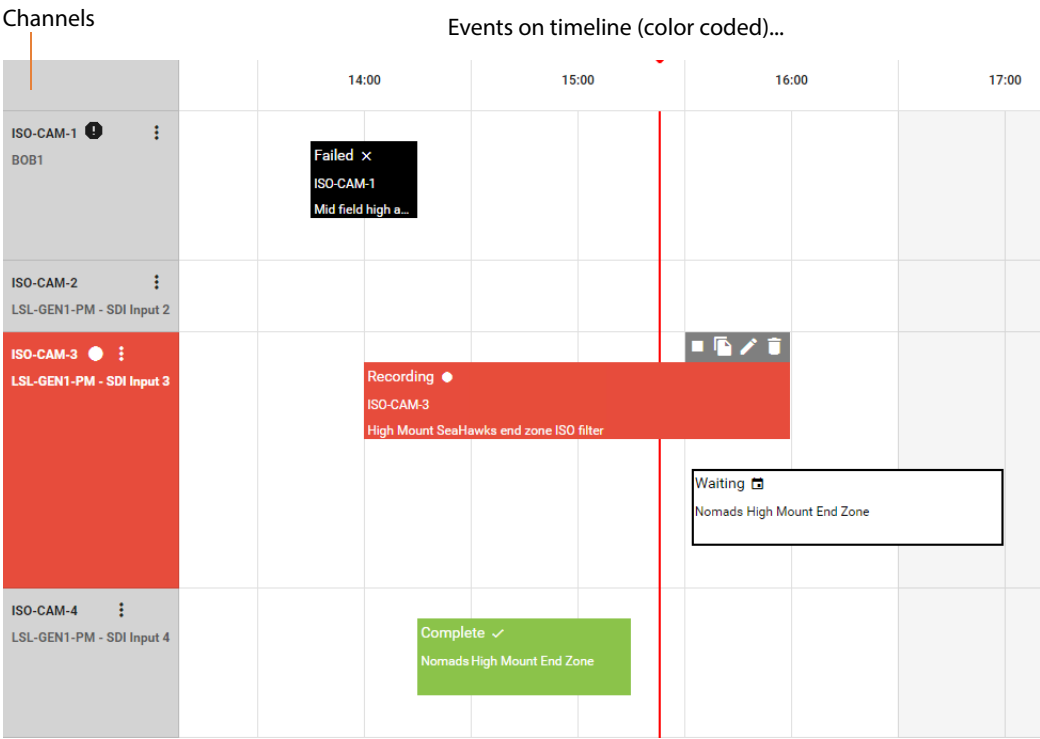
File deletion is performed once every 24 hours, based on the Telestream Live Scheduler Service start time. For example, if the service is restarted at 2:00 PM, each day at 2:00 PM the files that have expired in the past 24 hours are deleted.

## Using the Event Schedule Panel

**Calendar Rows & Columns**—At the far left, your channels display vertically. The Event schedule displays a row for each of the channels in the channel group or individual






channels that have been selected. Each row is divided into time blocks on a 24-hour period and displays events that have been added, by time.



During the time that a channel is queued or recording, the event displays in red. When a channel is waiting, it is gray. If a capture event fails, the channel displays in black. The workflow could also fail without the Capture action failing, in which case the event indicates recording or complete, but the exclamation point displays to indicate a downstream action in the workflow has failed.

The status icon in the header of each event updates in real time, to represent various event, states and status:

Icon	State Description
	Waiting. The event is waiting to be recorded—displays in white.
	Queued. The event is currently in queue—displays in yellow; queued 2 minutes prior to start ( <a href="#">Setting the Event Start Offset Time</a> ).

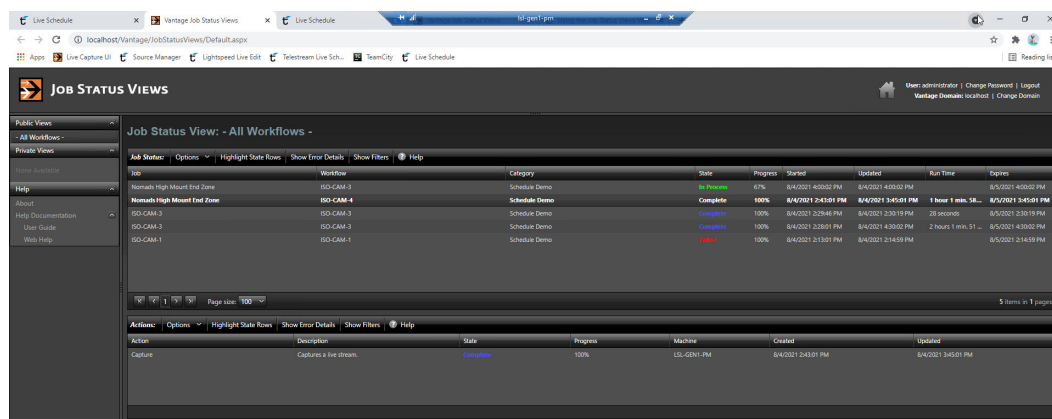
Icon	State Description
	Recording. Currently being recorded—the event displays in red.
	Complete; recording was successful—the event displays in green.
	Failed. Recording was attempted, but failed—the event displays in black.

Once an event is queued, a job has been initiated in Vantage and you can monitor it in the Job Status Views web app, which is accessible from the titlebar:

Click to launch the Vantage Job Status web app.



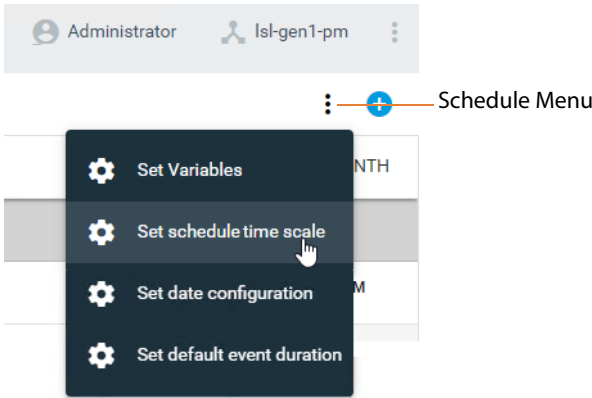
Click the Job Status icon in the toolbar to launch it:



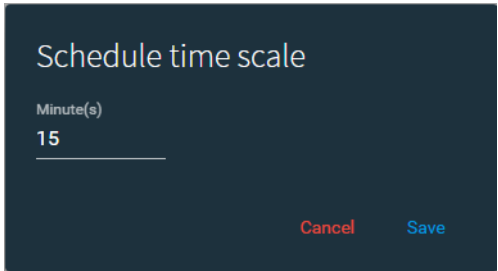
**Note:** You can also monitor the job status directly in Vantage Workflow Designer. See the Vantage User Guide for information on monitoring jobs.

## Setting the Schedule Time Scale

To view a longer or shorter time frame in the Event Schedule panel, select Set Schedule Time Scale from the Schedule menu :



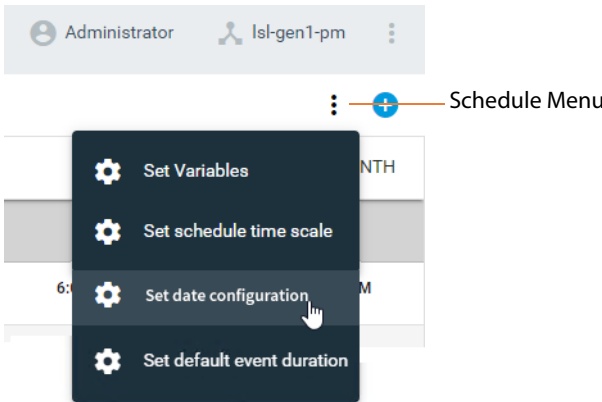
Live Schedule displays the Schedule Time Scale panel:



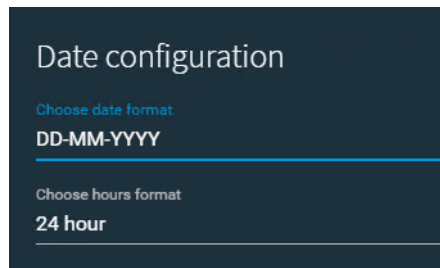
You can set the default cell scale from 1 to 60 minutes, effectively zooming in or out on the schedule, so that you view a narrower or wider span of time.

## Setting the Date Configuration

To change how dates and time are displayed in Live Schedule, select Set Date Configuration from the Schedule menu :



Live Schedule displays the Date configuration panel:



You can set the date format to MM-DD-YYYY or DD-MM-YYYY. The date is displayed in your specified format at the top of the schedule.

You can also set the hour format to 12 hour or 24 hour, which also displays in the hour column headers at the top of the schedule. For example, with a 12 hour format, Live Schedule display 1 o'clock as 1:00 PM; in 24 hour format it displays as 13:00.

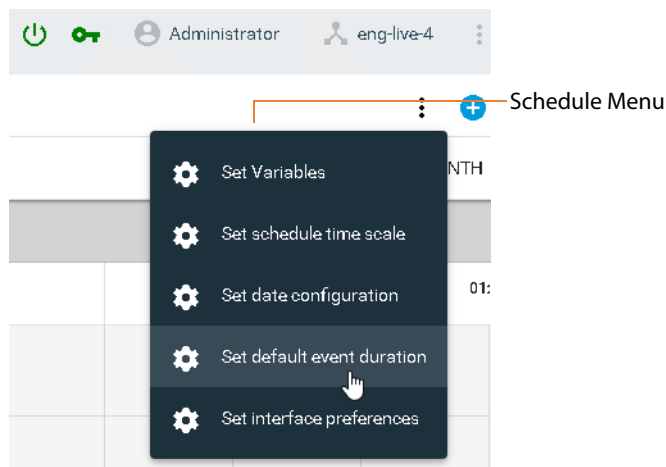
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**Note:** 24-hour time is always used for an Event's Start and End times.

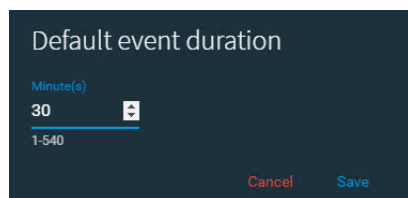
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## Setting the Default Event Duration

To change the default duration of each event you create, select Set Default Event Duration from the Schedule menu :



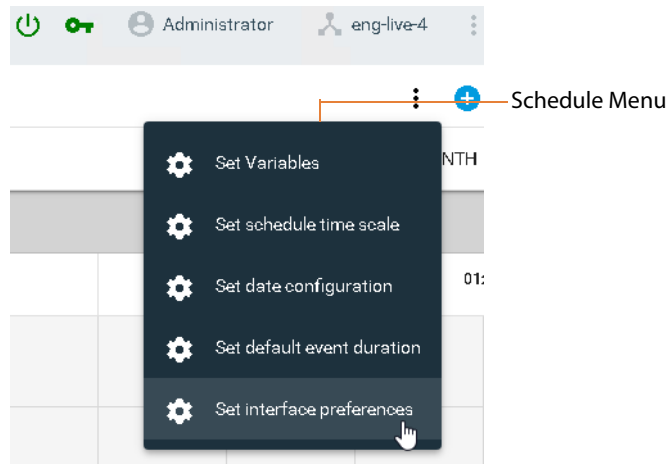
Live Schedule displays the Default Event Duration panel:



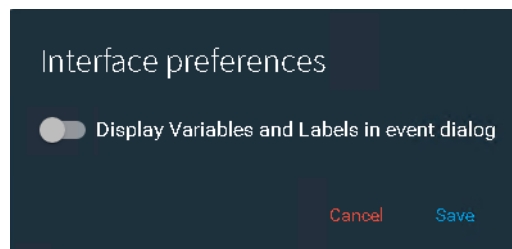
Enter the number of minutes for the default event duration and click Save.

## Setting Variables and Labels Event Preferences

To change the default variable and label event preferences, select Set Interface Preferences from the Schedule menu :




Live Schedule displays the Interface Preferences panel:



Enable or disable Display Variables and Labels in event dialog. When enabled, all input variables and labels are displayed directly in the Add Event | Edit Event dialog. When disabled, to view and update variables and labels, you click the Variables and Labels buttons at the bottom of the Add Event dialog. (See [Adding and Configuring a NewEvent](#)).

## Monitoring Channel Status

You use the Status panel to monitor your channels and their events. To display the Channel Status panel, click the Panel Selector  menu in the Channels panel and select Status.

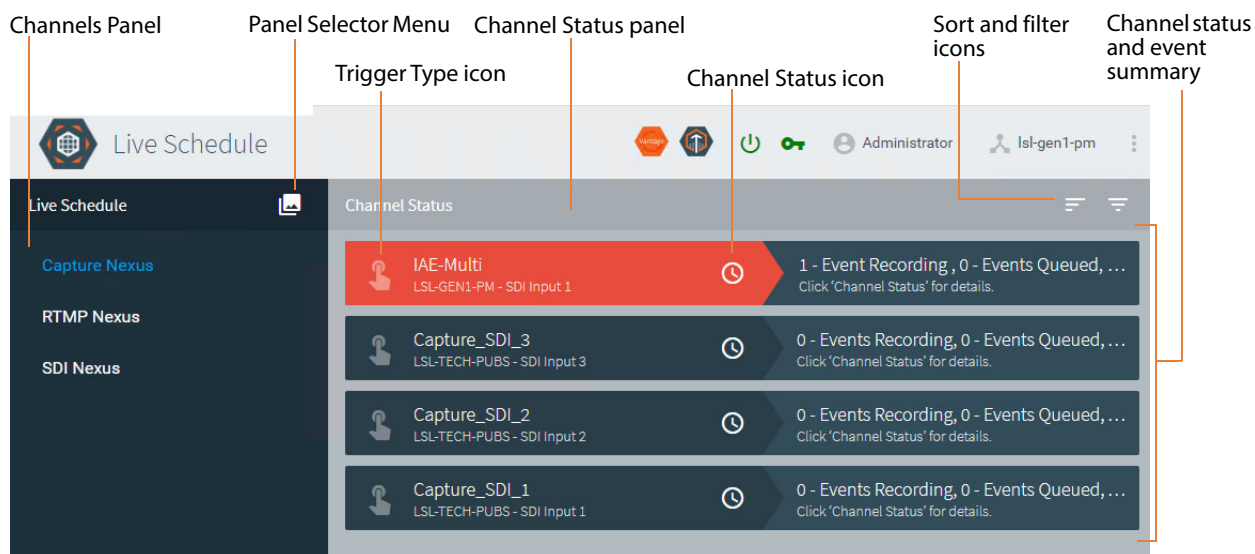
- [Status Panel Overview](#)
- [Viewing Channel Status and Summary Information](#)

## Status Panel Overview

Display the Status panel and select a channel group, which displays in blue when selected. Live Schedule displays the selected group's channels, with a summary of their capture events.

You can also view each channel's upcoming events and current/completed jobs in detail. Select a channel group to display all of its channels in the Status panel, to the right, as shown here:

Channel event statistics are summarized in this panel:

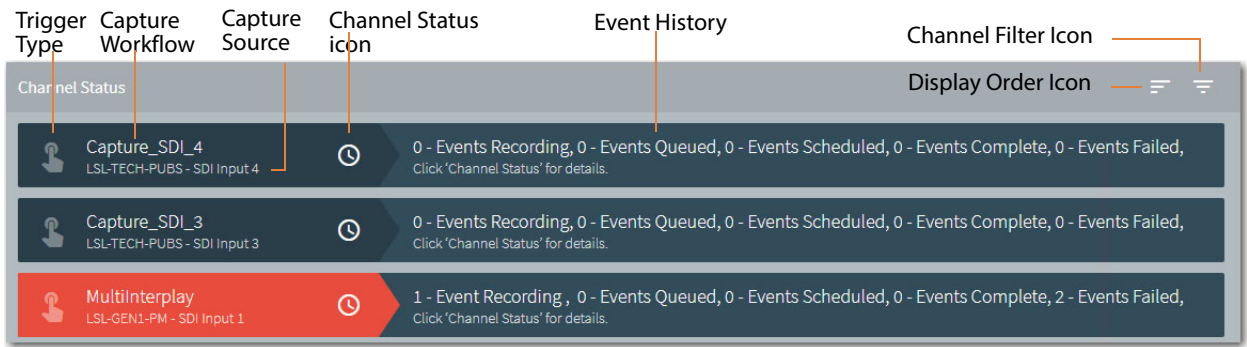


**Channels Panel**—Displays all of the channel groups defined in Live Capture. When displaying the Status panel, choose a channel group to display its active workflows in the panel, as shown above.

**Channel Status Panel**—Displays all active channels associated with the selected channel group.

## Viewing Channel Status and Summary Information

You can use the Channel Summary panel to view event statistics and event details, on a channel-by-channel basis.



For each active channel, Live Schedule displays the name of the Live Capture workflow, and below it, the source input associated with this channel’s workflow. Event statistics are also summarized in this view. Channels currently recording display in red.

The channel is identified by the name of its workflow, followed by the source input (below) associated with the channel.

**Note:** If a channel is not listed, it is likely that the workflow is not in an Activated state or the Capture action is not configured to use a Manual or Web Service trigger. Verify this by opening the Workflow Designer and select the workflow to check its current state or review the Capture action’s trigger type.

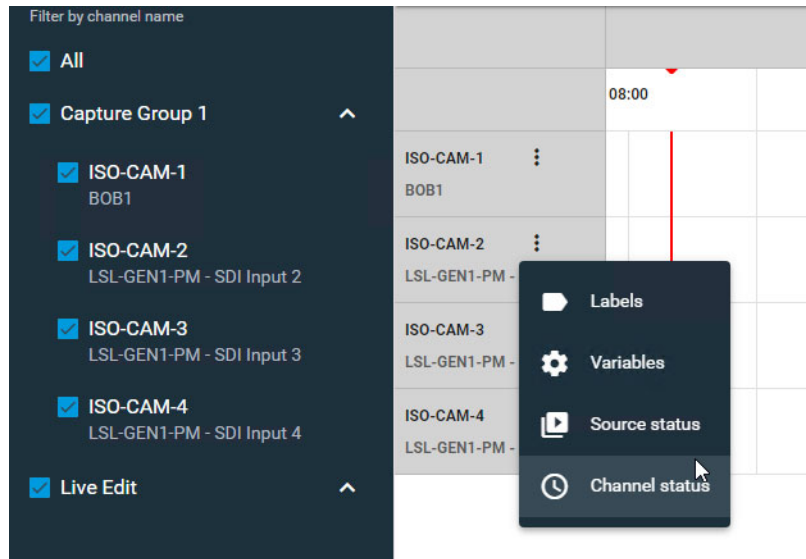
**Trigger Type**—Type of trigger, as specified in the Live Capture workflow:


Icon	Trigger Type
	Manual Trigger
	Web Service Trigger

**Capture Workflow/Capture Source**—The channel is identified by the name of its workflow, followed by the input source associated with the channel.


**Channel Status**—Click the Channel Status icon on a channel to display all of its scheduled events and recording jobs with details—[Viewing/Updating Events | Jobs by Channel](#).

You can also view events and recording jobs in the Event Schedule panel—Select Channel Status from the Channel menu of the channel you’re using:




**Display Order Icon**—Click the  icon in the Channel panel’s toolbar at the right, and choose how to order the channels in this table:

- **Channel Name**—Displays the active channels in alphabetic, ascending order by channel name.
- **Trigger**—Displays the active channels order by the workflow’s trigger type: Manual | Web Service.

**Channel Filter Icon**—Click the  icon in the Channel panel’s toolbar at the right, and enter a string to filter the channels in this table.

**Event History**—Displays the total number of jobs that are recording, queued, scheduled, complete, and failed for this event.

## Viewing/Updating Events | Jobs by Channel

Click the  icon on a channel to display the Channel Status panel with all of its events with details, plus source status information.

The Channel Status panel displays events that are scheduled in Live Schedule in the upper, Scheduled Events table. The Recording Jobs table, located directly below the Scheduled Events table, displays recording jobs that are either underway or completed.

Recording jobs displays a history of all jobs that have been recorded on the channel—not just those scheduled in Live Schedule. This table includes recordings submitted from all interfaces—Live Schedule, API submission, SCTE-104, and crash recordings.



Jobs are purged based on expiration rules in Vantage. For details, see the Vantage User's Guide.

The screenshot shows the 'Channel Status - SchedTest' interface. It contains two main tables: 'Scheduled events' and 'Recording jobs'. The 'Scheduled events' table has columns for Name, Description, Duration, Start, and End. The 'Recording jobs' table has columns for Name, Duration, Primary Output, and Secondary Output. Annotations with orange lines point to the 'Paging Toolbar' (located at the bottom right of the 'Scheduled events' table) and 'Tools' (located at the bottom right of the 'Recording jobs' table).

Name	Description	Duration	Start	End
SchedTest-1:30:00 PM	Recurring Event	01:30:00	1:30:00 PM 2/7/2021	3:00:00 PM 2/7/2021
SchedTest-1:30:00 PM	Recurring Event	01:30:00	1:30:00 PM 2/6/2021	3:00:00 PM 2/6/2021
SchedTest-1:30:00 PM	Recurring Event	01:30:00	1:30:00 PM 2/5/2021	3:00:00 PM 2/5/2021
SchedTest-1:30:00 PM	Recurring Event	01:30:00	1:30:00 PM 2/4/2021	3:00:00 PM 2/4/2021

Name	Duration	Primary Output	Secondary Output
SchedTest_LSL-PLAYOUT - SDI Input 1	09:00:00 00:00:00:02 to 09:00:00:02	SchedTest_LSL-PLAYOUT - SDI Input 1.mxf \\isl-playout\0\Vantage\Capture\071d0ef4-57e4-4...	
SchedTest_LSL-PLAYOUT - SDI Input 1	09:00:00 00:00:00:02 to 09:00:00:02	SchedTest_LSL-PLAYOUT - SDI Input 1.mxf \\isl-playout\0\Vantage\Capture\02a0e5de-631b-...	

Page through the tables using the paging toolbar, at the bottom right of each table.

### Scheduled Events Table

Each event is listed by the current event state, current Vantage job state, name, description, duration, with start and stop times. Icons in the first two columns indicate the current state of each event.

When an event is in the Waiting state, its record is stored in the Live Schedule database. However, when an event starts—initiating a job in Live Capture—as it transitions through the Queued, Recording, and finally, Complete | Failed state—the job is stored in the Vantage database and is only removed when the job expires or is manually removed.

**Capture State**—Indicates the real time state of the capture process (represented by the Capture action itself) for this channel's recording job:


Icon	Recording State
	The current recording is complete.
	In an idled state, either queued for or stopping recording.
	Recording is in progress.
	Recording has failed.

**Deleting an Event**—The Delete (garbage can) icon is active when an event is in the Waiting state. You can delete the event only during this state.

**Modifying an Event**—The edit (pencil) icon is active when an event is in the Waiting state, or the job is Queued | Recording. You can click the edit icon to modify the event/job only during these states.

**Recording Jobs Table**

Each completed job is listed by name, and includes duration, plus the file name and URL of the primary output, and secondary output if specified in the Capture workflow.

**Previewing Output**—To preview the primary or secondary output, click the  icon.

**Modifying a Job**—The edit (pencil) icon is active when you’re running a job. If the job was started by Live Schedule, you can modify the end time, end date and description.


**Viewing/Updating Source Status by Channel**

Source status includes a snapshot of the timecode (updated every 2 seconds), the presence of a signal, frame resolution rate, and bit depth, number of audio channels and whether captions are present or not. A thumbnail is also provided.

Source status

Timecode	Signal	Resolution	Frame Rate	Bit Depth	Audio Channels	Captions
08:17:03:29	Yes	1920x1080i	29.97	8	16 Ch.	No

Source thumbnail



Page through the tables using the paging toolbar, at the bottom right of each table.

SCHD-535Viewing a Channel’s Recording History

The Recordings panel provides information about the selected channel—queued, in-process, stopped, or completed—and enables you to copy the output path to your clipboard for use in other applications, such as a web browser or video player.

**Note:** Status details for Vantage Capture workflow can also be found in the Job Status Views web app. See [Using the Vantage Job Status Views Web App](#).

You can not use multiple Capture actions in a workflow—inaccurate state information is displayed reported for the workflow Status in the thumbnail card and Status Panel.





Recordings				
Capture State	Job State	Name	Duration	Primary Output
		1600	00:30:00 16:00:00:00 to 16:30:00:00	
		1530	00:30:00 15:30:00:00 to 16:00:00:00	1530_820.mxf \\fl-pm\D\Live Store\4f523296-3051-4e... 
		1500	00:20:50 15:00:00:00 to 15:30:00:00	1500_494.mxf \\fl-pm\D\Live Store\315d7163-4cf4-42... 
		Bob123456	00:30:00 15:00:00:00 to 15:30:00:00	
		Bob11234	00:14:59 14:15:00:00 to 14:30:00:00	Test Workflow SDI 4a_LL-PM - SDI ... \\fl-pm\D\Live Store\ae5a9c84-5f72-424... 

The Recordings panel displays information in columns, described here:

**Capture State**—Indicates the real time state of the capture process (represented by the Capture action itself) for this channel’s recording job:


Icon	Recording State
	The current recording is complete.
	In an idled state, either queued for or stopping recording.
	Recording is in progress.
	Recording has failed.


**Vantage Job State**—Indicates the real time state of the capture workflow’s job in Vantage (which is set by the state of all actions in the workflow):

Icon	Job’s Workflow State
	The workflow’s job completed successfully.
	The job is waiting or in progress.
	The job has been stopped by the user.
	The job failed. Check the Job Status View for details of failed jobs. See <a href="#">Using the Vantage Job Status Views Web App</a> .

**Name**—Displays the job name. The name varies for different trigger types and can include information such as Base Name, workflow name, or capture start time entries.

**Duration**—The amount of time specified to record, or the final time recording occurred.

**Primary Output**—The primary output file name and location path. Click the  icon to copy the output path to your clipboard. You can paste the copied path into Windows File Explorer, then log into the Lightspeed Live Server to open the file with an appropriate application.

**Secondary Output**—The secondary output file name and location path. Click the  icon to copy the output path to your clipboard.

## Using Variables in Events

Variables enable you to assign metadata values dynamically when you create an event, for use in your Live Capture workflows on a job-by-job basis, as required.

---

**Note:** Schedule and Channel level variables and labels are used as templates when you add an event. Live Schedule sets the variables and labels from the templates available when the event is created. Existing (those already on the calendar) events' variables and labels are not modified when channel or schedule level variables and labels are later changed.

---

Before you can assign values to variables in Live Schedule, you must create a Live Capture workflow, add the variables as appropriate to your workflow actions, and activate the workflow.

---

**Note:** Variables that are bound to a control in Capture workflow actions or manually added to a workflow are automatically displayed in Live Schedule so you can set their value when you add the event.

---

Variables can be updated at three levels:

- Schedule level—all future events that created inherit the value assigned unless you override it at a lower (channel or event) level (see [Setting Schedule-level Variables](#)).
- Channel level—events that are created for this channel inherit the value assigned unless you override it at the event level (see [Setting Channel-level Variables](#)).
- Event level—The value assigned to variables directly on an event apply only to the individual event, overriding any schedule- or channel-level variable values. (See [Setting Event-Level Variables](#)).

If you don't assign values using at least one of these methods in Live Schedule, the default value (if any) of the variable in Live Capture is used. You should always set a default value for a variable—otherwise, no value may be assigned in Live Schedule either, and may lead to workflow error, resulting in a capture failure.


Variables can be populated in Live Schedule in the same way that they are populated in Live Capture. For information on creating and managing variables for use in your workflows, read [Creating Labels and Variables for Use in Workflows](#).

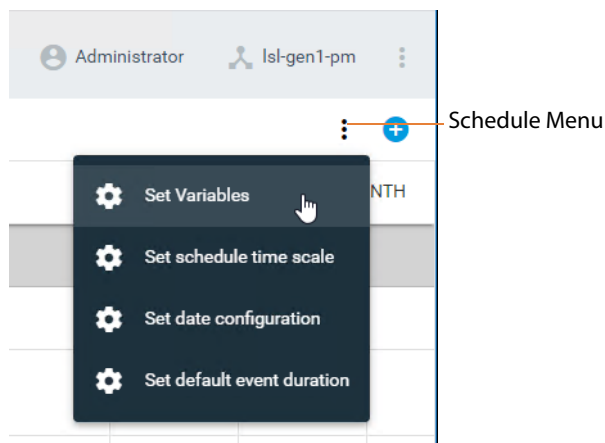
## Setting Schedule-level Variables

When you have a variable for which you use the same value for every event you create, you can set it once at the schedule level, instead of setting it in each individual event. Schedule-level variables override the default variable value's specified in Vantage.

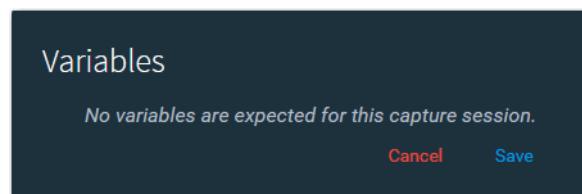
**Note:** When you use this variable in any event, it inherits the schedule-level value automatically when the event is created. You can override a schedule-level variable at the channel level ([Setting Channel-level Variables](#)), or you can edit it directly in the event itself ([Setting Event-Level Variables](#)).

Schedule-level variable values only are valid for the duration of your Web browser session. When you close your web browser window or log out of Live Schedule, these settings are lost and must be re-entered next time you log in.

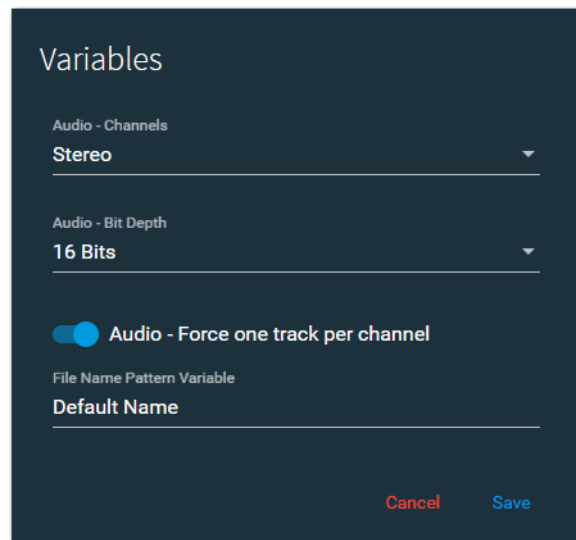
To update variables at the schedule level, display the Event Schedule panel, click the Schedule menu  and select Set Variables:



When Live Schedule displays the Variables panel as shown here—with no variables—it means that the workflow you are using for this event has no variables in it. Return to Workflow Designer and update your workflow with the required variables.



Live Schedule displays the Variables panel with all variables and current values in the workflow being utilized:



The screenshot shows a dark-themed 'Variables' panel. It contains the following elements:

- A dropdown menu for 'Audio - Channels' with 'Stereo' selected.
- A dropdown menu for 'Audio - Bit Depth' with '16 Bits' selected.
- A toggle switch for 'Audio - Force one track per channel' which is currently turned on (blue).
- A text input field for 'File Name Pattern Variable' containing the text 'Default Name'.
- At the bottom right, there are two buttons: 'Cancel' (in red) and 'Save' (in blue).

Locate each variable you want to update, enter/update the value, then click Save.


These values are inherited by all future events you create, but may be overridden at the channel or individual event level.


## Setting Channel-level Variables

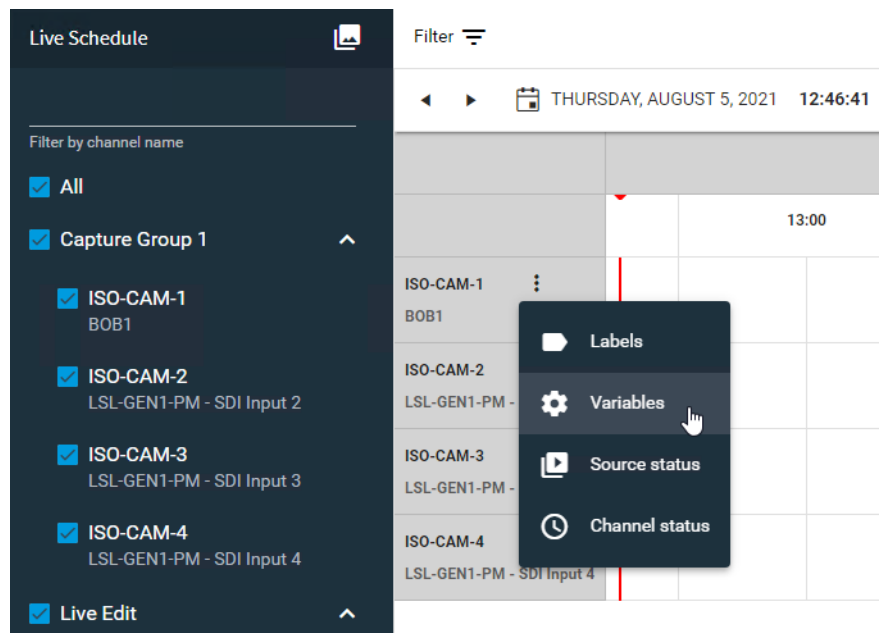
When you have one or more variables for which you want the same value for every event on a specific channel, you can set it once at this level, instead of setting it in each individual event.

**Note:** When you use this variable in an event for this channel, it inherits the channel-level value automatically when the event is created. Channel-level variables override schedule-level variables of the same name. You can override a channel-level variable by editing it directly in the event.

Schedule-level variable values only are valid for the duration of your Web browser session. When you close your web browser window or log out of Live Schedule, these settings are lost and must be re-entered next time you log in.

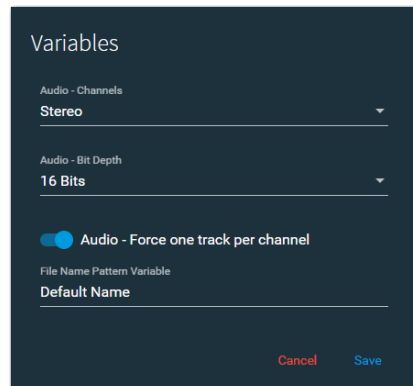
To update variables at the channel level for use in all future events in this channel, display the event schedule (from the Panel Selector  menu and choose Schedule).

Click the Channel menu  on the target channel and select Variables:

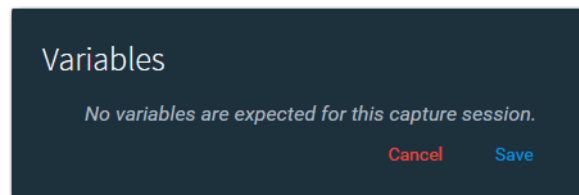




Live Schedule displays the Variables panel:

A screenshot of the 'Variables' panel in a software interface. The panel has a dark blue background with white text. At the top, it says 'Variables'. Below this, there are two dropdown menus: 'Audio - Channels' with 'Stereo' selected, and 'Audio - Bit Depth' with '16 Bits' selected. Below these is a toggle switch labeled 'Audio - Force one track per channel' which is currently turned on. At the bottom, there is a section for 'File Name Pattern Variable' with a text input field containing 'Default Name'. At the very bottom right, there are two buttons: 'Cancel' in red and 'Save' in blue.


When Live Schedule displays the Variables panel as shown here—with no variables—it means that the workflow you are using for this event has no variables assigned. Return to Workflow Designer and update your workflow.

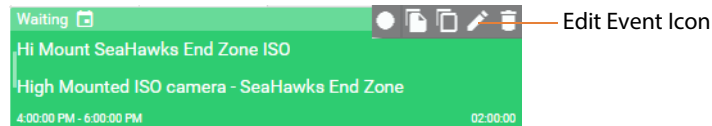
A screenshot of the 'Variables' panel showing a message: 'No variables are expected for this capture session.' Below the message are two buttons: 'Cancel' in red and 'Save' in blue.

Select each variable you want to update in turn, enter/update the value and click Save. These values are inherited by each event you create for this channel, but may be overridden at the individual event level.

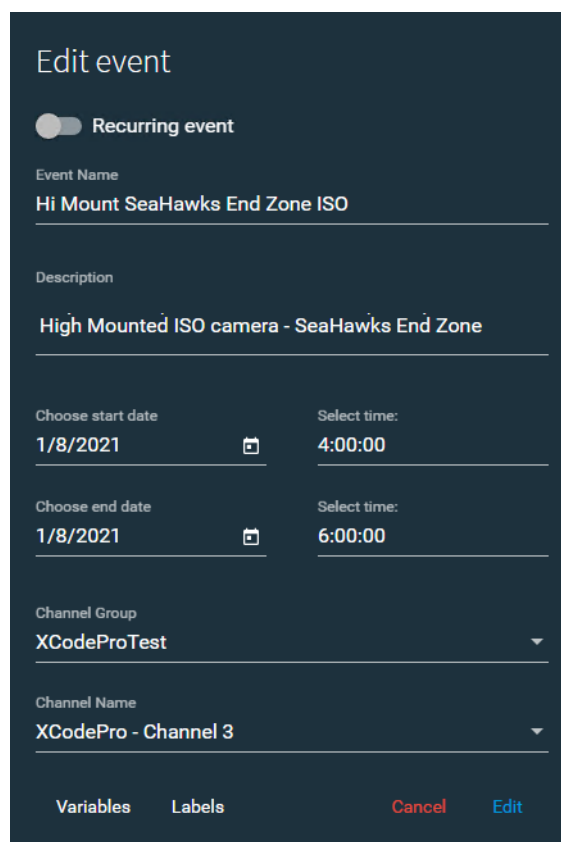
## Setting Event-Level Variables

Event-level variables override all other settings (default, schedule, and channel level.)

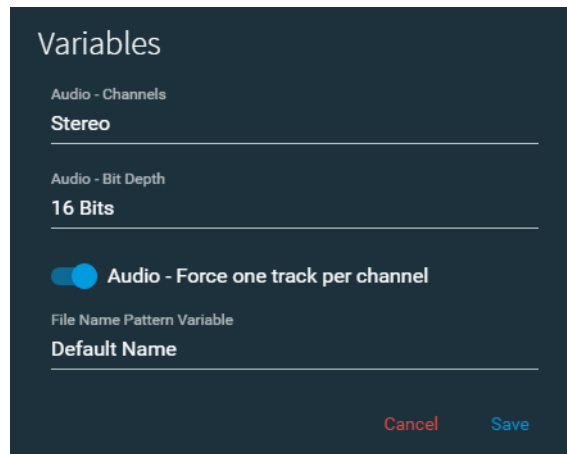
To update variables on a specific event which you've already created, hover over the event and click the Edit  icon in the toolbar.



Live Schedule displays the Edit Event panel—click Variables (bottom left corner):

A screenshot of the 'Edit event' panel. The title is 'Edit event'. There is a toggle switch for 'Recurring event'. The 'Event Name' field contains 'Hi Mount SeaHawks End Zone ISO'. The 'Description' field contains 'High Mounted ISO camera - SeaHawks End Zone'. Below these are two rows for scheduling: 'Choose start date' with '1/8/2021' and a calendar icon, and 'Select time:' with '4:00:00'; and 'Choose end date' with '1/8/2021' and a calendar icon, and 'Select time:' with '6:00:00'. Below the scheduling fields are two dropdown menus: 'Channel Group' with 'XCodeProTest' and 'Channel Name' with 'XCodePro - Channel 3'. At the bottom are four buttons: 'Variables', 'Labels', 'Cancel', and 'Edit'.

Live Schedule displays the Variables panel:

A screenshot of the 'Variables' panel in a software interface. The panel has a dark blue background with white text. It contains four sections: 'Audio - Channels' with a value of 'Stereo', 'Audio - Bit Depth' with a value of '16 Bits', 'Audio - Force one track per channel' with a toggle switch turned on, and 'File Name Pattern Variable' with a value of 'Default Name'. At the bottom right, there are two buttons: 'Cancel' in red and 'Save' in blue.

Variables

Audio - Channels  
**Stereo**

Audio - Bit Depth  
**16 Bits**

☒ Audio - Force one track per channel

File Name Pattern Variable  
**Default Name**

Cancel Save

Select each variable you want to update in turn, and enter/update the value in the field, then click Save. This value overrides values entered at the schedule and channel level.

When you're done updating variables, click Edit to update the event.

## Using Metadata Labels in Events

Labels enable you to collect and organize metadata associated with an event (typically by updating the individual fields in the label in the Capture action or via variables during execution of the Capture workflow), and then store the labels permanently with its media for utilization after the job ends.

---

**Note:** A practical example of updating a label here in Live Schedule, and submitting it to the Capture workflow for use during the job is illustrated in [Prototype Capture Workflow—Labels & Variables](#).

---

Metadata labels are similar to variables in that you can attach a label(s) to an event, and then, on a job-by-job basis, provide unique values for fields in the label. You can also save the label along with the output of your workflow in a catalog, for use in other workflows or for use externally, in other systems.

---

**Note:** Labels and variables can be updated prior to adding an event to the schedule or while the event you added is in the Waiting state.

---

Labels can be edited at two levels:

- Channel-level—all events on this channel inherit the assigned value, and it may be overridden by a specific event ([Setting Channel-level Labels](#)).
- Event level—This event uses the values in the assigned metadata label ([Setting Event-level Labels](#)).

If you don't update fields in a label using at least one of these methods in Live Schedule, the default value (if any) in the label specification in the Capture action is used. If no value is assigned, it may lead to an error in your workflow.

For information on creating and managing labels for use in your workflows, read [Creating Labels and Variables for Use in Workflows](#).

Before you can modify label fields in Live Schedule, you must create a Live Capture workflow, create the label or select an existing one in your domain, add the labels as appropriate to your workflow actions, and activate the workflow.


---


**Note:** As you manage labels in Live Capture, they are automatically updated in Live Schedule so that you can apply run-time values dynamically.

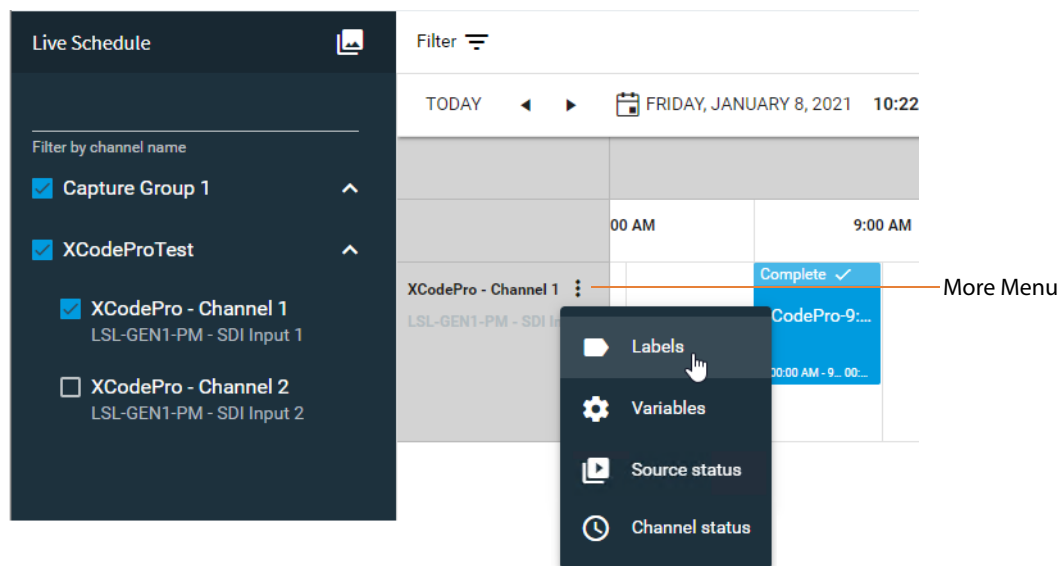
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## Setting Channel-level Labels

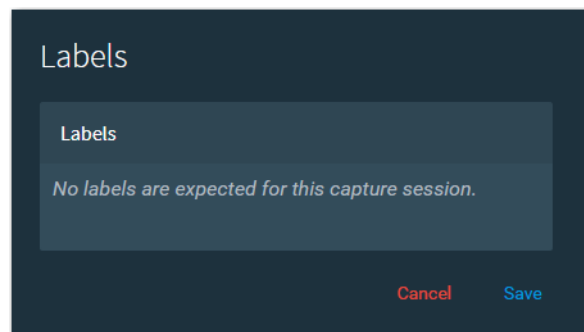
Channel-level labels override the label's default settings in Vantage.

To update labels at the channel level, in the Panel Selector  menu, choose Schedule to display the Event Schedule panel.

Locate the channel with the label to update, click the Channel menu  and select Labels:



If Live Schedule displays the Labels panel as shown here—with no labels—it means that the Capture workflow you are using for this event has not been configured to expect any labels. Return to Workflow Designer and update your workflow.




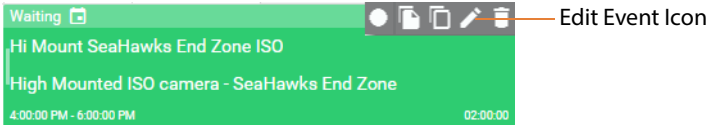
Live Schedule displays the Labels panel and all labels in the workflow being utilized:

The screenshot shows a dark-themed interface titled "Labels". On the left, there is a list of labels: "Labels" (header), "Live Schedule" (highlighted with a blue bar), and "Example Label". On the right, there is a configuration area for the selected label. It shows "Category A" with an upward arrow, "Parameter 1" with a dropdown menu showing "Value 1", "Category B" with a downward arrow, and "Delivery Location" with a downward arrow. At the bottom right, there are "Cancel" and "Save" buttons.

Select each label in turn that you want to update, locate each field, enter/update the value, and then click Save. These values are inherited by all future events you create, but may be overridden at the individual event level.

## Setting Event-level Labels

To update a label’s fields on a specific event, hover over the event and click the Edit  icon in the toolbar.



Live Schedule displays the Edit Event panel—click Labels at the bottom left:

Edit event

Recurring event

Event Name

Hi Mount SeaHawks End Zone ISO

Description

High Mounted ISO camera - SeaHawks End Zone

Choose start date

1/8/2021

Select time:

4:00:00

Choose end date

1/8/2021

Select time:

6:00:00

Channel Group

XCodeProTest

Channel Name

XCodePro - Channel 3

Variables

Labels

Cancel

Edit

Live Schedule displays the Labels panel and all labels in the workflow being utilized:

Select each label in turn that you want to update, locate each field, enter/update the value, then click Save.

## Accessing Application Information | Users Guide | Help | Legal Documents & Contacting Telestream

Click the main menu and select About to display the Live Schedule information panel:

### Application

**Version.** Displays the version of Live Schedule you are using.

### Documents

**User Guide.** Displays the Live Capture User Guide (this document) in PDF format. This guide is also published on the [Telestream web site](#) and on the Lightspeed Live installation USB drive.

**License Agreement.** Displays the Telestream license agreement.



**Attribution.** Displays third party licenses.

### Contact Us

Use these methods to communicate with Telestream. See also [Obtaining Support | Information | Assistance](#).

## Using the Live Schedule API

You can use the Live Schedule API to create and manage events from your own system or program. The Lightspeed Live Schedule Web API enables scheduling, management, and query of capture events to be controlled manually via the web service. The Live Schedule web API is implemented in the Telestream Schedule Service.

The Lightspeed Schedule web API is described at `http://<LSL_Server>:6500/swagger/index.html`, where `<LSL_Server>` is the Windows domain name of the Lightspeed Live Server.

For example: `http://lsl-capture-server:6500/swagger/index.html`.

## Managing System Logs

Lightspeed Live Schedule log files can provide valuable information about various Live Schedule operations.

The log files are intended for use by Telestream Customer Service to troubleshoot problems. Consider obtaining the log files before contacting Customer Service so you can email them to Telestream as part of the support process.

Here's how to access the logs and control the level of information that is recorded.

## Controlling Logging Settings

The information written to the log files can be changed by editing settings in the configuration file: `C:\Program Files\Telestream\Scheduler\appSettings.json`.

---

**CAUTION:** Before making changes to configuration files, make backups by copying the existing file and saving it in a safe location.

---

To change trace logging, change the minimum log level in the Serilog block:

```
"Serilog": {  
  "MinimumLevel": {  
    "Default": "Information"
```

Change the Default key-pair value to one of the keywords below and restart the Telestream Live Schedule Service. You can also override specific components, as listed.

Keywords (from most restrictive to most verbose):

- *Fatal*: The most critical level; logs fatal events that demand immediate attention.
- *Error* (default): When functionality is unavailable or expectations broken.
- *Warning*: When service is degraded, endangered, or may be behaving outside of its expected parameters.
- *Information*: Information events describe things happening in the system that correspond to its responsibilities and functions. Generally these are the observable actions the system can perform.
- *Debug*: Debug is used for internal system events that are not necessarily observable from the outside, but useful when determining how something happened.
- *Verbose*: Verbose is the noisiest level, rarely (if ever) enabled in production.

## Accessing Live Schedule Log Files

Live Schedule log files, by default, are written to `C:\ProgramData\Telestream\Scheduler\`.

# Lightspeed Live Server Resource Requirements

This chapter provides information to help you calculate Lightspeed Live Capture resource usage. General information is provided, as well as platform-specific resource usage guidelines.

Lightspeed Live Capture uses a variety of codecs and container formats to digitize live video and serialize it into media files. At the simplest level, Lightspeed Live Capture consists of customizable workflow actions that automate the real-time video capture process.

A workflow is the process you create in Vantage that ingests an incoming live source and compresses it using one of many codecs and saves the file using one of many container formats. Given the data and computation intensity of multiple, simultaneous processes, care must be taken not to exceed the limits of the Lightspeed Live Server's available resources.

---

**Note:** When Live Capture and Live Stream are used on the same Lightspeed Live Server, use the *Live Stream CPU and GPU Resource Usage Guide* topic located in the *Lightspeed Live Stream Guide*, along with the guidance described here to determine how Live Capture and Live Stream can best share a Lightspeed Live Server's resources.

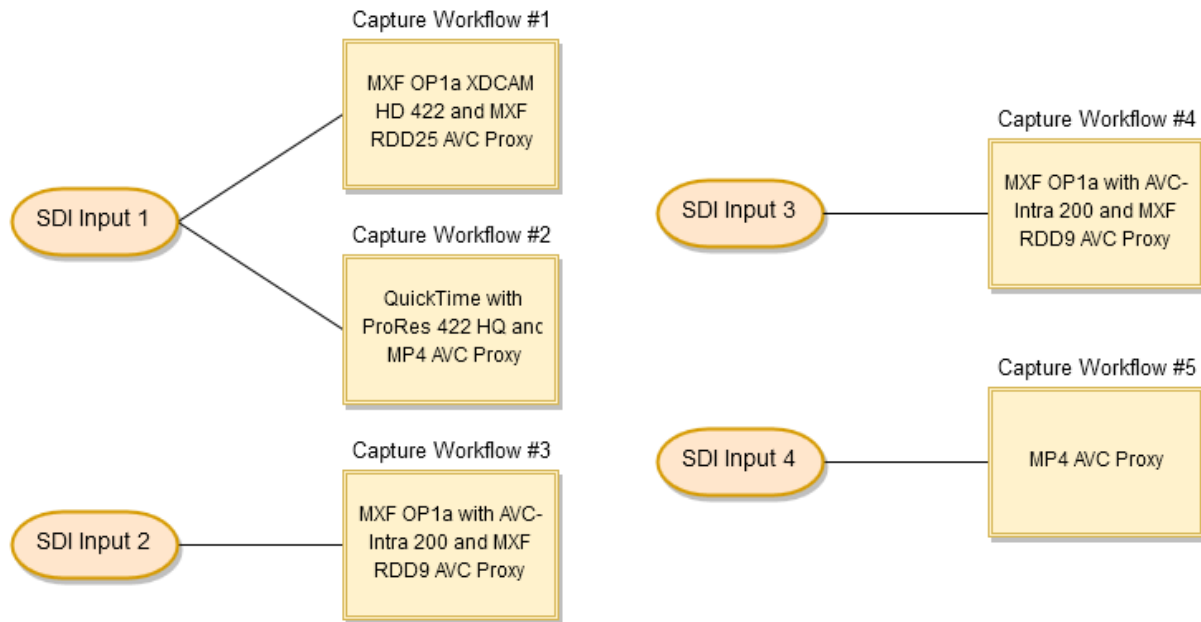
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## Topics

- [Overview](#)
- [CPU Processor Group Assignment](#)
- [Processes & Factors Affecting Performance](#)
- [Capturing Uncompressed Media Via SDI](#)
- [Maximum Concurrent Captures](#)

## Overview

Several Live Capture workflows may be connected to a single video source. This enables you to configure your system to create multiple format output files from a single source simultaneously. For example, if your Live Capture workflow generates two hi-res output files, such as MXF OP-1a and QuickTime, Lightspeed Live Capture can be used for this by creating two Capture actions, both of which use the same source.



This figure illustrates four SDI HD inputs. SDI 1 is connected to two workflows. SDI 2, 3, and 4 are each connected to individual workflows. This source-to-workflow flexibility makes it important to ensure that simultaneous processes being performed on a Lightspeed Live Server do not exceed its total processing capabilities.

Processes that materially affect system resources include the Primary Output codec, Secondary Output codec and the input video's frame size, video bit depth. Also, the Live web app's Preview and thumbnails, and the time shift buffer (if enabled) affect resources.

Keep in mind that the CPU is assigned to a processor group based on which source input is selected. See [CPU Processor Group Assignment](#) following, for details.

Every process should be taken into account when determining what resources are required. For example, if two workflows are sourcing from the same input, then the requirements are twice that required if only one workflow is sourcing the input.

## CPU Processor Group Assignment

The Lightspeed Live Server has two separate CPU processor groups. Each source (SDI, Transport Stream, etc.) is assigned to a processor group (Affinity 1 or Affinity 2) at start-up. Live Capture workflows execute capture processes on the processor group to which the associated input has been assigned.

Processor affinities should be balanced. Generally SDI 1 | 3 | 5 | 7 are assigned an affinity value of 1. SDI 2 | 4 | 6 | 8 are assigned an affinity value of 2.

Affinity for a given source is set zero (0) when Assign Processor is disabled for the source.

Care should be taken to ensure that a processor group is not assigned more workflows than it can support. See the Resource Utilization tables later in this chapter for specific processor and codec capacities.

To determine which processor group a given source has been assigned, in Source Manager, make sure Advanced Mode is enabled ([Managing System Settings](#)). Select a source to view the processor group assignment (in the Affinity column)—as well as CPU utilization—in real time.

CPU0/CPU1	Affinity	Resolution	Frame Rate	Bit Depth	Audio Channels	Captions	Firmware
3%/ 9%	2	1920x1080p	59.94	10	16	No	2019/0

When performing 4 concurrent captures, they should be balanced across processor groups. For example 1, 2, 3, 4 or 5, 6, 7, 8 will be balanced across affinity groups. 1, 3, 5, 7 or 2, 4, 6, 8 will not be balanced because they are assigned the same affinity group and thus, will saturate the resources of the CPU processor group.

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**Note:** CPU utilization should not exceed 75%; 60% or less is recommended.

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For more details, see [Source Information and Statistics Panel](#).

## Processes & Factors Affecting Performance

These processes and factors materially affect system resources:

### Primary Output Codec

The Primary Output codec is the most resource intensive component. See the codec charts below for general information on CPU utilization.

### Secondary Output codec

The Secondary Output AVC codec generally utilizes the GPU for encoding and uses the CPU for video processing library operations such as spatial formatting and interlacing. It is the second most resource intensive component.

### Codec/Source Input Bit Depth

It is considered best practices to match the selected codec's bit depth to the bit depth of the source input. For example, DNxHD HQX is a 10-bit codec. Set the associated source input to 10-bit in order to avoid additional processes to convert the incoming frames to match the codec's bit depth.

In contrast, DNxHD SQ is an 8-bit codec, so you should use it only on 8-bit source, in order to obtain the most efficient resource usage.

### Live Capture Web App

Using the Live Capture web app directly on a Lightspeed Live Server adds to the resource load. This fact must be taken into account when capturing multiple channels concurrently. For details, see [Live Capture Web App](#).

Telestream recommends that you connect to the Lightspeed Live web applications from browsers running on client workstations and you do not run them directly on a Lightspeed Live Server. This avoids additional decoding load for the Live Web app's preview directly on the server.

### Determining the Time-Shift Buffer Duration

The Time-Shift buffer in the Lightspeed Live Server has a maximum duration of 10 seconds for each source. The memory used by each instance of the Time-Shift buffer is directly related to the frame size and frame rate of the source video.

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**Note:** For more details about the Time-Shift buffer, see [Creating a Live Capture Workflow](#).

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Use the following data as a baseline when determining the duration of each source's Time-Shift buffer:

### Standard Definition (SD) Codecs

- **NTSC and PAL**—The total for all (maximum 8 SD sources) source Time-Shift buffers combined should not exceed 80 seconds.

### High Definition (HD) Codecs

- **720p/1080i /1080p up to 30fps**— The total for all Time-Shift buffers combined should not exceed 80 seconds.
- **720p/1080p above 30fps**—The total for all Time-Shift buffers combined should not exceed 60 seconds.

### UHD/4K Codecs

- The total for all (maximum 2 UHD/4K sources) Time-Shift buffers combined should not exceed 20 seconds.

## Capturing Uncompressed Media Via SDI

Lightspeed Live Capture can capture Uncompressed SD | HD | UHD/4K in 8- or 10-bit via SDI. Several factors (both platform- and media-based) determine capture limits.

- **Storage Location**—Local media drive or shared storage (NAS | SAN).
- **Drive Configuration**—The drive configuration is governed by the number of drives in your Live Capture server's media drive and the RAID type. A standard Live Capture server ships with a media drive containing 4 drives striped as RAID 5. In addition, the media drive can be expanded to 8 drives by purchasing Media Drive Option LS-LIVE-4TB-OPTION. The RAID type of the media drive can be changed from RAID 5 by the end user to RAID 0 if disk I/O is more important than data redundancy. See [Rebuilding the Lightspeed Live Storage RAID](#).
- **Frame Size | Frame Rate | Scan Type**—The incoming source frame size, frame rate, and scan type (interlaced (i) | progressive (p)) affects the requirements for capturing and generating an uncompressed output file.



# Maximum Concurrent Captures

Use this table to determine the resource requirements for capture workflows executing concurrently on a Lightspeed Live Server, based on the codec and profile you've specified in the Capture action. When ingesting multiple concurrent feeds, the CPU load is automatically balanced across both NUMA nodes/CPU sockets.

**Note:** CPU utilization should not exceed 75 percent; 60 percent or less is recommended. You should contact Telestream support ([Obtaining Support | Information | Assistance](#)) if you encounter situations where the load is not balanced across both nodes/sockets or exceeds 75%.

**Caution:** You should not route more than six 10-bit, 59.94 SDI sources to the server, whether you are capturing them or not—over time, it will degrade performance. If all 8 sources are 59.94 Progressive, two of the sources should be switched to Force 8-bit or they should be a lower profile than 1080p 59.94.

Codec and Profile	Max. Concurrent Captures per Server			
	C2	C2+	C3	C4/C5
<b>HD 1080p @ 59.94</b>				
AVC-H.264	2	4	4	6
Panasonic AVC-Ultra 25	2	4	4	6
Panasonic AVC-Intra 50	2	4	4	6
Panasonic AVC-Intra 100	2	4	4	6
Panasonic AVC-Intra 200	2	4	4	6
Sony XAVC Class 100 (HD)	2	4	4	6
Sony XAVC Long Class 50	2	4	4	6
HEVC	2	4	4	6
Avid DNxHD up to HQX	2	4	4	6
Apple ProRes HD 444	2	4	4	6
Apple ProRes 422 HD up to HQ	2	4	4	6
Sony XAVC Class 100	2	4	4	6
x264 HD - Baseline, Main, High (8-bit)	2		4	6
x264 HD - High 10, High 422(10-bit)		4	4	6
x265 HD - Main10	2	4	4	6
JPEG2000 YUV 10-bit lossless		2		
JPEG2000 YUV 10-bit lossy		2		
<b>HD 1080i @ 29.97</b>				
Sony XDCAM 420/422 (8-bit)		4	8	8
DVCProHD		4	8	8

Codec and Profile	Max. Concurrent Captures per Server			
	C2	C2+	C3	C4/C5
<b>HD 1080i @ 59.94</b>				
Sony XDCAM 420/422 (8-bit)	2		8	8
DVCProHD	2		8	8
JPEG2000 YUV 10-bit			2	4
<b>SD NTSC</b>				
IMX	2	4	8	8
DV/DVC Pro	2	4	8	8
<b>UHD/4K</b>				
JPEG2000 YUV 10-bit lossless		1 up to 30p	1 up to 30p	2 up to 30p
JPEG2000 YUV 10-bit lossy		1 up to 30p		1 up to 30p
Sony XAVC Long QFHD Class 100			1 up to 30p	2 up to 30p
Sony XAVC Long QFHD Class 200				2 up to 30p
Sony XAVC Class 300 (4K/UHD)		1 up to 30p (CBG   VBR) 1 up to 60p (CBG only)	2 up to 30p	2 up to 60p
Sony XAVC Class 480 (4K/UHD)		1 up to 30p (CBG   VBR)	2 up to 30p	2 up to 60p (CBG only)
Avid DNxHR 4K/UHD up to HQX		1 up to 30p	2 up to 30p	2 up to 60p
Apple ProRes 422 4K/UHD SQ		1 up to 60p	2 up to 60p	2 up to 60p
Apple ProRes 422 4K/UHD HQ		1 up to 60p	2 up to 30p	2 up to 60p
x264 4K/UHD		1 up to 30p	2 up to 30p	2 up to 30p
x265 4K/UHD		1 up to 30p	2 up to 30p	2 up to 30p
XAVC QFHD Long Class 100			1 up to 30p	2 up to 30p
XAVC QFHD Long Class 140				
XAVC QFHD Long Class 200		1 up to 30p		2 up to 30p

# Vantage Actions | Containers | Codecs

This chapter describes the containers and codecs provided in the [Capture action](#) and [Tape action](#). It also summarizes other Vantage actions that are often utilized in Capture workflows.

For more details on Vantage action operation and configuration, open the action's help (M) or the Vantage User's Guide (?) from the upper right corner of the action inspector.

## Topics

- [Capture Action Output Containers](#)
- [MP4 Output](#)
- [MXF OP1a Output](#)
- [MXF XAVC Output](#)
- [MPEG2-TS Output](#)
- [QuickTime Output](#)
- [QuickTime Open Output](#)
- [TIFO Output](#)
- [Proxy TIFO Output](#)
- [Proxy MP4 Output](#)
- [Proxy MXF RDD 25 Output](#)
- [Proxy HLS Output](#)
- [Tape Action Output Containers](#)
- [MXF OP1a Output](#)
- [MXF XAVC Output](#)
- [MPEG2-TS Output](#)
- [QuickTime Output](#)
- [QuickTime Open Output](#)
- [TIFO Output](#)
- [Proxy TIFO Output](#)

- [Proxy MP4 Output](#)
- [Proxy MXF RDD 25 Output](#)
- [Poster Frame](#)
- [Primary Output - Video Codecs](#)
- [Primary Output - Audio Codec](#)
- [Secondary Output - Video Codecs](#)
- [Secondary Output - Audio Codecs](#)
- [Related Vantage Actions](#)

# Capture Action Output Containers

These output containers are included in the Capture action:

## MP4 Output

The MP4 Output container encodes video and audio as specified, and saves it as an MP4 file.

MP4 files do not contain a timecode track.

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

Select the container to display its settings in the configuration panel on the right.

## Format Summary

### Video

AVC | x264

### Audio

AAC 16-bit, 64-512 kbps, up to 8 stereo channels

PCM

### MP4 Applicable Standards

IEC 14496-14

## Container Settings

### General

**File Extension.** Specifies *mp4*. The MP4 Container wraps the specified media in MP4 file format.

### Aspect Ratio Mode

Select one option:

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options in the panel on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MP4 container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MP4 container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MP4 container.

### Codec

**Codec.** Specifies which codec (AVC | x264) to use to encode video streams.

### AVC

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Profile.** Specifies the video quality profile.

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, progressive only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

### Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## x264

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the output video bit rate in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported: `--fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code

such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details in the panel on the right.

### Language Tags

**Language Tags.** Specify mode: Automatically Detect Language Tags | Manually Set Language Tags.

**Language.** When Language Tags is set to Manually Set Language Tags, specifies the language to use.

### Codec

**Codec.** Specifies which codec to use to encode audio streams. For configuration details, see appropriate topic following.

### Codec: AAC

#### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

**Bitrate.** Specifies the target bit rate for this audio stream: AAC 16-bit, 64-512 kbps, up to 8 channel stereo.

**Create Stereo Pairs.** When checked, specifies that each set of tracks should be converted to a stereo pair. Specify the number of stereo pairs to create (up to 8 pairs).

**Channel Map.** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.



## Codec: PCM

**Codec.** Specifies PCM as the codec to use to encode audio tracks. No other codecs are provided.

## General

**Channel Configuration.** Specifies Mono | Stereo | number of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## MXF OP1a Output

MXF OP1a Output produces an MXF Operational Pattern 1a (OP-1a, SMPTE 379M-2004) file with a generic container mapped to video and audio formats encoded by codecs implemented in Lightspeed Live Capture.

---

**Note:** Most Lightspeed Live Capture MXF files containing IMX, XDCAM or AVC-Intra, and all QuickTime Open files, can be opened for editing/playing while they are still growing during capture. Check in your edit/player user's guide for details on supported formats.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

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## Format Summary

### Video

AVC | Avid DNxHD | Avid DNxHR | DV | DVCPRO HD | IMX | JPEG2000 Lossless | JPEG2000 Lossy | Panasonic AVC-Intra | Panasonic AVC-Ultra | Sony XDCAM | Uncompressed | x264

### Audio

PCM 16/20/24-bit, 48Kbps, up to 16 channels

PCM/Dolby E (pass through)

### Timecode

SMPTE 377M, Timecode track

SMPTE 385M, System item

SMPTE 405M, System item (DNxHD)

## MXF Applicable Standards

SMPTE 331M-2004, Elements and Metadata Definitions for SDTI-CP

SMPTE 377M-2004, Material Exchange Format (MXF)

SMPTE 378M-2004, MXF Operational Pattern 1a

SMPTE 379M-2004, MXF Generic Container

SMPTE 382M-2007, Mapping AES3 and Broadcast Wave Audio into MXF Generic Container - DV (AES3), DNxHD, (BWF)

SMPTE 383M-2008, Mapping DV-DIF Data into MXF Generic Container - DV

SMPTE 385M-2004, Mapping SDTI-CP Essence and Metadata into MXF Generic Container - DV, IMX

SMPTE 386M-2004, Mapping Type D-10 Essence Data to MXF Generic Container - IMX

SMPTE 394M-2006, System Scheme 1 for MXF Generic Container DNxHD

SMPTE 405M-2006, Elements and Individual Data Items for MXF Generic Container System Scheme 1 - DNxHD

SMPTE 436M-2006, MXF Mappings for VBI Lines and Ancillary Data Packets

SMPTE 2019-4-2008, Mapping VC-3 Coding Units into MXF Generic Container - DNxHD

SMPTE RDD03, eVTR MXF Interoperability Specification - DV, IMX

SMPTE RDD 9-2009, MXF Interoperability Specification of Sony MPEG Long GOP Product

SMPTE ST 298-2009, Universal Labels for Unique Identification of Digital Data

SMPTE ST 326:2000, Television -SDTI Content Package Format (SDTI-CP)

SMPTE ST 381-1:2005, Television-Material Exchange Format (MXF) - Mapping MPEG Streams into the MXF Generic Container

SMPTE RDD 25:2014, AVC MXF Proxies

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**Note:** The resulting MXF (OP-1a) file can contain VANC data (SMPTE 436M) if present in the incoming SDI stream.

---

## Container Settings

The MXF OP1a Container wraps the specified media in MXF OP-1a file format.

### General

**File Extension.** Specifies *mxl*. No other extensions are provided.

**436 Data Track.** Specifies how to add SMPTE 436 data to the output.

**Partition Strategy.** Specifies how to apply MXF partitioning. The Partition Strategy must be set to *Isolated Body Leading Index + RIP* in order for the Partition Duration parameter to be used.

The Partition Duration parameter is ignored if the Partition Strategy is set to Automatic.

**Partition Duration.** When checked, specifies the MXF partition duration in seconds.

**Broadcast Wave Audio.** When checked, sets the audio tracks to Broadcast Wave format, adding metadata such as timestamps to the audio stream.

**Mpeg Picture Element.** Specifies that MPEG picture elements should be used, for Avid and Adobe Premiere Pro compatibility.

**Telestream Index.** When enabled, a proprietary Telestream Index file is created for use in specific customer workflows.

## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

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**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codec

**Codec.** Specifies which codec to use to encode video streams. For configuration details, see appropriate topic following.

### AVC

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**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

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**Profile.** Specifies the video quality profile.

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10-bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8-bit) - not supported in 1080p 50/59.94/60.
- LB (8-bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 1.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 440x 1080p/60	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8-bit 291 Mbs
DNXHQ LB	Avid DNxHD 90 1080p/60	8-bit 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8-bit 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8-bit 90 Mbs
DNXHD HQX	Avid DNxHD 365x 1080p/50	10-bit 367 Mbs
DNXHD HQ	Avid DNxHD 365 1080p/50	8-bit 367 Mbs
DNXHD SQ	Avid DNxHD 240 1080p/50	8-bit 242 Mbs
DNXHD LB	Avid DNxHD 75 1080p/50	8-bit 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8-bit 100 Mbs

**Table 1.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD HQX	Avid DNxHD 185x 1080i/50	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8-bit 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10-bit 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8-bit 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/24	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10-bit 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8-bit 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8-bit 45 Mbs

**Table 1.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8-bit 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10-bit 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8-bit 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8-bit 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8-bit 85 Mbs

## Avid DNxHR

Avid DNxHR is a UHD/4K format codec.

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10-bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-bit 4:2:2 high-quality
- SQ (8-bit 4:2:2 standard-quality)
- LB (8-bit 4:2:2 low bandwidth, offline quality)

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies the video quality profile.

## DVCPro HD

DVCPro HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback.

Supported input frame rates:

- 720p: 50/59.94
- 1080i: 25/29.97

- 1080p: 23.976p/psf

No user-configurable settings available.

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:

- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPro HD supports up to eight audio channels at 48kHz/16 bits per channel.

## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies the video quality profile.

**Follow D-10/SMPTE 331M Spec.** To match the Sony IMX implementation, uncheck this control and configure the audio tracks to specify Force one track per channel. Check this control to produce output conforming to D-10/SMPTE 331M.

You should not select Follow D-10 and also configure the audio tracks to Force one track per channel – this creates audio that is not compatible with D-10 or Sony IMX.

## JPEG2000 Lossless (Comprimato)

The Comprimato JPEG2000 Lossless codec encodes video into JPEG2000 format, using the JPEG2000 codec in lossless mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.



**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## JPEG2000 Lossy (Comprimato)

The Comprimato JPEG2000 Lossy codec encodes video into JPEG2000 format, using the JPEG2000 codec in lossy mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG 2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Video Bit Rate.** Specifies the output bit rate in kbps.

**Quantization Coefficient.** Specifies quality (1-100). If set toward the lower bound it reduces data correspondingly and quality decreases; if set toward the upper bound it increases data and quality. The default value of 100 allows the full quality as set by the bit rate to be used.

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## Panasonic AVC-Intra

**Follow SMPTE RP2027 Spec (Only applies to AVC-I class 50 and 100).** When enabled, specifies that the file should be recognized as Panasonic AVC-I in the Media Creation action. The parameter is enabled by default, but may be disabled for generic AVC-I output.

**Quality.** Specifies the video quality profile.

### AVC-Intra 50

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10-bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440x1080. 1280 x 720 is scaled to 960x720)

### **AVC-Intra 100**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output Frames are not scaled

### **AVC-Intra 200**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output frames are not scaled.

## **Panasonic AVC-Ultra**

Panasonic AVC-Ultra is generated at 10-bit, with 4:2:2 chroma sub-sampling.

Supported frame rates for long GOP: 23.98p | 25i | 25p | 29.97i | 29.97p | 50p (720 at 25 and 50 Mbs, 1080 for Long GOP 25 only) | 59.94p (720 at 25 and 50Mbs, 1080 for Long GOP 25 only)

**Quality.** Specifies the video quality profile.

- AVC-Ultra Long GOP 12 for 1280 x 720: 50p | 59.94p.
- AVC-Ultra Long GOP 12 for 1920 x 1080: 12 Mbs for 25i | 29.97i | 50p | 59.94p. 50p/59.94p@1080 is supported for Ultra Long G 12, but is recorded at 24 Mbs.
- AVC-Ultra Long GOP 25 (25 Mbs for all frame rates, except 59.94p@1080 is recorded at 50 Mbs)
- AVC-Ultra Long GOP 50 (50 Mbs for all supported frame rates)

## **Sony XDCAM**

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbps at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbps). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

## Uncompressed

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

**512 VBI Cropping Method.** In interlaced video, when transcoding to a Lower Field First convention, the lower field is the first line of output of an interlaced format, followed by alternating upper (aka top, odd) and lower (aka bottom, even) field lines.

To preserve the standard of encoding VBI data on a specific line of the output video, such as preserving captions on line 21, an encoder may need to either pad, crop and/or shift lines when creating the output.

When recording SD NTSC video from tape, 26 lines of non-visible data need to be discarded to produce 486 lines of visible data. Capture adds additional cropping options to maintain VBI caption data from line 21 in a transcoded output for 486 line output when using the ProRes or Uncompressed transcoders.

**Crop 25 lines from the top.** Crop 25 lines from the top and 1 line from the bottom. This results in Lower Field first video with Closed Captioning on Line 22.

**Crop 26 lines from the top.** Crop 26 lines from the top, resulting in Upper field first video with Closed Captioning on Line 21.

**Crop 27 lines from the top.** Crop 27 lines from the top, and pad the bottom with 1 blank line to keep the correct frame dimensions, resulting in Lower Field first video with Closed Captioning on Line 21.

## x264

**Quality.** Specifies the video quality profile.

**Bit Rate.** Specifies the output video bit rate in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported: `--fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec to use to encode audio tracks. No other codecs are provided.

### General

**Channel Configuration.** Specifies Mono | Stereo | number of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

# MXF XAVC Output

The MXF XAVC Output component generates Sony-compliant XAVC video wrapped in an MXF OP1a file. Audio defaults to 8 tracks of 24 bit PCM audio, with each track containing one channel of audio. These files are compliant with the SMPTE-377M standard.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

Select the container to display its settings in the configuration panel on the right.

## Format Summary

### Video

Sony XAVC

### Audio

PCM 24-bit, 48Kbps, 8 channels

PCM/Dolby E (pass through)

### Timecode

SMPTE 377M, Timecode track

SMPTE 385M, System item

## MXF Applicable Standards

SMPTE 331M-2004, Elements and Metadata Definitions for SDTI-CP

SMPTE 377M-2004, Material Exchange Format (MXF)

SMPTE 378M-2004, MXF Operational Pattern 1a

SMPTE 379M-2004, MXF Generic Container

SMPTE 436M-2006, MXF Mappings for VBI Lines and Ancillary Data Packets

SMPTE ST 298-2009, Universal Labels for Unique Identification of Digital Data

SMPTE ST 326:2000, Television-SDTI Content Package Format (SDTI-CP)

---

**Note:** The resulting MXF (OP-1a) file can contain VANC data (SMPTE 436M) if present within the incoming SDI stream.

---

## Container Settings

### General

**File Extension.** Specifies *mxl*. No other extensions permitted.

**436 Data Track.** Specifies how to add SMPTE 436 data (None | Ancillary | VBI) to the output.

**Broadcast Wave Audio.** When checked, sets the audio tracks to Broadcast Wave format, adding metadata such as timestamps to the audio stream.

**Partition Duration.** When checked, sets the partition duration to the value specified, in seconds. Default: 30 seconds.

**Partition Strategy.** Place Essence Container and Index Table in Header Partition + RIP.

**Color Primaries Signaling.** Overrides the color primaries signaling in the MXF container per the selected specification.

**Transfer Function Signaling.** Overrides the color transfer function signaling in the MXF container per the selected specification.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its settings in the panel on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.



**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec

**Codec.** Specifies Sony XAVC as codec used to encode the output video stream.

## Sony XAVC

Sony XAVC is available in TIFO, but only MXF XAVC is maintained for Sony specification performance. XAVC HD is always CBR - Use Constrained Bytes Per GOP is ignored.

**Quality.** Specifies the quality setting to use for encoding.

Sony XAVC HD Long classes 25, 35, and 50 are long GOP, 10-bit 4:2:2 chroma.

**Table 2.**

Standard	25	35	50
720p50			*
720p59.94			*
1080i50	*	*	*
1080i59.94	*	*	*
1080p23.98	*	*	*
1080p25	*	*	*
1080p29.97	*	*	*
1080p50p		*	*
1080p59.94		*	*

The bitrate for a class is maintained for all resolutions (25/35/50 mbs)

GOP length for 23.976/25 fps = 12 frames

GOP length for 29.97 fps = 15 frames

GOP length for 50 fps = 24 frames

GOP length for 59.94 fps = 30 frames

**Quality.** Specifies the video quality profile.

Class 50 - The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (223,232 bytes (NTSC FHD)) and 271,360 bytes (PAL FHD). Therefore, high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Supported frame rates: Standard | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97.

#### **Class 100 4:2:2 - HD - CBG only**

The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (462,848 bytes (NTSC 1080)) and 559,104 bytes (PAL 1080), so high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling

Output is full HD - it is not anamorphically scaled.

Supported frame rates: Standard | 720p 50 | 720p 59.94 | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97 | 1080p 50p | 1080p 59.94.

#### **Class 300 4:2:2 and Class 480 4:2:2 - UHD/4K - CBG/VBR - Capture action only**

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Constant bitrate (Use Constrained Bytes Per GOP) is enabled by default.

Supported frame rates for UHD and 4K: Standard | 23.98 | 24 (4K only) | 25 | 29.97 | 50 | 59.94

#### **XAVC Long QFHD**

Class 100 Supported sources: UHD 23.98, 25, 29.97)

Class 140 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

Class 200 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

**Use Constrained Bytes per GOP.** When enabled, XAVC Class 300 and Class 480 is generated as CBG. All other classes are generated as VBR. Ignored for XAVC HD video.

#### **Time Code Burn-in Filter**

When checked, this filter rasterizes the current timecode value into each output video frame.

---

**Note:** The burned-in timecode always represents the actual input timecode being used by the Input Source.

---

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code

such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m<sup>2</sup>.

**MaxFALL.** Specifies the maximum frame average light level in cd/m<sup>2</sup>.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec used to generate audio tracks. No other codecs provided.

## General

**Channel Configuration.** Specifies Mono | Stereo | number of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** Defaults to True.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

# MPEG2-TS Output

The MPEG2-TS output container encodes media and saves it as an MPEG2 Transport Stream file.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

MPEG-2 | x264

### Audio

AAC 16-bit, 64-512 kbps, 1 track | PCM 16-24-bit, 32 channel

## Container Settings

**File Extension.** Specifies the extension to apply to the output file name.

**File Bit Rate.** (Default 19,000,000 bps). If unchecked, the Multiplexer uses the minimum rate as computed from the sum of all maximum rates for elementary streams, data streams, PSI streams and necessary overhead.

**List Audio Streams Before Video Streams.** When checked, will list audio streams before video streams in the PMT stream order.

**PAT Rate.** (Default 10.0 tables per second). This function specifies the repetition rate of the Program Association Table in the output stream. The PAT lists all programs in a transport stream, each of which is identified by a 16-bit Program Number.

**PMT Rate.** (Default 10.0 tables per second). This function specifies the repetition rate of the Program Map Table in the output stream. Each program listed in the PAT has a PMT (with PID) containing information about the program.

**Transport ID.** (Default 0). This function sets the ID number for this transport stream.

**PAT Version.** (Default 0). This function sets the version number of the Program Association Table.

**Program Number.** (Default 1). This sets the ID number of a specific program.

**PMT PID.** (Default 480). This sets the Packet ID used for the Program Map Table.

**PCR PID.** (Defaults unselected/zero). This specifies the Packet ID that carries the Program Clock Reference for this program. Set to the first video PID value if not specified.

**Maximum PCR Interval.** (Default 37 ms). This function defines the maximum time between Program Clock References for this stream.

**PCR on every PES header.** When selected (default), a PCR is inserted on each packet that has a PES header.

**No Empty Adaptation Fields.** When selected (default), the multiplexer avoids using zero length adaptation field video packets.

**VBR Transport stream.** Defaults to unselected. When selected, the Multiplexer creates a variable bit rate transport stream, and no attempt is made to maintain the bit rate.

**Error Behavior.** Defaults to Fail on Error. Species Fail on Error | Always Complete | Fail on Warning or Error.

**Error/Warning Threshold.** Defaults to 1 (range 1 - 100). Specifies the number of errors permitted before file generation fails and the number of warnings that trigger a Fail on warning or error. This parameter has no effect when Error Behavior is set to Always Complete.

**Treat Buffer Underflows/Overflow Warnings as Errors.** Defaults to selected. When selected, buffer underflow or overflow warnings are treated as errors.

**2-Pass Multiplexing.** Only use if you need to correct excessive bitrate fluctuations in the encoded stream resulting in video decoder underflow errors. The second pass is only executed if the first pass fails.

**Generate Config File.** Generates and places a Manzanita-compliant configuration file using the current UI settings into the same location as the muxed output. The file can be augmented and specified under Manzanita Configuration File in Advanced Settings.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec

**Codec.** Specifies which codec to use to encode video streams. For configuration details, see appropriate topic following.

## MPEG-2

### General

**Bit Rate.** Specifies the output video bit rate in kbps (512 - 300,000).

**GOP Structure.** Sets the GOP Structure as a combination of I frames, B frames, and P frames. I frame-only structures have a lower visual quality but are well suited for editing. Longer GOP structures have higher visual quality and are best suited for playout.

**GOP Configuration.** Specifies the type of GOP structure.

**Start with I Frame.** When checked, specifies that the GOP start with an I-frame (display and coded order).

**Motion Estimation Factor.** Indicates how much motion estimation to use when encoding the video stream. A higher value results in higher quality and increases the encode time. (Default 80; range 1 - 100).

**Profile.** Specifies the video quality profile.

**Table 3.**

Profile	Max Data Rate	Resolution	Color Sampling
Main Profile@Main Level	15Mbps	720 x 480 up to 30fps	4:2:0
Main Profile@High 1440 Level	60Mbps	1080i x 1440 up to 30fps or 1080p x 1440 up to 30fps	4:2:0
Main Profile@High Level	60Mbps	1920 x 1080 at 30 fps OR 1280 x 720 up to 60fps	4:2:0
High Profile@Main Level / 4:2:2Profile@Main Level	20Mbps	720 x 480 up to 60fps	4:2:2
High Profile@High 1440 Level / 4:2:2 Profile@High 1440 Level	80Mbps	1080i x 1440 up to 30fps or 720p up to 60 fps	4:2:2
High Profile@High Level / 4:2:2 Profile@High Level	100Mbps	1080i x 1920 up to 30fps or 1080p x 1920 up to 60fps	4:2:2

**Level.** Specifies the MPEG level to use during encoding.

**Video Performance Setting.** Indicates the video quality setting to use when encoding the video stream. A higher value results in higher quality and increases the encode time. Default 9; range 0 - 31.

**MPEG Encoder Version.** Specifies the MainConcept MPEG encoder version to use, or set to Auto.

### Video Buffer Verifier

**Video Buffer Verifier.** Specifies whether or not to use the default settings or custom VBV settings. When Specify VBV Settings is set, configure these controls:

**VBV Buffer Size.** Specifies the size of the VBV buffer in kbps. Larger values allow the encoder greater flexibility during encoding.

**VBV Delay.** Specifies how much time is allowed between the transmission of the first frame and its actual decode. Larger values allow the encoder greater flexibility during encoding.

## x264

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the target bit rate in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported: *-fake-interlaced | --nal-hrd cbr | --profile | --video-format | --bitrate*.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range: 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.



**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec

**Codec.** Specifies which codec to use to encode audio tracks. No other codecs are provided. For configuration details, see appropriate topic following.

### AAC

#### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

**Bitrate.** Specifies the target bit rate for this audio stream: AAC 16-bit, 64-512 kbps, 1 track.

### PCM

#### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

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**Note:** Up to 16 channels are supported from SDI sources.

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**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single multi-channel track. When checked, overrides the Label Channel Pairs Left and Right control.

## Channel Map

**Channel Map.** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

# QuickTime Output

The QuickTime container conforms to the IEC 14496-14 MP4 File Format standard and the QuickTime File Format Specification.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

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## Format Summary

### Video

Apple ProRes | AVC | Avid DNxHD | Avid DNxHR | DV | DVCPro HD | HEVC | IMX | Panasonic AVC-Intra | Sony XDCAM | Uncompressed | x264 | x265.

### Audio

PCM, 16/20/24-bit, 48Kbps, up to 32 channels; PCM/Dolby E.

## Container Settings

The QuickTime Container wraps the specified media into a QuickTime file format.

### General

**File Extension.** Specifies QuickTime (MOV). No other file extensions are available.

**Tape Reel Name.** This name is embedded into the container for later identification. The string that is embedded in the output should be viewable in the following supported editing applications: Final Cut Pro, Adobe Premiere Pro, and DaVinci Resolve.

**Timecode Track.** Specifies no track, or a track that is hidden or visible.

**Caption Track.** (Closed caption track) Specifies the type of closed caption track or None. When creating output using the 608 caption track in a QuickTime container, only 29.97 FPS sources are supported, and it is generally expected that the source is SD NTSC with captions in VBI. Also, in this scenario, the Create 708 Caption Data control in the Program panel should be disabled. If the source that is being recorded is progressive HD, you must select the 708 caption track in the QuickTime container to propagate captions.

**Fast Start.** Check to improve web-based playback when downloading the file.

**Header Compression.** When checked, compresses QuickTime header information to improve playback responsiveness when downloading the file.

**Color Space.** Specifies the QuickTime file color space:

- *Do not specify*
- *ITU-R Recommendation BT.601*
- *XYZ with SMPTE 428-1 (DCDM) Transfer Characteristics*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (NTSC)*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (PAL)*
- *ITU-R Recommendation BT.2020*
- *ITU-R Recommendation BT.709*
- *RGB with BT.709 Color Primaries*

**Conform Aperture.** Check to enable, then choose one of these options:

- *Disabled*
- *Classic* - Displays the image without applying either the pixel aspect ratio or the clean aperture. The image is displayed using the track header dimensions, meaning the decompressed picture is scaled into the track header dimensions if the encoded dimensions are different.
- *Clean Aperture* - Both the clean aperture and the pixel aspect ratio are applied. The dimensions of the track become equal to the clean dimensions which are equal to the display dimensions (with conformed contents).
- *Production Aperture* - Applies the pixel aspect ratio but not the clean aperture. The image is presented in the correct aspect ratio, but the extra pixels outside of the image that exist in the source material will be presented. The track dimensions are equal to the result of applying the pixel aspect ratio.
- *Encoded Pixels* - The encoded pixels are displayed intact in this mode. Under this mode the track dimensions are equal to the encoded dimensions. No scaling or transformation takes place.

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**Note:** The Clean Aperture selection should not be used in conjunction with the Enable CLAP Atom selection. Only one or the other should be used.

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**Enable CLAP Atom.** Enables the QuickTime Clean Aperture atom.

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**Note:** CLAP Atom insertion should be used in conjunction with Conform Aperture > Clean Aperture selection above.

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## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Clean Aperture

**Clean Aperture.** Specify the crop settings for Left, Right, Top, and Bottom pixels to apply to the Clean Aperture:

- *Not Enabled* - Turns off the crop settings for Clean Aperture.
- *Specify Inset* - Enables the ability to specify the Clean Aperture crop settings.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

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**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codec you are utilizing.

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**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codec

**Codec.** Specifies which codec to use to encode video streams. For details, see the appropriate topic following.

### Apple ProRes

**Quality.** Specifies the video quality profile.

### AVC

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**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

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**Quality.** Specifies the video quality profile.

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10-bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8-bit) - not supported in 1080p 50/59.94/60
- LB (8-bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 4.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 440x 1080p/60	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8-bit 291 Mbs
DNXHQ LB	Avid DNxHD 90 1080p/60	8-bit 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8-bit 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8-bit 90 Mbs
DNXHD HQX	Avid DNxHD 365x 1080p/50	10-bit 367 Mbs
DNXHD HQ	Avid DNxHD 365 1080p/50	8-bit 367 Mbs
DNXHD SQ	Avid DNxHD 240 1080p/50	8-bit 242 Mbs
DNXHD LB	Avid DNxHD 75 1080p/50	8-bit 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8-bit 100 Mbs

**Table 4.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 185x 1080i/50	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8-bit 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10-bit 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8-bit 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/24	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10-bit 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8-bit 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8-bit 45 Mbs

**Table 4.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8-bit 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10-bit 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8-bit 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8-bit 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8-bit 85 Mbs

## Avid DNxHR

Avid DNxHR is a UHD/4K format codec.

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10-bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-bit 4:2:2 high-quality
- SQ (8-bit 4:2:2 standard-quality)
- LB (8-bit 4:2:2 low bandwidth, offline quality)

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies the video quality profile.

## DVCPRO HD

DVCPRO HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback.

No user-configurable settings available.

Supported input frame rates:

- 720p: 50/59.94



- 1080i: 25/29.97
- 1080p: 23.976p/psf

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:

- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPRO HD supports up to eight audio channels at 48kHz/16 bits per channel.

## HEVC

There are no general limitations for frame size or frame rate generation, but compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p at 59.94 fps.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies the video quality profile.

## Panasonic AVC-Intra

**Follow SMPTE RP2027 Spec (Only applies to AVC-I class 50 and 100).** When enabled, specifies that the file should be recognized as Panasonic AVC-I in the Media Creation action. The parameter is enabled by default, but may be disabled for generic AVC-I output.

**Quality.** Specifies the video quality profile.

### AVC-Intra 50

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10-bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440x1080. 1280 x 720 is scaled to 960x720)

### **AVC-Intra 100**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output Frames are not scaled

### **AVC-Intra 200**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output frames are not scaled.

## **Sony XDCAM**

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbps at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbps). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

## **Uncompressed**

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NTSC SD sources that contain VBI data.

**512 VBI Cropping Method.** In interlaced video, when transcoding to a Lower Field First convention, the lower field is the first line of output of an interlaced format, followed by alternating upper (that is - top, odd) and lower (aka bottom, even) field lines.

To preserve the standard of encoding VBI data on a specific line of the output video, such as preserving captions on line 21, an encoder may need to either pad, crop and/or shift lines when creating the output.

When recording SD NTSC video from tape, 26 lines of non-visible data need to be discarded to produce 486 lines of visible data. Capture adds additional cropping options to maintain VBI caption data from line 21 in a transcoded output for 486 line output when using the ProRes or Uncompressed transcoders.

**Crop 25 lines from the top.** Crop 25 lines from the top and 1 line from the bottom. This results in Lower Field first video with Closed Captioning on Line 22.

**Crop 26 lines from the top.** Crop 26 lines from the top, resulting in Upper field first video with Closed Captioning on Line 21.

**Crop 27 lines from the top.** Crop 27 lines from the top, and pad the bottom with 1 blank line to keep the correct frame dimensions, resulting in Lower Field first video with Closed Captioning on Line 21.

## x264

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported: `-fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## x265

There are no general limitations for frame size or frame rate, but encoding interlaced source is not supported. Compression is resource intensive, and real time performance may not be sustained when recording high frame rates.

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

**Command Line.** Configure the compressor using x265 command line syntax. For setting specific x265 parameters, you can enter x265 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x265 command line parameters are not supported: `-fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specifies the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec to use to encode audio tracks. No other codecs are provided.

### Channel Configuration

*-fake-interlaced | --nal-hrd cbr | --profile | --video-format | --bitrate- 32 channels (not supported from SDI sources)*

**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Specifies the desired audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata is set to Mono.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## QuickTime Open Output

QuickTime Open output is implemented in the Capture action with Capture ComponentPac 7.0.4 or later.

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**Note:** Most Lightspeed Live Capture MXF files containing IMX, XDCAM or AVC-Intra, and all QuickTime Open files, can be opened for editing/playing while they are still growing during capture. Check in your edit/player application guide for details on supported formats.

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Because of the unique characteristics of QuickTime Open files created by Live Capture, the duration set in the QuickTime header is hard-coded to the value of the Default Duration setting during capture. If a capture is stopped prior to the timecode specified in the Default Duration, the QuickTime Open process updates the captured file's header with the actual duration of the clip. See [Important Information about Default Duration](#) below for important details.

The QuickTime container conforms to the IEC 14496-14 MP4 File Format standard and the QuickTime file format specification.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

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## Format Summary

### Video

Apple ProRes | Avid DNxHD | Avid DNxHR

### Audio

PCM, 16/20/24-bit, 48Kbps, up to 32 channels; PCM/Dolby E

## Container Settings

The QuickTime Container wraps the specified media into a QuickTime file format.

### General

**File Extension.** Specifies QuickTime (MOV). No other file extensions are provided.

**Tape Reel Name.** This name is embedded into the container for later identification. The string that is embedded in the output should be viewable in the following supported editing applications: Final Cut Pro, Adobe Premiere Pro, and DaVinci Resolve.

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**Note:** In DaVinci Resolve, the following setting must be changed for the Tape Reel Name to appear: Go to File > Project Settings > General Options. Enable "Assist using reel names from the:" and set it to "Embedding in source clip file".

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**Caption Track.** (Closed caption track) Specifies the type of closed caption track or None. When creating output using the 608 caption track in a QuickTime container, only 29.97 FPS sources are supported, and it is generally expected that the source is SD NTSC with captions in VBI. Also, in this scenario, the Create 708 Caption data should be disabled. If the source that is being recorded is progressive HD, you must select the 708 caption track in the QuickTime container to propagate captions.

**Default Duration.** The maximum possible duration for a captured file.

## Important Information about Default Duration

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**Note:** The *Default Duration* is the maximum possible duration that can be captured using the QuickTime Open container. Default: 9 hours.

---

The QuickTime Open container's *Default Duration* is used to set the initial duration written to the QuickTime Open file's header. This value will be reported by the QuickTime media file when it is opened by a media player or edit application while the captured file is being written to and is growing. If a capture session is stopped before the *Default Duration* is reached the QuickTime Open process will update the captured file's QuickTime header with the *actual* captured duration of the clip.

Here are three possible scenarios that you may encounter when using the QuickTime Open container:

1. A capture session is stopped before reaching, or exactly at, the *Default Duration* set in the Workflow. In these cases the Workflow will complete successfully. The captured QuickTime file's header will be updated with the *actual* captured duration of the clip.
2. Your capture session attempts to record to a duration that is *beyond* the *Default Duration* set in the Workflow. In this case the associated Workflow's origin action (and any subsequent downstream actions) indicates that they have 'FAILED'. The Capture origin action reports the following error:  
*... Failed to write sample. The Default Duration of this workflow has been reached. Capture actions configured with a QuickTime 'Open' container will automatically stop at the container's Default Duration regardless of the requested record duration. The output file created by this action will contain a duration equal to the Default Duration. In most cases the resulting output file will be playable and can be used for editing. The default duration has been exceeded.*
3. If scenario #1 or #2 occur with a Workflow in the Open mode, and the action immediately following the capture origin action is an Open Copy action, the file

copied by the Open Copy action will retain the original *Default Duration*. The *copied* media file will show a duration equal to the Workflow's *Default Duration* and will be playable and editable. Captured files stopped prior to the *Default Duration* (scenario #1) will contain no active media data from the point where the capture session was stopped through the end of the file. Some media players or edit applications may display errors or faults when trying to access the timeline locations with no active media data.

**Header Compression.** Compresses QuickTime header information to improve playback responsiveness when downloading the file.

**Color Space.** Specifies the QuickTime file color space. Options include:

- *Do not specify*
- *ITU-R Recommendation BT.601*
- *XYZ with SMPTE 428-1 (DCDM) Transfer Characteristics*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (NTSC)*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (PAL)*
- *ITU-R Recommendation BT.2020*
- *ITU-R Recommendation BT.709*
- *RGB with BT.709 Color Primaries*

**Conform Aperture.** Check to enable, then choose one of these options:

- *Disabled*
- *Classic* - Displays the image without applying either the pixel aspect ratio or the clean aperture. The image is displayed using the track header dimensions, meaning the decompressed picture is scaled into the track header dimensions if the encoded dimensions are different.
- *Clean Aperture* - Both the clean aperture and the pixel aspect ratio are applied. The dimensions of the track become equal to the clean dimensions which are equal to the display dimensions (with conformed contents).
- *Production Aperture* - Applies the pixel aspect ratio but not the clean aperture. The image is presented in the correct aspect ratio, but the extra pixels outside of the image that exist in the source material will be presented. The track dimensions are equal to the result of applying the pixel aspect ratio.
- *Encoded Pixels* - The encoded pixels are displayed intact in this mode. Under this mode the track dimensions are equal to the encoded dimensions. No scaling or transformation takes place.

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**Note:** The Clean Aperture selection should not be used in conjunction with the Enable CLAP Atom selection. Only one or the other should be used.

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**Enable CLAP atom.** Enables the QuickTime Clean Aperture atom.



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**Note:** The Clean Aperture selection should not be used in conjunction with the Enable CLAP Atom selection. Only one or the other should be used.

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## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Clean Aperture

**Clean Aperture.** Specify the crop settings for Left, Right, Top, and Bottom pixels to apply to the Clean Aperture:

- *Not Enabled* - Turns off the crop settings for Clean Aperture.
- *Specify Inset* - Enables the ability to specify the Clean Aperture crop settings.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codec

**Codec.** Specifies which codec to use to encode video streams. For details, see the appropriate topic following.

### Apple ProRes

**Quality.** Specifies the video quality profile.

**512 VBI Cropping Method.** In interlaced video, when transcoding to a Lower Field First convention, the lower field is the first line of output of an interlaced format, followed by alternating upper (aka top, odd) and lower (aka bottom, even) field lines.

To preserve the standard of encoding VBI data on a specific line of the output video, such as preserving captions on line 21, an encoder may need to either pad, crop and/or shift lines when creating the output.

When recording SD NTSC video from tape, 26 lines of non-visible data need to be discarded to produce 486 lines of visible data. Capture adds additional cropping options to maintain VBI caption data from line 21 in a transcoded output for 486 line output when using the ProRes or Uncompressed transcoders.

**Crop 25 lines from the top.** Crop 25 lines from the top and 1 line from the bottom. This results in Lower Field first video with Closed Captioning on Line 22.

**Crop 26 lines from the top.** Crop 26 lines from the top, resulting in Upper field first video with Closed Captioning on Line 21.

**Crop 27 lines from the top.** Crop 27 lines from the top, and pad the bottom with 1 blank line to keep the correct frame dimensions, resulting in Lower Field first video with Closed Captioning on Line 21.

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10-bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8-bit) - not supported in 1080p 50/59.94/60.
- LB (8-bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 5.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 440x 1080p/60	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8-bit 291 Mbs
DNXHQ LB	Avid DNxHD 90 1080p/60	8-bit 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10-bit 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8-bit 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8-bit 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8-bit 90 Mbs

**Table 5.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 365x 1080p/50	10-bit 367 Mbps
DNXHD HQ	Avid DNxHD 365 1080p/50	8-bit 367 Mbps
DNXHD SQ	Avid DNxHD 240 1080p/50	8-bit 242 Mbps
DNXHD LB	Avid DNxHD 75 1080p/50	8-bit 75 Mbps
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10-bit 220 Mbps
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8-bit 220 Mbps
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8-bit 145 Mbps
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8-bit 100 Mbps
DNXHD HQX	Avid DNxHD 185x 1080i/50	10-bit 184 Mbps
DNXHD HQ	Avid DNxHD 185 1080i/50	8-bit 184 Mbps
DNXHD SQ	Avid DNxHD 120 1080i/50	8-bit 121 Mbps
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8-bit 84 Mbps
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10-bit 367 Mbps
DNXHD HQX	Avid DNxHD 185x 1080p/25	10-bit 184 Mbps
DNXHD HQ	Avid DNxHD 185 1080p/25	8-bit 184 Mbps
DNXHD SQ	Avid DNxHD 120 1080p/25	8-bit 121 Mbps
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8-bit 84 Mbps
DNXHD LB	Avid DNxHD 36 1080p/25	8-bit 36 Mbps
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10-bit 352 Mbps
DNXHD HQX	Avid DNxHD 175x 1080p/24	10-bit 176 Mbps
DNXHD HQ	Avid DNxHD 175 1080p/24	8-bit 176 Mbps
DNXHD SQ	Avid DNxHD 115 1080p/24	8-bit 116 Mbps
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8-bit 80 Mbps
DNXHD LB	Avid DNxHD 36 1080p/24	8-bit 36 Mbps
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10-bit 352 Mbps
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10-bit 176 Mbps
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8-bit 176 Mbps
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8-bit 116 Mbps

**Table 5.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10-bit 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8-bit 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8-bit 45 Mbs
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8-bit 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10-bit 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8-bit 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8-bit 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8-bit 85 Mbs

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Avid DNxHR

Avid DNxHR is a UHD/4K format codec.

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10-bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-bit 4:2:2 high-quality
- SQ (8-bit 4:2:2 standard-quality)
- LB (8-bit 4:2:2 low bandwidth, offline quality)

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec to use to encode audio tracks. No other codecs are provided.

**Channel Configuration.** Specifies the number or layout of the audio channels: Mono | Stereo | number of channels.

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**Note:** Up to 16 channels are supported from SDI sources.

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**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Select the desired audio bit depth.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata is set to Mono.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata.

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

# TIFO Output

Telestream Intermediary Format (TIFO) is an intermediate media wrapper format designed by Telestream as a uniform, interchangeable file format to ensure interoperability among Telestream's media processing solutions, including Vantage, Lightspeed Live Capture, and Pipeline. TIFO provides a lightweight, low-overhead wrapper that is essence-agnostic, with out-of-band metadata, timecode, and closed caption support.

Using TIFO improves the ability to move media files between Telestream's media processing solutions with all media essence elements and metadata intact, preserving the widest range of transcoding options.

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**Note:** TIFO files can be opened, as they are being captured, by Telestream's Switch player and Vantage systems at a time when the captured file reports a non-zero file size. Requires Switch 4.0 or later.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

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## Format Summary

### Video

Apple ProRes | AVC | Avid DNxHD | Avid DNxHR | DV | DVCProHD | HEVC | IMX | JPEG2000 Lossless | JPEG2000 Lossy | MPEG-2 | Panasonic AVC-Intra | Panasonic AVC-Ultra | Sony XAVC | Sony XDCAM | Uncompressed | x264 | x265.

### Audio

PCM, 16/20/24-bit, 48Kbps, up to 16 channels; PCM/Dolby E

## Container Settings

The TIFO Container wraps the specified media into a TIFO file format.

### General

**File Extension.** Specifies *tifo*. No other extensions are provided.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codec you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codec

**Codec.** Specifies which codec to use to encode video streams. For details, see the appropriate topic following.

### Apple ProRes

**Quality.** Specifies the video quality profile.

#### Video Buffer Verifier

**Video Buffer Verifier.** Specifies whether or not to use the default settings or custom VBV settings. When Specify VBV Settings is set, configure these controls:

**VBV Buffer Size.** Specifies the size of the VBV buffer in kbps. Larger values allow the encoder greater flexibility during encoding.

**VBV Delay.** Specifies how much time is allowed between the transmission of the first frame and its actual decode. Larger values allow the codec greater flexibility during encoding.



## AVC

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

**Profile.** Specifies the video quality profile:

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10-bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8-bit) - not supported in 1080p 50/59.94/60.
- LB (8-bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 6.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNxHD HQX	Avid DNxHD 440x 1080p/60	10-bit 440 Mbs
DNxHD HQ	Avid DNxHD 440 1080p/60	8-bit 440 Mbs
DNxHD SQ	Avid DNxHD 290 1080p/60	8-bit 291 Mbs
DNxHQ LB	Avid DNxHD 90 1080p/60	8-bit 90 Mbs
DNxHD HQX	Avid DNxHD 440x 1080p/59.94	10-bit 440 Mbs
DNxHD HQ	Avid DNxHD 440 1080p/59.94	8-bit 440 Mbs
DNxHD SQ	Avid DNxHD 290 1080p/59.94	8-bit 291 Mbs
DNxHD LB	Avid DNxHD 90 1080p/59.94	8-bit 90 Mbs
DNxHD HQX	Avid DNxHD 365x 1080p/50	10-bit 367 Mbs
DNxHD HQ	Avid DNxHD 365 1080p/50	8-bit 367 Mbs
DNxHD SQ	Avid DNxHD 240 1080p/50	8-bit 242 Mbs

**Table 6.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD LB	Avid DNxHD 75 1080p/50	8-bit 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8-bit 100 Mbs
DNXHD HQX	Avid DNxHD 185x 1080i/50	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8-bit 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10-bit 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10-bit 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8-bit 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8-bit 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8-bit 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/24	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10-bit 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10-bit 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8-bit 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8-bit 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8-bit 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8-bit 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10-bit 440 Mbs

**Table 6.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8-bit 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8-bit 45 Mbs
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10-bit 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8-bit 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8-bit 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8-bit 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10-bit 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8-bit 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8-bit 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8-bit 85 Mbs

## Avid DNxHR

Avid DNxHR is a UHD/4K format codec.

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10-bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-bit 4:2:2 high-quality
- SQ (8-bit 4:2:2 standard-quality)
- LB (8-bit 4:2:2 low bandwidth, offline quality)

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies the video quality profile.

## DVCPRO HD

DVCPRO HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback.

Supported Input Frame Rates:

- 720p: 50/59.94
- 1080i: 25/29.97
- 1080p: 23.976p/psf

No user-configurable settings available.

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:

- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPRO HD supports up to eight audio channels at 48kHz/16 bits per channel.

## HEVC

There are no general limitations for frame size or frame rate generation, but compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p at 59.94 fps.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies the video quality profile.

## JPEG2000 Lossless (Comprimato)

The Comprimato JPEG2000 Lossless codec encodes video into JPEG2000 format, using the JPEG2000 codec in lossless mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG 2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Configuration Settings

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Partition Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

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**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

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**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## JPEG2000 Lossy (Comprimato)

The Comprimato JPEG2000 Lossy codec encodes video into JPEG2000 format, using the JPEG2000 codec in lossy mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG 2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

## Settings

**Video Bit Rate.** Specifies the output bit rate in kbps.

**Quantization Coefficient.** Specifies quality (1-100). If set toward the lower bound it reduces data correspondingly and quality decreases; if set toward the upper bound it increases data and quality. The default value of 100 allows the full quality as set by the bitrate to be used.

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## MPEG-2

**Bit Rate.** Specifies the target bit rate (512 - 300,000).

**GOP Structure**

Sets the GOP Structure as a combination of I frames, B frames, and P frames. I frame-only structures have a lower visual quality but are well suited for editing. Longer GOP structures have higher visual quality and are best suited for playout.

**GOP Configuration**

Specifies the type of GOP structure: Open GOP or Closed GOP.

**Start with I Frame**

When checked, specifies that the GOP start with an I-frame (display and coded order).

**Motion Estimation Factor**

Indicates how much motion estimation to use when encoding the video stream. A higher value results in higher quality and increases the encode time. The default is 80 and the range is 1 to 100.

**Profile.** Specifies the video quality profile.

**Table 7.**

Profile	Max Data Rate	Resolution	Color Sampling
Main Profile@Main Level	15Mbps	720 x 480 up to 30fps	4:2:0
Main Profile@High 1440 Level	60Mbps	1080i x 1440 up to 30fps or 1080p x 1440 up to 30fps	4:2:0
Main Profile@High Level	60Mbps	1920 x 1080 at 30 fps OR 1280 x 720 up to 60fps	4:2:0
High Profile@Main Level / 4:2:2Profile@Main Level	20Mbps	720 x 480 up to 60fps	4:2:2
High Profile@High 1440 Level / 4:2:2 Profile@High 1440 Level	80Mbps	1080i x 1440 up to 30fps or 720p up to 60 fps	4:2:2
High Profile@High Level / 4:2:2 Profile@High Level	100Mbps	1080i x 1920 up to 30fps or 1080p x 1920 up to 60fps	4:2:2

**Level.** Specifies the level to use for encoding.

**Video Performance Setting**

Indicates the video quality setting to use when encoding the video stream. A higher value results in higher quality and increases the encode time. The default is 9 and the range is 0 to 31.

**Panasonic AVC-Intra**

**Follow SMPTE RP2027 Spec (Only applies to AVC-I class 50 and 100).** When enabled, specifies that the file should be recognized as Panasonic AVC-I in the Media

Creation action. The parameter is enabled by default, but may be disabled for generic AVC-I output.

**Quality.** Specifies the video quality profile.

### **AVC-Intra 50**

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10-bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440 x 1080. 1280 x 720 is scaled to 960x720)

### **AVC-Intra 100**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output Frames are not scaled

### **AVC-Intra 200**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10-bit luma

Output frames are not scaled.

## **Panasonic AVC-Ultra**

Panasonic AVC-Ultra is generated at 10-bit, with 4:2:2 chroma sub-sampling.

Supported frame rates for long GOP: 23.98p | 25i | 25p | 29.97i | 29.97p | 50p (720 at 25 and 50 Mbs, 1080 for Long GOP 25 only) | 59.94p (720 at 25 and 50Mbs, 1080 for Long GOP 25 only)

**Quality.** Specifies the video quality profile.

- AVC-Ultra Long GOP 12 for 1280 x 720: 50p | 59.94p.



- AVC-Ultra Long GOP 12 for 1920 x 1080: 12 Mbs for 25i | 29.97i | 50p | 59.94p. 50p/59.94p@1080 is supported for Ultra Long G 12, but is recorded at 24 Mbs.
- AVC-Ultra Long GOP 25 (25 Mbs for all frame rates, except 59.94p@1080 is recorded at 50 Mbs).
- AVC-Ultra Long GOP 50 (50 Mbs for all supported frame rates).

## Sony XAVC

Sony XAVC is available in TIFO, but only MXF XAVC is maintained for Sony specification performance.

XAVC HD is always CBR - Use Constrained Bytes Per GOP is ignored.

**Quality.** Specifies the quality setting to use for encoding.

Sony XAVC HD Long classes 25, 35, and 50 are long GOP, 10-bit 4:2:2 chroma.

**Table 8.**

Standard	25	35	50
720p50			*
720p59.94			*
1080i50	*	*	*
1080i59.94	*	*	*
1080p23.98	*	*	*
1080p25	*	*	*
1080p29.97	*	*	*
1080p50p		*	*
1080p59.94		*	*

The bitrate for a class is maintained for all resolutions (25/35/50 mbs)

GOP length for 23.976/25 fps = 12 frames

GOP length for 29.97 fps = 15 frames

GOP length for 50 fps = 24 frames

GOP length for 59.94 fps = 30 frames

**Class 50** - The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (223,232 bytes (NTSC FHD)) and 271,360 bytes (PAL FHD). Therefore, high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Supported frame rates: Standard | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97.

### **Class 100 4:2:2 - HD - CBG only**

The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (462,848 bytes (NTSC 1080)) and 559,104 bytes (PAL 1080), so high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling

Output is full HD - it is not anamorphically scaled.

Supported frame rates: Standard | 720p 50 | 720p 59.94 | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97 | 1080p 50p | 1080p 59.94.

### **Class 300 4:2:2 and Class 480 4:2:2 - UHD/4K - CBG/VBR - Capture action only**

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Constant bitrate (Use Constrained Bytes Per GOP) is enabled by default.

Supported frame rates for UHD and 4K: Standard | 23.98 | 24 (4K only) | 25 | 29.97 | 50 | 59.94

### **XAVC Long QFHD**

Class 100 Supported sources: UHD 23.98, 25, 29.97)

Class 140 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

Class 200 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

**Use Constrained Bytes per GOP.** When enabled, XAVC Class 300 and Class 480 is generated as CBG. All other classes are generated as VBR. Ignored for XAVC HD video.

### **Sony XDCAM**

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbs at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbs). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

## Uncompressed

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

**512 VBI Cropping Method.** In interlaced video, when transcoding to a Lower Field First convention, the lower field is the first line of output of an interlaced format, followed by alternating upper (that is - top, odd) and lower (bottom, even) field lines.

To preserve the standard of encoding VBI data on a specific line of the output video, such as preserving captions on line 21, an encoder may need to either pad, crop and/or shift lines when creating the output.

When recording SD NTSC video from tape, 26 lines of non-visible data need to be discarded to produce 486 lines of visible data. Capture adds additional cropping options to maintain VBI caption data from line 21 in a transcoded output for 486 line output when using the ProRes or Uncompressed transcoders.

**Crop 25 lines from the top.** Crop 25 lines from the top and 1 line from the bottom. This results in Lower Field first video with Closed Captioning on Line 22.

**Crop 26 lines from the top.** Crop 26 lines from the top, resulting in Upper field first video with Closed Captioning on Line 21.

**Crop 27 lines from the top.** Crop 27 lines from the top, and pad the bottom with 1 blank line to keep the correct frame dimensions, resulting in Lower Field first video with Closed Captioning on Line 21.

## x264

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the target bit rate in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported: `-fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## x265

There are no general limitations for frame size or frame rate, but encoding interlaced source is not supported. Compression is resource intensive, and real time performance may not be sustained when recording high frame rates.

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x265 command line syntax. For setting specific x265 parameters, you can enter x265 CLI commands (separated by

spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x265 command line parameters are not supported: `-fake-interlaced` | `--nal-hrd cbr` | `--profile` | `--video-format` | `--bitrate`.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec to use to encode audio tracks. No other codecs are provided.

**Channel Configuration.** Specifies the number or layout of the audio channels: Mono | Stereo | number of channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, causes the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is checked, in which case this setting is ignored.

**Bit Depth.** Select the desired audio bit depth.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Proxy TIFO Output

Telestream Intermediary Format (TIFO) is an intermediate media wrapper format designed by Telestream as a uniform, interchangeable file format to ensure interoperability among Telestream's media processing platforms, including Vantage, Lightspeed Live Capture, and others. TIFO provides a lightweight, low-overhead wrapper that is essence-agnostic, with out-of-band metadata, timecode, and closed caption support.

Using TIFO improves the ability to move media files between Telestream's media processing platforms with all media essence elements and metadata intact, preserving the widest range of transcoding options.

---

**Note:** TIFO files can be opened as they are being captured by Telestream's Switch player and Vantage workflows at a time when the captured file reports a non-zero file size. Requires Switch 4.0 or later.

---

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

Apple ProRes Proxy | AVC | Avid DNxHD LB | Avid H.264 Proxy

### Audio

MPEG-1 Layer 2, Mono, 48 kHz, 96Kbps, up to 16 tracks

PCM, 16/20/24-bit, 48Kbps, up to 16 tracks; PCM/Dolby E

## Container Settings

The TIFO Container wraps the specified media into a TIFO file format.

### General

**File Extension.** Specifies *tifo*. No other extensions are provided.

**Flush Period.** When checked, writes all buffered media to disk at the specified interval (1000 ms default) at a minimum.

## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codecs

**Codec.** Specifies which codec to use to encode video streams. For details, see the appropriate topic following.

### Apple ProRes Proxy

There are no user-settable controls in this codec.

### AVC

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Same as Source.** When checked, the width and height of the source is passed through. Width and Height parameters set in the action for the AVC codec are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** (Ignored when Same as Source is checked.) Specifies the width of the frame, in pixels (320 - 720).

**Height.** (Ignored when Same as Source is checked.) Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## **Avid DNxHD LB**

No user-settable controls provided for this codec.

## **Avid H.264 Proxy**

When used in conjunction in a workflow with the Avid Media Creation action for Interplay ingest, the Avid H.264 Proxy outputs are checked in with Avid-compatible Hi Res outputs from the Capture action and can be linked for proxy based editing.

**Quality.** Specifies the video quality profile.

## **Time Code Burn-in Filter**

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame (0 - 2160 pixels).

**Font Size.** Specifies the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.



## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codecs

**Codec.** Specifies which codec to use to encode audio.

### MPEG-1 Layer 2

**Channel Configuration.** Specifies Mono.

**Track Count.** Specifies the number of tracks (max. 16). Channels: 2, 4, 6, 8, 10, 12, 16 (14 is intentionally omitted).

**Bit Rate.** Specifies 96 kbps for the encoded audio stream.

**Sample Rate.** Specifies 48kHz as sample rate of the encoded audio stream.

### PCM

**Channel Configuration.** Specifies the number or layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Select the desired audio bit depth.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Proxy MP4 Output

The Proxy MP4 container conforms to IEC 14496-14 MP4 file format standard.

---

**Note:** MP4 files do not contain a timecode track.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Container Settings

The Proxy MP4 Container wraps the specified media into an MP4 file format.

**File Extension.** MP4 selected by default. No other selections are available.

## Video Stream Details

Select the Video Stream component to display its details on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codec you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codec (AVC)

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Codec.** Specifies AVC as the codec to use to encode video tracks. No other codecs are provided.

**Same as Source.** When checked, the width and height of the source is passed through. Width and Height parameters set in the action for the AVC codec are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** (Ignored when Same as Source is checked.) Specifies the width of the frame, in pixels (320 - 720).

**Height.** (Ignored when Same as Source is checked.) Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (AAC)

**Codec.** Specifies AAC for encoding audio tracks. No other codecs are provided.

### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

**Bitrate.** Specifies the target bit rate for this audio stream: AAC 16-bit, 64-512 kbps, 1 track.

# Proxy MXF RDD 25 Output

The Proxy MXF RDD 25 Secondary Output component generates media in a container that conforms to the RDD 25 MXF file format standard.

---

**Note:** RDD 25 proxy files can be opened in Telestream's Switch player, and other applications, as they are being captured and are growing in size. Requires Switch 4.0 or later.

---

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Container Settings

The Proxy MXF RDD 25 container wraps the specified media in MXF format.

**File Extension.** Specifies *mxl*. No other extensions are available.

## Video Stream Details

Select the Video Stream component to display its details on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec (AVC)

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Codec.** Specifies AVC as the codec to use to encode video tracks. No other codecs are provided.

**Same as Source.** When checked, the width and height of the source is passed through. Width and Height values are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** (Ignored when Same as Source is checked). Specifies the width of the frame, in pixels (320 - 720).

**Height.** (Ignored when Same as Source is checked). Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (AAC)

**Codec.** Specifies AAC for encoding audio tracks. No other codecs are provided.

#### General

When binding a control to a variable, choose a Text variable and set the value to the menu option you choose.

**Channel Configuration.** Specifies which type of audio to generate. This settings is valid only when Create Stereo Pairs is *not* checked.

**Bitrate.** Specifies the target bit rate for this audio stream: AAC 16-bit, 64/96/128 kbps, 8 channel.

**Create Stereo Pairs.** When checked, specifies that each set of tracks should be converted to a stereo pair. Specify the number of stereo pairs to create (up to 8 pairs).

**Channel Map.** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Proxy HLS Output

HTTP Live Streaming (HLS) is an HTTP-based, adaptive bit rate streaming communications protocol. The Proxy HLS output generates media in HLS format.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Container Settings

The Proxy HLS Container wraps the specified media into HLS format.

**File Extension.** *m3u8* selected by default. No other selections are available.

**GOP Length.** Specifies the GOP length in number of frames.

**GOPs per Segment.** Number of GOPs per Segment.

---

**Note:** Segment duration should be a multiple of GOP duration. Lower segment duration can reduce latency.

---

**SCTE date range.** When checked, adds SCTE date messages to the manifest files.

**Floating point duration.** When checked, enables floating point duration. When unchecked, integer values are used.

## Video Stream Details

Select the Video Stream component (up to 4 permitted) to display its details on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

**NOTE:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.



**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec (AVC)

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Codec.** Specifies AVC as the codec to use to encode video. No other codecs are provided.

**Same as Source.** When enabled, the width and height of the source is passed through. Width and Height parameters set in the action for the AVC codec are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** (Ignored when Same as Source is checked.) Specifies the width of the frame, in pixels (320 - 720).

**Height.** (Ignored when Same as Source is checked.) Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The X position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The Y position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (AAC)

**Codec.** Specifies AAC for encoding audio tracks. No other codecs are provided.

#### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

**Bitrate.** Specifies the target bit rate for this audio stream: AAC 16-bit, 64-512 kbps, 1 track.

**Channel Map.** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## ANC Stream Details

Select the ANC component to display its details on the right.

### ANC (Web VTT)

**Codec.** Enable to create WebVTT output.

**Language.** Specifies the language of the WebVTT output subtitles.

**Force Separate Video, Audio, and VTT Folders.** When checked, the output audio, video, and VTT files are all in separate folders and files.

**Caption Input Type.** Specifies the caption format of the input.

# Tape Action Output Containers

These output containers are included in the Tape action:

## MXF OP1a Output

The MXF container encodes the media and produces an MXF Operational Pattern 1a (OP-1a, SMPTE 379M-2004) file with a generic container mapped to Lightspeed Live Capture's available video essences.

---

**Note:** Most Lightspeed Live Capture MXF files containing IMX, XDCAM or AVC-Intra, and all QuickTime Open files, are created in such a way that they can be opened for editing/playing while they are still growing during capture. Check in your edit/player application guide for details on supported formats.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

Select the container to display its settings in the configuration panel on the right.

## Format Summary

### Video

AVC | Avid DNxHD | DV | DVCPro HD | IMX | JPEG2000 Lossless | JPEG2000 Lossy | MPEG-2 I-Frame | Panasonic AVC-Intra | Panasonic AVC-Ultra | Sony XDCAM | Uncompressed | x264

### Audio

PCM 16/20/24-bit, 48Kbps, up to 16 tracks

### Timecode

The following standards, available from SMPTE, describe the timecode track:

SMPTE 377M, Timecode track

SMPTE 385M, System item

SMPTE 405M, System item (DNxHD)

## MXF Applicable Standards

The following standards, available from SMPTE, describe the MXF format:

SMPTE 331M-2004, Elements and Metadata Definitions for SDTI-CP

SMPTE 377M-2004, Material Exchange Format (MXF)

SMPTE 378M-2004, MXF Operational Pattern 1a

SMPTE 379M-2004, MXF Generic Container

SMPTE 382M-2007, Mapping AES3 and Broadcast Wave Audio into MXF Generic Container - DV (AES3), DNxHD, (BWF)

SMPTE 383M-2008, Mapping DV-DIF Data into MXF Generic Container - DV

SMPTE 385M-2004, Mapping SDTI-CP Essence and Metadata into MXF Generic Container - DV, IMX

SMPTE 386M-2004, Mapping Type D-10 Essence Data to MXF Generic Container - IMX

SMPTE 394M-2006, System Scheme 1 for MXF Generic Container DNxHD

SMPTE 405M-2006, Elements and Individual Data Items for MXF Generic Container System Scheme 1 - DNxHD

SMPTE 436M-2006, MXF Mappings for VBI Lines and Ancillary Data Packets

SMPTE 2019-4-2008, Mapping VC-3 Coding Units into MXF Generic Container - DNxHD

SMPTE RDD03, eVTR MXF Interoperability Specification - DV, IMX

SMPTE RDD 9-2009, MXF Interoperability Specification of Sony MPEG Long GOP Product

SMPTE ST 298-2009, Universal Labels for Unique Identification of Digital Data

SMPTE ST 326:2000, Television -SDTI Content Package Format (SDTI-CP)

SMPTE ST 381-1:2005, Television-Material Exchange Format (MXF) - Mapping MPEG Streams into the MXF Generic Container

SMPTE RDD 25:2014, AVC MXF Proxies

---

**Note:** The resulting MXF (OP-1a) file can contain VANC data (SMPTE 436M) if present within the incoming SDI stream.

---

## Output Settings

**MXF OP-1a Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

## Container Settings

### General

**File Extension.** Specifies the extension of the output file name: mxf. No other options available.

**436 Data Track.** Specifies how to add SMPTE 436 data to the output.

**Partition Strategy.** Specifies how to apply MXF partitioning.

**Broadcast Wave Audio.** When checked, sets the audio tracks to Broadcast Wave format, adding metadata such as timestamps to the audio stream.

**Mpeg Picture Element.** When checked, specifies that MPEG picture elements should be used for Avid and Adobe Premiere Pro compatibility.

**Telestream Index.** When checked, a proprietary, sidecar Telestream Index file is created for use in specific customer workflows. For details, please contact Customer Service.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its settings on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codecs

**Codec.** Specifies the codec used to encode the output video stream.

## AVC

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

**Profile.** Specifies the video quality profile:

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the output target bit rate in kbps (512 - 50,000).

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10 bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97

- HQ TR - Not supported in Capture - do not use.

-SQ TR (8 bit) - not supported in 1080p 50/59.94/60.

- LB (8 bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97.

**Table 9.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 440x 1080p/60	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8 bits 291 Mbs
DNXHQ LB	Avid DNxHD 90 1080p/60	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8 bits 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 365x 1080p/50	10 bits 367 Mbs

**Table 9.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQ	Avid DNxHD 365 1080p/50	8 bits 367 Mbs
DNXHD SQ	Avid DNxHD 240 1080p/50	8 bits 242 Mbs
DNXHD LB	Avid DNxHD 75 1080p/50	8 bits 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 185x 1080i/50	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8 bits 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10 bits 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8 bits 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10 bits 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/24	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8 bits 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10 bits 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8 bits 80 Mbs

**Table 9.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD LB	Avid DNxHD 36 1080p/23.976	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10 bits 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8 bits 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8 bits 45 Mbs
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10 bits 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8 bits 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8 bits 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8 bits 85 Mbs

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies the encoder quality setting.

## DVCPRO HD

DVCPRO HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback. There are no user-configurable settings.

Supported input frame rates:

- 720p: 50/59.94
- 1080i: 25/29.97
- 1080p: 23.976p/psf

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:



- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPro HD supports up to eight audio channels at 48kHz/16 bits per channel.

## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies the encoder quality setting.

**Follow D-10/SMPTE 331M Spec.** To match the Sony IMX implementation, uncheck this control and configure the audio tracks to specify Force one track per channel. Check this control to produce output conforming to D-10/SMPTE 331M.

## JPEG2000 Lossless (Comprimato)

The Comprimato JPEG2000 Lossless codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossless mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit, in megabytes (MB).

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## JPEG2000 Lossy (Comprimato)

The Comprimato JPEG2000 Lossy codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossy mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high-quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Video Bit Rate.** Specifies the bit rate of the output in kbps.

**Quantization Coefficient.** Specifies quality (1-100). If set toward the lower bound it reduces data correspondingly and quality decreases; if set toward the upper bound it increases data and quality. The default value of 100 allows the full quality as set by the bit rate to be used.

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## MPEG-2 I-Frame

The MPEG-2 I-Frame codec is an alternative IMX codec that encodes SD NTSC video cropped to 720x480 to eliminate VBI. It is encoded as an MPEG-2, I-Frame-only file in an MXF OP1a container.

The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies the encoder quality setting.

## Panasonic AVC-Intra

**Follow SMPTE RP2027 Spec (Only applies to AVC-I class 50 and 100).** When enabled, specifies that the file should be recognized as Panasonic AVC-I in the Media Creation action. The parameter is enabled by default, but may be disabled for generic AVC-I output.

**Quality.** Specifies the encoder quality setting.

### AVC-Intra 50

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10 bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440x1080. 1280 x 720 is scaled to 960x720)

### **AVC-Intra 100**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output Frames are not scaled

### **AVC-Intra 200**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output frames are not scaled.

## **Panasonic AVC-Ultra**

Panasonic AVC-Ultra is generated at 10 bits, with 4:2:2 chroma subsampling.

Supported frame rates for long GOP: 23.98p | 25i | 25p | 29.97i | 29.97p | 50p (720 at 25 and 50 Mbs, 1080 for Long GOP 25 only) | 59.94p (720 at 25 and 50Mbs, 1080 for Long GOP 25 only)

**Quality.** Specifies the video quality profile:

- AVC-Ultra Long GOP 25 (25 Mbs for all frame rates, except 59.94p@1080 is recorded at 50 Mbs)

- AVC-Ultra Long GOP 50 (50 Mbs for all supported frame rates)

## **Sony XDCAM**

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbps at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbps). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

## Uncompressed

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## x264

**Profile.** Specifies the profile to use for encoding.

**Bit Rate.** Specifies the output bit rate in kbps.

**Command Line.** Enables you to optionally configure the codec using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Specifies the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: white). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add SMPTE 2086 Master Display Metadata.** Enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates - Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

**Codec.** Specifies PCM as the codec used to generate audio tracks. No other codecs provided.

### General

**Channel Configuration.** Specifies Mono | Stereo | number of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## MXF XAVC Output

The MXF XAVC Output component generates Sony-compliant XAVC video wrapped in an MXF OP1a file. Audio defaults to 8 tracks of 24 bit PCM audio, with each track containing one channel of audio. These files are compliant with the SMPTE-377M standard.

---

**Note:** Most Lightspeed Live Capture MXF files containing IMX, XDCAM or AVC-Intra, and all QuickTime Open files, are created in such a way that they can be opened for editing/playing while they are still growing during capture. Check in your edit/player application guide for details on supported formats.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

Select the container to display its settings in the configuration panel on the right.

## Format Summary

### Video

Sony XAVC

### Audio

PCM 24-bit, 48Kbps, 8 channels

PCM/Dolby E (pass through, 16 bit only)

### Timecode

SMPTE 377M, Timecode track

SMPTE 385M, System item

## MXF Applicable Standards

SMPTE 331M-2004, Elements and Metadata Definitions for SDTI-CP

SMPTE 377M-2004, Material Exchange Format (MXF)

SMPTE 378M-2004, MXF Operational Pattern 1a

SMPTE 379M-2004, MXF Generic Container



SMPTE 436M-2006, MXF Mappings for VBI Lines and Ancillary Data Packets

SMPTE ST 298-2009, Universal Labels for Unique Identification of Digital Data

SMPTE ST 326:2000, Television -SDTI Content Package Format (SDTI-CP)

---

**Note:** The resulting MXF (OP-1a) file can contain VANC data (SMPTE 436M) if present within the incoming SDI stream.

---

## Container Settings

The MXF XAVC Container wraps the specified media in a Sony compliant MXF OP-1a file format.

**MXF XAVC Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

### General

**File Extension.** Specifies *mxl*. No other extensions permitted.

**436 Data Track.** Specifies how to add SMPTE 436 data to the output.

**Broadcast Wave Audio.** When checked, sets the audio tracks to Broadcast Wave format, adding metadata such as timestamps to the audio stream.

**Partition Duration.** When checked, sets the partition duration to the value specified, in seconds. Default: 30 seconds.

**Partition Strategy.** Place Essence Container and Index Table in Header Partition + RIP.

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its settings on the right.

## Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Sony XAVC

Sony XAVC is available in TIFO, but only MXF XAVC is maintained for Sony specification performance.

XAVC HD is always CBR - Use Constrained Bytes Per GOP is ignored.

**Quality.** Specifies the quality setting to use for encoding.

Sony XAVC HD Long classes 25, 35, and 50 are long GOP, 10-bit 4:2:2 chroma.

**Table 10.**

Standard	25	35	50
720p50			*
720p59.94			*
1080i50	*	*	*
1080i59.94	*	*	*
1080p23.98	*	*	*
1080p25	*	*	*
1080p29.97	*	*	*
1080p50p		*	*
1080p59.94		*	*

The bitrate for a class is maintained for all resolutions (25/35/50 mbs)

GOP length for 23.976/25 fps = 12 frames

GOP length for 29.97 fps = 15 frames

GOP length for 50 fps = 24 frames

GOP length for 59.94 fps = 30 frames

**Quality.** Specifies the video quality profile.

Class 50 - The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (223,232 bytes (NTSC FHD)) and 271,360 bytes (PAL FHD). Therefore, high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Supported frame rates: Standard | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97.

### **Class 100 4:2:2 - HD - CBG only**

The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (462,848 bytes (NTSC 1080)) and 559,104 bytes (PAL 1080), so high frame rates will result in higher bit rates.

Capture support is limited to 10 bit 4:2:2 chroma sampling

Output is full HD - it is not anamorphically scaled.

Supported frame rates: Standard | 720p 50 | 720p 59.94 | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97 | 1080p 50p | 1080p 59.94.

### **Class 300 4:2:2 and Class 480 4:2:2 - UHD/4K - CBG/VBR - Capture action only**

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Constant bitrate (Use Constrained Bytes Per GOP) is enabled by default.

Supported frame rates for UHD and 4K: Standard | 23.98 | 24 (4K only) | 25 | 29.97 | 50 | 59.94

### **XAVC Long QFHD**

Class 100 Supported sources: UHD 23.98, 25, 29.97)

Class 140 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

Class 200 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

**Use Constrained Bytes per GOP.** When enabled, XAVC Class 300 and Class 480 is generated as CBG. All other classes are generated as VBR. Ignored for XAVC HD video.

### **Time Code Burn-in Filter**

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

## Codec (PCM)

**Codec.** Specifies PCM as the codec used to generate audio tracks. No other codecs provided.

### General

**Channel Configuration.** Defaults to 8 channels.

**Label Channel Pairs Left/Right.** Defaults to False.

**Bit Depth.** Specifies 24 bit.

**Force One Track Per Channel.** Defaults to True.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## MPEG2-TS Output

The MPEG2-TS output container encodes media and saves it as an MPEG2 Transport Stream file.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

Select the container to display its settings in the configuration panel on the right.

### Format Summary

#### Video

MPEG-2 | x264

#### Audio

PCM

### Container

**MPEG2-TS Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

### Container Settings

**File Extension.** Specifies the extension to apply to the output file name.

**File Bit Rate.** (Default 19,000,000 bps). If unchecked, the Multiplexer uses the minimum rate as computed from the sum of all maximum rates for elementary streams, data streams, PSI streams and necessary overhead.

**List Audio Streams Before Video Streams.** When checked, lists audio streams before video streams in the PMT stream order.

**PAT Rate.** (Default 10.0 tables per second.) Specifies the repetition rate of the Program Association Table in the output stream. The PAT lists all programs in a transport stream, each of which is identified by a 16-bit Program Number.

**PMT Rate.** (Default 10.0 tables per second.) Specifies the repetition rate of the Program Map Table in the output stream. Each program listed in the PAT has a PMT (with PID) containing information about the program.

**Transport ID.** (Default 0.) Specifies the ID number for this transport stream.

**PAT Version.** (Default 0.) Specifies the version number of the Program Association Table.

**Program Number.** (Default 1.) Specifies the ID number of a specific program.

**PMT PID.** (Default 480.) This sets the Packet ID used for the Program Map Table.

**PCR PID.** (Default unselected/zero.) Specifies the Packet ID that carries the Program Clock Reference for this program. Set to the first video PID value if not specified.

**Maximum PCR Interval.** (Default 37 ms.) Specifies the maximum time between Program Clock References for this stream.

**PCR on every PES header.** When checked, inserts a PCR in each packet that has a PES header.

**No Empty Adaptation Fields.** When checked, forces the Multiplexer to avoid using zero-length adaptation field video packets.

**VBR Transport stream.** When checked, the Multiplexer creates a VBR transport stream; no attempt is made to maintain the bit rate.

**Error Behavior.** (Default: Fail on error.) Specifies how the action responds to an error.

**Error/Warning Threshold.** (Default 1.) Specifies the number of errors before the action enters the error state and the number of warnings that trigger a Fail on Warning or Error. This parameter has no effect when Error Behavior is set to Always Complete.

**Treat Buffer Underflows/Overflows as Errors.** When checked, buffer underflow or overflow warnings are treated as errors.

**2-Pass Multiplexing.** When checked, performs 2-pass multiplexing. Only use if you need to correct excessive bit rate fluctuations in the encoded stream resulting in video decoder underflow errors. The second pass is only executed if the first pass fails.

**Generate Config File.** Generates and places a Manzanita-compliant configuration file using the current settings into the same location as the output. The configuration file can be utilized in the IPTV transcoder action or in other actions that utilize Manzanita configuration files.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codecs

**Generate Config File.** Specifies which codec to use to encode the output file.

## MPEG-2

### General

**Bit Rate (in kbps).** Specifies the bit rate in kbps.

**GOP Structure.** Specifies the GOP Structure as a combination of I frames, B frames, and P frames. I frame-only structures have a lower visual quality but are well suited for editing. Longer GOP structures have higher visual quality and are best suited for playout.

**GOP Configuration.** Specifies the type of GOP structure.

**Start with I Frame.** When checked, specifies that the GOP start with an I-frame (display and coded order).

**Motion Estimation Factor.** Specifies how much motion estimation to use when encoding the video stream. A higher value results in higher quality and increases encoding time.

**Profile.** Specifies the video quality profile.

**Table 11.**

Profile	Max Data Rate	Resolution	Color Sampling
Main Profile@Main Level	15Mbps	720 x 480 up to 30fps	4:2:0
Main Profile@High 1440 Level	60Mbps	1080i x 1440 up to 30fps or 1080p x 1440 up to 30fps	4:2:0
Main Profile@High Level	60Mbps	1920 x 1080 at 30 fps OR 1280 x 720 up to 60fps	4:2:0



Table 11.

Profile	Max Data Rate	Resolution	Color Sampling
High Profile@Main Level / 4:2:2Profile@Main Level	20Mbps	720 x 480 up to 60fps	4:2:2
High Profile@High 1440 Level / 4:2:2 Profile@High 1440 Level	80Mbps	1080i x 1440 up to 30fps or 720p up to 60 fps	4:2:2
High Profile@High Level / 4:2:2 Profile@High Level	100Mbps	1080i x 1920 up to 30fps or 1080p x 1920 up to 60fps	4:2:2

**Level.** Specifies the level to use for encoding.

**Chroma.** Specifies the chroma sub-sampling to use.

#### Video Buffer Verifier

**Video Buffer Verifier.** Specifies whether or not to use the default settings or custom VBV settings. When Specify VBV Settings is set, configure these controls:

**VBV Buffer Size.** Specifies the size of the VBV buffer in kbps. Larger values allow the encoder greater flexibility during encoding.

**VBV Delay.** Specifies how much time is allowed between the transmission of the first frame and its actual decode. Larger values allow the codec greater flexibility during encoding.

## x264

**Profile.** Specifies the profile to use for encoding.

**Bit Rate (in kbps).** Specifies the bit rate in kbps.

**Command Line.** Enables you to optionally configure the codec using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code

such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec

**Codec.** Specifies PCM as the codec used to generate audio tracks.

### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the audio bit depth.

**Force One Track Per Channel.** When checked, the codec creates multiple mono tracks instead of a single multi-channel track.

### Channel Map

**Output Channel (1... 32).** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

# QuickTime Output

The QuickTime container conforms to the IEC 14496-14 MP4 File Format standard and the QuickTime File Format Specification.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

Apple ProRes | AVC | Avid DNxHD | Avid DNxHR | DV | DVCPro HD | HEVC | IMX | Panasonic AVC-Intra | Sony XDCAM | Uncompressed | x264 | x265

### Audio

PCM, 16/20/24-bit, 48Kbps, up to 32 channels

## Container Settings

The QuickTime Container wraps the specified media into a QuickTime file format.

**QuickTime Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

### General Panel

**File Extension.** QuickTime (MOV) selected by default. No other selections are available.

**Timecode Track.** Specifies no track, or a track that is hidden or visible.

**Caption Track.** (Closed caption track) None, C608, or C708.

**Fast Start.** Enable Fast Start to improve web based playback when downloading the file.

**Header Compression.** Compresses QuickTime header information to improve playback responsiveness when downloading the file.

**Color Space.** Specifies the color space to use for the generated video. Options include:

**Conform Aperture.** Check to enable, then choose one of these options:

- Disabled

- *Classic* - Displays the image without applying either the pixel aspect ratio or the clean aperture. The image is displayed using the track header dimensions, meaning the decompressed picture is scaled into the track header dimensions if the encoded dimensions are different.

- *Clean Aperture* - Both the clean aperture and the pixel aspect ratio are applied. The dimensions of the track become equal to the clean dimensions which are equal to the display dimensions (with conformed contents).

- *Production Aperture* - Applies the pixel aspect ratio but not the clean aperture. The image is presented in the correct aspect ratio, but the extra pixels outside of the image that exist in the source material will be presented. The track dimensions are equal to the result of applying the pixel aspect ratio.

- *Encoded Pixels* - The encoded pixels are displayed intact in this mode. Under this mode the track dimensions are equal to the encoded dimensions. No scaling or transformation takes place.

---

**Note:** The Clean Aperture selection should not be used in conjunction with the Enable CLAP Atom selection. Only one or the other should be used.

---

**Enable CLAP atom.** Enables the QuickTime Clean Aperture atom.

CLAP Atom insertion should not be used in conjunction with Conform Aperture > Clean Aperture selection above. Only one or the other should be used.

## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Clean Aperture

**Clean Aperture.** Specify the crop settings for Left, Right, Top, and Bottom pixels to apply to the Clean Aperture:

- *Not Enabled* - Turns off the crop settings for Clean Aperture.

- *Specify Inset* - Enables the ability to specify the Clean Aperture crop settings.

## Video Stream Details

Select the Video Stream component to display its options on the right.

## Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codec you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codecs

Specifies the codec to produce the capture output. Additional configuration parameters may be present.

## Apple ProRes

**Quality.** Specifies video quality profile.

## AVC

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Profile.** Specifies the video quality profile:

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the target bit rate of the output in kbps (512 - 50,000).

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10 bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8 bit) - not supported in 1080p 50/59.94/60.
- LB (8 bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 12.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD HQX	Avid DNxHD 440x 1080p/60	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8 bits 291 Mbs
DNXHQB LB	Avid DNxHD 90 1080p/60	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8 bits 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 365x 1080p/50	10 bits 367 Mbs
DNXHD HQ	Avid DNxHD 365 1080p/50	8 bits 367 Mbs
DNXHD SQ	Avid DNxHD 240 1080p/50	8 bits 242 Mbs
DNXHD LB	Avid DNxHD 75 1080p/50	8 bits 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 185x 1080i/50	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8 bits 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10 bits 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8 bits 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10 bits 352 Mbs

**Table 12.**

<b>Transcoder Category</b>	<b>Legacy Avid Resolution</b>	<b>Bit Depth / Rate</b>
DNXHD HQX	Avid DNxHD 175x 1080p/24	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8 bits 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10 bits 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8 bits 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10 bits 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8 bits 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8 bits 45 Mbs
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10 bits 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8 bits 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8 bits 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8 bits 85 Mbs

**Avid DNxHR**

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10 bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-Bit 4:2:2 high-quality
- SQ (8-Bit 4:2:2 standard-quality)
- LB (8-Bit 4:2:2 low bandwidth, offline quality)

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies video quality profile.

## DVCPRO HD

DVCPro HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback. There are no user-configurable settings.

Supported input frame rates:

- 720p: 50/59.94
- 1080i: 25/29.97
- 1080p: 23.976p/psf

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:

- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPro HD supports up to eight audio channels at 48kHz/16 bits per channel.

## HEVC

There are no general limitations for frame size or frame rate generation, but compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p at 59.94 fps.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).



## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies video quality profile.

**Follow D-10/SMPTE 331M Spec.** To match the Sony IMX implementation, uncheck this control and configure the audio tracks to specify Force one track per channel. Check this control to produce output conforming to D-10/SMPTE 331M.

## Panasonic AVC-Intra

**Quality.** Specifies video quality profile.

### AVC-Intra 50

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10 bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440x1080. 1280 x 720 is scaled to 960x720)

### AVC-Intra 100

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output Frames are not scaled

### AVC-Intra 200

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output frames are not scaled.

## Sony XDCAM

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbs at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbs). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

## Uncompressed (10-bit)

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## x264

**Quality.** Specifies video quality profile.

**Bit Rate.** Specifies the bit rate of the output in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported:

`--fake-interlaced`

`--nal-hrd cbr`

`--profile`

`--video-format`

`--bitrate`

## x265

There are no general limitations for frame size or frame rate, but encoding interlaced source is not supported. Compression is resource intensive, and real time performance may not be sustained when recording high frame rates.

**Profile.** Specifies video quality profile.

**Bit Rate.** Specifies the bit rate of the output in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x265 command line syntax. For setting specific x265 parameters, you can enter x265 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x265 command line parameters are not supported:

`--fake-interlaced`

`--nal-hrd cbr`

`--profile`

`--video-format`

`--bitrate`

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as `#0000DDFF`, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as `#0000DD`, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec

PCM is specified by default. No other selections are available.

### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata are set to Mono.

### Channel Map

Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.



## QuickTime Open Output

The QuickTime Open container conforms to the IEC 14496-14 MP4 File Format standard and the QuickTime File Format Specification.

Because of the unique characteristics of QuickTime Open files created by Live Capture, the duration set in the QuickTime header is hard-coded to the value of the Default Duration setting during capture. If a capture is stopped prior to the timecode specified in the Default Duration, the QuickTime Open process updates the captured file's header with the actual duration of the clip. See [Important Information about Default Duration](#) below for important details.

---

**Note:** Most Lightspeed Live Capture MXF files containing IMX, XDCAM or AVC-Intra, and all QuickTime Open files, can be opened for editing/playing while they are still growing during capture. Check in your edit/player application guide for details on supported formats.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

Apple ProRes | Avid DNxHD

### Audio

MPEG-1 Layer 2 | PCM, 16/20/24-bit, 48Kbps, up to 32 channels

## Container Settings

The QuickTime container wraps the specified media into a QuickTime file format.

**QuickTime Open Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

### General Panel

**File Extension.** QuickTime (MOV) selected by default. Not changeable.

**Timecode Track.** Specifies no track, or a track that is hidden or visible.

**Caption Track.** Specifies the type of closed caption track or None. When creating output using the 608 caption track in a QuickTime container, only 29.97 FPS sources are supported, and it is generally expected that the source is SD NTSC with captions in VBI. Also, in this scenario, the Create 708 Caption data should be disabled. If the source that is being recorded is progressive HD, you must select the 708 caption track in the QuickTime container to propagate captions.

**Default Duration.** The maximum possible duration for a captured file.

## Important Information about Default Duration

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**Note:** The *Default Duration* is the maximum possible duration that can be captured using the QuickTime Open container. Default: 9 hours.

---

The QuickTime Open container's *Default Duration* is used to set the initial duration written to the QuickTime Open file's header. This value will be reported by the QuickTime media file when it is opened by a media player or edit application while the captured file is being written to and is growing. If a capture session is stopped before the *Default Duration* is reached the QuickTime Open process will update the captured file's QuickTime header with the *actual* captured duration of the clip.

Here are three possible scenarios that you may encounter when using the QuickTime Open container:

1. A capture session is stopped before reaching, or exactly at, the *Default Duration* set in the Workflow. In these cases the Workflow will complete successfully. The captured QuickTime file's header will be updated with the *actual* captured duration of the clip.
2. Your capture session attempts to record to a duration that is *beyond* the *Default Duration* set in the Workflow. In this case the associated Workflow's origin action (and any subsequent downstream actions) indicates that they have 'FAILED'. The Capture origin action reports the following error:  
*... Failed to write sample. The Default Duration of this workflow has been reached. Capture actions configured with a QuickTime 'Open' container will automatically stop at the container's Default Duration regardless of the requested record duration. The output file created by this action will contain a duration equal to the Default Duration. In most cases the resulting output file will be playable and can be used for editing. The default duration has been exceeded.*
3. If scenario #1 or #2 occur with a Workflow in the Open mode, and the action immediately following the capture origin action is an Open Copy action, the file copied by the Open Copy action will retain the original *Default Duration*. The copied media file will show a duration equal to the Workflow's *Default Duration* and will be playable and editable. Captured files stopped prior to the *Default Duration* (scenario #1) will contain no active media data from the point where the capture session was stopped through the end of the file. Some media players or edit applications may display errors or faults when trying to access the timeline locations with no active media data.

**Header Compression.** Compresses QuickTime header information to improve playback responsiveness when downloading the file.

**Color Space.** Specifies the QuickTime file color space. Options include:

- *Do not specify*
- *XYZ with SMPTE 428-1 (DCDM) Transfer Characteristics*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (NTSC)*
- *ITU-R Recommendation BT.601 with SMPTE-C Color Primaries (PAL)*
- *ITU-R Recommendation BT.2020*
- *ITU-R Recommendation BT.709 Color Primaries*
- *RGB with BT.709 Color Primaries*

**Conform Aperture.** Check to enable, then choose one of these options:

- *Disabled*
- *Classic* - Displays the image without applying either the pixel aspect ratio or the clean aperture. The image is displayed using the track header dimensions, meaning the decompressed picture is scaled into the track header dimensions if the encoded dimensions are different.
- *Clean Aperture* - Both the clean aperture and the pixel aspect ratio are applied. The dimensions of the track become equal to the clean dimensions which are equal to the display dimensions (with conformed contents).
- *Production Aperture* - Applies the pixel aspect ratio but not the clean aperture. The image is presented in the correct aspect ratio, but the extra pixels outside of the image that exist in the source material will be presented. The track dimensions are equal to the result of applying the pixel aspect ratio.
- *Encoded Pixels* - The encoded pixels are displayed intact in this mode. Under this mode the track dimensions are equal to the encoded dimensions. No scaling or transformation takes place.

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**Note:** The Clean Aperture selection should not be used in conjunction with the Enable CLAP Atom selection. Only one or the other should be used.

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**Enable CLAP atom.** Enables the QuickTime Clean Aperture atom.

CLAP Atom insertion should not be used in conjunction with Conform Aperture > Clean Aperture selection above. Only one or the other should be used.

## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.



**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Clean Aperture

**Clean Aperture.** Specify the crop settings for Left, Right, Top, and Bottom pixels to apply to the Clean Aperture:

- *Not Enabled* - Turns off the crop settings for Clean Aperture.
- *Specify Inset* - Enables the ability to specify the Clean Aperture crop settings.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codecs

**Codec.** Specifies which codec to use to encode video streams.

### Apple ProRes

**Quality.** Specifies video quality profile.

**512 VBI Cropping Method.** In interlaced video, when transcoding to a Lower Field First convention, the lower field is the first line of output of the interlaced format, followed by alternating upper (that is - top, odd) and lower (that is - bottom, even) field lines.

To preserve the standard of encoding VBI data on a specific line of the output video, such as preserving captions on line 21, an encoder may need to either pad, crop and/or shift lines when creating the output.

When recording SD NTSC video from tape, 26 lines of non-visible data need to be discarded to produce 486 lines of visible data. Capture adds additional cropping

options to maintain VBI caption data from line 21 in a transcoded output for 486 line output when using the ProRes or Uncompressed transcoders.

**Crop 25 lines from the top.** Crop 25 lines from the top and 1 line from the bottom. This results in Lower Field first video with Closed Captioning on Line 22.

**Crop 26 lines from the top.** Crop 26 lines from the top, resulting in Upper field first video with Closed Captioning on Line 21.

**Crop 27 lines from the top.** Crop 27 lines from the top, and pad the bottom with 1 blank line to keep the correct frame dimensions, resulting in Lower Field first video with Closed Captioning on Line 21.

## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies the video quality profile. Certain profiles have limits:

- 444 - (10 bit) only supported in these 1080p resolutions: 23.98, 24, 25, 29.97
- HQ TR - Not supported in Capture - do not use.
- SQ TR (8 bit) - not supported in 1080p 50/59.94/60.
- LB (8 bit) - only supported for these 1080p resolutions: 23.98, 24, 25, 29.97

**Table 13.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQX	Avid DNxHD 440x 1080p/60	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/60	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/60	8 bits 291 Mbs
DNXHQB	Avid DNxHD 90 1080p/60	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 440x 1080p/59.94	10 bits 440 Mbs
DNXHD HQ	Avid DNxHD 440 1080p/59.94	8 bits 440 Mbs
DNXHD SQ	Avid DNxHD 290 1080p/59.94	8 bits 291 Mbs
DNXHD LB	Avid DNxHD 90 1080p/59.94	8 bits 90 Mbs
DNXHD HQX	Avid DNxHD 365x 1080p/50	10 bits 367 Mbs
DNXHD HQ	Avid DNxHD 365 1080p/50	8 bits 367 Mbs
DNXHD SQ	Avid DNxHD 240 1080p/50	8 bits 242 Mbs
DNXHD LB	Avid DNxHD 75 1080p/50	8 bits 75 Mbs
DNXHD HQX	Avid DNxHD 220x 1080i/59.94	10 bits 220 Mbs

**Table 13.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD HQ	Avid DNxHD 220 1080i/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 1080i/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080i/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 185x 1080i/50	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080i/50	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080i/50	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080i/50	8 bits 84 Mbs
DNXHD 4:4:4	Avid DNxHD 365x 1080p/25	10 bits 367 Mbs
DNXHD HQX	Avid DNxHD 185x 1080p/25	10 bits 184 Mbs
DNXHD HQ	Avid DNxHD 185 1080p/25	8 bits 184 Mbs
DNXHD SQ	Avid DNxHD 120 1080p/25	8 bits 121 Mbs
DNXHD SQ TR	Avid DNxHD 85 1080p/25	8 bits 84 Mbs
DNXHD LB	Avid DNxHD 36 1080p/25	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/24	10 bits 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/24	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/24	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/24	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/24	8 bits 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/24	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 350x 1080p/23.976	10 bits 352 Mbs
DNXHD HQX	Avid DNxHD 175x 1080p/23.976	10 bits 176 Mbs
DNXHD HQ	Avid DNxHD 175 1080p/23.976	8 bits 176 Mbs
DNXHD SQ	Avid DNxHD 115 1080p/23.976	8 bits 116 Mbs
DNXHD SQ TR	Avid DNxHD 80 1080p/23.976	8 bits 80 Mbs
DNXHD LB	Avid DNxHD 36 1080p/23.976	8 bits 36 Mbs
DNXHD 4:4:4	Avid DNxHD 440x 1080p/29.97	10 bits 440 Mbs
DNXHD HQX	Avid DNxHD 220x 1080p/29.97	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 1080p/29.97	8 bits 220 Mbs

**Table 13.**

Transcoder Category	Legacy Avid Resolution	Bit Depth / Rate
DNXHD SQ	Avid DNxHD 145 1080p/29.97	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 1080p/29.97	8 bits 100 Mbs
DNXHD LB	Avid DNxHD 45 1080p/29.97	8 bits 45 Mbs
DNXHD HQX	Avid DNxHD 220x 720p/59.94	10 bits 220 Mbs
DNXHD HQ	Avid DNxHD 220 720p/59.94	8 bits 220 Mbs
DNXHD SQ	Avid DNxHD 145 720p/59.94	8 bits 145 Mbs
DNXHD SQ TR	Avid DNxHD 100 720p/59.94	8 bits 100 Mbs
DNXHD HQX	Avid DNxHD 175x 720p/50	10 bits 175 Mbs
DNXHD HQ	Avid DNxHD 175 720p/50	8 bits 175 Mbs
DNXHD SQ	Avid DNxHD 115 720p/50	8 bits 115 Mbs
DNXHD SQ TR	Avid DNxHD 85 720p/50	8 bits 85 Mbs

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m<sup>2</sup>.

**MaxFALL.** Specifies the maximum frame average light level in cd/m<sup>2</sup>.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codecs

Specifies MPEG-1 Layer 2 | PCM codec to use to encode audio streams.

### PCM

#### General

**Channel Configuration.** Specifies the number or layout of the audio channels: Mono | Stereo | number of channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Select the desired audio bit depth. 16, 20, or 24 bit.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata are set to Mono.

## Channel Map

Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## MPEG-1 Layer 2

**Channel Configuration.** Specifies Mono for the track.

**Track Count.** Specifies the number of tracks (max. 16).

**Bit Rate.** Specifies 96 kbps.

**Sample Rate.** Specifies 48kHz.

# TIFO Output

Telestream Intermediary Format (TIFO) is an intermediate media wrapper format designed by Telestream as a uniform, interchangeable file format to ensure interoperability among Telestream's media processing solutions, including Vantage, Lightspeed Live Capture, and Pipeline. TIFO provides a lightweight, low-overhead wrapper that is essence-agnostic, with out-of-band metadata, timecode, and closed caption support.

Using TIFO improves the ability to move media files between Telestream's media processing solutions with all media essence elements and metadata intact, preserving the widest range of transcoding options.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

Apple ProRes | AVC | Avid DNxHD | Avid DNxHR | DV | DVCPro HD | HEVC | IMX | JPEG2000 Lossless | JPEG2000 Lossy | MPEG-2 | Panasonic AVC-Intra | Panasonic AVC-Ultra | Sony XAVC | Sony XDCAM | Uncompressed | x264 | x265

### Audio

PCM, 16/20/24-bit, 48Kbps, up to 32 channels

## Container Settings

The TIFO Container wraps the specified media into Telestream TIFO file format.

**TIFO Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

### General Panel

**File Extension.** TIFO selected by default. No other selections are available.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

### Codecs

Select a codec to produce the desired capture output. Additional configuration parameters may also be present.

### Apple ProRes

**Quality.** Specifies video quality profile.

### AVC

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Profile.** Specifies the video quality profile:

Baseline - Primarily for low-cost applications, typically used in video-conferencing and mobile applications. By specification, interlaced only.

Main - Standard-definition digital TV broadcasts that use MPEG-4 format.

High - Broadcast and disk storage applications, particularly for HD televisions.

**Bit Rate.** Specifies the target output bit rate in kbps (512 - 50,000).



## Avid DNxHD

DNxHD generates HD video, with a set bitrate for each DNxHD quality profile.

**Quality.** Specifies video quality profile.

## Avid DNxHR

Frame sizes - 3840x2160, 4096x2160 (up to 30 fps at 444, up to 60 fps at HQX 10 bit)

Frame rates - 23.976, 25, 29.97, 50, 59.94

**Quality.** Specifies the video quality profile:

- 444 - 12-bit RGB 4:4:4, cinema-quality delivery. This profile is not supported in Live Capture due to performance limitations.
- HQX - UHD/4K 12-bit YUV 4:2:2, Broadcast-quality delivery
- HQ - 8-Bit 4:2:2 high-quality
- SQ (8-Bit 4:2:2 standard-quality)
- LB (8-Bit 4:2:2 low bandwidth, offline quality)

## DV

The DV codec generates interlaced SD format NTSC (29.97 fps) and PAL (25 fps) video.

**Quality.** Specifies video quality profile.

## DVCPRO HD

DVCPRO HD video is an anamorphic format - the horizontal pixels are sub-sampled in the recording to save bandwidth, and stretched to fit a 16:9 frame during playback. There are no user-configurable settings.

Supported input frame rates:

- 720p: 50/59.94
- 1080i: 25/29.97
- 1080p: 23.976p/psf

Video is encoded at 8-bit, using 4:2:2 chroma. The data rate is generally recorded at 115 mbs. Encoded frames vary by input size:

- 1280x720 video is encoded at 960x720.
- 1920x1080 is encoded at 1280x1080@59.94i
- 1920x1080 is encoded at 1440x1080@50i

DVCPRO HD supports up to eight audio channels at 48kHz/16 bits per channel.

## HEVC

There are no general limitations for frame size or frame rate generation, but compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p at 59.94 fps.

**Bit Rate.** Specifies the output target bit rate (512 - 50,000).

## IMX

The IMX codec can only encode SD video. The IMX format specified by Sony supports 4 channel, 48 kHz, 24 bit or 8 channel, 48 kHz, 16 bit audio to match the Sony IMX implementation. Both configurations require Force One Track per Channel to be enabled in the PCM audio transcoder.

**Quality.** Specifies video quality profile.

**Follow D-10/SMPTE 331M Spec.** To match the Sony IMX implementation, uncheck this control and configure the audio tracks to specify Force one track per channel. Check this control to produce output conforming to D-10/SMPTE 331M.

## JPEG2000 Lossless (Comprimato)

The Comprimato JPEG2000 Lossless codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossless mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## JPEG2000 Lossy (Comprimato)

The Comprimato JPEG2000 Lossy codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossy mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

There are no general frame size or frame rate limitations. However, compression is resource intensive, and real time performance cannot be sustained beyond HD 1080p@59.94 for YUV encoding, and lower frame rates for RGB encoding.

### Codec Settings

**Video Bit Rate.** Specifies the bit rate of the output in kbps.

**Quantization Coefficient.** Specifies quality (1-100). If set toward the lower bound it reduces data correspondingly and quality decreases; if set toward the upper bound it increases data and quality. The default value of 100 allows the full quality as set by the bit rate to be used.

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code-block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the maximum number of discrete wavelet transform levels, or stages, to use (also known as Discrete Wavelet Transformation resolution).

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers will be used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, SOP marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

## MPEG-2

**Bit Rate.** Specifies the bit rate of the output in kbps (512 - 800,000).

**GOP Structure.** Sets the GOP Structure as a combination of I frames, B frames, and P frames. I frame-only structures have a lower visual quality but are well suited for editing. Longer GOP structures have higher visual quality and are best suited for playout.

**GOP Configuration.** Specifies the type of GOP structure: Open GOP or Closed GOP.

**Start with I Frame.** When checked, specifies that the GOP start with an I-frame (display and coded order).

**Motion Estimation Factor.** Indicates how much motion estimation to use when encoding the video stream. A higher value results in higher quality and increases the encode time. The default is 80 and the range is 1 to 100.

**Profile.** Specifies the video quality profile.

**Table 14.**

Profile	Max Data Rate	Resolution	Color Sampling
Main Profile@Main Level	15Mbps	720 x 480 up to 30fps	4:2:0
Main Profile@High 1440 Level	60Mbps	1080i x 1440 up to 30fps or 1080p x 1440 up to 30fps	4:2:0
Main Profile@High Level	60Mbps	1920 x 1080 at 30 fps OR 1280 x 720 up to 60fps	4:2:0
High Profile@Main Level / 4:2:2Profile@Main Level	20Mbps	720 x 480 up to 60fps	4:2:2
High Profile@High 1440 Level / 4:2:2 Profile@High 1440 Level	80Mbps	1080i x 1440 up to 30fps or 720p up to 60 fps	4:2:2
High Profile@High Level / 4:2:2 Profile@High Level	100Mbps	1080i x 1920 up to 30fps or 1080p x 1920 up to 60fps	4:2:2

**Level.** Specifies the MPEG level at which to encode the video.

**Chroma.** Specifies the chroma sub-sampling to use.

**VBV Buffer Size.** When Specify VBV Settings is selected, VBV Buffer Size specifies the size of the VBV buffer in kbps. Larger values allow the encoder greater flexibility during encoding.

**VBV Delay.** When Specify VBV Settings is selected, VBV Delay specifies how much time is allowed between the transmission of the first frame and its actual decode. Larger values allow the encoder greater flexibility during encoding.

## Panasonic AVC-Intra

**Quality.** Specifies video quality profile.

### AVC-Intra 50

CABAC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:0 chrominance sampling, 10 bit luma

Output frames are sub-sampled (1920x1080 is scaled to 1440x1080. 1280 x 720 is scaled to 960x720)

### AVC-Intra 100

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output Frames are not scaled

### **AVC-Intra 200**

CAVLC entropy coding only

1920 x 1080@59.94i, 50i, 29.97p, 25p, 23.98p

1920 x 1080@59.94, 50p

1280 x 720@59.94p, 50p

4:2:2 chrominance sampling, 10 bit luma

Output frames are not scaled.

### **Panasonic AVC-Ultra**

Panasonic AVC-Ultra is generated at 10 bits, with 4:2:2 chroma subsampling.

Supported frame rates for long GOP: 23.98p | 25i | 25p | 29.97i | 29.97p | 50p (720 at 25 and 50 Mbs, 1080 for Long GOP 25 only) | 59.94p (720 at 25 and 50Mbs, 1080 for Long GOP 25 only)

**Quality.** Specifies the video quality profile:

- AVC-Ultra Long GOP 25 (25 Mbs for all frame rates, except 59.94p@1080 is recorded at 50 Mbs)
- AVC-Ultra Long GOP 50 (50 Mbs for all supported frame rates)

### **Sony XAVC**

Sony XAVC is available in TIFO, but only MXF XAVC is maintained for Sony specification performance.

XAVC HD is always CBR - Use Constrained Bytes Per GOP is ignored.

**Quality.** Specifies the quality setting to use for encoding.

Sony XAVC HD Long classes 25, 35, and 50 are long GOP, 10-bit 4:2:2 chroma.

**Table 15.**

Standard	25	35	50
720p50			*
720p59.94			*
1080i50	*	*	*
1080i59.94	*	*	*
1080p23.98	*	*	*
1080p25	*	*	*
1080p29.97	*	*	*
1080p50p		*	*
1080p59.94		*	*

The bitrate for a class is maintained for all resolutions (25/35/50 mbs)

GOP length for 23.976/25 fps = 12 frames

GOP length for 29.97 fps = 15 frames

GOP length for 50 fps = 24 frames

GOP length for 59.94 fps = 30 frames

**Quality.** Specifies the video quality profile.

Class 50 - The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (223,232 bytes (NTSC FHD)) and 271,360 bytes (PAL FHD). Therefore, high frame rates will result in higher bit rates.

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Supported frame rates: Standard | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97.

#### **Class 100 4:2:2 - HD - CBG only**

The class category is determined by the approximate bitrate for a 1080i 59.94 stream. The size of each frame is fixed (462,848 bytes (NTSC 1080)) and 559,104 bytes (PAL 1080), so high frame rates will result in higher bit rates.

Capture support is limited to 10 bit 4:2:2 chroma sampling

Output is full HD - it is not anamorphically scaled.

Supported frame rates: Standard | 720p 50 | 720p 59.94 | 1080i 50 | 1080i 59.94 | 1080p 23.98 | 1080p 25 | 1080p 29.97 | 1080p 50p | 1080p 59.94.

**Class 300 4:2:2** and **Class 480 4:2:2** - UHD/4K - CBG/VBR - Capture action only

Capture support is limited to 10-bit 4:2:2 chroma sampling.

Constant bitrate (Use Constrained Bytes Per GOP) is enabled by default.

Supported frame rates for UHD and 4K: Standard | 23.98 | 24 (4K only) | 25 | 29.97 | 50 | 59.94

### XAVC Long QFHD

Class 100 Supported sources: UHD 23.98, 25, 29.97)

Class 140 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

Class 200 Supported sources: UHD 23.98, 25, 29.97, 50, 59.94)

**Use Constrained Bytes per GOP.** When enabled, XAVC Class 300 and Class 480 is generated as CBG. All other classes are generated as VBR. Ignored for XAVC HD video.

### Sony XDCAM

The XDCAM codec generates 1920x1080 interlaced video at 25 and 29.97fps, and 1280x720 progressive sources at 50 and 59.94 fps.

XDCAM HD422 is based on a 4:2:2 chroma MPEG essence that is compatible with the Sony XDCAM VTR (when wrapped as MXF). The codec records at 50 Mbs at full resolution (for example, 1920x1080 interlaced or, 1280x720 progressive).

Other XDCAM variants are based on a 4:2:0 chroma MPEG essence, also compatible with the Sony XDCAM VTR, that are recorded at reduced bit rates (18,25,35 Mbs). To save bandwidth, 1080i source is horizontally sub-sampled (for example, 1440x1080). Sony EX 35 is an exception in that it does not sub-sample horizontal pixels.

XDCAM 18 is only supported for 1080i sources.

**Quality.** Specifies the video quality profile.

### Uncompressed

**Encode Less VBI.** When checked, the codec removes the top 32 lines from PAL SD sources or 26 lines from NSTC SD sources that contain VBI data.

### x264

**Profile.** Specifies the video quality profile.

**Bit Rate.** Specifies the bit rate of the output in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported:

`--fake-interlaced`



*--nal-hrd cbr*  
*--profile*  
*--video-format*  
*--bitrate*

## x265

There are no general limitations for frame size or frame rate, but encoding interlaced source is not supported. Compression is resource intensive, and real time performance may not be sustained when recording high frame rates.

**Profile.** Specifies video quality profile.

**Bit Rate.** Specifies the bit rate of the output in kbps (512 - 50,000).

**Command Line.** Configure the compressor using x265 command line syntax. For setting specific x265 parameters, you can enter x265 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: *--bframe 5*, for example. Use of short form (*-b 5*) is not recommended.

The following x265 command line parameters are not supported:

*--fake-interlaced*  
*--nal-hrd cbr*  
*--profile*  
*--video-format*  
*--bitrate*

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## HDR Metadata Filter

### Master Display

**Add.** When checked, enables embedding SMPTE 2086 master display metadata in the output. HDR metadata is written to the container for use by downstream players to accurately display the High Dynamic Range video.

**Master Display X | Y Coordinates for Red | Green | Blue | White Point.** specify the X and the Y coordinate for each color.

**Minimum | Maximum Display Mastering Luminance.** Specifies the minimum | maximum brightness of the mastering display in candelas per square meter as configured for the mastering process.

### Light Level

**Add CTA-861.3 Content Light Level Metadata.** When checked, inserts CTA-861.3 message with Content Light Level Metadata. Configure these controls:

**MaxCLL.** Specifies the maximum content light level in cd/m2.

**MaxFALL.** Specifies the maximum frame average light level in cd/m2.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (PCM)

PCM is selected by default. No other selections are available.

### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the output audio bit depth.

**Force One Track Per Channel.** When checked, creates multiple mono tracks instead of a single, multi-channel track.

## Channel Map

Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Proxy TIFO Output

Telestream Intermediary Format (TIFO) is an intermediate media wrapper format designed by Telestream as a uniform, interchangeable file format to ensure interoperability among Telestream's media processing solutions, including Vantage, Lightspeed Live Capture, and Pipeline. TIFO provides a lightweight, low-overhead wrapper that is essence-agnostic, with out-of-band metadata, timecode, and closed caption support.

Using TIFO improves the ability to move media files between Telestream's media processing solutions with all media essence elements and metadata intact, preserving the widest range of transcoding options.

---

**Note:** TIFO files can be opened as they are being captured, by Telestream's Switch player and Vantage systems at a time when the captured file reports a non-zero file size. Requires Switch 4.0 or later.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Format Summary

### Video

Apple ProRes Proxy | AVC | Avid DNxHD LB | Avid H.264 Proxy

### Audio

MPEG-1 Layer 2, Mono, 48 kHz, 96Kbps, up to 16 tracks

PCM, 16/20/24-bit, 48Kbps, up to 16 tracks; PCM/Dolby E

## Container Settings

The TIFO Container wraps the specified media in TIFO file format.

**Proxy TIFO Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

## General

**File Extension.** Specifies .tifo. No other extensions are provided.

**Flush Period.** When checked, writes all buffered media to disk at the specified interval (1000 ms default) at a minimum.

## Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its options on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codec you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codecs

**Codec.** Specifies which codec to use to encode video streams.

## Apple ProRes Proxy

### AVC

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Same as Source.** When enabled, the width and height of the source is passed through. Width and Height parameters are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** (Ignored when Same as Source is checked.) Specifies the width of the frame, in pixels (320 - 720).

**Height.** (Ignored when Same as Source is checked.) Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate.** Specifies the target bit rate (512 - 50,000) in kbps.

## Avid DNxHD LB

No user-configurable settings.

## Avid H.264 Proxy

When used in conjunction in a workflow with the Avid Media Creation action for Interplay ingest, the Avid H.264 Proxy outputs are checked in with Avid-compatible Hi Res outputs from the Capture action and can be linked for proxy based editing.

**Quality.** Specifies video quality profile.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codecs

**Codec.** Specifies which codec to use to encode audio tracks.

### MPEG-1 Layer 2

**Channel Configuration.** Specifies Mono.

**Track Count.** Specifies the number of tracks (max. 16). Channels: 2, 4, 6, 8, 10, 12, 16 (14 is intentionally omitted).

**Bit Rate.** Specifies 96 kbps for the encoded audio stream.

**Sample Rate.** Specifies 48kHz as sample rate of the encoded audio stream.

### PCM

#### Channel Configuration

**Channel Configuration.** Specifies the number / layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specified the output audio bit depth. 16 | 20 | 24 bit.

**Force One Track Per Channel.** Select to make multiple mono tracks instead of a single multi-channel track.

**Channel Map.** Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Proxy MP4 Output

The Proxy MP4 output container encodes media and saves it as an MP4 file. The MP4 container conforms to IEC 14496-14 MP4 file format standard.

MP4 files do not contain a timecode track.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

Select the container to display its settings in the configuration panel on the right.

## Format Summary

### Video

AVC

### Audio

PCM

## Container

**Proxy MP4 Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

## Container Settings

**File Extension.** Specifies the file extension of the generated MP4 file.

### Aspect Ratio Mode

**Automatic.** Set the aspect ratio automatically, based on the detected content.

**Display Aspect Ratio.** When selected, specify the display frame aspect ratio to utilize.

**Pixel Aspect Ratio.** When selected, specify the pixel aspect ratio to utilize.

## Video Stream Details

Select the Video Stream component to display its details on the right.



## Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec (AVC)

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**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Codec.** Specifies AVC. No other codecs provided.

**Same as Source.** When enabled, the width and height of the source is passed through. Width and Height parameters are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** Specifies the output frame width in pixels.

**Height.** Specifies the output frame height in pixels.

**Bit Rate.** Specifies the output video bit rate in kbps.

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code

such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec

Specifies that the audio is encoded using the PCM codec. No other codecs are available.

### General

**Channel Configuration.** Specifies the number or layout of the audio channels.

---

**Note:** Up to 16 channels are supported from SDI sources.

---

**Label Channel Pairs Left/Right.** When checked, forces the first channel pair to be labeled Left and Right, unless Force One Track Per Channel is selected, in which case this setting is ignored.

**Bit Depth.** Specifies the audio bit depth.

**Force One Track Per Channel.** When checked, the codec creates multiple mono tracks instead of a single multi-channel track.

### Channel Map

**Output Channel (1... 32).** When checked, enables re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

# Proxy MXF RDD 25 Output

The Proxy MXF RDD 25 container conforms to the RDD 25 MXF file format standard.

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**Note:** RDD 25 proxy files can be opened in Telestream's Switch player, and other applications, as they are being captured and are growing in size. Requires Switch 4.0 or later.

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**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Container Settings

The Proxy MXF RDD 25 container wraps the specified media into a MXF file format.

**Proxy MXF RDD 25 Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

**File Extension.** Specifies MXF. No other extensions are available.

## Video Stream Details

Select the Video Stream component to display its details on the right.

### Color Space Signaling

Color space signaling may be inserted into the container; it may also be inserted into the video stream.

---

**Note:** Color space signaling is only supported in certain container and media formats. It may not be inserted in the output, based on the container/codecs you are utilizing.

---

**Color Primaries Signaling.** Specifies the standard for color primaries signaling in the MXF container.

**Transfer Function Signaling.** Specifies the standard for transfer function signaling in the MXF container.

**Color Matrix Signaling.** Specifies the standard for color matrix signaling in the MXF container.

## Codec (AVC)

---

**Note:** If your Live Capture server is equipped with an NVIDIA RTX or T series GPU, you can not use the AVC codec to encode interlaced sources.

---

**Codec.** Specifies AVC. No other codecs are provided.

**Same as Source.** When enabled, the width and height of the source is passed through. Width and Height parameters set in the action for the AVC codec are ignored.

---

**Caution: Same as Source cannot be used when UHD/4K is set as the primary output.**

---

**Width.** Specifies the width of the frame, in pixels (320 - 720).

**Height.** Specifies the height of the frame, in pixels (240 - 480).

**Bit Rate (in kbps).** Specifies the target bit rate (512 - 50,000).

## Time Code Burn-in Filter

When checked, this filter rasterizes the current timecode value into each output video frame.

**X Position.** The horizontal position of the top-left of the timecode in the output video frame (range 0 - 4096 pixels).

**Y Position.** The vertical position of the top-left of the timecode in the output video frame of the timecode in the output (range: 0 - 2160 pixels).

**Font Size.** Sets the font size of the timecode (range 6 - 120 pixels).

**Text Color.** (Default: White). Specifies the text color of the timecode. You can enter simple color names, such as red, green, or white. Or enter a color hexadecimal code such as #0000DDFF, which is dark blue. The "FF" characters in this example specify the opacity, and are optional. When these characters are not included the text is completely opaque (no transparency). The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the black default is used.

**Background Color.** (Default: Black). Specifies the color of the area behind the timecode. You can enter simple color names, such as red, green, or blue. Or enter a color hexadecimal code such as #0000DD, which is dark blue. The pound sign (#) must be included with the hexadecimal code. When a color entry is not valid, the white default is used.

**Timecode Transparency.** The opacity of the timecode. 1.00 is fully opaque, or 100% opacity, 0 is transparent.

**Force Source Timecode Burn-in.** When the Override Timecode Enable option in the Program panel is checked and this control is also checked, burn-in the source timecode instead of the override timecode.

## Audio Stream Details

Select the Audio Stream component to display its details on the right.

### Codec (AAC)

**Codec.** Specifies AAC for encoding audio tracks. No other codecs are provided.

### General

**Channel Configuration.** Specifies the layout of the audio channels.

## Poster Frame

The Poster Frame output creates a small thumbnail bitmap image of the first frame of the input.

Use the Poster Frame output option when you need to have some type of output to satisfy the ability to activate the workflow when you have downstream actions, but you plan to delete the file and want the output to be a small file size that uses very little computing power and takes a small amount of hard drive space.

---

**Note:** Controls with a green Browse button may be bound to a variable to dynamically assign their setting or value. The variable must have a value when this action executes. You can assign the value to the variable in a previous action in the workflow or use the variable's default value. Click Browse to select the variable or create a new one.

---

## Container Settings

The Poster Frame container creates a bitmap image file.

**Poster Frame Config Name.** Specifies the custom name of this output configuration. Displayed as a Configuration Template (along with all other outputs in this action, if any) in the Tape Capture Web app, so that the operator can select a specific output configuration to utilize in the current capture session.

**File Extension.** Specifies BMP as the extension of the file name. No other selections are available.

## Primary Output - Video Codecs

The following Primary Output video codecs are available in the Capture and Tape actions. Codec availability and options vary by container.

- [Apple ProRes](#)
- [AVC](#)
- [Avid DNxHD](#)
- [Avid DNxHR](#)
- [DV/DVCPro](#)
- [DVCPRO HD](#)
- [HEVC](#)
- [IMX](#)
- [JPEG2000 Lossless \(Comprimato\)](#)
- [JPEG2000 Lossy \(Comprimato\)](#)
- [MPEG-2](#)
- [Panasonic AVC-Intra](#)
- [Panasonic AVC-Ultra](#)
- [Sony XDCAM](#)
- [Uncompressed \(10-bit\)](#)
- [x264](#)
- [x265/HEVC](#)
- [Sony XAVC](#)

## Apple ProRes

### Container

- QuickTime
- QuickTime Open
- TIFO

### Quality

- 422 HQ
- 422 SQ
- 422 LT
- 422 Proxy
- 444

## AVC

### Container

- MXF OP1a
- QuickTime
- TIFO

### Profile

- Baseline
- Main
- High

### Bit Rate (in Mbps)

- Between 512 and 50,000

## Avid DNxHD

### Container

- MXF OP1a
- QuickTime
- TIFO

### Quality

- 444
- HQX (10 bit, 220/185 Mbps)
- HQ (220/185 Mbps)
- HQ TR (145/120 Mbps)
- SQ (145/120 Mbps)
- SQ TR (100 Mbps)
- LB (45/36 Mbps)

## Avid DNxHR

### Container

- MXF OP1a
- QuickTime
- TIFO

### **Quality**

- 444
- HQX (10 bit)
- HQ
- SQ
- LB

## **DV/DVCPPro**

### **Containers**

- MXF OP1a
- QuickTime
- TIFO

### **Quality**

- DV 25 Mbps
- DVCPRO 25 Mbps
- DVCPRO 50 Mbps

## **DVCPRO HD**

### **Containers**

- MXF OP1a
- QuickTime
- TIFO

## **HEVC**

### **Containers**

- QuickTime
- TIFO

### **Bit Rate (in Kbps)**

- Between 512 and 50,000



## IMX

### Containers

- MXF OP1a
- QuickTime
- TIFO

### Quality

- 30 Mbps
- 40 Mbps
- 50 Mbps

## JPEG2000 Lossless (Comprimato)

### Containers

- MXF OP1a
- TIFO

### Description

The Comprimato JPEG2000 Lossless codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossless mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

### General

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

- RGB 4:4:4 8 bit or 10 bit
- YUV 4:2:2 10 bit
- YUV 4:2:2 8 bit

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code Block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression Order.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the Discrete Wavelet Transform resolution.

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers are used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Header Markers.** When checked, Start of Packet marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

## JPEG2000 Lossy (Comprimato)

### Containers

- MXF OP1a
- TIFO

### Description

The Comprimato JPEG2000 Lossy codec encodes the input video into one output video file in JPEG2000 format, using the JPEG2000 codec in lossy mode. Comprimato-based ISO/ITU still image compression provides a fast and flexible solution for high-quality, wavelet-based compression.

JPEG-2000 is an intra-frame HD video codec specified by ISO/IEC 15444-1. It uses wavelet transformations to compress the image which results in high quality images in both lossy and lossless modes. JPEG 2000 offers higher compression ratios over standard JPEG video. It offers resolution, color, quality and position progression scalability, and also supports 4:2:2 and 4:4:4 chroma sub-sampling methods.

### General

**Video Bit Rate.** Specifies the bit rate, per second.

**Quantization Coefficient.** Specifies quality (0-100). If set toward the lower range it reduces data correspondingly and quality decreases; if set to the upper range it increases data and quality. However, the default value of 0 (zero) applies no coefficient (effectively disables the feature), resulting in the video being encoded at the full data rate. Uncheck the Use Default Quantization Coefficient option to enable this ability to specify the quality.

**Pixel Format.** Specifies the color space, chroma sub-sampling, and bit depth to use for encoding.

- RGB 4:4:4 8 bit or 10 bit @50,000 bps
- YUV 4:2:2 10 bit @50,000 bps
- YUV 4:2:2 8 bit @50,000 bps

**Tile Partition Width.** Specifies the tile partition width in pixels.

**Tile Partition Height.** Specifies the tile partition height in pixels.

**Precinct Width and Height.** Specifies the precinct size.

**Code Block Width and Height.** Specifies the height and width (in pixels) of a code block to process.

**Packet Progression.** Specifies the order of packet progression.

**Decomposition Levels.** Specifies the Discrete Wavelet Transform resolution.

**Tile-Part Length Markers.** When checked, specifies that Tile Length Markers are used.

**End of Packet Header Markers.** When checked, EPH marker segments are generated.

**Start of Packet Markers.** When checked, Start of Packet marker segments are generated.

**CUDA Memory Limit.** Specifies the CUDA memory limit in MB.

---

**Note:** When the CUDA Memory Limit is set to 0, GPU processing is disabled.

---

**CUDA Tile Limit.** Specifies the CUDA tile limit.

**Encoder Queue Size.** Specifies the encoder queue size.

## MPEG-2

### Containers

- MPEG2-TS
- TIFO

### Bit Rate (in kbps)

- Between 512 and 300,000

### GOP Structure

Sets the GOP Structure as a combination of I frames, B frames, and P frames. I frame-only structures have a lower visual quality but are well suited for editing. Longer GOP structures have higher visual quality and are best suited for playback.

### **GOP Configuration**

Specifies the type of GOP structure: Open GOP or Closed GOP.

### **Start with I Frame**

When checked, specifies that the GOP start with an I-frame (display and coded order).

### **Motion Estimation Factor**

Indicates how much motion estimation to use when encoding the video stream. A higher value results in higher quality and increases the encode time. The default is 80 and the range is 1 to 100.

### **Profile**

Adjusts MPEG profile:

- High
- Main
- 4:4:2

### **Level**

Adjusts MPEG level:

- High
- High 1440
- Main

### **Chroma**

Adjusts chroma sub-sampling:

- 4:2:0
- 4:4:2

### **Video Performance Setting**

Indicates the video quality setting to use when encoding the video stream. A higher value results in higher quality and increases the encode time. The default is 9 and the range is 0 to 31.

### **Video Buffer Verifier**

Choose to specify Video Buffer Verifier buffer size and delay settings, or to use default settings.

- Do not specify VBV settings
- Specify VBV settings

### **VBV Buffer Size**

When Specify VBV Settings is selected, this setting specifies the size of the VBV buffer in kbps. Larger values allow the encoder greater flexibility during encoding.

### **VBV Delay**

When Specify VBV Settings is selected, this setting specifies how much time is allowed between the transmission of the first frame and its actual decode. Larger values allow the encoder greater flexibility during encoding.

## **Panasonic AVC-Intra**

### **Containers**

- MXF OP1a
- QuickTime
- TIFO

### **Quality**

- 50 Mbps 4:2:0
- 100 Mbps 4:2:2
- 200 Mbps 4:2:2

## **Panasonic AVC-Ultra**

### **Containers**

- MXF OP1a
- TIFO

### **Quality**

Specifies video quality profile: AVC Ultra Long GOP 12 | AVC Ultra Long GOP 25 | AVC Ultra Long GOP 50

## **Sony XDCAM**

### **Containers**

- MXF OP1a
- QuickTime
- TIFO

### **Quality**

- XDCAM HD 18 Mbps CBR

- XDCAM HD 25 Mbps CBR
- XDCAM HD 35 Mbps VBR
- XDCAM HD422 18 Mbps CBR
- XDCAM HD422 25 Mbps CBR
- XDCAM HD422 35 Mbps CBR
- XDCAM HD422 50 Mbps CBR
- XDCAM EX 35 Mbps VBR

## Uncompressed (10-bit)

### Containers

- MXF OP1a
- QuickTime
- TIFO

## x264

### Containers

- MPEG2-TS
- MXF OP1a
- QuickTime
- TIFO

### Profile

- Baseline
- Main
- High
- High 10
- High 4:2:2

### Bit Rate (in kbps)

- Between 512 and 50,000

### Command Line (option)

Configure the compressor using x264 command line syntax. For setting specific x264 parameters, you can enter x264 CLI commands (separated by spaces) to execute them.

For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x264 command line parameters are not supported:

- `--fake-interlaced`
- `--nal-hrd cbr`
- `--profile`
- `--video-format`
- `--bitrate`

## x265/HEVC

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**Note:** x265/HEVC supports progressive scan inputs only.

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### Containers

- QuickTime
- TIFO

### Profile

- Main
- Main 10
- Main 10 Intra

### Bit Rate (in kbps)

- Between 512 and 300,000

### Command Line (option)

Configure the compressor using x265 command line syntax. For setting specific x265 parameters, you can enter x265 CLI commands (separated by spaces) to execute them. For best results, be sure to use long form: `--bframe 5`, for example. Use of short form (`-b 5`) is not recommended.

The following x265 command line parameters are not supported:

- `--fake-interlaced`
- `--nal-hrd cbr`
- `--profile`
- `--video-format`
- `--bitrate`

## Sony XAVC

### Containers

- MXF OP1a
- MXF XAVC
- TIFO

### Quality

**Quality.** Specifies the quality setting to use for encoding.

Class 100 - 4:2:2



# Primary Output - Audio Codec

The following Primary Output audio codec is available in Capture and Tape actions.

## PCM

### Containers

- MPEG2-TS
- MXF OP1a
- QuickTime
- TIFO

### Channel Configuration

Select the audio output channel configuration.

- Mono
- Stereo
- 4 Channels
- 6 Channels
- 8 Channels
- 10 Channels
- 12 Channels
- 14 Channels
- 16 Channels
- 32 channels (*currently not supported from SDI sources*)

### Bit Depth

Select the desired audio bit depth.

- 16-bit
- 20-bit
- 24-bit

### Force One Track Per Channel

Select to make multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata is set to 'Mono'.

### **Channel Map**

Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Secondary Output - Video Codecs

The following Secondary Output video codecs are available when configuring the Capture or Tape actions.

### AVC

#### Container

- Proxy MXF OP1a RDD25
- Proxy MP4
- Proxy TIFO

#### Same as Source

When enabled, the width and height of the source is passed through. Width and Height parameters set in the action for the AVC codec are ignored.

---

**Caution: Same as Source cannot be enabled when UHD/4K is set as the primary output.**

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#### Width

- 320-720

#### Height

- 240-480

#### Bit Rate (in kbps)

- 512-10,000

### ProRes Proxy

No configurable options. Output is the same size as the source.

### DNxHD LB

No configurable options. Output is the same size as the source. DNxHD LB only supports 1080p sources at these resolutions: 23.98, 24, 25, 29.97.

## Secondary Output - Audio Codecs

The following Secondary Output audio codecs are available when configuring the Capture or Tape actions.

### AAC

The AAC codec encodes audio in MPEG-2AAC LC profile (16 bit samples at 64 | 96 | 128 Kbps). Use the Channel Map to map multiple tracks.

#### Container

- Proxy MXF OP1a RDD25
- Proxy MP4
- Proxy TIFO

#### Channel Configuration

- Mono
- Stereo
- 5.1 (C L R BL BR LFE)

#### Create Stereo Pairs

When checked, stereo tracks (1 - 8) are created. Each track is 64 Kb/s stereo AAC-LC @ 48kHz.

### PCM

#### Container

- MP4

#### Channel Configuration

Select the audio output channel configuration.

- Mono
- Stereo
- 4 Channels
- 6 Channels
- 8 Channels
- 10 Channels
- 12 Channels
- 14 Channels

- 16 Channels
- 32 channels (*currently not supported from SDI sources*)

### **Bit Depth**

Select the desired audio bit depth.

- 16-bit
- 20-bit
- 24-bit



### **Force One Track Per Channel**

Select to make multiple mono tracks instead of a single multi-channel track. QuickTime audio channel Assignment metadata is set to 'Mono'.

### **Channel Map**

Allows re-mapping of the incoming source audio channels to the captured file output channels. Channels are numbered from 1 to 32. Specify the number of the audio input channel to use for each output channel.

## Related Vantage Actions

These topics briefly describe workflow actions available in Vantage Workflow Designer when the domain has a Live Capture license. Details of action features and operation are described in the help page and Vantage User Guide available in each action's Inspector. Click   (M=man page (help page) / ?=User Guide) in the Inspector window's upper right corner.

For additional information about using the Workflow Designer and its actions to create Live Capture and Tape workflows, refer to [Creating Live and Tape Capture Workflows](#).

- [Live Actions](#)
- [Cloud Actions](#)
- [Metadata Actions](#)
- [Flip 64 Transcode Action](#)
- [Transport Actions](#)
- [VidChecker Action](#)

## Live Actions

The Vantage Live Service runs in Vantage on a Lightspeed Live Capture Server and executes the Capture and Tape actions that capture and process files from live or tape sources.

- [Capture Action](#)
- [Tape Action](#)

### Capture Action

A Capture action operates as an origin action and can only be used as the first action in a workflow. It may be the only action in this workflow. It operates in normal mode and also supports Open Workflows on the outbound side and starts jobs that capture live SDI inputs and output captured media files to Live Storage using the specified output container and encoder.

The Capture action is executed by the Vantage Live Service, and only executes in a Vantage domain running on a Lightspeed Live Server. information capturing tape-base media, see [Creating Live and Tape Capture Workflows](#)

### Tape Action

The Tape action operates as an origin action and can only be used as the first action in a workflow. It may be the only action in this workflow. This action is executed by the Vantage Live Service. It is used to start SDI tape capture workflows created in a Vantage domain installed on a Lightspeed Live Server.

Use the Tape action inspector to select and configure VTR sources for processing, filtering, transcoding, and output. You can also use the action to add metadata labels.

For information capturing tape-base media, see [Creating Live and Tape Capture Workflows](#).

## Cloud Actions

The Cloud Service enables Vantage to interact with a Telestream Cloud account to provide cloud storage and processing, including transcoding, quality checking, and speech-to-text conversion. These actions are enabled by the Live Capture license.

The following actions are executed by the Cloud Service:

- [Cloud Flip Action](#)
- [Cloud QC Action](#)
- [Cloud Speech Action](#)

### Cloud Flip Action

The Cloud Flip action submits media from Vantage workflows via the Telestream Cloud Service and the Telestream Cloud API to the Telestream Cloud for transcoding.

To use the Cloud Flip action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud Flip action executes, the input file is uploaded and processed according to the Cloud Flip factory chosen in the Cloud Flip action, and the results are returned to the workflow for downstream use.

### Cloud QC Action

The Cloud QC action submits media from Vantage workflows via the Telestream Cloud Service and the Telestream Cloud API to the Telestream Cloud for quality checking.

To use the Cloud QC action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud QC action executes, the input file is uploaded and processed according to the Cloud Quality Control project chosen in the Cloud QC action, and the results are returned to the workflow for downstream use.

### Cloud Speech Action

The Cloud Speech action submits media from Vantage workflows via the Telestream Cloud Service and the Telestream Cloud API to the Telestream Cloud for speech-to-text conversion.

To use the Cloud Speech action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud Speech action executes, the input file is uploaded and processed according to the Cloud Timed Text Speech project chosen in the Cloud Speech action, and the results are returned to the workflow for downstream use.

## Metadata Actions

The *Metadata Service* in Vantage executes the actions that create metadata labels and perform conversions between [attachment](#) files, metadata labels, and [variables](#).

- [Populate Action](#)
- [Transform Action](#)

### Populate Action

A *Populate action* is executed by the Metadata Service to read and write metadata labels. It is enabled by the Live Capture license and executed by the Metadata Service. During ingest, metadata labels can be added to ingested media and generally include trim information, audio levels, file properties, and commercial metadata. The metadata labels can then be reviewed and modified by operators using Workflow Portal.

At any stage of a workflow, Vantage can extract information from labels using the Populate action, allowing Vantage for example to use trim points during a transcode, or audio level information when creating the final broadcast asset. This action can operate in Open Workflow mode.

### Transform Action

A *Transform action* is enabled by the Live Capture license and executed by the Metadata Service to transform metadata between XML files (attachments) and labels. XSL style sheets are used to perform these transformations; style sheets can be managed in the Vantage Management Console: Workflow Design Items > Style Sheets. This action can operate in Open Workflow mode.

## Flip 64 Transcode Action

The *Vantage Transcode Service* is the Vantage component that executes Flip64 actions to transform (decode > encode) media from one format to another.

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**Note:** The Transcode Service executing on Lightspeed Live servers provides only a small subset of transcoding functionality. In order to prevent a functionality mismatch the Transcode Service must not be installed on Live Capture servers that are part of a larger Vantage array domain. In the case of Live Capture servers joined to a Vantage array domain, all other transcoding must be performed on the Vantage nodes. When you disable the Transcode service on a Live Capture server in an array, you must to use a Copy action to move the media file from the local capture drive to a network drive or have the Capture action write directly to a network share that the Vantage Transcode services on the other Vantage nodes can access. The Transcode (or any service) can not access the captured output file from an alias. Aliases only work for storage-related functions.

---

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**Note:**

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The Flip64 action is a 64-bit multi-core-optimized encoder executed by the Transcode Service, which transcodes media from one or more input files into another format as specified by the output configuration. Available resolutions extend from SD to UltraHD and 4K in a broad range of file formats, from QuickTime to MPEG-4 and TIFO, and including encoding for x264, x265 (H.265 HEVC), MXF, and many more. Only the Keyframe encoder is licensed to run on a Live Capture Server using the Live Capture license. This action is Open Workflow capable.

## Transport Actions

Transport actions are executed by the Transport Service and perform file operations on specified files.

- [Copy Action](#)
- [Delete Action](#)
- [Deploy Action](#)
- [Move Action](#)

### Copy Action

A *Copy action* is executed by the Transport Service and is used to replicate a file from a source target (file system/device and directory) to a destination target (file system/device and directory). It typically performs this task by copying the file to the destination.

Copy actions can be executed on any action state. This action is Open Workflow capable.

### Delete Action

A *Delete action* is executed by the Transport Service, and is used to permanently remove a file from a source target (file system/device and directory). Delete actions can be executed on any action state.

### Deploy Action

A *Deploy action* is executed by the Transport Service, and is used to save the specified files to a destination outside the Vantage domain. Unlike Delete, Move, or Copy actions, Deploy actions allow multiple files to be operated on simultaneously, and do not maintain a reference to those files in the binder after completion.

The Deploy action delivers files to a wide variety of file systems, including Aspera, Azure, Avid MediaStream, Amazon AWS S3, FTP, Windows, and many others.

### Move Action

A *Move action* is executed by the Transport Service, and is used to move a file from a source target (file system/device and directory) to a destination target (file system/device and directory). It performs this task by copying the file to the destination, then

deleting the source. The copy first, delete last process ensures that the move completes normally before deleting the source file.

Move actions can be executed on any action state.

## Common Actions

Common actions are typically light-weight, short duration, utilitarian actions, and do not have a dedicated Vantage service to execute them. Instead, these actions are implemented in every Vantage service, so that any service available can execute them efficiently and instantaneously.

- [Compute Action](#)
- [Construct Action](#)
- [Decide Action](#)
- [Forward Action](#)
- [Receive Action](#)
- [Synchronize Action](#)

### Compute Action

A Compute action uses variables to set other variables. For example, you can use Compute to add two numbers and assign the result to the selected variable. Compute can perform mathematical operations such as addition, subtraction, division and multiplication. It can also convert variables between types (such as converting a timecode to a string), string manipulation, such as appending strings together into an output variable, and comparison functions.

This action is open workflow capable.

### Construct Action

A Construct action enables you to construct complex strings, paths, and math expressions from literals, variables, and tokens, for use in downstream actions.

This action is open workflow capable.

### Decide Action

A Decide action allows you to explicitly set the action state based upon analysis of variable values at runtime. It is most commonly used to determine whether or not subsequent actions (or actions in a given branch) in a workflow should execute. When the Decide action is used, the state set by the Decide action is passed to the next action.

Typically, more than one Decide action is required to support decision branches.

For example, if one branch is for HD, it starts with a Decide action that sets the state to Success for HD content, and ignore otherwise; if another branch is for everything else, it starts with a Decide action that performs the opposite behavior.

## Forward Action

A Forward action starts a new job for the target workflow, delivering a binder and all current variables from the originating workflow. A Forward action can only be added to the end of a workflow, and requires that the target workflow has a Receive action as its first action.

The Forward action is the only terminating action in Vantage—it does not have a connecting pin on the right side. Thus, once you add a Forward action to a workflow (or branch in a workflow), you cannot add any more actions, because control has passed to another workflow with a Receive action as its origin action.

## Receive Action

A Receive action is an origin action which is implemented in every service. Receive actions are designed to receive files from other systems: workflows, SDK-based applications, and Workflow Portal, for example. Files can also be automatically submitted to a workflow starting with a Receive action from another workflow using the Forward action.

Typically, workflows are created with a Receive action when they are intended for execution by another workflow that immediately precedes this one. This ability to chain workflows enables you to create run-time customizable workflows consisting of smaller workflow building blocks.

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**Note:** An origin action is required as the first action in a workflow, even if you plan to only manually submit jobs to this workflow.

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## Synchronize Action

A *Synchronize action* is a connector action, for the sole purpose of reducing action connecting lines. In workflows with many-to-many action relationships, instead of drawing connections between them all, you can simply connect them to a common Synchronize action. There is no inspector for the Synchronize action, because no configuration is required.

The Synchronize action is used in workflows where multiple actions connect to multiple subsequent actions. Synchronize provides a common connection point, where all upstream actions must be connected to all downstream actions.

## Communicate Actions

Communicate actions are used to communicate with external systems. They are executed by the Communicate Service.

- [Message Action](#)
- [Notify Action](#)

### Message Action

A Message action enables you to generate and transmit an email. You must configure Vantage to use an SMTP server before email can be utilized; this can be done in the Vantage Management Console.

This action is open workflow capable.

### Notify Action

A Notify action transfers job information to external systems via Web Services or other methods to transfer data. The job information may also be transferred via an XML file or files of other formats. You can also use the Notify action to invoke a command shell.

This action is open workflow capable.

The XML Dump, Interplay, and MOB ID Generator Notifier are available with a Live Capture license containing the LS-LIVE-AVID-OPT option.

## VidChecker Action

A *VidChecker* action is an optional, licensed feature in Vantage. It uses the VidChecker Service to enable Vantage workflows to utilize and interact with various QC tests provided by the VidChecker software.



# Connecting VTR Systems

This chapter describes connecting VTR units to a Lightspeed Live Capture server using the optional 4-port USB-to-RS-422 VTR Interface Kit (purchased separately) so that you can control them with the Tape web app.

The 4-port RS-422 VTR Interface Kit enables you to connect up to 4 VTRs to the Lightspeed Live Server. The VTR Interface Kit muxes and passes multiple RS-422 port connections through a single USB cable, connected to the Lightspeed Live Server.

To support 8 VTRs you can use two 4-port VTR Interface Kit.

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**Note:** Before you can capture video from a VTR, the system must be set up and configured ([Configuring Vantage for Use with Live Capture](#)), including a tape capture workflow ([Creating Live and Tape Capture Workflows](#)). Use of the Tape Capture web app is described in [Capturing Tape Media](#).

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## Topics

- [4-Port Interface Kit Components](#)
- [Installing the RS-422 Interface Box](#)
- [Connecting a VTR to the Lightspeed Live Server](#)
- [RS-422 Connector Pin Assignments](#)
- [Configuring an RS-422 Port's Latency Time](#)

## 4-Port Interface Kit Components

The *4-Port RS-422 VTR Interface Kit* includes these components:



- One USB-to-RS-422 interface box, pre-mounted, providing four RS-422 serial ports
- One 1R-U rack-mount tray that can hold two RS-422 interface boxes
- One USB cable to connect the RS-422 interface box to the Lightspeed Live Server
- Two sets of RS-422 DB9-to-RJ45 (Ethernet style) adapters:
  - Four Female DB9-to-RJ45 blue adapters to connect to the RS-422 interface box.
  - Four Male DB9-to-RJ45 gray adapters to connect to a VTR.
- Rack mount tray mounting hardware (see image below) includes:
  - Four 10-32 rack screws and washers
  - Four G-type cage nuts
  - One small tie-wrap to secure the USB cable to the tray.

The RS-422 interface box is powered by the Lightspeed Live Server's USB port, so no additional power supply is required. Drivers for the USB-to-RS-422 interface box are included in the software package and are installed as one of the steps below.

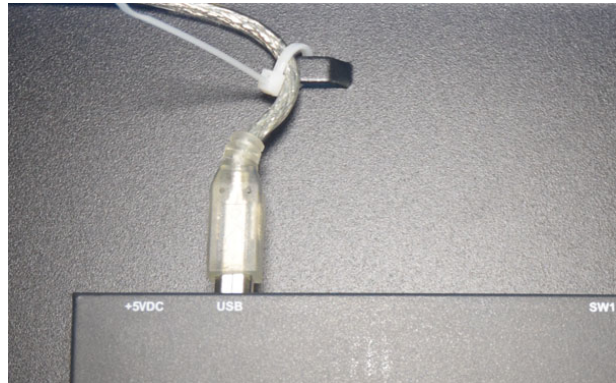


## Installing the RS-422 Interface Box

The RS-422 interface box and tray should be installed in a rack. It is best installed in the rear of the equipment rack directly behind the Lightspeed Live Server—or directly above or below—to be close to the Lightspeed Live Server USB ports.

To install the USB-to-RS-422 interface box in its rack mount tray, follow these steps:

1. Insert the USB cable into the rear of the RS-422 interface box.  
Fasten the USB cable to the tray by inserting the tie wrap through the raised anchor tab and tighten it to secure the cable.



2. To prepare the tray mounting location, place the four G-type cage nuts onto holes of an open rack space that is close to the Lightspeed Live Server.



3. Install the rack mount tray with the supplied screws and washers into the cage nuts.



4. Making sure that the Lightspeed Live Server is off, attach the USB cable to the Lightspeed Server; for a single 4-port box, insert the USB cable into either USB port. For two 4-port boxes, plug box 1 into the lower USB port to support VTRs 1-4; plug box 2 into the top USB port for VTRs 5-8.

---

**Note:** If only one USB port is available, use an external USB hub to provide additional ports. Plug box 1 into the hub's first USB port and box 2 into the second USB port.

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Do not turn on your Lightspeed Live Server yet. Proceed to [Connecting a VTR to the Lightspeed Live Server](#), following.

## Connecting a VTR to the Lightspeed Live Server

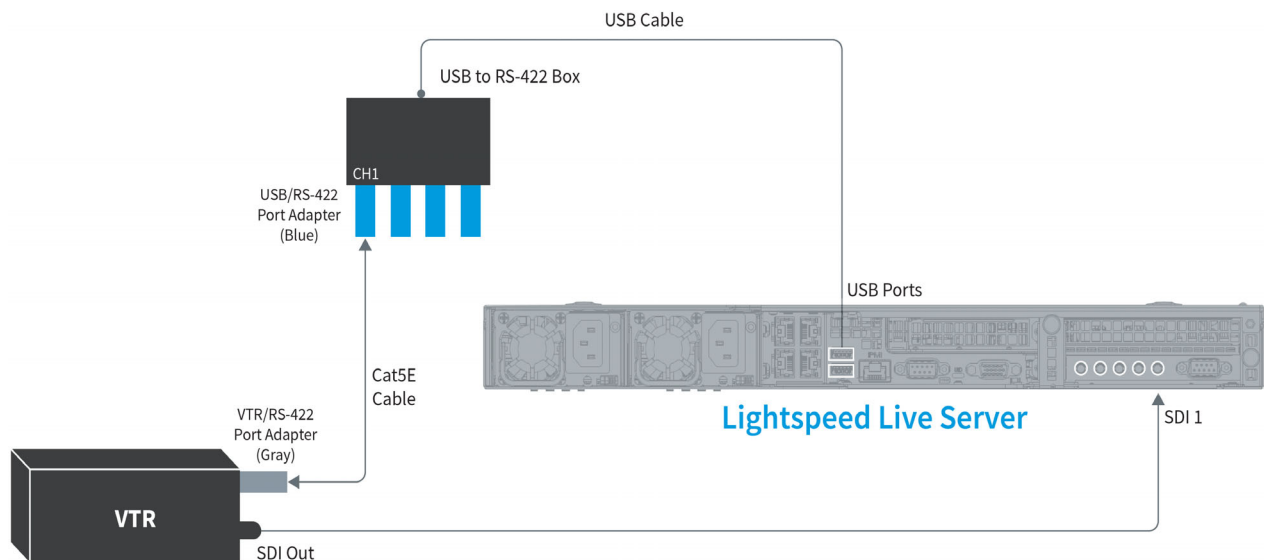
If you have a single VTR, you should connect it (RS-422 and SDI) through the box to the Lightspeed Live Server on the first port. For example, connect the VTR's RS-422 port to Channel 1 (CH1) on the RS-422 interface box and then connect the VTR's SDI Out to SDI 1 on the Lightspeed Live Server.

For multiple VTRs, Telestream suggests plugging VTR1 into RS-422 and SDI Port 1, VTR2 into RS-422 and SDI Port 2, etc.

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**Note:** The back plane of the Lightspeed Live Server has two USB ports. When using two 4-port RS-422 boxes to support up to 8 VTRs, connect the bottom USB port to the 4-port RS-422 box supporting VTRs 1 through 4 and the top USB port connects to a second 4-port RS-422 box supporting VTRs 5 through 8.

---



To make the connections for each VTR, follow these steps:

1. Turn off the VTR and the Lightspeed Live Server.
2. Position or install the VTR(s) in a safe and convenient location co-located near the RS-422 box and the Lightspeed Live Server.
3. If you are using RJ45 cables for control, attach the gray, male DB9-to-RJ45 adapter to the RS-422 terminal on the VTR.

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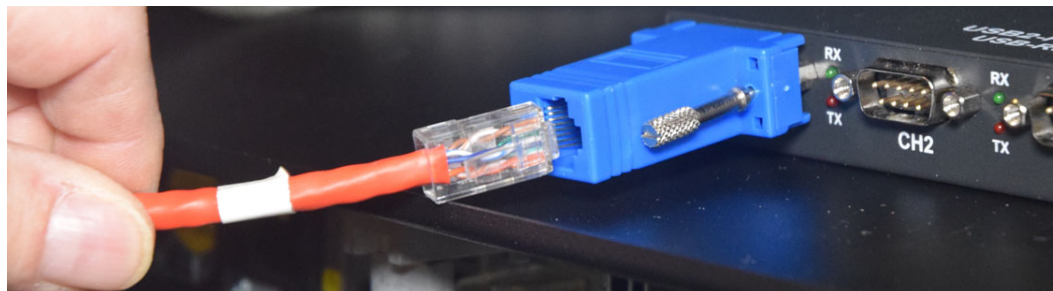
**Note:** If an RS-422 router is between the RS-422 interface box and the VTR, the male DB9-to-RJ45 gray adapter should be plugged into the router on the Lightspeed Live Server side of the system.

---

4. To prepare for VTR connection, If you are using RJ45 cables for control, attach a female DB9-to-RJ45 blue adapter to the Channel 1 (CH1) RS-422 serial port on the

interface box. Attach additional DB9-to-RJ45 blue adapters to other channels if you plan to connect more than one VTR.

Connect a user-supplied serial cable into the RS-422 port or Cat5E (or higher) cable into the RJ45 jack on the adapter connected to the VTR. A Cat5E (Cat5 Enhanced) cable is recommended; a straight-through pin-to-pin type (not a cross-over cable) is required. The maximum cable length is 100 meters (328 feet).

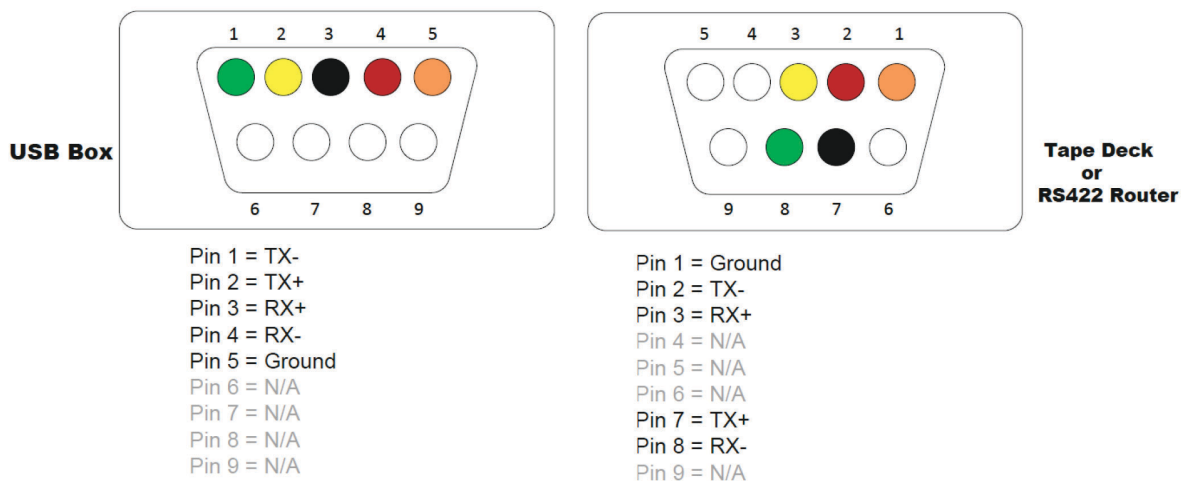


5. Connect the other end of the Cat5E cable into the DB-9 connector or RJ45 jack on the adapter connected to the RS-422 interface box, on the terminal number that corresponds to the SDI source (input) number you want to use on the Lightspeed Live Server.
6. Connect an SDI cable to the SDI Output terminal on the VTR.
7. Connect the other end of the SDI cable to the SDI input terminal on the Lightspeed Live Server that corresponds to the same terminal number you connected to on the RS-422 interface box.
8. Power up the VTR and switch it into the proper Remote mode for RS-422 control.
9. To establish serial communication, the RS-422 Interface Box must be initialized in the Vantage Live Service on the Capture server.
10. To initialize the device, make sure that it is plugged into a USB port and re-start your Live Stream server.

When all connections are complete between the VTR, the RS-422 interface box, and the Lightspeed Live Server, the VTR connection is initialized and CH1 (Channel 1) of the RS-422 interface box automatically synchronizes with SDI 1 on the Lightspeed Live Server, and similarly for all other VTRs.

## RS-422 Connector Pin Assignments

Use the pin assignment diagram below if you have to create custom RS-422 cables for your USB-to-RS-422 interface box.



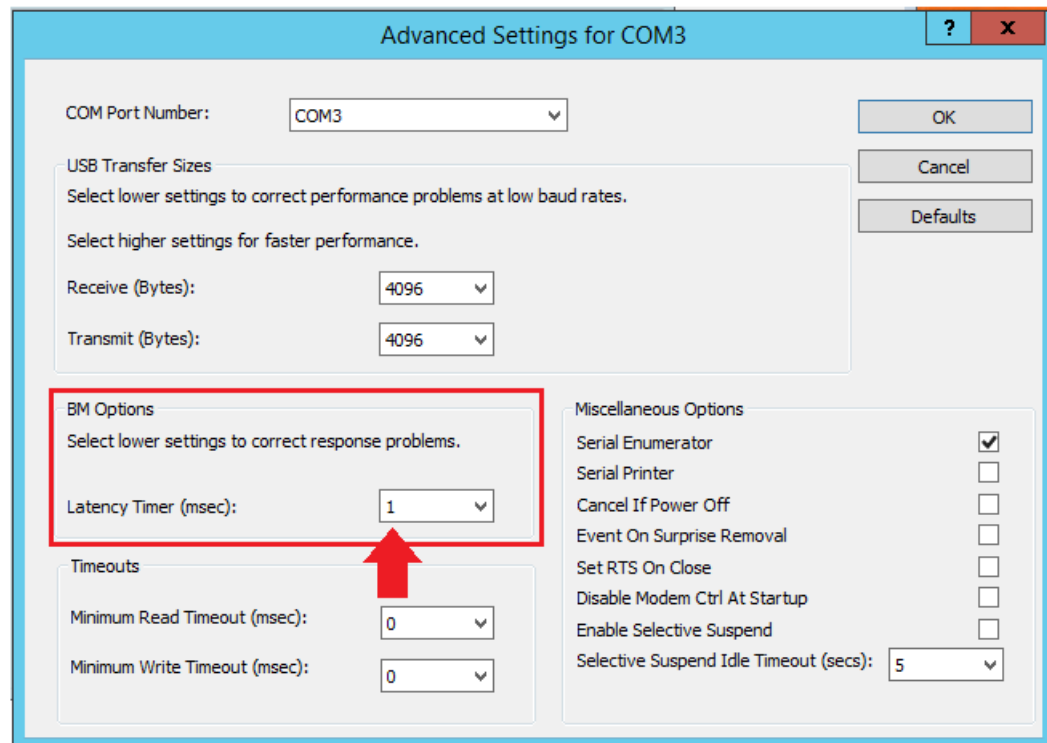
## Configuring an RS-422 Port's Latency Time

The RS-422 port's latency is set at 1 msec by default. However, if new drivers are installed or a new USB-to-RS-422 interface box is used, the latency value may not persist and should be reconfigured to 1 msec.

**Note:** The COM port number typically starts with 3 for your VTR connections because COM ports 1 and 2 are permanent and reserved. Therefore, VTR1 is typically COM port 3; VTR2 is 4, VTR5 is 7, etc.

Follow these steps to set each USB Serial Port's Latency Timer value to 1 msec:

1. Open Device Manager on the Lightspeed Live Capture server.
2. Click on Ports > USB Serial Port.
3. Select the first USB Serial Port, right-click and select Properties.
4. Select the Port Settings tab and click Advanced:



5. Change Latency Timer to 1 msec and click OK.
6. For multiple VTRs, repeat steps 3, 4 and 5 for the remaining USB serial ports.
7. Click OK to update and close the Device Manager.

# Vantage Glossary

## **action**

An *action* is the smallest unit of work that can be specified in a Vantage workflow. Actions are connected together in a workflow to perform a useful task. Each action must be configured to perform its task in the context of the workflow, using an action [Inspector](#). Action inspectors are specific to each type of action.

Actions are grouped by functional categories: communication, transcoding, file operations, metadata processing, etc. Each action is defined by the specific task it performs. For example, an email action, or a metadata [label](#)/file transformation action. All actions are executed by Vantage Windows services, which correlate to the functional categories.

Actions have limited interdependency, and so, are very flexible. You may impose limitations on actions in a workflow. For example, you might require action B to depend on action A in a Vantage workflow.

During execution, actions operate on files, [binders](#), variables, and states, and they generate an [action state](#) when they complete. Actions are executed by Vantage services, which perform the requirements of the action. In the case of the [Vantage Transport Service](#) and most transcoding services, the services may manage file transfers and transcoding/rendering via an out-of-process resource.

## **action state**

The *action state* describes the condition of an action execution in process and after completion.

During execution, an action may be Queued | Paused | In Process | Waiting. After execution, an action's final state may be Success | Ignore | Failure. Certain actions (Decide/Examine/Compare/Identify, for example) allow the user to specify the post-execution state, including Ignore. For all other actions, the post-execution state is set by the service, and is either Success or Failure. These states display in the Vantage Workflow Designer Job Status tab.

Action states are always passed to subsequent actions. The incoming state is tested by the next actions to determine whether or not following actions should execute.

Some actions allow you to specify that an action should execute on a specific state (right-click the action, and select Perform On > Success | Failure | Ignore | Any).



If an action fails, then the next action will inherit the Failure state and (in most cases) will not execute. If one action fails, the entire [job](#) fails.

Similarly, if you specify an action to set the Ignore state, the next action will inherit the Ignore state and will also likely not execute. Certain special actions, such as Message, can be configured to perform on any state (Failure, for example)—this allows workflows to send an email if they detect a failure.

Action states have precedence when an action receives states from multiple incoming actions (a merge of multiple branches):

- If at least one incoming state is Failure, regardless of other incoming states, the action will inherit the Failure state. Failure has precedence over all action states.
- If there is no Failure state, but at least one Success state, then the action will inherit the Success state. Success has precedence over Ignore states.
- If all incoming states are Ignore, the action will inherit the Ignore state. Ignore has lowest precedence of the three states. If an action receives an Ignore state and does not explicitly fail, then it emits a Success state. Otherwise, it emits a Failure state *unless* it is an action which can emit Ignore, and you have configured it to do so.

### **Alchemist File action**

The Alchemist File action, which is executed by the [Vantage Alchemist Service](#), allows you to configure connection settings with an existing installation of Grass Valley Alchemist File software.

### **Vantage Alchemist Service**

The *Alchemist Service* allows Vantage to interact with an installation of the Grass Valley Alchemist software via the Alchemist File action. For configuration and set up details, see the *Alchemist File* app note available on the Telestream website.

### **All-in-one domain**

An *all-in-one* (or single-node or single-server) Vantage domain is one in which all server components of Vantage—the Microsoft SQL Server [database](#), all Vantage services, and the optional Vantage web applications—are installed and operate on a single computer.

See also [Vantage array](#).

### **Analyze action**

The *Analyze action*, which is executed by the [Vantage Analysis Service](#) on-premises or the [Telestream Cloud Service](#) when in Cloud Port mode, enables you to perform analysis on media using a variety of analysis tools, specifying the result of the analysis in variables, for use in downstream actions. It is Vantage Cloud Port capable.

### **Vantage Analysis Service**

The *Analysis Service* is the Vantage component which executes the actions relating to the analysis of content: [Examine action](#), [Compare action](#), [Identify action](#), [Analyze action](#), [Report action](#), and [MediaInfo action](#).



**Archive action**

An *Archive action*, which is executed by the [Vantage Staging Service](#), uses the selected archiver (TAR, for example) to convert the selected input file to another format, usually in preparation for copying, moving, or deploying a file to a given system that has special file format requirements.

**array**

Another term for [Vantage array](#).

**Vantage Aspera Service**

An *Aspera Service* implements the Aspera software for Vantage, and provides two-way communication between workflows (and the [Faspex Delivery action](#)) utilizing the Aspera software itself.

**Asset Monitor action**

The Asset Monitor is an [origin action](#). It uses the [Vantage Avid Service](#) to monitor the specified Interplay server for new files to ingest and generate output in one or more media descriptor formats [CML (Interplay Metadata) or MPEG 4 Reference files] from the ingested input file. This action is Open Workflow capable.

When a new file is discovered, the Asset Monitor action submits a [job](#) for the workflow to process the file.

**Associate action**

An *Associate action* uses the [Vantage Monitor Service](#) to continually (and at regular periods) poll a target location (a directory, for example) on a device or file system (FTP, network folder, etc.) to discover new files, based on some permutation of the name of the file being processed by the current [job](#).

Associate actions can be executed on any [action state](#).

Generally, the Associate action uses the file name of an existing media file or [attachment](#) as the basis for discovering new files. For example, if media file *Vantage.mpg* is currently in the workflow, then the Associate action may look for *Vantage.scc*. This behavior can be configured in the Associate action's [Inspector](#).

Associate actions begin executing when a [job](#) is submitted, and execute until a new file is discovered—subsequent actions do not execute until the file is found. When the new file is discovered, the Associate action makes the file available to the other actions in the workflow.

Configuration is accomplished in the inspector, and is based on the target device/file system being monitored and other requirements.

**attachment**

An *attachment* is a non-media file that is associated with media during execution of a workflow. For example, an attachment may be an XML file that contains metadata, an SCC caption file, or an STL or PAC subtitle file. An attachment may also be a PDF file, Excel spreadsheet, or Word document, for example. Attachments are identified and processed using nicknames for simplicity. Processing is optional—attachments may be simply passed through a workflow for storage with the processed media and registered in a Vantage [catalog](#).

**attachment nickname**

An *attachment nickname* is an alias or alternate name that is assigned to an attachment file during Vantage workflow execution. When an attachment file is submitted to a workflow, the actual file name and location is stored in a Vantage [binder](#) along with a nickname as defined in the workflow. Within the workflow, all references to a file are by nickname. However, when Vantage needs to access a file, Vantage uses the actual file name and location stored in the binder.

See [media nickname](#) and [nickname](#).

**AudioTools action**

An *AudioTools action* is an optional, licensed feature in Vantage. It uses the [Vantage AudioTools Service](#) to enable Vantage workflows to utilize and interact with various AudioTools products from Minnetonka Audio Software. The AudioTools Custom Workflow executes a selected, pre-defined AudioTools Server workflow. AudioTools Loudness Control executes the typical loudness processes, including hitting multiple target parameters using an iterative processing pass.

**Vantage AudioTools Service**

The *AudioTools Service* implements the AudioTools Connector and enables Vantage workflows to utilize and interact with various AudioTools products from Minnetonka Audio Software.

**Aurora action**

An *Aurora action* is an optional, licensed feature in Vantage. It uses the [Vantage Aurora Service](#) to enable Vantage workflows to utilize and interact with various QC tests provided by the Digimetrics Aurora software. The tests provide the ability to determine whether a particular input media (specified by nickname) either passes or fails a particular QC check. Each test also generates a report file that may be utilized during later stages of the workflow.

**Vantage Aurora Service**

The *Aurora Service* implements the Digimetrics Aurora software for Vantage, and provides two-way communication between workflows (and the [Aurora action](#)) utilizing Aurora and the Aurora software itself.

**Automate action**

The *Automate action*, which is executed by the [Vantage Communicate Service](#), is similar to the Notify action. It contains system-integration extensions which are relevant to TrafficManager workflows, enabling you to save [job](#) or other metadata to a file and interface/integrate with external automation systems. This capability ranges from writing XML-based material to a file system to direct integration with specific automation systems.

In TrafficManager applications, this action is useful to notify automation systems that a commercial has been processed and is available for air. For example, a Notify action can create text or CSV dublists and provide them to automation systems that are capable of processing dublists in that format.

## Vantage Avid Service

The *Avid Service* is the Vantage component which executes the actions relating to use of media on Avid Interplay servers using the [Media Creation action](#) and [Asset Monitor action](#) as well as the [Media Management action](#). Before you can use these actions in a Vantage workflow with a given Interplay server, you must first create an Interplay connection in the Vantage Management Console and configure it.

## Baton action

A *Baton action* is an optional, licensed feature in Vantage. It uses the [Vantage Baton Service](#) to enable Vantage workflows to utilize and interact with various QC tests provided by the Baton software. The tests provide the ability to determine whether a particular input media (specified by nickname) either passes or fails a particular QC check. Each test also generates a report file that may be utilized during later stages of the workflow.

## Vantage Baton Service

The *Baton Service* implements the Baton software for Vantage, and provides two-way communication between workflows (and the [Baton action](#)) utilizing the Baton software itself.

## binder

A *binder* is a collection of file and metadata information, created for each [job](#) that Vantage executes. A binder contains media and [attachment](#) file references and metadata [labels](#) that were ingested or created during the job. While a binder is created for every [job](#), many binders are never used. Therefore, only media processing scenarios which require operator intervention should use the [Register action](#) in ingest workflows to create binders in a user-accessible [Vantage catalog](#).

You use the Register action to automatically create binders during a job, and you use Exist to determine if a binder of a certain name has already been created. Binders are most often named by some permutation of the name of the file that started the job. Binders that are not explicitly registered are accessible to users only in Workflow Designer, in the Job Status tabs.

Vantage catalogs and their binders are accessible in Workflow Portal. Binders are saved in the [Vantage domain database](#) until deleted manually or by job expiration policies. You can also view binders in the Vantage Management Console, and manually create them there—or delete them.

Binders are not file folders and are not part of the Windows file system—they are records in the Vantage database. Thus, binders do not contain the files themselves; they only have the paths to those files.

## Camera Ingest action

A *Camera action* is an [origin action](#); it uses the [Vantage Monitor Service](#) to regularly poll a target location (a directory, for example) on a card reader device or Windows file system to discover new camera files.

When a new file or shot is discovered, the Camera action submits a [job](#) for the workflow which it is part of, for processing.

**Capture action**

A Capture action is an [origin action](#); it supports Open Workflows on the outbound side and it is used to capture live SDI | IP inputs and output captured media files to Live Storage using the specified output container and encoder. The Capture action is executed by the [Vantage Live Service](#), and only works in a Vantage domain on a Lightspeed Live Server hosting Capture.

**catalog**

Similar in concept to the folders in a file system, a Vantage *catalog* is a container that stores [binders](#). *Catalog folders* are sub-containers that organize binders. To access a binder, Workflow Portal operators search through the visible catalogs and folders, just as they might sort through folders in a file system.

**Vantage Catalog Service**

The *Catalog Service* is the Vantage component that executes the [Register action](#) and [Exist action](#).

**Catch action**

A *Catch action* is an [origin action](#); it is a specialized origin action for ingesting commercials and syndicated media assets (including metadata) from catch servers in TrafficManager applications. It uses the [Vantage Traffic Service](#) to regularly poll the catch server to discover new files.

When a new file is discovered, the Catch action exposes all relevant metadata and submits a [job](#) to the workflow for processing. Typically, the workflow is an ingest workflow which localizes the media, populates a metadata [label](#), creates proxies and thumbnails, and registers the asset in a Vantage [catalog](#). The Catch action also includes an interface to common cloud storage systems, allowing storage in the cloud to be monitored. For more details, see the TrafficManager User Guide.

**Cerify action**

A *Cerify action* is an optional, licensed feature in Vantage. It uses the [Vantage Cerify Service](#) to enable Vantage workflows to utilize the Tektronix Cerify suite of QC components. Cerify is a fully automated system for verifying and checking file-based content.

**Vantage Cerify Service**

The *Cerify Service* implements the Cerify software for Vantage, and provides two-way communication between workflows (and the [Cerify action](#)) utilizing the Baton software itself.

**Change Log**

The *Change Log* (Vantage Management Console > Support Utilities) captures changes to the Vantage domain configuration and operation and records the following details: date and time of change, Vantage user who made the change, host computer where the change occurred, change summary message.

**Chronicle action**

The *Chronicle action*, along with Colocate, Compose, and Conform actions, are part of the optional, licensed [Post Producer](#) feature in Vantage. The Chronicle action

uses the [Vantage Edit Service](#) to convert post-rendered Composition XML files into formats for use in other systems—ad-insertion systems, for example.

### **Cloud Flip action**

The *Cloud Flip action* submits media from Vantage workflows to Telestream Cloud for transcoding. To use the Cloud Flip action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud Flip action executes, the input file is uploaded and processed according to the Cloud Flip factory chosen in the Cloud Flip action, and the results and status are returned to the on premises workflow. The Cloud Flip action is supported in Vantage Cloud Port hosted workflows and is constrained to creating a single output as with on-premises Vantage configurations. For details on using hosted workflows, consult the Vantage Cloud Port User Guide available on the Telestream website.

### **Cloud Port mode**

*Cloud Port mode* is an execution option that you can enable in Cloud-capable Vantage actions to enable processing in the cloud (enabled by configuring your Vantage domain with a valid Telestream Cloud account). When supported actions execute in the Cloud Port mode, they are executed by the [Telestream Cloud Service](#).

### **Cloud QC action**

The *Cloud QC action* submits media from Vantage workflows to Telestream Cloud for quality checking. To use the Cloud QC action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud QC action executes, the input file is uploaded and processed according to the Cloud Quality Control project chosen in the Cloud QC action, and the results and status are returned to the on premises workflow. The Cloud QC action is supported in Vantage Cloud Port hosted workflows. For details on using hosted workflows, consult the Vantage Cloud Port User Guide available on the Telestream website.

### **Cloud Speech action**

The *Cloud Speech action* submits media from Vantage workflows to Telestream Cloud for speech-to-text conversion. To use the Cloud Speech action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. When the Cloud Speech action executes, the input file is uploaded and processed according to the Cloud Timed Text Speech project chosen in the Cloud Speech action, and the results and status are returned to the on premises workflow. The Cloud Speech action is supported in Vantage Cloud Port hosted workflows. For details on using hosted workflows, consult the Vantage Cloud Port User Guide available on the Telestream website.

### **Colocate action**

The *Colocate action*, along with Chronicle, Compose, and Conform actions, are part of the optional, licensed [Post Producer](#) feature in Vantage. The Colocate action uses the [Vantage Edit Service](#) to ingest Composition XML files with references to non-

file-based URLs (for example, Amazon S3), localize the files, and convert the media references in a copy of the CML into paths to the localized files.

### Common action

*Common actions* are implemented in multiple Vantage services (Catalog, Communicate, Staging, and Metadata) so they are not restricted to execution by a single service. See [Receive action](#), [Forward action](#), [Decide action](#), [Compute action](#), [Construct action](#), [Synchronize action](#).

### ComponentPac

Vantage *ComponentPacs* are version-controlled Vantage components, such as an updated Capture action. ComponentPac versions are controlled using Telestream's Secure Version Control. For details, see the [Secured Version Control application note](#) on the Telestream web site.

Secured Version Control provides the ability to update Vantage—and create or update workflows that utilize new versions of actions—while keeping existing workflows untouched and operating using existing versions of actions. When you want to upgrade an action in a workflow, you can do so at a convenient time.

### Vantage Communicate Service

The *Communicate Service* is the Vantage component that executes the actions relating to electronic messaging: [Message action](#), and [Notify action](#).

### Compare action

A *Compare action* uses the [Vantage Analysis Service](#) to compare media files based on certain metrics (for example, PSNR). These metrics can generally be published as variables or as metadata [labels](#).

### Compose action

A *Compose action*, along with Chronicle, Colocate, and Conform actions, are part of the optional, licensed [Post Producer](#) feature in Vantage. The Compose action uses the [Vantage Edit Service](#) to convert various media descriptor file formats (Anystream AN2, Final Cut Interchange XML, Simplified Avid AAF, QuickTime Reference, Adobe FC7XML, and Telestream TSEDL) into a Composition XML file so that it can be used by the Conform action to compose media) into a Composition XML file so that it can be used by the Conform action to compose media.

### Composition (CML) file

A *Composition file* is an XML schema that provides the vocabulary to describe media elements and their temporal and spatial relationships on a video timeline. Composition files (or Composition XML objects in a computer program) are submitted to a Conform action in a workflow to render the media file from the description.

### Compute action

A *Compute action*, which is implemented in every Vantage service, performs various arithmetic and string manipulation functions, permitting you to create and modify values in variables, for use in downstream actions. This action is Open Workflow capable.

### Conform action

A *Conform action*, along with the other Edit actions, are part of the optional, licensed [Post Producer](#) feature in Vantage. The Conform action, which is Vantage Cloud Port capable, uses the [Vantage Edit Service](#) to assemble and optionally transcode multiple video and still image files into a single output file, applying filters as specified by you. The input files and related specifications for the output file are all defined in a Composition XML file. This action is Open Workflow capable except when executing in [Cloud Port mode](#).

### Construct action

A *Construct action*, which is implemented in every Vantage service, enables you to construct complex strings, paths, and math expressions from literals, variables, and tokens, for use in downstream actions. This action is Open Workflow capable.

### Copy action

A *Copy action* is executed by the [Vantage Transport Service](#) and is used to replicate a file from a source target (file system/device and directory) to a destination target (file system/device and directory). It typically performs this task by copying the file to the destination.

Copy actions can be executed on any [action state](#). This action is Open Workflow capable.

### database

The term *database* is the common term used to refer to the [Vantage domain database](#), where all specifications for the domain are stored, along with workflows and job history.

### Data Collection Utility

The *Data Collection Utility* is built into the Vantage Domain Console (Support Utilities > Data Collection). It enables you to collect relevant information about selected services for transmission to Telestream during a troubleshooting session. You can also log point-in-time details about a selected service into a log file for diagnostics purposes.

### Delay action

The Delay action provides the ability to delay the workflow for a fixed number of seconds before continuing. The Delay action operates in Open Workflow mode; for example, if you set a 60 second delay, the action will turn green, delay 60 seconds, then propagate the Open signal to the next action.

### Decide action

A *Decide action*, which is implemented in every Vantage service, is an action which allows you to explicitly set the [action state](#) based upon analysis of variable values at runtime. It is most commonly used to determine whether or not subsequent actions (or actions in a given branch) in a workflow should execute.

When the Decide action is used, the state set by the Decide action is passed to the next action. Typically, more than one Decide action is required to support decision branches. For example, if one branch is for HD media, it will start with a Decide



action that will set the state to Success for HD content, or set it to Ignore otherwise; if another branch is for all other media, it will start with a Decide action that performs the opposite behavior.

See [variable](#), [action state](#).

### **Delete action**

A *Delete action* is executed by the [Vantage Transport Service](#), and is used to permanently remove a file from a source target (file system/device and directory). Delete actions can be executed on any [action state](#).

### **Deploy action**

A *Deploy action* is executed by the [Vantage Transport Service](#), and is used to save the specified files to a destination outside the Vantage domain. Unlike Delete, Move, or Copy actions, Deploy actions allow multiple files to be operated on simultaneously, and do not maintain a reference to those files in the [binder](#) after completion.

### **distributed domain**

Another term for [Vantage array](#).

### **domain**

See [Vantage domain](#).

### **DPP Validate Action**

The *DPP Validate* action is executed by the [Vantage Analysis Service](#). You can use the DPP Validate action to confirm compliance of a DPP metadata XML file. If the XML file passes validation, TRUE is generated; otherwise FALSE is generated. You can test the results of the action downstream to change the workflow's actions based on the validation results. Optionally, you can also generate a validation report. The DPP Validate action is supported in Vantage Cloud Port hosted workflows with the exception of the validation report option which is not supported. For details, consult the Vantage Cloud Port User Guide available on the Telestream website.

### **DRM action**

The DRM action is part of the Multiscreen group, and is executed by the Multiscreen Service. You use the DRM action to execute a script that utilizes input data and generates a JSON string. The string contains the information required to encrypt streaming media with DRM (digital rights management) in Multiscreen workflows.

Scripts are created externally in a supported language and added to a Vantage domain via the Vantage Management Console > Workflow Design Items > Scripts. The specified script is executed in the DRM action, generating the output into a text variable for use in a downstream Multiscreen action. Multiscreen Flip uses the output of the script when encoding the media.



### Dublist action

A *Dublist action* is a specialized [origin action](#) for ingesting dublist files from a specified server and directory in TrafficManager applications. It uses the [Vantage Monitor Service](#) to regularly poll the server to discover new files.

When a new dublist file is discovered, it is parsed by the specified scheme and new entries are added to the master dublist maintained by Vantage. The Dublist action simultaneously polls the selected Vantage [catalog](#) for any media files which match entries in the master list; when found, it submits a [job](#) to a TrafficManager application workflow for processing. The Dublist action uses the [binder](#) name as the unique identifier for the commercial, so it should be set to the Ad ID.

Typically, the workflow is an on-air processing workflow which transcodes the media, optionally trims the clip and alters audio for compliance. Then, it delivers the media to an on-air server and notifies an automation system. For more details, see the TrafficManager User Guide.

### Dublist Portal

*Dublist Portal* is a client Windows program provided as part of a TrafficManager license. Dublist Portal enables customers who are performing advertisement processing to define, manage, and process dublists as part of their automated TrafficManager workflows.

### Edit Decision List

A Vantage *edit decision list* (EDL) is a list of clips that will be merged together in a target clip. The list entries specify the start and stop of the clip, and Vantage supports list entries from multiple media files. Vantage operators use the Workflow Portal program to create EDLs.

### Vantage Edit Service

The *Edit Service* executes the Playlist actions: [Colocate action](#), [Conform action](#), [Chronicle action](#), and [Compose action](#). In the case of Conform, the Edit Service may manage the rendering via an out-of-process resource.

### emotion Action

The emotion action is an optional, licensed feature in Vantage. The emotion action enables Vantage to utilize and interact with Emotion Systems Emotion Engine audio software.

### Error Log

The Error Log utility captures Vantage errors and records the following details: date and time of error, error source (Vantage service), host computer where the error occurred, type of error (Info or Error), and error message.

### Examine action

An *Examine action* uses the [Vantage Analysis Service](#) to evaluate the video and audio of a media file to measure certain characteristics, such as audio loudness, or to detect characteristics, such as the presence and size of curtains. You can configure it to publish metadata or variables containing the results of analysis.

**Exist action**

An *Exist action* uses the [Vantage Catalog Service](#), and allows you to determine if a [binder](#) of a given name (or name fragment) is present in a specified [catalog](#).

**Extract action**

The Extract action, executed by the [Vantage Metadata Service](#), is used to extract specific values from element attributes in XML or key-value pairs in JSON metadata. The Extract action identifies and extracts specific values from structured metadata and populates variables for use in downstream actions. The Extract action enables you to browse a sample file and identify the location in the structured data where the value is located.

The workflow can ingest an XML or JSON file during job execution or by making web service calls. The Extract action automatically generates XPATH or JSONPath references from the structured metadata in these files to extract the data, and populates a variable with the value. During execution, each extraction path is evaluated against the input and the associated variables are populated for use in downstream actions.

This action is Open Workflow capable if the Open Workflows license is installed.

**Faspex Delivery action**

A *Faspex Delivery action*, which is executed by the [Vantage Aspera Service](#), is used to deliver files to Aspera Faspex servers. Upon delivery, recipients are notified and can download the package.

**FileCatalyst action**

The *FileCatalyst action* is an optional, licensed feature, which enables Vantage workflows to access and deliver files to FileCatalyst servers via integrated FileCatalyst client software. It is executed by the [Vantage FileCatalyst Service](#).

**Vantage FileCatalyst Service**

The *FileCatalyst Service* implements the FileCatalyst action for Vantage.

**Flip action**

A *Flip action* is executed by the [Vantage Transcode Service](#), and implements the specified codec, which is used to transcode decoded digital baseband media into another media encoding format. The Telestream Media Transcode and Analysis Engine performs the transcode on behalf of Vantage. The Flip action has an Export command, which allows you to save the configured Flip action as an XML file, for use in SDK applications.

**Flip64 action**

The Flip64 action is a Vantage Cloud Port-capable, 64-bit multi-core-optimized encoder running under the [Vantage Transcode Service](#) (except in [Cloud Port mode](#), when it is executed by the [Telestream Cloud Service](#), operating as a proxy of Telestream Cloud). It transcodes media from one or more input files into another format as specified by the output configuration you specify. Available resolutions extend from SD to UltraHD and 4K in a broad range of file formats, from QuickTime to MPEG-4 and TIFO, and including encoding for x264, x265 (H.265 HEVC), MXF, and

more. This action is Open Workflow capable except when executing in [Cloud Port mode](#).

### **Forward action**

A *Forward action*, which is implemented in every Vantage service, forwards a [binder](#) and all current variables to another workflow, starting a new [job](#) with the target workflow. A Forward action may be added to the end of a workflow, and requires that the target workflow have a [Receive action](#) as its first action.

Typically, workflows are created with a Receive action when they are intended for execution by another workflow that immediately precedes this one. This ability to chain workflows enables you to create comprehensive, intelligent run-time switching workflows consisting of smaller workflows used as building blocks.

See [Receive action](#).

### **Frame.io action**

The *Frame.io action* is implemented by the [Vantage Publish Service](#) and, via the Frame.io connector, allows for the creation and delivery of assets, between Vantage and Frame.io, an online hub that facilitates the organization of and collaboration around media assets. Frame.io allows team members to upload material, annotate this material, and collaborate with other team members on material. A special license is required to use this feature.

### **Gather action**

A *Gather action* is implemented by the [Vantage Staging Service](#), and collects one or more files from a specified server and directory (and optionally, its subfolders), and brings them into the workflow as [attachments](#). Use of a file matching pattern allows you to select only certain types of files.

### **hosted workflows**

A *hosted workflow* is a workflow that has been exported to Telestream Cloud after being designed in Workflow Designer. They are managed in the Telestream Cloud console after deployment in Telestream Cloud.

Jobs to hosted workflows are either submitted via the Telestream Cloud's Cloud Port console or a Telestream Cloud API-based client program, and all action execution occurs exclusively in Telestream Cloud. For details on using hosted workflows, consult the Vantage Cloud Port User Guide available on the Telestream website.

### **hot folder**

A *hot folder* is a directory on a server that has been identified as a directory for storing media to be processed by a workflow in Vantage. When the workflow monitor identifies new media in this folder, it is submitted for processing. Also referred to as a Watch folder.

See [Watch action](#), [Vantage Monitor Service](#).

**Identify action**

An *Identify action* uses the [Vantage Analysis Service](#) to determine certain properties of a media file, such as codec type, video bit rate, or file size. This information can then be published as a metadata [labels](#) or variables.

**Inspector**

An *inspector* is a series of one or more panels in Vantage Workflow Designer that facilitate the setup and configuration of a given action. Inspectors are unique to each action—for example, configuring a Watch action is very different than configuring a Flip action.

**IPTV Flip action**

The *IPTV Flip action* is included with the Cable / IPTV version of TrafficManager. IPTV Flip actions are Cloud Port capable, and are executed by the [Vantage IPTV VOD Transcode Service](#) except when operating in Cloud Port mode, when the [Telestream Cloud Service](#) executes it as a proxy for Telestream Cloud. IPTV Flip can optionally run on a [Lightspeed Server](#) for GPU-enhanced x264/x265 encoding and video processing. The IPTV Flip action and IPTV VOD Service supports the features required to handle varying IPTV, set-top box and cable encoding requirements, and ancillary metadata specific to cable ad splicing and cable/IPTV set-top box environments. This action is Open Workflow capable except when executing in [Cloud Port mode](#).

**Vantage IPTV VOD Transcode Service**

The *IPTV VOD Transcode Service* is the Vantage component that executes the [IPTV Flip action](#). This service (which can optionally run on a [Lightspeed Server](#) for H264 and HEVC encoding and video processing), supports the features required to handle varying IPTV, set-top box and cable encoding requirements, and ancillary metadata specific to cable ad splicing and cable/IPTV set-top box environments. Transcoding is performed by the Telestream Media Framework on behalf of Vantage. Rendering may be performed by an out-of-process resource managed by the IPTV VOD Transcode Service.

**job**

A *job* is each execution of a Vantage workflow. Jobs have a state (separate from [action states](#)), and jobs are comprised of actions that are executing. Jobs, like actions, may be in-process or they may be complete.

As a job executes, each action may be performed by any service (on any computer) in the Vantage domain that is capable of performing it. The capability of a service to perform a specific job depends on its current operating state, its workload, and its suitability, defined by a [qualification rule](#).

Jobs for a given workflow can be viewed in the Vantage Workflow Designer by selecting the workflow in the Workflow Designer panel and displaying the Job Status tab. Alternatively, all in-process and failed jobs within a Vantage Domain may be viewed in the Status details panel of the Management Console.

**job routing**

See [qualification rule](#) and [run on rules](#).

**job state**

A *job state* is the current status of a job. Keyword values are In Process | Paused | Complete | Failed | Waiting | Stopped by User | Waiting to Retry.

**Job Status Views Web Application**

The *Vantage Job Status Views web application* is installed on a Vantage web server and enables you to view real-time information about jobs in the domain from anywhere on your network with a web browser.

**label**

A *label* or *metadata label* defines a set of metadata by use of name/value pairs associated with content. For example, a spot label may contain Agency, Author, or Ad-ID and other metadata values; this set of metadata is collectively called a Spot metadata label. Metadata labels can be stored in [binders](#) with the associated media and [attachment](#) files.

Vantage supplies a set of default metadata labels for use in workflows. In addition, you can create and modify labels for your use using the Management Console (Workflow Design Items > Metadata Labels).

**license**

A Vantage *license* is stored in the [Vantage domain database](#) and enables one or more Vantage features within a Vantage domain. Licenses are delivered as XML files and imported into the database and activated via the Vantage Management Console.

**Lightspeed Live Server**

Telestream's *Lightspeed Live Server* is a 1RU, GPU-enabled, multi-core CPU server used to host Lightspeed Live Capture and Lightspeed Live Stream.

**Lightspeed Server**

A Vantage *Lightspeed Server* is a 1RU, GPU-enabled, multi-core CPU server used to host Vantage services and accelerate video processing and x264 transcoding. Lightspeed Server accelerates compute-intensive image processing, including scaling, de-interlacing, frame rate conversion, motion vector calculation, and other tasks that require computation and analysis to modify or create new video frames.

**Location action**

The *Location action* uses the [Telestream Cloud Service](#) to determine if a specified file is located in Cloud-native storage or in local storage with an optional, 24-hour signed URL for HTTPS access. This information is usually utilized in branching workflows which execute a given workflow branch based on the location of the file.

**Lookup action**

The Lookup action is part of the Metadata group and is executed by the Metadata Service. The Lookup action performs a search operation on a set of key-value pairs in a master CSV file, based on values extracted from the metadata file associated with a job submission. If the key is found, the value is returned in the output variable, for use downstream. Lookup is typically used with a Catch action workflow, in TrafficManager applications.

**Management Console**

The *Management Console* enables Vantage system administrators to effectively configure Vantage domains, and scale domains across multiple servers to meet their operating requirements and perform effectively in their environment.

**MedialInfo action**

The *MedialInfo action*, which is executed by the [Vantage Analysis Service](#), performs 2 tasks, based on its analysis of the media file and its streams:

- Creates variables from properties, using the MedialInfo API
- Creates a report of the properties and their values.

In each category, you can produce variables of selected metrics with the results the analysis.

**Media Creation action**

The Media Creation action uses the [Vantage Avid Service](#) to deliver new media to the specified Interplay server and issue the Interplay commands necessary to check the file into the Interplay server. This action is Open Workflow capable.

**Media Management action**

The Media Management action uses the [Vantage Avid Service](#) for dual ingest of media into Avid Media Central | Production and Avid Media Central | Asset Management systems via Avid Media Central | Cloud UX.

**media nickname**

A *media nickname* is an alias or alternate name that is assigned to a media file during Vantage workflow execution. When a media file is submitted to a workflow, the actual file name and location is stored in a Vantage [binder](#) along with a media nickname as defined in the workflow. Within the workflow, all references to a file are by media nickname. However, when Vantage needs to access a file, Vantage uses the actual file name and location stored in the binder.

See [attachment nickname](#) and [nickname](#).

**MediaMate action**

A *MediaMate action* uses the [Vantage MediaMate Service](#) to enable Vantage workflows to utilize and interact with the Subtitling capabilities of Screen MediaMate. Each subtitling option provides different capabilities that relate to the subtitle process.

**Vantage MediaMate Service**

The *MediaMate Service* implements the MediaMate Screen software for Vantage, and provides two-way communication between workflows (and the [MediaMate action](#)) utilizing the MediaMate Screen software itself.

**Message action**

A *Message action* is implemented in the [Vantage Communicate Service](#) and enables you to generate and transmit an electronic Message—an email, for example. A Vantage administrator must configure Vantage to use an SMTP server (Vantage Management Console: Settings & Options > Email) before email can be utilized.

### Vantage Metadata Service

The *Metadata Service* executes the actions to extract metadata values, and perform conversions between [attachment](#) files, metadata [labels](#), and variables. Metadata Service actions include the [Extract action](#), the [Populate action](#), and the [Transform action](#).

### Vantage Metric Service

The *Metric Service* gathers and supplies machine-level information about a specific Vantage node. It monitors CPU, network, and RAM utilization and reports these to Vantage. On a Lightspeed server, it also monitors the GPU activity. The bulk of the information that the Metric Service presents is visualized in the Machine Metrics section of the Vantage Console. By convention, a Metric Service should be installed and running on every node in a Vantage domain. If you do not have a Metric Service running on a specific machine, then that machine will not appear (will not have an entry) in the Machine Metrics section of the Vantage Console.

### Vantage Monitor Service

The *Monitor Service* is the Vantage component that executes [Watch actions](#) and [Associate actions](#), [Camera Ingest action](#) and the [Workorder action](#), all relating to the discovery of files and starting [jobs](#).

### Move action

A *Move action* is executed by the [Vantage Transport Service](#), and is used to move a file from a source target (file system/device and directory) to a destination target (file system/device and directory). It performs this task by copying the file to the destination, then deleting the source. The copy first, delete last process insures that the move completes normally before deleting the source file.

Move actions can be executed on any [action state](#).

### Multi-Decide action

The Multi-Decide action simplifies a Vantage workflow by allowing multiple phases of Boolean logic called Decision Groups to be implemented within a single action. One Multi-Decide action can evaluate many different groups of variables and set a Result variable to represent the evaluation result for each group.

A key feature is that the Decide Groups defined in the action can be chained together, similar to Compute and Construct actions, so that the Result variable of one group within the action can feed the input conditions of a subsequent group within the same action. This provides powerful internal logical processing within a single Multi-Decide action. The variable values resulting from a Multi-Decide action can trigger any of several branches in a workflow.

As an example, a Multi-Decide action can implement internal logic to trigger downstream workflow branches. For example, IF the video format is MXF AND the video frame rate is 60, THEN IF the bit rate is 35 MB/sec, execute branch 1; IF the bit rate is 50 MB/sec, execute Branch 2; otherwise, execute Branch 3. IF the video format is not MXF or the frame rate is not 60, execute Branch 4. The Multi-Decide greatly reduces the number of Decide actions required per workflow because many expressions can be grouped into a single action.



### Multiscreen Flip action

The *Multiscreen Flip action* is an optional, licensed feature. Multiscreen Flip actions are Cloud Port actions; executed by the [Vantage Multiscreen Service](#) in Vantage or by the [Telestream Cloud Service](#) operating as a proxy, when executed in Telestream Cloud. The Multiscreen Service performs adaptive bit-rate encoding and simultaneous packaging of decoded digital baseband media into multiple bit-rate variants of H.264/HEVC video and containers in adaptive rate streaming formats, including Adobe HDS, Apple HLS, Microsoft HSS, and players the support MPEG DASH. You can configure the Multiscreen action to perform transcoding on a standard Vantage server or on a [Lightspeed Server](#). This action is Open Workflow capable except when executing in [Cloud Port mode](#).

### Vantage Multiscreen Service

The *Multiscreen Service* is the Vantage component that executes the [Multiscreen Flip action](#) and the [DRM action](#). This service (which can optionally run on a [Lightspeed Server](#) for H264 and HEVC encoding and video processing), supports the features required to handle varying adaptive bit-rate encoding and packaging requirements. Transcoding is performed by the Telestream Media Framework on behalf of Vantage. Rendering may be performed by an out-of-process resource managed by the Multiscreen Transcode Service.

### Nexidia Action

The *Nexidia action* is an optional, licensed feature in Vantage. It uses the [Vantage Nexidia Service](#) to interact with Nexidia QC servers running Nexidia QC software. The specified input files are passed to the Nexidia QC software where they are analyzed using the test profile selected.

### Vantage Nexidia Service

The *Nexidia Service* is an optional, licensed feature in Vantage. It executes Nexidia actions.

### nickname

A *nickname* is an alias or alternate name that is assigned to a media or [attachment](#) file during Vantage workflow execution. When a media or attachment file is submitted to a workflow, the actual file name and location is stored in a Vantage [binder](#) along with a nickname as defined in the workflow. Within the workflow, all references to a file are by nickname. However, when Vantage needs to access a file, Vantage uses the actual file name and location stored in the binder.

Nicknames may refer to either media files or attachment files. Certain actions only allow the use of certain nickname types. For example, a Flip action only allows media file nicknames to be used as the inputs and outputs. However, other actions (such as the Move and Copy actions) operate on any type of file and allow the use of any nickname.

See [attachment nickname](#) and [media nickname](#).

### Notify action

A *Notify action* is implemented in the [Vantage Communicate Service](#), and is an action which saves [job](#) information to a file to interface with an external system.



You can configure a Notify action to produce an XML file, and you can also use it to invoke a Web Service.

TrafficManager-centric extensions are presented here for backward compatibility.

### Open Workflows

An option to Vantage workflow functionality (enabled by the Open Workflows license), *Open Workflows* enhance the processing speed of workflows by enabling most actions to begin processing media before the previous action has completed its work. Open workflows only operate in Open mode when operating on Vantage domain nodes that are running on Windows in your local environment. They can not operate in Open mode when executing in [Cloud Port mode](#).

### origin action

An *origin action* is a specific type of action, which must be used to start a workflow. A workflow without an origin action as its first action is not properly designed, and cannot be activated. The origin actions include the [Capture action](#), [Watch action](#), [Workorder action](#), and [Receive action](#), as well as the [Catch action](#) and [Dublist actions](#) (optional TrafficManager actions).

### Original nickname

The media nickname *Original* is a reserved nickname that is typically assigned to media files in a workflow by the origin action.

See [media nickname](#).

### Populate action

A *Populate action* uses the [Vantage Metadata Service](#) to read and write metadata [labels](#). During ingest, metadata labels can be added to ingested media and generally include trim information, audio levels, file properties, and commercial metadata. The metadata labels can then be reviewed and modified by operators using Workflow Portal. At any stage of a workflow, Vantage can extract information from labels using the Populate action, allowing Vantage for example to use trim points during a transcode, or audio level information when creating the final broadcast asset. This action is Open Workflow capable.

### Post Producer

*Post Producer* is a specially-licensed set of actions and functionality in Vantage that enables iterative, template-driven assembly and encoding of assets for publication. Post Producer workflows automate assembly and reduce production costs by producing multi-layer video deliverables with transition and image effects, graphic overlays, and conformed for IPTV and cable VOD production, news or weather updates, international localization, promo assembly and insertion and advertisement insertion.

### Vantage Publish Service

The Publish service implements the [Frame.io action](#) in Vantage.

**Pulsar Action**

The *Pulsar action* is an optional, licensed feature which enables broadcasters to integrate the Pulsar suite of content verification components directly in Vantage workflows. It is executed by the [Vantage Pulsar Service](#).

**Vantage Pulsar Service**

The Pulsar service implements the Pulsar action in Vantage.

**qualification rule**

A *qualification rule* influences or controls the routing and execution of actions among Vantage services of the same type in a distributed Vantage domain. Qualification rules can be used to ensure that jobs are routed to services that are best suited for the task. Vantage uses values contained in variables to determine the suitability of a given service to execute the action.

Qualification rules are exclusively based on variables; they are not based on any actual machine analysis. As a result, it is up to the system administrator to correctly set up variables and qualification rules, and apply variables to the appropriate actions to ensure that [jobs](#) are routed correctly.

Qualification rules are created and managed in the Vantage Management Console > Services.

See also [run on rules](#).

**Receive action**

A *Receive action* is an [origin action](#) which is implemented in every Vantage service. Receive actions are designed to receive files from other systems: workflows, SDK-based applications, and Workflow Portal, for example. Files can also be automatically submitted to a workflow starting with a Receive action from another workflow using the Forward action.

See [Forward action](#).

**Register action**

A *Register action* uses the [Vantage Catalog Service](#) to add the [binder](#) created by each job to a Vantage [catalog](#). Register actions can be executed on any [action state](#).

See also [Vantage catalog](#).

**Remove action**

A *Remove action* is executed by the [Vantage Catalog Service](#), and is used to permanently remove a [binder](#) from the [catalog](#) and set the associated file resources to expired. If the action succeeds, it emits an [action state](#) of Success; otherwise, Failure.

**Report action**

A *Report action*, which is executed by the [Vantage Analysis Service](#), generates a list of variables and their values and saves them in a file format specified by you.

**resource cost**

A *resource cost* is an integer value, implemented in the Vantage Management Console on each action type to specify a relative computer resource consumption

value in relation to all other action types. This value enables Vantage to maximize resources and optimize transactions, so that you can tune your Vantage system for the highest possible throughput on your particular hardware.

### **retry rules**

*Retry rules* are rules that you can specify on certain actions, to re-execute actions that fail primarily due to platform access and network latency problems. The retry rules you set on a given action override the default retry rules established in the Management Console.

### **run on rules**

*Run on rules* are rules that you specify on a given action, to qualify which services have the characteristics that enable them to execute this action. Rules are set up by specifying variables which have been bound to a given Vantage service and values set. After configuration, the action can test each rule by comparing its run time value to the value in the service's copy and determine if there is a match before attempting to execute it.

See also [qualification rule](#).

### **Vantage SDK Service**

The *SDK Service* is the Vantage component which enables integration with third-party or custom-developed client programs, for submitting [jobs](#), tracking status, etc.

### **Session Log**

The *session log* is a function of the Job Status and Domain Job Status panels in the Workflow Designer. This log displays session activity entries, if any, including which variables have been provided to each action and which ComponentPac was used to run an action. This information can be helpful when debugging the use of variable, or when working on an issue with Telestream Customer Service.

### **Signiant Delivery action**

A *Signiant Delivery action*, which is executed by the [Vantage Signiant Service](#), is used to deliver files to servers controlled by Signiant file transfer products.

### **Signiant Media Shuttle action**

A *Signiant media Shuttle action*, which is executed by the [Vantage Signiant Service](#), used for automated Media Shuttle accelerated file transfers among a specified list of users using Vantage workflows.

### **Vantage Signiant Service**

The *Signiant Service* is the Vantage component which enables integration with third-party or custom-developed client programs, for submitting jobs, tracking status, etc.

The *Signiant Service* implements the Signiant file transfer product for Vantage, and provides two-way communication between workflows (along with the [Signiant Delivery action](#) and [Signiant Media Shuttle action](#)) utilizing the Signiant software itself.

**Vantage Staging Service**

The *Staging Service* is the Vantage component which executes [Archive actions](#) and [Gather actions](#).

**service**

See [Vantage services](#).

**Secured Version Control**

The *Secured Version Control* feature provides the ability to install the latest software and begin building workflows that utilize new ComponentPac libraries (software libraries), while keeping the existing workflows untouched and operating off a previous ComponentPac version. When the user desires to upgrade a workflow or action within a workflow, it can be done at a convenient time. For a detailed description of Secured Version Control, search the *Vantage Domain Management Guide*.

**Synchronize action**

A *Synchronize action* is a connector action, for the sole purpose of uncluttering workflow connectors. In workflows where there is a many-to-many relationship (for example, 6 Flip actions connecting to 6 Deploy actions, which connect to 6 Deletes), instead of drawing connection between them all, you simply connect them to a common Synchronize action. There is no [Inspector](#) for the Synchronize action, because no configuration is required.

**Syndicate action**

The *Syndicate* action processes and can apply a template to metadata accompanying syndicated content from providers such as Pitchblue and generic providers. The Syndicate action is part of TrafficManager, an optional, licensed feature of Vantage, enabled with the TrafficManager license. It is executed by the [Vantage Traffic Service](#). The purpose of this action is to automatically rearrange segments according to the template, or to mark specific segments as “not included” in the final program. Use the Syndicate action in syndicated media ingest workflows to convert sidecar metadata XML files to a mezzanine format for use in downstream actions in the workflow, or for use in Syndication Workflow Portal applications.

**Syndication Forward action**

The *Syndication Forward* action is part of TrafficManager, an optional, licensed feature of Vantage, enabled with the TrafficManager license. It is executed by the [Vantage Traffic Service](#).

The Syndication Forward action processes incoming jobs from a traditional syndication source, such as a catch server, and allows for automatic forwarding of a CML file to a publishing workflow which performs segment extraction and processing. This removes the step of manual Workflow Portal interactions involving a typical Syndication action workflow in cases where an automated process is required or desired.

### **Tape action**

The *Tape* action is an origin action (and may be the only action in a workflow) used to start SDI-based tape capture workflows created in any Vantage domain installed on the Lightspeed Live server. The Tape action inspector allows you to select and configure VTR sources for processing, filtering, transcoding, and output. You can also use the action to add metadata [labels](#).

### **Telestream Cloud Service**

The *Telestream Cloud Service* connects a Vantage domain with Telestream Cloud. The Telestream Cloud service acts primarily as a proxy for Telestream Cloud as the Vantage component that is responsible for transporting files and executing actions which interact with resources in Telestream Cloud or are related to Cloud processing: [Cloud Flip action](#) | [Cloud QC action](#) | [Cloud Speech action](#) | [Location action](#) | [Utility action](#). The *Telestream Cloud Service* is also responsible for executing the [Analyze action](#) | [Conform action](#) | [Flip64 action](#) | [IPTV Flip action](#) | [Multiscreen Flip action](#) | [Tempo action](#) | [Timed Text Conform action](#) | [Timed Text Flip action](#) when these actions are executing in [Cloud Port mode](#).

To use the Cloud Service and its associated actions and features in your workflows, you must have a Telestream Cloud account on the Telestream Cloud web site: <https://cloud.telestream.net/>. When you create your Telestream Cloud account, you are supplied an API key. Use this key in the Vantage Management Console > Settings & Options > Telestream Cloud tab to allow Vantage to log into your Telestream Cloud account automatically to perform cloud processing that you specify in workflows.

### **Telestream Live Persistence Service**

The *Telestream Live Persistence Service* handles the persistence of source material.

### **Telestream Live Service**

The Telestream Live Service corresponds to the Live Manager capability and arbitrates resource allocation for Lightspeed Live Capture.

### **Telestream Live Source Service**

The Telestream Live Source service manages the acquisition of material from a specific source (spawned by the Telestream Live Service).

### **Telestream Media Framework**

The *Telestream Media Framework* is a software framework developed by Telestream for reading, writing transcoding, and analyzing many different kinds of media files. Telestream Media Framework is integrated in many Telestream products, including Vantage.

### **Telestream Playlist Service**

The *Telestream Playlist Service* implements Telestream Live Play, which is used to play out files created by Live Capture.

Telestream Playlist Service is an optional, separately licensed feature. The Live Play web app provides on-screen and SDI-based real-time playback features based on custom playlists you create.

**Telestream RouteMaster Service**

The *Telestream RouteMaster Service* implements Telestream RouteMaster—an optional, separately licensed feature. It works in conjunction with Live Capture to provide SDI source routing control.

**Telestream Schedule Service**

The *Telestream Schedule Service* is an optional, separately licensed feature. It implements Live Schedule, including Live Schedule, a service-based web application. Live Schedule works in conjunction with Live Capture, enabling you to create events you want captured for each source, and automatically starts and stops capturing video on an event-by-event basis.

**Tempo action**

The *Tempo action* is part of the Edit group executed by the [Vantage Edit Service](#) and is Cloud Port capable. When in Cloud Port mode, it is executed by the [Telestream Cloud Service](#) in Telestream Cloud. The Tempo action is included in Tempo, a time-adjusting encoding solution built on the Vantage platform. The Tempo action re-times file-based content and intelligently decreases or increases the running time of shows and segments. This action is Open Workflow capable.

**Timed Text Conform action**

The Timed Text Conform action is part of the Timed Text group and is Cloud Port capable. The Timed Text Conform action is executed by the [Vantage Timed Text Service](#) or via the [Telestream Cloud Service](#) when executed in Telestream Cloud. The Timed Text Conform action ingests a Timed Text CML file with references to caption/subtitle files in order to create SCC, MCC, or IMSC outputs.

**Timed Text Flip action**

The *Timed Text Flip action* is part of the Timed Text group and is Cloud Port capable. The Timed Text action is executed by the [Vantage Timed Text Service](#), or by the [Telestream Cloud Service](#) operating as a proxy, when executed in Telestream Cloud. The Timed Text Flip action automates caption file-type conversions, extracts caption data from media with embedded captions, creates subtitle overlay graphics, and manipulates the timecode of caption data to match media.

**Vantage Timed Text Service**

The *Timed Text Service* is the Vantage component which executes the [Timed Text Conform action](#) or [Timed Text Flip action](#).

**Vantage Traffic Service**

The *Traffic Service* is the Vantage component which executes the [Catch action](#) | [Dublist action](#) | [Syndicate action](#).

**TrafficManager**

*TrafficManager* is an optional, licensed feature which enables automated advertisement and syndicated media processing from catch server to automation systems and on-air servers, serving both the broadcast and cable industry. It includes the [Catch action](#) for catch servers and the [Dublist action](#) for dublist

management. It also includes the [Syndicate action](#) for processing syndicated media.

### **transcode**

*Transcode* means the process of decoding media in one format (MPEG2, for example) down to digital baseband and then encoding it in another media format (MPEG4, for example).

### **Vantage Transcode Service**

The *Transcode Service* is the Vantage component that executes the [Flip action](#) | [Flip64 action](#) —transforming media from one format to another. Transcoding for the Flip action is performed by the Telestream Media Transcode and Analysis Engine on behalf of Vantage. The remaining actions are performed within the Telestream Media Framework.

### **Transform action**

A *Transform action* uses the [Vantage Metadata Service](#) to transform metadata between XML files ([attachments](#)) and [labels](#). XSL style sheets are used to perform these transformations; style sheets can be managed in the Vantage Management Console: Workflow Design Items > Style Sheets. This action is Open Workflow capable.

### **Vantage Transport Service**

The *Transport Service* is the Vantage component that executes (or manages the execution via an out-of-process resource) the actions relating to file operations: [Move action](#), [Delete action](#), [Copy action](#), and [Deploy action](#). File transfers may be performed by an out-of-process resource managed by the Transport Service.

### **Utility action**

The *Utility action* provides an API/SDK bridge for interaction with specific functionality in Telestream Cloud using custom designed plugins via the [Telestream Cloud Service](#). To use the Utility action you must have a Telestream Cloud account and enter the account credentials in the Vantage Management Console Settings to enable Vantage to access the account. After the selection of an available plugin, the Utility action allows access to functions available exclusively in Telestream Cloud.

### **Utilization action**

A *Utilization action* enables users to determine the relative load on the domain as well as transcoding services within the domain. Other downstream actions can then make intelligent branching decisions based on that information: Telestream Cloud versus on-premises transcoding of media, for example.

### **Vantage array**

A *Vantage array* is a domain whose software components are distributed among multiple computers for durability and scalability, instead of installed and operating on a single computer (often referred to as a distributed domain). A typical array has the [Vantage domain database](#) installed on a dedicated server, and all Vantage



services installed on another computer, and additional Transcode Services each installed on other computers for high-performance, parallel transcoding.

### **Vantage catalog**

Formal name for [catalog](#). Similar in concept to the folders in a file system, a Vantage *catalog* is a container that stores [binders](#). *Catalog folders* are sub-containers that organize binders. To access a binder, Workflow Portal operators search through the visible catalogs and folders, just as they might sort through folders in a file system.

### **Vantage domain database**

A *Vantage domain database* is a Microsoft SQL Server database which contains all workflows, actions, [jobs](#), [binders](#), licenses, and configuration information for a Vantage domain.

### **Vantage domain**

A *Vantage domain* is a collection of computers, Vantage workflows, actions, Vantage services, [jobs](#), [binders](#), and configuration settings, all known to and interacting with each other, stored in a [database](#). This collection constitutes a Vantage domain. Vantage domains may exist on a single computer or they may be distributed across many computers for durability and scalability.

The name of a Vantage domain is the same as the name of the server that hosts the [Vantage domain database](#).

Multiple Vantage domains may exist on a network, but they are independent entities that do not communicate with each other. They are not bound together and do not share resources or work. The purpose of storing an entire domain in a [database](#) is to provide an easy way to create and manage the domain and to provide access to all the details about each resource in the domain to any other resource that needs it.

### **Vantage EDL nickname**

The nickname *Vantage EDL* is a reserved nickname that is typically assigned to media files that are created in [catalog](#) ingest workflows, to identify the ingest files of an [Edit Decision List](#) in Workflow Portal, during Stitch and Trim operations. See [media nickname](#).

### **Vantage folder address**

A *Vantage folder address* is an alias to a local or remote file folder. You can create and manage Vantage folder addresses in the Vantage Folder Address Book dialog, in Copy and Move actions in Vantage Workflow Designer, and in the Vantage Management Console.

After you create a Vantage folder address, you can specify the destination directory in any workflow simply by selecting the Vantage folder address. Changes to a Vantage folder address—such as updating an IP address or a password—immediately affect all workflows that use that Vantage folder.

Unlike Vantage stores, temporary files that are created during workflow execution are not automatically deleted from Vantage folders according to [job](#) expiration settings.



### Vantage Live Service

Part of the Vantage Media Processing Platform on a Lightspeed Live Server, the Vantage Live Service is listed in the Management Console Services list and executes the [Capture action](#) processes.

### Vantage Proxy nickname

The media nickname *Vantage Proxy* is a reserved nickname that may be assigned to media files encoded using the QuickTime encoder in H.264/AAC as QuickTime movies or MP4 files with x264/AAC, which enables previewing with the media viewers provided in Vantage programs such as Workflow Designer, Workflow Portal, and the Vantage Management Console.

Alternatively, the Workflow Portal Windows Client QuickTime Media Player supports MP4 with x264-encoded H.264/AAC, provided that QuickTime 7.7.6 or later is installed.

See [media nickname](#).

### Vantage services

The term *Vantage services* refers to the collection of Windows services in a Vantage domain, which are responsible for executing all of the actions in a workflow as it executes.

### Vantage store

A *Vantage store* is a directory on a Windows file system that stores temporary files. Stores are managed by the Vantage domain for the purpose of centralizing large directories for reading and writing files. Unlike a Vantage folder, temporary files placed in a Vantage store are deleted when the [binder](#) is deleted. Vantage stores are generally used to hold temporary files for the duration that a [job](#) is executing.

Vantage stores are managed in the Vantage Management Console: Storage. Services that create temporary files, such as the Transcode Service, can be configured to use specific stores.

### Vantage Thumbnail nickname

The media nickname *Vantage Thumbnail* is a reserved nickname that is typically assigned to output media files that are created to display thumbnail images instead of [binder](#) names in Vantage programs such as Workflow Portal.

See [media nickname](#).

### variable

In Vantage, a *variable* is a container for temporary [job](#) information—a symbolic name (or identifier) which contains some known or unknown quantity or element of information; a value. You use the variable name to reference the current value; this separation of name and content allows the name to be used independently of the exact information it represents. The variable can be bound to a value (that is, you can set a variable to a given value) during run time, and the value of the variable may change during the course of workflow execution.

A variable identifies temporary job metadata. Variables have a name (such as *Number of Audio Channels*), a type (such as *Integer Number*) and a default value

(such as 50). Variables values can be set inside a job in a variety of ways: through analysis, through metadata population, in the Watch and Associate actions, as a property of an action, or by a service as it executes an action.

Variables are used by Vantage services and actions to control workflow execution. Many settings in actions can be bound (or attached) to variables, allowing the workflow to dynamically update values on a [job](#)-by-job basis.

For example, a variable may be assigned a value by an Analysis action to determine how many lines of black are at the top of a video frame; a crop filter later in the workflow can bind to that variable, ensuring that every crop in every job is appropriate to the workflow requirements.

Variables in services may be also be used for [job routing](#). For example, an action with a boolean variable named *hostnameRequired* set to TRUE must pass this condition to a service which evaluates the condition to determine if it can successfully perform the action.

Variables can be created in Vantage Management Console (Workflow Design Items > Variables) or in Vantage Workflow Designer, and assigned for use in workflows and services.

### **VidChecker action**

A *VidChecker action* is an optional, licensed feature in Vantage. It uses the [VidChecker Service](#) to enable Vantage workflows to utilize and interact with various QC tests provided by the VidChecker software.

### **VidChecker Service**

The *VidChecker Service* implements the VidChecker QC software for Vantage, and provides two-way communication between workflows (and the [VidChecker action](#)) utilizing the VidChecker software to perform media quality tests.

### **Watch action**

A *Watch action* is an [origin action](#); it uses the [Vantage Monitor Service](#) to regularly poll a target location (a directory, for example) on a device or file system (FTP, Windows network folder, etc.) to discover new files. This action is Open Workflow capable.

When a new file is discovered, the Watch action submits a [job](#) for the workflow which it is part of, for processing the file—typically, a media file.

### **Web Dashboard**

The *Web Dashboard* is an optional, licensed web app which displays important domain information from anywhere on your network in a web browser. The Web Dashboard is installed on the IIS server on your [Vantage domain database](#) server.

### **workflow**

A *workflow* in Vantage is a set of actions designed to perform an automated process. Vantage workflows are created using the Vantage Workflow Designer by adding and configuring actions and connecting them together. Workflows are stored in the [Vantage domain database](#), and executed by Vantage services.

**Workflow Designer**

*Vantage Workflow Designer* is a client program that enables you to create and edit workflows, activate and deactivate workflows, monitor [job](#) status, and review and delete [jobs](#) that have completed.

**Workflow Portal**

*Workflow Portal* is a client program that features a customizable set of functionality to support various operator-related tasks: selecting media and submitting [jobs](#), updating variables and metadata, forwarding jobs, creating EDL-based jobs, etc.

Customization is implemented in the Vantage Management Console, when Vantage administrators construct the user interface and functionality they want for a given task, then save it. When operators launch Workflow Portal, they select the configuration appropriate to the task at hand, and Workflow Portal dynamically display the user interface components specified in the configuration file.

**Workflow Portal Web Application**

The *Workflow Portal web app* is a limited implementation of Workflow Portal, for use in a web browser over a network or Internet connection.

**Workorder action**

A *Workorder action* is an [origin action](#); it uses the [Vantage Monitor Service](#) to regularly poll a target Windows directory for new [workorder files](#) to process. The Workorder action provides a simple and highly effective method of submitting multiple similar jobs without using the SDK.

When a new file is discovered, the Workorder action submits one job for each row in the file.

**workorder file**

A *workorder file* is a comma-separated value (CSV) text file containing one or more work orders, or job descriptions. Each row in the CSV file specifies a job, and each column specifies either an input file for the job, or value for run-time use; typically assigned to a variable in the workflow. Workorder file configurations are specified in the Domain Management Console. At least one workorder scheme must be created in order to use a Workorder action.

