MTS4000
MPEG Test Systems
Specifications and Performance Verification

Technical Reference

077-0626-00

Tektronix

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Specifications and Performance Verification

Technical Reference

www.tektronix.com
077-0626-00

Tektronix

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- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

Use proper power cord. Use only the power cord specified for this product and certified for the country of use.

Ground the product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe all terminal ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

Power disconnect. The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

Do not operate without covers. Do not operate this product with covers or panels removed.

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Avoid exposed circuitry. Do not touch exposed connections and components when power is present.

Use proper fuse. Use only the fuse type and rating specified for this product.

Wear eye protection. Wear eye protection if exposure to high-intensity rays or laser radiation exists.

Do not operate in wet/damp conditions.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry.

Provide proper ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Terms in This Manual

These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols and Terms on the Product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

The following symbol(s) may appear on the product:

Preface

This manual lists the electrical, mechanical, and environmental specifications, and the certification and compliance statements for the Tektronix MTS4000 MPEG Test System. Also provided are procedures for verifying the performance of the test system.

NOTE. *Text in this manual about the MPEG Player refers to the MPEG player application installed in the MTS4000 system.*

Related Manuals

The following manuals are also available to use with the MTS4000 MPEG Test System. These manuals are available on the MTS4000 Product Documentation CD-ROM (Tektronix part number 063-4386-xx) that was supplied with the test system. Product documentation is also available from the Manuals Finder on the Tektronix Web site.

Table i: MTS4000 product documentation

Item (Tektronix part number)	Description
MTS4000 Quick Start User Manual (071-2970-xx)	Provides installation and high-level operational overviews
MTS4000Analyzer Applications User Manual (077-0622-xx)	Provides in-depth operating information for the MTS4000 analyzer applications
MTS4000 Generator Applications User Manual (077-0623-xx)	Provides in-depth operating information for the MTS4000 generator applications
MTS4000 Carousel Applications User Manual (077-0624-xx)	Provides in-depth operating information for the MTS4090 carousel applications
MTS4000 Specifications and Performance Verification Technical Reference (077-0626-xx) (this manual)	Provides complete product specifications and a procedure for verifying the operation of the instrument
MTS4000 Release Notes (077-0627-xx)	Provides information about software problems and behaviors

Specifications

This chapter contains specifications for the MTS4000 MPEG Test Systems.

All specifications are guaranteed unless labeled “typical.” Typical specifications are provided for your convenience but are not guaranteed.

To meet specifications, the following conditions must be met:

- The system must be kept within the environmental limits specified in this document.
- The system must be powered from a source maintaining voltage and frequency within the limits described in this document.
- The system must have been operating continuously for at least 20 minutes within the specified operating temperature range.

Any conditions that are unique to a particular characteristic are expressly stated as part of that characteristic.

Table 1: Platform specifications

Characteristic	Description
Operating system	Microsoft Windows 7 Ultimate, 64 bit
Processor	Intel i7 860 Quad core
Disk space	
Operating system and software applications	500 GB SATA hard drive
File storage	500 GB SATA hard drive
RAM	4 GB
CD-ROM drive	CD-R/W, DVD-R/RW, DVD+R/RW
Display	LCD, 1280 X 1024, 17 inch
Ethernet	
10/100/1000 (GigE)	Two 10/100/1000Base-T; RJ45 connector Supported protocol: Ethernet/IP/UDP/ MPEG-TS and VLAN When used in MPEG-TS analysis and record, the minimum and maximum link bit rates are typically 250 kbps and 100 Mbps respectively IP playout bit rate is typically up to 190 Mbps
Keyboard/mouse	Integrated keyboard/mouse
External audio ports	External audio jacks for microphone input and line output
External VGA Output	
USB ports	Six USB 2.0 device connectors, two on front, four on side

Table 2: ASI card electrical characteristics

Characteristic	Description
ASI card	Quad ASI adapter for PCI Express bus, x4 Gen 1.
Connector type	BNC 75 Ω (4x). Each port can be independently configured as input or output.
Tx or Rx Bit Rate, typical	Up to 214 Mbps max
Physical layer	DVB-ASI (coax) EN50083-9
Return Loss, typical	> 15 dB, typical
ASI Output (Demodulated RF Output)	
Signal amplitude	1.0 V_{p-p} max, 600 mV_{p-p} min, into a 75 Ω load.
Return loss	10 dB min at 270 MHz

Table 3: DVB-S2 card characteristics

Characteristic	Description
Input frequency range	950 MHz to 2150 MHz with 1 MHz step size
Input signal amplitude range, typical	–60 dBm to –30 dBm for a CBER of $<1^{e-6}$
	Use high quality shielded cables and higher input level to prevent ingress of interfering signals. This is particularly important at the tuned frequency where the input circuitry is by design most sensitive.
Modulation format	QPSK in accordance with DVB-S (ETSI EN 300 421)
	QPSK, 8PSK, 16APSK and 32APSK in accordance with DVB-S2 (ETSI EN 302 307) including Constant, Adaptive and Variable Coding and Modulation (CCM, ACM and VCM)
Modulation baud rate	1 MBaud min, 60 MBaud max
	Maximum symbol rate: 60 MBaud in QPSK, 45 MBaud in 8PSK, 39 MBaud in 16APSK, and 32 MBaud in 32APSK.
Code rate	DVB-S: 1/2, 2/3, 3/4, 5/6, 6/7, 7/8
	DVB-S2: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
FEC modes	Viterbi and Reed-solomon in accordance with DVB-S
	LDPC and BCH in accordance with DVB-S2
	Short and Normal FEC blocks in accordance with DVB-S2
Roll off	0.2, 0.25, 0.35
Connector type	F type
Input termination impedance	75 Ω nominal
Input return loss, typical	>6 dB, 950 MHz to 2150 MHz
LNB supply voltage	selectable; 13.0 V ±1.5 V or 18.0 V ±1.5 V, with 100 Ω, 5 watt resistor load
LNB supply maximum current	200 mA
LNB 22 kHz signalling frequency	22 kHz ±20%
LNB 22 kHz signalling amplitude	800 mV_{p-p} with 100 Ω load
LNB mode	DiSEqC 2

Table 4: DVB-S2 measurements

Measurement	Description
RF lock	RF lock is indicated by LED and Status
Input level (signal strength), typical	Range: –60 dBm to –30 dBm Resolution: 1 dB Accuracy: ±5 dB
EVM (Error Vector Magnitude), typical	Display Range: ≤4.0% to ≥30.0% RMS Resolution: 0.1% Accuracy: ±20% or reading
MER (Modulation Error Ratio) with equalizer, typical	Display Range: 10 dB to 30 dB with equalizer Resolution: 1 dB Accuracy: ±2 dB for range from 10 to 28 dB
C/N (Carrier to Noise ratio), typical	Display Range: 10 dB to 30 dB Resolution: 1 dB Accuracy: ±2 dB for range from 10 to 28 dB
Phase noise, typical	Display Range: 5 to 45 Degrees RMS Resolution: 1 Degree
Pre-Viterbi BER	Pre-Viterbi BER is displayed
Pre-Reed Solomon (RS) BER	Pre-RS BER is displayed
Pre-LDPC BER	Pre-LDPC BER is displayed
Pre-BCH BER	Pre-BCH BER is displayed
Post RS BER and TEF (Transport Error Flag)	Post Reed Solomon BER (TEF ratio), TEF rate, and number of Transport Error Flags (TEF count) is displayed
Transmission parameter	All coding and modulation parameters are indicated to the user
Constellation	The RF constellation is displayed

Table 5: 8VSB card characteristics

Characteristic	Description
Input frequency range	54 MHz to 860 MHz, VHF/UHF channels 2 to 69 (to include low VHF frequencies)
Input signal level	–72 dBm to –6 dBm (–23 dBmV to +43 dBmV) Use high quality shielded cables and higher input level to prevent ingress of interfering signals. This is particularly important at the tuned frequency where the input circuitry is by design most sensitive.
Modulation format	8VSB in accordance with ATSC A/53B
Receiver bandwidth	6 MHz
Input termination impedance	75 Ω nominal
Connector type	F-type
Input return loss, typical	5 dB minimum

Table 6: 8VSB measurements

Measurements	Description
RF Lock	RF lock is indicated by LED and Status
Input level (signal strength), typical	Display Range: –72 dBm to –2 dBm relative to 75 Ω (–23 dBmV to +47 dBmV) Resolution: 1 dB Accuracy: ±3 dB
EVM (Error Vector Magnitude), typical	Display Range: ≤3.0% to ≥12.5% rms Resolution: 0.1% Accuracy: ±20% of reading
Equivalent MER (Modulation Error Ratio) with Equalizer, typical	Display Range: 17 dB to 31 dB with Equalizer Resolution: 0.1 dB Accuracy: ±1 dB for MER >25 dB; ±3 dB for MER 25 dB to 31 dB (Measured at –30 dBm input. For best MER accuracy, maintain the input signal level between –50 dBm and –15 dBm.)
SNR (Signal to Noise Ratio), typical	Display Range: 15 dB to 35 dB Resolution: 1 dB Accuracy: ±1 dB for SNR < 25 dB; ±3 dB for SNR 25 dB to 35 dB
BER	Pre-RS BER, SER 1 second and 10 seconds windows values are displayed
TEF (Transport Error Flag)	Transport Error Flags (uncorrectable error count) in a 1 second window and 10 second window are displayed
Constellation diagram	The 8VSB constellation diagram is a display of I-data history with histograms (the IQ constellation is not available). This is displayed as Symbol Distribution in the user interface
Echo profile, typical	Equalizer filter tap information is displayed. Display Echo Level range: Normalized real tap values over the range of –1 to 1 Display Delay range: –6.7 µs to 45.5 µs

Table 7: QAM Annex B card characteristics

Characteristic	Description
Input frequency range	88 MHz to 858 MHz
Input signal level, typical	–64 dBm to –19 dBm (45 dBuV to 90 dBuV relative to 75 Ω) With either a 64 or 256 QAM input, there are five or fewer Transport Error Flags in 11 seconds, which corresponds to a post FEC rate of $1e^{-8}$ ≥ –30 dBm when operated in an electromagnetic field of 3 V/m or more
Modulation format	64QAM, 256QAM (compliant with ITU J-83 Annex B)
Interleaving mode	Level 1 and Level 2 interleaving support compliant with all ITU J-83 Annex B, excluding I, J = (128,7) and (128,8), and in 256 QAM excluding (8, 16) and (16, 8)
Modulation baud rate	64 QAM: 5.056941 Mbaud/s 256 QAM: 5.360537 Mbaud/s
Spectrum polarity	Demodulates both Normal and Inverted IF Spectrum
Receiver bandwidth, QAM B	6 MHz nominal
Connector type	F type

Table 7: QAM Annex B card characteristics (cont.)

Characteristic	Description
Input termination impedance	75 Ω nominal
Input return loss, typical	5 dB minimum
Ultimate Modulation Error Ratio with equalizer, typical	≥37 dB with an equalizer

Table 8: QAM Annex B measurements

Measurement	Description
RF lock	RF lock is indicated by LED and Status
Input level (signal strength), typical	
Range	–64 dBm to –19 dBm (45 dBuV to 90 dBuV relative to 75 Ω)
Resolution	1 dB
Accuracy	±3 dB
EVM (Error Vector Magnitude), typical	
Display Range	
64 QAM	≤1% to ≥5% rms
256 QAM	≤1% to ≥2.5% rms
Resolution	0.1%
Accuracy	±1%
MER (Modulation Error Ratio) with Equalizer, typical	
Display Range	
64 QAM	22 dB to 37 dB
256 QAM	28 dB to 37 dB
Resolution	0.1 dB
Accuracy	±1 dB for MER < 25 dB; ±3 db for MER 25 dB to 34 dB (measured at –30 dBm input)
SNR (Signal to Noise Ratio), typical	
Display Range	
64 QAM	22 dB to 37 dB
256 QAM	28 dB to 37 dB
Resolution	Resolution: 1 dB
Accuracy	Accuracy: ±1 dB for SNR < 25 dB; ±3 db for SNR 25 dB to 34 dB
BER (Bit Error Ratio)	Pre-RS BER is displayed
TEF (Transport Error Flag)	Transport Error Flags (uncorrectable error count) in a 1 second window and 10 second window are displayed
Constellation	The RF constellation is displayed

Table 9: Video over IP card

Characteristic	Description
General Description	
Ethernet ports	The interface supports full duplex operation only. Half duplex is not supported.
ASI input	One ASI input for loop-through of ASI input
ASI output	One ASI output for video over IP to ASI output or for ASI/SMPTE310M loop-through of input signal selectable via SW control.
Transport stream rate over IP	250 Kbps to 155 Mbps max
ASI Output (TS from Video over IP)	
Connector	BNC
Impedance	75 Ω nominal, transformer coupled.
Transport stream rate, typical	250 Kbps min and up to 155 Mbps max.
Signal amplitude	600 mV_{p-p} min, 1.0 V_{p-p} max into a 75 Ω load.
Return loss	10 dB min at 270 MHz
Ethernet Optical Port - General Characteristics	
Optical operating mode	Single mode or Multimode
Connector type	Duplex data link MSA compliant SFP connector
Standard	1000 BASE-X
Data format	NRZ
Ethernet Optical Transmitter - Single mode 1550 nm using Tektronix supplied SFP module	
Output power, typical	–2 dBm to +4 dBm
Center wavelength - 1550 nm, typical	1530 nm Min, 1550 nm typical, 1570 nm max
Total jitter (peak-to-peak)	<170 ps
Extinction ratio	≥9.0 dBm
Ethernet Optical Receiver - Single mode 1550 nm using Tektronix supplied SFP module	
Optical input power, typical	–26 dBm to –3 dBm, BER ≤ 1 X 10^{-12}
Input wavelength	1270 nm ≤ λ ≤ 1610 nm
Jitter tolerance	IEEE 802.3z and ANSI X3T11
Ethernet Optical Transmitter - Single mode 1310 nm using Tektronix supplied SFP module	
Output power, typical	–11 dBm to –3 dBm
Center wavelength - 1310 nm, typical	1270 nm min, 1310 nm typical, 1355 nm max

Table 9: Video over IP card (cont.)

Ethernet Optical Transmitter - Single mode 1310 nm using Tektronix supplied SFP module	
Total jitter (peak-to-peak)	<170 ps
Extinction ratio	≥9.0 dBm
Ethernet Optical Receiver - Single mode 1310 nm using Tektronix supplied SFP module	
Optical input power, typical	–19 dBm to –3 dBm, BER ≤ 1 X 10^{-12}
Input wavelength	1270 nm ≤ λ ≤ 1610 nm
Jitter tolerance	IEEE 802.3z and ANSI X3T11
Ethernet Optical Transmitter - Multimode 850 nm using Tektronix supplied SFP module	
Output power, typical	–9.5 dBm to –2 dBm
Center wavelength - 850 nm, typical	830 nm min, 850 nm typical, 860 nm max
Total jitter (peak-to-peak)	<170 ps
Extinction ratio	≥9.0 dBm
Ethernet Optical Receiver - Multimode 850 nm using Tektronix supplied SFP module	
Optical input power, typical	–17 dBm to 0 dBm, BER ≤ 1 X 10^{-12}
Input wavelength	770 nm ≤ λ ≤ 860 nm
Jitter tolerance	IEEE 802.3z and ANSI X3T11
Ethernet Electrical Port	
Standard	10/100/1000BASE-T IEEE 802.3
Connector type	RJ-45
Data format 10/100 Base T	NRZ
Data format 1000 Base T	Trellis encoded, PAM5 symbols full-duplex on 4-pair Cat-5 UTP per IEEE 802.3ab

Table 10: 10G Ethernet card

Characteristic	Description
General Description	
Ethernet ports	Dual 10 Gigabit SFP+ Ethernet connections supporting 10GBASE-SR
Transport stream rate over IP, typical	700 Mbps throughput
Ethernet Optical port	
Optical operating mode	Multi mode SR
Connector type	SFP+
Standard	IEEE 802.3
Physical layer interface	10GBASE-SR (E10G41BFSR, E10G42BFSR)

Table 11: AC power source electrical characteristics

Characteristic	Description
Source voltage	100 to 240 VAC. Fluctuations must not exceed 10% of the nominal rated voltage.
Frequency range	50/60 Hz

Table 11: AC power source electrical characteristics (cont.)

Characteristic	Description
Power consumption	220 W maximum, 100 - 240 V, 50/60 Hz.
Mains fuse	Not operator replaceable.

Table 12: Mechanical characteristics

Characteristic	Description
Classification	Bench top instrument.
Cooling airflow	Intake is from the side of the instrument, and exhaust is to the rear of the instrument. For proper cooling, at least two inches (51 mm) of clearance is needed on the sides and rear of the instrument cabinet
Overall dimensions	Height: 346.0 mm (13.62 in) Width: 434.5 mm (17.01 in) Depth: 243.0 mm (9.57 in)
Weight	17.0 kg (37.48 lb)
Shipping weight	20.2 kg (44.53 lb)

Table 13: Environmental characteristics

Characteristic	Description
Atmospherics	
Temperature	
Operating	+5 °C to +40 °C, 30 °C per hour maximum gradient; temperature of the intake air at the front and sides of the instrument
Non-operating	–20 °C to +60 °C, 30 °C per hour maximum gradient
Humidity	Max wet bulb temperature: +29 °C (derates relative humidity to ~22% at 50 °C).
Operating	20% to 80% relative humidity, non-condensing.
Non-operating	10% to 80% relative humidity, non-condensing.
Altitude	
Operating	0 to 3000 m (9800 ft).
Non-operating	0 to 12,000 m (40,000 ft).
Dynamics	
Random vibration	
Operating	0.27 g_{rms} total from 5 to 500 Hz.
Non-operating	2.28 g_{rms} total from 5 to 500 Hz.
Sine vibration, operating	0.013 inch peak-to-peak displacement from 5 Hz to 55 Hz
Functional shock, non-operating	30 g, 11 ms half-sine

Performance Verification

The procedures in this section allow you to verify the performance of the following MTS4000 MPEG Test System components:

- ASI Interface
- 10 G Interface
- MTS4000 Platform and System Software

Preparation

Before you begin the Performance Verification procedures, review the following information:

- Ensure that the procedures are performed only by qualified service personnel who have read the General Safety Summary at the front of this manual.
- Ensure that the service personnel are familiar with system operation (refer to the MTS4000 MPEG Test System Quick Start User Manual).

Required Equipment

You will need the following equipment to perform the verification procedures:

- 75 Ω BNC-to-BNC cable (quantity of one) Tektronix part number 174-4954-00.
- RJ45 network cable.
- 850 nm fiber cable.
- A copy of the “sym1.mpg” transport stream file.

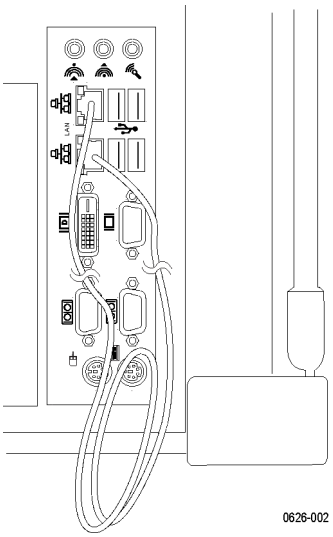
NOTE. *The “sym1.mpg” transport stream file is supplied with every instrument in the following directory: C:\Test Streams.*

You can also obtain this file from the MTS4000 Documentation Browser CD or from the Tclips MPEG Test Stream Software DVD.

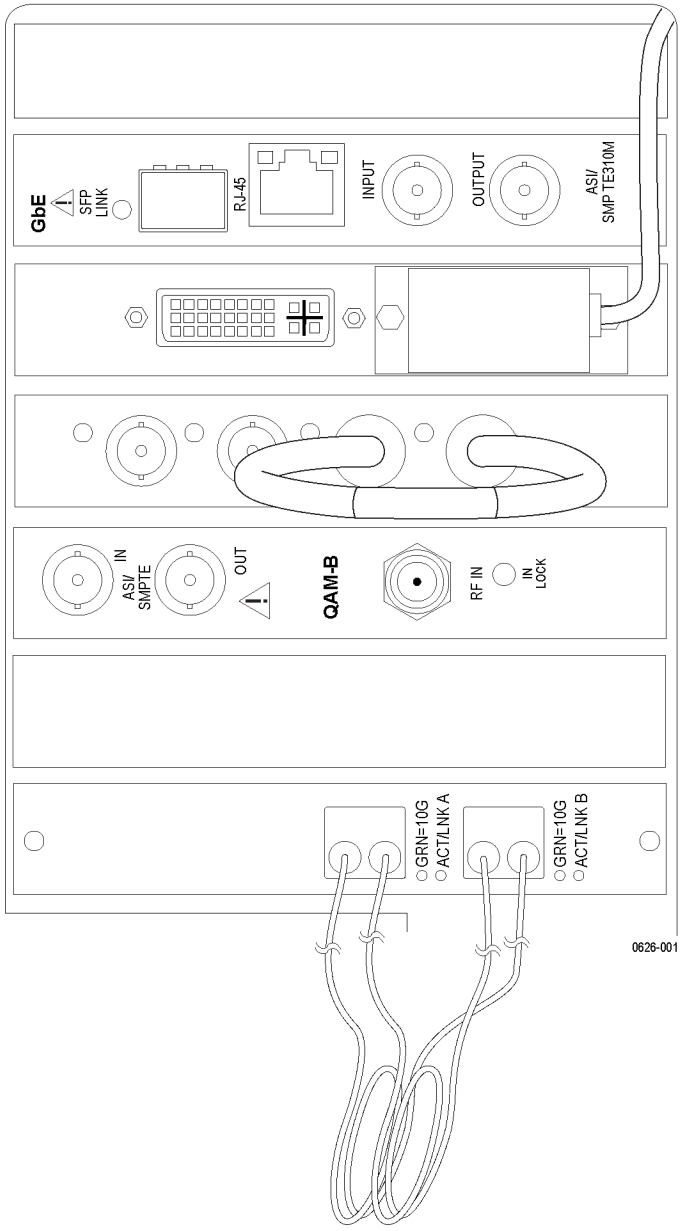
Prepare the Instrument

Perform the following steps to prepare the instrument to be tested:

1. Make sure the dongle is securely installed on a USB port.
2. Make the following cable connections on the instrument.
   - Connect the 75 Ω BNC-to-BNC cable between the ASI 3 and ASI 4 ports on the ASI card.
   - Connect the RJ45 network cable between the two network connectors on the instrument side panel.
   - Connect the 850 nm fiber cable between the ports on the 10G card (if installed).



Standard 1G network loopback connection



ASI loopback connection and 10G optical loopback connection

3. Connect the power cord to the side-panel power input connector.
4. Power on the MTS4000 system.

MPEG Player Initial Setup.

The verification procedures use the MPEG player to play out a test stream file. Prepare the MPEG Player using the following steps.

1. Start the MPEG Player by double-clicking the icon on the desktop.

NOTE. *If the Recommended Settings dialog box displays, dismiss the box by selecting OK.*

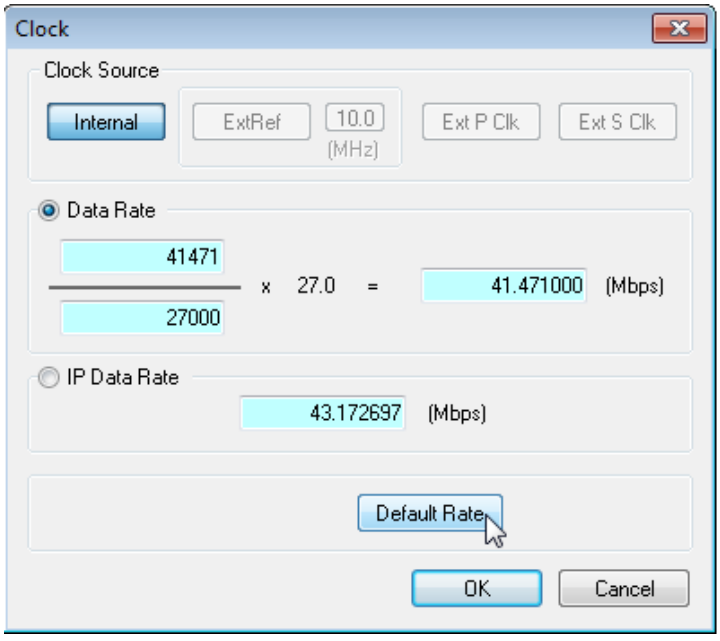
---

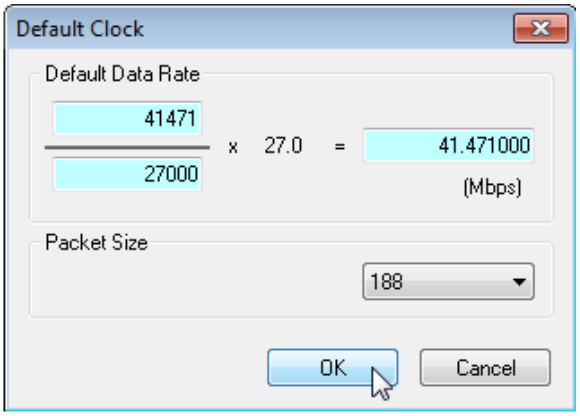
2. Open the sym1.mpg transport stream file.
   a. Click File > Open and locate the file sym1.mpg (C:\TestStreams).
   b. Select the file and click Open.
3. In the Play menu, set the following:

NOTE. *In the MPEG Player menus, a check mark appears next to the selected setting for some menu parameters.*

---

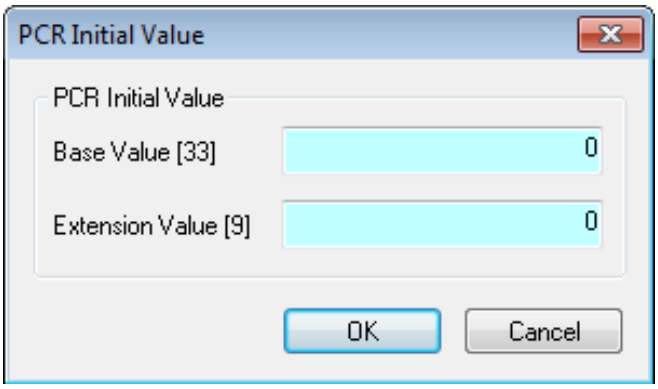
   a. Packet Size: 188.
   b. Clock: Select Default in the dialog box to display the Default Clock dialog box. Select OK in the Default Clock dialog box.





   c. Update: On.

d. PCR Initial Value: Set Base Value and Extension Value to 0 in the dialog box.



e. Source: Disk.

f. Loop: On.

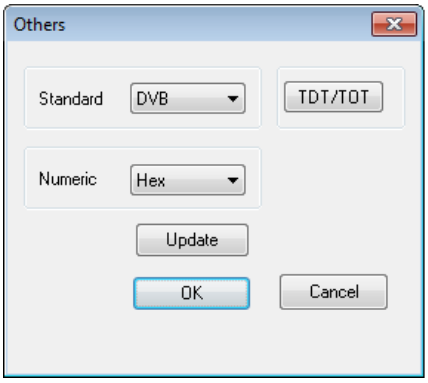
g. Other: Set the Standard to DVB. The select Update.

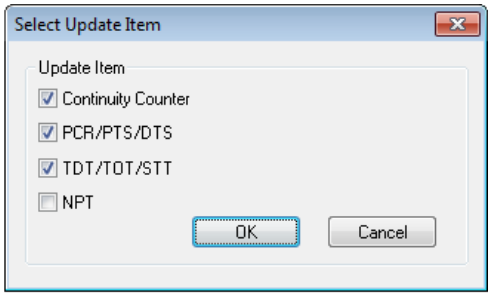
Select the Continuity Counter check box.

Select the PCR/PTS/DTS check box.

Select the TDS/TOT/STT check box.

Clear the NPT check box.





Do not close the MPEG Player application.

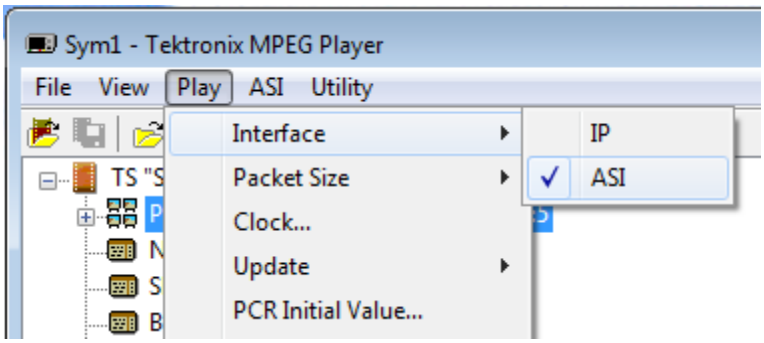
Verification Procedures

Perform the following steps to verify that the MTS4000 system is operating properly. The steps are written with the assumption that you are performing all of the steps in order. If you start the procedures in the middle, you will have to review previous steps for instrument setup.

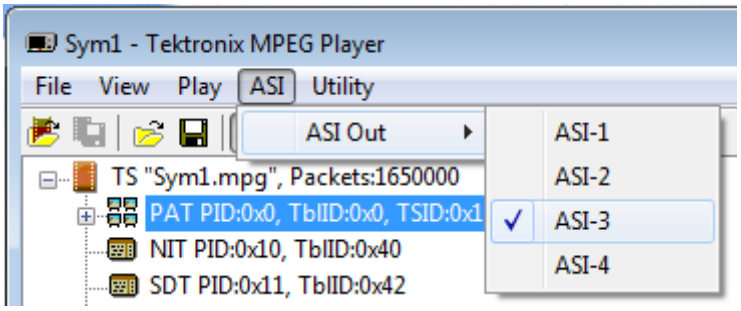
ASI Loopback Test

1. In the MPEG Player, set the following:

   a. Select Play > Interface > ASI.



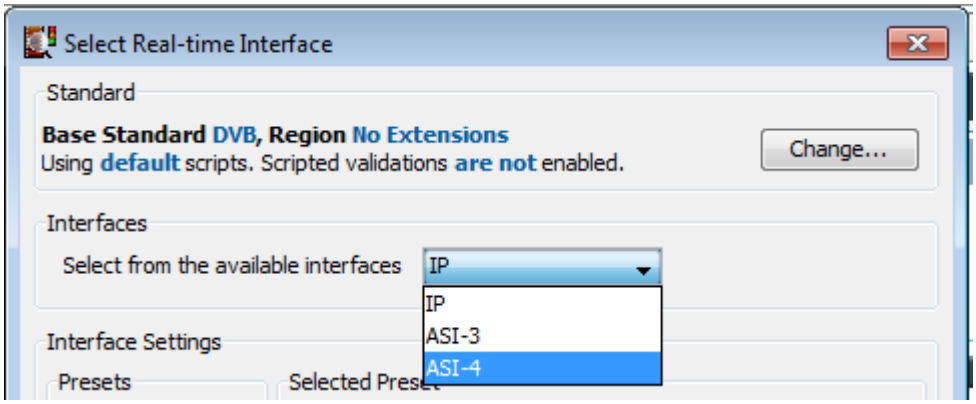
   b. Select ASI > ASI Out > ASI-3.



   c. In the MPEG Player toolbar, click the green Play arrow to start playing the transport stream file.

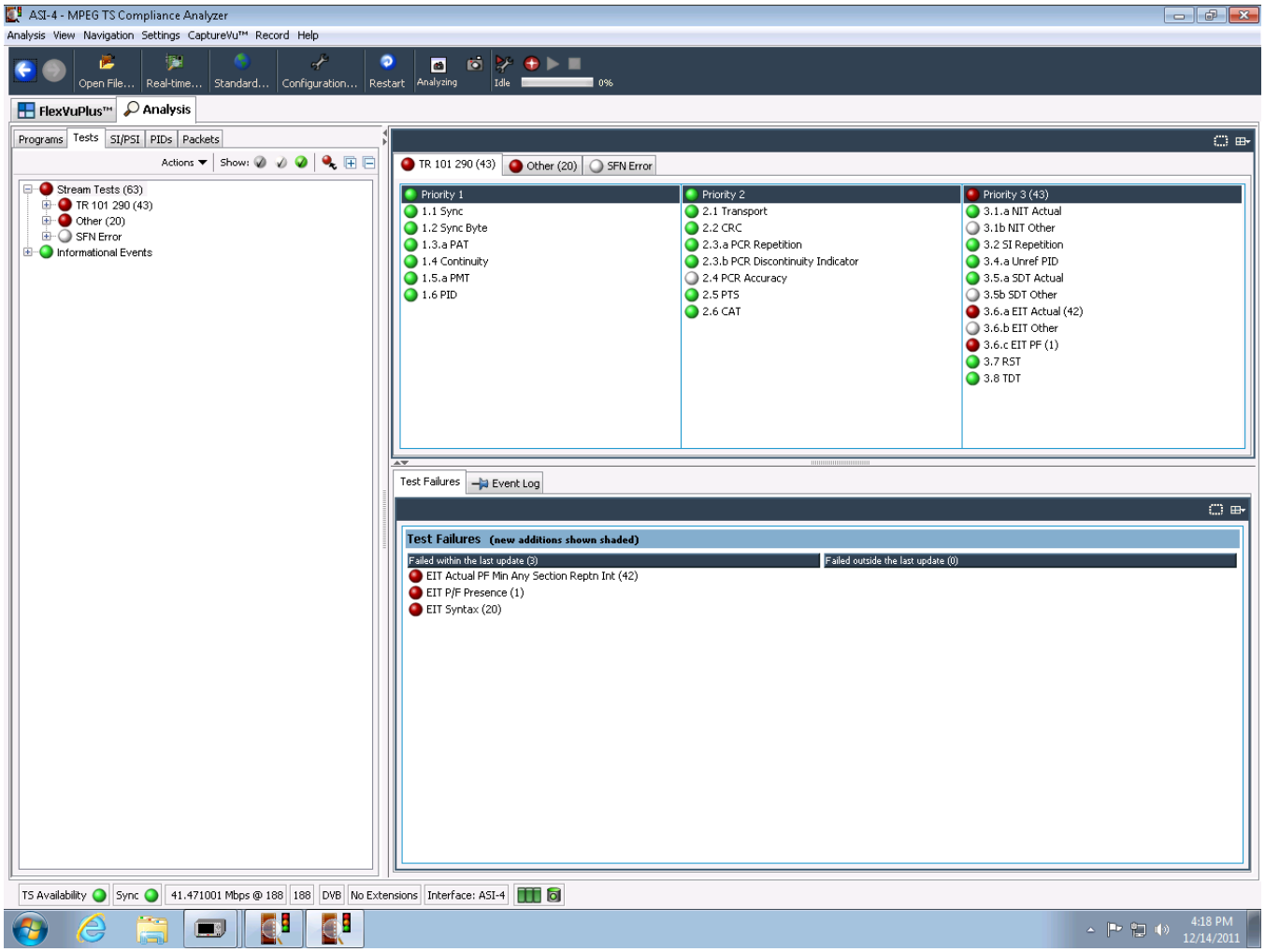
2. Start the TS Compliance Analyser by double-clicking the icon on the desktop.

3. Set the Real-time Interface to ASI-4.



4. Click OK to accept the changes and close the Select Real-time Interface dialog box.

   After a few seconds, the TSCA window opens with the analysis results of the ASI transport stream. Some EIT errors are acceptable.


ASI-4 - MPEG TS Compliance Analyzer
Analysis View Navigation Settings CaptureVu™ Record Help
Open File... Real-time... Standard... Configuration... Restart Analyzing Idle 0%
FlexVuPlus™ Analysis
Programs Tests SI/PSI PIDs Packets
Actions Show:
Stream Tests (63)
TR 101 290 (43)
Other (20)
SFN Error
Informational Events
TR 101 290 (43) Other (20) SFN Error
Priority 1
1.1 Sync
1.2 Sync Byte
1.3.a PAT
1.4 Continuity
1.5.a PMT
1.6 PID
Priority 2
2.1 Transport
2.2 CRC
2.3.a PCR Repetition
2.3.b PCR Discontinuity Indicator
2.4 PCR Accuracy
2.5 PTS
2.6 CAT
Priority 3 (43)
3.1.a NIT Actual
3.1b NIT Other
3.2 SI Repetition
3.4.a Unref PID
3.5.a SDT Actual
3.5b SDT Other
3.6.a EIT Actual (42)
3.6.b EIT Other
3.6.c EIT PF (1)
3.7 RST
3.8 TDT
Test Failures Event Log
Test Failures (new additions shown shaded)
Failed within the last update (3)
Failed outside the last update (0)
EIT Actual PF Min Any Section Reptn Int (42)
EIT P/F Presence (1)
EIT Syntax (20)
TS Availability Sync 41.471001 Mbps @ 188 188 DVB No Extensions Interface: ASI-4
4:18 PM
12/14/2011

1G Ethernet Loopback Test
10G Loopback Test

The steps in this procedure can be used to perform a loopback test on the standard 1G Ethernet ports and the optional 10G optical interface card ports.

The example screen shots display the names and connections for the 1G Ethernet ports. The 10G optical ports have identical screens, but different adapter names.

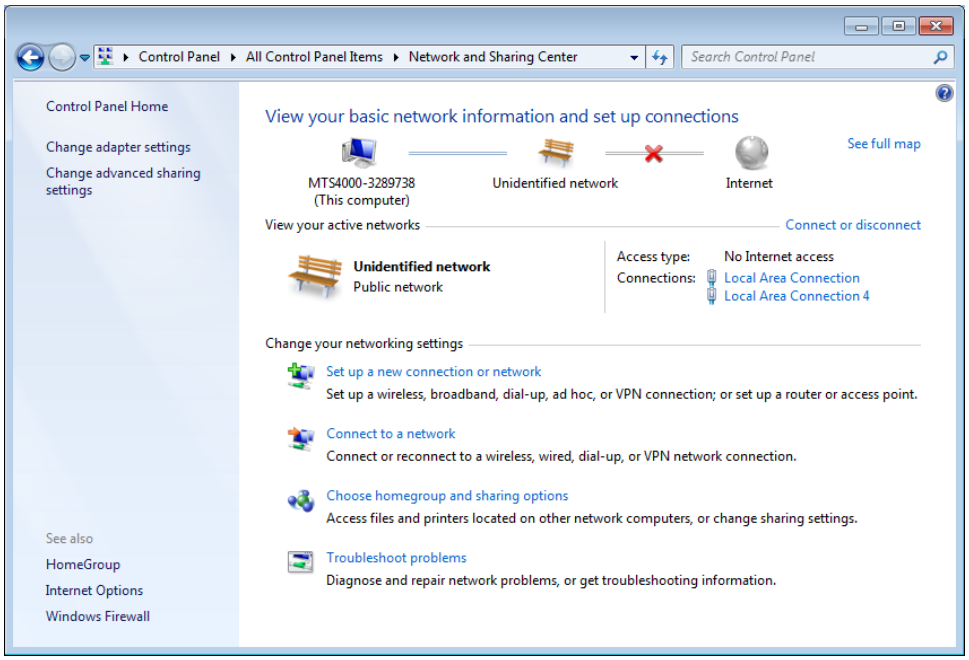
NOTE. *Do not attempt to perform the two loopback test simultaneously. First test the 1G Ethernet ports, then if installed, test the 10G optical ports.*

1. Verify that the ports are active.
   a. 1G Standard Ethernet ports: With a loopback cable connected, verify that the LEDs on the Ethernet ports are on or blinking. Check the RJ45 cable connections if the LEDs are off.
   b. 10G Optical Interface ports: With a loopback cable connected, verify that the LEDs on the optical ports are on or blinking. Check the fiber cable connections if the LEDs are off.

NOTE. *For ease of identifying the ports, if you need to verify both the 1G Standard Ethernet ports and the 10G Optical ports, do not have both loopback cables connected at the same time.*

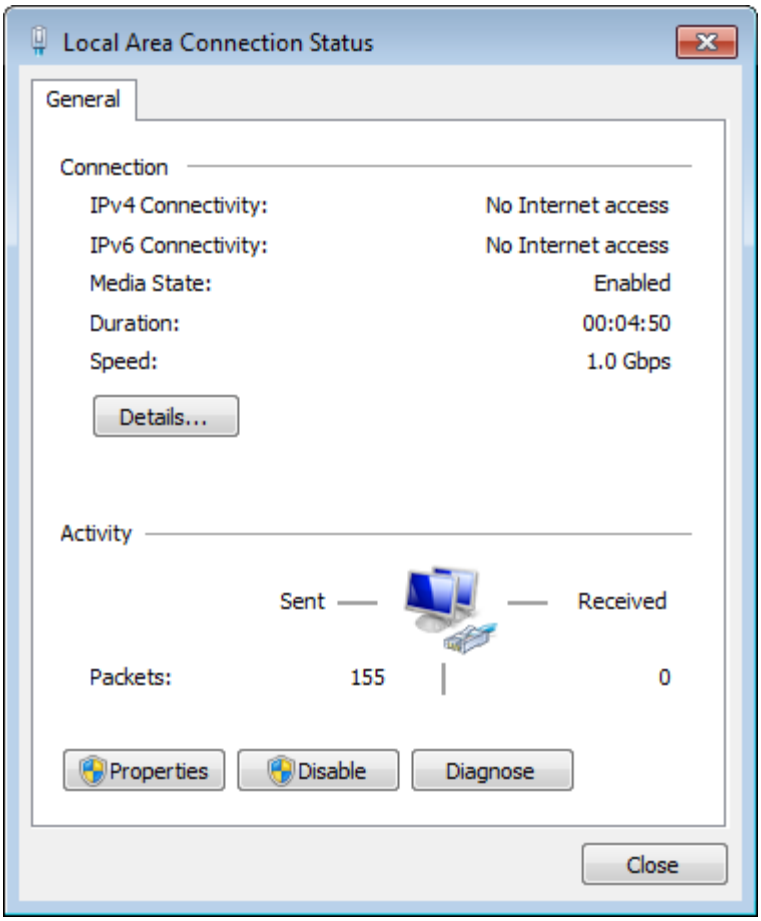
2. Open the Network and Sharing Center in the Windows Control Panel.

   You should see two local area connections displayed.

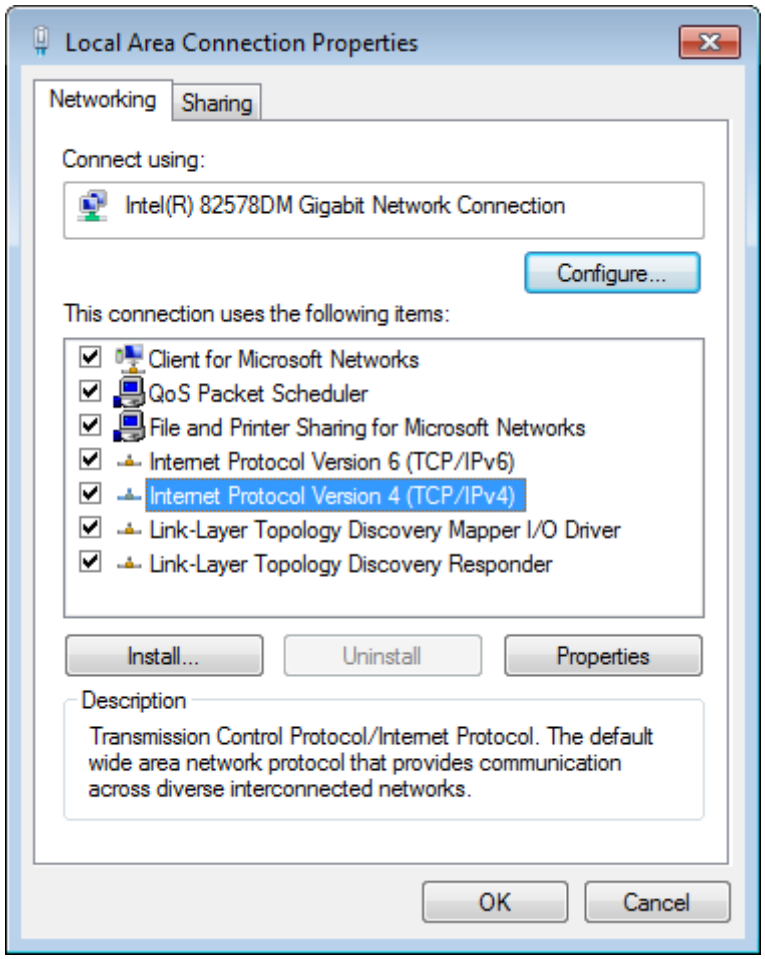


4. Configure the two ports as static IP addresses 192.168.1.100 and 192.168.1.200 on the MTS4000.

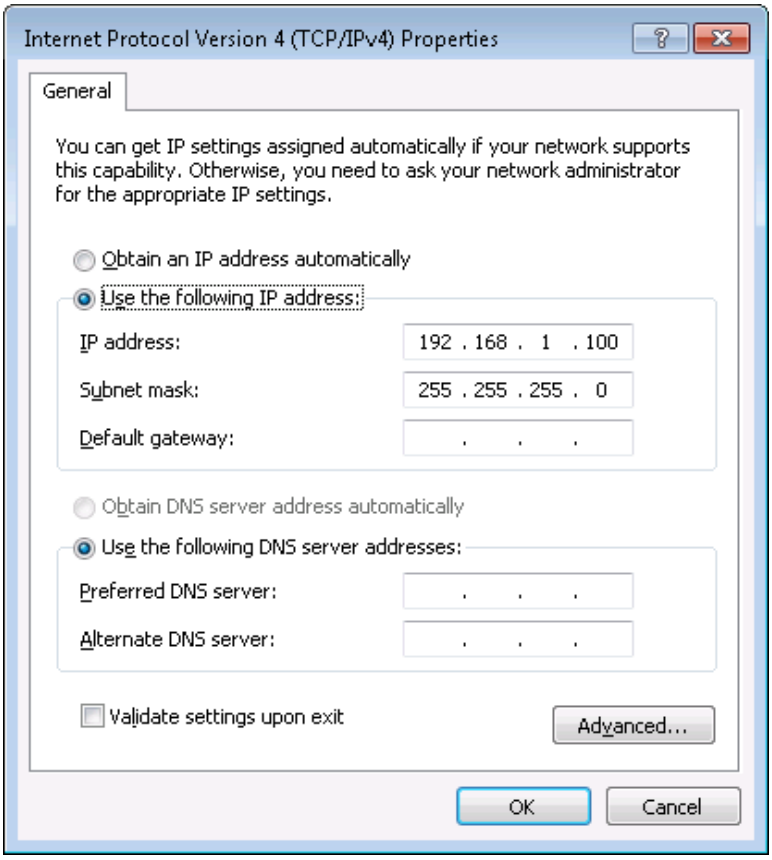
   a. Select the first Local Area Connection and then click Properties in the dialog screen. Configure it to 192.168.1.100 IP address. (This will be used for the MPEG Player.)



b. Highlight Internet Protocol Version 4 (TCP/IPv4) and select Properties.



c. Select Use the following IP address: and enter the value 192.168.1.100.

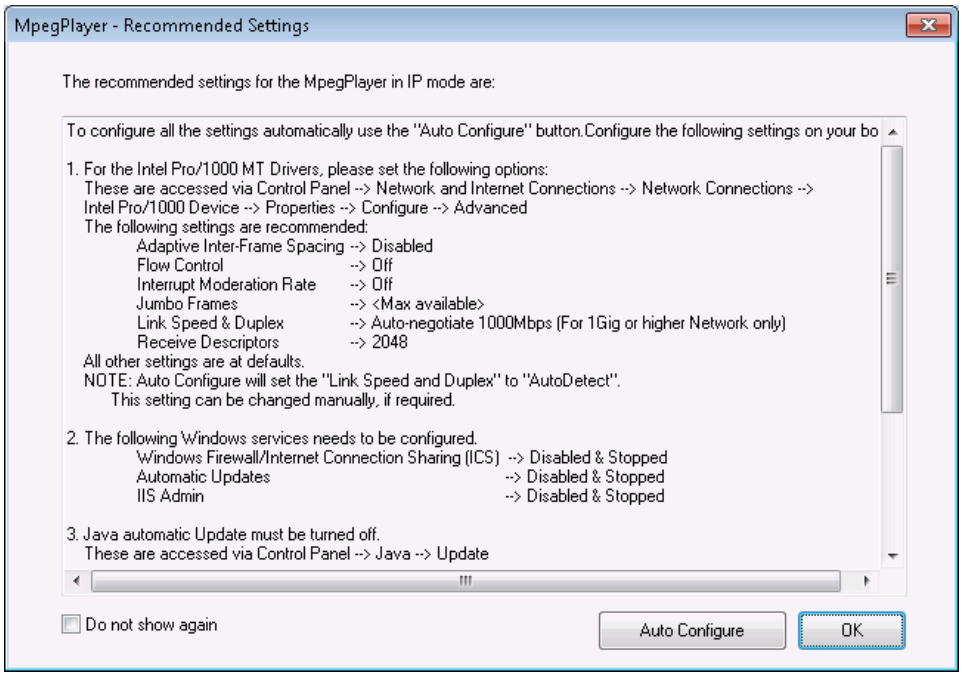


d. Select the second Local Area Connection and set the IP address to 192.168.1.200. Use the same method as described for setting the first Local Area Connection. (This will be used for TSCA input.)

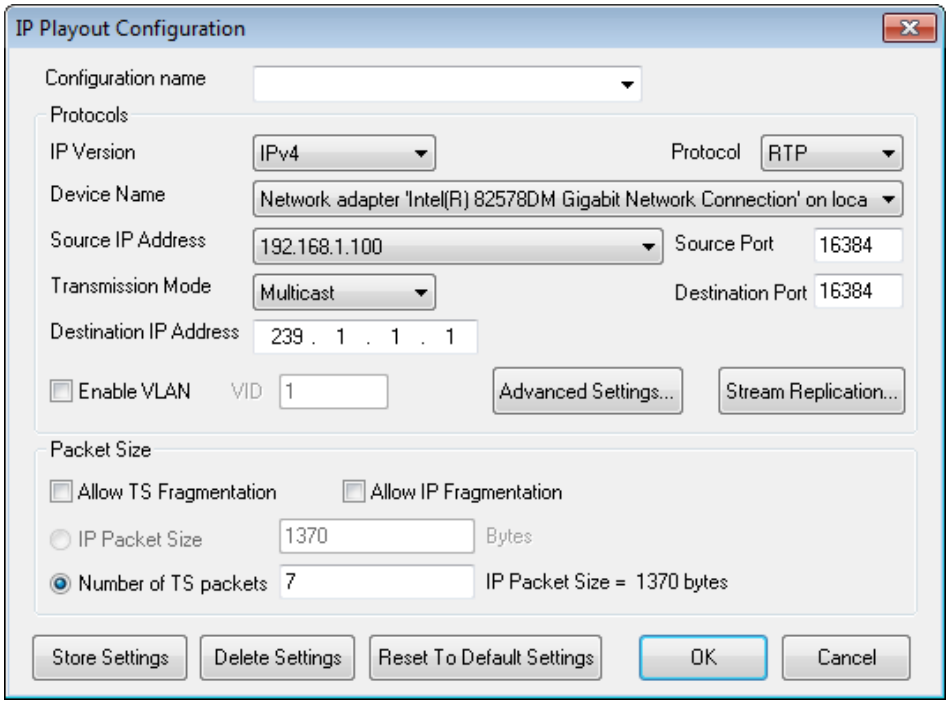
5. Start the MPEG player and open the Sym1.mpg file.

6. In the MPEG player toolbar, select Play > Interface > IP.

   If the following pop-up displays, select OK. Do not use Auto Configure.



7. In the MPEG player toolbar, select IP > Configure.



8. Configure the IP interface.

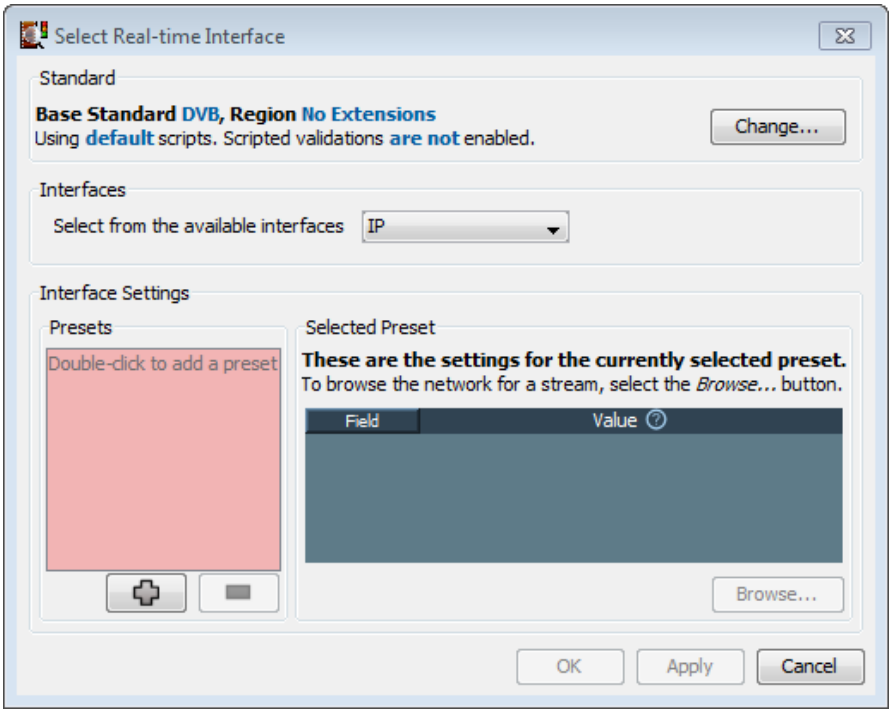
   a. Use the Device Name pull-down list and select the adapter that you set the IP address to 192.168.1.100. This is to be used for playout.

   b. Click Stream Replication and enter 0 (no stream replication).

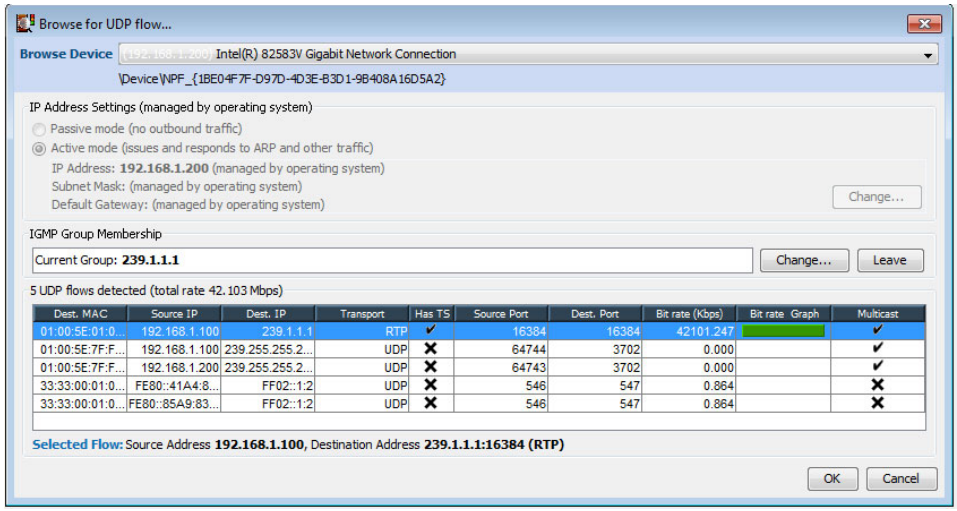
9. In the MPEG Player toolbar, click the green Play arrow to start playing the transport stream file.

10. Start the TS Compliance Analyzer and choose IP interface.

    If this is the first time the IP interface has been selected, double click the red area in preset or click the "+" button once



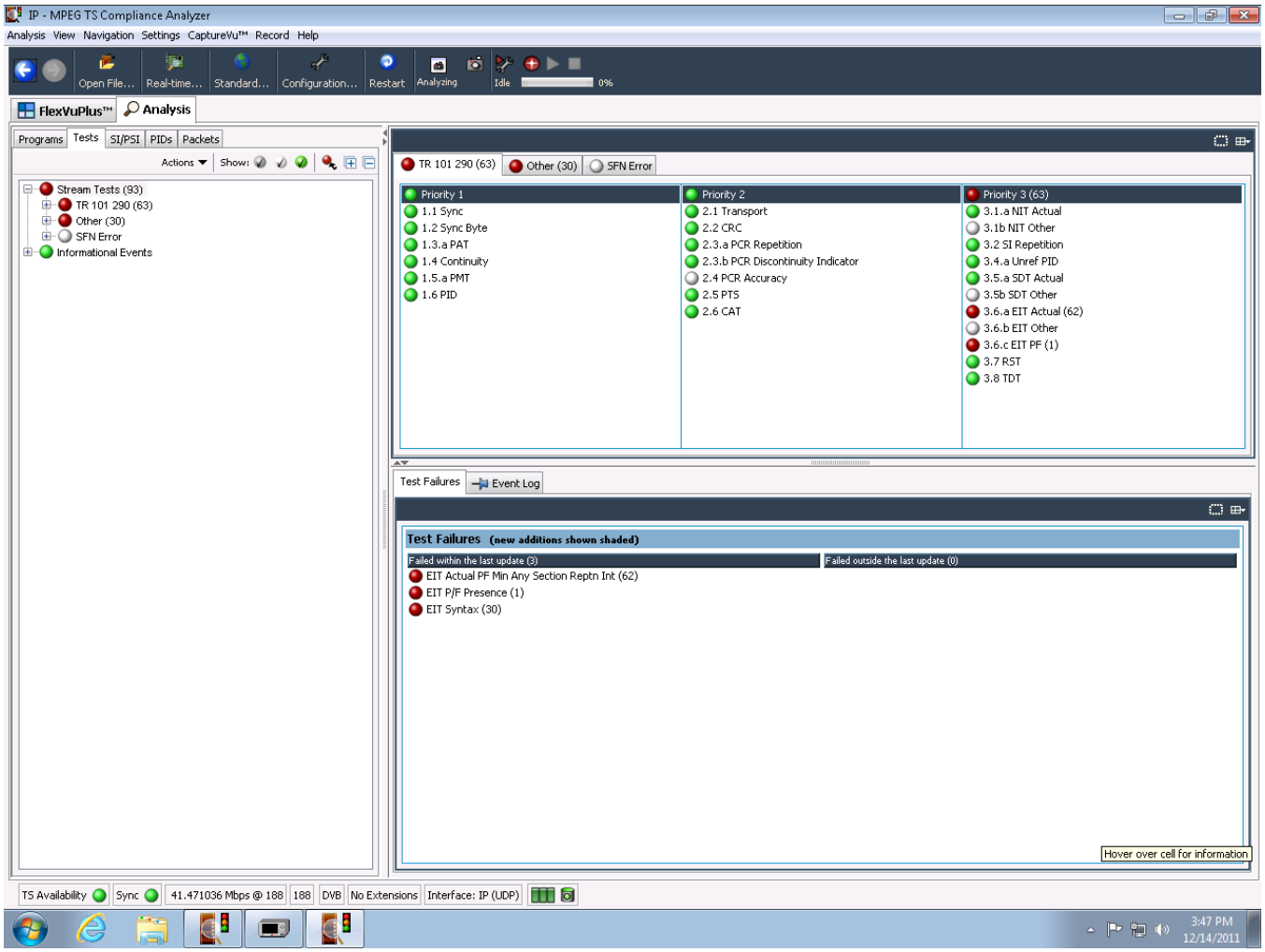
11. Browse to the stream coming to 192.168.1.200 port. In this example, it is the Intel(R) 82583V Gigabit Network Connection.



12. Click on the “green” stream on the list for analysis where source IP is 192.168.1.100 (this is from MPEG Player) and select OK.

13. Close all remaining configuration screens, and the analysis will start.

14. Some EIT errors are acceptable, see below:



Shut Down the Instrument

The Performance Verification procedure is complete.

Power off the instrument and disconnect the signal cables.