



SPG9000

Timing and Reference System

Release Notes

This document supports firmware version 3.0

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Release notes

This document describes new features, fixes, and improvements of firmware version 3.0 for the SPG9000 Timing and Reference System.

Product Updates

Upgrades All SPG9000 products are eligible for upgrading to 3.0 using the standard upgrade process. All customers with earlier releases are strongly encouraged to upgrade as soon as possible to take advantage of the bug fixes and stability improvements.

Downgrades There are currently no downgrades possible from version 3.0 to 2.0.2 or earlier.

New Features

Version 3.0 adds ST 2110 IP test signal generation features to the SPG9000 product. See the user manual for details about the following functions and their operation:

- Two independent IP ports that can each operate at 25 Gbps or 10 Gbps when SFP28 or SFP+ modules are installed.
- Up to eight ST 2110-20 video streams, depending on available port bandwidth. Each stream has an independent video format and test pattern.
- Eight independent ST 2110-30 audio streams, each with 1, 2, 4, 6, 8, or 16 channels of audio tones.
- Four independent ST 2110-40 ancillary data streams, each carrying time code data with independent format and source time code.
- ST 2022-7 support when a stream is enabled on both IP ports.

Version 3.0 also includes the following enhancements:

- Option to override the automatic colorimetry selection for SDR and HDR formats at HD and UHD image sizes.
- Individual audio channels can be marked active or inactive for embedded audio in SDI outputs, independent of the tone or mute selection.
- The set of built-in video test patterns has been updated.
 - The SMPTE RP 219 Color Bars have been replaced by RP 219-1 color bars for HD and SD formats and RP 219-2 color bars for UHD formats.
 - ARIB STD B28 (HD) and STD B66 (UHD) color bars have been added.
 - A BT.814 Pluge pattern for SD formats has been added.

Resolved Issues and Improvements

This firmware release has resolved the following issues and makes the following improvements to the previous 2.0.2 release.

- Black Outputs** An issue has been fixed for the BLACK 4-6 outputs, in which the black burst signal was unstable.
- PTP** An issue has been fixed in which a leader instance might reset itself (and trigger a grandmaster change) if the timestamp for a PTP message is dropped. The syslog messages around this event would include a message that reported “ptpx timed out while polling for tx timestamp”.
- The `/ptp/{instance}/parent-ds` API object now correctly shows the parent port identity of the leader when the instance is following a boundary clock port that is different from the grandmaster.
- System** After a failed upgrade attempt, the system could report a Power-On Self Test error 23 for the TSG Board (“TSG Communications Failure”). Many functions of the SPG9000 would cease to operate after this failure, requiring the unit to be serviced. Additional safeguards have been added to the upgrade process to prevent this situation from occurring.
- Test Signals** Several color bar test patterns have been updated to use the correct filter coefficients for bar transitions.

General Limitations

This firmware release has the following general limitations.

GNSS GNSS does not lock while system is in mobile mode and moving.

The web interface reports that GNSS is locked 10-15 seconds too soon when in Jam Phase holdover recovery mode.

If the GNSS signal quality is low, especially if multipath is present, then the UTC offset may shift and not recover for 12.5 minutes. This was more prevalent in the 1.0.1 release and can be detected by monitoring the syslog output. Software changes in the 2.0 release reduce the probability of this happening. To avoid this, first ensure the GNSS signal is strong. Secondly, configure the SPG9000 to defer leap second changes to a local time at least one hour after UTC midnight.

The GNSS receiver will erroneously report a degraded signal with fewer satellites in view for a brief period once per week. The error happens at approximately 07:45 UTC each Tuesday. This spurious signal error will not cause any synchronization issues for the SPG9000 because the system recovers quickly.

PTP 1000BASE-T SFP modules from some vendors may report a speed of 2 Gbps, which will appear as an error in the Network Settings on the web interface. The error indication is strictly cosmetic, and the SFP will correctly operate at 1 Gbps.

SDI SDI timing adjustment is scaled wrong for some formats, so the amount requested is not equal to the actual offset of the signal.

SDI 3G Level B 47.95 and 48Hz signals are not fully correct.

6G-SDI outputs with 1080-line image size, frame rates of 47.95, 48, 50, 59.94 or 60 fps, and sample structures other than 4:2:2 10-bit are not fully tested due to equipment limitations. These are provided on a best effort basis only. Pathological signals are not correct.

IP The IP ports may incorrectly report a link down condition. To clear the error, disable and re-enable the ports from the Network Settings menu.

Some direct-attach SFP cables cannot be used with V3.0 firmware because they report an available bandwidth of 0 Gbps. This will be fixed in a future release.

SFP modules for the IP ports may not be detected when the system is initially powered up. They should appear after the system is rebooted.

For UHD and 4K formats using the default values, the IP streams may slightly exceed the upper limits for the ST 2110-21 virtual receiver buffer model. This can be corrected by adjusting the source timing to delay the video one or two lines, or by decreasing the TR_{OFFSET} value in the receiver by a few microseconds.

General Limitations

System USB memory devices may erroneously report being damaged after removal from the SPG9000 and mounting on another computer.

Front panel display updates may briefly change to an intermediate setting before displaying the correct setting.

System may not function properly immediately after a software upgrade when a new PLD is loaded. Always reboot the system after performing a software upgrade.