SPG9000

Timing and Reference System

Release Notes

This document supports firmware version 4.0

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Release Notes

This document describes the new features, fixes, improvements, and limitations of firmware version 4.0 for the SPG9000 Timing and Reference System.

Product Updates

Upgrades All SPG9000 products are eligible for upgrading to 4.0 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 4.0 to 3.1.1 or earlier.

New Features

Version 4.0 is a major release that adds several enhancements to the test signal generation functions of the SPG9000, and many other fixes and improvements. See the user manual for details about the following functions and their operation:

- Overlays can be superimposed onto the background test pattern for video sources 1-4 (used by both SDI and IP outputs). Three kinds of overlays are independently supported:
    - ID Text: Multiple lines of text at an adjustable character size. Multiple character sets are included for text in languages such as Japanese, Chinese, Korean, and more.
    - Logo: A color image with background transparency can be used for network, channel, team, or company branding.
    - Burnt-In Time Code: Time code digits (including the date) can be added to the test signal and are frame-accurate with ancillary time code for the same video frame.
- Image files can be used instead of the built-in test patterns. This feature can be used for complex user-specific test patterns or photographic content. The TIFF (16-bit or 8-bit RGB) format is used for user-defined image files.
- A File Manager in the web interface can be used to upload, download, rename or delete user files on the SPG9000.
- The ST 2110-20 video stream generator now supports 12-bit 4:4:4 formats (in addition to 10-bit 4:2:2 from previous releases).
- Dynamic test patterns have been added to the set of built-in patterns:
    - **SMPTE RP 219 with Moving Box** (Color Bars category) is similar to the standard RP 219 bars pattern, but has a black center section in which a small 100% white square is in motion and “bounces” off the edges of the enclosing box
    - **EBU 3305 Color Bars with Motion** (Color Bars category) is an implementation of the EBU Tech 3305 *Digital Television Test Pattern Sequence for Operational Use* but extended for HD/2K

and UHD/4K image sizes. Motion sequence one ("transmission alive check") is included, but not motion sequence two ("audio/video delay check"). Corresponding audio tone sequences are also not included.

- **Screensaver** (Monitor category) displays a small 75% color bars pattern in motion on a black background.

Resolved Issues and Improvements

This firmware release has resolved the following issues and makes the following improvements to the previous 3.1.1 release.

GNSS The Figure of Merit (FOM) for the GNSS signal will no longer have spurious changes from 9 to 0 and back a second later.

PTP The Dynamic Offset value is no longer set to a value of 8 instead of the saved value in the power-on default preset.

SMPTE Synchronization Metadata can now be configured when the PTP instance is set to Ordinary Clock mode.

A new configuration item has been added to select the version number (as signaled in transmitted PTP messages) as either 2.0 or 2.1.

Querying the CLOCK_DESCRIPTION TLV with a PTP management message now returns useful system information.

Link Layer Discovery Protocol (LLDP) is now functional on the PTP 1 and PTP 2 ports.

NTP A new control has been added to disable message rate limiting for the NTP server. This is normally enabled to prevent denial-of-service attacks.

System A second remote syslog server can now be enabled, by entering a second hostname or IP address.

The most recently saved or recalled preset file is now displayed in the Preset section of the web interface.

The hostname, domain name and DNS server address can now be configured from the web interface, not just from the front panel or HTTP API.

The System Name and Location are new configurable values that are used for the NMOS, SNMP, PTP and LLDP management protocols.

The user manual PDF file can be viewed directly from the web interface by clicking on a link in the top banner.

IP IP video streams that are enabled in the power-on default preset will no longer be disabled if the link is down when the preset is restored (as might be the case if the network switch is also being powered up at the same time.)

Resolved Issues and Improvements

The SSRC field in the RTP header for all ST 2110 streams is now set to a unique number per stream and per device.

The number of ST 2110 IP streams available for configuration has changed from 8 video, 8 audio and 4 data (time code), to 6 video, 6 audio and 6 data streams.

Link Layer Discovery Protocol (LLDP) is now functional on the IP 1 and IP 2 ports.

NMOS The BCP-002-02 specification is now supported, with asset tags now included in the /self and /devices objects in the IS-04 Node API.

The port number is now included with the IP address (e.g. 10.10.1.1:80) with the Registry Server status when the SPG9000 node is registered.

Each IP stream (video, audio, and data) now has a user-configurable label that will be used in the SDP object and in the IS-04 Node API objects to identify the sender, source and flow.

The IP interface names in the IS-04 Node API are now “ip1” and “ip2” instead of “eth3” and “eth4”.

Black VITC settings in a preset file are now correctly restored for NTSC-J and PAL formats.

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.

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.

General Limitations

When using Dynamic Priority with multiple SPG9000s that are powered-on at the same time, the preferred GM (as determined by the configured Priority 1 and Priority 2 values) may not start as the active leader, although GM changes are minimized on system startup Use the Restore function if you wish to reset the active leader to the preferred GM.

After upgrading from an earlier firmware version, the default value for the new Header Version parameter may be set to 2.1 in the Power-On Default preset. You may need to change this to 2.0 for interoperability with other devices in your PTP network.

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.

If an SFP module for the IP 1 or IP 2 port is removed and replaced by a different speed module (e.g. from 10G to 25G or vice versa) while the system is operating, the IP streams may stop working. A power cycle is required to resume operation with the new port speed.

If the fiber link is disconnected from one of the IP ports, there may be a momentary disruption to the IP streams transmitted from the other port.

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.

If a video source (1-4) is configured for Level B 3G-SDI, that source will not appear correct if it is also used for an IP video stream. Use Level A 3G-SDI or use source 5-6 for the IP stream.

Test Signals When loading a TIFF image for UHD and 4K formats, ensure that the source file has an image width and height that is divisible by 4 pixels, such as 3840 or 3836 but not 3838.

If TIFF image files (especially UHD or 4K size) are set for the test pattern output on one or more video sources in the Power-On Default preset, the system boot time will be noticeably longer. We recommend using a standard test pattern for the Power-On Default preset and then load the image file after the system is running.

NMOS NMOS should be disabled and re-enabled if the system's domain name is changed.

General Limitations

The SPG9000 may briefly stop sending IS-04 “health” messages to the registry after several weeks of continuous operation. If this happens, the NMOS process will restart and the SPG9000 will re-register its node, device and sender resources.

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.

The system may not function properly immediately after a firmware upgrade when a new PLD is loaded. Always power-cycle the system after performing a firmware upgrade.