SPG9000

Timing and Reference System

Release Notes

This document supports firmware version 3.1

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Release notes

This document describes the new features, fixes, improvements, and limitations of firmware version 3.1 for the SPG9000 Timing and Reference System.

Product Updates

Upgrades All SPG9000 products are eligible for upgrading to 3.1 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 3.1 to 3.0 or earlier.

New Features

Version 3.1 adds NMOS features and PTP enhancements to the SPG9000 product. See the user manual for details about the following functions and their operation:

- Support for the AMWA IS-04 NMOS Discovery and Registration Specification. The SPG9000 can register as an NMOS node with 20 sender resources, corresponding to 8 ST 2110-20 video streams, 8 ST 2110-30 audio streams and 4 ST 2110-40 data (time code) streams. The SPG9000 supports both automatic discovery (using either unicast or multicast DNS-SD) or manual discovery with a user-specified registry server address.
- Support for the AMWA IS-05 NMOS Device Connection Management Specification
- Dynamic Priority is a new feature for PTP leaders. Using a Telestream-developed algorithm, it minimizes ST 2110 network disturbances due to PTP grandmaster changes. PTP priority is adjusted automatically to make a backup GM stay active, even when the primary GM recovers from a disruption to its GNSS time source.

Resolved Issues and Improvements

This firmware release has resolved the following issues and makes the following improvements to the previous 3.0 release.

Black Outputs In previous versions, it was possible in rare cases for the black outputs to have a random timing offset when the system was initially powered on. This has been fixed.

GNSS The SPG9000 will no longer falsely report a drop in signal quality and satellites in view at approximately 07:45 UTC on Tuesday of every week.

PTP The correct configuration parameters will be displayed when the PTP tab on the web interface is first opened.

Refreshing the web interface for the PTP tab will no longer cause a spurious configuration change that could reset the PTP engine.

Follower operation with the unicast communication model will correctly work.

Announce and Sync message rates for a leader will be correctly restored from the power-on default preset.

IP address settings for the PTP ports can be updated on new systems without reverting to factory default values.

The reported state for a PTP follower on the Status tab of the web interface will not show “Tracking” (in green) if the Offset From Master is greater than 1 microsecond. The status will appear as “Adjusting” (in yellow) until the Offset From Master value falls to less than 1 µs.

System The system will no longer indefinitely report a Power-On Self Test error 23 (“TSG Communications Failure”) if the error is cleared moments later as part of the power-on process.

If a firmware upgrade process is aborted, a subsequent upgrade attempt will now proceed normally instead of quickly terminating.

Saving the power-on default preset from the front panel menu will now complete for systems that do not have the SPG9000-PTP license installed.

The DOMAIN NAME and DNS SERVER submenus from the front panel SYSTEM : NETWORK menu have been moved to the SYSTEM : NETWORK : MGMT menu. If the management interface is configured for DHCP, these values will be supplied from the DHCP server and these menus will be read-only.

The return JSON object from the GET /configuration API request can be used directly for a subsequent call to PUT /configuration.

API request messages with an incorrect value for the X-API-Key header will now return a JSON object for the 401 Unauthorized response message.

The NTP process will no longer report about an expired “leapsecond” file in syslog messages until 28 December 2024 or the next firmware release.

Resolved Issues and Improvements

SDI An issue has been fixed when too many embedded audio packets were placed in the ancillary data space of UHD and 4K formats at 29.97 and 30 fps, causing CRC errors.

Enabling Mute for any audio channel will correctly zero the audio data for corresponding channels in SDI embedded audio groups.

The multiple VPID packets embedded in the constituent data streams of 6G-SDI and 12G-SDI signals are now all correctly encoded.

IP The ATC Type menu for ST 2110-40 time code streams has been split into an enable/disable checkbox and an ATC Type selection (ATC_LTC or ATC_VITC).

IP ports had occasionally reported on power-up that SFP modules were not installed. This has been fixed.

Long-reach (1310 nm) 25G SFP28 modules will now work correctly with the IP 1 and IP 2 ports. However, it might be necessary to power-cycle the SPG9000 if the module is swapped for another type while the instrument is running.

In firmware version 3.0, packets transmitted from the IP 2 port had a single-bit error in the IP header checksum. This has been fixed.

All supported formats now comply to the Narrow Sender (Type N) limit of VRX_{FULL} defined in ST 2110-21

IP streams will work correctly when the aggregate bandwidth in use from all streams is close to the maximum available bandwidth for the installed SFP module. The allowed bandwidth limit has been updated.

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.

When the reference source is PTP Follower and the second PTP port is used as a leader, its Time Source may be reported as “Internal Oscillator” instead of “PTP”.

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.

For a follower using the unicast communication model, adding IP addresses to the unicast discovery list will not take affect unless the PTP engine is restarted.

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.

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

The “click” feature for IP audio streams is not functional. It works as documented for embedded audio on SDI outputs.

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

Sending many IS-05 Connection API messages in quick succession may result in the NMOS process stopping unexpectedly.

The IS-05 bulk control interface (POST /bulk/senders) may take up to 2 seconds to complete, especially if all 20 senders are being updated.

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.