Sentinel

surround sound audio monitor

Release Notes

Version 1.24a
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1 Changes in This Release

New Features

The 1.24a release of the Sentinel firmware is a maintenance revision to the 1.24 firmware. It corrects several problems but does not introduce new functionality. The new features listed below were introduced with the 1.24 firmware release.

Added dialog balance measurement

Dialog balance is a measurement of the loudness of the CF channel relative to the total loudness of the remaining program channels, gated based on the presence of signal in the CF channel. It provides an indication of dialog intelligibility. Displays include a bargraph panel showing the balance level and a trace on the readings timeline. An error is asserted when the difference exceeds a specified tolerance and duration.

Added downmix differential measurement

The Sentinel now tracks the difference between the loudness of the surround program and its downmix. It displays this difference as an additional indicator on the surround loudness panel. An error is asserted when the difference exceeds a specified tolerance and duration.

Added BS.1770-1 loudness measurement

The Sentinel can now measure loudness according to either the BS.1770-1 or BS.1770-2 standards.

Added left/right imbalance detection

Signal level imbalances in the surround program are detected by comparing the left and right signals of the signal pairs LF/RF, LS/RS, and LB/RB (if present). An error is asserted when the difference exceeds a specified tolerance and duration. Similarly, imbalances in the ancillary program are detected by comparing the A1/A2 signal pair. These assert a separate error.

Added summary under level errors

Summary under level errors have been added for both the surround and ancillary programs. The error is asserted when the program channel with the maximum loudness level falls below an error threshold. There are separate error thresholds for the front, surround and ancillary channel sets.

Added Dolby errors

A coded audio error is set when the Dolby 'error count' increments.

A dialnorm metadata error is set when the Dolby metadata dialnorm value differs from the Sentinel's loudness target setting.

Automatic detection of stereo format

The Sentinel now automatically detects when a surround program contains only stereo content. It uses this to suppress errors associated with the unused channels. The balance panel indicates when stereo content is detected.

Configurable scaling of downmix

You can now configure the overall gain the Sentinel uses when deriving the downmix channels. Choices include no scaling, peaks (prevents downmixed signals from exceeding full scale when input channels are at full scale) and peaks - 3 dB (the ATSC A/52b standard recommendation).

Meterbars are adjusted to allow the display of signals above 0 dB which can now occur.

Added second loudness display

Added displays for a second program source – the ancillary program when the Sentinel is configured for 5.1+2 format, and the stereo downmix program otherwise. Displays include a second loudness display panel and a second set of loudness traces on the readings timeline.

Reworked display panels

Panel positioning controls allow you to group, position within the display window, and hide or reveal the Sentinel's display panels. This panel arrangement persists from one browser session to the next.

The readings navigation panel can now be hidden when not in use.

Channel bargraph meters for the ancillary program, if present, are now displayed on a separate panel from the surround program channels.

The Sentinel now displays a startup screen until initialization is complete.

Enhanced readings timeline display

Timeline traces can now be viewed in either a compact display format (as before), or a more detailed format with an expanded vertical axis.

Additional timeline traces can display downmix differential, dialog balance, and true peak measurements.

Enhanced program segment table display

Measurements with associated errors are now highlighted in red, and segments with errors are marked with an error icon.

Rearranged errors panel

The layout of the errors panel has been adjusted for a more compact display and to accomodate additional error indicators.

Added configuration setup panel

The Configuration settings panel displays configuration information for the Sentinel hardware and lists the revisions of the firmware components installed in field-upgradeable ROMs on the device.

Adjustments to alarm settings panel

The alarm settings panel has been adjusted to accomodate additional error conditions, and to simplify some of the error assignments.

Corrections

Except where indicated as 1.24a, the corrections listed below were introduced in the 1.24 firmware release.

Digital Input module firmware change (1.24a)

The FPGA firmware for the Digital Input module has been updated to support a revision to the Sentinel Signal Interconnect board. This firmware change is backwards-compatible with earlier hardware.

Browser compatibility adjustments (1.24a)

Newer versions of several browsers have changed the way tables are rendered, causing problems with the layout of the digital interface panel. The display has been corrected to work with the new browser versions.

LogRepository applet

The applet did not exit properly when run as a standalone application (typically, as a scheduled job). It would finish processing, but then hang, due to issues with the Java Web Start environment. The applet now forces an exit when it is done.

Downmix compatibility measurements

Problems in the calculation of downmix compatibility measurements have been corrected.

Null channel mapping

A null channel was not handled correctly by several measurement calculations, hum detection in particular. The problem occurred both with channels explicitly mapped to None, and the implicit null channels in 6.1 and 5.1 formats.

Loudness measurements for user-defined program segments

User-defined segments are those programming segments created by placing left and right bounds cursors on the signal timeline. Loudness measurements for these segments did not always update correctly when the cursors were moved.

Known Issues

Browser version requirements

The web user interface has been tested with current versions of Chrome, Firefox, Internet Explorer, and Safari. Browser performance is improving rapidly, and the responsiveness of the user interface benefits greatly. We strongly recommend using a current browser for the best experience in using the Sentinel.

Javascript, cookies, and Java must be enabled in the browser for the user interface to function correctly.

The Sentinel web user interface is not compatible with Internet Explorer 7 or 6, or with Safari on the iPad or iPhone. It will not work correctly with Internet Explorer 8 in compatibility mode (which effectively makes IE8 behave like IE7).

Java version requirements

The Sentinel uses a Java applet to save and view log data. The applet is used both within the web user interface and for scheduled downloading of log data, which operates independently of the user interface.

The Sentinel user interface will work correctly with Java Runtime Environment v1.5.x or later. However, scheduled downloading requires JRE v1.6 or later. Using an earlier version of the JRE will cause an error when the scheduled download is attempted.

Processor requirements

The Sentinel web user interface requires considerable processor resources for rendering the real-time display and for the JavaScript

code that controls its behavior. Typical current-generation processors (at least dual core, 2 GHz clock rate, 2 Mb memory) comfortably meet these requirements. However, performance on slower earlier-generation processors lacks responsiveness.

Log repository file format

Enhancements to the measurement capabilities of the Sentinel result in changes to the data reported by the Sentinel and recorded in the log repository. For some changes, new and old formats are incompatible – the newer user interface can no longer interpret the older log repository data correctly.

Such changes are indicated by a change to the file type (file name extension) of the daily log files in the repository. The current file type is *.qa2*. The user interface will not display earlier log files.

Digital interface characteristics missing for Dolby input

Digital input signal characteristics and metadata are not displayed on the digital interface panel when input signals are from the Dolby decoder. This will be corrected in the next maintenance release.

Loudness integration indicator does not pause

When the Sentinel is in measure/pause mode for integrated loudness measurement, the loudness integration indicator on the loudness meter panel does not show the paused state (it continues to show the progress animation). This will be corrected in the next maintenance release.

Incomplete help pages

The Sentinel help pages have not been fully updated to include new functionality. The Sentinel User Manual is the most current and complete source of information. A PDF version is available from the downloads page of the Qualis Audio web site (www.qualisaudio.com); contact us for printed copies.

Browser caching of readings packets

In certain cases where communications between the Sentinel and browser interface are lost, the browser supplies stale cached readings in response to readings requests. The effect is that the displays appear to be showing live data, even though no data is being received from the Sentinel. (This is not a problem as long as communications are live.) This will be corrected in a future release.

2 Installing the Firmware

The Sentinel is designed to allow firmware updates over the network from a web browser. The process is as follows.

Unzip the archive, verify its contents

Updates are packaged as zip archives, containing documentation and the firmware images required to update the Sentinel. Use the unzip command or whatever command you normally use for unpacking zip archives.

There are five separate field-upgradeable ROMs in the Sentinel 1.24a firmware update:

SentinelDSP_20120214.bin base
SentinelCPU_20120413.bin base
SentinelWeb_20120503.bin base
SentinelDINMCU_20120105.bin digital input module (AES, SDI only)
SentinelFPGA_20120329.bin digital input module (AES, SDI only)

Images are identified by date. Make sure you have firmware images for all the ROMs you're planning to update.

You can check installed firmware versions from your Sentinel's front panel. Dates in the firmware image filenames are in yyyymmdd format (year, month, day); this differs from the front panel firmware display, which is mm/dd/yy format (month, day, year).

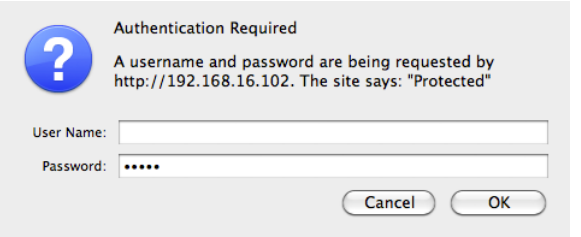
Load the Firmware Update page in your browser

Navigate to the Firmware Update page:

http://*address*/fwupdate

Replace the *address* with actual address of the Sentinel you're updating.

The Sentinel will display a pop-up menu that prompts you for a User Name and Password:



Leave the User Name blank; the default password is *audio*.

Once you are authenticated, the Sentinel will display the Firmware Update page.

Select the firmware image to update

Use the Browse... button to select the firmware image file, then press the Update button to upload the file to the Sentinel.

The Sentinel will display a message indicating the Firmware Update is in progress. Wait for the Sentinel to update the ROM and restart.

When the update completes, the Sentinel will restart and the Sentinel Firmware Update page will again appear.

If you are updating digital input module firmware (DINMCU or FPGA) and your Sentinel contains two digital input modules, the update will be applied to the first module, the Sentinel will restart, and the update will be applied to the second module.

If you are updating multiple firmware images, select and update the next image. Normally, you will repeat the update process for each image file provided in the zip archive.

If the update fails due to a corrupted firmware image, the Sentinel will display a Firmware Update File Invalid message. If you see this message, you'll need to get a new copy of the image file.

Restart your browser and clear its cache

If you've updated the SentinelWeb firmware, you'll need to quit and restart your browser, and clear the browser's cache when you restart it. Otherwise, the browser will use stale copies of the Sentinel web pages from its cache – the resulting errors can be quite confusing.

For Firefox, go to the Tools menu, select Clear Recent History, and make sure the Time range to clear is set to Everything and Cache is checked.

Other browsers have similar options. For Chrome, use the Clear Browsing Data... in the Tools menu. For Internet Explorer, use the Delete Browsing History... in the Tools menu. For Safari, use Empty Cache... in the Safari menu.