



Sentinel R9.1.1 Release Notes

Release Date: February 2019



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Release Overview

Sentinel R9.1.1 Release

This release offers software only feature enhancements on Sentinel. No new options are associated with these enhancements.

The software resolves an issue introduced in R9.1.0 that resulted in the loss of the GNSS antenna delay parameter when Sentinel was rebooted

The software also incorporates the following features and changes to Sentinel introduced in the R9.0.0 release:

- NTP support for 2 Way Time Error measurement.
- NTP pseudo client mode
- Additional GNSS support for GLONASS, Galileo, Beidou and QZSS constellations

The following known issues were also resolved in R9.1.0:

- GPS module may report incorrect satellite status and number of satellites it is locked to.
- When a measurement is re-loaded the measurement.summary.txt file is re-written
- Packet capture incorrectly names files saved for channel E
- Measurement.summary.txt file does not show max / min results for 2WayTE
- GM Identity saved in measurement files is incorrect

NOTE: this revision of firmware can only be installed on Sentinels with a serial number greater than 300000.

R9.1.1 Resolved Issue

Loss of GNSS Module Configuration When Re-booting

If the antenna delay was set to a non-zero value then the GNSS module would not apply that offset if Sentinel was re-booted, the quality of the 1PPS output from the module to the internal Rb could be degraded and the site survey may not complete.

Additionally, if the module was capable of supporting multi-GNSS constellations the saved setting would not be applied and the module would be configured to use GPS and GLONASS constellations. Pressing the Reset Module button had no effect.

R9.1.0 Features Description

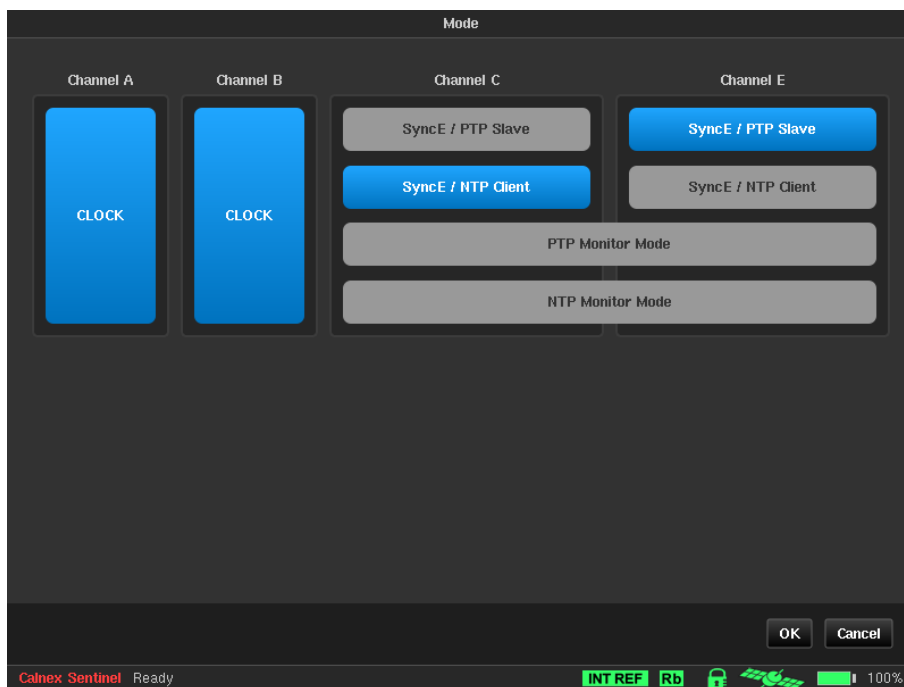
NTP Support for 2 Way Time Error Measurement

Previous versions of Sentinel have only supported measurement of NTP server to client packet delay while operating mode in monitor mode. This feature has been extended to also measure the NTP client to server packet delay, allowing 2 Way Time error calculations to also be recorded.

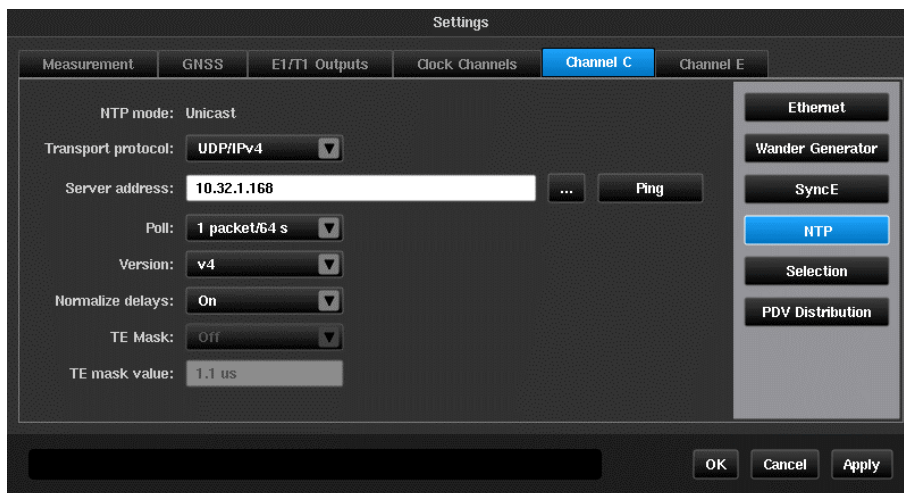
NTP Pseudo Client Mode

Sentinel Packet Cards can now operate as a pseudo NTP client allowing NTP servers to be tested without requiring a separate NTP client and Sentinel configured in monitor mode. This added functionality has additional settings pages and these are detailed here. Refer to the Sentinel User Guide for details other than setting up NTP client mode.

The **Mode** page now allows packet channels to be configured as **SyncE / NTP Client**.



Selecting this option adds a **NTP** page to the **Settings->Channel x** tab.



Each channel can operate independently as PTP slave or NTP client. Selecting either PTP monitor mode or NTP monitor mode will automatically configure the other channel to the corresponding monitor mode.

Ethernet, Wander Generator and SyncE configuration remain unaltered and should be set as required.

Sentinel NTP client currently only supports operating in IPv4 unicast mode. Selecting **UDP/IPv6** from the **Protocol Level** dropdown will result in no measurement data being recorded.

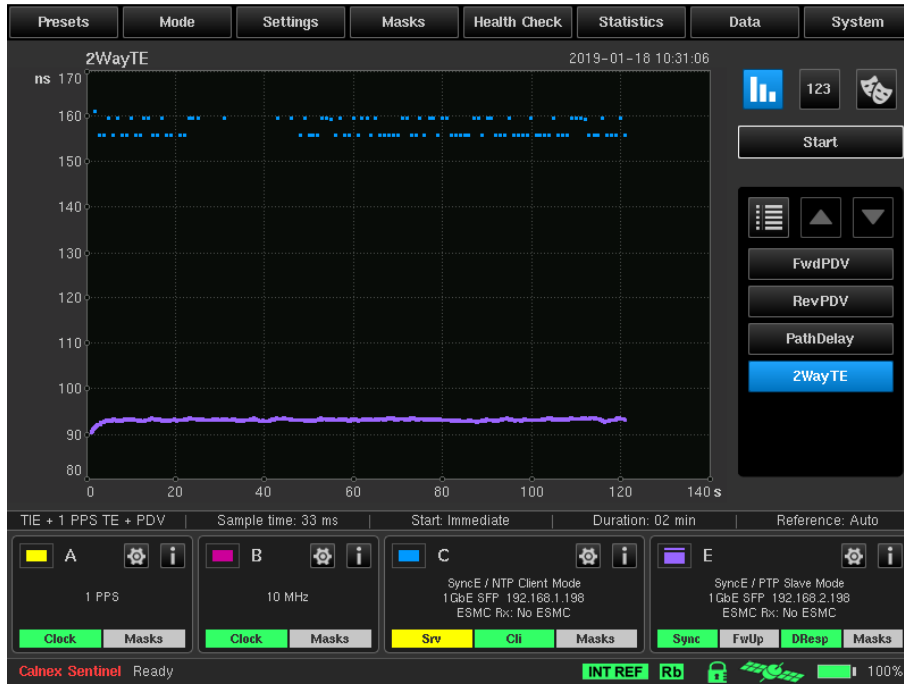
The NTP client will start to poll at the rate specified in Poll and will continue to do so unless requested to increase the poll period by the NTP server. The poll rate can be configured as 1 packet every 2^n seconds, where $n=0$ to 17. This gives a maximum poll rate of 1 packet per second and a minimum poll rate of 1 packet every 36.4 hours.

Sentinel supports NTP versions 1 through 4.

Normalize delays selects whether packet delays are recorded as absolute values or as values relative to the first packet delay. To measure 2 Way Time Error **Normalize delays** should be set to **Off**.

Limits can be set for the 2 Way Time Error and displayed on the graph by setting **TE mask** to **On** and setting **TE mask value** to the test limit.

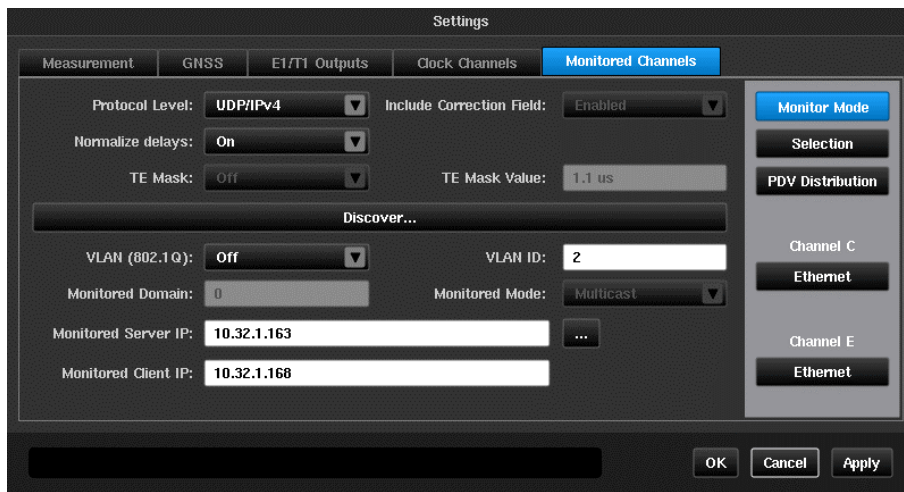
During the test the channel widgets display the status of the NTP message flow.



Further details including a decode of the information contained in the Server response can be obtained by pressing the **i** button.



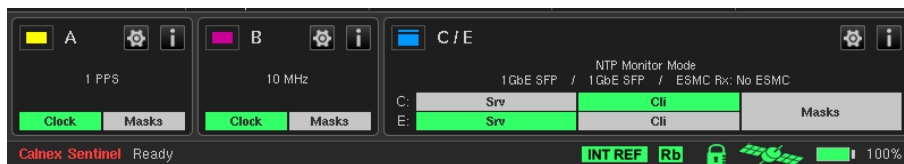
Selecting Monitor Mode operation brings up a single configuration tab on the **Settings** tab.



The flow to be monitored can be selected by pressing the **Discover...** button while the flow is active or manually entered in the **Monitored Server IP** and **Monitored Client IP** boxes.

NOTE: The **Discover...** function may not work at slow poll rates and manual entry will be required.

A single widget is created displaying a combined status of the flow as detected by each channel/



GNSS Module Now Supports Multiple Constellations

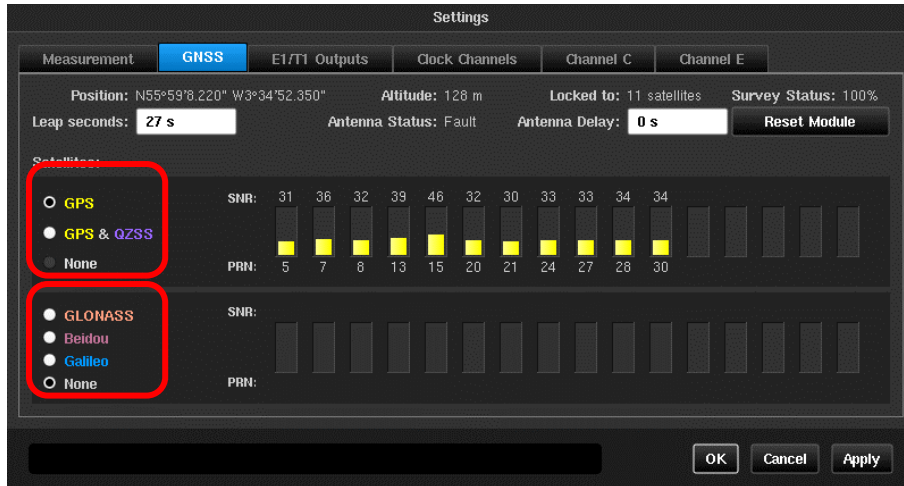
This release introduces the capability of using GPS, GLONASS, Galileo, Beidou and QZSS GNSS constellations in addition to tracking multiple GNSS constellations.

The following table shows the possible combinations of constellations that may be used.

GPS	GLONASS	Galileo	Beidou	QZSS
✓				
	✓			
		✓		
			✓	
✓	✓			
✓		✓		
✓			✓	
✓				✓
✓	✓			✓
✓		✓		✓
✓			✓	✓

NOTE: Support for multiple GNSS constellations is dependent on the correct revision of GNSS module hardware being fitted. If, after installing R9.1, no additional constellations can be configured then please submit a problem report to support@calnexsol.com requesting information on whether multi-constellation operation can be added.

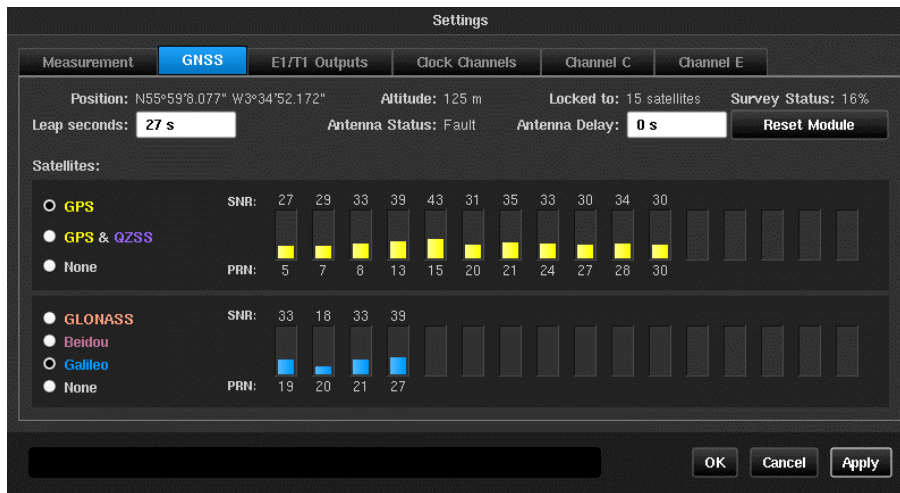
The GNSS module is configured from the Settings->**GNSS** tab.



The top constellation selection determines whether GPS is used and if GPS is selected, whether QZSS is also used. If GPS is not selected then a constellation must be selected in the lower selection area. For multi-constellation operation, Select GPS or GPS and QZSS and a secondary constellation.

Press Apply. This will cause the GNSS module to reset and begin a new site survey using the new constellation(s).

NOTE: Changing constellations will cause the Rb timebase to unlock and it may experience a step input from the GNSS 1PPS output. It is recommended that Sentinel remains disciplining to GNSS for at least 6 hours after changing constellations. This period should be at least 12 hours if Sentinel has not been disciplined for more than a week.



Satellite SNR status is shown in the same colour as the text in the constellation name. The **Locked to** status displays the total number of locked satellites over the multiple selected constellations.

GPS, Galileo and Beidou satellites transmit information that allows Sentinel to calculate the number of leap seconds that have occurred and this is used to determine the offset between TAI and UTC. The **Leap seconds** value is updated automatically whenever this information is received. GLONASS does not transmit leap second information and the **Leap seconds** must be manually entered if the current value is not correct. PTP uses TAI as the time base for its timestamps and if the **Leap seconds** value is incorrect it will show as whole seconds of offset in the FwdPDV, RevPDV and 2WayTE graphs.

NOTE: As of January 2019, there have been 27 leap second events.

Resolved Issues

The following issues have been resolved in this release:

Module May Report Incorrect Satellite Status

Under certain conditions the **Settings->GPS** page may show incorrect satellite PRN and SNR status as well as a false indication of the number of satellites it is locked to. This may lead to a lack of ability to acquire lock when GPS is first connected / enabled or a temporary loss of lock while disciplining.

When a measurement is re-loaded the measurement.summary.txt file is re-written

At the completion of each measurement a summary of the results is stored in the measurement.summary.txt file. If a measurement was re-loaded the results in this file were lost.

Packet capture incorrectly names files saved for channel E

Packet capture saves a pcap file for each channel selected. Channel E was incorrectly saved as channel A.

Measurement.summary.txt file does not show max / min results for 2WayTE

The measurement.summary.txt file now correctly saves the max and min results for 2WayTE.

GM Identity saved in measurement files is incorrect

Sentinel includes information about the PTP GM in the measurement files. This information is automatically inserted into CAT generated report files. Sentinel corrupted the GM information in the measurement file.

Known Potential Issues

The following items are being investigated by Calnex and product updates will be provided as and when resolved:

1. Saving measurement data to USB memory may encounter issues with some memory stick types. If this issue is seen, we recommend using a different brand of memory stick or use the internal memory.
2. The Measurement Duration setting can incorporate processing times of ± 1 second for TIE and ± 10 s for PDV measurements
3. Loss of Signal: Short link down events may not be reported in the log if they happen between status requests to the PTP board
4. When using IP Multicast mode, no Del Req messages are sent if the gateway address is not on the same subnet.
5. In Pseudo-slave mode, setting 128 packets/second rate on Sentinel may occasionally run at a lower rate (i.e. 105 packets/second)
6. The Discover function in monitor mode may not detect Client-Server pairs automatically if the poll rate is too low. If this is the case then the monitored IP addresses should be entered manually.
7. The Srv and Cli loss of signal indicators may show a loss of signal if the poll rate is too low. The channel widget may display **Srv: -; Cli: -** then **Srv: +; Cli: +** then **Srv: !; Cli: !** throughout the test. This will not affect the measurement results.
8. IPv6 mode does not work for NTP. If selected no NTP client messages will be generated and no measurement results will be recorded.
9. CAT versions less than v23.0 will not create a 2Way Time error graph for NTP measurements. Contact Calnex for details of how to generate files that will allow generation of 2Way Time Error graphs.
10. Protocol check only executes for PTP channels, NTP channels will not be displayed in the results panel.
11. Packet capture is not supported for NTP channels.

Installing New Firmware

This setup guide shows you how to upgrade the Sentinel firmware:

Note:

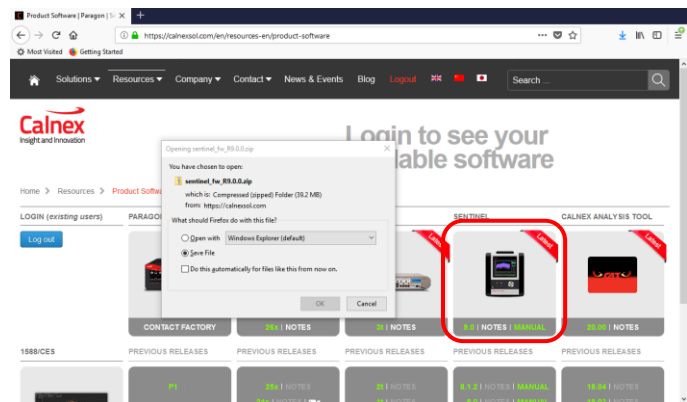
- Sentinel firmware upgrades are only available to registered product users.
- Registration can be completed by selecting the **Resources > Product Software** dropdown at <https://www.calnexsol.com>



STEP 1

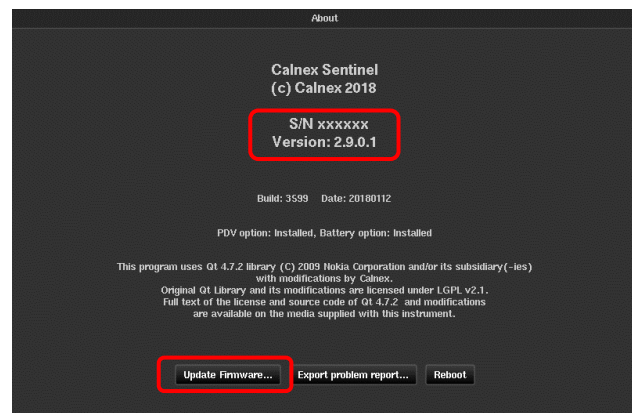
- In the **Resources > Product Software** page at <https://www.calnexsol.com> select the latest Sentinel firmware release.
- Save the file to a local disk.
- Unzip the **sentinel_fw_Rx.y.z.zip** file.
- Copy the **sentinel_fw_Rx.y.z.tar** file from the unzipped **sentinel_fw_Rx.y.z** folder to a blank USB drive.

NOTE: Do not untar the **sentinel_fw_Rx.y.z.tar** file as Sentinel will do this as part of the firmware upgrade.



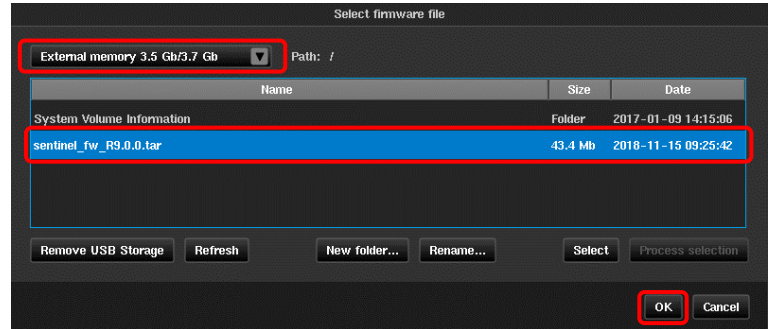
STEP 2

- Power on the Sentinel then plug the USB drive into the USB data port.
- Press the **Systems** tab then select the **About** button. This will show the Sentinel serial number and the current firmware revision.
- Press the **Update Firmware...** button.



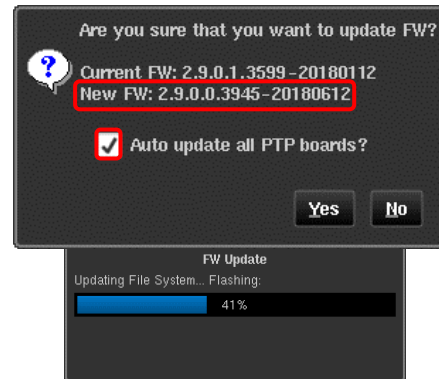
STEP 3

- Select **External memory** as the source.
- Select the **sentinel_fw_Rx.y.z.tar** file.
- Press **OK**.
- Sentinel will begin to extract the firmware.



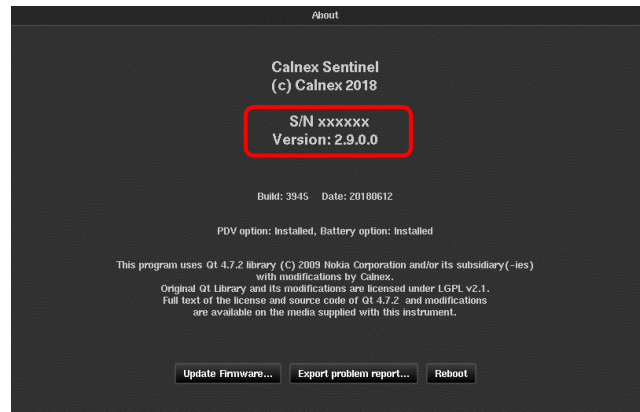
STEP 4

- Verify that the new firmware revision is correct.
 - Ensure that the **Auto update all PTP boards?** check box is selected.
 - Press **Yes**.
- Sentinel will now run through the firmware update, displaying progress on screen. When the upgrade has completed, Sentinel will re-boot automatically.
 - The PTP card(s) firmware version will be checked during re-boot and will be updated if required.



STEP 5

- Verify that the new firmware revision has been installed by checking the information on the **Settings > About** tab.



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