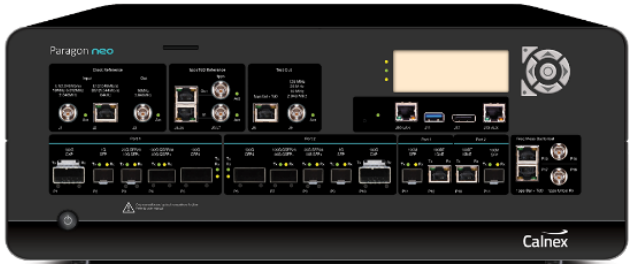


Paragon-**neo** Release 4

NEW FUNCTIONALITY AND ENHANCEMENTS

(Release 04.00.XX)




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1 Software Release Overview

Release 4 (04.00.XX) also includes target features from Release 3 and adds the following features to Paragon-neo and CAT¹:

Software Update with valid CSS
(Customer Support Service) contract



New Options	Enhancements to existing Options	Base product enhancements
Option SyncE Jitter (1G/10G)	PTP: Time Error Impairments PTP: Two Masters PTP: IPv6 SyncE Jitter: ESMC measurement	HTTP File Management "Current User" note feature CAT: Cascaded Media Converter support Defect Fixes

 To check the current software version installed, select **Help > About** on the Paragon-neo GUI.

¹ This release includes enhancements to the CAT. The CAT accompanies Paragon-neo and is used to display/present graphical results such as Wander and Time Error and to calculate metrics such as MTIE/TDEV for further analysis.

2 Features and Benefits

Paragon-neo	Benefit
<p>Option: SyncE Jitter (1G/10G)</p>	<p>Verify 1/10GbE SyncE jitter tolerance standards compliance to ITU-T G.8262.1/G.8262. Applies Jitter with test packets for visibility of device throughput, plus ability to apply jitter beyond G.8262.1/G.8262 jitter tolerance mask limits for device margin testing.</p> <p>Verify 1/10GbE SyncE jitter generation performance to ITU-T G.8262.1/G.8262 Measures ITU-T G.8262 peak to peak jitter and RMS jitter with pass/fail to G.8262.1/G.8262</p>
<p>ESMC measurement in Jitter tolerance mode (Requires any SyncE Jitter option)</p>	<p>Measure ESMC status changes from DUT during Jitter tolerance test, to prove pass/fail and gain deeper insight.</p>
<p>Two Masters (Requires any PTP option)</p>	<p>Allows device conformance testing of Slave devices up to ITU-T Class-C/D accuracy levels, with easy setup and ability to test performance in e.g. switchover conditions.</p>
<p>IPv6 (Requires PTP-G.8275.2 option)</p>	<p>Use IPv6 encapsulation for PTP packets to represent intended deployment scenarios, and test/troubleshoot issues moving between IPv4 and IPv6 implementations.</p>
<p>Time Error impairments</p>	<p>Test device conformance to a wide range of standards-based and user-defined scenarios to prove conformance and test performance. ‘Replay’ real-world time-error conditions to validate for e.g. APTS/PTS network deployments.</p>
<p>HTTP File Management</p>	<p>Select files to download by navigating the folders and clicking the download icon next to the file name. You can delete, rename or copy the file by selecting the appropriate icon next to the file name. To select multiple files / folders to download select them and create a Zip with the Zip button and then download the Zip.</p>
<p>“Current User” note feature</p>	<p>Improves useability by providing note of current user or test purpose information to new users remotely connecting to the instrument.</p>
<p>CAT: Cascaded Media Converter Masks</p>	<p>Allows specific testing to ITU-T G.8273.2 and G.8262.1/G.8262 for transmission technologies other than ethernet, with two devices acting as back-to-back media converters.</p>

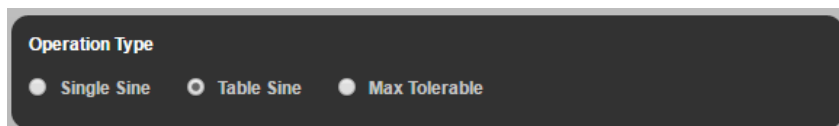
3 New Options

3.1 Option: SyncE Jitter 1G/10G

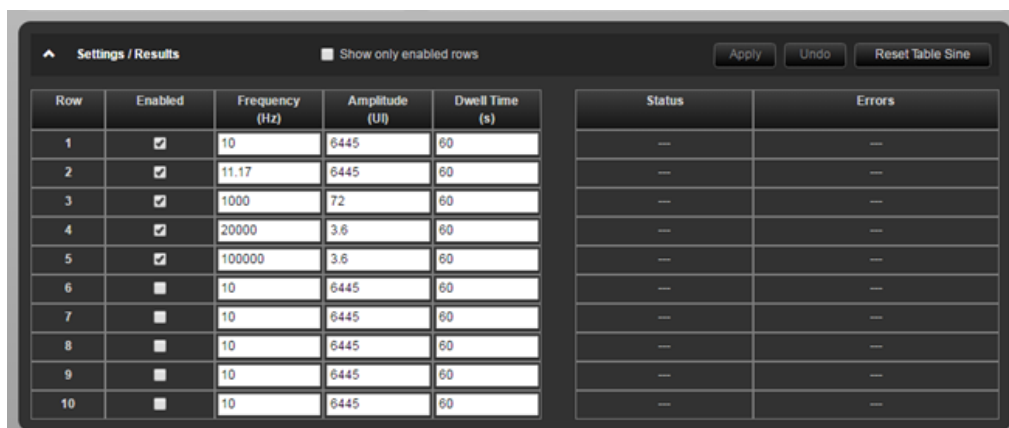
In addition to existing capabilities for 25G, 40G and 100G, this release enables a 1G and 10G SyncE Jitter option, allowing testing of device compliance to G.8262.1 and G.8262 jitter specifications.

Jitter Tolerance

Configuration options for Single Sine, Table Sine and Max Tolerable Jitter.



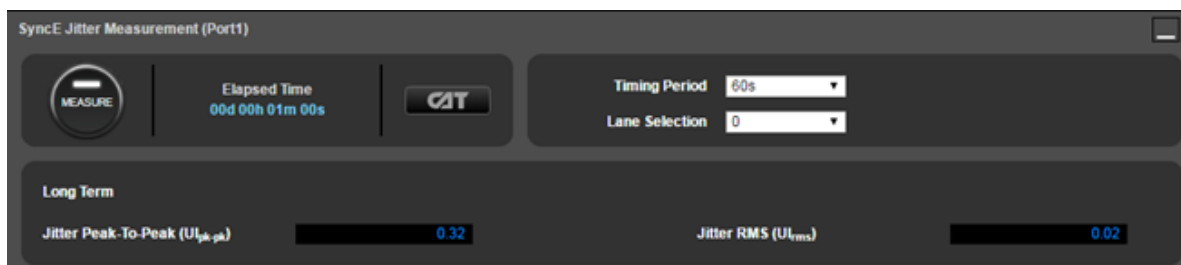
To perform a Jitter Tolerance measurement, the user can use the default settings listed below or enter the Frequency, Amplitude and Dwell Time for each row.



Row	Enabled	Frequency (Hz)	Amplitude (UI)	Dwell Time (s)	Status	Errors
1	<input checked="" type="checkbox"/>	10	6445	60	---	---
2	<input checked="" type="checkbox"/>	11.17	6445	60	---	---
3	<input checked="" type="checkbox"/>	1000	72	60	---	---
4	<input checked="" type="checkbox"/>	20000	3.6	60	---	---
5	<input checked="" type="checkbox"/>	100000	3.6	60	---	---
6	<input type="checkbox"/>	10	6445	60	---	---
7	<input type="checkbox"/>	10	6445	60	---	---
8	<input type="checkbox"/>	10	6445	60	---	---
9	<input type="checkbox"/>	10	6445	60	---	---
10	<input type="checkbox"/>	10	6445	60	---	---

Jitter Generation

This release enables Jitter Generation verification to ITU-T G.8262 Section 8.3. Jitter Generation refers to the amount of jitter the device under test generates, which requires accurate jitter measurement.



Both peak to peak and RMS jitter results are displayed. The measurement filters are fixed as per the ITU-T G.8262.1/G.8262 recommendations, dependent on lane speed.

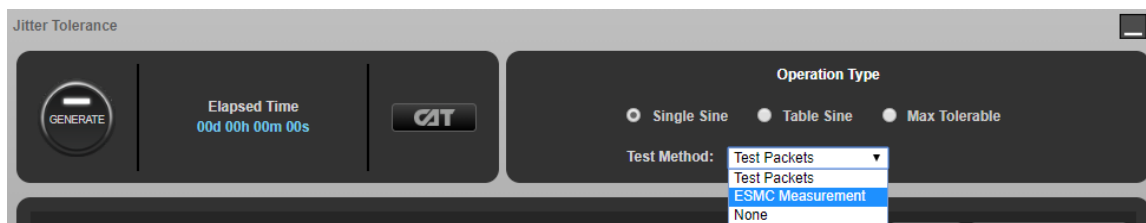
More details on all Jitter test capabilities are available in the **G.8262.1/G.8262 Conformance Test Guide**, available in the Paragon-neo GUI.

4 Enhancements to Existing Options

4.1 ESMC measurement in Jitter Tolerance test (Requires any SyncE Jitter option)

In addition to the existing methodology allowing a closed loop test of DUT Jitter Tolerance using test packets, as of this release it is possible to measure the received ESMC messages from a device, monitoring for state changes as an alternate method to determine pass/fail directly from the Paragon-neo.

Users can switch between the **Test Packets** and **ESMC Measurement** method from the **Test Method** drop-down selector in the **Jitter Tolerance** app.

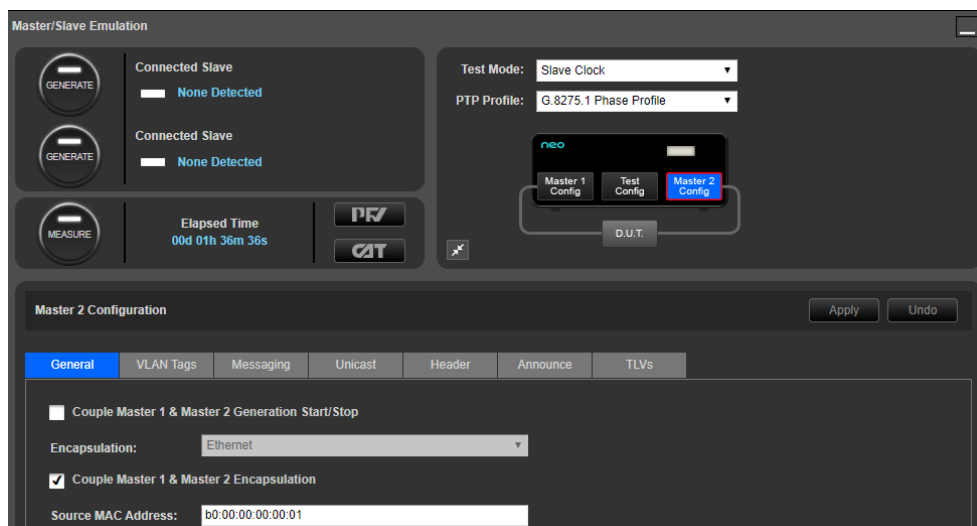


Note that it is also possible to select **None** to switch off other test methods (including associated Pass/Fail for Test Packets) and instead monitor the DUT directly for alarms, etc.

If **ESMC Measurement** is selected, then once **Generate** has been pressed to start the Tolerance test, ESMC measurement will automatically run on Port 1 (which will be the connection back to Paragon-neo from the DUT during Jitter testing), and status can be viewed real-time by selecting **CAT**. It is then possible to view any state changes, indicating for example that input jitter has not been tolerated and the DUT has switched to an alternate reference source.

4.2 Two Masters in Slave Test Mode (Requires any PTP option)

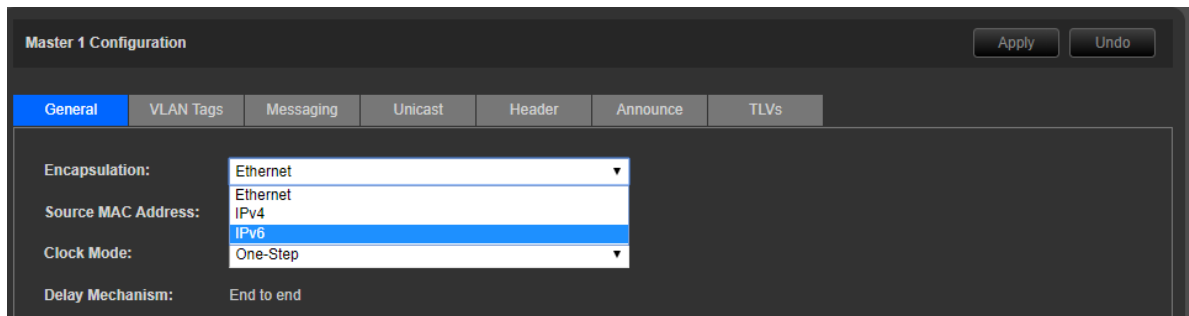
This enhancement allows two independent PTP masters to be configured when selecting **Slave Clock** from the **Test Mode** drop-down menu in the PTP **Master/Slave Emulation** app. Users can then perform specific testing of Slave devices, for example by setting up different clock quality parameters for **Master 1** and **Master 2**, initiating a session with the Slave clock under test and simultaneously measuring clock outputs such as 1pps, then changing parameters again to check the DUT changes reference source as appropriate and monitoring output clock performance during the switch.



It is possible to couple or decouple Start/Stop for the two emulated Master clocks, as well as couple/decouple certain settings such as Encapsulation.

4.3 IPv6 Encapsulation for PTP (Requires PTP G.8275.2 option)

In addition to IPv4, IPv6 encapsulation is now available as a configuration for emulated Master and Slave clock PTP messages.

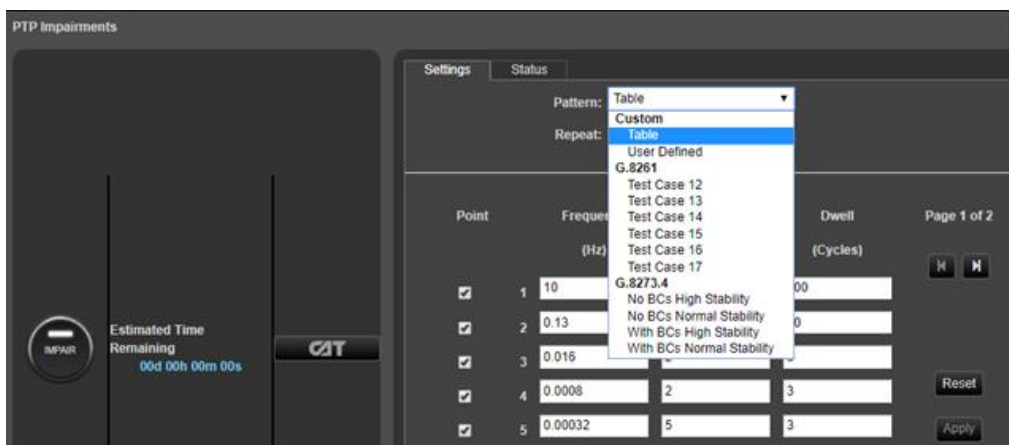


This release also includes a selector to determine if Option 1 or Option 2 devices are being used, and allows population of the SSM code list accordingly.

4.4 Time Error Impairments (Requires any PTP option)

To allow an increased range of standards-based testing and validation/troubleshooting for real-world deployment conditions, a PTP Time Error Impairments function is introduced in this release, providing a range of options to generate Time Error impairment patterns as input to a device or system under test.

Capability is accessed from the **PTP Impairments** app. From the **Pattern** drop-down menu, users can select the desired Time Error Pattern. Selecting **No** or **Yes** in the **Repeat** drop-down menu allow the impairment to be set to run once or repeat continuously.



Selections are available via single click to automatically load noise tolerance patterns in accordance with **ITU-T G.8261** and **G.8273.4**.

Custom Pattern options available are:

Table, allowing the user to define a range of Frequency/Amplitude pairs to be applied as Sinusoidal Time Error for defined numbers of cycles.

Point	Frequency (Hz)	Amplitude (µs)	Dwell (Cycles)	
<input checked="" type="checkbox"/>	1	10	0.25	300
<input checked="" type="checkbox"/>	2	0.13	0.25	10
<input checked="" type="checkbox"/>	3	0.016	2	3
<input checked="" type="checkbox"/>	4	0.0008	2	3
<input checked="" type="checkbox"/>	5	0.00032	5	3
<input type="checkbox"/>	6			

User Defined, allowing the user to browse for suitable impairment files on the Paragon-neo and apply these in the forward or reverse direction.

Forward Pattern

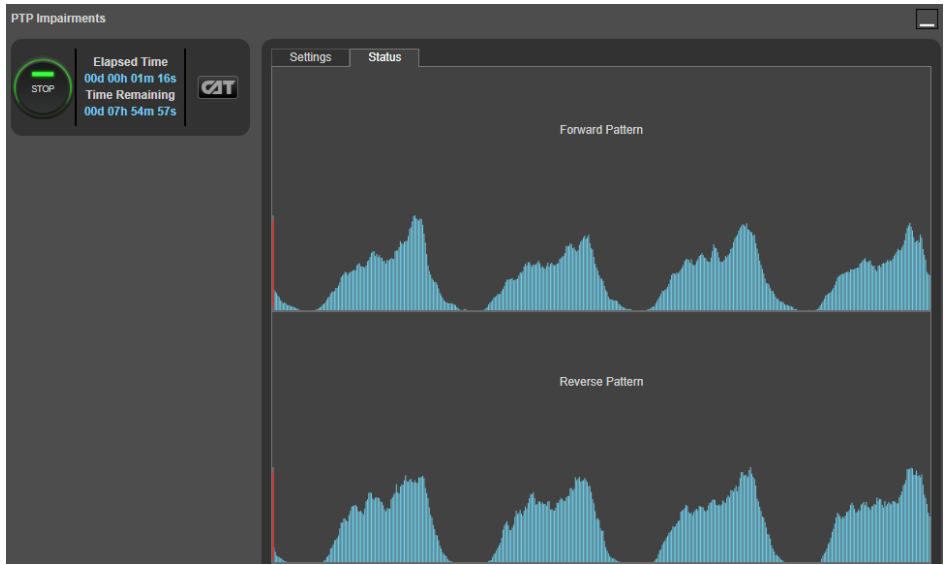
Load No files chosen Clear

Reverse Pattern

Load No files chosen Clear

User defined files may include captures from testing with **Paragon-neo**, custom impairments, for example those created with **Paragon-X**, or real-world Time Error captures made with **Sentinel**. Paragon .cpd and .cdf file formats are accepted, in addition to Sentinel .dset files. Selecting **Load** allows the user to choose suitable files for the **Forward** and/or **Reverse** direction. Selections are made from any files available in the **Sessions** directory and any sub-directories within.

Pressing **Impair** will start the impairment. The **Status** tab will show progress through the impairment pattern, as well as giving a visual indication of the Time Error pattern being applied.

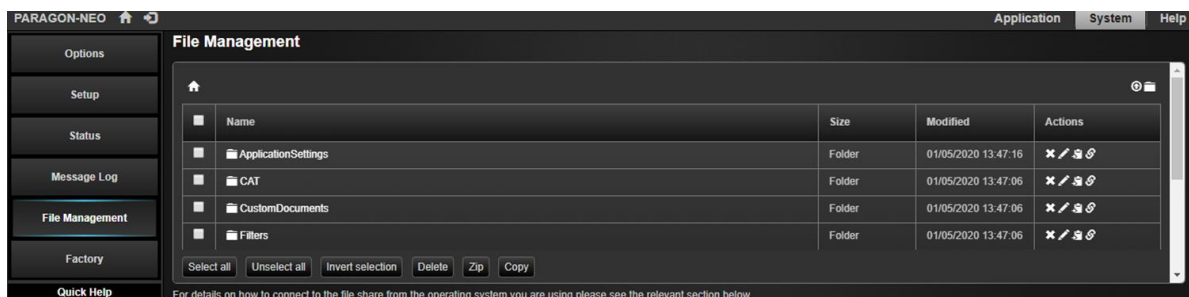


5 Base Product Enhancements

5.1 HTTP File Management

Improved capability to move capture data from the Paragon-*neo* instrument to other systems, or to add new Time Error Impairment Patterns, Masks for CAT and other useful data to the Paragon-*neo* is provided in this release through an HTTP file management system.


The feature is accessed by clicking **System** in the top-right of the UI, then **File Management**



Instructions for connecting via different OS are listed beneath the file management pane.


Select files to download by navigating the folders and clicking the download icon next to the file name.

You can delete, rename or copy the file by selecting the appropriate icon next to the file name. To select multiple files / folders to download select them and create a Zip with the Zip button and then download the Zip.

To upload files, select the  icon in the top-right of the pane, then browse for the desired file. Once uploaded, files can be moved to the preferred directory.

Note as mentioned in section 4.4 of these Release Notes, the **Sessions** folder is the required directory for files that are intended to be replayed as Time Error Impairment Patterns. Files can be in their own sub-directories as long as these are contained in the **Sessions** folder.

5.2 “Current User” note feature

By selecting the  icon towards the left of the top bar in the Paragon-*neo* GUI, the option is provided to enter text in the **Current User** field, enabled by selecting **Apply**.



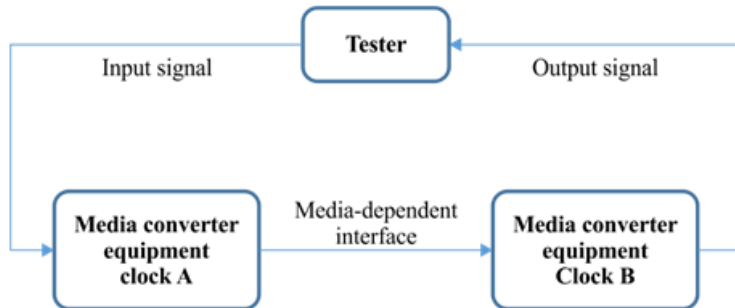
This will be visible to any user connecting to the Paragon-*neo* and can therefore be used to provide notice of who to contact to enquire about current unit status, which group in an organization is currently using the equipment, or other notification purposes. Max length is 25 characters.



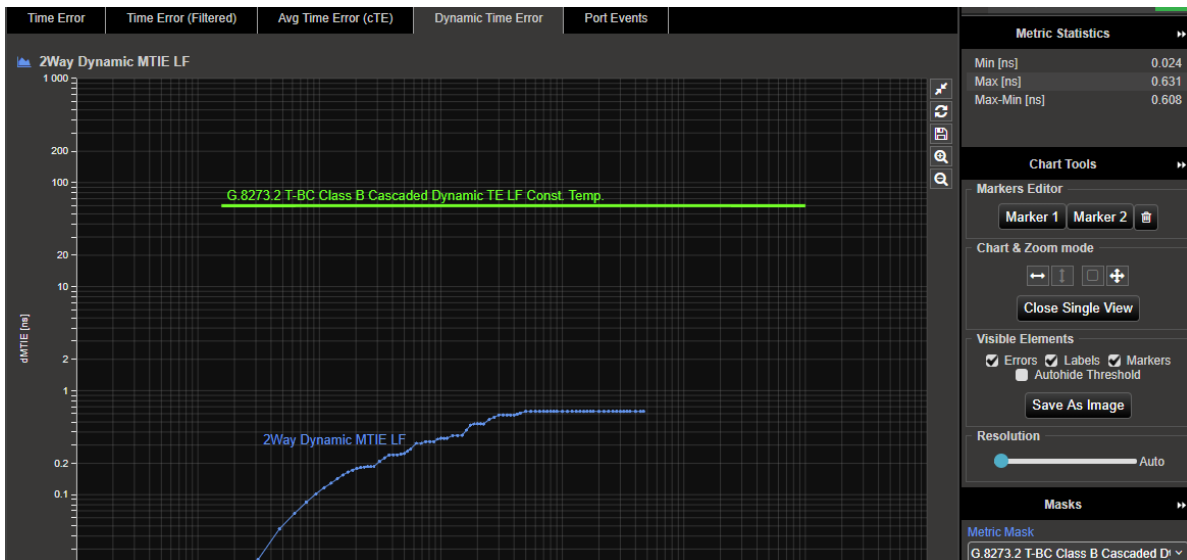
Selecting the current user icon again will clear the current user information.

5.3 CAT: ITU-T Cascaded Media Converter Masks

To allow timing performance tests of systems which distribute timing on media-dependent interfaces, but to external systems appear as a single 'black-box' with ethernet synchronization interfaces (systems such as microwave links) guidance on estimating expected timing performance of these systems is available in Appendices to G.8273.2, G.8262.1 and G.8262.



To allow comparison to these estimations, Cascaded Media Converter Masks are now available in CAT, available from the drop-down selections on the appropriate metrics.



6 Appendix A: Software Advisory Notes

- For more information on features and fixes in this Release, along with other user information on Calnex products, please visit the Knowledge Base at: <https://calnexsolutions.atlassian.net/wiki/spaces/KB/overview>
- It was noted that a drop-down PTP profile selector for 1588-2008 Annex J was not present in previous releases, despite necessary fields being available. The selection is now available.
- Optical Power reading in the UI is now displayed in units of dBm.
- If displaying packet data in the packet debug mode when multiple VLANs are present, only the first VLAN will be displayed in PFV, along with the PTP packet data. In future releases this will be enhanced to display all present VLANs.
- There is a known issue in this release, affecting Transparent Clock Mode T4 measurements when transmitting at relatively high packet rates. It is recommended to use the ITU-T G.8275.1 specified packet rate of 16pkt/s. An issue has also been noted when running packet MTIE metrics from Transparent Clock test mode -
- It is not recommended to have multiple web browser tabs open on the PFV in live mode as this can have a significant effect on performance.
- When using automation, it is recommended to have live captures stopped before trying to access/read data via script, as there can be intermittent errors.

To Install:

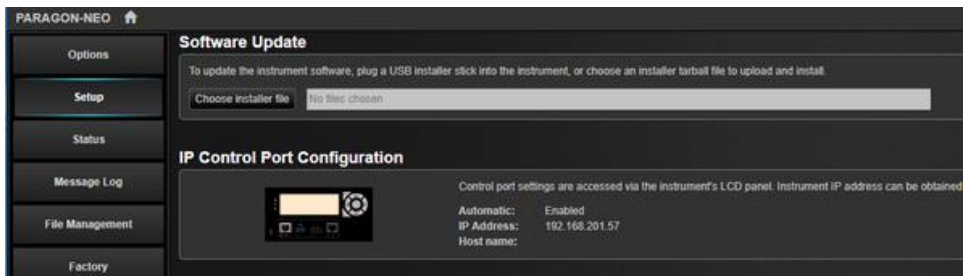
The Paragon-neo software may either be delivered as a tar file (*.tar) or as an ISO (*.iso) file (disk image). Upgrading using tar file is recommended.

Note that .tar upgrade should be from version 2.1. If you are running an older SW version, or would rather use the ISO file for other reasons, please see the instructions at:

<https://calnexsolutions.atlassian.net/wiki/spaces/KB/pages/37814276/Paragon-neo+How+to+upgrade+the+software>

To install using tar file:

- Download the tar file and save it to a location on your PC.
- Before upgrading the instrument, you must first stop all generation and capture.
- Follow the steps below to upgrade:
- Click **System** in the menus on the top right of the UI
- Click **Setup** in the left hand menu bar
- The UI should look something like



- Click **Choose installer file** to select the tar file that you saved earlier
- The instrument will now begin the upgrade process. Note that this will take a while (maybe as much as an hour). **Do not power off while the upgrade is in process.**

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