



**Paragon-*t***  
Latest Software Release (2t)

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# 1 Software Release Overview

2t (X.50.01) adds the following features to Paragon-t and CAT:

👉 To check the current software version installed, select Help -> About Paragon-t Remote Client on the Paragon-t GUI.

## Software Maintenance

New Options	Enhancements to existing options	Base product enhancements
Opt 004: E1/T1/2MHz/10MHz Wander Generator	TE Absolute/Relative and cTE terminology	User Defined Port Naming
Opt 005: SyncE Wander Generator	ToD 1 Second Step Analysis	Support for 'Stand-Alone' CAT
Opt 223: MTIE/TDEV Wander Generation		Report Generation
	In the same release, enhancements have been added to the CAT. The CAT accompanies the Paragon-t and is used to display/present graphical results such as Wander and Time Error results and to calculate metrics such as MTIE/TDEV for further analysis.	

## 2 Features and Benefits

<b>Paragon-t Feature</b>	<b>Benefit</b>
<b>Wander Generator</b>	Faster and more flexible test with up to 4 independent wander generators
<b>User Defined Port Naming</b>	Ease of analysis for numerous simultaneous tests with Paragon-t
<b>TE Absolute/Relative and cTE terminology</b>	Measurement and analysis to ITU-T defined metrics
<b>ToD 1 Second Step Analysis</b>	Instant visual feedback of 1pps/ToD alignment
<b>Support for 'Stand Alone' CAT</b>	Independent and accelerated route to latest CAT enhancements
<b>CAT Feature</b>	<b>Benefit</b>
<b>Report Generation</b>	Ease of use for result reporting, plus the added confidence of providing results and reports directly from the measurement device and software.

### 3 New Options<sup>1</sup>

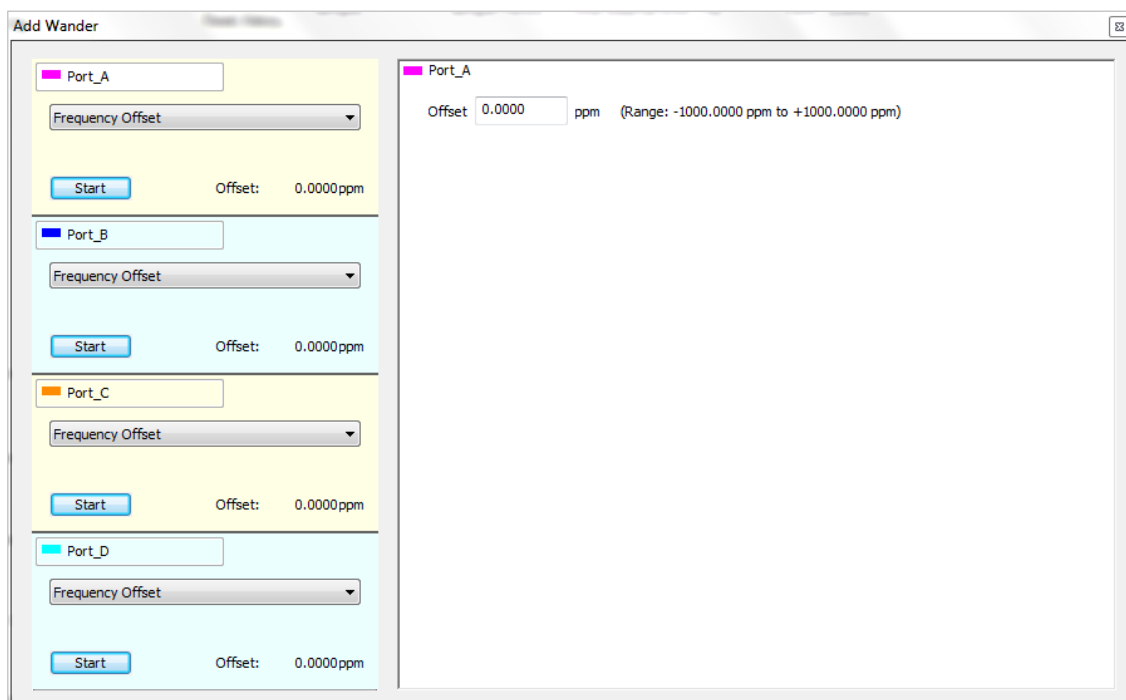
#### 3.1 Option 004: E1/T1/2MHz/10MHz Wander Generator, Option 005: SyncE Wander Generator

With the appropriate option, Paragon-t will be able to generate up to 4 individual clock signals, plus additional frequency offset or sinusoidal wander, for e.g. wander tolerance testing.

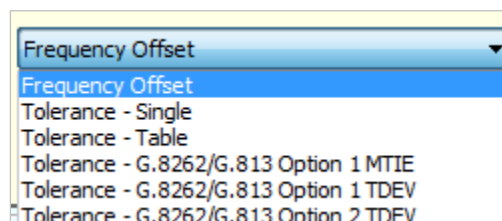
#### 3.2 Measurement Process

3.2.1 Select the 'Add Wander' button on the Paragon-t GUI.

3.2.2 The Following window will open, with available selections based on the ports already selected by the user.



3.2.3 For each active port, Frequency Offset or Wander can be applied/removed. Wander can be specified as a Single Sinusoid, Table Sine or selected MTIE/TDEV patterns.



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<sup>1</sup> Requires appropriate option to be fitted.

### 3.2.4 Frequency Offset

Can be defined in steps of 1ppm from -1000ppm to +1000ppm. Once offset value is defined, press **Start** to apply the offset, and **Stop** to remove.

### 3.2.5 Table (Sinusoidal)

Can be used to test Maximum Tolerable Wander, or to defined Wander Tolerance masks, as shown.

Port\_A

Enable	Frequency (Hz)	Amplitude ( $\mu$ s)	Dwell Time (Cycles)	Status
<input checked="" type="checkbox"/>	10.00000	0.25	300	0%
<input checked="" type="checkbox"/>	0.13000	0.25	10	0%
<input checked="" type="checkbox"/>	0.01600	2.00	3	0%
<input checked="" type="checkbox"/>	0.00080	2.00	3	0%
<input checked="" type="checkbox"/>	0.00032	5.00	3	0%
<input type="checkbox"/>				0%
<input type="checkbox"/>				0%
<input type="checkbox"/>				0%
<input type="checkbox"/>				0%
<input type="checkbox"/>				0%

(Frequency Range: 0.0001 Hz to 100 Hz)  
 (Amplitude Range: 0.01  $\mu$ s to 10  $\mu$ s)  
 (Dwell Time Range: 1 cycle to 500 cycles)

**Lower limit of max tolerable sinusoidal input wander**

- The user can enter up to 10 different wander parameter sets in the table.
- The Paragon-*t* will then automatically add each of the specified wander sets in turn giving full indication of progress in the **Status** column.
- Switching between different sets is always done at a zero crossing to prevent phase steps.
- Enter the frequency, amplitude, and dwell time (number of cycles the frequency/amplitude pair will be run) for each wander test point.
- The same frequency with different amplitudes can be entered to find maximum tolerable wander
- The **Restore Defaults** button, when checked, will restore the values to that defined in table 9 in G.8262 (table 10 in G.813)
- Only rows that have the **enable** check box ticked will be executed in the test. To skip over a selection, un-tick the enable box for that selection.
- Click **Start** to start the test
- Click **Stop** to stop the test. The test will terminate at the next zero crossing
- A pop up box A pop up box stating how long to the next zero crossing is displayed, click the **Stop Now** button if it is desired to stop the test instantly.

### 3.2.6 Single Sinusoidal Wander

Can be used for e.g. troubleshooting issues at a specific frequency

Port\_A

Frequency  Hz (Range: 0.0001 Hz to 100 Hz) Restore Defaults

Amplitude  μs (Range: 0.01 μs to 10 μs)

- Enter the frequency and amplitude of the desired wander
- Click **Start** to start the test
- Click **Stop** to stop the test. The test will terminate at the next zero crossing of the wander frequency
- A pop up box stating how long to the next zero crossing is displayed.

### 3.2 Option 223: MTIE/TDEV Wander Generation

The Paragon-t generates MTIE and TDEV wander as defined in G.8262.

- Select the wander mask required from the drop down list. The mask and the maximum running time will be shown on the right hand side of the window.
- G.8262 Option 1 MTIE - Running Time is 1000s
- G.8262 Option 1 TDEV - Running Time is 12000s
- G.8262 Option 2 TDEV - Running Time is 12000s
- Click **Start** to start the test. The elapsed time will be displayed on the bottom right hand side of the window.
- The test will stop after the max running time has elapsed, the test can also be stopped manually by clicking **Stop**.

## 4 Enhancements to Existing Options<sup>2</sup>

### 4.1 TE Absolute/Relative and cTE terminology

For clarity, Paragon-t measurements will be labelled in line with ITU-T standard terminology for Time Error, as per G.827x recommendations.

### 4.2 ToD 1 Second Step Analysis

In order to measure the ToD output from the device under test, the CAT has now been updated to show ToD information. The CAT has been enhanced with an additional **Time of Day** tab which present graphs and a table of the received ToD messages (NMEA and CCSA format) with errors highlighted (missing 1pps pulses, non-1s steps, CRC).

To see the results, select the **Time of Day** tab in the CAT and the ToD table as well as the graphs will be displayed. The screenshot below is purely the ToD message table. To view the table on its own use the cursor to drag the blue horizontal line to the top of the display area.

The CAT will display the following graph:

**Time Error: 1pps Time Error/ToD:** displays 1pps TE and highlights missing 1pps and ToD (CRC, non-1s step) errors with a red vertical line. The graph shows the position of the ToD error and the missing 1pps making it easy to identify and troubleshoot major errors.

## 5 Base Product Enhancements<sup>3</sup>

### 5.1 User Defined Port Naming

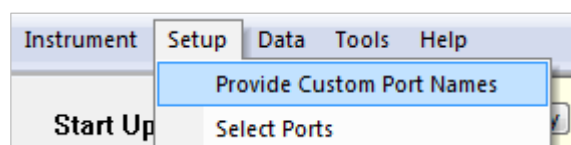
To allow ease of analysis across the multiple simultaneous tests/measurements possible in Paragon-t, this enhancement allows user defined naming to distinguish the 4 individual port sets (identified by default as A,B,C and D).

For example, distinct user, test or DUT naming conventions can now be applied.

Naming will apply to configuration and GUI 'SoftLED' windows, in addition to being indicated on real-time measured results in CAT.

To configure port names, connect to Paragon-t unit, then from **Setup** select **Provide Custom Port Names**:

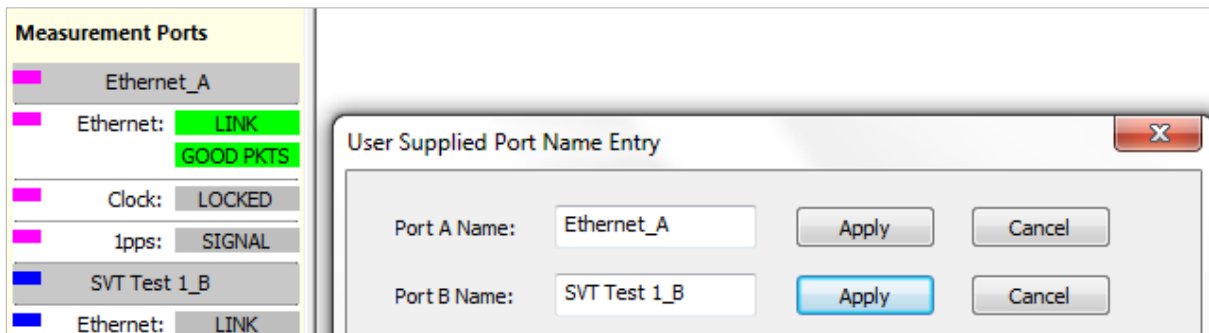
A dialog will then open to allow user-defined naming, up to 10 alpha-numeric characters. Press **Apply** to confirm port name. Note that chosen name will be appended with the original port letter for clarity.



<sup>2</sup> Paragon-t updated features, option 003 required

<sup>3</sup> Paragon-t updated features





## 6 Enhancements to CAT

### 6.1 Support for 'Stand-Alone' CAT

As of this SW release, Paragon-t GUI will automatically check for and use the latest version of the CAT tool on the user PC.

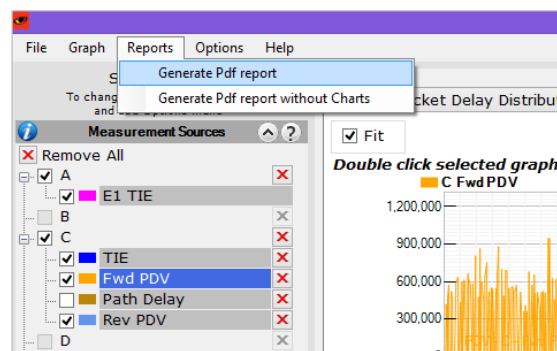
Future releases of CAT with additional functionality can then be installed and used immediately without reinstalling Paragon-t SW.

### 6.2 Report Generation

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

To enhance the reporting of results, including Pass/Fail to Standards-based masks, the CAT can now automatically generate test reports.

From the CAT, select **Reports**, and either **Generate Pdf report**, or **Generate Pdf report without Charts** if only pass/fail information is required.



The option will then be given to add test details before generating a report.

Fill fields for report

General Information

Report Title

Report Description

Company

User Name

Network Operator

Test Location

Report Date

Beginning of Test

End of Test

Instrument Type

Instrument Serial Number

Test Configuration

Device Under Test

Frequency reference source

Sync-E source

E1 or T1 source

Open generated report

Once **Generate report** is selected, a Pdf file with entered details and pass/fail results will be created, with Charts included if this option was selected. The file will be created in the user's selected directory, with entered file name. By default the generated report will open, this option can be toggled off.

## 7 Software Advisory Notes

- A change has been made to correct 1pps Time Error polarity errors between Paragon-t and Paragon-X measurements.
- Using Script Recorder feature, it should be noted that file export from main GUI will not be recorded to the script. The functional workaround is to ensure that results are opened in CAT tool, then exported from within the tool.
- Additionally, a series of changes have been made to correct misleading units across calibration and measurement screens, these are now harmonised:
  - Measurement Calibration units
  - Y-axis graph units
  - Cursor Coordinates

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All information subject to change, without notice

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