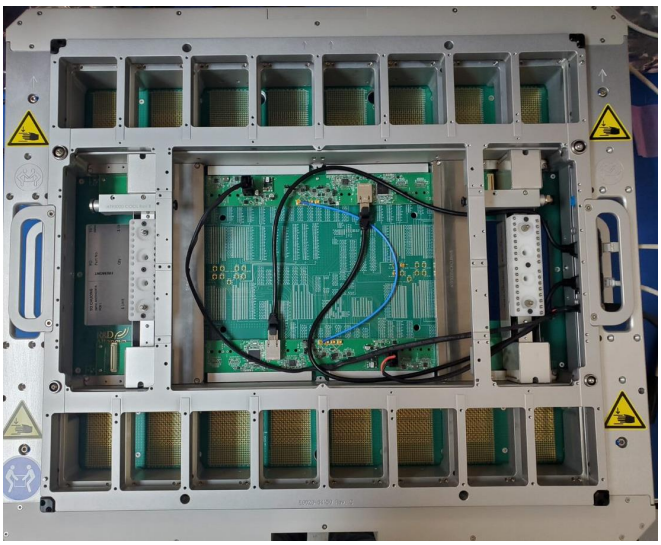
USER MANUAL

multiLane

AT93000 Diagnostics User Manual

Instrument Troubleshooting Guide

AT93000 Diagnostics Guide-rev0.4 (DM 20210330a)
March 2021



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Notices

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the General Safety Summary in other system manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Only use the power cord specified for this product and certified for the country of use.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal, including the common terminal that exceeds the maximum rating of that terminal.

Do Not Operate Without Covers.

Do not operate this product with covers or panels removed.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate with Suspected Failures.

If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions. Do Not Operate in an Explosive Atmosphere. Keep Product Surfaces Clean and Dry

⚠ *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Contents

Table of Figures

Purpose of this User Manual

The purpose of this User Manual is to help isolate Multilane-related failure mechanisms inside the AT93000 twinning frame shown in Figure 1.

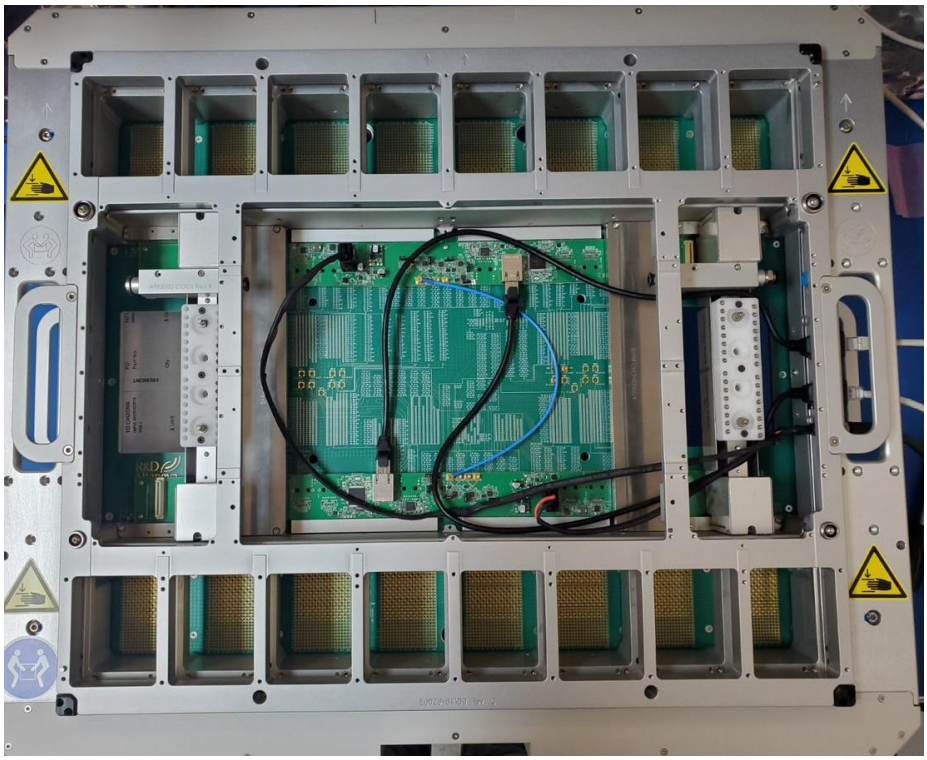

Figure 1: AT93000 internal view

System Nomenclature

The cassette and backplane numbering are shown in Figure 2. The V93000 digital pogo block locations are also noted in this figure.

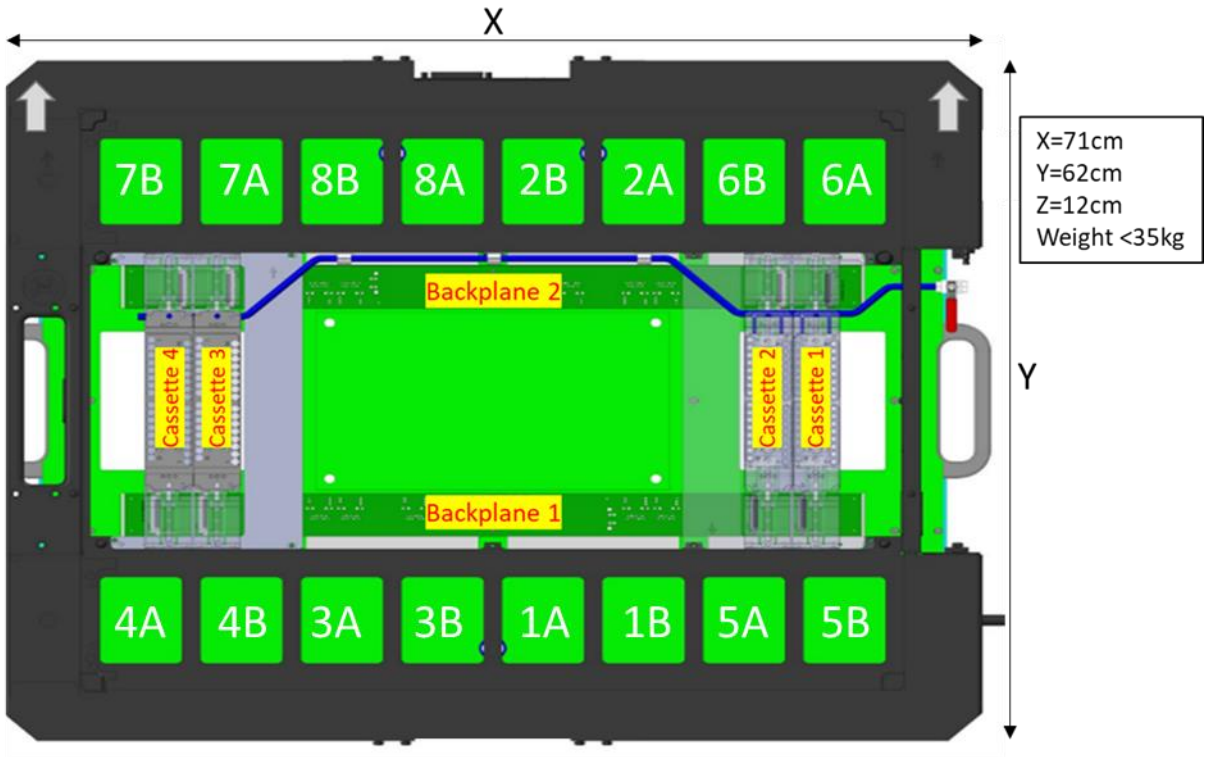

Figure 2: AT93000 cassette and backplane numbering

Items used for diagnostics

1) Voltmeter to check 12V on the backplane (optional).
2) External diagnostic brackets with F-F connectors if needed.
3) Diagnostic GUI available on MultiLane's public website. The file is here: HERE.

Quick checks before running hardware diagnostics

Ping Check

Start by trying to ping an instrument using its IP address to make sure that the instrument is turned ON and a proper Ethernet connection is available.

Docking Checks

- See Advantest manuals for proper docking procedures.
- Is AT93000 Twinning Frame properly docking to V93000?
- Is DUT Loadboard properly docking to AT93000? This can be done manually or using the Advantest docking remote control.

SMPM connector checks

- Are all SMPM male connectors on the loadboard stiffener straight? Make sure none are bent. Figure 3.
- Are all SMPM female connectors on the Multilane cassettes free of dirt and in good conditions? Figure 4.

Figure 3: SMPM male connectors on loadboard blindmate connectors

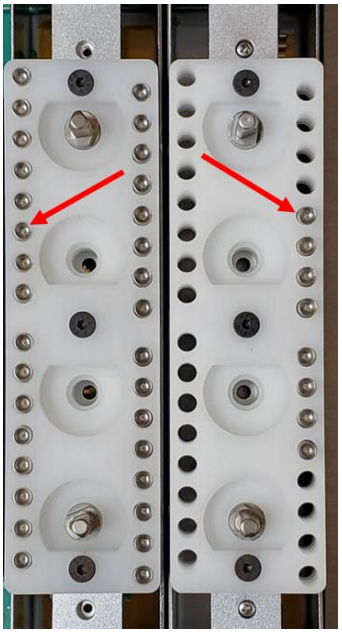

Figure 4: SMPM female connectors on Multilane cassettes

Faceplate Checks

- Refer to Figure 5.
- Are Power, Ethernet and Air Supply securely attached to AT93000 faceplate?
- Is 12V power plugged into test floor outlet and power supply switch turned on?
    - Switch is on backside of 12V power supply box.
    - If 12V supply is suspect, measure +12V across the diode shown in Figure 6 on both backplanes
- Are ethernet cables plugged into ethernet switches connected to the V93000?
- Is air cooling supply ON and flowing > 1CFM into the twinning frame?

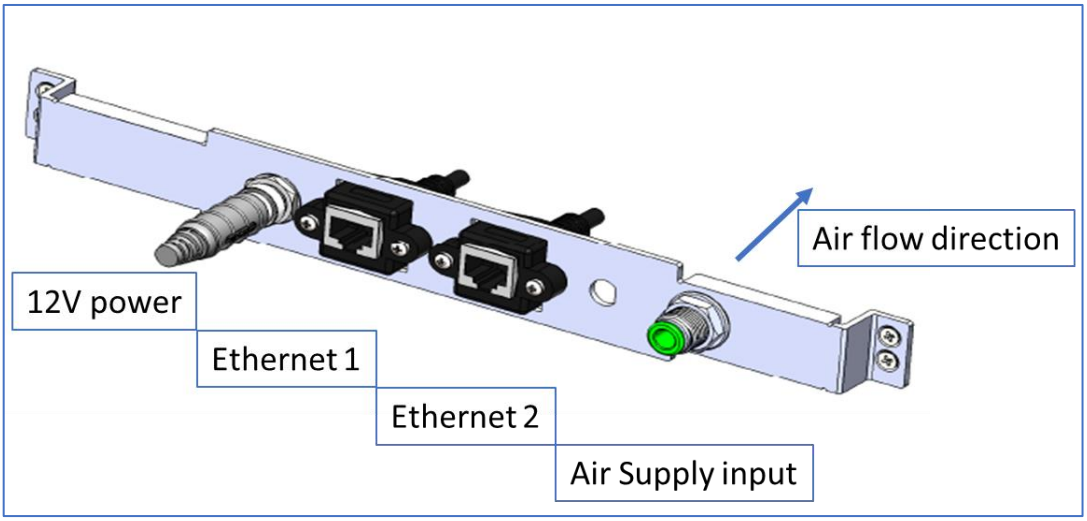

Figure 5: AT93000 faceplate

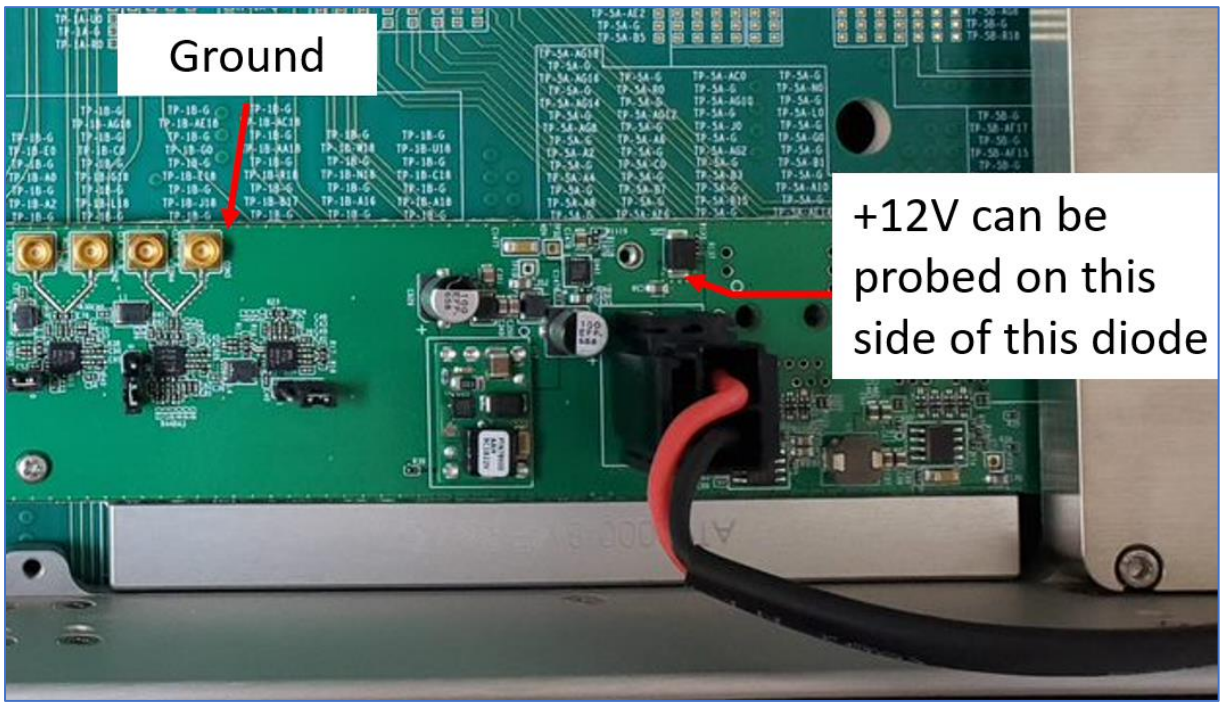

Figure 6: AT93000 +12V power

Backplane Jumper and Sync Cable Checks

Make sure the backplane jumpers and sync cables between backplanes 1 and 2 are properly installed for your application. Each application may require different jumper settings and a different cable installation. Consult the application's documentation for correct settings

Diagnostic GUI Manual Disclaimer

This manual describes diagnostic GUI operation where the Source and Measure instruments are both present inside the Multilane twinning frame assembly.

Examples of Source and Measure:

Example #	Backplane Source	Backplane Measure	Described in this manual
1	BERT Tx	BERT Rx	YES
2	BERT Tx	DSO Rx	YES
3	None	DSO Rx	NO (contact Multilane)

In *Example 3* above, an external source must be used to performance DSO Rx diagnostics. The diagnostic GUI supports the following Multilane benchtop instruments that can be used as sources; however, cabling to the DSO Rx backplane should be done with the assistance of Multilane support.

Example #	External Source	Backplane Measure	Described in this manual
4	ML-4039E	DSO Rx	NO (contact Multilane)
5	ML-4039D	DSO Rx	NO (contact Multilane)
6	ML-4035	DSO Rx	NO (contact Multilane)

In addition, if the customer wants to use a DSO to review the BERT Tx window characteristics, the following configuration is also supported by the GUI:

Example #	External Source	Backplane Measure	Described in this manual
7	BERT Tx	ML4025	NO (contact Multilane)

Diagnostic GUI

When the GUI is opened, the following choices are available:

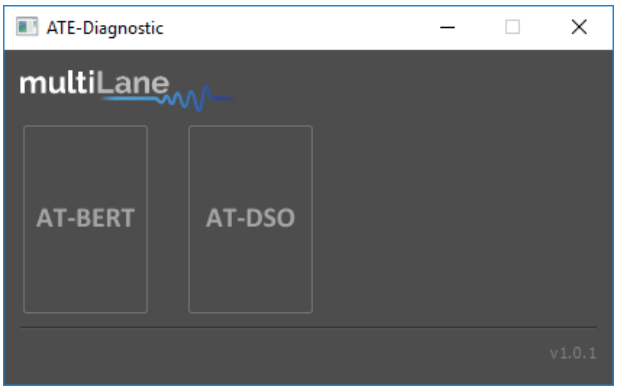

Figure 7: ATE Diagnostic GUI

AT-BERT

By clicking on AT-BERT a new window will pop up allowing the user to connect the instrument using the “Device” tab. When a connection is secured, the user will be able to access four different sections listed below. “File” tab will allow user to save all the instrument’s info shown in Module Settings section on page 10.

Module Settings

In module settings the user will be able to detect the instrument's temperature in addition to the board revision, FW revision, calibration, IP address, supported FW options, and others, as shown in Figure 8.

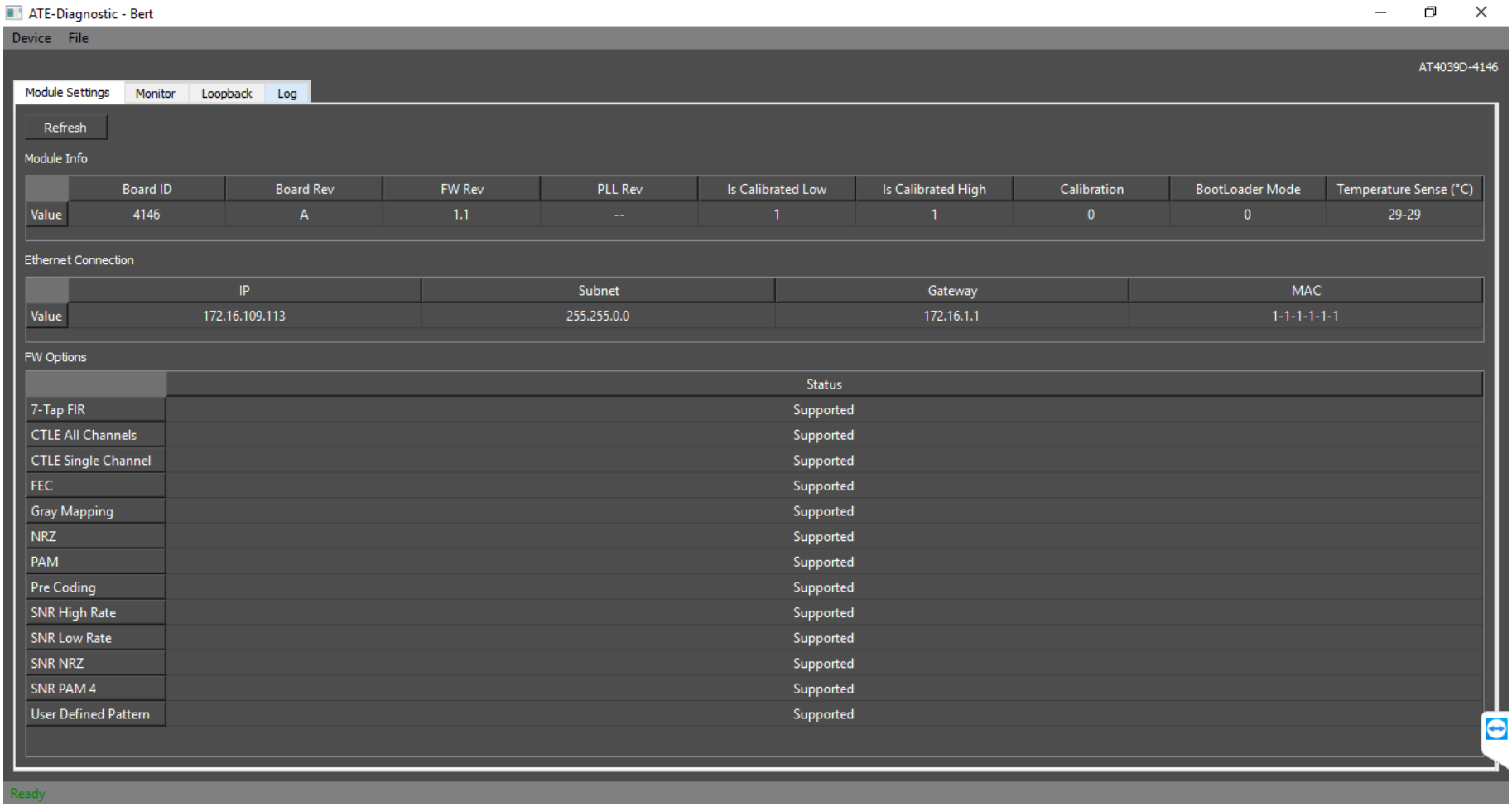

Figure 8: Module Settings

Monitor

In the monitor section, the user can track the different settings applied to the BERT including the amplitude, pre- and post- emphasis, 7 taps, Tx and Rx pattern, and others, as shown in Figure 9.

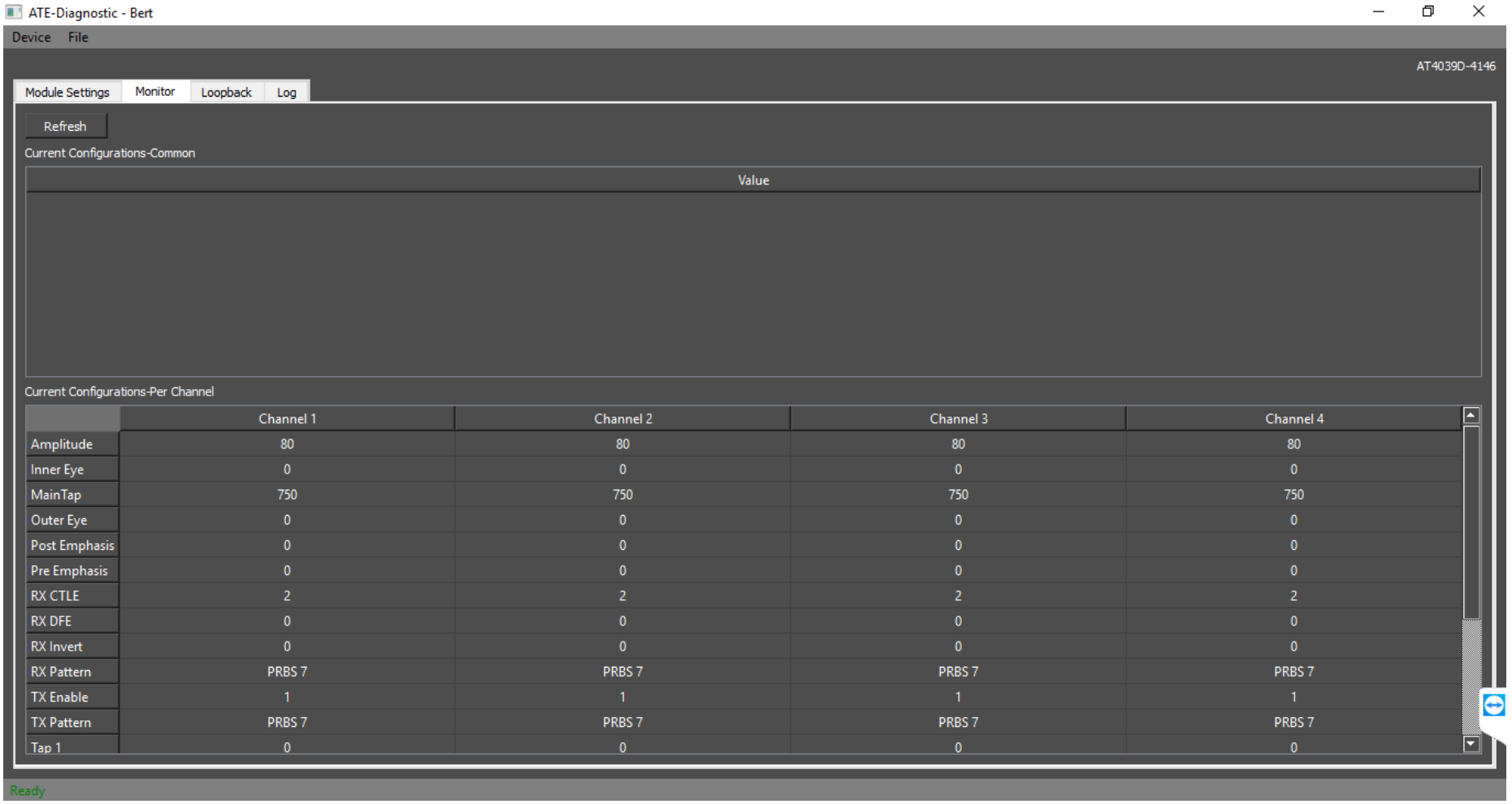

Figure 9: Monitor

Loopback

In loopback section, the user first has to “initialize” in order to generate a signal from the BERT. The GUI will specify what settings are being set, and it can be also tracked in the Monitor section on page 11. After initialization, a refresh button should be clicked to get latest BER and SNR values.

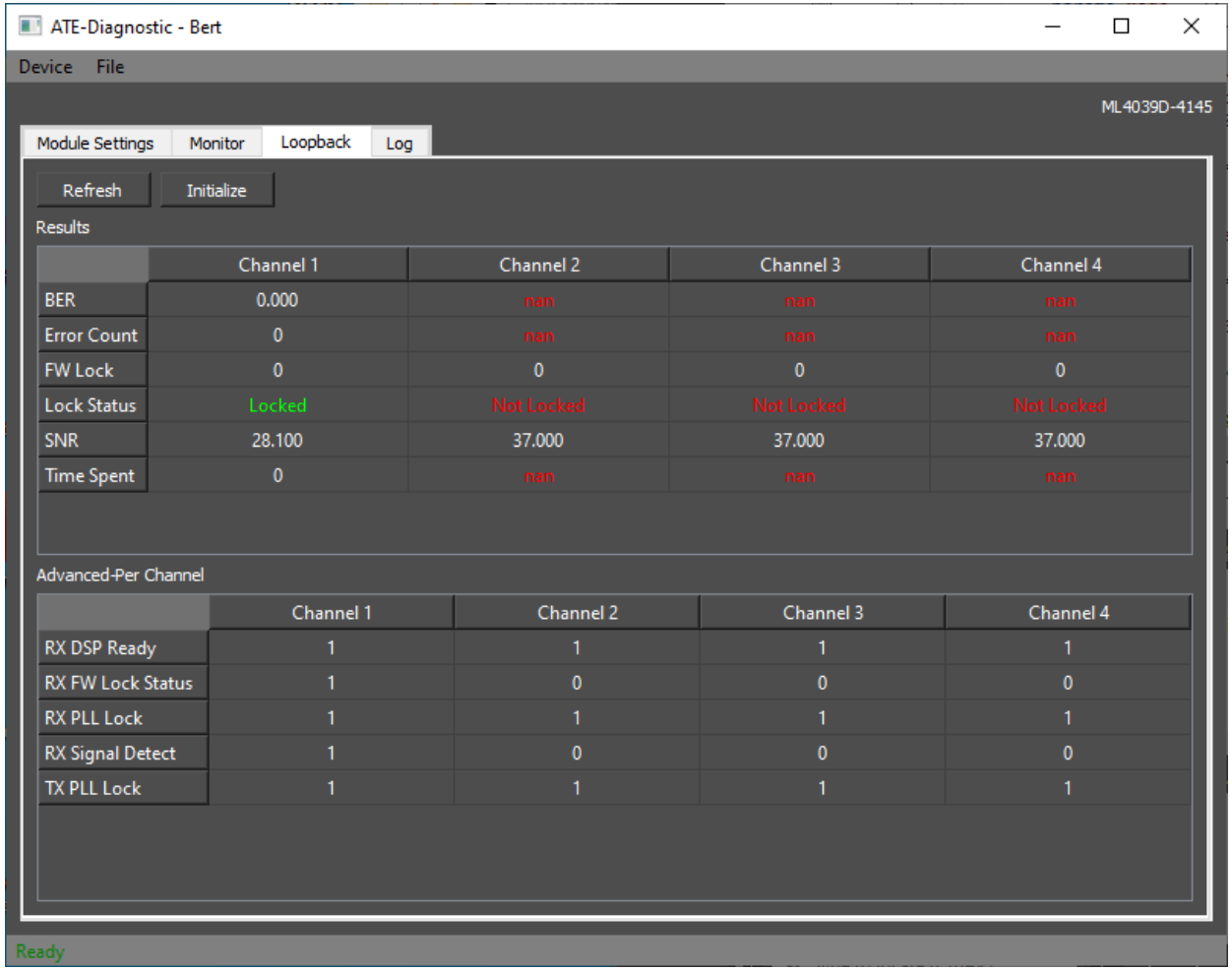

Figure 10: Loopback

Log

Log section will automatically be generated when the BERT is connected and it mentions the lock status on all channels.

Figure 11: Log

AT-DSO

By clicking on AT-DSO a new window will pop up allowing the user to connect the instrument using the “Device” tab. When a connection is secured, the user will be able to access two important different sections listed below. “File” tab will allow user to save all the instrument’s info and calibration coefficients shown in Module Settings section on page 10.

Module Settings

In module settings the user will be able to detect the instrument's temperature in addition to the board revision, FW revision, FPGA revision, IP address, supported FW options, calibration coefficients (by clicking "Load Calibration"), and others, as shown in Figure 12.

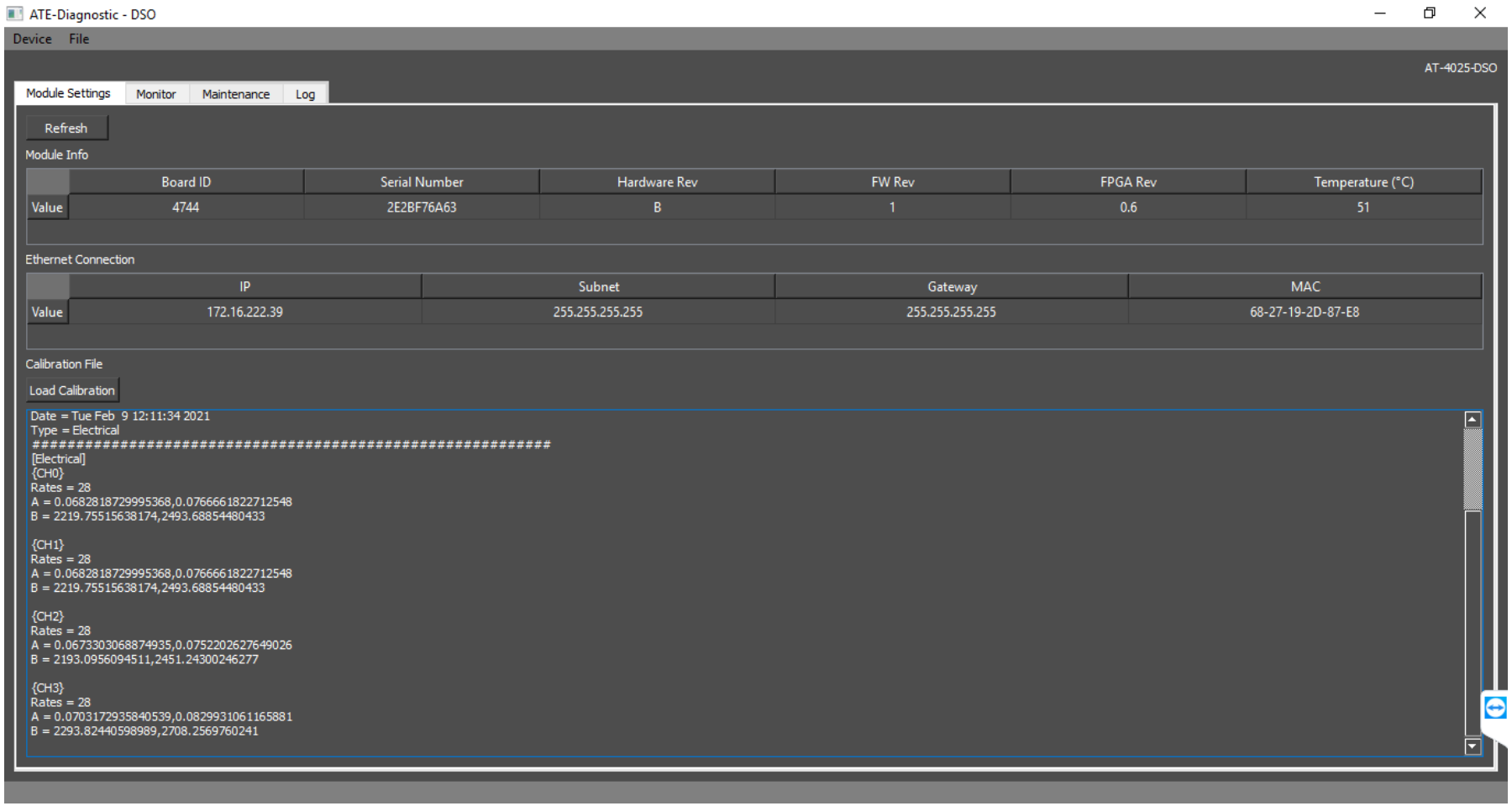

Figure 12: Module Settings

Monitor:

In the monitor section, the user will be able to detect Eye diagrams of the signal coming from the BERT (if connected). First click on "Configure" and select the specs of the signal received from the BERT as shown in Figure 12. Then click on refresh to detect the eye diagrams, Figure 13.

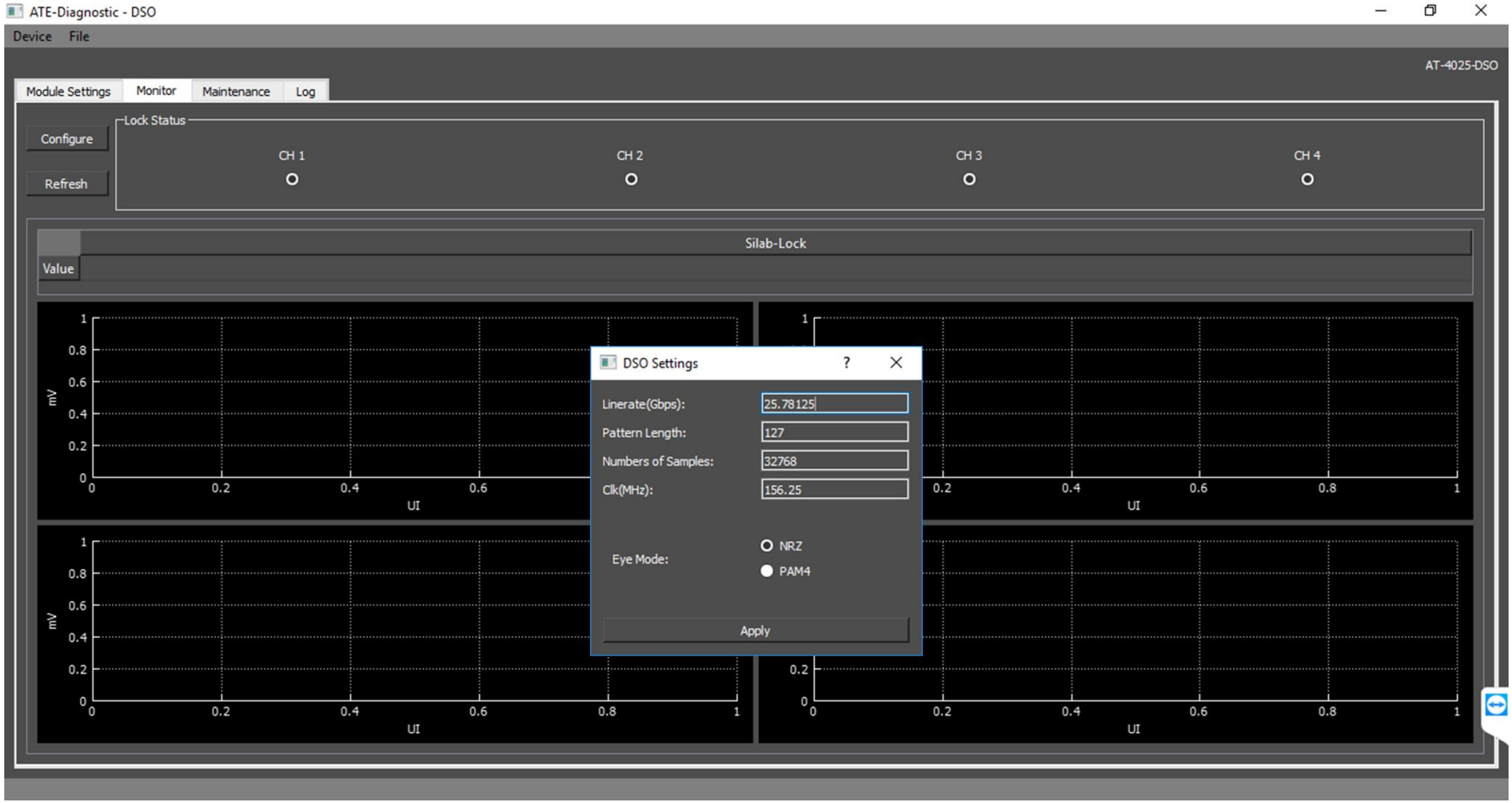

Figure 13: Monitor - Configuring

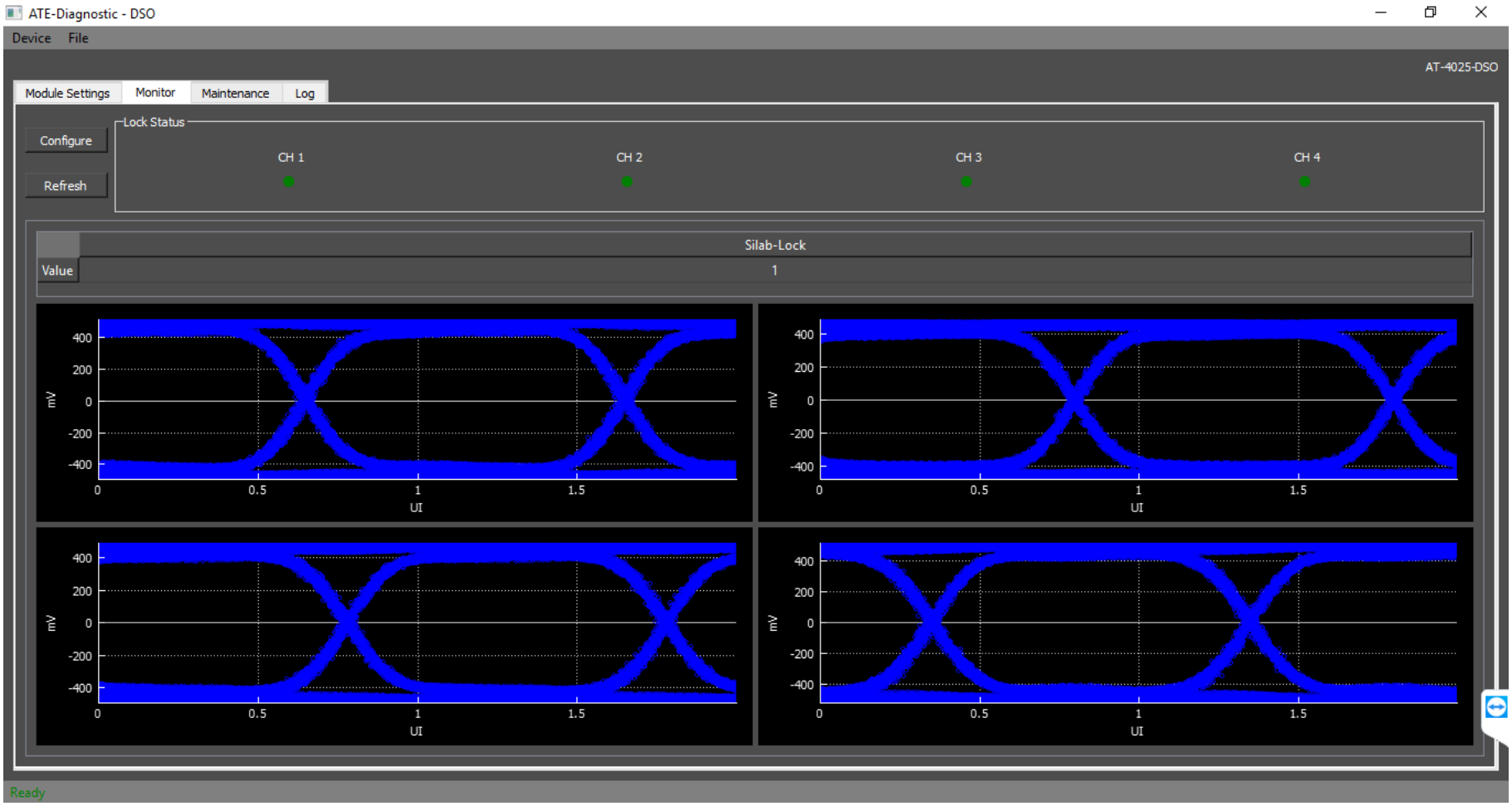

Figure 14: Monitor - Eye Diagrams

The user can connect to as many BERTs and DSOs as needed using the Diagnostic GUI. By that, one should refer to the Loopback section on page 12 of the BERT to generate a signal and detect it on the DSO.

Connecting Instruments Examples

In order for the user to run a BER or observe an eye diagram, the transmitted signal of the BERT should be connected to its error detectors or DSO channels respectively. One should always refer to the instrument's datasheet or user manual for the pinouts.

Suggested Minimum Materials to connect Tx to Rx channels:

Multilane P/N	Description	Quantity	Color Used in this document
AT93000-POGO	Blindmate connector shown in Figure 15	1 or 2	
TM40-0200-01	Cable: 1x1 38cm, SMPM-BM(f) <-> 1.85mm(m)	2 (ship as matched pairs)	Green Lines
TM40-0430-01	Cable: 1x1 38cm, SMPM-BM(f) <-> 1.85mm(f)	2 (ship as matched pairs)	Red Lines

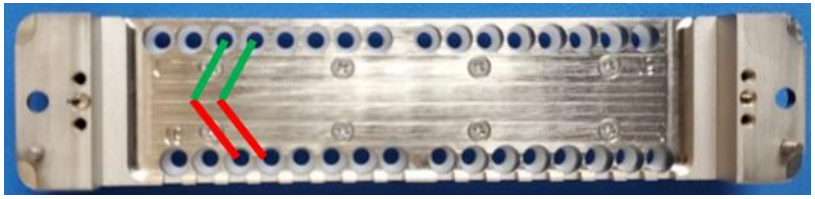

Figure 15: AT93000-POGO

Note:

- All of the instruments datasheets and user manuals are available on MultiLane Website.
- Refer to the System User Manual for clock routing.

1. Figure 16 shows an AT4079B loopback configuration, illustrating how the transmitted signals (left side) are looped back into the error detectors (right side). The GREEN and RED cables are interchangeable and can be used for either the Tx side or Rx side.

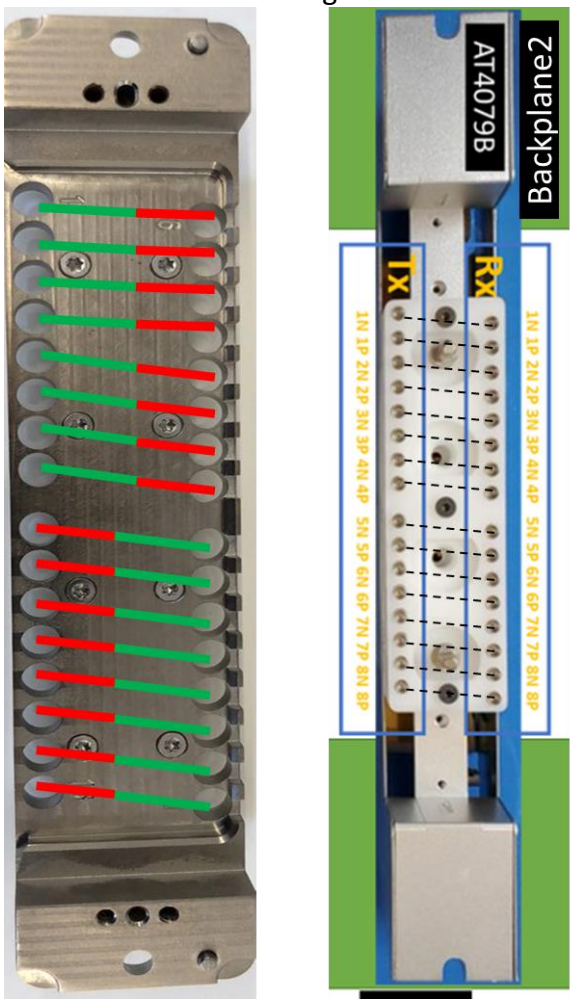

Figure 16: Example on Loopback Configuration – AT4079B only

2. Figure 17 shows the configuration of an AT4039D (or AT4039E) signal (Tx) transmitted into the AT4025 channels (Rx) for eye diagram observation. And Figure 18 illustrates the configuration of an AT4079B with AT4025.

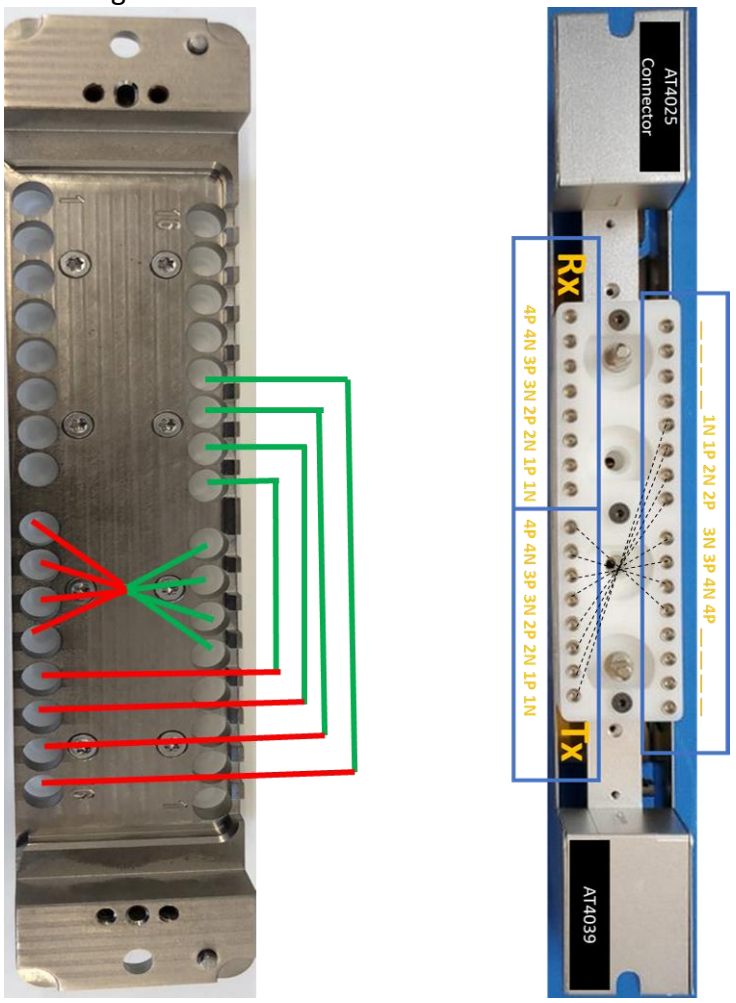

Figure 17: Example on Eye Diagram Configuration – AT4039 + AT4025

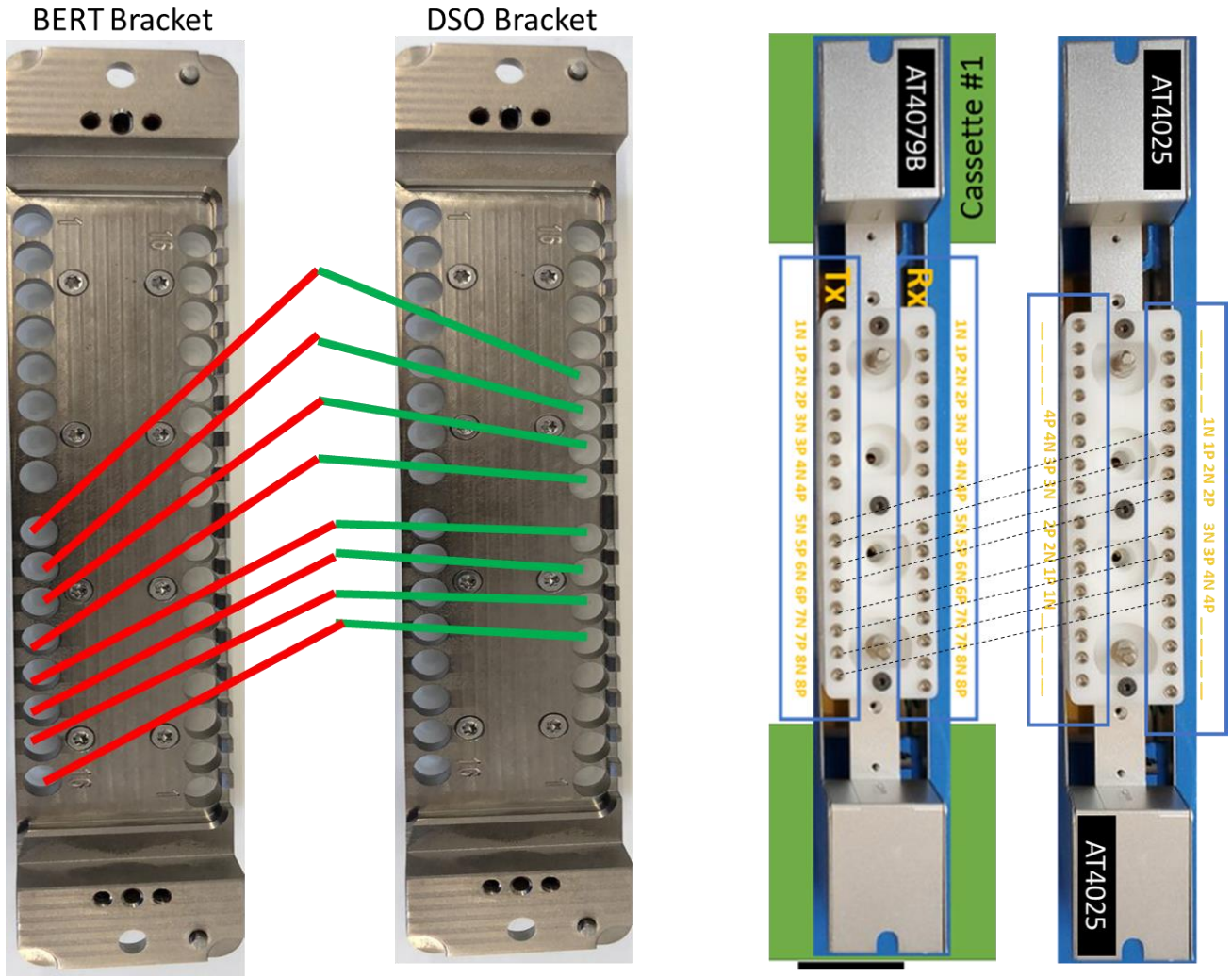

Figure 18: Example (2) of Eye Diagram Configuration – AT4079B + AT4025

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