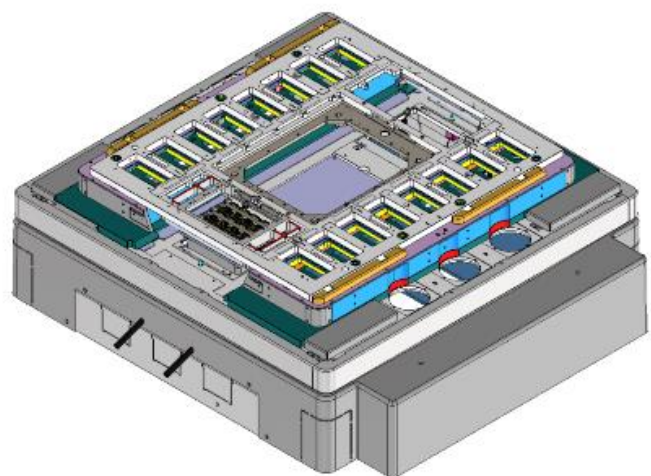
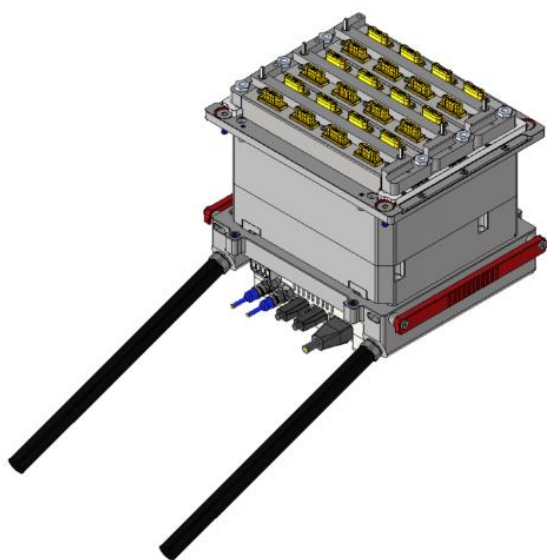


USER GUIDE



OT93000 System Overview

User Manual Revision 0.1.0, October 2023



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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.

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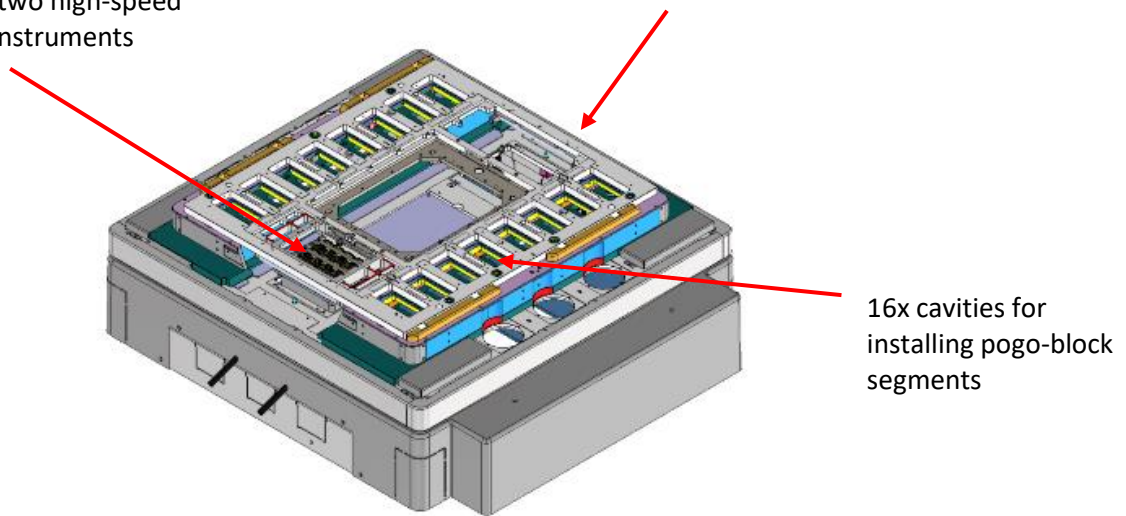
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Overview of the Advantest Olive Tree High Speed I/O (HSIO) Test System

The OT93000 is an ATE system used for wafer sort or final test on the EXA-Scale Machine from Advantest. Supported testheads are CX, SX and LX. A view of the system's individual pieces is shown in Figure 1, including up to six Multilane instrument cassettes (DUT DUO Test Head configuration).

Up to 6 multilane instrument cassettes each with up to two high-speed Multilane Instruments

Stiffener



16x cavities for installing pogo-block segments

Figure 1: Building blocks of the OT93000 system

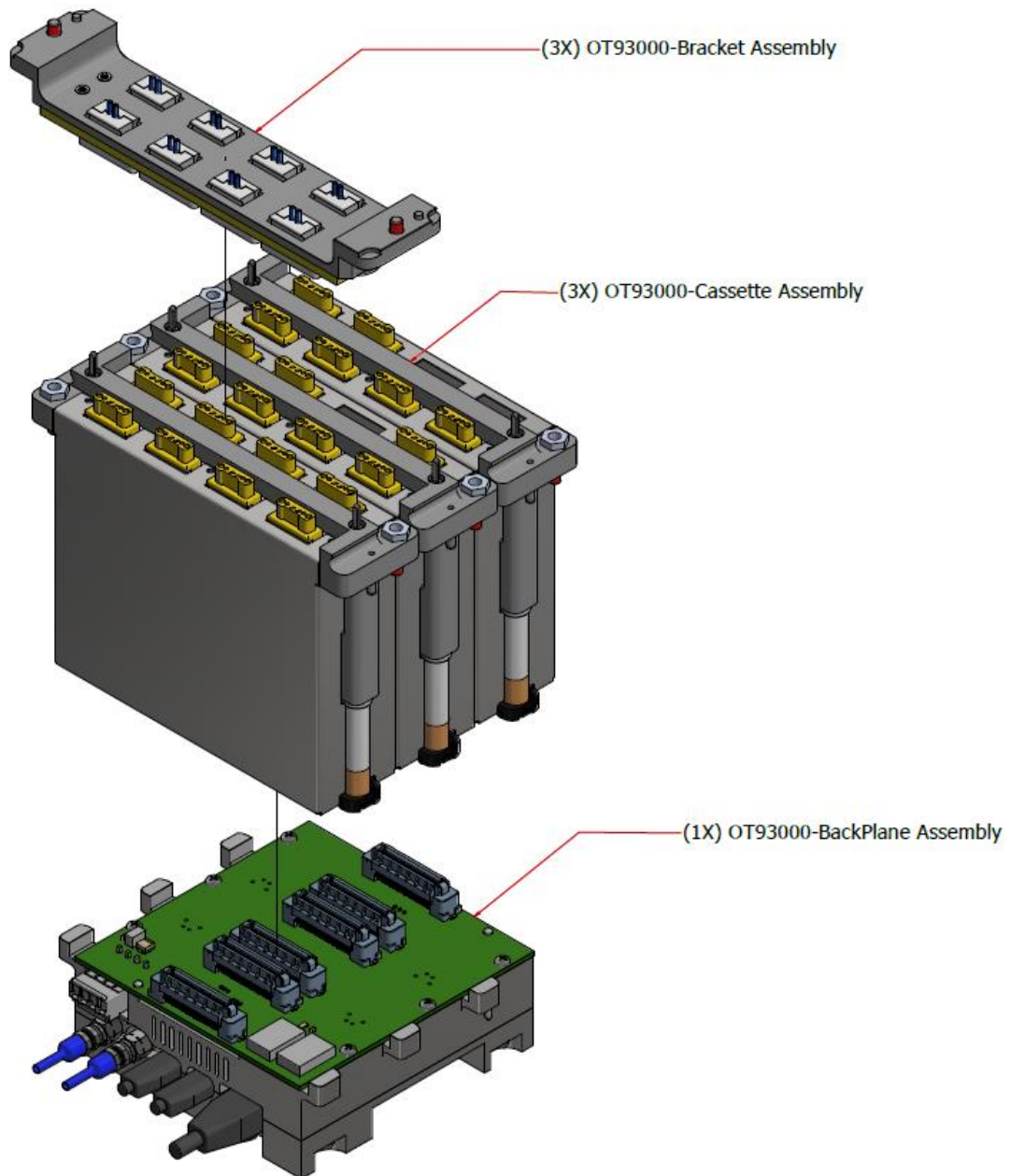


Figure 2: Backplane, cassette, and bracket

Figure 2 shows an exploded view of the backplane with the cassette and bracket.

The OT system channel density maximum is up to 48 channels if all 6 cassettes are fully populated.

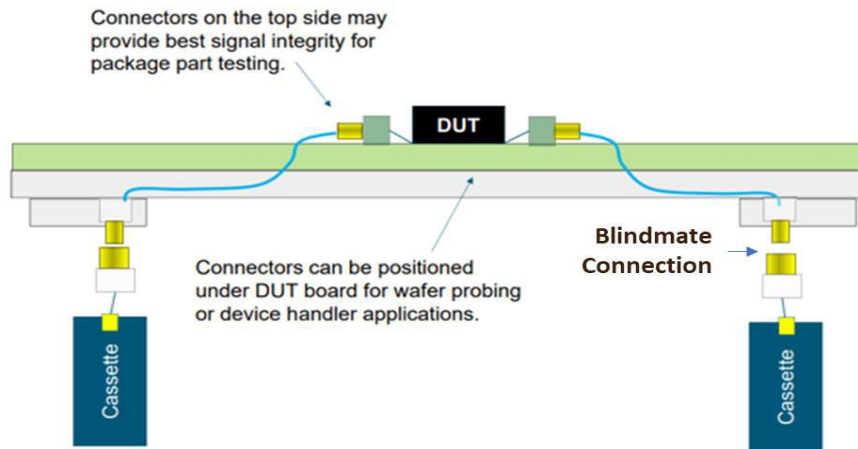


Figure 3: OT signal paths from instruments to DUT

Each of the six Multilane cassettes contains either one or two Multilane high-speed instruments. Refer to each instrument's User Manual for the blindmate connector pinout of that instrument in the cassette. Instrument manuals and datasheets can be found at [ATE | MultiLane \(multilaneinc.com\)](http://ATE | MultiLane (multilaneinc.com)). Figure 4 shows one side of a cassette with the protective cover removed. This exposed PCB is a 4-channel (differential) Multilane instrument. The other side of the cassette can have a second 4-channel Multilane instrument for a total of 8 differential channels per cassette. Figure 3 also shows the backplane connector. The instrument on the opposite side of the cassette is facing into the page so that its backplane connector is located on the backside. For example, a cassette might contain a 4-channel AT4039 BERT on side 1 of the cassette and a 4-channel AT4025 DSO on side 2 of the cassette.



Figure 4: OT cassette

Figure 5 shows the OT93000 high frame assembly.

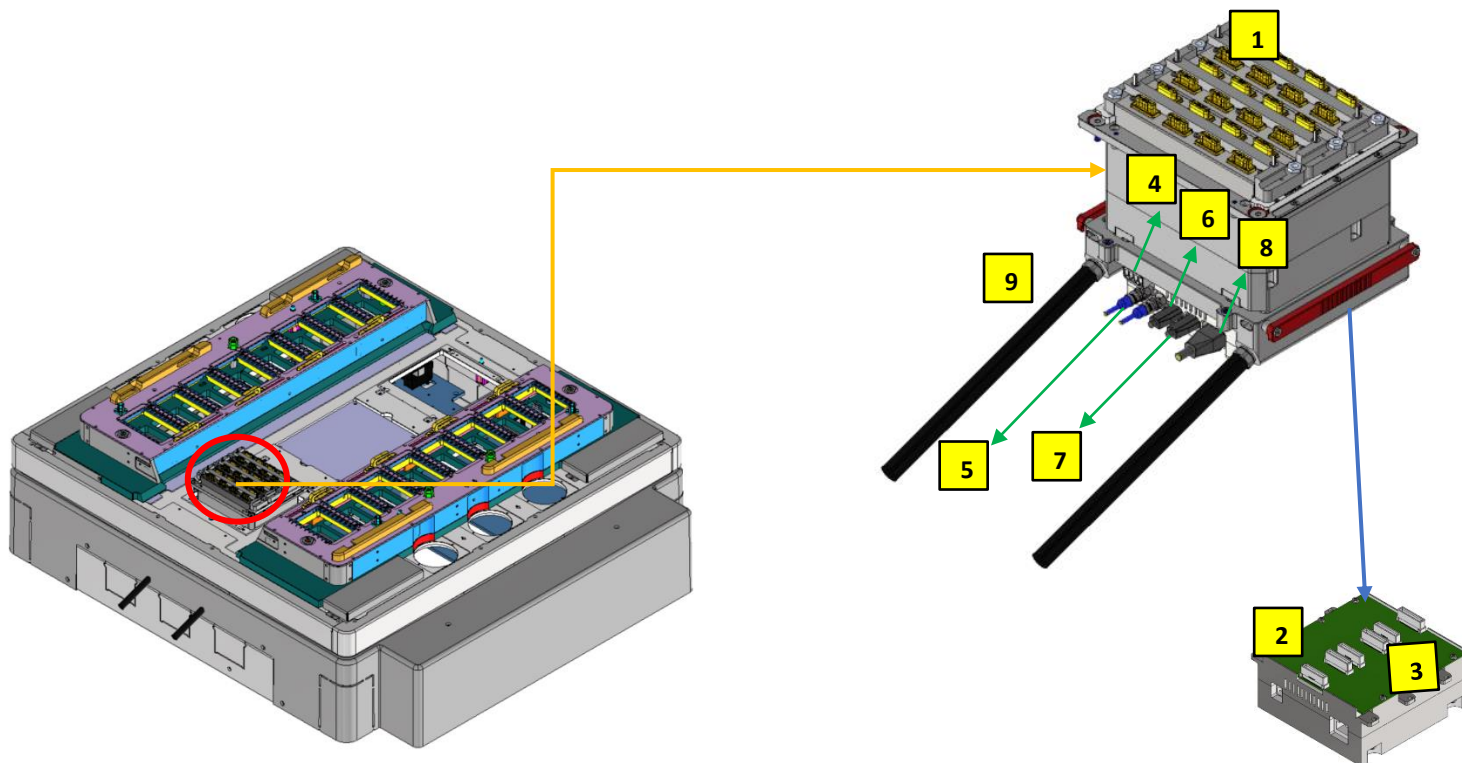


Figure 5: OT Garage Assembly

	Item	Description of Items in Figure 5
1	Cassette	Instrument cassette
2	Backplane	Two backplanes – one at right and one at left Provides power, communication, and clock sync to the cassettes
3	Backplane connectors	Instrument PCB's inside cassettes plug into these connectors
4	Power connector	12V, 15A each backplane for a total requirement of 30A external power supply
5	Clock In	Clock cabling between backplanes
6	UART	USB Interface for microcontroller communication
7	Firmware	USB Interface for Firmware Upgrade
8	Ethernet	Ethernet port
9	Water Intake	Water intake used to cool the cassettes

Table 1 OT6000Backplane constituents



Figure 6: OT6000 Backplane back side



Figure 7: OT6000 backplane front view: Diff clock inputs 2.92mm; Ethernet; 12V Power and USB for debugging

Cassette and Backplane Location References

For consistency across all customer configurations, the backplane connectors and cassette reference numbers are arbitrarily chosen to be defined as shown in Figure 9. The “arrow up” engravings on the twinning frame are referenced as pointing “UP”. These engravings differentiate the right side from the left side of the system. Figure 8 shows the numbering of the backplane’s connectors and the cassettes ordering. User documentation should be provided to explain to the cassette installer which connector to plug in the cassette. The backplane that an instrument is plugged into also effects the Master Clock synchronization scheme.

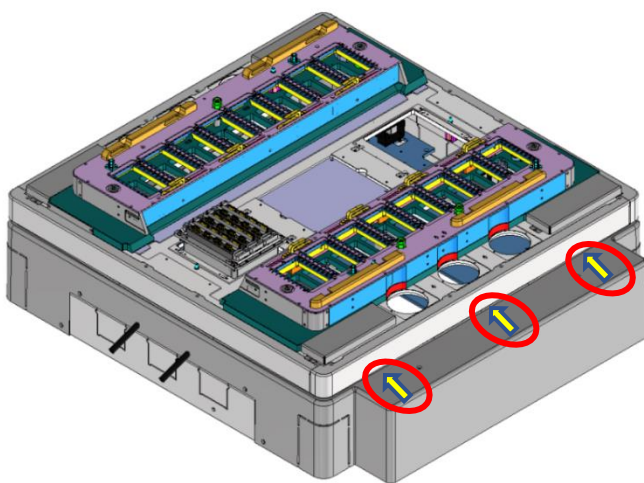


Figure 8: "Arrow Up" engravings

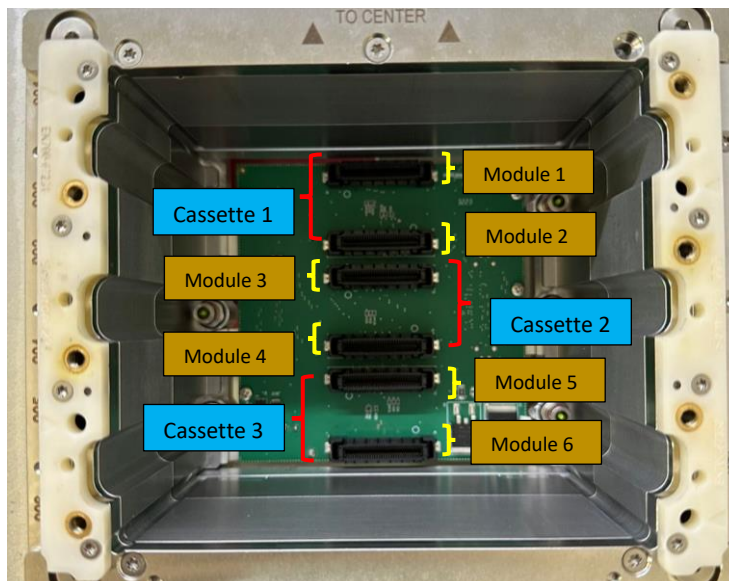


Figure 9: Backplane connectors

Blind-Mate Interface Bracket

The blind-mate bracket for the OT modules is mounted on the load-board stiffener or the probe-card stiffener. Compatible stiffener models from Advantest are listed in the table below.

	Proposed stiffener		DUT-IF			+ for Wafer Test
	Final Test (FT)	Wafer Test (WT)	CX	SX	LX	bridge
EXA-Scale interface	N2605-64120	N2605-64170 *	EK240-60116	EK240-60126	EK240-60136	E5150-60195
DUT-Duo interface	EK301-64120 + EK301-64123	EK301-64181 + EK301-64123	EK310-60110	EK310-60120	EK310-60130	EK302-60101

The Multilane 4-channel DSO OT4025 has its SMPS bracket depicted below.

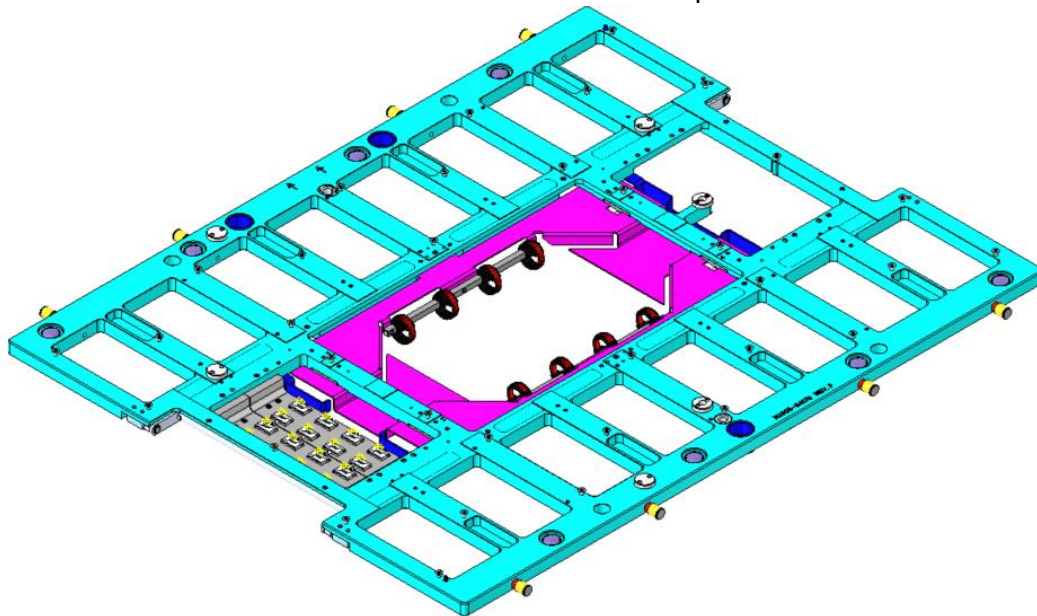


Figure 10: Two 1x2 SMPS brackets mounted on the left side of the stiffener

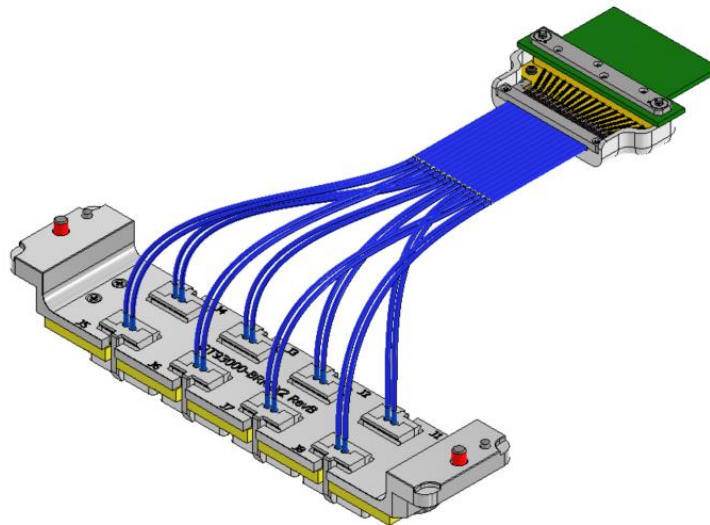


Figure 11: Probe-card SMPS cable assembly for the OT4025 DSO

Master/Slave Clock Sync Configuration on the backplanes

A master clock can either be generated by one of the installed BERT instruments or by a clock from the DUT loadboard. There can only be one clock master for synchronizing all BERTs and DSOs on each backplane. All other instruments on that backplane operate as clock slaves and will synchronize their operation to the instrument or loadboard master clock.

If the clock is coming from the DUT or 93000, then all cassette instruments will be slaved to the external master clock. In this case, the external differential clock should be cabled to the “clock-in” SMP connectors on the backplane having the slaved instruments, using two high-speed cables. Check Multilane instrument datasheets for maximum clock sync frequency. There is a special cable assembly to convey the clock from the probe card to the Multilane instruments, as shown in Figure 12.

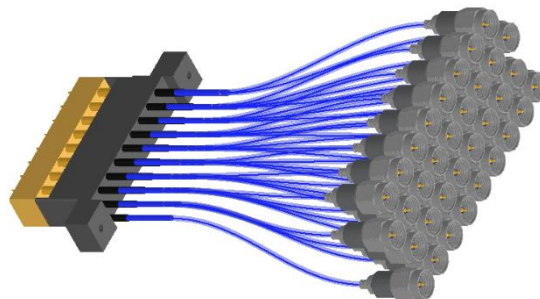


Figure 12: 34-pin cable assembly to convey differential clock signals from loadboard to ML Backplanes

Water, Power and Ethernet sources

The OT93000 cassette instruments are

- Cooled using water
- Powered from an external +12V supply
- Communicated with through ethernet

Ethernet Connections and IP Addressing

Multilane instruments are controlled by individual IP addresses. IP addresses are dynamically assigned at runtime (DHCP). The instruments can also be configured with static IP addresses. For help choosing the appropriate ethernet connections for each instrument, contact Multilane at ATE-FAE@multilaneinc.com

Appendix: Software installation when controlling OT93000 via PC

The OT93000 can be controlled via a PC by connecting the Ethernet ports to it.

PC minimum hardware requirements are as follows:

- Windows XP SP3 or greater
- Minimum 2 GB RAM
- 1 Ethernet card to establish connection with the device (2 Multilane ethernet ports)
- Pentium 4 processor 2.0 GHz or greater
- .NET Framework 4.0

PC software installation follows. To use an ML instrument under Windows XP, Windows 7 and Vista, it is important that the correct start-up sequence is followed:

- Ensure [Microsoft .NET Framework 4.0](#) is installed
- Install the OT6000 Dash Board GUI software from MultiLane's [ATE | MultiLane \(multilaneinc.com\)](#)
- Connect the power cable to the backplane

GUI Instructions: (Refer to Figure 13)

- The OT6000 GUI can automatically discover all OT6000 backplanes that are live on the network. It does that by sending a UDP broadcast message. Each OT6000 that receives the broadcast message answers back with its IP address. It is up to the user to discover the physical location of each backplane on the network. Copy the IP address displayed in the "Broadcast" field and paste it in the "IP" field, then click connect.
- Upon successful connection to the backplane, all cassettes plugged into this backplane will be listed in the right-hand pane of the GUI.
The physical location of the modules is also shown in the GUI: there are 6 slots labeled Mod 1 thru Mod 6. Mod 1 is the module closest to the DUT, while the Mod 6 is the module closest to the edge of the probe-card. In the below example, modules 3 and 4 are populated.
- The desired module should first be selected before controlling it.
In the example, module 4 is selected.

For power cycling:

- The backplane: Use the 'Power Cycle' Button.
- The module: Use the 'Rst' Button

For Firmware Upgrading:

1. Connect the Micro Port and the PC via a USB cable
2. Use the 'Enter Bootloader' Button for the backplane or the 'BL' button for the module.
3. Upload the new Firmware using the Bootloader Application.

For Image Upgrading:

Use the 'FPGA Maintenance Tool'.

For IP Address change:

Load the current ethernet configuration

Change to the desired configuration.

Save the new settings.

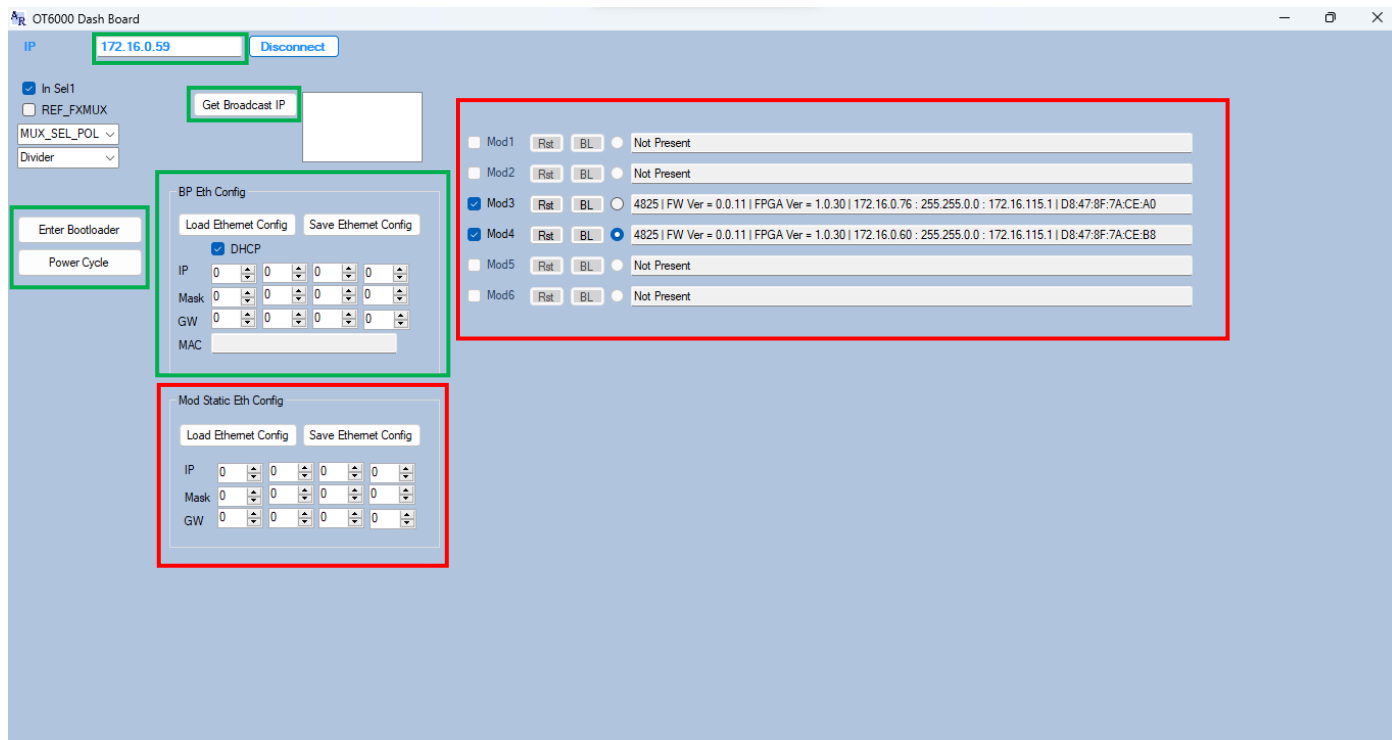


Figure 13: OT6000 Dash Board

- Backplane Side
- Instrument Side
- Mod3 Populated Module Indicator
- Rst Reset
- BL Bootloader
- Selected Module