



Digital Isolation Module

User Manual

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1. INTRODUCTION


The main feature of the digital isolation modules is to provide digital isolation and to enable a safe connection to flight hardware in a compact, reliable, and economical platform. All modules are designed to be interfaced with National Instrument's SLSC-12001 chassis. This user manual is compatible with the digital Isolation modules listed in Table 1.

Table 1. Compatible Digital Isolation Modules


Part Number	Revision	Description
200078	B	ISOLATED RS422 MODULE
200102-00	A	ISOLATED DIFFERENTIAL SLSC MODULE (RS-485)
200102-01	A	ISOLATED DIFFERENTIAL SLSC MODULE (LVDS)
200102-02	A	ISOLATED DIFFERENTIAL SLSC MODULE (mLVDS)
200102-X	A	ISOLATED DIFFERENTIAL SLSC MODULE (Custom LVDS/mLVDS)
200103	A	ISOLATED SINGLE-ENDED MODULE (LVTTTL)
200112 ¹	A	PWA ISOLATED HS LVDS DIFFERENTIAL SLSC MODULE

Note: 1- Does not support ChipScope Pro Debugging.

2. SAFETY GUIDELINES

Caution	
	Using the Digital Isolation Module in a manner not described within this document may impair the protection the Digital Isolation Module provides. Module misuse can result in a hazard. If any damage occurs to the module, please contact B&A Engineering Inc. for support.

3. UNPACKING THE KIT

Caution	
	To prevent electrostatic discharge (ESD) from damaging the module, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis. Always follow ESD procedures for handling. In case of damage or operational issues please contact B&A support team at: support@baengineering.com

Follow the instructions below:

- 1) Wear an Anti-Static Wrist Strap/ Wristband with touching the antistatic package to a metal part of the computer chassis.
- 2) Remove the device from the package (as shown in Figure 1) and inspect the device for loose components or any other signs of damage. Do not install the module if the module appears to be damaged.

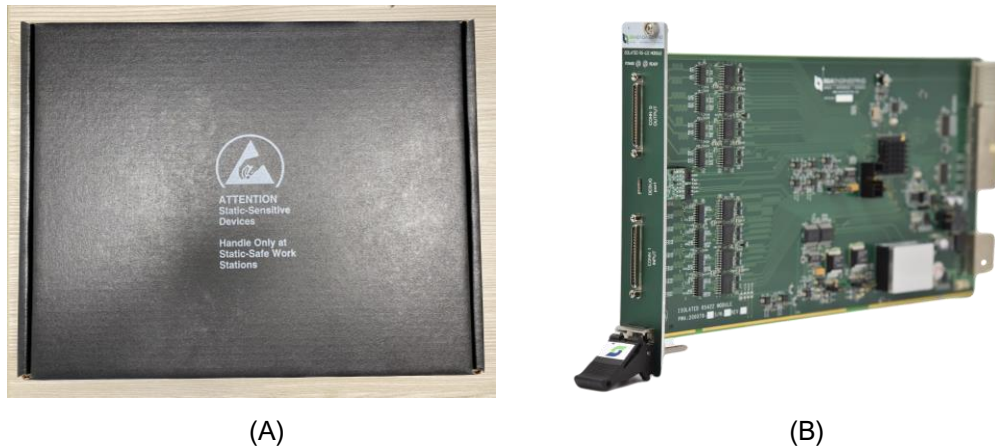


Figure 1. (A) Black ESD Safe Box, (B) SLSC Module

- 3) Verify that the product information printed on the exterior box label matches with the information on the product. Sample shown in Figure 2 and 3. Boxes shown on module (Figure 2) should have serial number and revision. If product has dash number, the box after dash should also contain information.

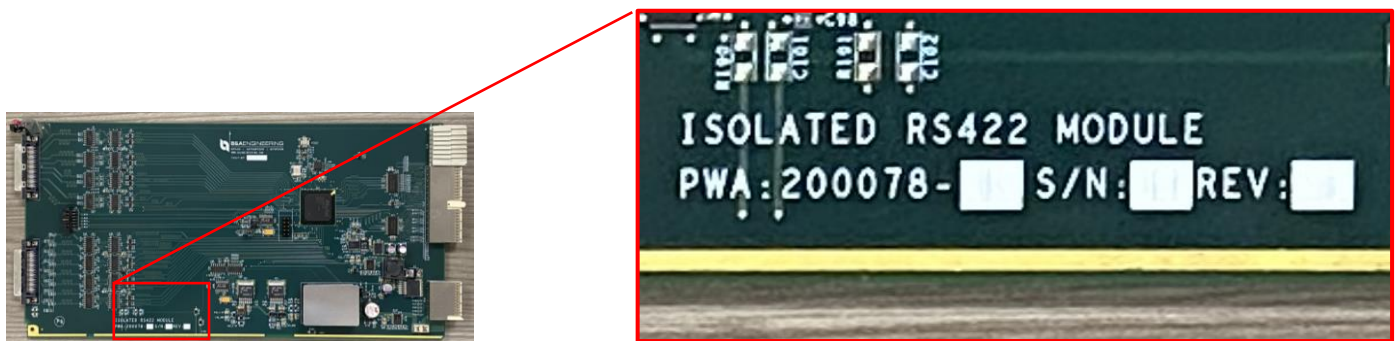


Figure 2. Location of Product Information on Module



Figure 3. Module Information Label affixed on side of the ESD Safe Black Box


4. PREPARING THE ENVIRONMENT

The modules are designed based on National Instrument SLSC-12001 chassis operating environment requirements. The operating environment complies with the chassis environment requirements. Please refer to National Instrument website for SLSC-12001 requirements. The module is for indoor use only.

Before using the B&A Digital Isolation Module, you must install the following application software and SLSC-12001 drivers on the host computer.

- LabVIEW 2014 SP1 or later
- NI-SLSC 12001 driver, downloadable from ni.com.
- VI Package Manager
- XILINX ChipScope Pro Analyzer

5. INSTALLING THE DIGITAL ISOLATION MODULE

Caution	<ul style="list-style-type: none">• To prevent damage to the module caused by ESD or contamination, always follow ESD procedures for handling.• The SLSC-12001 chassis and the B&A Digital Isolation Module do not support hot plug-in. The entire chassis must be powered down when a module is installed.
	

Follow the instructions below:

- 1) Wear an Anti-Static Wrist Strap/ Wristband with touching the antistatic package to a metal part of the computer chassis.
- 2) The NI SLSC-12001 Chassis is powered by an external AC-DC power supply (AC to 24VDC). Ensure that the chassis is powered off; The POWER LED should be off as shown in Figure 4. (When on, light is green)



Figure 4. Power Light of NI SLSC-12001 Chassis

- 3) Inspect the connector slot of interest on the chassis backplane for any bent pins or damage prior to installation as shown in Figure 5. Do not install the module if the backplane connector is damaged or has bent pins.



Figure 5. Backplane Connector

- 4) The module can be installed into any of the 12 NI SLSC-12001 Chassis slots. Ensure that the ejector handle is in the unlatched (downward) position as shown in Figure 6. For this example, slot 6 is used.

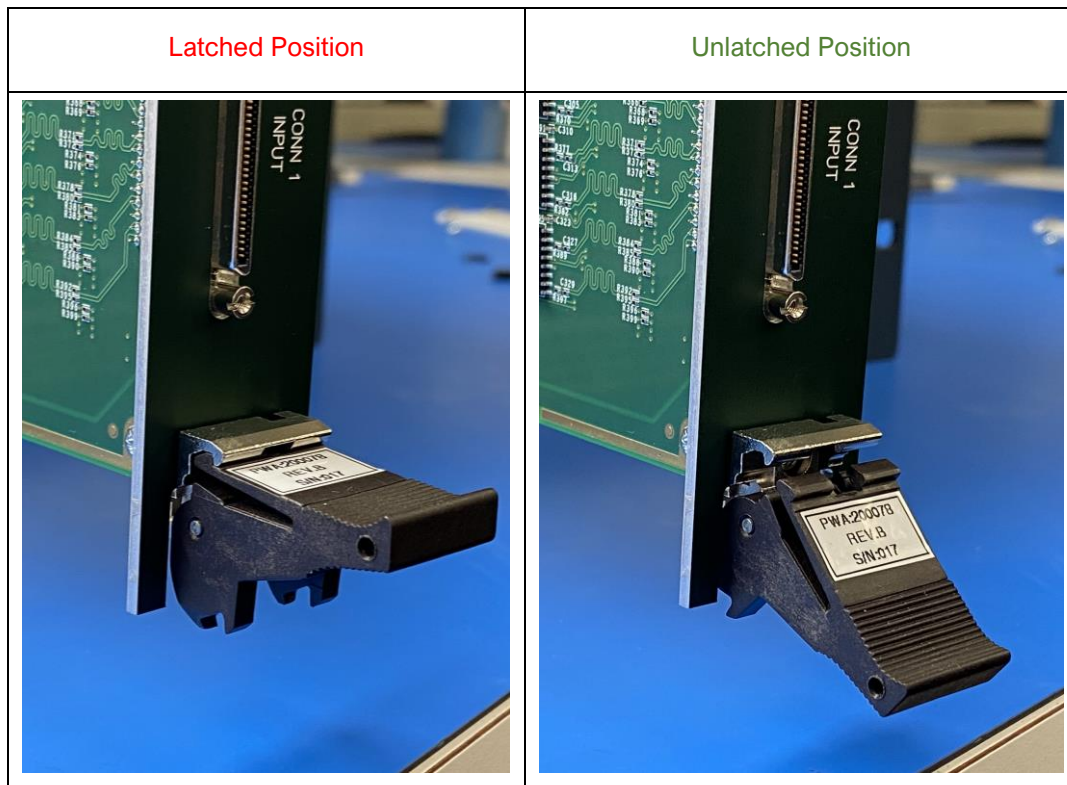


Figure 6. Ejector Handle Positions

- 5) Slide in the module inside the red SLSC chassis slots located on the top and bottom as shown in Figure 7.

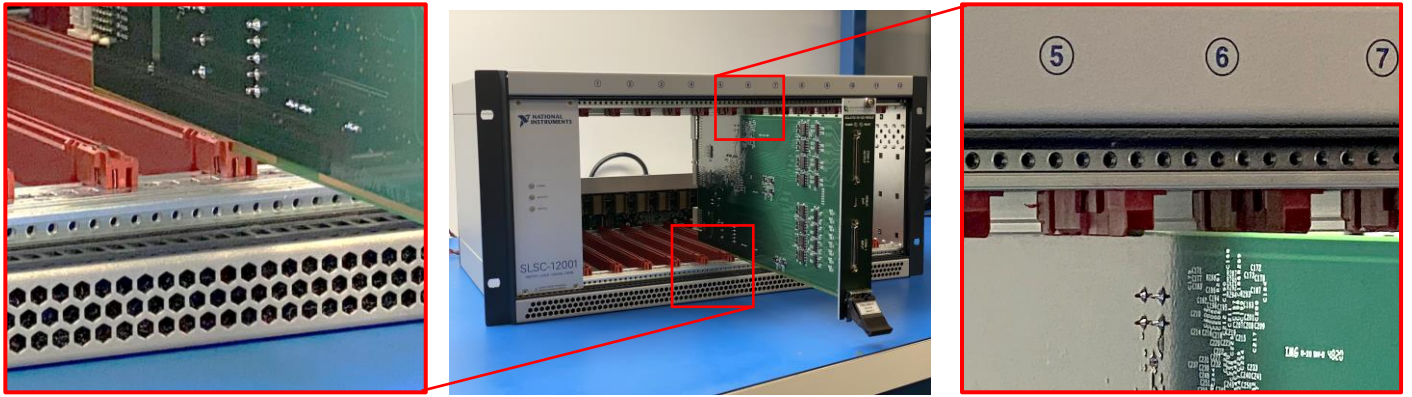


Figure 7. Insertion of Module in Chassis

- 6) Slide the module in and ensure that it is guided within the top and bottom red slot of the chassis. Push in the module up to a point where resistance is felt. Push up the injector/ejector handle and the module connector will mate with the chassis backplane connector as shown in Figure 8.

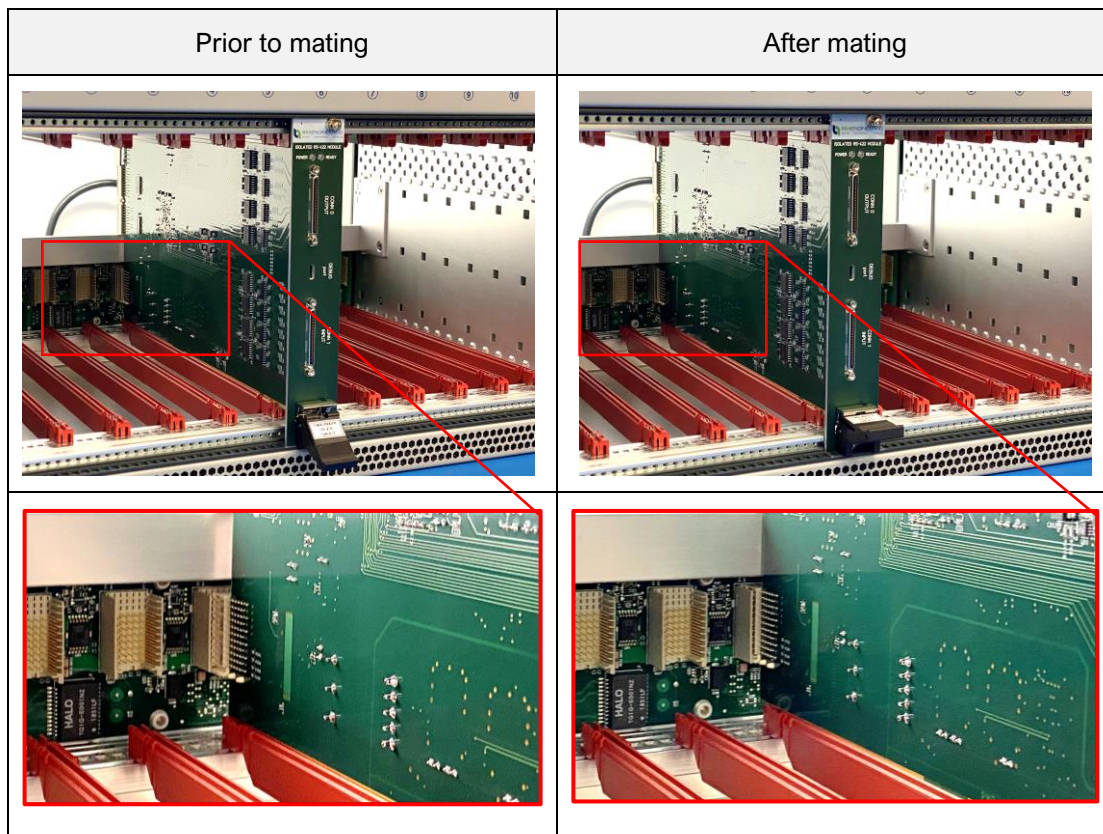


Figure 8. Mating of Module with Chassis Backplane Connector

- 7) Tighten screw on top of the front panel as shown in Figure 9. Tightening the top mounting screw increases stability and connects the front panel to the chassis electrically, leading to improved signal quality and electromagnetic performance.

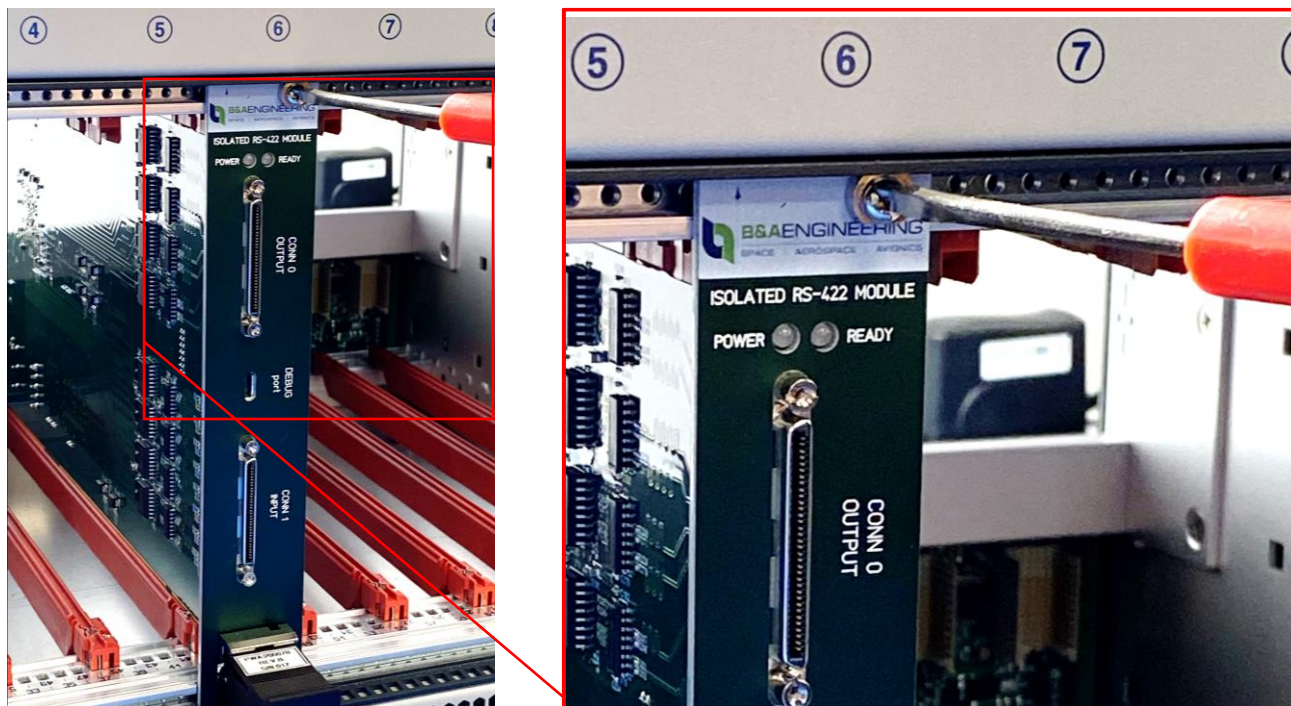


Figure 9. Tightening Module front panel top mounting screw

6. CONNECTING MODULE TO HOST

- 1) Connect the SLSC-12001 chassis and the host computer with a standard network cable directly (Figure 10) or connect them both to the same network.
- 2) Power on the chassis and host computer. The three front panel LEDs of the SLSC-12001 chassis (POWER, ACTIVITY, and STATUS) should all be **GREEN**.

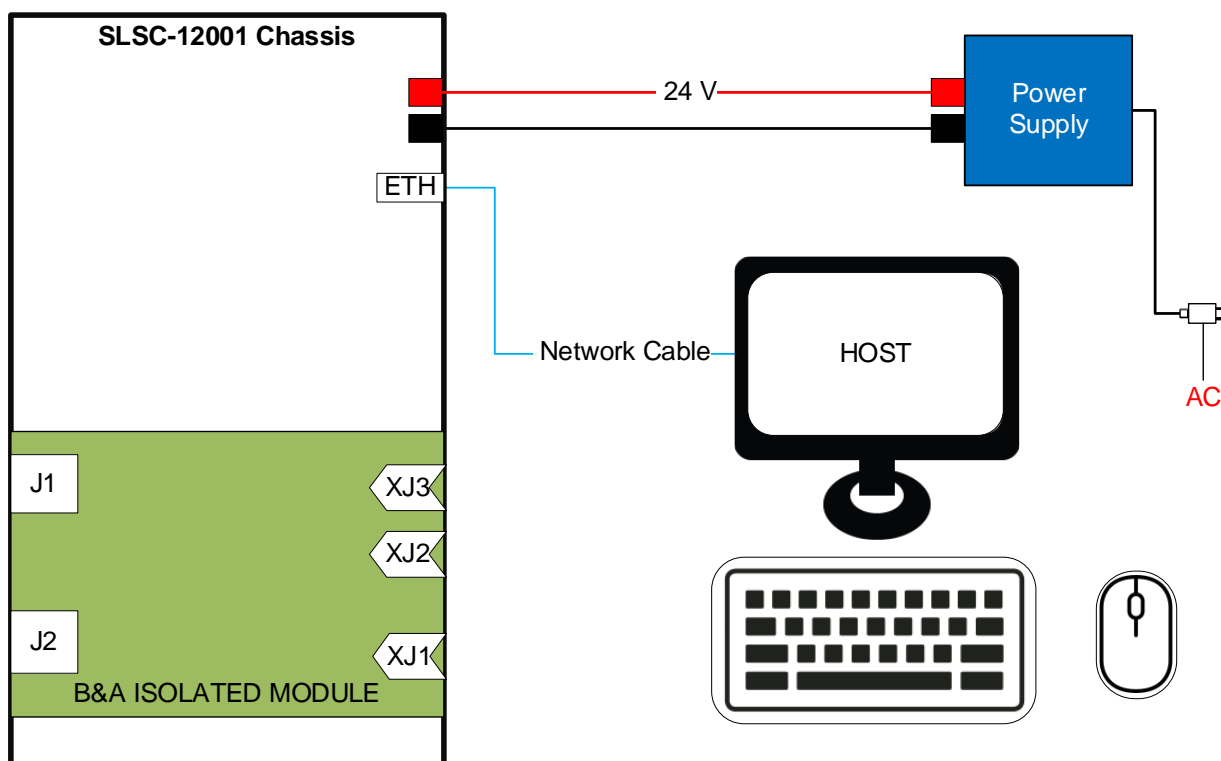


Figure 10. Module to Host Connection

7. VERIFYING HARDWARE INSTALLATION FOR HOST TARGETS

Recognition Verification can be done by using built in SLSC Configuration software.

To verify the module status in the SLSC chassis, follow the instructions below:

- 1) Launch “SLSC Configuration” at the specified location below:

PC»Program Files(x86) »National Instruments»LabVIEW 20xx»Examples»SLSC»Configuration.vi.

- 2) Run configuration.vi
- 3) Under the Device Name will show SLSC-12001-xxxxxxx » SLSC-12001-xxxxxxx-Modx (Mod will show the slot the module inserted). For example, SLSC-12001-031E7C4F»SLSC 12001-031E7C4F-Mod6 (the module is in slot 6 of SLSC 12001 chassis).
- 4) If the device does not appear, press<Refresh> to refresh the view.
- 5) A sample of the configuration information is presented in Figure 11.

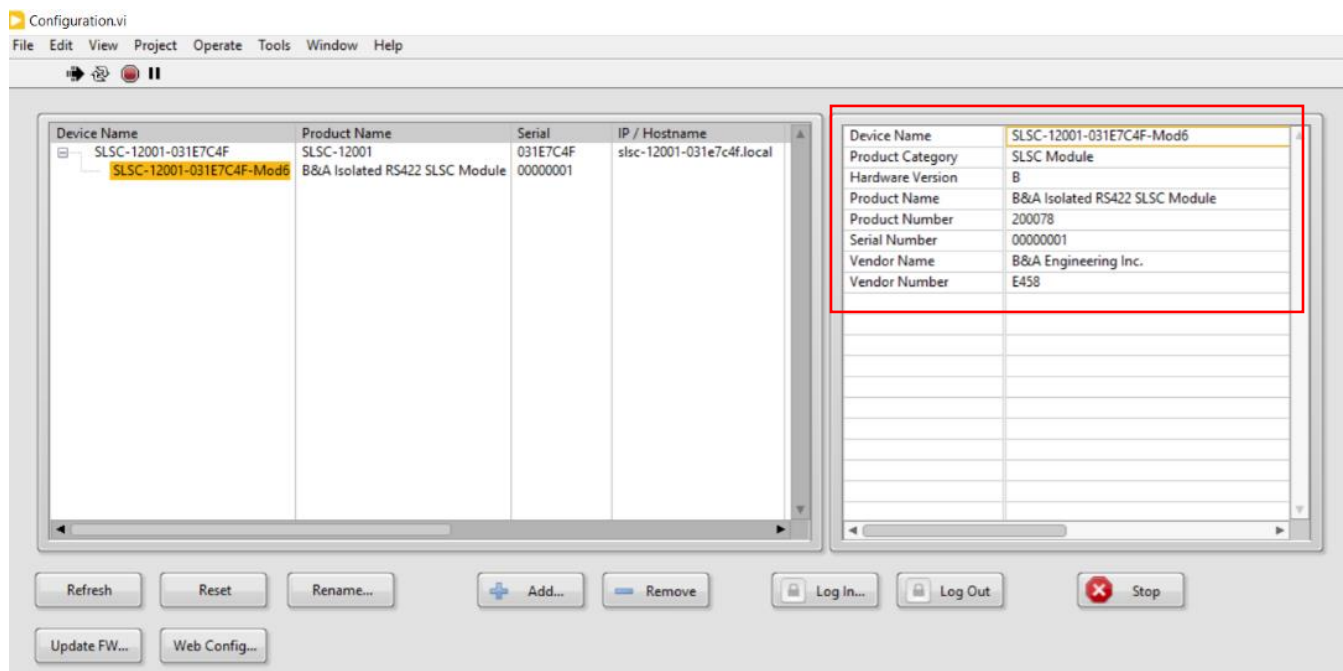



Figure 11. Configuration Information Sample

8. OPTIONAL REAR TRANSITION INTERFACE (RTI)

Caution	
	<ul style="list-style-type: none">• To prevent damage to the RTI caused by ESD or contamination, always follow ESD procedures for handling. Do not touch the XP2 connector pins.• The SLSC-12001 chassis must be powered down. Do not install SET-RTI (Rear Transition Interface) into the rear side of the SLSC-Chassis if any visible damage is observed on the RTI.

The Rear Transition Interface (RTI) can be used to communicate with the SLSC Digital Isolation Module. As an example, an RTI-12302 is installed on the back of the SLSC-12001 chassis. (As shown in Figure 12)

- The rear of the RTI-12302 mates to the two rear XJ2 and XJ3 connectors of the module.
- Two VHDCI connectors are located on the front of the RTI-12302 which can be used to connect to other communication devices such as NI 7821R module. A VHDCI-to-VHDCI COTS cable or custom cable can be used to establish the connection. See example setup shown in Figure 13.

Follow instructions below:

- 1) Power off the chassis. The POWER LED on the chassis should be off. If it is not off, do not proceed until the POWER LED is off. RTI Installation is recommended to be performed prior to the installation of the Digital Isolation Module.
- 2) Loosen the upper rear panel screws.
- 3) Position the RTI to the desired slot and secure four screws, two on upper rear panel, two on the downward panel, but do not tighten them completely.
- 4) Insert the corresponding module in the same slot, and push the module to the RTI, until the module and RTI fully mate.
- 5) Ensure the RTI and module mate properly, once aligned and mating is done, tighten the screws. (Figure 14).

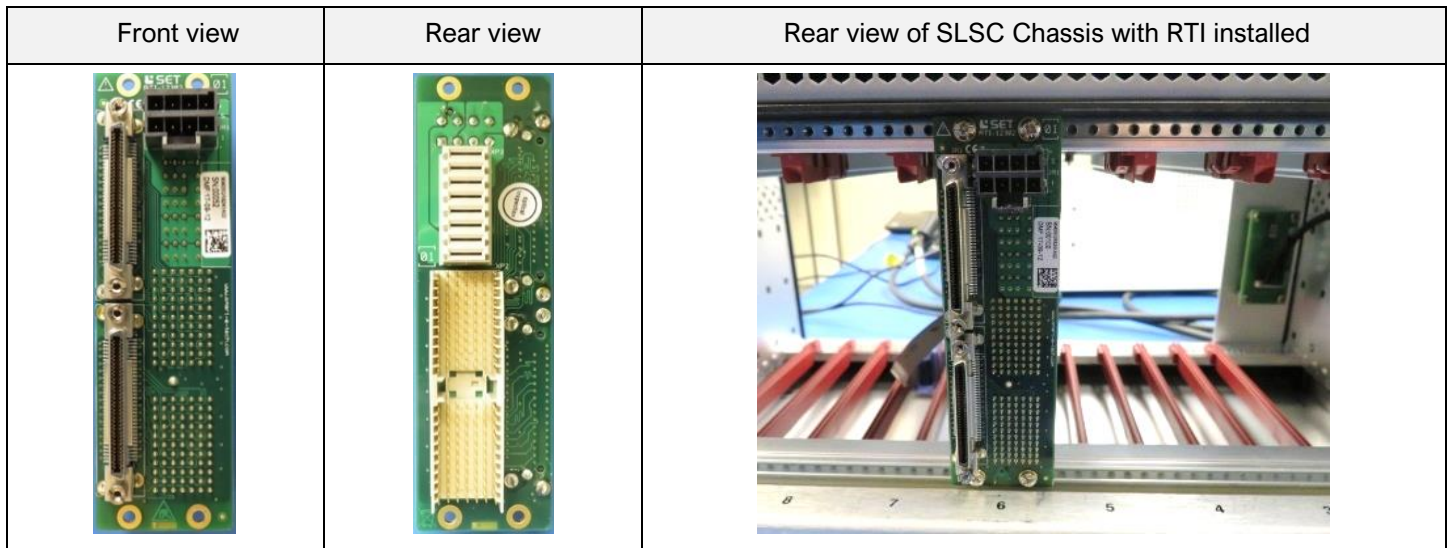


Figure 12. RTI-12302 Installed on the SLSC Chassis

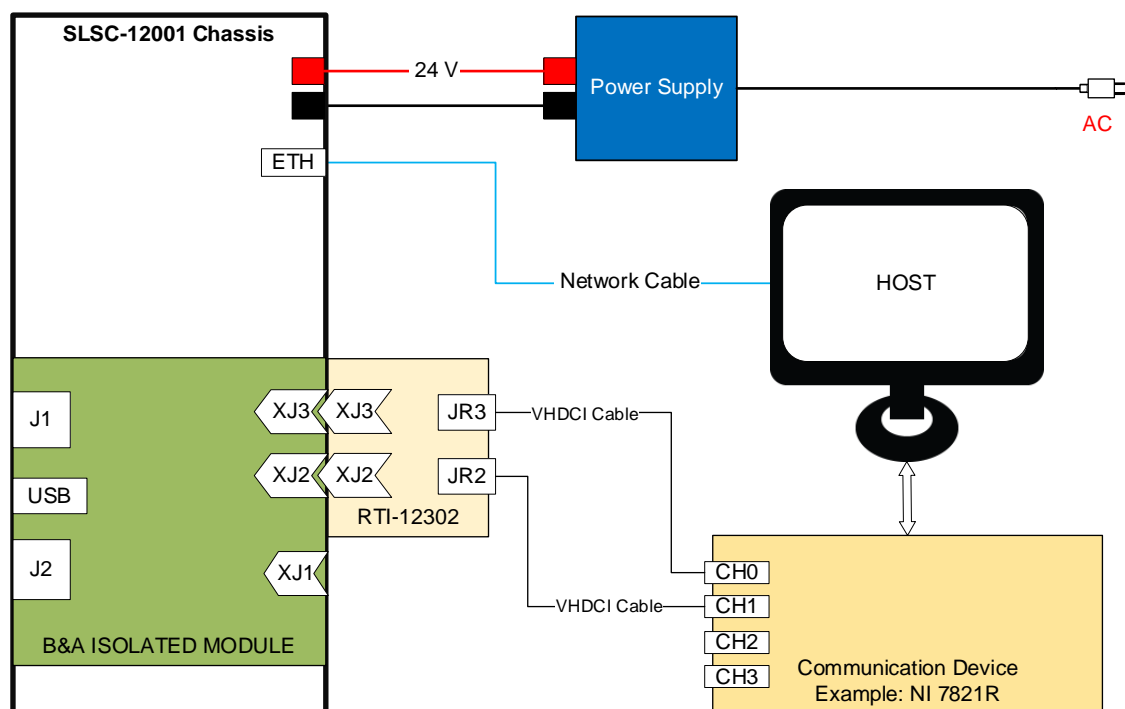


Figure 13. Sample Setup utilizing RTI

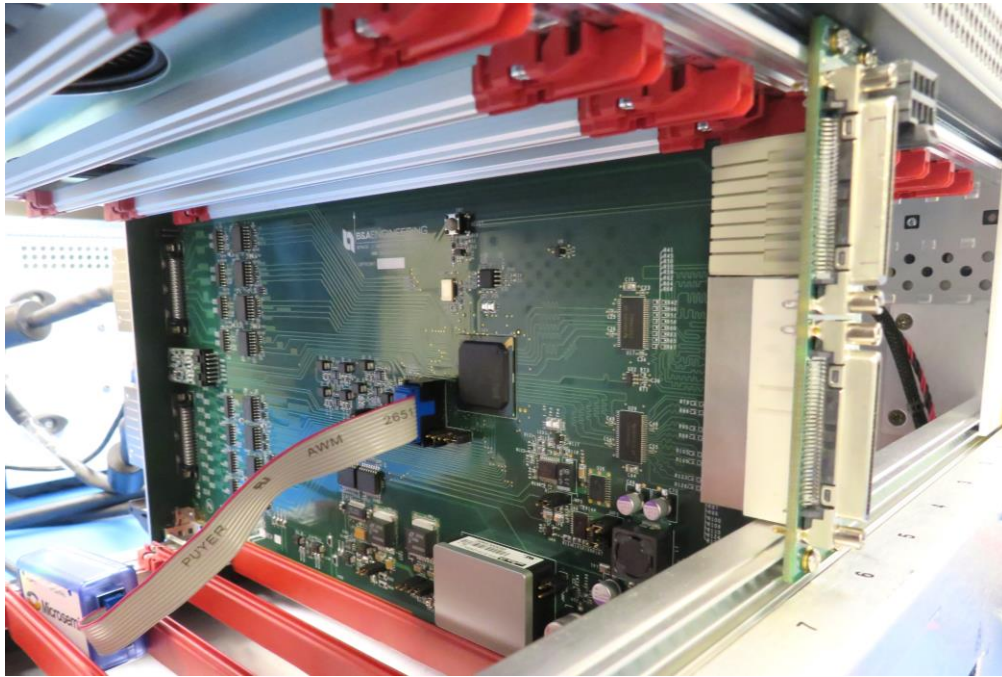


Figure 14. Chassis view with RTI and Module installed

9. DEBUG USING XILINX CHIPSCOPE PRO ANALYZER

Xilinx ChipScope Pro Analyzer can be used to verify signals transmitted from host. The following prerequisites are required to use this feature of the Module:

- A communication device/Module installed on host to transmit signals. The device must be compatible with ChipScope Pro hardware. Refer to ChipScope Pro user manual to check compatibility or contact support@baengineering.com.
- The communication is established via RTI therefore, RTI must be installed in accordance with Section 7.
- LabView code or software to control communication device. Once triggered, the ChipScope Pro displays the signal.
- NI VIPM (VI Package Manager) installed on Host

SETUP EXAMPLE

A setup example is for utilizing the ChipScope Pro Analyzer is shown in Figure 15.

- The host controls the communication device/module (NI 7821R) which transmits the signal. The RTI is connected to the 7821R module on the host via two VHDCI cables.
- Micro-USB to USB cable connects the Debug Port 1 on B&A Digital Isolation Module to USB port on host.

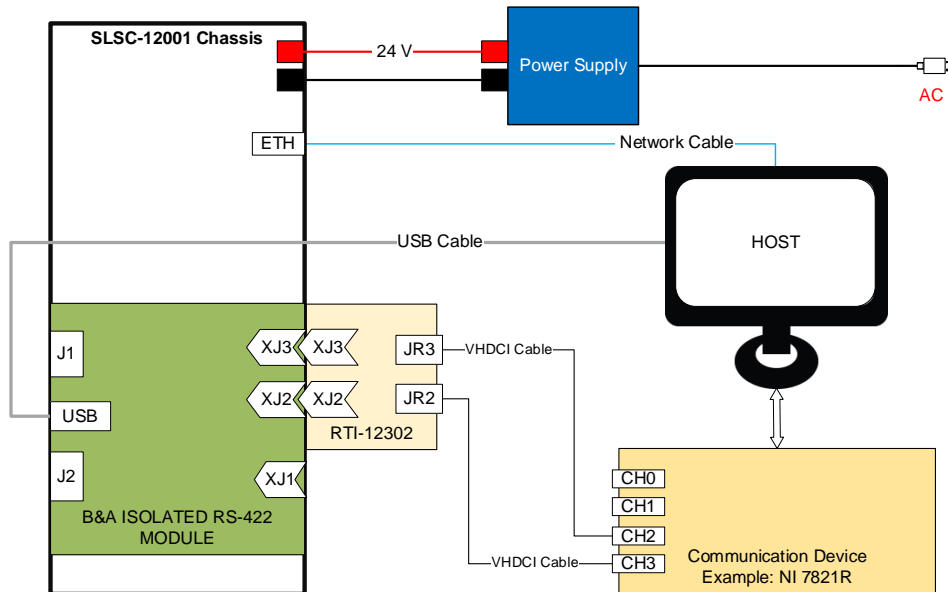


Figure 15. Sample Configuration for using the ChipScope Pro Analyzer

A sample waveform displayed on the ChipScope Pro Analyzer Window is shown in Figure 16.

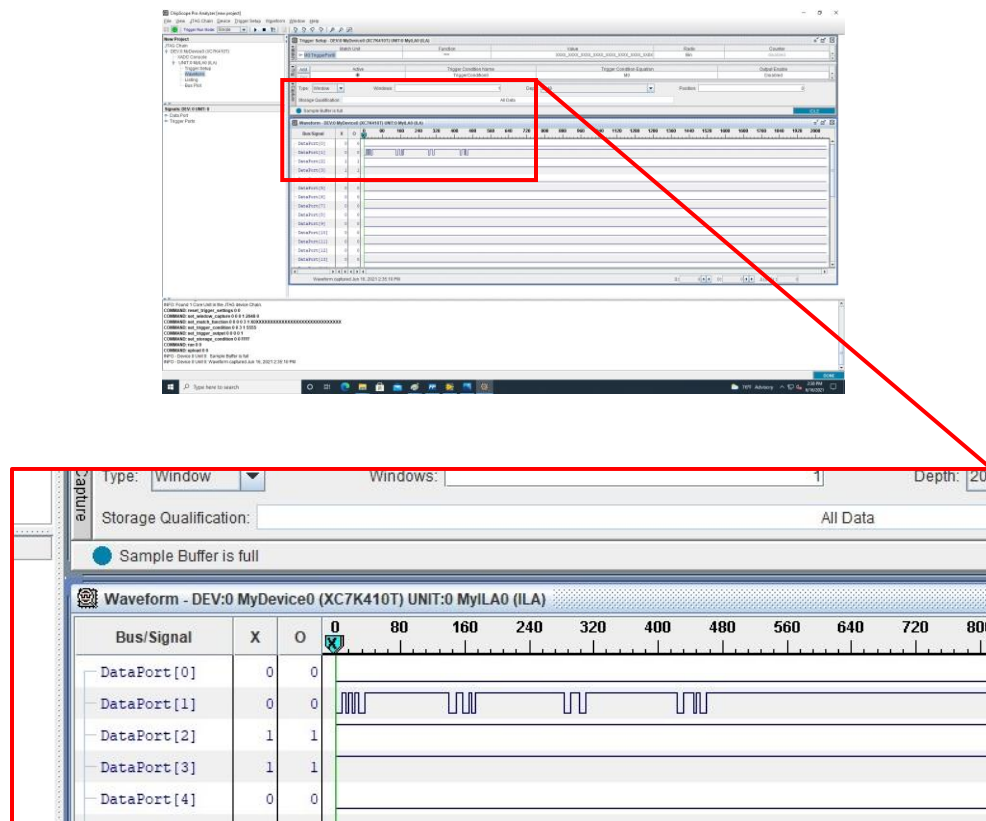


Figure 16. Wave Form of received signal

The Xilinx ChipScope Pro Analyzer debugging process is dependent on available hardware, configuration, and software.

Contact B&A Engineering for guidance and support.

10. SUPPORT

For any questions or technical support, please contact B&A Engineering support team at:

support@baengineering.com

For module pinouts and specifications please visit our SLSC module product page at:

<https://baengineering.com/cots/test-boards/slsc-modules/>