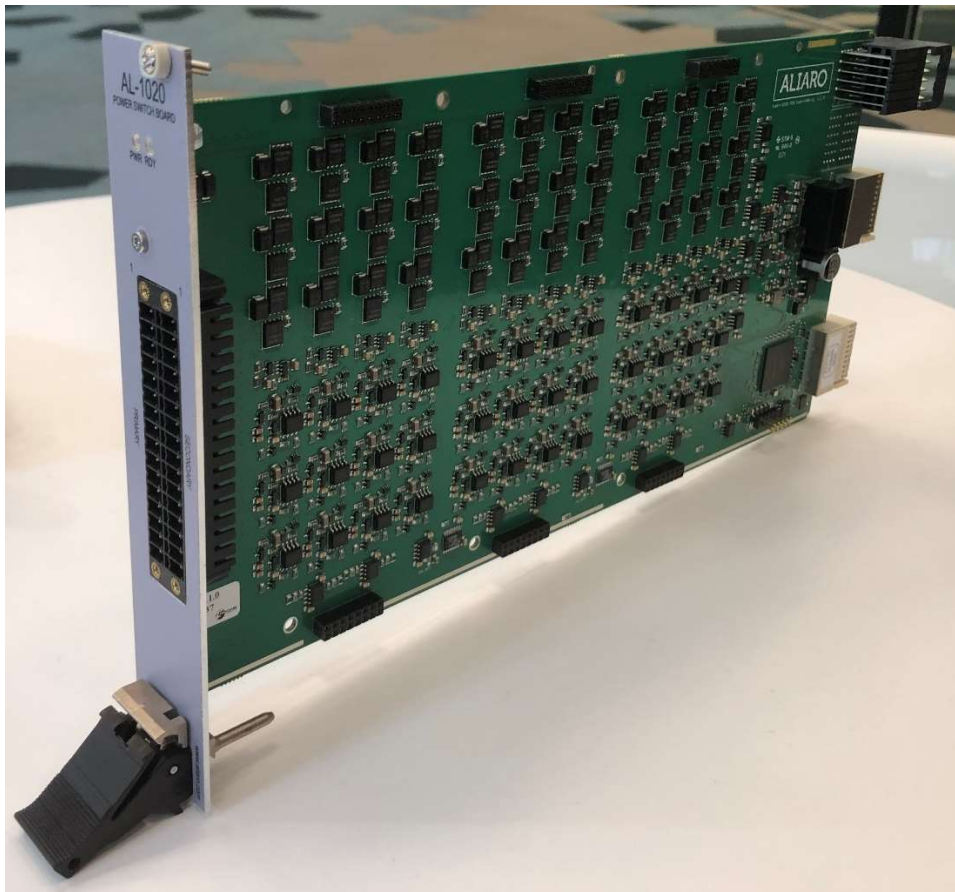


# 12 Channels Power Switch Board

## AL-1020 for SLSC

This document describes the AL-1020 board for National Instruments SLSC-12001 chassis.



## Definitions

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This document describes the performance of the described module under specific operating conditions which are covered by the module warranty.

These conditions can be classified into two main sections:

- *Typical* specifications describe the performance met by most modules.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing for this specific module.

Specifications are *Typical* unless otherwise noted.

ALIARO reserve the right to vary from the description given in this data sheet and shall not be liable for any errors.

## Conditions

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Specifications are valid under the following conditions unless otherwise noted.

The AL-1020 module is mounted in a standard NI SLSC chassis. This chassis should conform to the NI recommended cooling requirements and use a standard power supply that meets the specifications provided in the chassis user guide. All aspects of the SLSC chassis should follow NI guidelines.



**Please Note** - These specifications only apply to the product as provided by ALIARO. Modifications to the module may invalidate these.



**Caution** - Observe all instructions, warnings and cautions in the board documentation. Using the module in a manner not specified by this document can damage the module and compromise the built-in safety protection. Return damaged models to ALIARO for repair.

## Overview

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The AL-1020 (Power Switch Board) board provides power switching capability (to for example, test shorts in vehicles) and has fault insertion on all channels that allows users to switch output between multiple signals.

The AL-1020 board is designed to fit National Instruments (NI) Switch Load Signal Conditioning (SLSC) system together with corresponding computer interface boards and is delivered with LabVIEW driver and a Custom Device for VeriStand.

The main purpose of the board is to be used for test and validation of Devices Under Test (DUTs), testing for both software and hardware failures. This is usually done by incorporating the board as part of Hardware-In-the-Loop (HIL) test system.

For easy board/system configuration, it is recommended to use the board alongside xMove Configurator.

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## Description

Designed for applications where you need to control the power supply to a Device Under Test (DUT) as part of a test procedure.

## Features

- ✓ 60V, 10A per channel
- ✓ 12 independent and isolated channels in three banks
- ✓ Two power source buses per bank with switches to each channel
- ✓ Power On/Off for each channel
- ✓ Programmable level threshold on each channel
- ✓ Parallel connection possibility for high current signals
- ✓ LabVIEW driver included

## Detailed description

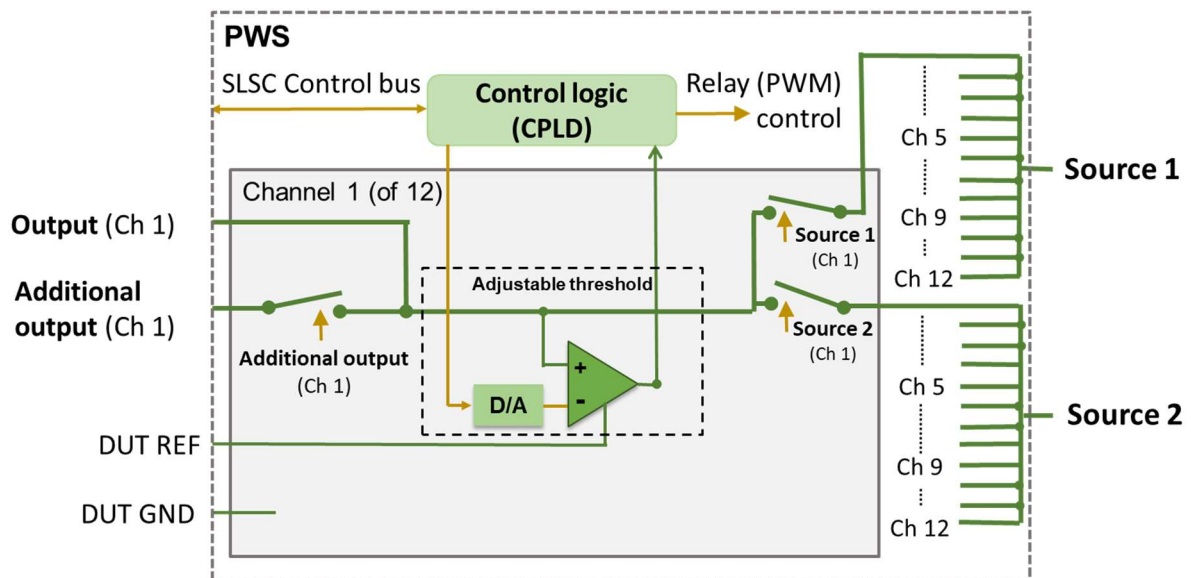


Figure 1: AL-1020 Block Diagram

The AL-1020 board provides power switching of up to 40A / 60V

### Functions:

- Twelve channels power switching of two power sources
- It is possible to configure channels in parallel (2/4 in parallel) to increase the current rating (to 20A/40A)
- Status monitoring with adjustable threshold
- Each channel has an optional additional output that can be switched on/off when required

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## Installation

### Electromagnetic Compatibility (EMC)

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This product is intended for use in industrial locations. Harmful interference may occur in certain installations, such as if the product is used in residential or commercial areas. This may also occur when the product is connected to a peripheral device or test object that outputs electromagnetic noise or other interference.

To minimize interference with radio and television reception and prevent unacceptable performance degradation, install, and use this product in strict accordance with the instructions of the product documentation.

Furthermore, any modifications to the product not expressly approved by ALIARO may void your warranty and your authority to operate it under your local regulatory rules.



**Caution** - To ensure the specified EMC performance, operate this product only with Shielded cables and accessories.

### Unpacking the module

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The AL-1020 board ships in an antistatic box to prevent Electrostatic Discharge (ESD). ESD can damage the device components. Users should be familiar with the steps to prevent ESD damage when handling the device.



**Warning** - Never touch the exposed pins of the connectors.

**To prevent ESD damage when handling the device, please take the following precautions:**

- Ground yourself before handling. Use a grounding strap or by touching a grounded object.
- Touch the antistatic package to a grounded metal part before removing the device from the package. A good example would be the metal part of your computer chassis.

Remove the device from the package and inspect it for damages such as loose components. Contact ALIARO if the device appears damaged in any way. Do not use a damaged device with any other components. Store the device in antistatic protection when not in use.

### What You Need to Get Started

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To set up and use the module you need the following items:

Hardware

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- SLSC-12001 chassis
- SLSC module(s)
- Power cable
- Power input connector
- Grounding wire
- Grounding lug

## Tools

- Screwdriver as needed for your application
- Wire stripper

## Documentation

- SLSC-12001 Chassis Getting Started Guide and Specifications



**Warning** - Do not touch the contacts or remove the I/O boards or cables while the system is energized. The SLSC chassis and the AL-1020 do not support hot plug-in. The entire chassis must be powered off when a module is inserted or removed.

## Installing the AL-1020

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**Warning** - Do not touch the contacts or remove the I/O boards or cables while the system is energized.

1. Power off the main DC power source or disconnect the power source from the chassis before installing any modules or RTIs.
2. Ensure that the chassis is powered off. The POWER LED should be off. If the POWER LED is not off, do not proceed until it is off.



**Please Note** - The SLSC chassis and the AL-1020 do not support hot plug-in. The entire chassis must be powered off when a module is inserted or removed.

3. Loosen the screws on the upper rear panel of the chassis.
4. Position the RTI backplane at the desired slot and insert the securing screws, but do not fully tighten them.
5. Insert an AL-1020 module into the same slot as its corresponding RTI while firmly holding the RTI in place until the RTI is fully connected to the module.
6. Repeat steps 4 and 5 for all required RTIs.
7. Fully tighten the screws for all RTIs and the upper rear panel of the chassis. Wait until all RTIs and modules are installed before fully tightening the screws. This ensures the proper alignment for future connections between modules and RTIs.

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8. Fully tighten the two module mounting screws on each newly installed module.
9. Power on the SLSC Chassis

## Software Installation - SLSC LabVIEW Drivers

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When the module is used with LabVIEW or TestStand, the ALIARO drivers need to be installed. Contact ALIARO support for the most recent version of our drivers: [support@ALIARO.com](mailto:support@ALIARO.com)

## Software Installation - ALIARO Custom Devices

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When the AL-1020 is used with VeriStand, Custom Devices needs to be installed. Contact ALIARO support for the most recent version of our Custom Devices: [support@ALIARO.com](mailto:support@ALIARO.com)

## Software Installation - ALIARO xMove Configurator (Optional)

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xMove Configurator is a tool for defining and editing VeriStand System definition files for HIL (Hardware-in-the-loop) test systems. It is specifically aimed at configuring ALIARO SLSC Multi-Purpose boards and NI modules.

The configurator uses a Predefined System Configuration file containing the system mapping and a VeriStand System Definition file defining all hardware. It empowers users to configure and reconfigure User Channels, Aliases and System Mappings for HIL systems.

For more information on xMove Configurator, check the xMove Configurator webpage on NI.com.

## System Check

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Finnish the installation by conducting a system check, see the chapter *Operation*.

# Operation

## Safety Guidelines

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Operate the ALIARO AL-1032 only as described in this document.



**Warning** - Do not operate the device in a manner not specified in this document. Misuse of the device can result in a hazard. You can compromise the safety protection built into the device if the device is damaged in any way. If the device is damaged, contact ALIARO for repairs or replacement.



**Warning** - Do not substitute parts or modify the device except as described in this document. Use the device only with the chassis, modules, accessories, and cables specified in the product specification.



**Warning** - Do not operate the device in an explosive atmosphere or where there may be flammable gases or fumes. If you must operate the device in such an environment, it must be in a suitably rated enclosure.

## System check using LabVIEW

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This chapter requires the LabVIEW Development Environment and installation of the ALIARO LabVIEW drivers.

To identify that the cards are correctly inserted and work properly with the right firmware, LabVIEW provides basic VI scripts to check SLSC cards mounted in chassis:

1. Open LabVIEW and select “*Help*” in the top menu bar and press “*Find Examples...*”. This opens a new window listing pre-made LabVIEW examples.
2. Switch to the “*Search*” tab and enter keyword “*SLSC*” and search.
3. In the new filtered table (to the right) find and select VI called “*Configuration.vi*”. This VI can locate all cards that are online in a SLSC chassis.
4. To find the newly inserted cards look for the SLSC chassis IP-address (in the table to the right).
5. Count the card(s) in the table and verify that all installed cards are being located by the program (this can be 1 to 11 cards per SLSC chassis).

## Maintenance

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Power off all connected device before attempting any maintenance. After maintenance is complete, ensure that the device is fully dry and installed correctly, before powering the system back on.



**Warning** - Many components within the chassis are susceptible to static discharge damage. Service the chassis only in a static-free environment. Observe standard handling precautions for static-sensitive devices while servicing the chassis. Always wear a grounded wrist strap or equivalent while servicing the chassis.

Clean dust from the chassis exterior and interior as needed, based on the operating environment. Periodic cleaning increase’s reliability.

Use a dry, low-velocity stream of air to clean the interior of the chassis. Use a soft-bristle brush for cleaning around components

## Calibration

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Recommended warm-up time	30 min
Calibration interval	Not required, recommended on system level

Contact ALIARO to schedule calibration services. Additionally, you may be entitled to calibration if you have a service agreement.

ALIARO reserve the right to vary from the description given in this data sheet and shall not be liable for any errors.



If you have purchased a calibration system from ALIARO, we recommend using the system with your complete ALIARO test system or device, after the specified interval.

## Specification

### Environmental Characteristics

Temperature and Humidity	
Operating temperature	0 °C to 40 °C
Storage temperature range	-40 °C to 85 °C
Operating relative humidity range	10% to 90%, noncondensing
Storage relative humidity range	5% to 95%, noncondensing

### Physical characteristics

Category	Condition	Value
Module Dimensions	Excluding front handle	144.32mm x 30.48mm x 281 mm (H x W x D)
Front Panel Connector		1 x female Weidmuller 32 high density

### General specification

Category	Condition	Value
No of channels		12
No of banks		3
Power supply		24VDC, +/-5%
Max. Operating Voltage	Any pin	+ 60V
Min. Operating Voltage	Any pin	- 60V

## Safety Guidelines



**Caution** - Ensure that hazardous voltage wiring is performed only by qualified personnel adhering to local electrical standards.



**Caution** - Do not mix hazardous voltage circuits and human-accessible circuits on the same module



**Caution** - When device terminals are hazardous (voltage is LIVE), you must ensure that devices and circuits connected to the device are properly insulated from human contact.



**Caution** - All wiring must be insulated for the highest voltage used.

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## Product Certifications and Declarations

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Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information.

To obtain product certifications and the DoC for ALIARO products, please contact our support team at [support@ALIARO.com](mailto:support@ALIARO.com)

## CE Compliance

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This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

## Electromagnetic Compatibility Standards

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This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 55011-2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement CISPR 11:2009
- EN 55032:2012 Electromagnetic compatibility of multimedia equipment - Emission requirements CISPR 32:2012
- EN 61326-1-2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements IEC 61326-1:2012

## Environmental Management

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ALIARO is committed to designing and manufacturing products in an environmentally responsible manner. ALIARO recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to ALIARO customers. For additional environmental information, refer to the Minimize Our Environmental Impact web page at [ALIARO.com/environment](http://ALIARO.com/environment).

This page contains the environmental regulations and directives with which ALIARO complies, as well as other environmental information not included in this document.

## Waste Electrical and Electronic Equipment (WEEE)

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EU Customers At the end of the product life cycle, all ALIARO products must be disposed of according to local laws and regulations.

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For more information about how to recycle ALIARO products in your region, visit [ALIARO.com/environment/weee](https://www.aliaro.com/environment/weee)