SMH Technologies®

FLASHRUNNER® X
LAN 2.0 NEXT GENERATION

High-Performance, Compact, Standalone In-System Programmer

User's Manual

Revision 1.1 — Nov 2025

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UNIVERSAL PRODUCTION IN-SYSTEM PROGRAMMING

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SMH Technologies S.r.l.

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Our policy at SMH Technologies is to comply with all applicable worldwide safety and EMC/EMI regulations. Our products are certified to comply with the European New Approach Directives and the CE mark is applied on all our products. This product as shipped from the factory has been verified to meet with requirements FCC as a CLASS A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate prevention measures.
Attaching additional wiring to this product or modifying the product operation from the factory default as shipped may affect its performance and cause interference with other apparatus in the immediate vicinity. If such interference is detected, suitable mitigating measures should be taken.

Note: *updated version of FlashRunner LAN 2.0 NXG Software is available on SMH Technologies website (www.smh-tech.com).*
Please check it out before continuing reading this documentation.

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Note: *Keep FlashRunner LAN 2.0 NXG always in a well-ventilated area in order to prevent product overheating, which could affect product performances and, if maintained for long time, it could damage product hardware components.*

FlashRunner LAN 2.0 NXG is a low-voltage device. However, when integrating it inside an automatic test equipment or when interfacing it with other systems, take all precautions in order to avoid electrical shocks due to, for example, different ground references.
Make all connections to the target system before applying power to the instrument.
To protect FlashRunner LAN 2.0 NXG against electrostatic discharge (ESD), always connect yourself to ground (e.g. via wrist straps) when handling the instrument. Always store FlashRunner LAN 2.0 NXG inside an antistatic bag when not in use.

Disclaimer: *when integrating FlashRunner LAN 2.0 NXG please pay attention to place it in a well-ventilated area to avoid overheating related damages. FlashRunner LAN 2.0 NXG has been designed to reach 90 °C (194 °F) in normal operating conditions over its ends.*

FlashRunner LAN 2.0 NXG has been designed to be immune to electromagnetic interference. FlashRunner LAN 2.0 NXG functionalities include operating with external target devices *(e.g. serial memories, microprocessors…).* To avoid any issue during the interaction with target devices and to guarantee task reliability, FlashRunner LAN 2.0 NXG is able to correctly detect **critical fault conditions** and take suitable mitigating measures such as *fail-safe state* and *functional reset procedure*.

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Introduction

FlashRunner LAN 2.0 Next Generation is a compact highly-integrated In System gang programmer, based on the new and innovative FlashRunner 2.0 cutting-edge technology. FlashRunner LAN 2.0 Next Generation is designed for programming multi-PCB panel assemblies, with microcontrollers, serial memories, eMMC memories and parallel NAND memories.

This means:

- extremely fast programming (fastest in-system programming system on the market);
- standalone operations for easy ATE integration;
- brand new Graphical User Interface focused on Setup, Production and Security features;
- compact and robust design for production environments.

FlashRunner LAN 2.0 Next Generation is composed by a carrier board and an engine board supporting up to 4 device programming channels. The engine board mounted on top is a highly performing System-On-Module integrating the FlashRunner 2.0 core technology in a very compact format.

FlashRunner 2.0 NXG supports up to 4 channels so it allows to interface in parallel up to 4 independent and heterogeneous devices. The customers choose to enable the needed channels (1, 2, 3 or 4) according to their project requirements and, eventually, extends the programming system capabilities, in terms of number of channels, through a **simple software license update**.

Description	Part Number
FlashRunner LAN 2.0 NXG Open Frame – 1 channel	FRLAN2P0NXG-01CH-OF
FlashRunner LAN 2.0 NXG Open Frame – 2 channels	FRLAN2P0NXG-02CH-OF
FlashRunner LAN 2.0 NXG Open Frame – 3 channels	FRLAN2P0NXG-03CH-OF
FlashRunner LAN 2.0 NXG Open Frame – 4 channels	FRLAN2P0NXG-04CH-OF
FlashRunner LAN 2.0 NXG Closed Case – 1 channel	FRLAN2P0NXG-01CH-CS
FlashRunner LAN 2.0 NXG Closed Case – 2 channels	FRLAN2P0NXG-02CH-CS
FlashRunner LAN 2.0 NXG Closed Case – 3 channels	FRLAN2P0NXG-03CH-CS
FlashRunner LAN 2.0 NXG Closed Case – 4 channels	FRLAN2P0NXG-04CH-CS

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Figure 1: FlashRunner LAN 2.0 Next Generation – Open Frame version



Figure 2: FlashRunner LAN 2.0 Next Generation – Closed Case version

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General features

- Fastest programming algorithms approved by silicon manufacturers - as fast as target device's memory technology limit;
- up to 4 universal, parallel and independent device channels;
- easy ATE and fixture integration;
- stand-alone operations through an isolated parallel control interface;
- host-controlled operations through isolated LAN Ethernet interface and isolated USB-UART interface;
- supports the most common ISP low level protocols: BDM, DAP, CSI, eMMC, JTAG, SPI, QSPI, OCTO-SPI, Parallel-NAND, I2C, ICSP, EICSP, ISSP, MON, ICC, PDI, SCI, SD, SWD, UART, USART and many others;
- supports CAN, CAN-FD, LIN, FASTLIN, PPM protocols with proper external signal conditioning circuits;
- flexible, fully configurable;
- compact and robust design for production environments.

Hardware features

- multi-core high performance processor for system management;
- highly programmable and powerful logic section to implement low level protocol;
- 1GB on-board RAM memory;
- upgradable and replaceable storage memory for user data files and system files: 64 GB in the default configuration and up to 256 GB upon request;
- on-board timekeeper and calendar (battery supplied) for system time reference;
- 10/100/1000 LAN Ethernet isolated interface;
- USB-UART isolated interface;
- isolated parallel Control Interface for stand-alone operations;
- for each In-System Programming device interface (i.e. device channel)
    - 8 Digital Input/Output communication lines (DIOs);
    - 2 independent voltage-programmable Power lines (VPROGs);
    - Ground Reference line for each communication or power lines (GNDs);
    - Voltage and Current measurement and monitoring[1].

[1] Although the programmer's monitoring provides valuable information regarding signal levels, ensuring the correctness of voltage and current during flashing procedures remains the sole responsibility of the end customer.

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Software features

- Linux Embedded based operating system;
- very extensive library of supported devices - enabled through software licensing;
- fully configurable number of channels – 1, 2, 3, or 4 active channels according to the customer's requirement – easily upgradeable through software licensing;
- FlashRunner 2.0 WorkBench Graphical user Interface - the most user-friendly way to discover and exploit the astonishing features of SMH Technologies programming systems (Windows, Linux and Mac compatible);
- controllable by any host system through a simple terminal utility and ASCII protocol;
- advanced Interface Library DLL to control the programming system through a user-written applications (C/C++, C#, Labview, TestStand);
- optional customer binary file cryptography to ensure user data antipiracy protection with a more secure and advanced encryption method;
- advanced system protection and access according to user settings and permission management;
- file integrity check and file authenticity check to prevent data alterations;
- flashing cycles control to limit the number of board produced;
- user data management and device-specific dynamic data management (e.g. serial number, password, configuration data, …);
- very detailed log file completed with time-stamp for programming system full monitoring;
- extensive range of flashing and verifying operations according to the target device (mass erase, sector erase, black-check, program, verify with complete device read, verify with CRC check, read and dump data to file, device-specific operations);
- very easy software/firmware update (Operating System, Device Drivers, Licenses).

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Hardware overview

Power and control connectors

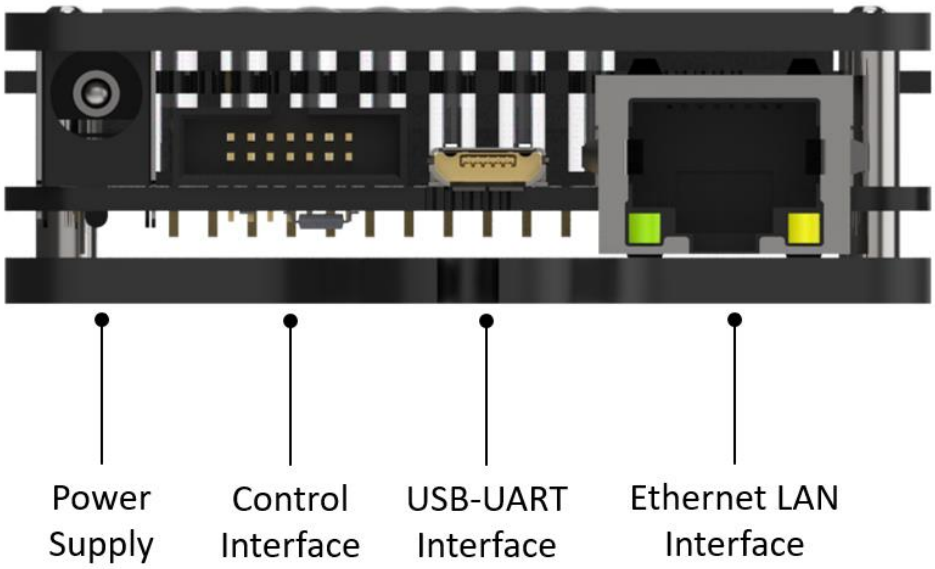


Figure 3: FlashRunner LAN 2.0 NXG – power and control connectors

Power supply

FlashRunner LAN 2.0 Next Generation is powered through a 15V power supply (up to 5A) connected to a DC power jack connector. Please refer to Technical Specification for a detailed parameters description.

Connector part-number: Same Sky (formerly CUI Devices) PJ-047AH
Mating plug connector: Same Sky (formerly CUI Devices) PP3-002AH

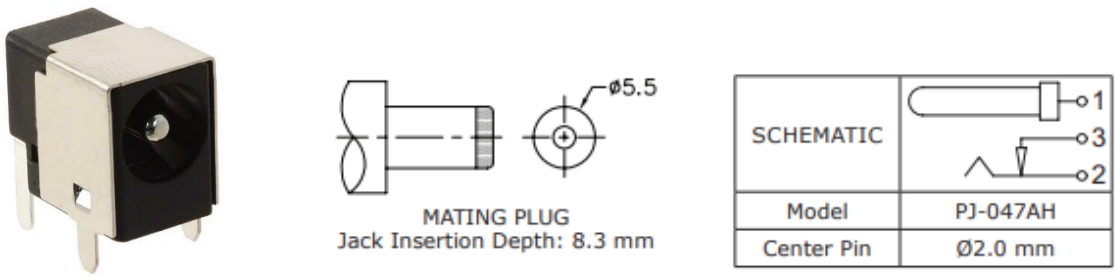


Figure 4: FlashRunner LAN 2.0 NXG - power jack plug connector

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Control Interface connector

Control Interface connector is used by an ATE system to control FlashRunner LAN 2.0 NXG through a parallel interface instead of communicating with the programming system through LAN Ethernet interface or USB-UART interface. Projects previously defined and stored into the programming system, together with their user data, can be easily triggered. Morover, the results of the programming sequence can be detected in a concise manner. Please refer to the Control Interface management section for more detail.

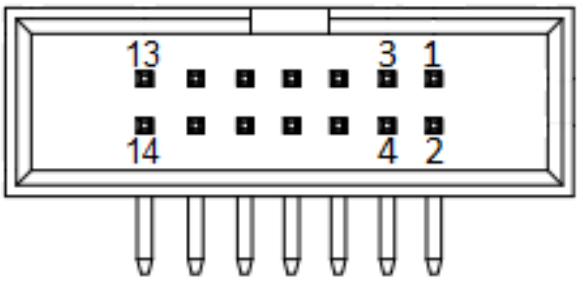


Figure 5: FlashRunner LAN 2.0 NXG – Control Interface connector

Part-number: CNC Tech 3220-14-0200-00
Mating part-number: CNC Tech 3230-14-0101-00 (flat cable IDC socket female)

Note: *all control signals are referenced to GND_I, separate from common ground GND of the programming system. This allows a host system to safely communicate with FlashRunner LAN 2.0 Next Generation even if the target boards have different ground reference compared to the host system's (and it's not possible to connect them together).*

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Pin #	Signal Name	Type	Description
1	SEL0	I	Project selection 0 (referenced to GND_I)
2	5V_I_FUSE	O	5V output (fuse-protected, referenced to GND_I)
3	SEL1	I	Project selection 1 (referenced to GND_I)
4	PASS/FAIL_CH1	O	Programming channel 1 PASS/FAIL (referenced to GND_I)
5	SEL2	I	Project selection 2 (referenced to GND_I)
6	PASS/FAIL_CH2	O	Programming channel 2 PASS/FAIL (referenced to GND_I)
7	SEL3	I	Project selection 3 (referenced to GND_I)
8	PASS/FAIL_CH3	O	Programming channel 3 PASS/FAIL (referenced to GND_I)
9	SEL4	I	Project selection 4 (referenced to GND_I)
10	PASS/FAIL_CH4	O	Programming channel 4 PASS/FAIL (referenced to GND_I)
11	START	I	Selected Project START (referenced to GND_I, active low)
12	BUSY	O	Selected Project BUSY (referenced to GND_I, active low)
13	GND_I	-	Isolated Ground Reference
14	GND_I	-	Isolated Ground Reference

Table 1: Control Interface connector pinout

To provide a easier way to access to the Control Interface signals, the Control Interface expansion board can be employed as signals breakout board (i.e. wire wrapping board) with a proper flat cable.

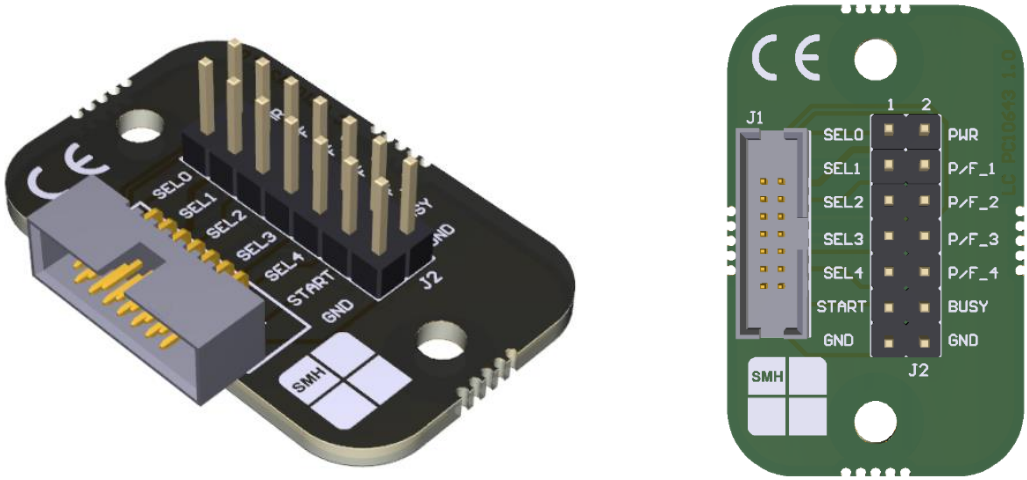


Figure 6: FlashRunner LAN 2.0 NXG – Control Interface expansion board

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Ethernet LAN connector

Ethernet LAN Connector is used to communicate with a host PC system. Please, use provided cable to connect FlashRunner LAN 2.0 Next Generation with your PC. Employed Ethernet transceiver is a 10/100/1000 Mbps single chip suitable for IEEE 802.3 applications. The automatic MDI/MDI-X feature eliminates the need to determine whether to use a straight cable or a crossover cable between the ethernet transceiver and its link partner. An isolation transformer with symmetrical transmit and receive data paths is also integrated into RJ45 connector.



Figure 7: FlashRunner LAN 2.0 NXG - Etherner LAN RJ45 connector – LEDs

RJ45 connector is equipped with two LEDs:

- Green LED is on when the Etherent link is up (any speed);
- Orange LED blinks when there is TX/RX activity on the link.

For more information, please refer to FlashRunner Programmer's Manual in order to correctly setup your host PC system.

USB-UART connector

Alternatively, communication with the host PC can be done with the micro-B USB connector through a UART serial connection. Use the provided USB cable to connect FlashRunner LAN 2.0 Next Generation with your PC. For more information, please refer to FlashRunner Programmer's Manual in order to correctly setup your host PC system.



Figure 8: FlashRunner LAN 2.0 NXG – USB-UART connector

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LEDs and ISP Connectors

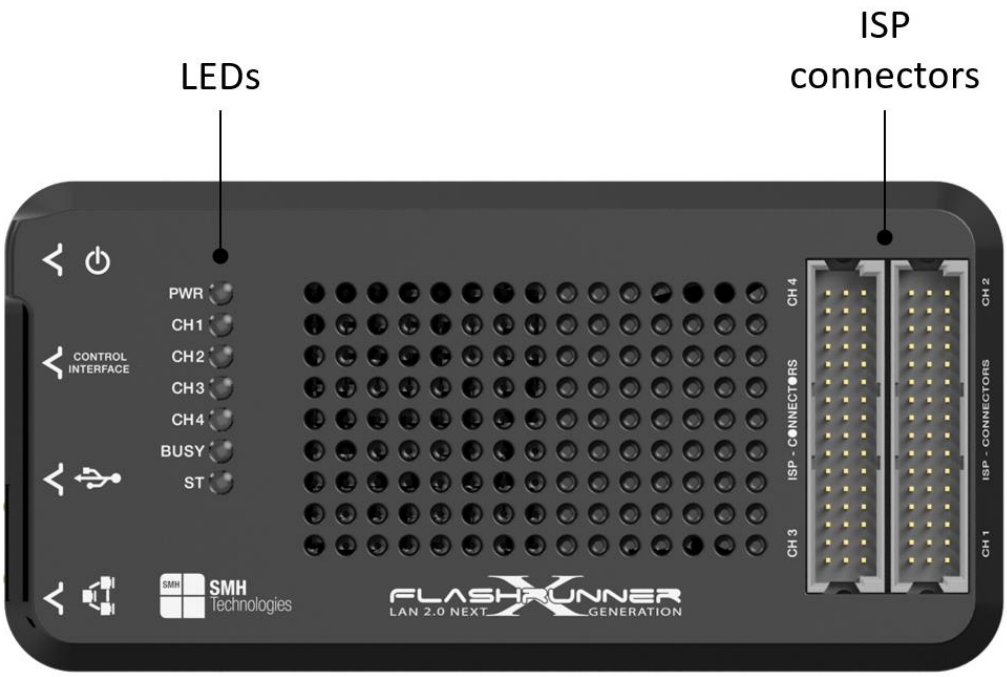


Figure 9: FlashRunner LAN 2.0 NXG – top side – LEDs and ISP connectors

LEDs

On the top layer of the FlashRunner LAN 2.0 NXG case, both Open Frame and Closed Case, several LEDs are available to show the general programming system status and also the programming procedure status and results. Following the layout order:

- POWER programming system power supplied (orange)
- CH1 STATUS PASS (green) – FAIL (red) – RUN (orange)
- CH2 STATUS PASS (green) – FAIL (red) – RUN (orange)
- CH3 STATUS PASS (green) – FAIL (red) – RUN (orange)
- CH4 STATUS PASS (green) – FAIL (red) – RUN (orange)
- BUSY programming system busy:
  RUN (orange) – STANDBY (switched off)
- STATUS programming system status at the end of the boot sequence:
  OK (orange)
  SYSTEM FAIL (blinking or switched off)

STATUS LED shows whether the general hardware self-test sequence, running during the boot phase, has been successful. CH1..CH4 STATUS LED show whether the hardware self-test on the related channel has been carried out successfully.

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ISP device connectors

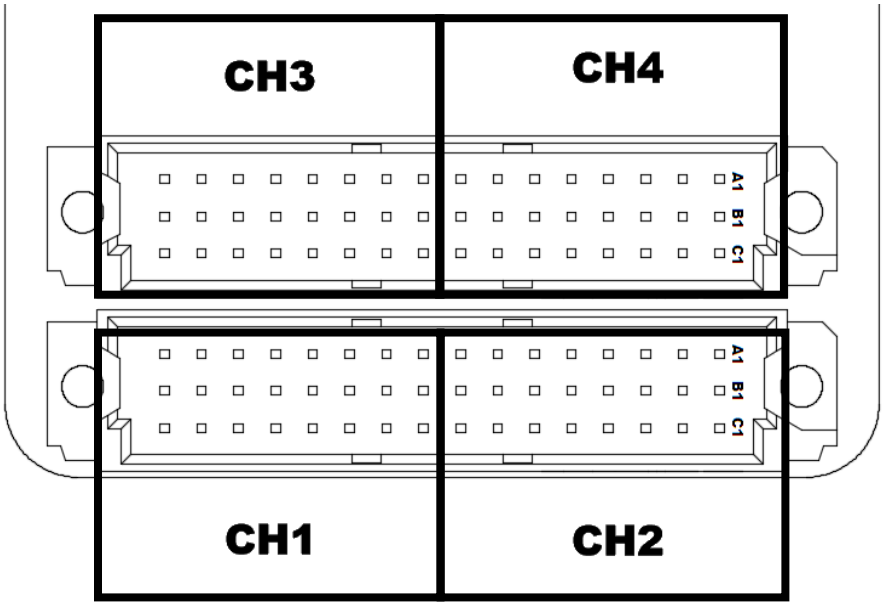


Figure 10: FlashRunner LAN 2.0 NXG – ISP device connector

ISP device connectors are DIN41612 connectors that conveys all the signals to communicate with up to 4 devices to be connected and interfaced.

Each one of the device channel is composed by:

- 8 Digital Input/Output (DIO0..DIO7);
- signals related ground references (DIO0_GND..DIO7_GND);
- 2 independent programmable voltages as power supplies:
  - DIO signal voltage level (VPROG0);
  - additional power supply for the board (VPROG1);
- power related ground references (VPROG0_GND, VPROG1_GND);
- external optional relay barrier power supply (PWR_RLY);
- external optional relay barrier command (RLY_ON).

> **Note:** *ISP and I/O signals are not isolated and are referenced to the programming system common ground GND (power supply and signals ground). Additionally, in order to avoid undesired current loops between FlashRunner LAN 2.0 NXG power supply and target board, a power supply with a floating output (ground not referenced to the earth potential) should be used.*

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	A	B	C
1	VPROG0_CH4	VPROG0_GND_CH4	VPROG1_CH4
2	VPROG1_GND_CH4	DIO0_CH4	DIO0_GND_CH4
3	DIO1_CH4	DIO1_GND_CH4	DIO2_CH4
4	DIO2_GND_CH4	DIO3_CH4	DIO3_GND_CH4
5	DIO4_CH4	DIO4_GND_CH4	DIO5_CH4
6	DIO5_GND_CH4	DIO6_CH4	DIO6_GND_CH4
7	DIO7_CH4	DIO7_GND_CH4	*RESERVED_CH4*
8	PWR_RLY_CH4	RLY_ON_CH4	GND_RLY_CH4
9	PWR_RLY_CH3	RLY_ON_CH3	GND_RLY_CH3
10	VPROG0_CH3	VPROG0_GND_CH3	VPROG1_CH3
11	VPROG1_GND_CH3	DIO0_CH3	DIO0_GND_CH3
12	DIO1_CH3	DIO1_GND_CH3	DIO2_CH3
13	DIO2_GND_CH3	DIO3_CH3	DIO3_GND_CH3
14	DIO4_CH3	DIO4_GND_CH3	DIO5_CH3
15	DIO5_GND_CH3	DIO6_CH3	DIO6_GND_CH3
16	DIO7_CH3	DIO7_GND_CH3	*RESERVED_CH3*

	A	B	C
1	VPROG0_CH2	VPROG0_GND_CH2	VPROG1_CH2
2	VPROG1_GND_CH2	DIO0_CH2	DIO0_GND_CH2
3	DIO1_CH2	DIO1_GND_CH2	DIO2_CH2
4	DIO2_GND_CH2	DIO3_CH2	DIO3_GND_CH2
5	DIO4_CH2	DIO4_GND_CH2	DIO5_CH2
6	DIO5_GND_CH2	DIO6_CH2	DIO6_GND_CH2
7	DIO7_CH2	DIO7_GND_CH2	*RESERVED_CH2*
8	PWR_RLY_CH2	RLY_ON_CH2	GND_RLY_CH2
9	PWR_RLY_CH1	RLY_ON_CH1	GND_RLY_CH1
10	VPROG0_CH1	VPROG0_GND_CH1	VPROG1_CH1
11	VPROG1_GND_CH1	DIO0_CH1	DIO0_GND_CH1
12	DIO1_CH1	DIO1_GND_CH1	DIO2_CH1
13	DIO2_GND_CH1	DIO3_CH1	DIO3_GND_CH1
14	DIO4_CH1	DIO4_GND_CH1	DIO5_CH1
15	DIO5_GND_CH1	DIO6_CH1	DIO6_GND_CH1
16	DIO7_CH1	DIO7_GND_CH1	*RESERVED_CH1*

Figure 11: FlashRunner LAN 2.0 NXG – ISP device connector

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Pin #	Signal Name	Description
A1	VPROG0_CH2	ISP Channel 2: Programmable voltage 0
A2	VPROG1_GND_CH2	ISP Channel 2: Programmable voltage 1 Ground
A3	DIO1_CH2	ISP Channel 2: Digital input/output 1
A4	DIO2_GND_CH2	ISP Channel 2: Digital input/output 2 Ground
A5	DIO4_CH2	ISP Channel 2: Digital input/output 4
A6	DIO5_GND_CH2	ISP Channel 2: Digital input/output 5 Ground
A7	DIO7_CH2	ISP Channel 2: Digital input/output 7
A8	PWR_RLY_CH2	ISP Channel 2: Relay Barrier Power Source
A9	PWR_RLY_CH1	ISP Channel 1: Relay Barrier Power Source
A10	VPROG0_CH1	ISP Channel 1: Programmable voltage 0
A11	VPROG1_GND_CH1	ISP Channel 1: Programmable voltage 1 Ground
A12	DIO1_CH1	ISP Channel 1: Digital input/output 1
A13	DIO2_GND_CH1	ISP Channel 1: Digital input/output 2 Ground
A14	DIO4_CH1	ISP Channel 1: Digital input/output 4
A15	DIO5_GND_CH1	ISP Channel 1: Digital input/output 5 Ground
A16	DIO7_CH1	ISP Channel 1: Digital input/output 7
B1	VPROG0_GND_CH2	ISP Channel 2: Programmable voltage 0 Ground
B2	DIO0_CH2	ISP Channel 2: Digital input/output 0
B3	DIO1_GND_CH2	ISP Channel 2: Digital input/output 1 Ground
B4	DIO3_CH2	ISP Channel 2: Digital input/output 3
B5	DIO4_GND_CH2	ISP Channel 2: Digital input/output 4 Ground
B6	DIO6_CH2	ISP Channel 2: Digital input/output 6
B7	DIO7_GND_CH2	ISP Channel 2: Digital input/output 7 Ground
B8	RLY_ON_CH2	ISP Channel 2: Relay Barrier Driver Output
B9	RLY_ON_CH1	ISP Channel 1: Relay Barrier Driver Output
B10	VPROG0_GND_CH1	ISP Channel 1: Programmable voltage 0 Ground
B11	DIO0_CH1	ISP Channel 1: Digital input/output 0
B12	DIO1_GND_CH1	ISP Channel 1: Digital input/output 1 Ground
B13	DIO3_CH1	ISP Channel 1: Digital input/output 3
B14	DIO4_GND_CH1	ISP Channel 1: Digital input/output 4 Ground
B15	DIO6_CH1	ISP Channel 1: Digital input/output 6
B16	DIO7_GND_CH1	ISP Channel 1: Digital input/output 7 Ground
C1	VPROG1_CH2	ISP Channel 2: Programmable voltage 1
C2	DIO0_GND_CH2	ISP Channel 2: Digital input/output 0 Ground
C3	DIO2_CH2	ISP Channel 2: Digital input/output 2
C4	DIO3_GND_CH2	ISP Channel 2: Digital input/output 3 Ground
C5	DIO5_CH2	ISP Channel 2: Digital input/output 5
C6	DIO6_GND_CH2	ISP Channel 2: Digital input/output 6 Ground
C7	RESERVED_CH2	ISP Channel 2: Reserved Pin
C8	GND_RLY_CH2	ISP Channel 2: Relay Barrier Ground
C9	GND_RLY_CH1	ISP Channel 1: Relay Barrier Ground
C10	VPROG1_CH1	ISP Channel 1: Programmable voltage 1
C11	DIO0_GND_CH1	ISP Channel 1: Digital input/output 0 Ground
C12	DIO2_CH1	ISP Channel 1: Digital input/output 2
C13	DIO3_GND_CH1	ISP Channel 1: Digital input/output 3 Ground

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Pin #	Signal Name	Description
C14	DIO5_CH1	ISP Channel 1: Digital input/output 5
C15	DIO6_GND_CH1	ISP Channel 1: Digital input/output 6 Ground
C16	RESERVED_CH1	ISP Channel 1: Reserved Pin

Table 2: ISP Device Connector Signals (Channels 1 and 2)

Pin #	Signal Name	Description
A1	VPROG0_CH4	ISP Channel 4: Programmable voltage 0
A2	VPROG1_GND_CH4	ISP Channel 4: Programmable voltage 1 Ground
A3	DIO1_CH4	ISP Channel 4: Digital input/output 1
A4	DIO2_GND_CH4	ISP Channel 4: Digital input/output 2 Ground
A5	DIO4_CH4	ISP Channel 4: Digital input/output 4
A6	DIO5_GND_CH4	ISP Channel 4: Digital input/output 5 Ground
A7	DIO7_CH4	ISP Channel 4: Digital input/output 7
A8	PWR_RLY_CH4	ISP Channel 4: Relay Barrier Power Source
A9	PWR_RLY_CH3	ISP Channel 3: Relay Barrier Power Source
A10	VPROG0_CH3	ISP Channel 3: Programmable voltage 0
A11	VPROG1_GND_CH3	ISP Channel 3: Programmable voltage 1 Ground
A12	DIO1_CH3	ISP Channel 3: Digital input/output 1
A13	DIO2_GND_CH3	ISP Channel 3: Digital input/output 2 Ground
A14	DIO4_CH3	ISP Channel 3: Digital input/output 4
A15	DIO5_GND_CH3	ISP Channel 3: Digital input/output 5 Ground
A16	DIO7_CH3	ISP Channel 3: Digital input/output 7
B1	VPROG0_GND_CH4	ISP Channel 4: Programmable voltage 0 Ground
B2	DIO0_CH4	ISP Channel 4: Digital input/output 0
B3	DIO1_GND_CH4	ISP Channel 4: Digital input/output 1 Ground
B4	DIO3_CH4	ISP Channel 4: Digital input/output 3
B5	DIO4_GND_CH4	ISP Channel 4: Digital input/output 4 Ground
B6	DIO6_CH4	ISP Channel 4: Digital input/output 6
B7	DIO7_GND_CH4	ISP Channel 4: Digital input/output 7 Ground
B8	RLY_ON_CH4	ISP Channel 4: Relay Barrier Driver Output
B9	RLY_ON_CH3	ISP Channel 3: Relay Barrier Driver Output
B10	VPROG0_GND_CH3	ISP Channel 3: Programmable voltage 0 Ground
B11	DIO0_CH3	ISP Channel 3: Digital input/output 0
B12	DIO1_GND_CH3	ISP Channel 3: Digital input/output 1 Ground
B13	DIO3_CH3	ISP Channel 3: Digital input/output 3
B14	DIO4_GND_CH3	ISP Channel 3: Digital input/output 4 Ground
B15	DIO6_CH3	ISP Channel 3: Digital input/output 6
B16	DIO7_GND_CH3	ISP Channel 3: Digital input/output 7 Ground
C1	VPROG1_CH4	ISP Channel 4: Programmable voltage 1
C2	DIO0_GND_CH4	ISP Channel 4: Digital input/output 0 Ground
C3	DIO2_CH4	ISP Channel 4: Digital input/output 2
C4	DIO3_GND_CH4	ISP Channel 4: Digital input/output 3 Ground
C5	DIO5_CH4	ISP Channel 4: Digital input/output 5
C6	DIO6_GND_CH4	ISP Channel 4: Digital input/output 6 Ground

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Pin #	Signal Name	Description
C7	RESERVED_CH4	ISP Channel 4: reserved Pin
C8	GND_RLY_CH4	ISP Channel 4: Relay Barrier Ground
C9	GND_RLY_CH3	ISP Channel 3: Relay Barrier Ground
C10	VPROG1_CH3	ISP Channel 3: Programmable voltage 1
C11	DIO0_GND_CH3	ISP Channel 3: Digital input/output 0 Ground
C12	DIO2_CH3	ISP Channel 3: Digital input/output 2
C13	DIO3_GND_CH3	ISP Channel 3: Digital input/output 3 Ground
C14	DIO5_CH3	ISP Channel 3: Digital input/output 5
C15	DIO6_GND_CH3	ISP Channel 3: Digital input/output 6 Ground
C16	RESERVED_CH3	ISP Channel 3: Reserved Pin

Table 3: ISP Device Connector Signals (Channels 3 and 4)

Note on DIN41612 connectors: The use of these connectors implies that the pin assignment of a possible type C/2 female connector will be mirrored over the rows with respect to the pin assignment of the R/2 male onboard. Therefore, pin A1 of the R/2 male will correspond to A16 on the C/2 female, B1 will correspond to B16 and so forth. Please compare with given illustration.

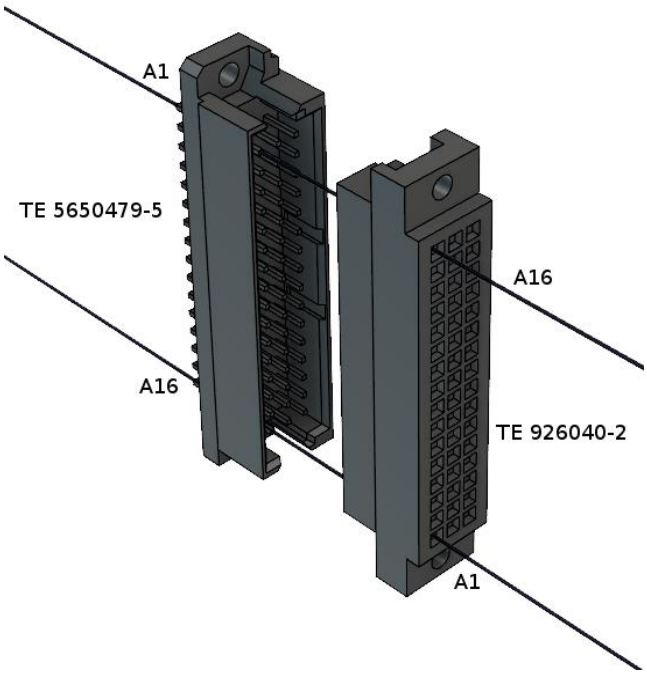


Figure 12: DIN41612 mating pin assignment example

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Programming system setup

This section explains how to set up FlashRunner LAN 2.0 NXG for the first time from a software and hardware point of view.

Workbench Graphical User Interface (GUI)

FlashRunner 2.0 Workbench GUI offers several fundamental features to set up quickly the programming system according to the project requirements:

- check projects features through the **Project Setup** tab;
- run projects through the **Production Control** tab;
- create a new project using the wizard application to be guided in device selection, protocol parameters selection, ISP channels management, user data selection, programming phases and parameters choice;
- modify an existing project through the wizard application or manual **Project Editor** tab;
- open a previously created project;
- user data management to be guided in a proper programming data generation according to the device memory map;
- discover the programming system ISP connector pinout according to the current project;
- explore, upload and download data stored into the programming system (projects, user data, device drivers, licenses, log files,…);
- send commands through text terminal;
- check programming system time-stamped activities through Real-Time Log;
- setup Cybersecurity features through **Cyber Security** tab.

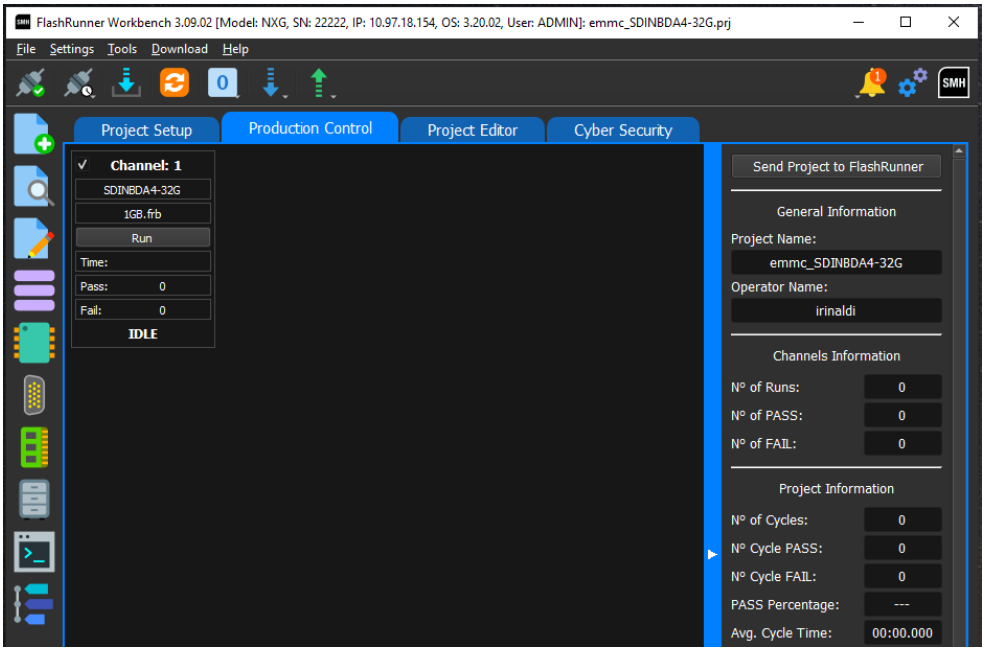


Figure 13: FlashRunner Workbench Graphical User Interface (GUI)

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Workbench GUI application can be used when the programming system is connected to a host-system such as a PC system through LAN Ethernet or USB-UART interface in **host mode**.

The programming system can be driven also through the Control Interface in **stand-alone mode**. Projects previously defined and stored into the programming system, together with their user data, can be easily triggered. Morover, the results of the programming sequence can be detected in a concise manner.

Please refer to FlashRunner 2.0 Programmer's Manual for further details.

Hardware setup

Please follow the steps below to set up FlashRunner LAN 2.0 NXG programming system:

- interface FlashRunner LAN 2.0 NXG with the target devices (i.e. devices to be flashed);
- connect FlashRunner LAN 2.0 NXG to a host system (host mode);
- power up FlashRunner LAN 2.0 NXG;
- setting up LAN Ethernet or USB-UART of the programming system.

Interface FlashRunner LAN 2.0 NXG with the target device

Build the required ISP cables to establish a connection between FlashRunner LAN 2.0 NXG ISP connectors and the target devices. The best way to discover the ISP connectors pinout is through the Pin Map tool of the Workbench GUI software application (working also when the programming system is not connected). Moreover, similar information regarding this matter can be spotted in the ISP connectors section of this document and on the Project Setup tab of the Workbench GUI software application.

Note: *connect very carefully communication lines, ground references and power supply lines of target devices and boards; an incorrect connection of the devices can cause a severe damage both to the customer's hardware and to the programming system.*

Connecting to a host system

Assuming to employ the programming system in host mode, we can connect FlashRunner LAN 2.0 NXG to a host system, such as a PC system, through USB-UART interface or LAN Ethernet interface. The connectors used have been already described in the Hardware overview section. Moreover, the proper cables are included into the programming system package.

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Power up the programming system

Using the included power supply adapter and cable, provide the power supply to the programming system. Please refer to the Hardware overview for further details.

Setting up connection parameters

To connect the programming system through LAN Ethernet connection, use the **factory default IP address 192.168.1.100**, or, if it is unknown, configure it through the USB-UART connection following the below steps:

- connect the programming system to the host system through USB-UART interface using the included USB cable;
- open the Workbench GUI;
- open Workbench Settings window clicking on Settings/Settings;
- chose Serial as FlashRunner Connection Type and chose the proper Com Port;
- close Workbench Settings window clicking OK;
- connect the host system to the programming system clicking the button 
- open the Terminal window and click on the SETIP button;
- insert the proper network parameters and wait for the automatic system reboot;

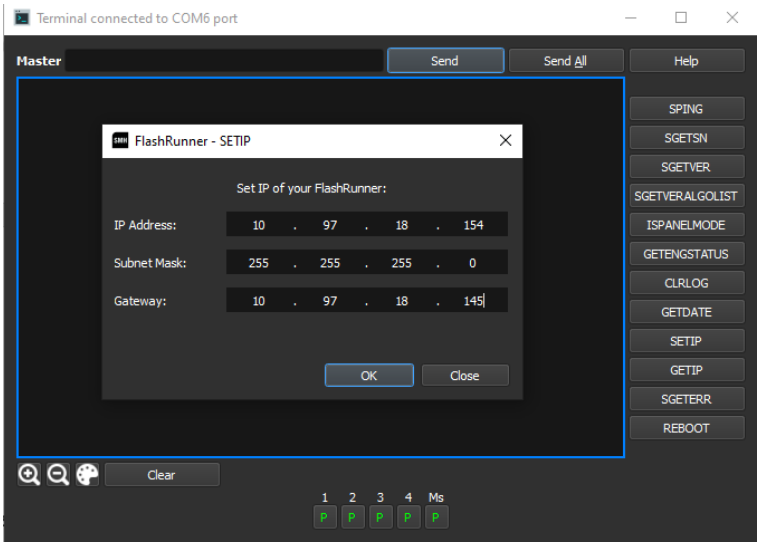


Figure 14: FlashRunner Workbench Graphical User Interface (GUI) – SETIP function

- once the system has completed the reboot, open Workbench Settings window clicking on Settings/Settings;
- chose LAN as FlashRunner Connection Type and chose the proper LAN IP address;
- close Workbench Settings window clicking OK;
- connect the host system to the programming system clicking the button 

Please refer to FlashRunner 2.0 Programmer's Manual for further details.

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FlashRunner LAN 2.0 NXG optional tools

Relay Barrier with Cable Interface

FlashRunner LAN 2.0 NXG supports up to 4 channels so it allows to interface in parallel up to 4 independent and heterogeneous devices.

Relay Barrier with Cable Interface is available in two different versions:

- FlashRunner 2.0 NXG Relay Barrier 2-channels
- FlashRunner 2.0 NXG Relay Barrier 4-channels

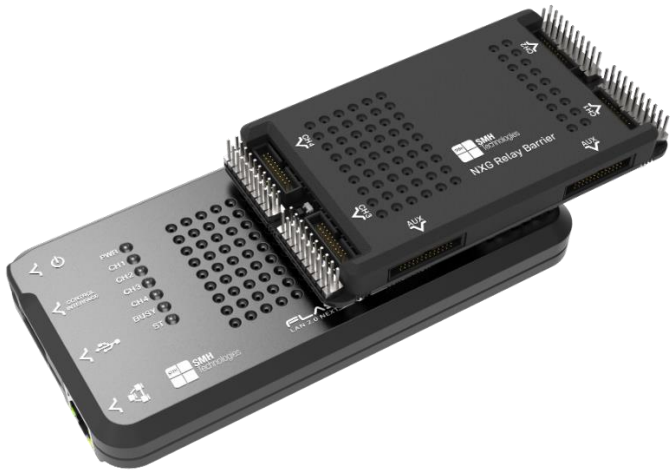


Figure 15: FlashRunner LAN 2.0 NXG Closed Case with 4-channels Relay Barrier

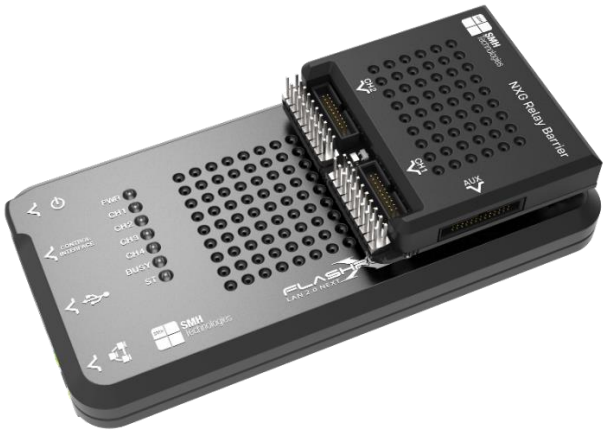


Figure 16: FlashRunner LAN 2.0 NXG Closed Case with 2-channels Relay Barrier

Description	Part Number
FlashRunner LAN 2.0 NXG Relay Barrier with Cable Interface - 2 channels	FRNXGRB02
FlashRunner LAN 2.0 NXG Relay Barrier with Cable Interface - 4 channels	FRNXGRB04

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Relay barrier gives the chance to separate the programmer lines and the ISP programmable devices when other operations such as In-Circuit Test procedures are carried out by the machinery.
Relay Barrier is normally open, separating programmer's lines and ISP programmable devices but connecting Auxiliary Connector to ISP device connector. Relay command and power supply are provided directly through the FlashRunner 2.0 NXG ISP connectors.

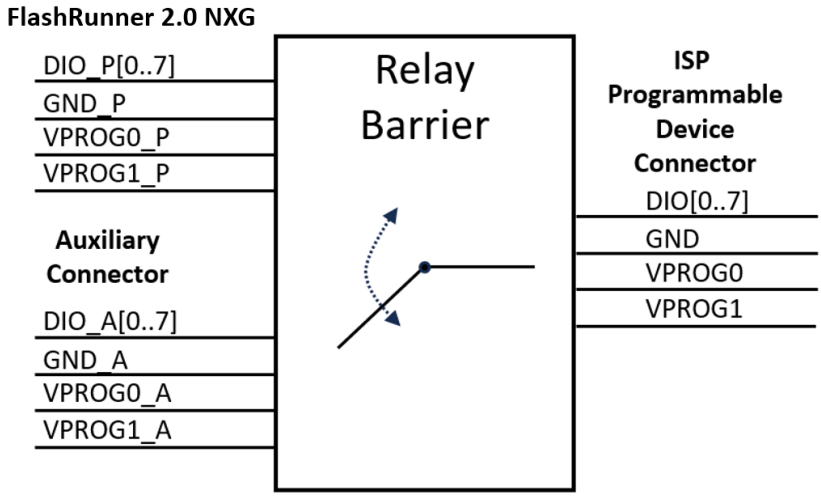


Figure 17: FlashRunner LAN 2.0 NXG – Relay Barrier – operating scheme

With the command RLYCLOSE (please check FlashRunner 2.0 Programmer's Manual for more details) the specific channel is activated and the current can flow through the external relay coils closing the relay. The command RLYOPEN stops the current flow releasing the relays.

RLYOPEN command

the relay switches go in the (normally) OPEN position
the **ISP device connector lines of the barrier are connected to the auxiliary connector**

RLYCLOSE command

the relay switches go in the CLOSED position
the **ISP device connector lines are connected to the programming system lines**

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The new relay barrier for FlashRunner LAN 2.0 NXG is equipped with two connectors for each channel:

- vertical 20-pin 2-row 1.27mm pitch with pinout compliant with FlashRunner 2.0 Cable Interface to connect FRCABLE;
- vertical 20-pin 2-row 2.54mm pitch (optionally mounted) to provide an easy way to wire wrapping;

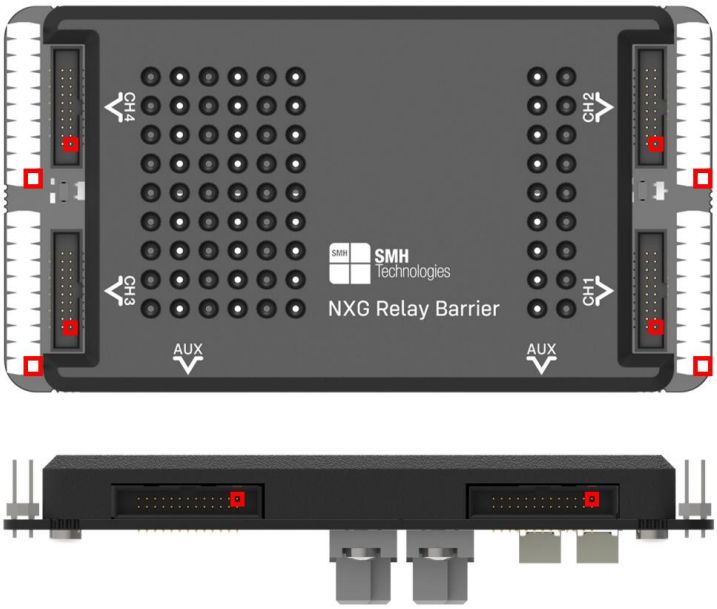


Figure 18: FlashRunner 2.0 LAN NXG 4-channels Relay Barrier – connectors – pin 1 highlighted in red

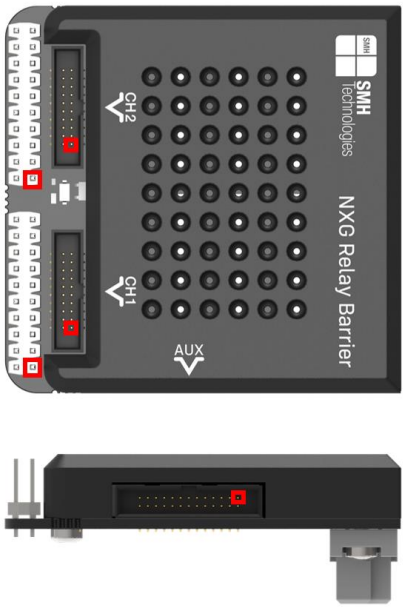


Figure 19: FlashRunner LAN 2.0 NXG 2-channels Relay Barrier – connectors – pin 1 highlighted in red

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Cable Interface connectors

Vertical 20-pin 2-row 1.27mm pitch
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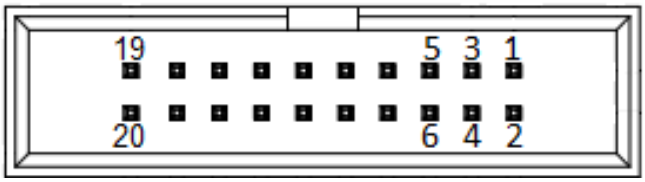


Figure 20: FlashRunner LAN 2.0 NXG Cable Interface connector

Please refer to the following table for the connector pinout definition.

Pin #	Signal Name	Input/Output or Power	Description
1	DIO0	I/O	Digital Input-Output 0
2	GND	-	Ground – GND
3	DIO1	I/O	Digital Input-Output 1
4	GND	-	Ground – GND
5	DIO2	I/O	Digital Input-Output 2
6	GND	-	Ground – GND
7	DIO3	I/O	Digital Input-Output 3
8	GND	-	Ground – GND
9	DIO4	I/O	Digital Input-Output 4
10	GND	-	Ground – GND
11	DIO5	I/O	Digital Input-Output 5
12	GND	-	Ground – GND
13	DIO6	I/O	Digital Input-Output 6
14	GND	-	Ground – GND
15	DIO7	I/O	Digital Input-Output 7
16	GND	-	Ground – GND
17	VPROG0	P	Programmable Voltage 0 – VP0
18	GND	-	Ground – GND
19	VPROG1	P	Programmable Voltage 1 – VP1
20	GND	-	Ground – GND

Table 4: FlashRunner LAN 2.0 NXG – Relay Barrier with Cable Interface - connectors pinout

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Cable Interface shall be conveniently used with its compliant flat cables FRCABLE and wire wrapping boards FRHDRDB15 provided by SMH technologies.

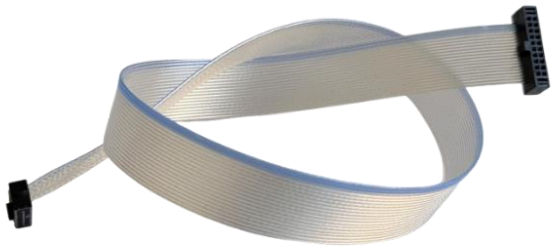


Figure 21: FlashRunner LAN 2.0 NXG Cable Interface – FRCABLE

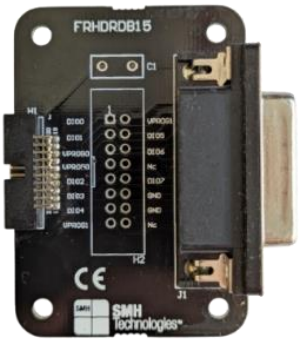


Figure 22: FlashRunner LAN 2.0 NXG Cable Interface – FRHDRDB15

Wire Wrapping connectors

Vertical 20-pin 2-row 2.54mm pitch (optionally mounted)
P/N: TSW-110-07-G-D or similar

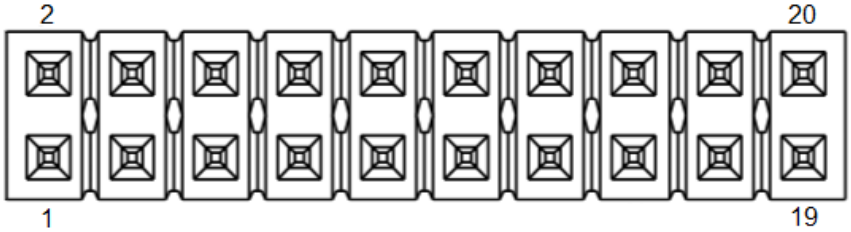


Figure 23: FlashRunner LAN 2.0 NXG Wire Wrapping pin header

The signal assignment is the same of the Cable Interface connector. Please refer to the above table.

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Auxiliary connectors

When the relay barrier is in the (normally) OPEN state the ISP device connector lines of the barrier are connected to the auxiliary connector.

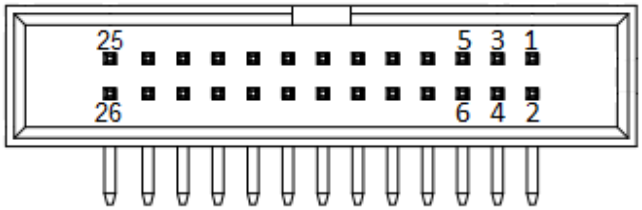


Figure 24: FlashRunner LAN 2.0 NXG auxiliary connector

Please refer to the following table for the auxiliary connector pinout definition (CH1/CH2 side).

Pin #	Signal Name	Type	Description
1	DIO0_AUX_CH1	I/O	Auxiliary Digital Input-Output 0 – CH1
2	VPROG0_AUX_CH2	P	Auxiliary Programmable Voltage 0 – VP0 – CH2
3	DIO1_AUX_CH1	I/O	Auxiliary Digital Input-Output 1 – CH1
4	VPROG1_AUX_CH2	P	Auxiliary Programmable Voltage 1 – VP1 – CH2
5	DIO2_AUX_CH1	I/O	Auxiliary Digital Input-Output 2 – CH1
6	GND_AUX_CH2	-	Auxiliary Ground – GND – CH2
7	DIO3_AUX_CH1	I/O	Auxiliary Digital Input-Output 3 – CH1
8	GND_AUX_CH2	-	Auxiliary Ground – GND – CH2
9	DIO4_AUX_CH1	I/O	Auxiliary Digital Input-Output 4 – CH1
10	DIO0_AUX_CH2	I/O	Auxiliary Digital Input-Output 0 – CH2
11	DIO5_AUX_CH1	I/O	Auxiliary Digital Input-Output 5 – CH1
12	DIO1_AUX_CH2	I/O	Auxiliary Digital Input-Output 1 – CH2
13	DIO6_AUX_CH1	I/O	Auxiliary Digital Input-Output 6 – CH1
14	DIO2_AUX_CH2	I/O	Auxiliary Digital Input-Output 2 – CH2
15	DIO7_AUX_CH1	I/O	Auxiliary Digital Input-Output 7 – CH1
16	DIO3_AUX_CH2	I/O	Auxiliary Digital Input-Output 3 – CH2
17	VPROG0_AUX_CH1	P	Auxiliary Programmable Voltage 0 – VP0 – CH1
18	DIO4_AUX_CH2	I/O	Auxiliary Digital Input-Output 4 – CH2
19	VPROG1_AUX_CH1	P	Auxiliary Programmable Voltage 1 – VP1 – CH1
20	DIO5_AUX_CH2	I/O	Auxiliary Digital Input-Output 5 – CH2
21	GND_AUX_CH1	-	Auxiliary Ground – GND – CH1
22	DIO6_AUX_CH2	I/O	Auxiliary Digital Input-Output 6 – CH2
23	GND_AUX_CH1	-	Auxiliary Ground – GND – CH1
24	DIO7_AUX_CH2	I/O	Auxiliary Digital Input-Output 7 – CH2
25	GND_AUX_CH1	-	Auxiliary Ground – GND – CH1
26	GND_AUX_CH2	-	Auxiliary Ground – GND – CH2

Table 5: FlashRunner LAN 2.0 NXG – Relay Barrier with Cable Interface – auxiliary connectors (CH1/CH2) pinout

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Please refer to the following table for the auxiliary connector pinout definition (CH3/CH4 side, only for 4-channel version).

Pin #	Signal Name	Type	Description
1	DIO0_AUX_CH3	I/O	Auxiliary Digital Input-Output 0 – CH3
2	VPROG0_AUX_CH4	P	Auxiliary Programmable Voltage 0 – VP0 – CH4
3	DIO1_AUX_CH3	I/O	Auxiliary Digital Input-Output 1 – CH3
4	VPROG1_AUX_CH4	P	Auxiliary Programmable Voltage 1 – VP1 – CH4
5	DIO2_AUX_CH3	I/O	Auxiliary Digital Input-Output 2 – CH3
6	GND_AUX_CH4	-	Auxiliary Ground – GND – CH4
7	DIO3_AUX_CH3	I/O	Auxiliary Digital Input-Output 3 – CH3
8	GND_AUX_CH4	-	Auxiliary Ground – GND – CH4
9	DIO4_AUX_CH3	I/O	Auxiliary Digital Input-Output 4 – CH3
10	DIO0_AUX_CH4	I/O	Auxiliary Digital Input-Output 0 – CH4
11	DIO5_AUX_CH3	I/O	Auxiliary Digital Input-Output 5 – CH3
12	DIO1_AUX_CH4	I/O	Auxiliary Digital Input-Output 1 – CH4
13	DIO6_AUX_CH3	I/O	Auxiliary Digital Input-Output 6 – CH3
14	DIO2_AUX_CH4	I/O	Auxiliary Digital Input-Output 2 – CH4
15	DIO7_AUX_CH3	I/O	Auxiliary Digital Input-Output 7 – CH3
16	DIO3_AUX_CH4	I/O	Auxiliary Digital Input-Output 3 – CH4
17	VPROG0_AUX_CH3	P	Auxiliary Programmable Voltage 0 – VP0 – CH3
18	DIO4_AUX_CH4	I/O	Auxiliary Digital Input-Output 4 – CH4
19	VPROG1_AUX_CH3	P	Auxiliary Programmable Voltage 1 – VP1 – CH3
20	DIO5_AUX_CH4	I/O	Auxiliary Digital Input-Output 5 – CH4
21	GND_AUX_CH3	-	Auxiliary Ground – GND – CH3
22	DIO6_AUX_CH4	I/O	Auxiliary Digital Input-Output 6 – CH4
23	GND_AUX_CH3	-	Auxiliary Ground – GND – CH3
24	DIO7_AUX_CH4	I/O	Auxiliary Digital Input-Output 7 – CH4
25	GND_AUX_CH3	-	Auxiliary Ground – GND – CH3
26	GND_AUX_CH4	-	Auxiliary Ground – GND – CH4

Table 6: FlashRunner LAN 2.0 NXG – Relay Barrier with Cable Interface – auxiliary connectors (CH3/CH4) pinout

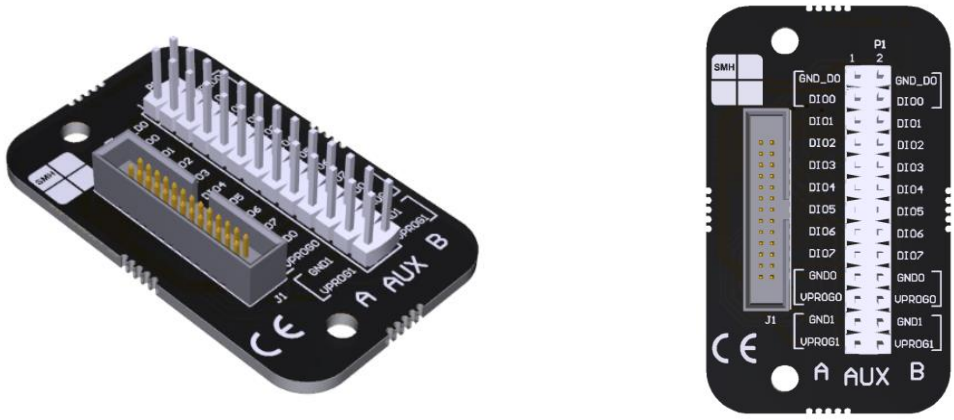


Figure 25: FlashRunner LAN 2.0 NXG – Relay Barrier auxiliary interface expansion board; pinout is clearly marked on the board (A: CH1/CH3; B: CH2/CH4)

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Cable Interface

FlashRunner LAN 2.0 NXG Cable Interface allows to connect up to 4 devices under test/programming (DUTs) through SMH Technologies flat cables (FRCABLE) and interface boards for wire wrapping (FRHDRPDB15) helping to maintain a good signal integrity.

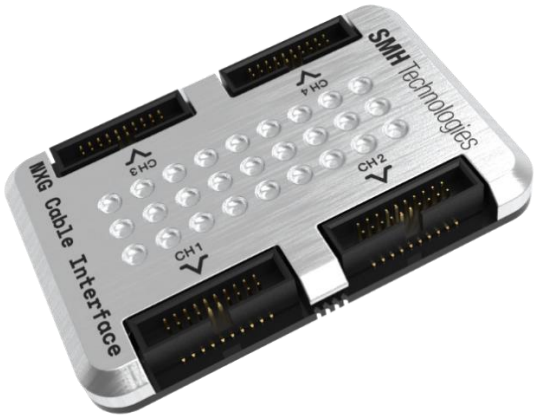


Figure 26: FlashRunner LAN 2.0 NXG – Cable Interface

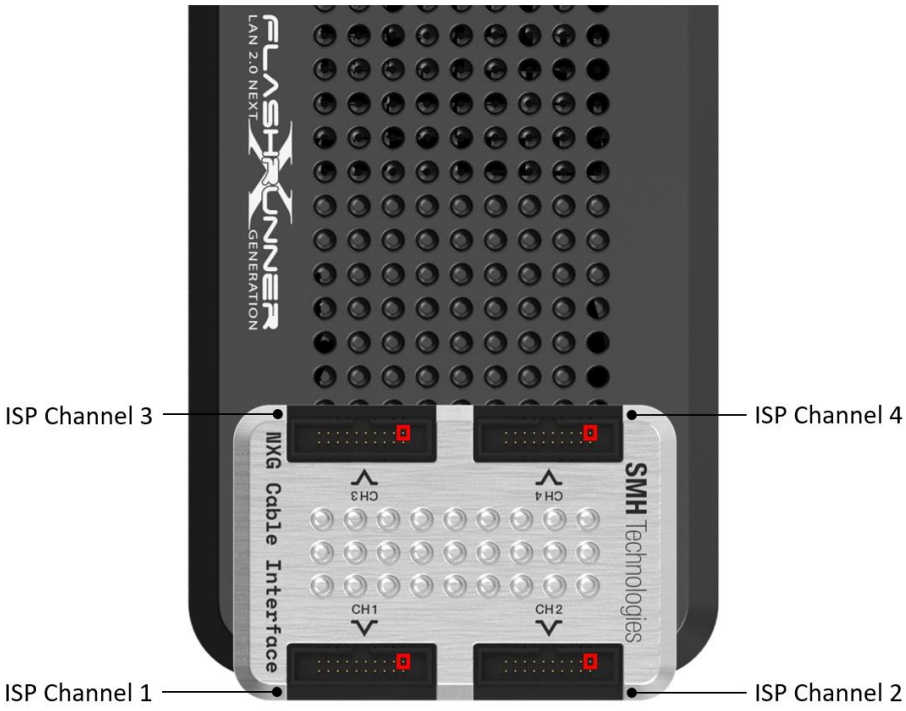


Figure 27: FlashRunner LAN 2.0 NXG with Cable Interface mounted – ISP channels – pin 1 highlighted in red

Description	Part Number
FlashRunner LAN 2.0 NXG Cable Interface - 4 channels	FRNXGINTF04

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Cable Interface ISP connectors

Vertical 20-pin 2-row 1.27mm pitch
P/N: CNC Tech 3220-20-0300-00

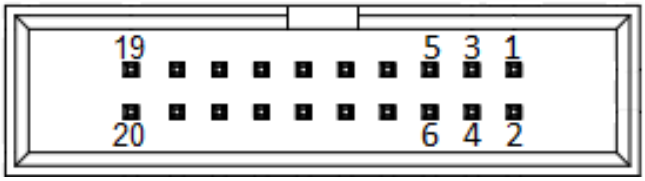


Figure 28: FlashRunner LAN 2.0 NXG Cable Interface ISP connector

Please refer to the following table for the connector pinout definition.

Pin #	Signal Name	Input/Output or Power	Description
1	DIO0	I/O	Digital Input-Output 0
2	GND	-	Ground – GND
3	DIO1	I/O	Digital Input-Output 1
4	GND	-	Ground – GND
5	DIO2	I/O	Digital Input-Output 2
6	GND	-	Ground – GND
7	DIO3	I/O	Digital Input-Output 3
8	GND	-	Ground – GND
9	DIO4	I/O	Digital Input-Output 4
10	GND	-	Ground – GND
11	DIO5	I/O	Digital Input-Output 5
12	GND	-	Ground – GND
13	DIO6	I/O	Digital Input-Output 6
14	GND	-	Ground – GND
15	DIO7	I/O	Digital Input-Output 7
16	GND	-	Ground – GND
17	VPROG0	P	Programmable Voltage 0 – VP0
18	GND	-	Ground – GND
19	VPROG1	P	Programmable Voltage 1 – VP1
20	GND	-	Ground – GND

Table 7: FlashRunner LAN 2.0 NXG – Cable Interface – connectors pinout

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ISP Connector Test Board

FlashRunner LAN 2.0 NXG ISP Connector Test Board allows to test the ISP interfaces of the programming system to verify if they are working properly as expected. To carry out the ISP interfaces verification, please start our FlashRunner Workbench GUI application. Run the Hardware Self-Analysis tool (Tools > Miscellaneous > Hardware Self-Analysis) and follow the instructions step by step. At the end of the test procedure, a report window shows the test result and a report file is generated in case of failure conditions on ISP interfaces.

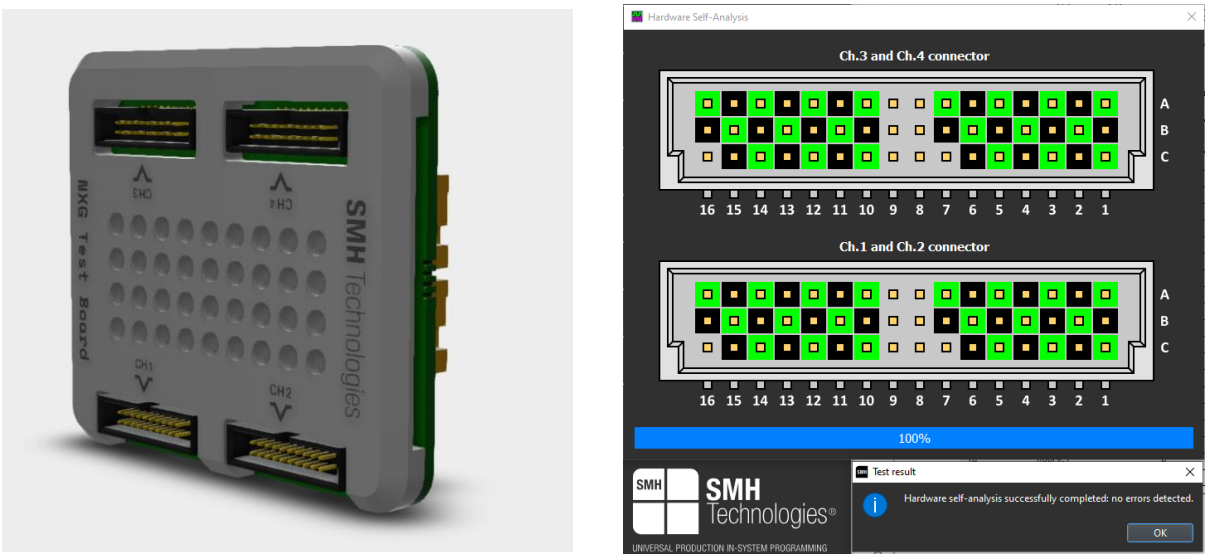


Figure 29: FlashRunner LAN 2.0 NXG – ISP Connector Test Board – top view and bottom view

ISP Connector Breakout Board

FlashRunner LAN 2.0 NXG includes in its delivery package one or two ISP Connector Breakout Board, according to the number of enabled channels, together with two/four strip connectors (vertical, 20-pin, 2-row, 2.54mm pitch, not mounted) to provide an easy way to wire wrapping. The connectors pinout is clearly marked on the Breakout Board and it is fully compliant with the one reported in table 4.

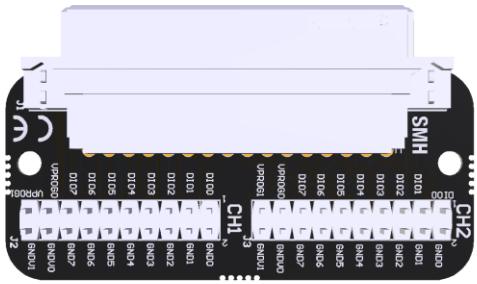


Figure 30: FlashRunner LAN 2.0 NXG – ISP Connector Breakout Board

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Programming system sizes

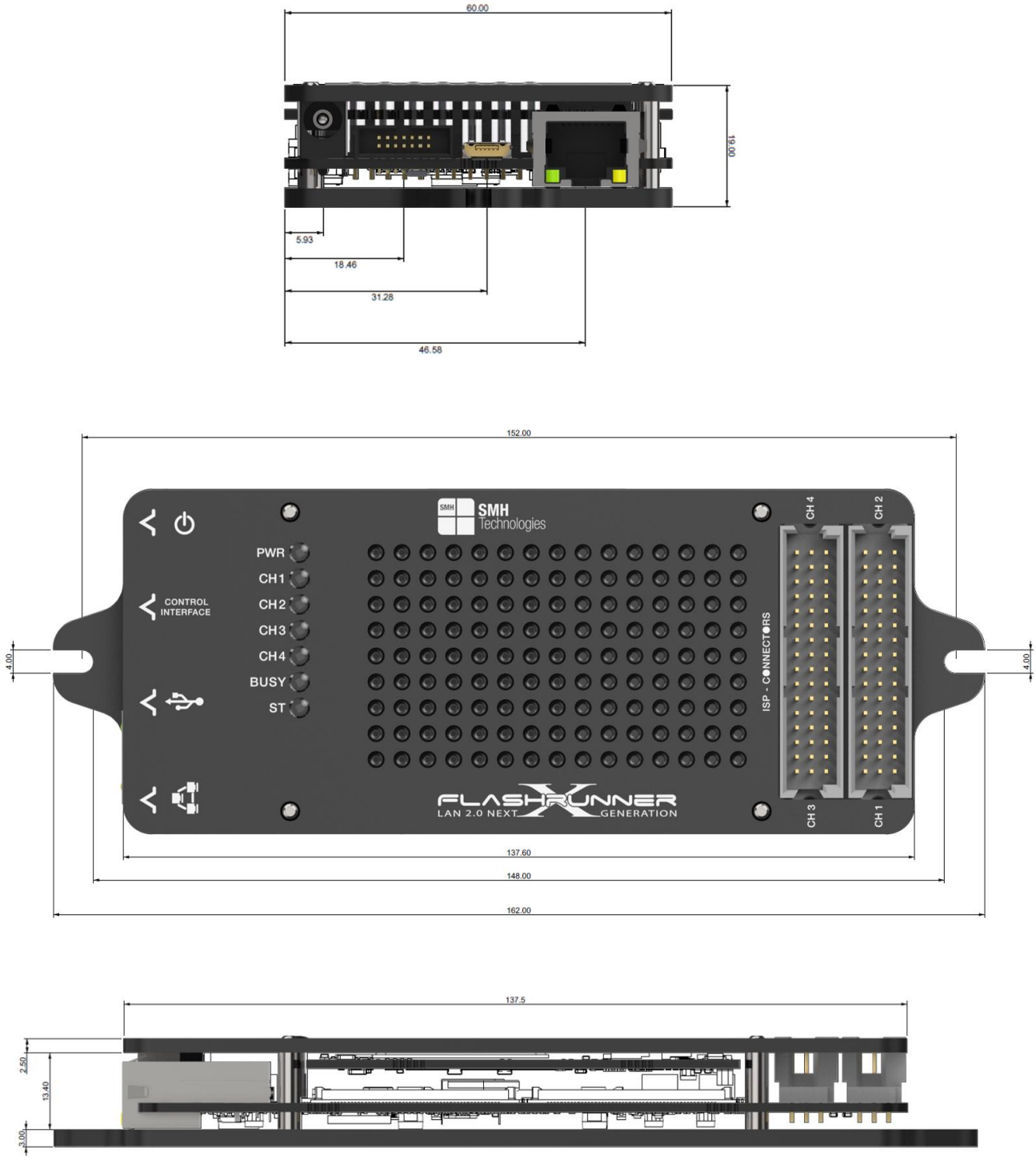


Figure 31: FlashRunner LAN 2.0 NXG – Open Frame sizes

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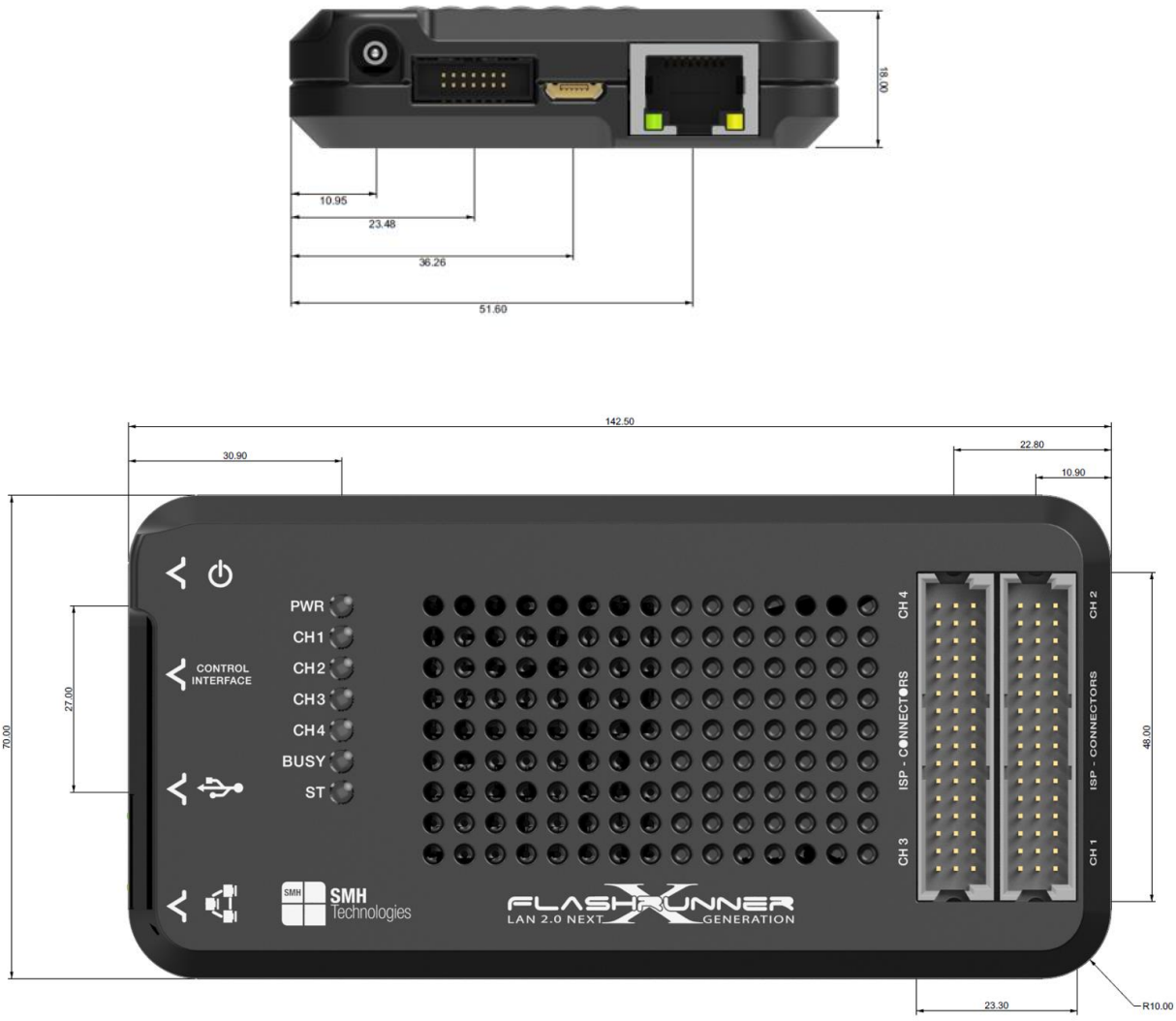


Figure 32: FlashRunner LAN 2.0 NXG – Closed Case Frame sizes

Please consider that the bottom layer (Panel Bracket) of the Open Frame version (as depicted in figure 30) can be also applied to the Closed Case version to help the programmer assembly into a machinery.

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Package checklist

FlashRunner LAN 2.0 Next Generation comes in two different packaging variants (Open Frame and Closed Case) with different items included. Please find the package lists in the following.

Qty.	Description
1	FlashRunner LAN 2.0 Next Generation Open Frame Unit
1	ISP Flat Cable Extension 30cm
1	Ethernet cross cable 2 meter RJ45
1	Micro USB2 cable 1.8 meter
1	Control Interface Flat Cable 15cm
1	Control Interface Board
1	ISP Connector Breakout Board
1	DIN41612 Connector 48 pin male IDC
2	ISP Connector Breakout Board - Strip connector 10 x 2 h=8mm
1	Control Interface Board - Strip connector 7 x 2 h=8mm
1	3-Year Warranty Sheet
1	FRLAN2P0NXG Pinout Reference
1	FRLAN2P0NXG Quick Start Guide
1	15V 40W AC/DC Wall Switching Power Adapter
2	M3x6 round head allen key screws

Table 8: FlashRunner 2.0 NXG Open Frame Package Checklist

Qty.	Description
1	FlashRunner LAN 2.0 Next Generation Closed Case Unit
1	Control Interface Flat Cable 15cm
1	ISP Flat Cable Extension 30cm
1	Ethernet cross cable 2 meter RJ45
1	Micro USB2 cable 1.8 meter
1	Panel Bracket for FRLAN2P0NXG-CS
1	Control Interface Board
1	ISP Connector Breakout Board
1	DIN41612 Connector 48 pin male IDC
2	ISP Connector Breakout Board - Strip connector 10 x 2 h=8mm
1	Control Interface Board - Strip connector 7 x 2 h=8mm
1	3-Year Warranty Sheet
1	FRLAN2P0NXG Quick Start Guide
1	FRLAN2P0NXG Pinout Reference
1	15V 40W AC/DC Wall Switching Power Adapter
2	M3x6 round head hex key screws
2	M3x6 TCEI hex socket screws

Table 9: FlashRunner 2.0 NXG Closed Case Package Checklist

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When either a 3 or 4 channels version is purchased, the following items will be included in the package:

Qty.	Description
1	Cable Interface Board
1	ISP Flat Cable Extension 30cm
1	DIN41612 Connector 48 pin male IDC
2	Cable Interface Strip connector 10 x 2 h=8mm

Table 10: Package addons for 3/4 channels versions

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Technical Specifications

Absolute Maximum Ratings

Parameter	Value
Power Connector	
Supply voltage on line POWER (reference GND)	+16V
ISP Device Connectors	
Maximum input voltage on DIO[7..0] lines	-0,5V to +6,5V
Maximum current on DIO lines	±50mA
Maximum current on VPROG0 line	250 mA
Maximum current on VPROG1 line	200 mA
CMD command line	
Coil supply voltage	15V
"RLY_ON" signal voltage	3.3V
Maximum current on RLY_ON lines	±24mA

Table 11: FlashRunner LAN 2.0 NXG – Absolute maximum Ratings

Physical and Environmental Specifications

Parameter	Value
Operating temperature	0-50°C
Operating humidity	90% max (without condensation)
Storage temperature	0-70°C
Storage humidity	90% max (without condensation)
EMC (EMI/EMS)	CE, FCC

Table 12: FlashRunner LAN 2.0 NXG – Physical and Environmental Specifications

Note: *Keep FlashRunner LAN 2.0 Next Generation **always in a well-ventilated area** in order to prevent product overheating, which could affect product performances and, if maintained for long time, it could damage product hardware components.*

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DC Characteristics and Functional Operating Range

Parameter	Condition	Value		
		Min	Typ	Max
Power Connector				
Supply voltage		14.8V	-	15.5V
Power consumption		-	-	5A
Control Connector				
V_{IL} (input low voltage) on lines START, SEL[4..0]		0V	-	0.8V
V_{IH} (input high voltage) on lines START, SEL[4..0]		2.4V	-	8V
V_{OL} (output low voltage) on lines BUSY, PASS_FAIL_CH[1..4]	I_{OL} = 4mA	-	-	0.8V
V_{OH} (output high voltage) on lines BUSY, PASS_FAIL_CH[1..4]		4.5V	-	5.5V
ISP Device Connectors				
V_{IL} (input low voltage) on DIO lines		-	-	0.3 V_{PROG0}
V_{IH} (input high voltage) on DIO lines	Configured as digital lines	0.7 V_{PROG0}	-	
V_{OL} (output low voltage) on DIO lines	Configured as digital lines V_{PROG0} = 3.3V, I_{OL} = 24mA	-	-	0.55V
V_{OH} (output high voltage) on DIO lines	Configured as digital lines V_{PROG0} = 3.3V, I_{OH} = -24mA	2.56V	-	-
V_{OL} (output low voltage) on DIO lines	Configured as digital lines V_{PROG0} = 5V, I_{OL} = 32mA	-	-	0.55V
V_{OH} (output high voltage) on DIO lines	Configured as digital lines V_{PROG0} = 5V, I_{OH} = -32mA	3.9V	-	-
I_{OH} current (source) on DIO lines	Configured as input with active pull-ups	-	3.8mA	-
VPROG0 output voltage		1.65V	-	5.5V
VPROG0 current (source)		-	-	250mA
VPROG1 output voltage		6.0V	-	13.5V
VPROG1 current (source)		-	-	200mA

Table 13: FlashRunner LAN 2.0 NXG – DC Characteristics and Functional Operating Range

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AC Characteristics

Parameter	Condition		Value		
			Min	Typ	Max
t_{RISE} on DIO lines when configured as digital output push-pull	V_{PROG0} = 1.8V	Load: 2KΩ//15pF	2.1ns	-	15.5ns
	V_{PROG0} = 3.3V		0.7ns	-	5.8ns
	V_{PROG0} = 5V		0.7ns	-	4.4ns
t_{FALL} on DIO lines when configured as digital output push-pull	V_{PROG0} = 1.8V	Load: 2KΩ//15pF	2ns	-	12.6ns
	V_{PROG0} = 3.3V		0.8ns	-	5ns
	V_{PROG0} = 5V		0.7ns	-	4ns
t_{RISE} on line VPROG0	V_{PROG0} = 0-1.8V	Load: 15Ω//10mF	-	10ms	-
	V_{PROG0} = 0-3.3V	Load: 22Ω//10mF	-	15ms	-
	V_{PROG0} = 0-5.5V	Load: 22Ω//10mF	-	20ms	-
t_{FALL} on line VPROG0	V_{PROG0} = 1.8-0V	Load: 10mF	-	300ms	-
	V_{PROG0} = 3.3-0V		-	350ms	-
	V_{PROG0} = 5.5-0V		-	350ms	-
t_{RISE} on line VPROG1	V_{PROG1} = 0-3V	Load: 10Ω//1mF	-	1.3ms	-
	V_{PROG1} = 0-5V	Load: 47Ω//1mF	-	1.8ms	-
	V_{PROG1} = 0-13.5V	Load: 94Ω//1mF	-	13ms	-
t_{FALL} on line VPROG1	V_{PROG1} = 3-0V	Load: 1mF	-	18ms	-
	V_{PROG1} = 5-0V		-	30ms	-
	V_{PROG1} = 13.5-0V		-	45ms	-

Table 14: FlashRunner LAN 2.0 NXG – AC Characteristics

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