

FlashRunner LAN 2.0 Next Generation

High-Performance, Compact Standalone In-System Programmer

User's Manual

Revision 0.8 — May 2022



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DC11408

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1 Before Starting



Note: Updated version of FlashRunner System Software is available on SMH Technologies website (www.smh-tech.com). Please check it out before continuing to read this documentation.

1.1 Important Notice to Users

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1.2 Safety



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

FlashRunner LAN 2.0 Next Generation 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 Next Generation against electrostatic discharge (ESD), always connect yourself to the ground (e.g. via wrist straps) when handling the instrument.

Always store FlashRunner LAN 2.0 Next Generation inside an antistatic bag when not in use.



Disclaimer: *when integrating FlashRunner LAN 2.0 Next Generation please pay attention to place it in a well-ventilated area in order to avoid overheating related damages.*

FlashRunner LAN 2.0 Next Generation has been designed to reach 90 °C (194 °F) in normal operating conditions over its ends.

1.3 Getting Technical Support

SMH Technologies is continuously working to improve FlashRunner LAN 2.0 Next Generation firmware and to release programming algorithms for new devices. SMH Technologies offers fast and knowledgeable technical support to all of its customers and is always available to solve specific problems or meet specific needs.

To get in touch with SMH Technologies, please refer to the contact information below.

Phone: +39 0434 421111

Fax: +39 0434 639021

Technical Support: support@smh-tech.com

1.4 Additional Documentation

This user's manual provides information about how to setup FlashRunner LAN 2.0 Next Generation and its hardware characteristics.

For information about FlashRunner LAN 2.0 Next Generation commands and their syntax, please refer to the FlashRunner 2.0 Programmer's Manual, included (in PDF format) in FlashRunner 2.0 setup.

2 Overview

2.1 What is FlashRunner LAN 2.0 Next Generation?

FlashRunner LAN 2.0 Next Generation is a compact high-integration 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 microcontroller, eMMC and NAND memories. This means:

- Extremely fast programming (the 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 of a carrier board that hosts up to 4 programming channels.

The engine board on top of it is a System on Module enclosing FlashRunner 2.0 core technology in a compact and easy to integrate format.

FlashRunner LAN 2.0 Next Generation is available in different enclosures:

- **FRLAN2P0NXG-OF** **open frame version**
- **FRLAN2P0NXG-CS** **closed case version**



Figure 1: FlashRunner LAN 2.0 Next Generation in closed case version

FlashRunner LAN 2.0 Next Generation comes in one hardware solution, enabling 1 channel for device programming.

Products upgrade for up to 4 active channels are available by asking your sales reference for a specific upgrade license.

In all of the above configurations, each ISP channel is composed of:

- Eight digital, bidirectional lines;
- Two power lines;
- Ten ground lines (one per digital signal and power line)

2.1.1 General features

- Fastest programming algorithms (as fast as target device's memory technology limit), approved by silicon manufacturers;
- Up to 4 parallel and independent channels
- Easy ATE integration;
- Standalone operations
- Controllable by ATE through optoisolated LAN and USB, or parallel control lines;
- Supports most ISP protocols (BDM, JTAG, SPI, I2C, MON, ICC, SCI, UART, etc.);
- Flexible, fully configurable;
- Compact and robust design for production environments;
- Up to 20 Mbyte/sec host data transfer.

2.1.2 Hardware features

- ISP lines:
 - 8 digital I/O lines; 1 ground line per signal;
 - 2 programmable output voltages; 1 ground line per power line;
- 1 GBytes on-board RAM memory;
- On-board timekeeper and calendar for time-stamped log file;
- LAN Communication Interface
- Optoisolated USB communication interface.
- Optoisolated ATE interface for standalone operations
- Programming voltage measure of each channel
- Programming current measure of each channel

2.1.3 Software features

- Linux based operating system;
- FlashRunner 2.0 WorkBench: the new user-friendly Graphical User Interface (Windows, Linux and Mac compatible)
- Controllable by any host system through a terminal utility and simple ASCII protocol;
- Up to 32 hardware-selectable projects in Standalone Mode, unlimited software-selectable projects in Host Mode;

- Interface Library DLL to control the instrument from within user-written applications;
- Optional customer binary file cryptography to ensure antipiracy protection
- Log file and production report file;
- Erase, blank check, program, read, verify, oscillator trimming, etc.

2.2 Package Checklist

FlashRunner LAN 2.0 Next Generation comes in packaging variants: Open-Frame and Closed-Case.

The relative packages include the following items:

Table 1: FlashRunner 2.0 NXG Open Frame Package Checklist

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	Cable Interface Board
1	DIN41612 Connector 48 pin male IDC
2	Cable Interface Strip connector 10 x 2 h=8mm
1	Control Interface Strip connector 7 x 2 h=8mm
1	3-Year Warranty Sheet
1	FRLAN2P0NXG Pinout Reference
1	FRLAN2P0NXG Quick Start Guide
1	FRLAN2P0NXG Connection Reference Document
1	15V 40W AC/DC Wall Switching Power Adapter
2	M3x6 round head allen key screws

Table 2: FlashRunner 2.0 NXG Closed Case 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	Cable Interface Board
1	DIN41612 Connector 48 pin male IDC
2	Cable Interface Strip connector 10 x 2 h=8mm
1	Control Interface 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
1	FRLAN2P0NXG Connection Reference Document
2	M3x6 round head hex key screws
2	M3x6 TCEI hex socket screws

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

Table 3: Package addons for 3/4 channels versions

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

2.3 Hardware Overview

2.3.1 Power Supply

FlashRunner LAN 2.0 Next Generation is powered through a 15V power supply connected to a DC plug connector.

2.3.2 ATE Control Connector

ATE Control DIN Connectors are used by an ATE system to control FlashRunner LAN 2.0 Next Generation instead of communicating with the instrument through the USB or LAN port. You could define and start a project, and check results. For more information please check chapter 4.3.

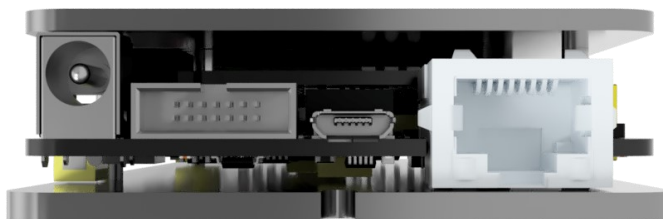


Figure 2: Power jack, ATE control connector, USB and LAN

2.3.3 LAN Connector

LAN Connector is used to communicate with Host PC system. Use provided cross cable to connect FlashRunner LAN 2.0 Next Generation with your PC. For more information check chapter 2.3.3 and check related documentation on FlashRunner 2.0 Programmer's Manual to correctly set up your host PC system

2.3.4 USB Connector

Alternatively, communication with the host PC can be done with the micro USB connector. Use the provided USB cable to connect FlashRunner LAN 2.0 Next Generation with your PC. For more information check chapter 2.3.4 and check related documentation on FlashRunner 2.0 Programmer's Manual to correctly set up your host PC system

2.3.5 ISP Connectors

In Illustration 3 you can see two ISP connectors, the one on the right will define channels 1 and 2, the left one will define channels 3 and 4. For more information check chapter 2.3.5.

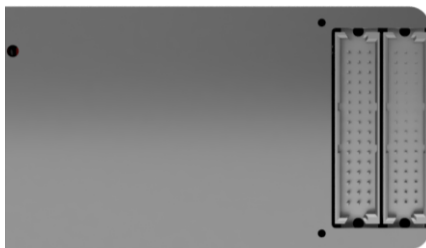


Figure 3: "ISP" DIN connectors group

2.3.6 LEDs

- POWER: the instrument is turned on
- STATUS: indicates system warnings
- BUSY: turned on when a project is running
- CHANNEL 1..4: programming result.

Green: programming successful, Red: programming failed

The STATUS_LED indicates whether the Hardware SelfTest, running during the boot phase that tests all the hardware peripherals connected on the i2c buses, such as DAC and ADC for the measurement of VPROG currents and voltages has been successful. If the test passes, the STATUS_LED stays on. If the test fails, the STATUS_LED blinks. If the STATUS_LED remains off there is something wrong.



Figure 4: FlashRunner LAN 2.0 Next Generation Top Panel

2.4 Programming Drivers and Licenses

FlashRunner LAN 2.0 Next Generation includes programming drivers for several devices. To program a specific device, however, a specific license file for that device, that family or that silicon producer must be purchased.



Note: *FlashRunner LAN 2.0 Next Generation comes already preinstalled with the license(s) you specified at the moment of purchase. You can purchase additional licenses at any future moment.*

Programming drivers and license files are stored inside FlashRunner LAN 2.0 Next Generation storage memory (see the FlashRunner 2.0 Programmer's Manual for more information).

There are several types of licensing:

- Single device license: only that single device programming is enabled
- Family license: only a single device family programming is enabled
- Silicon Producer license: only a single device silicon producer is enabled

2.4.1 Installing New Licenses

When you buy an additional license for a specific device, you will get a license file (.lic);

If you ordered a new device development, you will also receive:

- A driver file (.so)

For detailed information on how to update FlashRunner LAN 2.0 Next Generation please check FlashRunner 2.0 Programmer's Manual.

2.5 Channel Upgrade Licenses

If you would like to upgrade from FR2.0A4 to FR2.0A8, or from FR2.0A12 to FR2.0A16, you could purchase a Channel Upgrade License. Please ask our Sales Team (sales@smh-tech.com).

SMH Technologies reserves the right, at its discretion, to replace the product.

2.6 Upgrading the Firmware

FlashRunner LAN 2.0 Next Generation firmware can be easily upgraded using the FlashRunner 2.0 WorkBench software. For more information, please refer to the FlashRunner 2.0 Programmer's Manual.

3 System Setup

3.1 Overview



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

This chapter will explain how to set up FlashRunner LAN 2.0 Next Generation for the first time. The new FR2.0 WorkBench project Wizard allows an easy and fast system setup.

When moving FlashRunner LAN 2.0 Next Generation to the production environment, you can take full advantage of the FR2.0 WorkBench GUI Production Tool (Host mode) or let the instrument be controlled through the “ATE Control” interface (Standalone mode).

For more information about Standalone mode and Host mode, see the FlashRunner 2.0 Programmer’s Manual.

3.2 Software Setup

Please refer to the “System Setup/Upgrade” chapter of FlashRunner 2.0 Programmer’s Manual.

3.3 Hardware Setup

To set up FlashRunner LAN 2.0 Next Generation, you must follow the steps below in the following order:

- Interface FlashRunner LAN 2.0 Next Generation with your test/programming equipment;
- Connect FlashRunner LAN 2.0 Next Generation to host PC system (if you use it in Host Mode);
- Power up FlashRunner LAN 2.0 Next Generation;
- Set up LAN settings (if you use the Ethernet connection);

3.3.1 Interfacing with your Test/Programming equipment

Build one or more ISP cables to connect FlashRunner LAN 2.0 Next Generation ISP connectors to your target board(s). Wire up all the required connections (power, oscillator, ISP signals) to target microcontrollers using the PinMap tool (for more details please check the related chapter on FlashRunner 2.0 Programmer's Manual).

3.3.2 Connecting to the Host PC System

You can connect FlashRunner LAN 2.0 Next Generation to the host system through either the USB or LAN port.

FlashRunner LAN 2.0 Next Generation comes with a USB cable and an Ethernet cross cable to connect directly to a host PC.

3.3.3 Powering Up

Power up FlashRunner LAN 2.0 Next Generation by connecting the included power supply to DC plug connector.

3.3.4 Setting Up LAN Settings

If you connected FlashRunner LAN 2.0 Next Generation to the host PC using the Ethernet connection, you need to set up the FlashRunner LAN 2.0 Next Generation IP address. To learn how to set up the FlashRunner LAN 2.0 Next Generation address, please refer to the FlashRunner 2.0 Programmer's Manual.

4 Connectors

4.1 Overview

FlashRunner LAN 2.0 Next Generation connects to your programming/testing system through:

- “ISP” connectors: 48 way, 3 rows, DIN 41612, pitch = 2.54mm (male)
- “ATE CONTROL” connector: 14 way, 2 rows, pitch = 1.27mm (male)
- Additionally, a micro USB and Ethernet connectors are provided to interface fully with the ATE system.

4.2 ISP Connectors

“ISP” connectors group signals needed to program up to 4 target devices. These connectors are type R/2 DIN41612 (TE part number 5650479-5) with several input/output lines and power lines.



Note: *ISP and I/O signals are not optoisolated and are referenced to GND (power supply ground).*

Additionally, in order to avoid undesired current loops between FlashRunner LAN NXG power supply and target board, a power supply with a floating output (ground not referenced to the earth potential) should be used.



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.

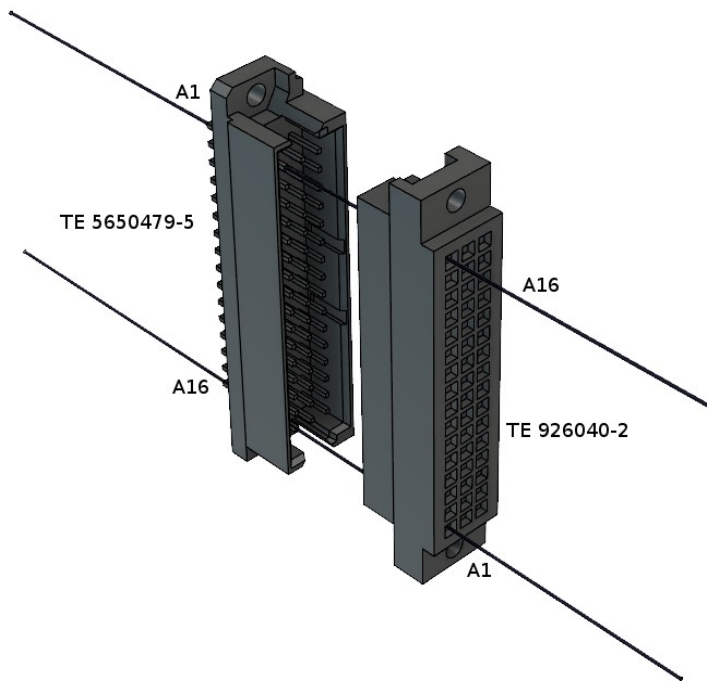


Figure 5: DIN41612 mating pin assignment example

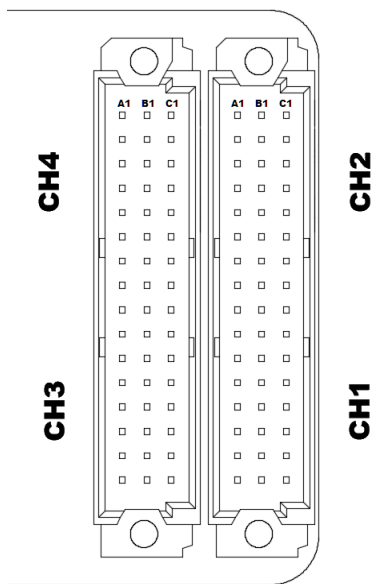


Figure 6: ISP Connector

Table 4: ISP Connector Signals (Channels 1 and 2)

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

Pin #	Signal Name	Description
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
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 5: ISP Connector Signals (Channels 3 and 4)

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

Pin #	Signal Name	Description
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
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

4.3 ATE Control Connector

ATE Control Connector is used to communicate with the host system and for integration with automatic programming/testing equipment (ATE).



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

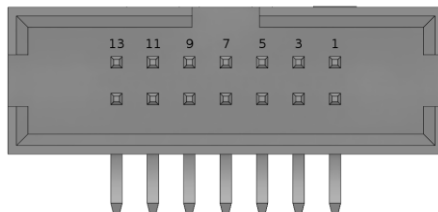


Figure 7: ATE CONTROL Connector

Table 6: Control Connector Signals

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

You can use the provided expansion board to connect to the control interface's signals which are indicated on the board's silkscreen.

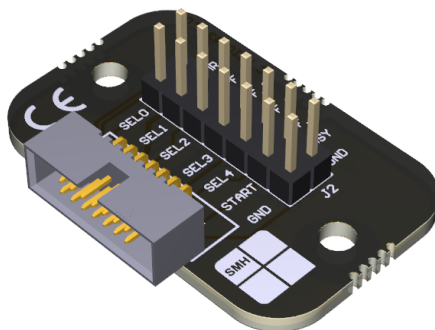


Figure 8: Control Interface expansion board

4.4 USB Connector

The USB-B connector can be used to communicate with the ATE system.



Note: USB signals are referenced to GND_USB, separate from GND, and GND_I.

5 FlashRunner LAN 2.0 Next Generation Tools

5.1 Relay Barrier

Relay barrier is functional to provide galvanic isolation between FlashRunner and the UUTs. It is available in a two-channel version:

- FRLAN2P0NXGRB (Relay Barrier for FRLAN2P0NXG)

It can be upgraded to a 4 channels version according to your needs. Please contact your sales representative for further information.

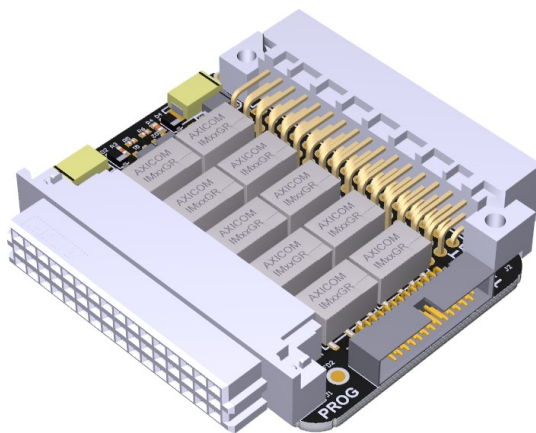


Figure 9: FRLAN2P0NXGRB two channels relay barrier

Relay barrier is self-powered when plugged into FlashRunner LAN 2.0 Next Generation.

The driving signals for the relays are given by the FlashRunner through the dedicated pins.

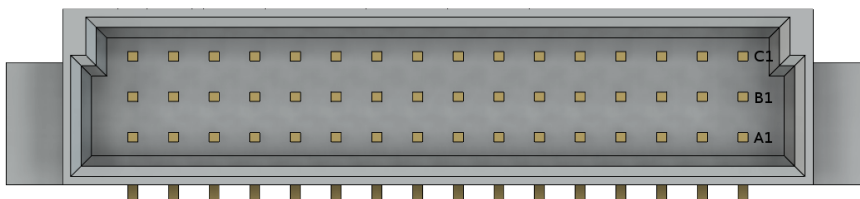


Figure 10: Relay Barrier ISP connector front view

Table 7: Relay Barrier ISP "output" signals

Pin #	Signal Name	Description
A1	DIO7_CHA	ISP Channel A: Digital input/output 7
A2	DIO5_GND_CHA	ISP Channel A: Digital input/output 5 Ground
A3	DIO4_CHA	ISP Channel A: Digital input/output 4
A4	DIO2_GND_CHA	ISP Channel A: Digital input/output 2 Ground
A5	DIO1_CHA	ISP Channel A: Digital input/output 1
A6	VPROG1_GND_CHA	ISP Channel A: Programmable voltage 1 Ground
A7	VPROG0_CHA	ISP Channel A: Programmable voltage 0
A8	NC	Not Connected
A9	NC	Not Connected
A10	DIO7_CHB	ISP Channel B: Digital input/output 7
A11	DIO5_GND_CHB	ISP Channel B: Digital input/output 5 Ground
A12	DIO4_CHB	ISP Channel B: Digital input/output 4
A13	DIO2_GND_CHB	ISP Channel B: Digital input/output 2 Ground
A14	DIO1_CHB	ISP Channel B: Digital input/output 1
A15	VPROG1_GND_CHB	ISP Channel B: Programmable voltage 1 Ground
A16	VPROG0_CHB	ISP Channel B: Programmable voltage 0
B1	DIO7_GND_CHA	ISP Channel A: Digital input/output 7 Ground
B2	DIO6_CHA	ISP Channel A: Digital input/output 6
B3	DIO4_GND_CHA	ISP Channel A: Digital input/output 4 Ground
B4	DIO3_CHA	ISP Channel A: Digital input/output 3
B5	DIO1_GND_CHA	ISP Channel A: Digital input/output 1 Ground
B6	DIO0_CHA	ISP Channel A: Digital input/output 0
B7	VPROG0_GND_CHA	ISP Channel A: Programmable voltage 0 Ground
B8	NC	Not Connected
B9	NC	Not Connected
B10	DIO7_GND_CHB	ISP Channel B: Digital input/output 7 Ground
B11	DIO6_CHB	ISP Channel B: Digital input/output 6

Pin #	Signal Name	Description
B12	DIO4_GND_CHB	ISP Channel B: Digital input/output 4 Ground
B13	DIO3_CHB	ISP Channel B: Digital input/output 3
B14	DIO1_GND_CHB	ISP Channel B: Digital input/output 1 Ground
B15	DIO0_CHB	ISP Channel B: Digital input/output 0
B16	VPROG0_GND_CHB	ISP Channel B: Programmable voltage 0 Ground
C1	NC	Not Connected
C2	DIO6_GND_CHA	ISP Channel A: Digital input/output 6 Ground
C3	DIO5_CHA	ISP Channel A: Digital input/output 5
C4	DIO3_GND_CHA	ISP Channel A: Digital input/output 3 Ground
C5	DIO2_CHA	ISP Channel A: Digital input/output 2
C6	DIO0_GND_CHA	ISP Channel A: Digital input/output 0 Ground
C7	VPROG1_CHA	ISP Channel A: Programmable voltage 1
C8	GND_RLY_CHA	ISP Channel A: Relay Barrier Ground
C9	GND_RLY_CHB	ISP Channel B: Relay Barrier Ground
C10	NC	Not Connected
C11	DIO6_GND_CHB	ISP Channel B: Digital input/output 6 Ground
C12	DIO5_CHB	ISP Channel B: Digital input/output 5
C13	DIO3_GND_CHB	ISP Channel B: Digital input/output 3 Ground
C14	DIO2_CHB	ISP Channel B: Digital input/output 2
C15	DIO0_GND_CHB	ISP Channel B: Digital input/output 0 Ground
C16	VPROG1_CHB	ISP Channel B: Programmable voltage 1

A 26 pins auxiliary input connector is available onboard, which connects to the output pins of the two channels when the relays are open.

You can use the provided Auxiliary Interface board to connect your signals to the UUT when not using the programmer's digital IOs.

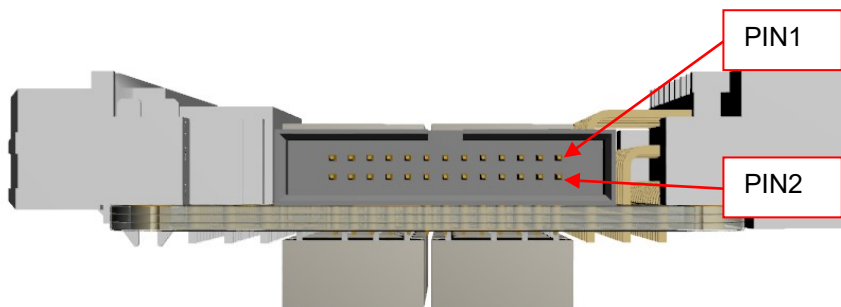


Figure 11: FRLAN2P0NXGRB Auxiliary input connector

Block diagram of the ISP lines switching capabilities:

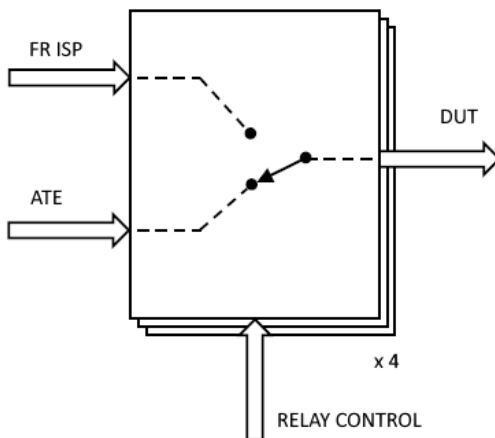


Figure 12: Relay Barrier Application Note

Table 8: Auxiliary Connector Pinout

Pin #	Signal Name	Description
1	AUX_A_DIO0	ISP Channel A: Digital input/output 0
2	AUX_B_VPROG0	ISP Channel B: Digital input/output Vprog0
3	AUX_A_DIO1	ISP Channel A: Digital input/output 1
4	AUX_B_VPROG1	ISP Channel B: Digital input/output VProg1
5	AUX_A_DIO2	ISP Channel A: Digital input/output 2
6	AUX_B_GND0	ISP Channel B: Digital input/output Ground 0
7	AUX_A_DIO3	ISP Channel A: Digital input/output 3
8	AUX_B_GND1	ISP Channel B: Digital input/output Ground 1
9	AUX_A_DIO4	ISP Channel A: Digital input/output 4
10	AUX_B_DIO0	ISP Channel B: Digital input/output 0
11	AUX_A_DIO5	ISP Channel A: Digital input/output 5
12	AUX_B_DIO1	ISP Channel B: Digital input/output 1
13	AUX_A_DIO6	ISP Channel A: Digital input/output 6
14	AUX_B_DIO2	ISP Channel B: Digital input/output 2
15	AUX_A_DIO7	ISP Channel A: Digital input/output 7
16	AUX_B_DIO3	ISP Channel B: Digital input/output 3
17	AUX_A_VPROG0	ISP Channel A: Digital input/output VProg0
18	AUX_B_DIO4	ISP Channel B: Digital input/output 4
19	AUX_A_VPROG1	ISP Channel A: Digital input/output VProg1
20	AUX_B_DIO5	ISP Channel B: Digital input/output 5

Pin #	Signal Name	Description
21	AUX_A_GND0	ISP Channel A: Digital input/output Ground 0
22	AUX_B_DIO6	ISP Channel B: Digital input/output 6
23	AUX_A_GND1	ISP Channel A: Digital input/output Ground 1
24	AUX_B_DIO7	ISP Channel B: Digital input/output 7
25	AUX_A_GND2	ISP Channel A: Digital input/output Ground 2
26	AUX_B_GND2	ISP Channel B: Digital input/output Ground 2

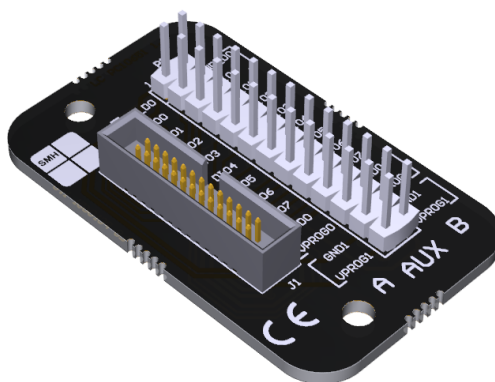


Figure 13: Auxiliary interface expansion board for relay barrier

Parameter	Value
Supply voltage on line POWER (reference GND)	+15V
FRLAN2P0NXGRB Dimensions	58.6 mm x 60 mm x16 mm
"ISP" connectors type	DIN41612 type C/2 male output, type R/2 female input
Auxiliary connector	26 pin box header 1.27mm pitch (0.50 mils)

5.2 Cable Interface

A cable interface is available for the FlashRunner LAN2P0 NXG to connect the targets using our special twisted cables, keeping good signals integrity.

Each header connector (H1..H4) is the output of one programming channel and can be connected to a FRHDPSTR through a FRCABLE.

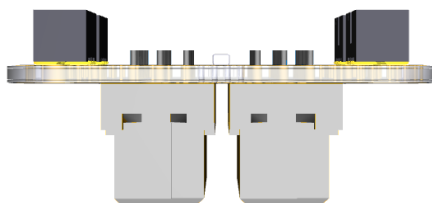


Figure 14: Auxiliary interface expansion board for relay barrier

Parameter	Value
FR2P0INTF08 Dimensions	60 x 40 x 19 mm
FRHDPSTR Dimensions	46 x 30 mm
"ISP" connectors type	48 way, 3 row, DIN 41612, pitch = 2,54mm
Header connectors type	20 way, 2 row, pitch = 1,27mm

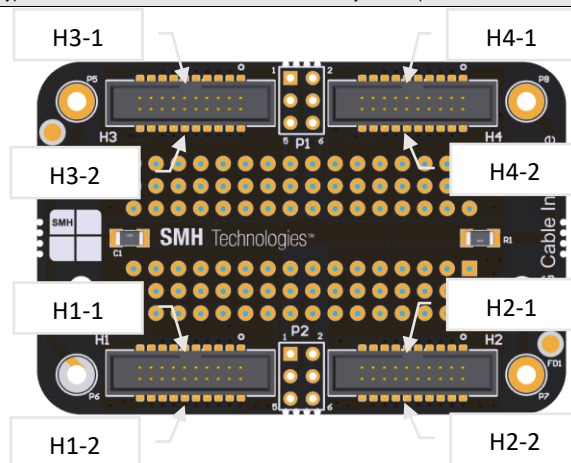


Table 9: Header Connector Signals Channel 1

Pin #	Signal Name	Description
H1-1	DIO0_CH1	ISP Channel 1: Digital input/output 0
H1-2	DIO0_GND_CH1	ISP Channel 1: Digital input/output 0 Ground
H1-3	DIO1_CH1	ISP Channel 1: Digital input/output 1
H1-4	DIO1_GND_CH1	ISP Channel 1: Digital input/output 1 Ground
H1-5	DIO2_CH1	ISP Channel 1: Digital input/output 2
H1-6	DIO2_GND_CH1	ISP Channel 1: Digital input/output 2 Ground
H1-7	DIO3_CH1	ISP Channel 1: Digital input/output 3
H1-8	DIO3_GND_CH1	ISP Channel 1: Digital input/output 3 Ground
H1-9	DIO4_CH1	ISP Channel 1: Digital input/output 4
H1-10	DIO4_GND_CH1	ISP Channel 1: Digital input/output 4 Ground
H1-11	DIO5_CH1	ISP Channel 1: Digital input/output 5
H1-12	DIO5_GND_CH1	ISP Channel 1: Digital input/output 5 Ground
H1-13	DIO6_CH1	ISP Channel 1: Digital input/output 6
H1-14	DIO6_GND_CH1	ISP Channel 1: Digital input/output 6 Ground
H1-15	DIO7_CH1	ISP Channel 1: Digital input/output 7
H1-16	DIO7_GND_CH1	ISP Channel 1: Digital input/output 7 Ground
H1-17	VPROG0_CH1	ISP Channel 1: Programmable voltage 0
H1-18	VPROG0_GND_CH1	ISP Channel 1: Programmable voltage 0 Ground
H1-19	VPROG1_CH1	ISP Channel 1: Programmable voltage 1
H1-20	VPROG1_GND_CH1	ISP Channel 1: Programmable voltage 1 Ground

Table 10: Header Connector Signals Channel 2

Pin #	Signal Name	Description
H2-1	DIO0_CH2	ISP Channel 2: Digital input/output 0
H2-2	DIO0_GND_CH2	ISP Channel 2: Digital input/output 0 Ground
H2-3	DIO1_CH2	ISP Channel 2: Digital input/output 1
H2-4	DIO1_GND_CH2	ISP Channel 2: Digital input/output 1 Ground
H2-5	DIO2_CH2	ISP Channel 2: Digital input/output 2
H2-6	DIO2_GND_CH2	ISP Channel 2: Digital input/output 2 Ground
H2-7	DIO3_CH2	ISP Channel 2: Digital input/output 3
H2-8	DIO3_GND_CH2	ISP Channel 2: Digital input/output 3 Ground
H2-9	DIO4_CH2	ISP Channel 2: Digital input/output 4
H2-10	DIO4_GND_CH2	ISP Channel 2: Digital input/output 4 Ground
H2-11	DIO5_CH2	ISP Channel 2: Digital input/output 5
H2-12	DIO5_GND_CH2	ISP Channel 2: Digital input/output 5 Ground
H2-13	DIO6_CH2	ISP Channel 2: Digital input/output 6
H2-14	DIO6_GND_CH2	ISP Channel 2: Digital input/output 6 Ground
H2-15	DIO7_CH2	ISP Channel 2: Digital input/output 7
H2-16	DIO7_GND_CH2	ISP Channel 2: Digital input/output 7 Ground
H2-17	VPROG0_CH2	ISP Channel 2: Programmable voltage 0
H2-18	VPROG0_GND_CH2	ISP Channel 2: Programmable voltage 0 Ground

Pin #	Signal Name	Description
H2-19	VPROG1_CH2	ISP Channel 2: Programmable voltage 1
H2-20	VPROG1_GND_CH2	ISP Channel 2: Programmable voltage 1 Ground

Table 11: Header Connector Signals Channel 3

Pin #	Signal Name	Description
H3-1	DIO0_CH3	ISP Channel 3: Digital input/output 0
H3-2	DIO0_GND_CH3	ISP Channel 3: Digital input/output 0 Ground
H3-3	DIO1_CH3	ISP Channel 3: Digital input/output 1
H3-4	DIO1_GND_CH3	ISP Channel 3: Digital input/output 1 Ground
H3-5	DIO2_CH3	ISP Channel 3: Digital input/output 2
H3-6	DIO2_GND_CH3	ISP Channel 3: Digital input/output 2 Ground
H3-7	DIO3_CH3	ISP Channel 3: Digital input/output 3
H3-8	DIO3_GND_CH3	ISP Channel 3: Digital input/output 3 Ground
H3-9	DIO4_CH3	ISP Channel 3: Digital input/output 4
H3-10	DIO4_GND_CH3	ISP Channel 3: Digital input/output 4 Ground
H3-11	DIO5_CH3	ISP Channel 3: Digital input/output 5
H3-12	DIO5_GND_CH3	ISP Channel 3: Digital input/output 5 Ground
H3-13	DIO6_CH3	ISP Channel 3: Digital input/output 6
H3-14	DIO6_GND_CH3	ISP Channel 3: Digital input/output 6 Ground
H3-15	DIO7_CH3	ISP Channel 3: Digital input/output 7
H3-16	DIO7_GND_CH3	ISP Channel 3: Digital input/output 7 Ground
H3-17	VPROG0_CH3	ISP Channel 3: Programmable voltage 0
H3-18	VPROG0_GND_CH3	ISP Channel 3: Programmable voltage 0 Ground
H3-19	VPROG1_CH3	ISP Channel 3: Programmable voltage 1
H3-20	VPROG1_GND_CH3	ISP Channel 3: Programmable voltage 1 Ground

Table 12: Header Connector Signals Channel 4

Pin #	Signal Name	Description
H4-1	DIO0_CH4	ISP Channel 4: Digital input/output 0
H4-2	DIO0_GND_CH4	ISP Channel 4: Digital input/output 0 Ground
H4-3	DIO1_CH4	ISP Channel 4: Digital input/output 1
H4-4	DIO1_GND_CH4	ISP Channel 4: Digital input/output 1 Ground
H4-5	DIO2_CH4	ISP Channel 4: Digital input/output 2
H4-6	DIO2_GND_CH4	ISP Channel 4: Digital input/output 2 Ground
H4-7	DIO3_CH4	ISP Channel 4: Digital input/output 3
H4-8	DIO3_GND_CH4	ISP Channel 4: Digital input/output 3 Ground
H4-9	DIO4_CH4	ISP Channel 4: Digital input/output 4
H4-10	DIO4_GND_CH4	ISP Channel 4: Digital input/output 4 Ground
H4-11	DIO5_CH4	ISP Channel 4: Digital input/output 5
H4-12	DIO5_GND_CH4	ISP Channel 4: Digital input/output 5 Ground
H4-13	DIO6_CH4	ISP Channel 4: Digital input/output 6

Pin #	Signal Name	Description
H4-14	DIO6_GND_CH4	ISP Channel 4: Digital input/output 6 Ground
H4-15	DIO7_CH4	ISP Channel 4: Digital input/output 7
H4-16	DIO7_GND_CH4	ISP Channel 4: Digital input/output 7 Ground
H4-17	VPROG0_CH4	ISP Channel 4: Programmable voltage 0
H4-18	VPROG0_GND_CH4	ISP Channel 4: Programmable voltage 0 Ground
H4-19	VPROG1_CH4	ISP Channel 4: Programmable voltage 1
H4-20	VPROG1_GND_CH4	ISP Channel 4: Programmable voltage 1 Ground

Table 13: Aux Connectors

Pin #	Signal Name	Description
P2-1	RLY_ON_CH1	ISP Channel 1: Relay Barrier Driver Output
P2-2	RLY_ON_CH2	ISP Channel 2: Relay Barrier Driver Output
P2-3	GND_RLY_CH1	ISP Channel 1: Relay Barrier Ground
P2-4	GND_RLY_CH2	ISP Channel 2: Relay Barrier Ground
P2-5	PWR_RLY_CH1	ISP Channel 1: Relay Barrier Power Source
P2-6	PWR_RLY_CH2	ISP Channel 2: Relay Barrier Power Source
P1-1	RLY_ON_CH3	ISP Channel 3: Relay Barrier Driver Output
P1-2	RLY_ON_CH4	ISP Channel 4: Relay Barrier Driver Output
P1-3	GND_RLY_CH3	ISP Channel 3: Relay Barrier Ground
P1-4	GND_RLY_CH5	ISP Channel 4: Relay Barrier Ground
P1-5	PWR_RLY_CH3	ISP Channel 3: Relay Barrier Power Source
P1-6	PWR_RLY_CH4	ISP Channel 4: Relay Barrier Power Source

Note: Aux connectors are intended to be used only as a development utility.

6 Technical Specifications

6.1 Absolute Maximum Ratings

Table 14: Absolute Maximum Ratings

Parameter	Value
“POWER” Connector	
Supply voltage on line POWER (reference GND)	+15V
“ATE CONTROL” Connector	
Maximum input voltage on lines START, SEL[4..0], SG[1..0]	-2V to +20V
Maximum current on lines BUSY, PASS, FAIL	±10mA
“ISP GROUP” Connectors	
Maximum input voltage on lines DIO/AO[1..0], DIO[6..2], CLKOUT	-1V to +5.5V
Maximum current on lines DIO	±24mA
Maximum current on line VPROG0	250 mA
Maximum current on line VPROG1	200 mA
“Relay Barrier”	
Coil Supply Voltage	15V
“RLY_ON” signal Voltage	3.3V
Maximum current on lines RLY_ON	±10mA



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.

6.2 DC Characteristics and Functional Operating Range

Table 15: DC Characteristics and Functional Operating Range

Parameter	Condition	Value		
		Min	Typ	Max
“ATE 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	-	15V
V _{OL} (output low voltage) on lines BUSY, FAIL, PASS	I _{OL} = 4mA	-	-	0.8V
V _{OH} (output high voltage) on lines BUSY, FAIL, PASS		4.5V	-	5V
“ISP” Connectors				
V _{IL} (input low voltage) on lines DIO		-	-	0.3V _{PROG0}
V _{IH} (input high voltage) on lines DIO	Configured as digital lines	0.7V _{PROG0}	-	V _{PROG0}
V _{OL} (output low voltage) on lines DIO, CLKOUT	Configured as digital lines, V _{PROG0} = 3V, I _{OL} = 12mA	-	-	0.36V
V _{OH} (output high voltage) on lines DIO, CLKOUT	Configured as digital lines, V _{PROG0} = 3V, I _{OH} = 12mA	2.56V	-	-
V _{OL} (output low voltage) on lines DIO, CLKOUT	Configured as digital lines, V _{PROG0} = 5.5V, I _{OL} = 24mA	-	-	0.36V
V _{OH} (output high voltage) on lines DIO, CLKOUT	Configured as digital lines, V _{PROG0} = 5.5V, I _{OH} = 24mA	4.86V	-	-
I _{OH} current (source) on lines DIO	Configured as input with active pull-ups	-	3.8mA	-
V _{PROG0} output voltage		1.65V	-	5.5V
V _{PROG0} current (source)		-	-	250mA
V _{PROG1} output voltage		6V	-	13.5V
V _{PROG1} current (source)		-	-	200mA
“POWER” Connector				
Supply voltage		15V	-	15V
Power consumption		-	-	5A

6.3 C Characteristics (TBW)

Table 16: AC Characteristics

Parameter	Condition		Value		
			Min	Typ	Max
t_{RISE} on lines DIO[6..2], DIO[1..0], CLKOUT when configured as digital output push-pull	$V_{PROG0} = 1.8V$	Load: 470Ω//100pF (see figure 4.1a)	-	40ns	-
	$V_{PROG0} = 3.3V$		-	30ns	-
	$V_{PROG0} = 5V$		-	25ns	-
t_{FALL} on lines DIO[6..2], DIO[1..0], CLKOUT when configured as digital output push-pull	$V_{PROG0} = 1.8V$	Load: 470Ω//100pF (see figure 4.1a)	-	35ns	-
	$V_{PROG0} = 3.3V$		-	25ns	-
	$V_{PROG0} = 5V$		-	25ns	-
	$V_{PROG1} = 12V$		-	20μs	-
	$V_{PROG1} = 14.5V$		-	30μs	-
t_{RISE} on line VPROG0	$V_{PROG0} = 0-1.8V$	Load: 15Ω//10mF (see figure 4.1a)	-	10ms	-
	$V_{PROG0} = 0-3.3V$	Load: 22Ω//10mF (see figure 4.1a)	-	15ms	-
	$V_{PROG0} = 0-5.5V$	Load: 22Ω//10mF (see figure 4.1a)	-	20ms	-
t_{FALL} on line VPROG0	$V_{PROG0} = 1.8-0V$	Load: 10mF (see figure 4.1b)	-	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 (see figure 4.1a)	-	1.3ms	-
	$V_{PROG1} = 0-5V$	Load: 47Ω//1mF (see figure 4.1a)	-	1.8ms	-
	$V_{PROG1} = 0-14.5V$	Load: 94Ω//1mF (see figure 4.1a)	-	13ms	-
t_{FALL} on line VPROG1	$V_{PROG1} = 3-0V$	Load: 1mF (see figure 4.1b)	-	18ms	-
	$V_{PROG1} = 5-0V$		-	30ms	-
	$V_{PROG1} = 14.5-0V$		-	45ms	-
CLKOUT frequency			0MHz	-	25MHz

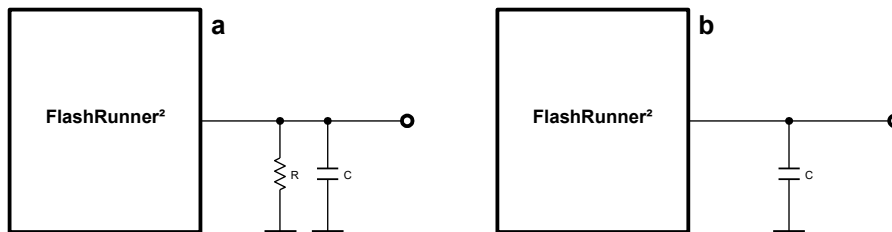


Figure 15: Load Conditions

6.4 Physical and Environmental Specifications

Table 17: Physical and Environmental Specifications

Parameter	Value
Dimensions, open frame version	140 x 60 x 18 mm
Dimensions, case version	140 x 70 x 18 mm
Dimensions, with relay barrier	-
"ISP" connectors type	48 way, 3 row, DIN 41612, pitch = 2.54mm (male)
"ATE CONTROL" connector type	14 way, 2 row, box header, pitch = 1.27mm (male)
"USB" connector type	USB-B micro receptable
"LAN" connector type	RJ-45 connector
"POWER" connector type	DC Plug
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
Sd card size	Up to 200 GB, by default mounts 64GB