

# Program your MCUs with new FlashRunner 2.0 NXG Relay Barrier with Cable Interface

## Application note

Revision 1.0 — Feb 2025



UNIVERSAL PRODUCTION IN-SYSTEM PROGRAMMING

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## Introduction

SMH Technologies offers a new useful tool dedicated to FlashRunner 2.0 NXG to provide galvanic isolation between the programming system and the devices under test/programming (DUTs).

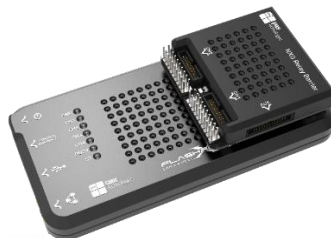
## Relay Barrier versions

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.

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



FlashRunner 2.0 NXG Relay Barrier 2-channels



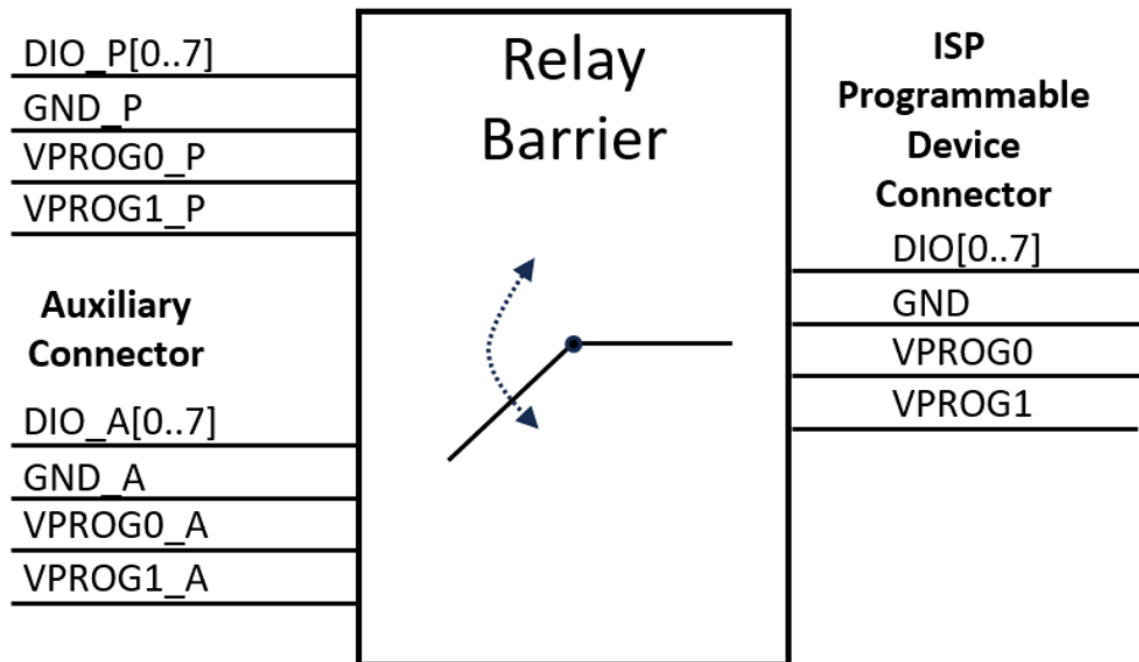
FlashRunner 2.0 NXG Relay Barrier 4-channels

## Relay Barrier operation

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.

### FlashRunner 2.0 NXG



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

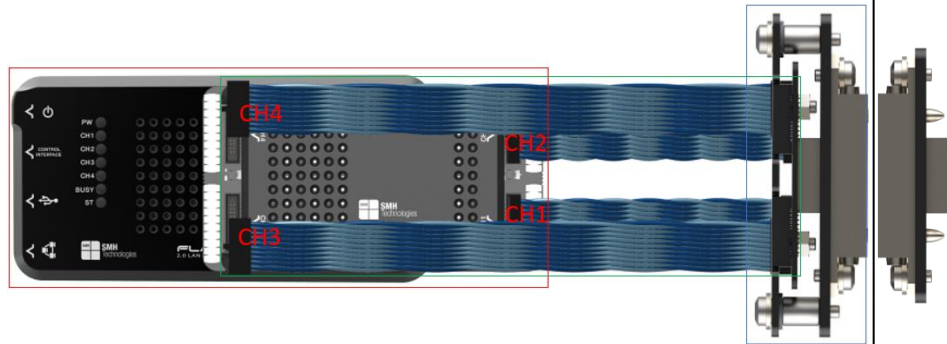
the relay switches go in the CLOSED position  
the **ISP device connector lines are connected to the Active Module line**

## Integration guidelines

### Option 1) Programmer placed machinery side (outside the fixture)

Machine Side

Fixture Side



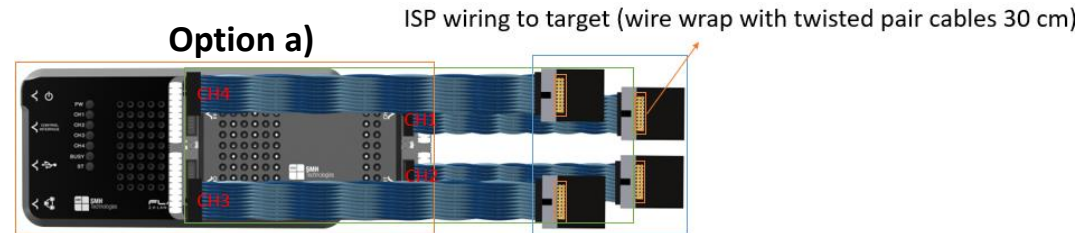
ISP wiring to target: twisted pair cables (30cm)

**NXG + Relay Barrier** FR flat cables (50cm) ODU4 machinery side ODU4 fixture side

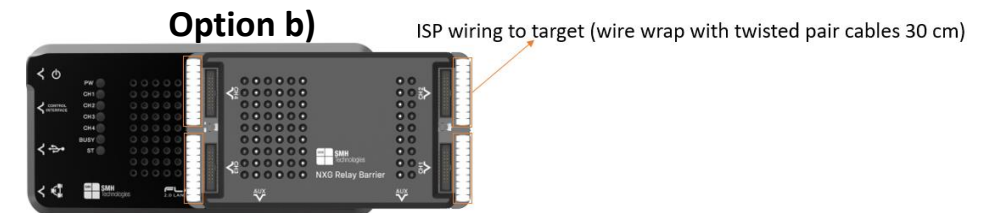
### Option 2) Programmer placed inside the fixture

Machine Side

Fixture Side



**NXG + Relay Barrier** FR flat cables (30cm) Headers



## Machinery side:

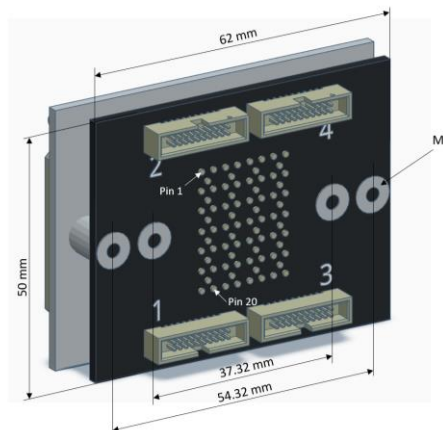
When the programmer is placed outside the fixture (**option 1**), it is highly recommended to employ the following suggestions to reach the fixture and maintain optimal signals integrity and stability:

### FR cable



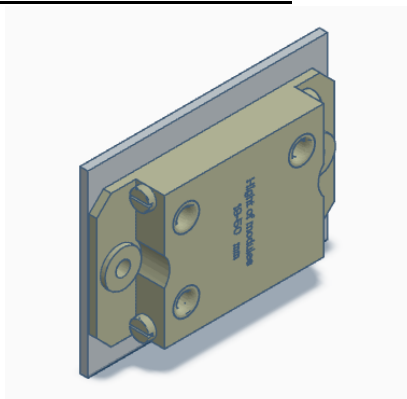
| Description                 | Part Number | Length[cm] |
|-----------------------------|-------------|------------|
| Flat cables .025 Flat 30AWG | FRCABLE30   | 30         |
| Flat cables .025 Flat 30AWG | FRCABLE50   | 50         |

### ODU 4 mass interconnection specifications machine side:



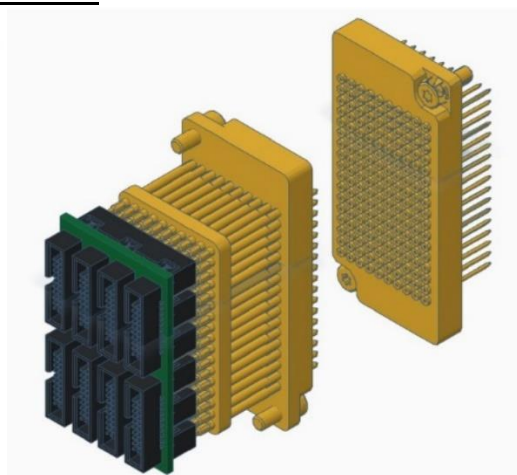
| Description                                    | Part Number        |
|--|--------------------|
| Pin frame ODU MAC-L - 8 units (machinery side) | JB-ODU4-FLAT20-MAC |

## ODU 4 mass interconnection specifications fixture side:



| Description                                  | Part Number        |
|--|--------------------|
| Pin frame ODU MAC-L - 8 units (fixture side) | JB-ODU4-FLAT20-FIX |

Another type of mass interconnections available at SMH for other products of the 2.0 line (FR2.0 8CHs, 16CHs) is **FR2.0: pylon block 8 CHs**



| Description                                  | Part number         |
|--|---------------------|
| Signal Receiver Pylon Block (machinery side) | JB-PYLON-FLAT20-MAC |

| Description   | Part number         |
|---|---------------------|
| Interchangeable Test Adapter Pylon Block (fixture side) | JB-PYLON-FLAT20-FIX |

## Fixture side

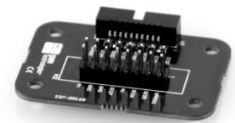
When the programmer is placed inside the fixture and the target is far from the programmer (**option 2a**), the best practice to reach it would be to use a flat cable (minimum length provided by SMH is 30cm, highly suggested for this application) from the new relay barrier cable interface connector to reach the cable interface header to then wire wrap the desired ISP signals.



FlashRunner2.0 NXG + new relay barrier



Flat cable



Cable interface header

When the programmer is placed inside the fixture and the target is closed to the programmer (**option 2b**), the new relay barrier allows the customer to directly wire-wrap the desired ISP signals.

## In general

The ISP wiring to target in both cases (machine side and fixture side) should follow these guidelines:

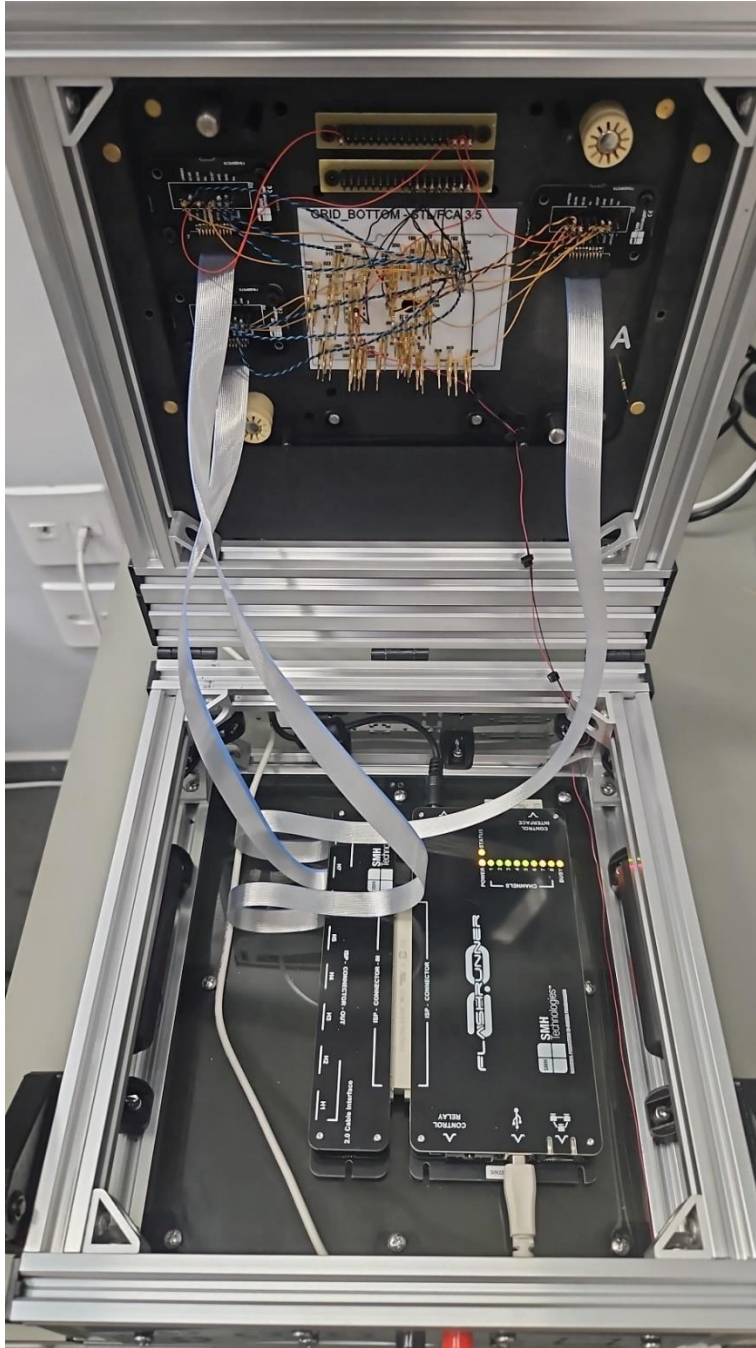
- It is highly suggested to not overcome a length of 30cm to reach the target using twisted pair cables.
- The twisted GNDs-data cable coming out from the programmer should reach the board GND plane and should have the same common GND reference.
- Keep the ISP lines separated from the rest of the cables that a production system would require for other purposes.

Using SMH tools and following these guidelines, it is possible to exploit the programming system at full potential without compromising protocol frequencies or data transfer speeds.

## User cases (practical demonstrations)

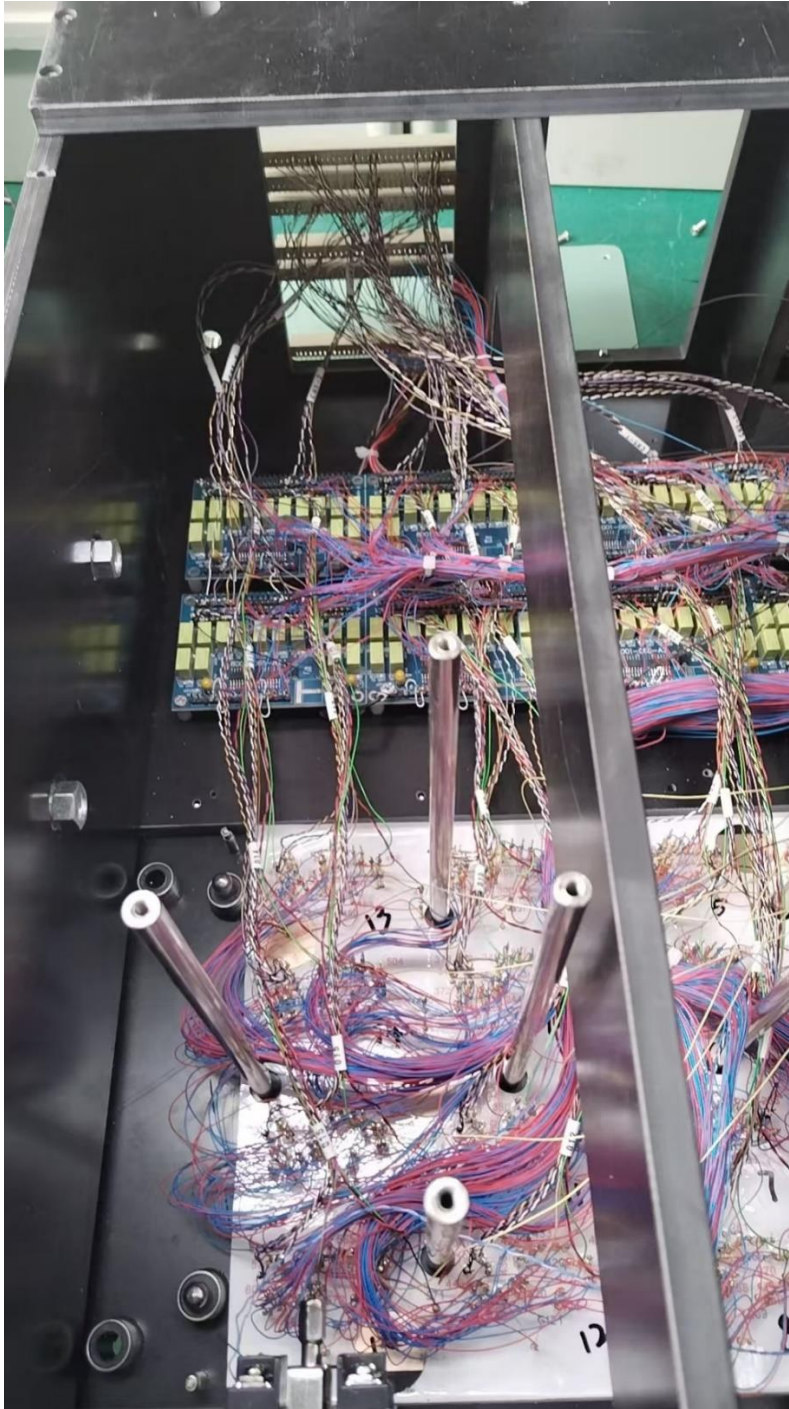
Exemple of Option 2° usage

Programmer inside the fixture + flat cable + wire wrap (twisted pair cables)



Here the programmer is well exploited thanks to the usage of flat cables no longer than 50cm that are reaching cable interface headers. Then ISP signals are made through wire-wrap technique no longer than 30cm using twisted pair cables.





115 Agnelli



In the second image wire wrap technique 150cm long is used outside the fixture for ISP signals. The same ISP signals are mixed together with other cables whose purposes are aside the programming. This environment is extremely limiting the programmer potential and absolutely not assuring signal integrity and stability.