SD FLASH 512MB MODULAR MUX

Using the SD FLASH 512MB MODULAR MUX multiplexer system in conjunction with SafetyBridge technology

Application note
108804_en_00

1 Description

This application note provides information on how to use the SD FLASH 512MB MODULAR MUX multiplexer system in conjunction with SafetyBridge technology.

Also refer to the documentation for the SD FLASH 512MB MODULAR MUX multiplexer system and the respective SafetyBridge modules.

It can be downloaded at phoenixcontact.net/products.

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Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/product/2701872.

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2 “SafetyBridge Multiplexer” operating mode

In this operating mode, the input data of a safe IB IL 24 PSDI 8-PAC input module is output one-to-one to the output terminals of the IB IL 24 LPSDO 8 V2-PAC safety module. A controller is still required as it copies the data.

The IB IL 24 LPSDO 8 V2-PAC and IB IL 24 PSDI 8-PAC safety modules which are to operate together in multiplexer mode are configured and assigned to one another via the switch position of the DIP switches (see “Switch position for SafetyBridge-V2 multiplexer mode” on page 3). The parameterizations of both safety modules are fixed and cannot be modified.
A parameterization tool is not required for the “SafetyBridge Multiplexer” operating mode.

NOTE: Not a safe application

In order to ensure correct use, subsequent safety logic (an evaluation unit) is required.

Multiplexer mode is intended as a replacement for cabling. A stand-alone solution will require additional components (see example in Figure 1).
Please also observe the UM EN SD FLASH 512MB MODULAR MUX user manual.
It can be downloaded at phoenixcontact.net/product/2701872.

The IB IL 24 LPSDO 8 V2-PAC safety module parameterizes both the local safe I/O devices and the input module as follows:

Parameterization of all safe outputs of the IB IL 24 LPSDO 8 V2-PAC safety module

Parameterization	Parameterized as	Comment
Assignment	**Used**	The parameterization is set automatically and cannot be changed.
Output	**Single-channel**	
Switch-off delay for stop category 1	**Disabled**	
Switch-off delay for stop category 1	–	
Value range of switch-off delay for stop category 1	–	
Test pulses (output disabled)	**Enabled**	
Enable	**Disabled**	

The watchdog time (tFWD) is set to a fixed value of 200 ms.

Parameterization of all safe inputs of the IB IL 24 PSDI 8-PAC safety module

Parameterization	Parameterized as	Comment
Input		
Assignment	**Used**	The parameterization is set automatically and cannot be changed.
Evaluation	**Single-channel**	
Sensor type	**Standard sensor**	
Filter time (t_{Filter})	**5 ms**	
Symmetry	**Disabled**	
Clock selection	**UT1 for inputs of channel 1** **UT2 for inputs of channel 2**	
Bounce time monitoring	**Disabled**	
Start inhibit due to symmetry violation	**Disabled**	
Input signal	**Equivalent**	
Clock output		
	UT1 on / UT2 on	

3 Switch position for SafetyBridge-V2 multiplexer mode

3.1 Basic settings for the SafetyBridge-V2 multiplexer mode

The table below shows the basic settings for the IB IL 24 LPSDO 8 V2-PAC and IB IL 24 PSDI 8-PAC safety modules for operation in SafetyBridge-V2 multiplexer mode.

Device	Mode	Switch position									
		Island number							Satellites		
		9	8	7	6	5	4	3	2	1	0
IB IL 24 LPSDO 8 V2-PAC multiplexer	Any	On	Off	1 ... 31 $_{dec}$					Off	Off	Off
IB IL 24 PSDI 8-PAC multiplexer	Mode 2	Off	Off	1 ... 31 $_{dec}$					On	On	On

3.2 Example: switch position for two islands for bidirectional safe signal exchange

Device	Mode	Switch position									
		Island number							Satellites		
		9	8	7	6	5	4	3	2	1	0
Island 1: IB IL 24 LPSDO 8 V2-PAC	Any	On	Off	0	0	0	0	1	Off	Off	Off
Island 1: IB IL 24 PSDI 8-PAC (satellite 1)	Mode 2	Off	Off	0	0	0	0	1	On	On	On
Island 2: IB IL 24 LPSDO 8 V2-PAC	Any	On	Off	0	0	0	1	0	Off	Off	Off
Island 2: IB IL 24 PSDI 8-PAC (satellite 1)	Mode 2	Off	Off	0	0	0	1	0	On	On	On

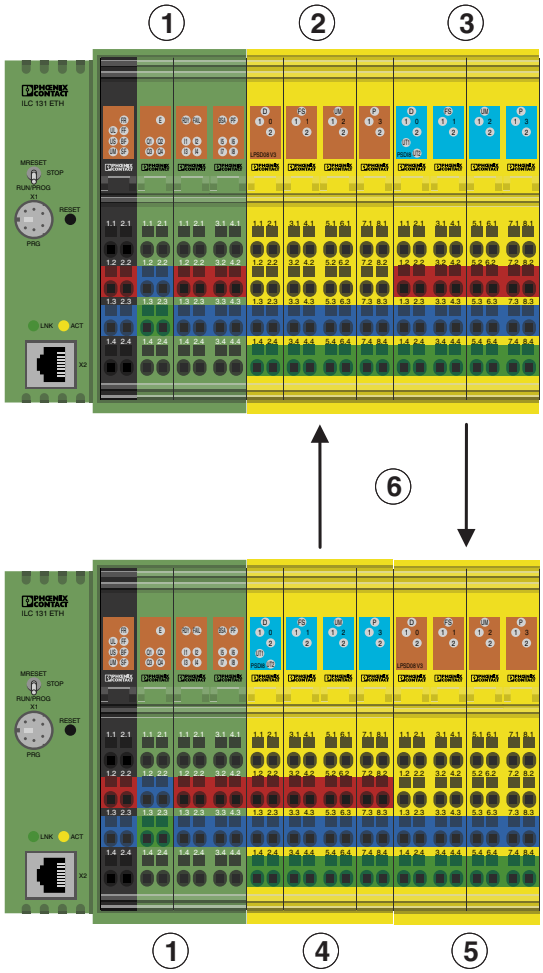

Figure 1 Example: switch position for two islands for bidirectional safe signal exchange

Key:

1 ILC 131 ETH
2 Island 1: IB IL 24 LPSDO 8 V2-PAC
3 Island 2: satellite 1
4 Island 1: satellite 1
5 Island 2: IB IL 24 LPSDO 8 V2-PAC
6 Transmission direction

4 Establishing a wireless connection

Please note:

- First, start up the multiplexer system using an Ethernet cable as described in the "Installing and starting up the SD FLASH 512MB MODULAR MUX multiplexer system" user manual.
- After successful startup, replace the Ethernet cable with the wireless connection.

The following wireless modules can be used as adapters for wireless connection of the Inline controllers:

– FL BT EPA 2 (Order No. 1005869)
– FL EPA 2 (Order No. 1005955)
– FL EPA 2 RSMA (Order No. 1005957)

To establish the wireless connection, proceed as follows:

- Configure the wireless modules as described in Section "Easy Config ("Mode" button)" of the "FL EPA 2" user manual.
- Set the following operating modes on the wireless modules:

For Bluetooth:

– Adapter A: mode 4 (LED: C)
– Adapter B: mode 8 (LED: D)

The configuration was carried out successfully if the BT LED is solid blue on both wireless modules.

- Subsequently, set additional operating modes on the wireless modules:

– Adapter A: mode 11 (LED: ABD)
– Adapter B: mode 11 (LED: ABD)

⇒ The PROFINET/PROFIsafe optimization is enabled. The WBM option for the wireless modules is disabled.

For WLAN:

– Adapter A: mode 4 (LED: C)
– Adapter B: mode 7 (LED: ABC)

The configuration was carried out successfully if the W LED is solid blue on both wireless modules.

- Subsequently, set additional operating modes on the wireless modules:

– Adapter A: mode 11 (LED: ABD)
– Adapter B: mode 11 (LED: ABD)

⇒ The PROFINET/PROFIsafe optimization is enabled. The WBM option for the wireless modules is disabled.

5 Application example

The application example shows the evaluation of a two-channel emergency stop with downstream safety logic using the SD FLASH 512MB MODULAR MUX multiplexer system.

Recommended:

- To avoid cross-circuits in the cable installation, place the safety relay and the external contactors K3 and K4 in the same electrical installation space.

WARNING: Risk of injury through loss of safety function

If the signal generator and the safety relay do not have the same ground potential, the functional safety of the system can no longer be guaranteed.

- Make sure that the signal generator and the safety relay have the same ground potential.

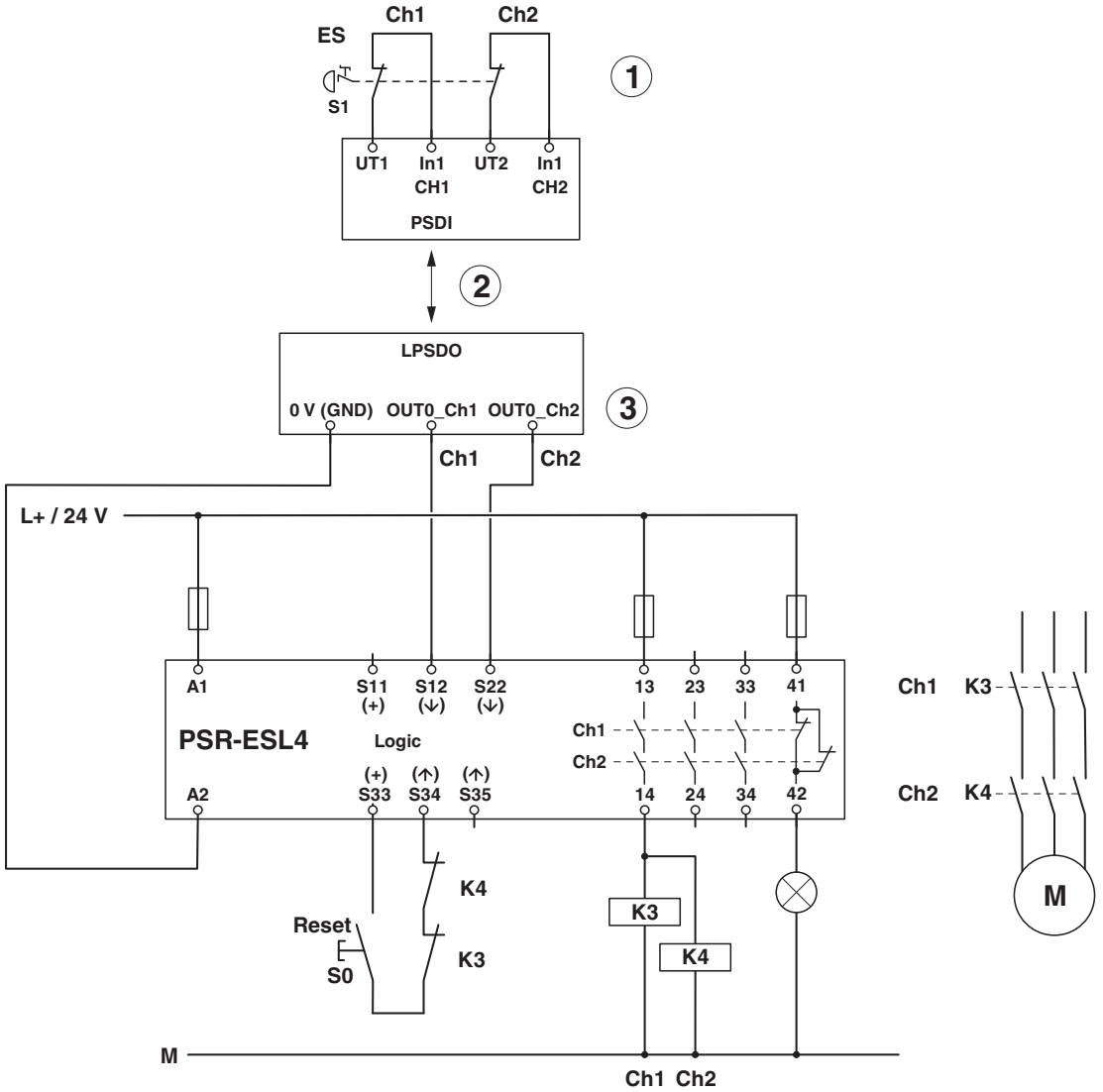

Figure 2 Application example

Key:

ES	Emergency stop switch
1	Cross-circuit detection through IB IL 24 PSDI 8-PAC
2	Multiplexer transmission
3	Cross-circuit detection through IB IL 24 LPSDO 8 V2-PAC
PSDI	IB IL 24 PSDI 8-PAC
LPSDO	IB IL 24 LPSDO 8 V2-PAC
PSR-ESL4/ Logic	Safety relay, suitable for OSSD signals (e.g., ESL4) Two-channel emergency-stop monitoring via plausibility check Monitoring of external contactors Manually monitored startup

6 Digital I/Os and diagnostic and status indicators

For information on digital inputs/outputs, as well as diagnostic and status indicators, please refer to the UM EN SD FLASH 512MB MODULAR MUX user manual.

The user manual can be downloaded at phoenixcontact.net/product/2701872.

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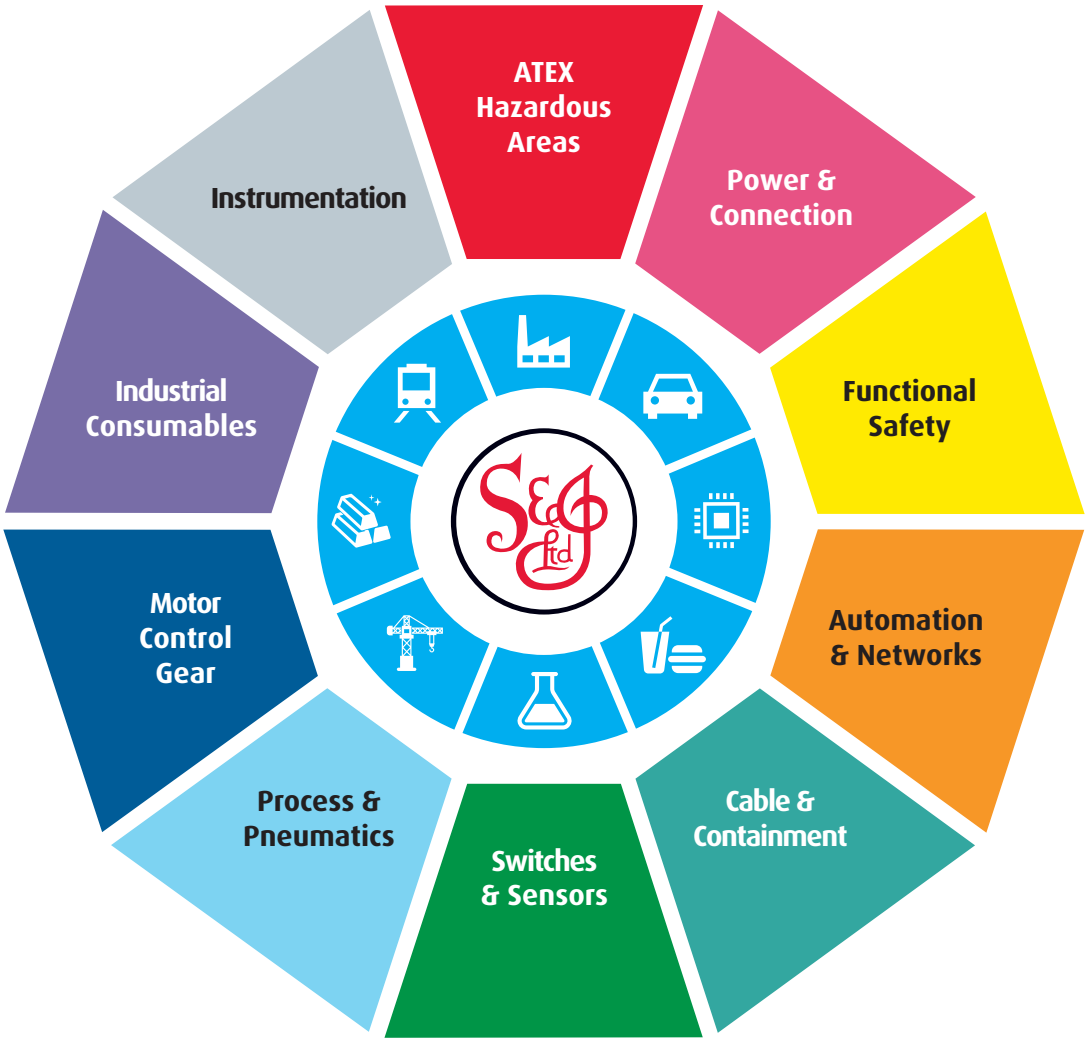

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