DSC FIELDBUS MODULES

Installation and use

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SUMMARY

INTRODUCTION

This technical sheet describes the operation of the fieldbus modules of the DSC series:
MBP (PROFIBUS DP-V1), MBD (DeviceNet), MBC (CANOpen), MBEC (ETHERCAT), MBEI (ETHERNET/IP), MBEP (PROFINET), MBEM (Modbus TCP), MBMR (Modbus RTU), MBCCL (CC-Link), MBU (USB).

ELECTRICAL CONNECTIONS

Each module is provided with four connectors (Figure 1):

1) 5 way connector MSC --> to the system DSC
2) USB miniB connect --> to the PC
3) BUS connector --> to the fieldbus (not present on MBU)
4) Front terminal --> power supply

TERMINAL BLOCK (SIDE A - TOP)		TERMINAL BLOCK (SIDE B - BOTTOM)	
TERMINAL	**SIGNAL**	**TERMINAL**	**SIGNAL**
1	*+24VDC ± 20%*	*5*	*-*
2	*-*	*6*	*Serial line RS-485 -(A)*
3	*-*	*7*	*GND*
4	*GND*	*8*	*Serial line RS-485 +(B)*

Table 1

- Install safety units in an enclosure with a protection class of at least IP54.
- The supply voltage to the units must be 24Vdc ±20%
  (PELV, in compliance with the standard EN 60204-1).
- Do not use DSC to supply external devices.
- The same ground connection (0VDC) must be used for all system components.

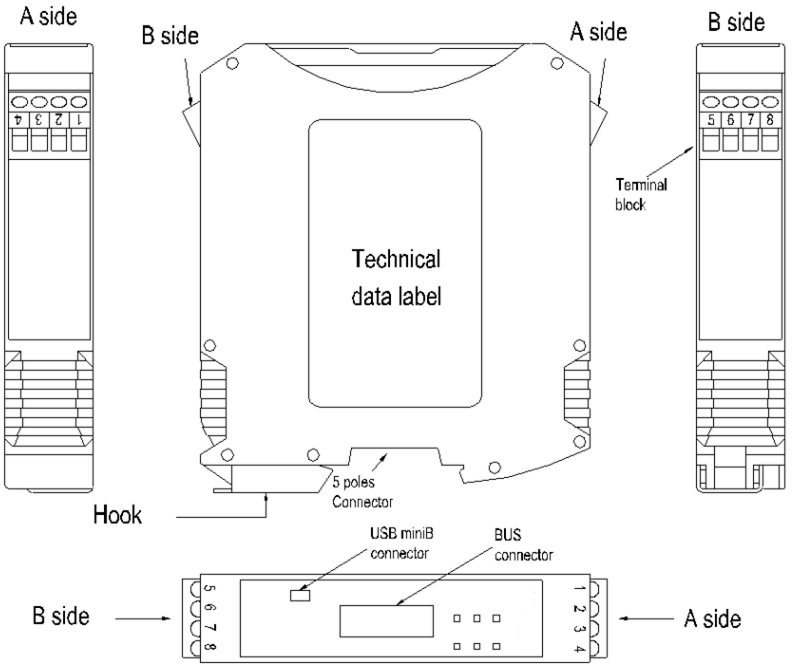


Figure 1

Figure 1

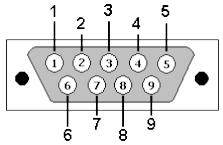
SIGNALS AND PINOUT

MEANING	LED					
	ON	RUN	IN FAIL	EXT FAIL	LED1	LED2
	GREEN	GREEN	RED	RED	RED/GREEN	RED/GREEN
Startup - Initial test	ON	ON	ON	ON	ON	ON
Waiting for configuration from Master	ON	OFF	OFF	OFF	see the modules tables	
Received configuration from Master	ON	ON	OFF	OFF		

Table 2 – Initial/ dynamic view.

Module MBC

The image does not show the specific model



DB9 – male (front view)

Pin	Signal
1	-
2	CAN_L
3	CAN_GND
4	-
5	CAN_SHIELD
6	-
7	CAN_H
8	-
9	-
Housing	CAN_SHIELD

LED OPR		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	OPERATIONAL	OPERATIONAL status
GREEN blinking slow	PRE-OPERATIONAL	PRE-OPERATIONAL status
GREEN 1 flash	STOPPED	STOPPED status
GREEN blinking fast	Autobaud	Baud rate detection
RED	EXCEPTION	EXCEPTION status

LED ERR		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	-	Normal operation
RED 1 flash	Warning level	A bus error counter has reached the warning level
RED blinking fast	LSS	LSS service operative
RED 2 flashes	Event Control	Detected ***Node Guarding*** (NMT master or slave) or ***Heartbeat*** (Consumer)
RED	Lack of BUS	BUS not working

Module MBD

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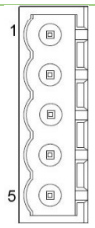

Pin	Signal	Description
1	V-	Negative BUS power supply
2	CAN_L	CAN low bus line
3	SHIELD	Cable shield
4	CAN_H	CAN high bus line
5	V+	Positive BUS power supply

LED NET		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	On-line connected	1 or more connections established
GREEN blinking (1Hz)	On-line non connected	No connection established
RED	Critical connection error	MBD unable to communicate
RED blinking (1Hz)	Time-out of 1 or more connection	One or more I/O device in time-out
GREEN/RED alternate	TEST	MBD in Test

LED STS		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	-	Normal operation
GREEN blinking (1Hz)	Pending	Configuration incomplete, MBD waiting for activation
RED	Fatal error	One or more unrecoverable errors detected
RED blinking (1Hz)	Error	One or more recoverable errors detected
GREEN/RED alternate	TEST	MBD in Test

Module MBP

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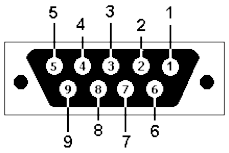

DB9 – female
(front view)

Pin	Signal	Description
1	-	-
2	-	-
3	**B-line**	Positive RxD/TxD, RS485 level
4	**RTS**	Request to send
5	**GND Bus**	0VDC (isolated)
6	**5V**	+5VDC (isolated/short circuit protected)
7	-	-
8	**A-line**	Negative RxD/TxD, RS485 level
9	-	-
Housing	**Cable shield**	Internally connected to the Anybus protective earth via cable shield filters according to the PROFIBUS standard.

LED MODE		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	On-line	data exchange
GREEN blinking	On-line	CLEAR
RED blinking (1 flash)	Parameterization error	rif. IEC 61158-6
RED blinking (2 flashes)	PROFIBUS configuration error	configuration data MASTER or MBP wrong

LED STS		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	MBP not initialized	Status **SETUP** o **NW_INIT**
GREEN	Initialized	End of initialization **NW_INIT**
GREEN blinking	Initialized with diagnostic active	**EXTENDED DIAGNOSTIC** bit set
RED	Exception error	**EXCEPTION** status

Module MBEC

The image does not show the specific model

LED STS		
STATUS	**INDICATES**	**DESCRIPTION**
OFF	INIT	INIT or no power
Green	OPERATIONAL	OPERATIONAL state
Green blinking	PRE-OPERATIONAL	PRE-OPERATIONAL state
Green blinking (1 flash)	SAFE-OPERATIONAL	SAFE-OPERATIONAL state
Red	(Fatal Event)	System locked

LED ERR		
STATUS	**INDICATES**	**DESCRIPTION**
OFF	No error	No error or no power
RED blinking (1 flash)	Configuration not valid	Status change requested by master not possible
RED blinking (2 flashes)	Watchdog timeout	Synch manager watchdog timeout
Red	Controller fault	Anybus module in EXCEPTION state

Module MBEI

The image does not show the specific model

LED NET	
STATE	**INDICATES/DESCRIPTION**
OFF	No power or no IP address
GREEN	On-line, connected
GREEN blinking	On-line, not connected
RED	Duplicate IP address
RED blinking	Connection timeout

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No power	-
GREEN	RUN state	-
GREEN blinking	Not configured	-
RED	Fatal error	One or more non-recoverable errors detected
RED blinking	Error	One or more recoverable errors detected

Module MBEP

The image does not show the specific model

LED NET		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Offline	• No power • Connection with IO controller not present
GREEN	Online (RUN)	• Established connection with IO controller • IO controller in RUN state
GREEN blinking (1 flash)	Online (STOP)	• Established connection with IO Controller • IO Controller in STOP state or IO data bad • IRT synchronization not finished
GREEN blinking	Blink	Used to identify the network node
RED	Fatal event	Major internal error (combined with a red module STS led)
RED blinking (1 flash)	Station Name error	Station Name not set
RED blinking (2 flashes)	IP address error	IP address not set
RED blinking (3 flash)	Configuration error	Expected identification differs from real identification

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Not initialized	No power or Module in SETUP or NW_INIT state
GREEN	Normal operation	Module has shifted from the NW_INIT state
GREEN blinking (1 flash)	Diagnostic event (s)	Diagnostic event (s) present
RED	Exception error	Device in state EXCEPTION
	Fatal event	Major internal error (combined with a red NET led module)
Alternating RED/GREEN	Firmware update	Do NOT power off the module. It could cause a permanent damage.

Module MBEM

The image does not show the specific model

LED NET	
STATE	**INDICATES/DESCRIPTION**
OFF	No power or no IP address
GREEN	Module is in Process Active or Idle state
GREEN blinking	Waiting for connections
RED	Duplicate IP address, or FATAL event
RED blinking	Process Active Timeout

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No power	-
GREEN	RUN	Normal operation
RED	Fatal error	• Major fault; • module in state EXCEPTION (or fatal event)
RED blinking	Error	• Minor fault in diagnostic object • IP conflict

Module MBCCL

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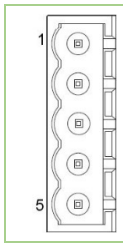

Pin	Signal	Description
1	**DA**	Positive RS485 RxD/TxD
2	**DB**	Negative RS485 RxD/TxD
3	**DG**	Signal Ground
4	**SLD**	Cable shield
5	**FG**	Protective Earth

LED NET	
STATUS	**DESCRIPTION**
OFF	No network participation, timeout status (no power)
GREEN	Participating, normal operation
RED	Major fault (FATAL error)

LED ERR		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	No error (no power)	Normal operation
RED	Major fault	Exception or FATAL event
RED flickering	(Temporary flickering) CRC	CRC Error
RED flashing	(Continuous flashing) PARAMETERS	Station Number or Baud Rate has changed since startup

Module MBMR

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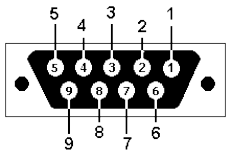


DB9 – female (front view)

Pin	Direction	Signal	Description
Housing	-	**PE**	Protective Earth
1	-	**GND**	Bus polarization 0VDC (isolated)
2	OUT	**5V**	Bus polarization +5VDC (isolated)
3	IN	**PMC**	Connect to pin 2 for RS-232 / Leave unconnected for RS-485
4	-	**-**	-
5	Bidirectional	**B-line**	RS-485 B-line
6	-	**-**	-
7	IN	**Rx**	RS-232 Data Receive
8	OUT	**Tx**	RS-232 Data Transmit
9	Bidirectional	**A-line**	RS-485 A-line

LED NET		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No power or no data exchange	-
YELLOW	Frame Reception or Transmission	Data exchange
RED	Fatal Error	One or more non-recoverable errors detected

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Initializing or no power	-
GREEN	Module initialized	Module initialized – no error
RED	Fatal Error	One or more non-recoverable errors detected
RED blinking (1 flash)	Communication fault or configuration error	• Invalid setting in Network Configuration Object • Setting in Network Configuration Object has been changed during operation
RED blinking (2 flashes)	Application diagnostic available	-

Module MBU

The image does not show the specific model

LED CONNECT		
STATE	**INDICATES**	**DESCRIPTION**
Green	USB connected	Module connected to Pc via USB
OFF	USB not connected	Module not connected

FAULT DIAGNOSIS						
MEANING	**LED**					
	ON	**RUN**	**IN FAIL**	**EXT FAIL**	**LED1**	**LED2**
	GREEN	**GREEN**	**RED**	**RED**	**RED/GREEN**	**RED/GREEN**
Internal fault microcontroller	ON	OFF	2 flashes*	OFF	see the modules tables	
Internal board fault	ON	OFF	3 flashes*	OFF		
Configuration Error	ON	OFF	5 flashes*	OFF		
BUS communication Error	ON	OFF	5 flashes*	OFF		
BUS communication interruption	ON	OFF	ON	OFF		
Detected an identical module	ON	OFF	5 flashes*	5 flashes		

Table 3

*** The LED frequency of flashing is: ON for 300ms and OFF for 400ms, with an interval between two sequences of 1s.**

DESCRIPTION

The MBx communication module gives access to various information related to the DSC system and allows to send commands from the PLC.

Each device connected to the DSC inputs is characterized by an ON/OFF status and a possible diagnostic. The processing of the inputs according to the program loaded on the DSC generates the ON/OFF status of the safety outputs which can also have diagnostics.

PROCESS IMAGE

System status and I/O status are available on the cyclic process image, while I/O diagnostics, system errors and the M1/M1S program CRC are accessible as acyclic data.

The process image has a fixed size with subsections for each information group: there are sections showing the status of the DSC inputs, the status of the safety outputs, the status of the probes and, if the dedicated module is present, the value of the analogue measures.

The Fieldbus inputs allows the PLC to cyclically send up to 32 ON/OFF status and are used as unsafe inputs in the DSC program.

The System status bits are described as follows:

1. Bit 0: present DSC presence
2. Bit 1: present diagnostic presence
3. Bit 2: error presence

The acyclic sections for diagnostics or errors report significant data if the relative bit is present in the status byte.

The section dedicated to the **input status** has a size of 16 bytes and allows to know the status of up to 128 inputs. The priority order of the modules is as follows:

- **M1/M1S, MI8O2, MI16, MI8, MI12, MV2, MV1, MV0, MI8O4.**

The section dedicated to the **safety outputs status** has a size of 4 bytes and allows to know the status of up to 32 outputs. The priority order of the modules is as follows:

- **M1/M1S, MI8O2, MO2, MO4, MOR4, MOR4S8, MO4LHCS8, MI8O4.**

If two or more modules of the same type are installed the one with the lowest node number is shown first.

Each module with inputs has a number of bits corresponding to the number of physical inputs; thus modules M1/M1S, MI8, MI8O2, MI8O4 will use 1 byte and modules MI12T8 and MI16 2 bytes. Modules MV0, MV1 and MV2 uses 1 byte each.
The status of the probe is represented with 4 bytes.

In fieldbus where the allocation is important (e.g. PROFIBUS, PROFINET), the Fieldbus input bytes must be mapped before the bytes in output.

If there is a fieldbus module in the DSC system, DSDESIGNER will include in the report a table with the I/O index for all inputs, fieldbus inputs, probes and safety outputs in the circuit diagram.

For the process data mapping description for your fieldbus please refer to the Addendum1: **"Process data mapping for MBx Fieldbus expansion modules"** annex at the bottom of the present manual.

DIAGNOSTICS

Each input and each safety output can generate a diagnostic code.
When the I/O is connected correctly, the diagnostic code is OK and is not exported to the fieldbus; when a problem on the I/O is detected, the system exports 2 bytes to the fieldbus with:

- **the index of the I/O in question**
- **the relative diagnostic code**

The "I/O index" field

This field indicates the number used to identify the I/O with a diagnostic code other than OK.
The I/O index range depends from the system version used. Refer to the following tables to know these data.

SYSTEM VERSION IN USE (version for M1 fw < 5.0.0)	
TYPE OF SIGNAL	**I/O INDEX**
Input	1-128
Output	192-255

Table 4

SYSTEM VERSION IN USE (version for M1S fw ≥ 5.0.0)	
TYPE OF SIGNAL	**I/O INDEX**
Input	1-128
Output	1-32

Table 5

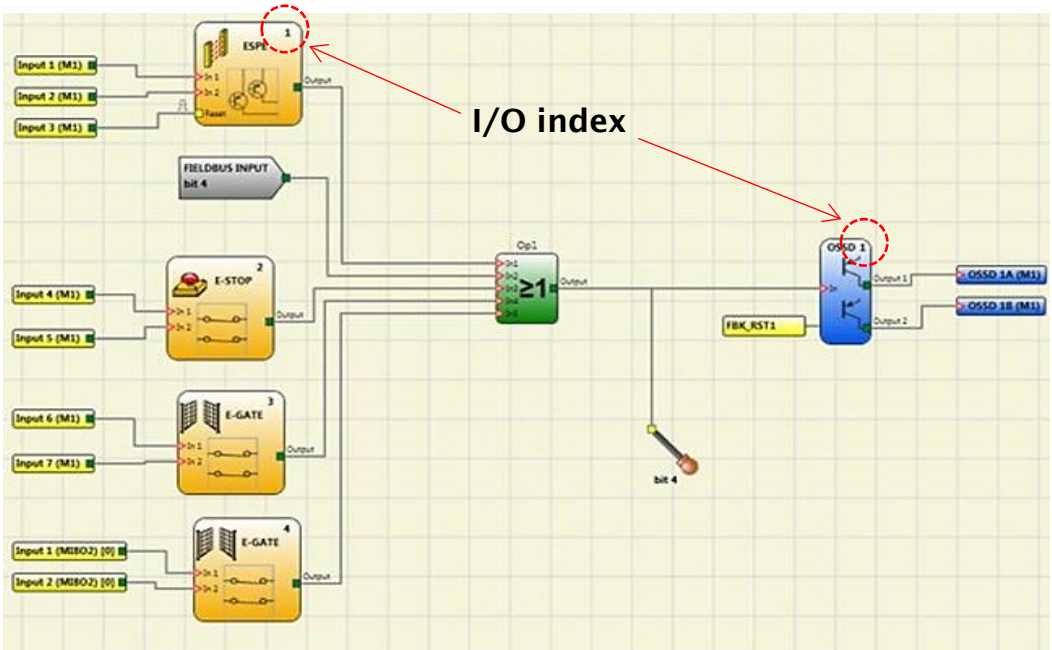


Figure 2 - Index of I/O

The "Diagnostic code" field

The *"Diagnostic code"* field indicates the diagnostics for the I/O. Possible values for this field are shown in the following tables.

Input diagnostics		
CODE	**NAME**	**MEANING**
128	Input diagnostics OK	
1	Not passed from zero	Both contacts have not returned to their rest position
2	Simultaneous control failed	The two contacts of a generic two-channel input do not close simultaneously
3	Two hands Simultaneity failed hand 1	Incorrect connection of one side of a two-hand command
4	Two hands Simultaneity failed hand 2	Incorrect connection of one side of a two-hand command
7	Incoherent selector	The selector cannot have more than one active input
8	Disconnected selector	The selector cannot have any active input
10	OUT_TEST error	Presence of diagnostics on an OUT_TEST connected to the input
11	Second input KO	Redundancy check failed on entry
13	Output connected to other inputs	The test output is not connected to the configured input
14	Output OK but input connected to 24DC	Input blocked
15	Short circuit between photocell test and photocell input	The response time of the photocell is too low
16	Photocell does not respond	Test signal on the emitter is not present on the photocell receiver
17	Short circuit between photocells	Test signal is present on two different photocells
18	Safety carpet not connected	One of the two carpet connections is not correct
19	Output not congruent to feedback	Test signal applied to the input is present on more than one OUT_TEST
20	Wrong connection	Test signal is present on more than one input
21	Stucked output	Test signal applied to the input is not present on the OUT_TEST
22	Second OUT_TEST KO	Redundancy check failed on OUT_TEST
23	MVx Proxy resource missing	
24	MVx Encoder resource missing	
25	MVx Resource proxy encoder missing	
26	MVx Resource proxy1 proxy2 missing	
27	MVx Resource encoder1 encoder2 missing	
28	MVx Frequency congruence error	
29	MVx Encoder supply missing	
30	MVx Encoder fault	
40	MA4 Reading out of lower threshold	
41	MA4 Disconnected sensor	
42	MA4 Reading out of upper threshold	
43	MA4 Overload	
44	MA4 Mismatch between channels	
133	Simultaneity two failed hands	The two contacts of a two-handed control do not close at the same time
134	Never started	Input with failed test at startup
137	Waiting for restart	Reset to an input with manual reset has not been activated
133 (0x85)[1]	TWO-HAND concurrent failed	Two-hands switch has to change state simultaneously
134 (0x86)[2]	Not started	Start test failed
137 (0x89)[3]	Waiting for restart	The input has manual reset and has not been restarted

Table 6

1 The diagnostic 133 does not provide visual error message on the LED DSC
2 The diagnostic 134 does not provide visual error message on the LED DSC
3 The diagnostic 137 does not provide visual error message on the LED DSC

Output diagnostics		
CODE	**NAME**	**MEANING**
0	Output diagnostics OK	
1	Enable missing	
2	Waiting for OSSD to restart	
3	Feedback K1 K2 missing	
4	Waiting for other micro	Redundancy check failed on the OSSD
5	OSSD power supply missing	
6	Exceeded maximum time restart	
7	Feedback K1 K2 external not congruous	
8	Waiting feedback K1 K2	
9	OSSD output overload	
10	OSSD with load set to 24V	

Table 7

EXAMPLES OF DIAGNOSTICS

Example 1

In the example shown in Figure 3, Input 1 (connected to module M1/M1S) is tested with the M1-T1 test signal. During wiring, the 24Vdc is connected to input 1 instead of the M1-T1 test signal.

- The I/O index and Diagnostic code fields assume the following values: 1 - 20 to indicate the diagnostics on input 1 of module M1/M1S *(Connection error).*

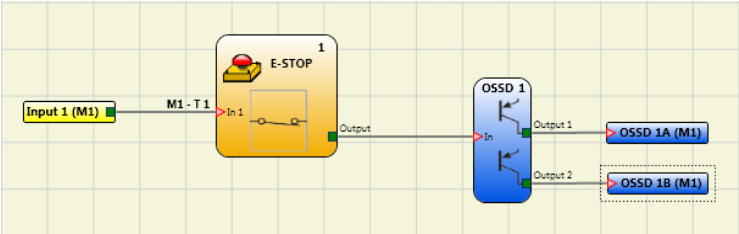


Figure 3

Example 2

In this example, the I/O index corresponds to the logical block and not to the physical terminal on module M1/M1S.
In Figure 4 for example, the two-hand element connected to the Input 1 and Input 2 physical terminals corresponds to *I/O index No. 1* and the emergency stop connected to the Input 3 and Input 4 terminals corresponds to *I/O index No. 2.*

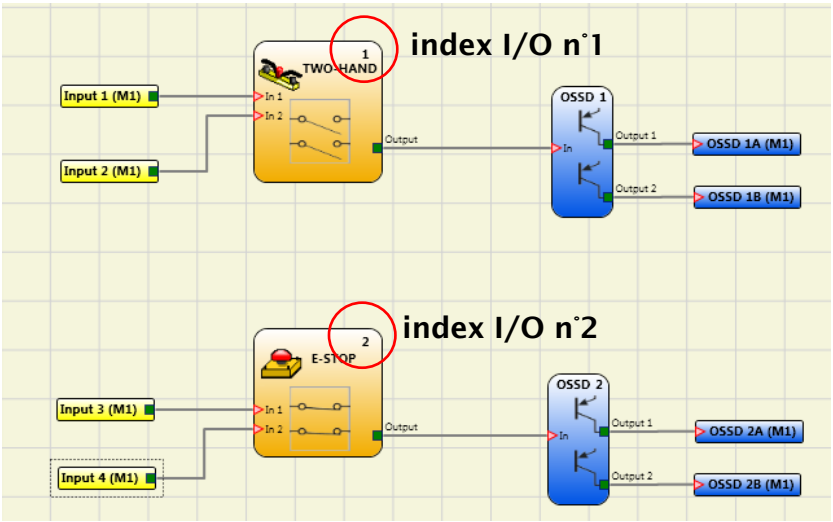


Figure 4

Example 3

The example in Figure 5 is similar to example 1, except in this case Input1 is connected to module MI16 and is tested with the MI16-T1 test signal.
During wiring, the 24Vdc is connected to input 1 instead of the MI16-T1 test signal.
Input 1 has diagnostic code 10 (OUT_TEST error) and OUT_TEST MI16-T1 has diagnostic code 8 (Connection error).

- The I/O index and Diagnostic code fields assume the following values: 1 - 20 to indicate the diagnostics on input 1 of module MI16.

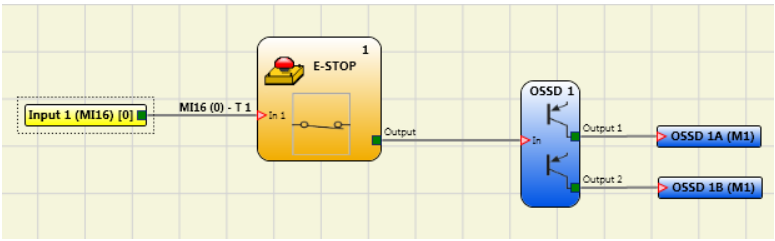


Figure 5

In the example shown in Figure 5 the manual reset function is enabled on OSSD 1.
The pushbutton connected to input 1 is pressed without sending a reset command.

Example 4

- The I/O index and Diagnostics code fields assume the following values: 1 - 2
- to indicate the diagnostics on OSSD 1A/1B *(Table 4: 1= first output)*.
- to indicate the diagnostic code *(Table 7: 2 = Waiting for OSSD to restart)*.

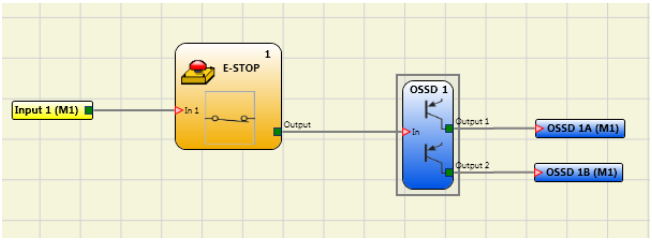


Figure 6

BUS CONFIGURATOR USER INTERFACE

The bus module is configured using the USB miniB interface on the front panel and the "Bus Configurator – User interface" software installed on the DSDESIGNER CD ROM disk.

This software can be used for configuration/communication of the DSC system with a PC (using an MBU module) or to monitor the data transmitted on the fieldbus (via connection to the USB port of a bus module).
The diagram below is helpful for understanding possible connections:

EXAMPLES OF CONNECTION

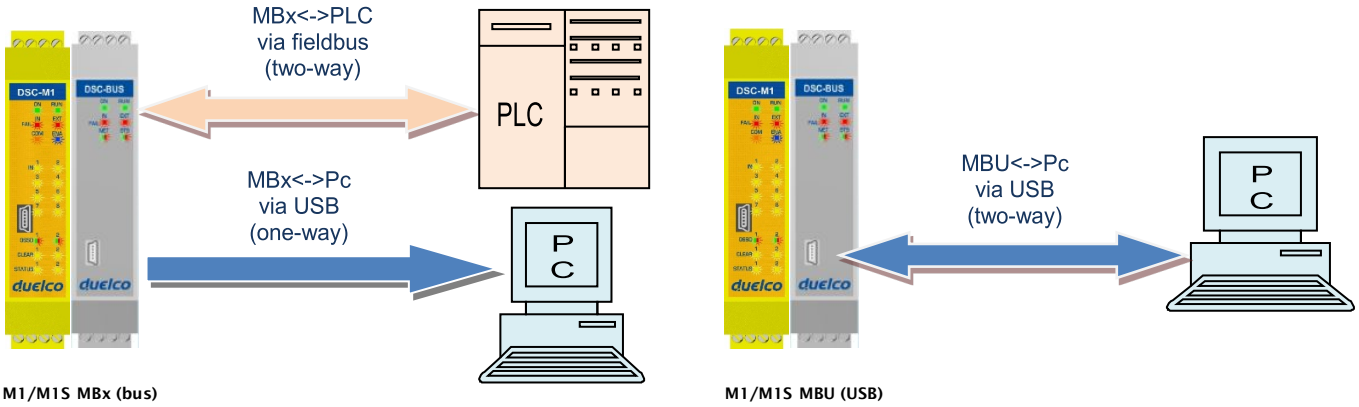


Figure 7

It is important to note that the Bus Configurator behaves differently, depending on whether communication is with an MBx module or an MBU module:

- MBx MODULE: THE SOFTWARE ONLY ALLOWS DATA TRANSMITTED VIA BUS TO BE DISPLAYED.
- MBU MODULE: THE SOFTWARE ALLOWS TWO-WAY DATA TRANSMISSION MBU↔PC (in this case the programmer can set the Fieldbus input directly via computer).

The configuration data depend on the type of the fieldbus module that is connected: the address field range and the baudrate data will adapt to the fieldbus type.
Selecting the checkbox Analog data will enable the data to be present on the Process image, changing its size.

Graphical User Interface

➔ Module configuration must be performed with the system switched off (outputs OFF).

Operator can query module configuration at any time while the module is in use.
To configure the MBx module, proceed as follows:

1. connect the module to the 24VDC±20% power supply via the terminal block;
2. connect the USB cable to the PC and to the MBx module;
3. double click on the "***BUS CONFIGURATOR – USER INTERFACE***" desktop icon.

The configuration window is displayed:

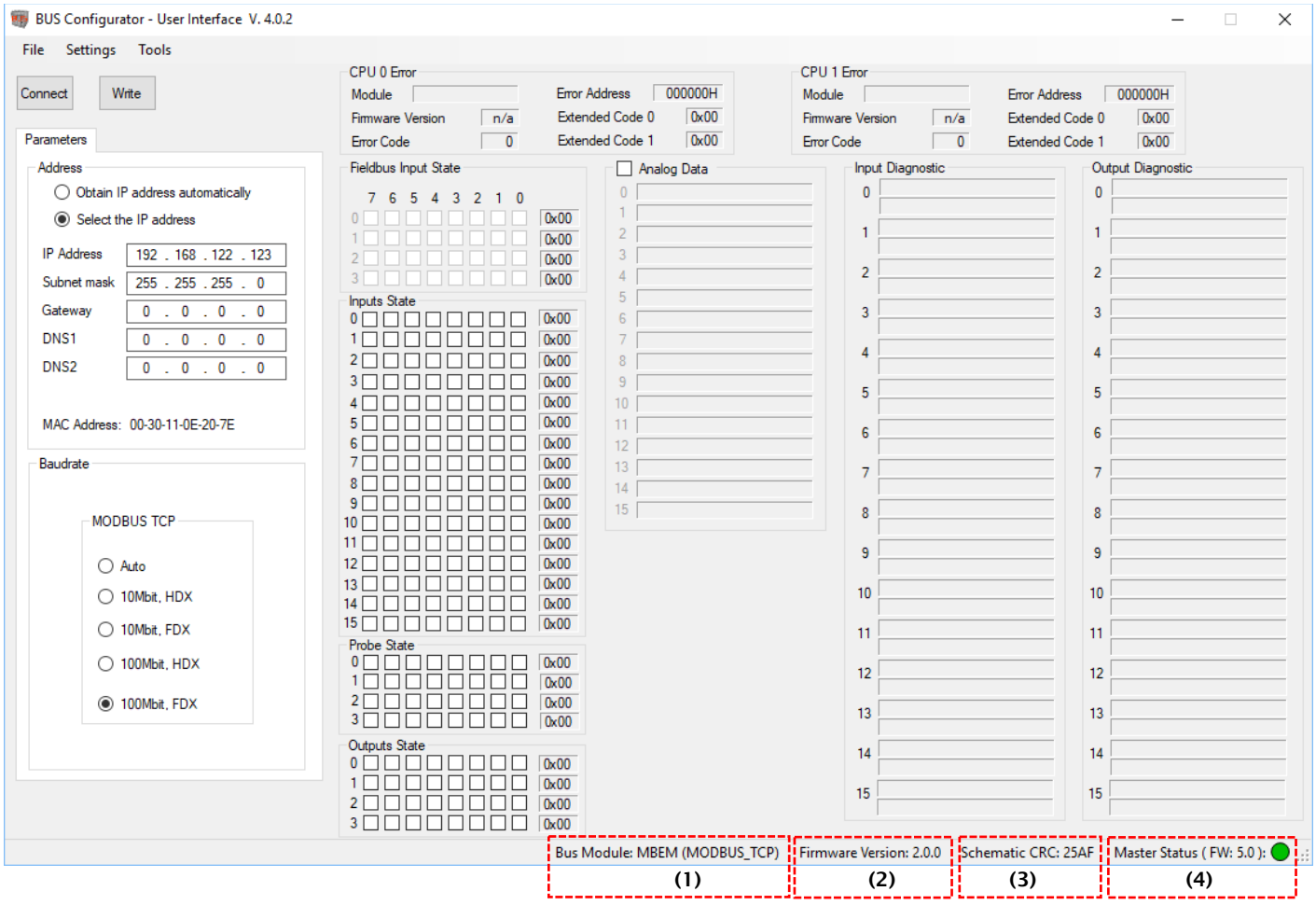


Figure 8

4. Press the "CONNECT" button.

The program recognizes that a MBx bus module is connected (Figure 8); the status bar shows the the MBx fieldbus model **(1)**, the MBx firmware version **(2)**, the schematic CRC **(3)** and the Master status and firmware version **(4)**:

- gray: the MBx is not connected
- orange: the MBx is getting/sending the configuration from the Bus configurator
- green: the Master is active (RUN)
- red: the Master is not active (e.g. communication with Designer)

Once the module is connected it is recognized and the operator can configure the parameters by selecting the different areas shown in *Figure 8*; press the ***WRITE*** button to send the configuration data to the module.
As soon as the bus module receives the data, the configurator enters the monitor condition.
The input, output, analog data status and relative diagnostics are illustrated in Figure 8.
Only the first 16 input diagnostics and output diagnostics are shown, if there are more than 16 diagnostics the exceeding one are displayed after the previous one are solved.
The Fieldbus input logical status can be changed by the user only with the MBU module, they are in read only mode for all the other fieldbuses and they'll display the status written by the external PLC.

BACKWARD COMPATIBILITY (VERSION FOR M1 fw < 5.0.0)

Process Image in backward compatibility (version for M1 fw < 5.0.0)

The backward compatibility mode allows the Bus module to use the "old" process image mapping, i.e.: it will adapt to the hardware installed on the system. This allows to replace an existing Bus module without changing the PLC program.

➔ The backward compatibility mode works only if the Bus module is connected to an M1 master module. If a Bus device is set-up in backward compatibility mode and is connected to an M1S the Bus module will go in fault.

System status, I/O status and I/O diagnostics are available on the cyclic process image.

The process image has a variable size depending on which modules are installed in the DSC system.

In the process image there are subsections for each information group: there are sections showing the status of the DSC inputs, the status of the safety outputs, the status of the probes.

The Fieldbus inputs allows the PLC to cyclically send up to 8 ON/OFF status and are used as unsafe inputs in the DSC program.

The System status bits are described as follows:

1. Bit 0: present DSC presence
2. Bit 1: present diagnostic presence

The section for diagnostics reports significant data if the relative bit is present in the status byte.

The section dedicated to the **input status** has a size of 16 bytes and allows to know the status of up to 128 inputs. The priority order of the modules is as follows:

- **M1, MI8O2, MI16, MI8, MI12, MV2, MV1, MV0.**

The section dedicated to the **safety outputs status** has a size of 1 or 2 bytes and allows to know the status of up to 16 outputs. The priority order of the modules is as follows:

- **M1, MI8O2, MO2, MO4, MOR4, MOR4S8, MO4LHCS8.**

If two or more modules of the same type are installed the one with the lowest node number is shown first.

Each module with inputs has a number of bits corresponding to the number of physical inputs; thus modules M1, MI8, MI8O2, MI8O4 will use 1 byte and modules MI12T8 and MI16 2 bytes. Modules MV0, MV1 and MV2 uses 1 byte each.
The status of the probe is represented with 2 bytes.

In fieldbus where the allocation is important (e.g. PROFIBUS, PROFINET), the Fieldbus input bytes must be mapped before the bytes in output.

If there is a fieldbus module in the DSC system, DSDESIGNER will include in the report a table with the I/O index for all inputs, fieldbus inputs, probes and safety outputs in the circuit diagram.

The input and output memory maps are described in Figure 10.

Diagnostic elements will use 2 bytes which indicate the number of the I/O with the problem and the value of the diagnostic element. If there is more than one diagnostic element, the relative values alternate every 500ms.

Each set of information:

- input status,
- input diagnostics,
- fieldbus input status,
- probe status,
- safety output status,
- safety output diagnostics

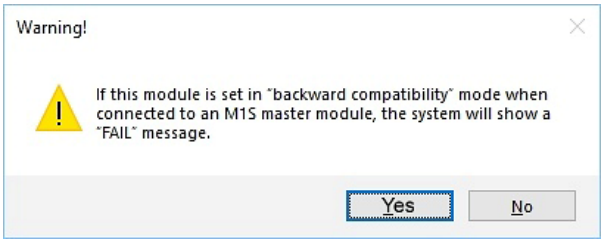
can be enabled/disabled in order to control the information and thus the number of bytes exported to the fieldbus.

The definition of the process image in the input and output is shown from the point of view of the DSC.

Graphical User Interface, backward compatibility (version for M1 fw< 5.0.0.)

➔ The backward compatibility mode allows the operator to use the DSD software by having an M1 master module with firmware version lower than 5.0.0.

This mode can be enabled from the menu: "**settings -> enable backward compatibility**"
This will bring up a pop-up window with the following message:



The user can choose which subsection must be exported in the fieldbus (refer to Figure 9).
Once the configuration data are selected the operator must press the "WRITE" key to send them to the module.

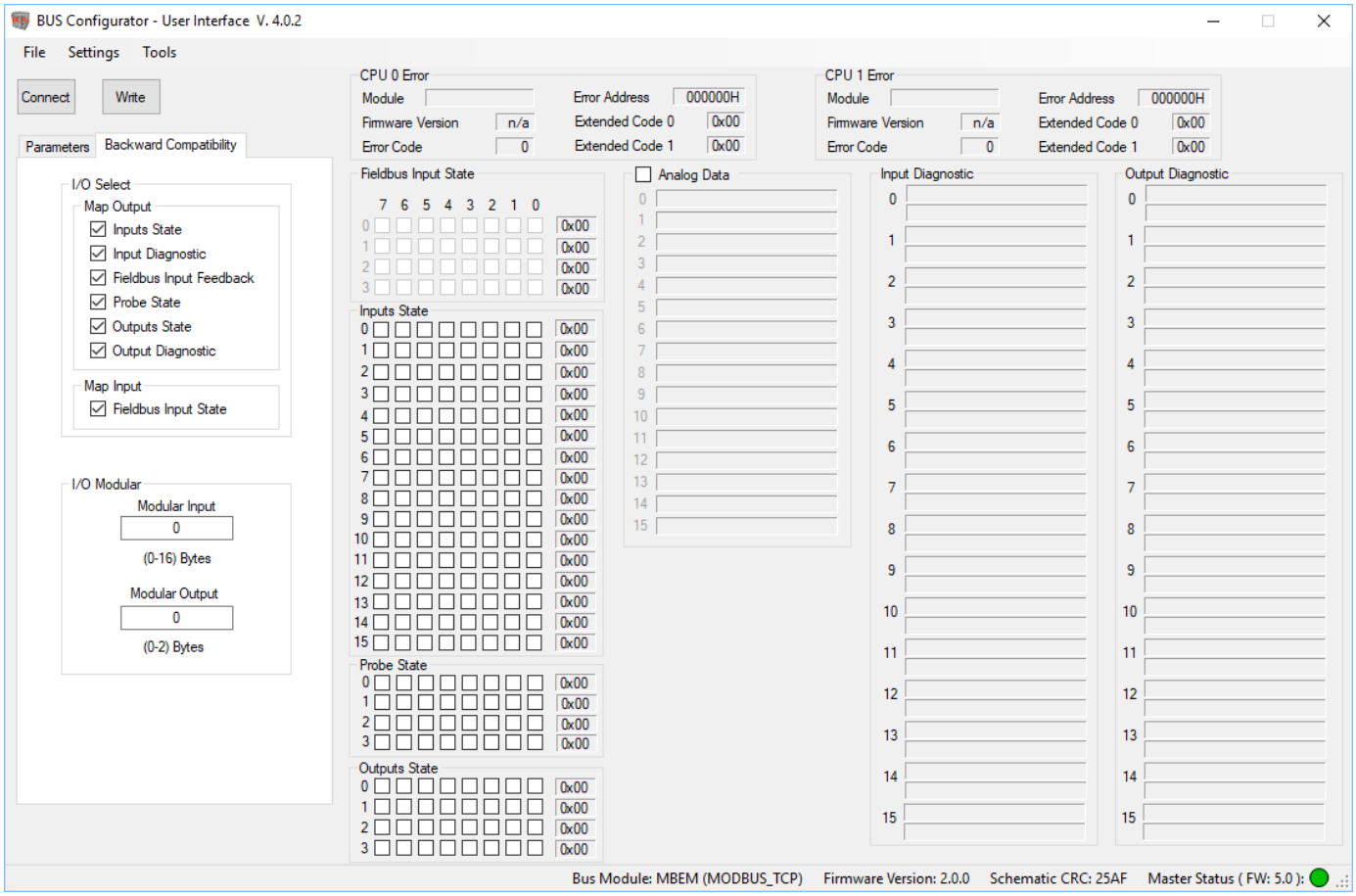


Figure 9 - Backward Compatibility

If more than one I/O has some diagnostic the I/O index and diagnostic code data will cycle every 500ms between all the diagnostics present.

Process image configuration in backward compatibility

The input process image and the output process image can be configured using the Bus Configurator User Interface software.

With this software the user can choose which subsection must be exported in the fieldbus, changing the size of each process image and then the size used in the PLC physical memory. Once the module is connected all the data are showed in the main window of the software.

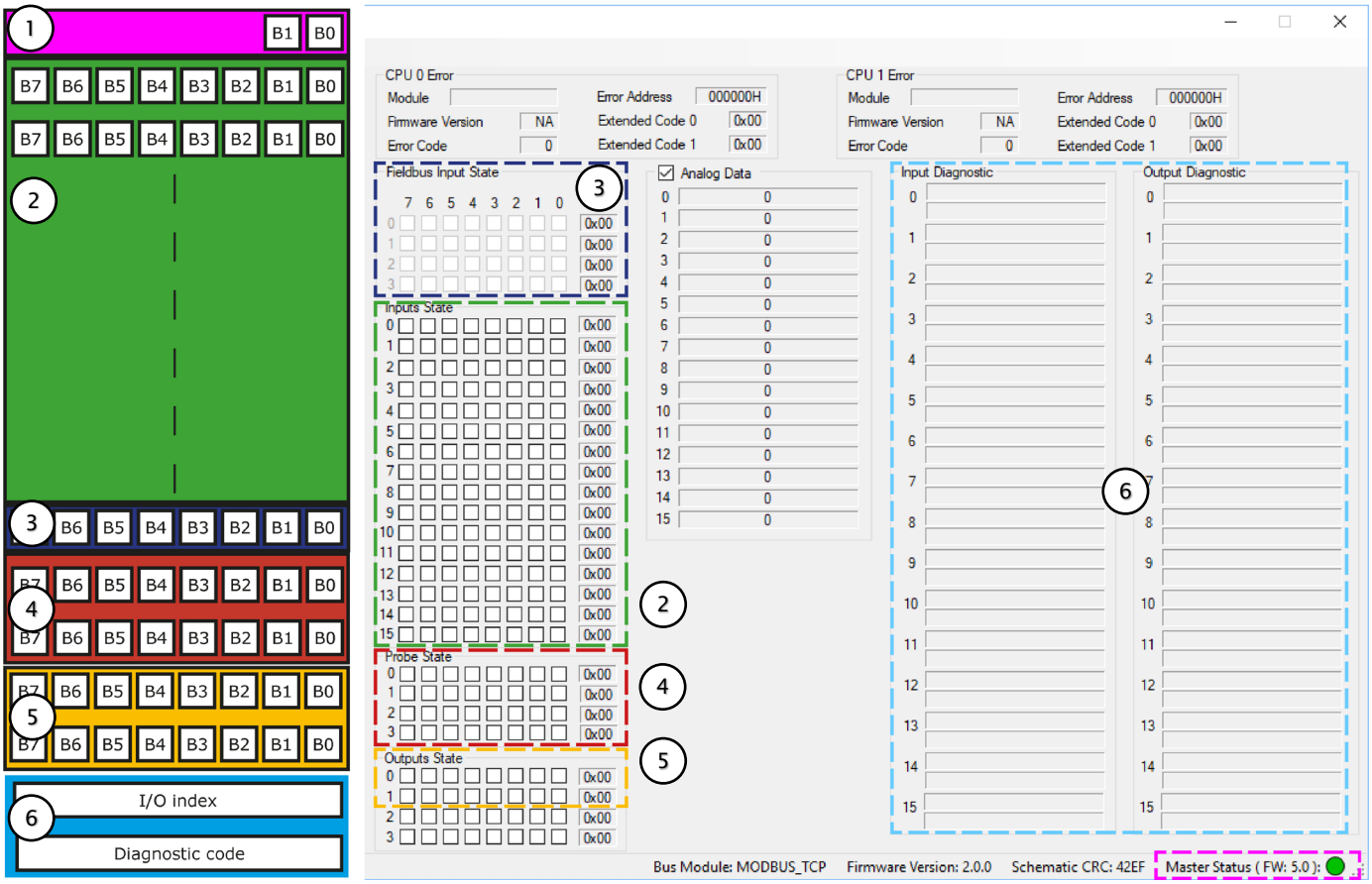


Figure 10 - Data Package Composition in backward compatibility

EXAMPLES OF DSD CONFIGURATION AS PRESENTED BY THE BUS CONFIGURATOR

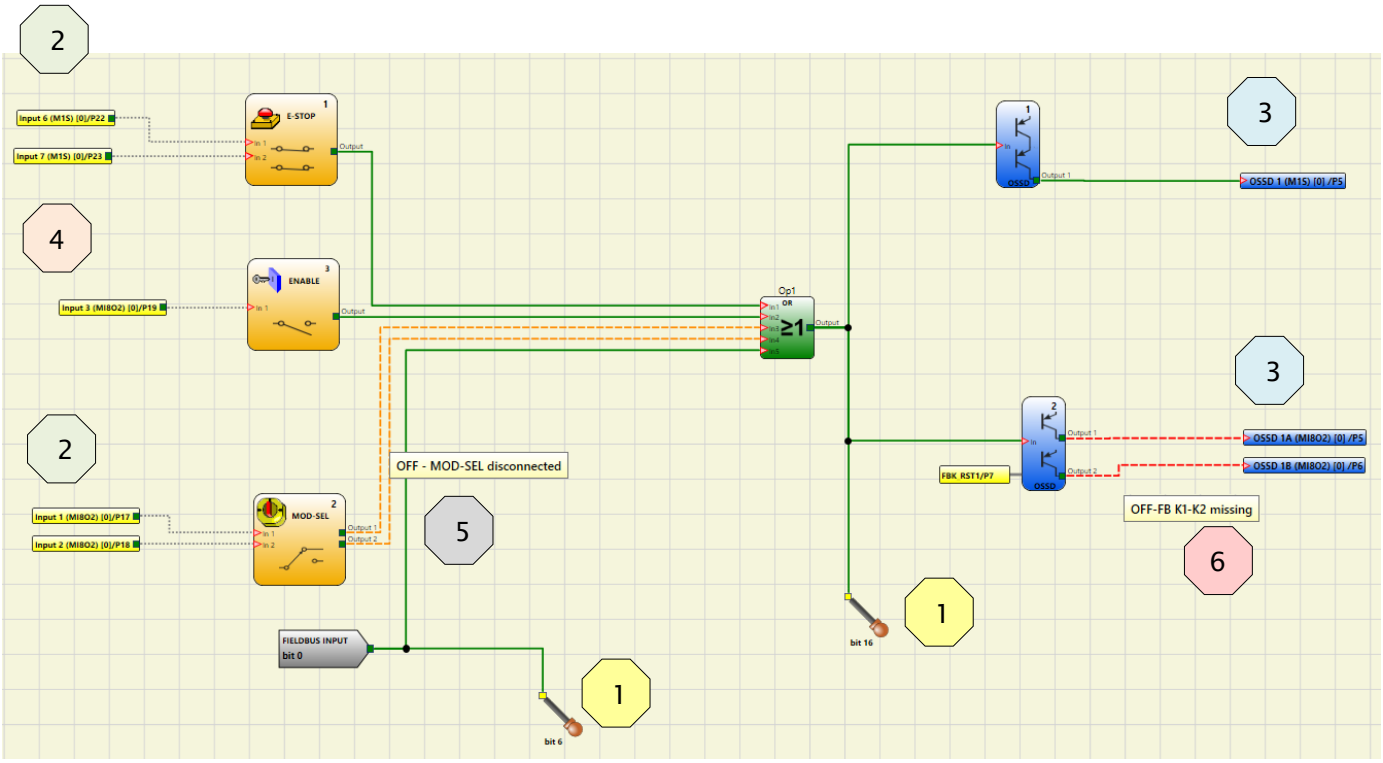


Figure 11 – Example of project on DSD

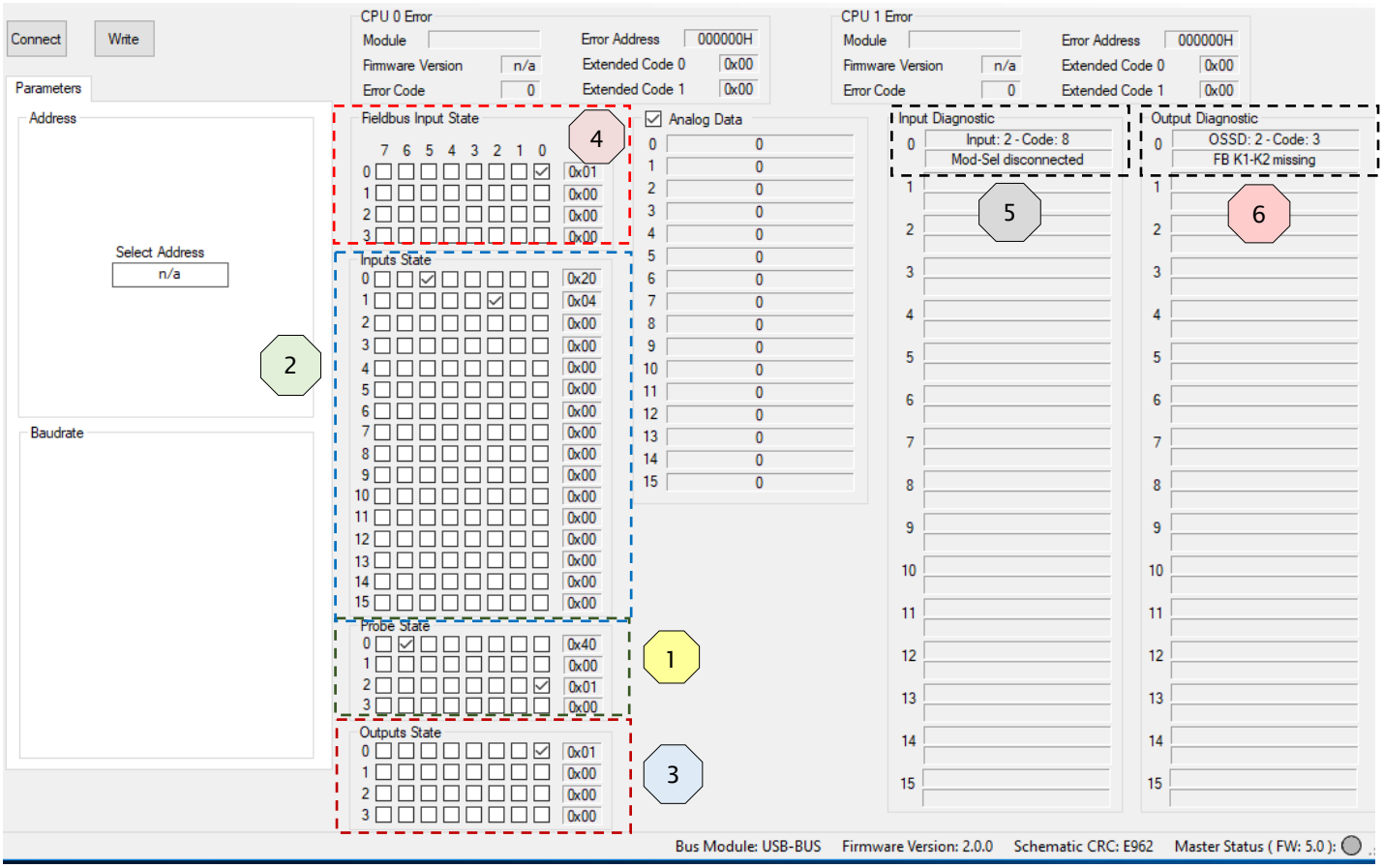


Figure 12

- Input 1 E-STOP is connected to screws 6 and 7 on M1/M1S. Its status (zero or one) is shown on bit 5 of byte 0 reserved for inputs. The bit 6 is always set to zero, it is kept busy to signal that the E STOP occupies two screws on M1/M1S.
- Input 2 ENABLE is connected to screw 8 on M1/M1S. Its status (zero or one) is shown on bit 7 of byte 0 reserved for M1/M1S inputs.
- Input 3 MOD-SEL is connected to screws 1 and 2 on MI802 with a diagnostic signaling that the MOD-SEL is disconnected. Its status is shown on bits 0 and 1 of byte 1 reserved for MI802 inputs. The diagnostic is shown in the section reserved for input diagnostics with the index 2 and the relative diagnostic.
- The probes on bit 6 and bit 8 are green and the relative bits on the Probe section are checked. Probe 8 is shown as bit 0 of the second byte.
- OSSD 1 is ON and connected to the second pair of M1/M1S outputs. Its status is shown on bit 1 of byte 0 reserved for outputs.
- OSSD 2 is OFF with diagnostic indicating wait for restart and is connected to the second pair of MI802 outputs. Its status is shown on bit 2 of byte 0 reserved for outputs. The diagnostic is shown in the section reserved for OSSD diagnostics with the index 3 and the relative diagnostic.
- In the Fieldbus Input section, bit 0 has been selected so the Fieldbus input on bit 0 is green in the DSD project.

MV MODULES INPUT STATUS

In presence of MV modules, the output data (in the "State Inputs" of the Process Image) will follow the diagram: