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ReeR MOSAIC

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Wiring an E-STOP and controlling two safety devices with EDM and manual reset

24VDC 24VDC 1 24 VDC 0 VDC 4 0VDC	OVDC
24VDC 2 MAST_EN1 MASTER ENABLE THIS MUST BE PERMANENTLY HED HIGH FOR M1 TO OPERATE	
13 OUT_TEST1 14 OUT_TEST2 15 OUT_TEST3 15 OUT_TEST3 16 OUT_TEST4 16 OUT_TEST4 REFER TO MANUAL	
ESTOP	
23 INPUT7 24 INPUT8 24 INPUT8 SAFETY APPLICATIONS SAFETY APPLICATIONS STATE O LIDITS STATE O LIDITS STATE O LIDITS STATE O LIDITS STATE O LIDITS	OVDC
24VDC 0 0 5D1 SD2 7 REST_FBK1 RESTART 1 PAIR OF SOUID STATE OUTPUTS 0SSD2_A 9 STATE OUTPUTS 0	OVDC
11 REST_FBK2 RESTART FEEDBACK NO.2	
2 STATUS OUTPUTS OUT_STAT2 12 OUT_STAT2 12	

M1 or M1S Module Connections				
Terminal	Signal	Description		
1	24VDC	24VDC power supply		
2*	MASTER_ENABLE1	Master Enable 1		
3*	MASTER_ENABLE2	Master Enable 2		
4	0VDC	0VDC power supply		
5	OSSD1_A	Statia autout 1		
6	OSSD1_B	Static output 1		
7	RESTART_FBK	Feedback/Restart		
1	OUT_STATUS	Programmable signal output		
Q	RESTART_FBK	Feedback/Restart		
0	OUT_STATUS	Programmable signal output		
9	OSSD2_A	Static output 2		
10	OSSD2_B			
11	RESTART_FBK	Feedback/Restart		
	OUT_STATUS	Programmable signal output		
12	RESTART_FBK	Feedback/Restart		
12	OUT_STATUS	Programmable signal output		
13	OUT_TEST1	Short circuit detected output		
14	OUT_TEST2	Short circuit detected output		
15	OUT_TEST3	Short circuit detected output		
16	OUT_TEST4	Short circuit detected output		
17	INPUT1	Digital input 1		
18	INPUT2	Digital input 2		
19	INPUT3	Digital input 3		
20	INPUT4	Digital input 4		
21	INPUT5	Digital input 5		
22	INPUT6	Digital input 6		
23	INPUT7	Digital input 7		
24	INPUT8	Digital input 8		

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* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

Blue-highlighted cells apply only to M1S controller. See manual for further information.





Controlling two safety devices with a light curtain and an E-STOP with EDM and manual reset

	IVI			15	
24VDC	24VDC	1 24 VDC	0 VDC 4	OVDC	OVDC
4VDC 4VDC	24VDC 24VDC	2 MAST_EN1	MASTER ENABLE THIS MUST BE PERMANENTLY HELD HIGH FOR M1 TO OPERATE		
		-13 OUT_TEST1 -14 OUT_TEST2 15 OUT_TEST3 16 OUT_TEST4	TEST OUTPUTS FOR SHORT CIRCUIT TEST REFER TO MANUAL		
LIGHT_CURTAIN		17 INPUT1 18 INPUT2 19 INPUT3 20 INPUT4 21 INPUT5	8 DIGITAL INPUTS WHEN WIRING DUAL CHANNEL DEVICES PLEASE NOTE THAT ALL THE PINS NEED TO BE CONSECUTIVE		
		22 INPUT7 23 INPUT7 24 INPUT8		SD = DEVIC SAFETY AP SD1	E SUITABLE FOR PLICATIONS
PB SD1	SD2	1 PAIR OF S STATE OUT 400mA OUT	OSSD1_A 5	^1 O A2	SD2 A1 C A2 OVD
4 <u>voc</u> o o	N	7 REST_FBK1	RESTART FEEDBACK NO.1 OLID OSSD2_A OSSD2_B		
		11 REST_FBK2	RESTART FEEDBACK NO.2		
		2 STATUS OUTPUTS	OUT_STAT1 8 OUT_STAT2 12	► TO P FOR	LC INPUT STATUS

M1 or M1S Module Connections				
Terminal	Signal	Description		
1	24VDC	24VDC power supply		
2*	MASTER_ENABLE1	Master Enable 1		
3*	MASTER_ENABLE2	Master Enable 2		
4	0VDC	0VDC power supply		
5	OSSD1_A	Chatia autout 1		
6	OSSD1_B	Static output 1		
7	RESTART_FBK	Feedback/Restart		
'	OUT_STATUS	Programmable signal output		
0	RESTART_FBK	Feedback/Restart		
ö	OUT_STATUS	Programmable signal output		
9	OSSD2_A	Chatia autout 2		
10	OSSD2_B	Static output 2		
44	RESTART_FBK	Feedback/Restart		
11	OUT_STATUS	Programmable signal output		
10	RESTART_FBK	Feedback/Restart		
12	OUT_STATUS	Programmable signal output		
13	OUT_TEST1	Short circuit detected output		
14	OUT_TEST2	Short circuit detected output		
15	OUT_TEST3	Short circuit detected output		
16	OUT_TEST4	Short circuit detected output		
17	INPUT1	Digital input 1		
18	INPUT2	Digital input 2		
19	INPUT3	Digital input 3		
20	INPUT4	Digital input 4		
21	INPUT5	Digital input 5		
22	INPUT6	Digital input 6		
23	INPUT7	Digital input 7		
24	INPUT8	Digital input 8		

* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

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Controlling two safety devices with an E-GATE with EDM and manual reset



M1 or M1S Module Connections				
Terminal	Signal	Description		
1	24VDC	24VDC power supply		
2*	MASTER_ENABLE1	Master Enable 1		
3*	MASTER_ENABLE2	Master Enable 2		
4	0VDC	0VDC power supply		
5	OSSD1_A	Statia autout 1		
6	OSSD1_B	Static output 1		
7	RESTART_FBK	Feedback/Restart		
1	OUT_STATUS	Programmable signal output		
0	RESTART_FBK	Feedback/Restart		
0	OUT_STATUS	Programmable signal output		
9	OSSD2_A	Statia autout 2		
10	OSSD2_B	Static output 2		
44	RESTART_FBK	Feedback/Restart		
11	OUT_STATUS	Programmable signal output		
10	RESTART_FBK	Feedback/Restart		
12	OUT_STATUS	Programmable signal output		
13	OUT_TEST1	Short circuit detected output		
14	OUT_TEST2	Short circuit detected output		
15	OUT_TEST3	Short circuit detected output		
16	OUT_TEST4	Short circuit detected output		
17	INPUT1	Digital input 1		
18	INPUT2	Digital input 2		
19	INPUT3	Digital input 3		
20	INPUT4	Digital input 4		
21	INPUT5	Digital input 5		
22	INPUT6	Digital input 6		
23	INPUT7	Digital input 7		
24	INPUT8	Digital input 8		

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* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

Blue-highlighted cells apply only to M1S controller. See manual for further information.



Controlling two safety devices with an E-STOP and an E-GATE with EDM and manual reset

24VDC	24VDC	1 24 VDC	0 VDC 4	OVDC	OVE
24VDC 24VDC	24VDC 24VDC	2 MAST_EN1 3 MAST_EN2	MASTER ENABLE THIS MUST BE PERMANENTLY HELD HIGH FOR M1 TO OPERATE		
		13 OUT_TEST1 14 OUT_TEST2 15 OUT_TEST3 16 OUT_TEST4	TEST OUTPUTS FOR SHORT CIRCUIT TEST REFER TO MANUAL		
		- 17 INPUT1 - 18 INPUT2 19 INPUT3 20 INPUT4 - 21 INPUT5	8 DIGITAL INPUTS WHEN WIRING DUAL CHANNEL DEVICES PLEASE NOTE THAT ALL THE PINS NEED TO BE CONSECUTIVE		
SHOWN CLOSEI TEST OUTPUTS CAN SHARE UP TO A DEVICES A SAFETY MATEROSE IS USED THEY NEED A DEDICATED SE OUTPUTS	UNIESS WHICH F OF TEST	22 INPUT6 23 INPUT7 24 INPUT8		SD = C SAFET	DEVICE SUITABLE FOR Y APPLICATIONS
PD		1 PAIR OF S STATE OUT 400mA OUT	OSSD1_A 5 PUTS OSSD1_B 6	A1 C	$\begin{array}{c}1\\ A2\\ SD2\\ \hline \\ A1\\ \hline \\ C $
	SD2	7 REST_FBK1	RESTART FEEDBACK NO.1 		
		11 REST_FBK2	RESTART FEEDBACK NO.2		
		2 STATUS OUTPUTS	OUT_STAT1 8 -		TO PLC INPUT FOR STATUS

		V
M1	or M1S Modul	e Connections
Terminal	Signal	Description
1	24VDC	24VDC power supply
2*	MASTER_ENABLE1	Master Enable 1
3*	MASTER_ENABLE2	Master Enable 2
4	0VDC	0VDC power supply
5	OSSD1_A	Statia autout 1
6	OSSD1_B	Static output 1
7	RESTART_FBK	Feedback/Restart
1	OUT_STATUS	Programmable signal output
0	RESTART_FBK	Feedback/Restart
0	OUT_STATUS	Programmable signal output
9	OSSD2_A	Statia autout 2
10	OSSD2_B	Static Output 2
11	RESTART_FBK	Feedback/Restart
11	OUT_STATUS	Programmable signal output
40	RESTART_FBK	Feedback/Restart
12	OUT_STATUS	Programmable signal output
13	OUT_TEST1	Short circuit detected output
14	OUT_TEST2	Short circuit detected output
15	OUT_TEST3	Short circuit detected output
16	OUT_TEST4	Short circuit detected output
17	INPUT1	Digital input 1
18	INPUT2	Digital input 2
19	INPUT3	Digital input 3
20	INPUT4	Digital input 4
21	INPUT5	Digital input 5
22	INPUT6	Digital input 6
23	INPUT7	Digital input 7
24	INPUT8	Digital input 8

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* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

Blue-highlighted cells apply only to M1S controller. See manual for further information.





Controlling two safety devices with a Safety Mat or Safety Edge with EDM and manual reset

24VDC	N	IOSAIC M1 or M1S	OVD
24VDC	24VDC	0 VDC 4 0VDC	OVDC
24VDC 24VDC	24VDC 24VDC	2 MAST_EN1 3 MAST_EN2 3 MAST_EN2 AMAST_EN2 AMASTER ENABLE THIS MUST BE PERMANENTLY HELD HIGH FOR M1 TO OPERATE	
	SAFETY_MAT OR SAFETY_EDGE	13 OUT_TEST1 14 OUT_TEST2 15 OUT_TEST3 16 OUT_TEST4 17 INPUT1	
	SAFETY MAT OR EDGE MUST BE WIRED TO TEST OUTPUTS AND THEY CANNOT BE SHARED BY ANN OTHER DEVICES, THE TEST PULSES MUST BE DEDICATED.	18 INPUT2 8 DIGITAL INPUTS 19 INPUT3 WHEN WIRING DUAL CHANNEL DEVICES 20 INPUT4 ALL THE PIKS NEED TO BE CONSECUTIVE 21 INPUT5 22 INPUT6	
	PB SDI SD2	SD = DEVICE SUITABLE FC SAFETY APPLICATIONS SD = DEVICE SUITABLE FC SAFETY APPLICATIONS	
24VDC		7 REST_FBK1 RESTART FEEDBACK NO.1 FEEDBACK NO.1 I PAIR OF SOLD OSSD2_A STATE OUTPUTS OSSD2_B 400mA OUT OSSD2_B	
		11 REST_FBK2 RESTART PEEDBACK NO.2 2 STATUS OUT_STAT1 0UT_STAT2 12	

M1 or M1S Module Connections				
Terminal	Signal	Description		
1	24VDC	24VDC power supply		
2*	MASTER_ENABLE1	Master Enable 1		
3*	MASTER_ENABLE2	Master Enable 2		
4	0VDC	0VDC power supply		
5	OSSD1_A	Statia autout 1		
6	OSSD1_B	Static output 1		
7	RESTART_FBK	Feedback/Restart		
'	OUT_STATUS	Programmable signal output		
0	RESTART_FBK	Feedback/Restart		
o	OUT_STATUS	Programmable signal output		
9	OSSD2_A	Statia autout 2		
10 OSSD2_B Stati				
11	RESTART_FBK	Feedback/Restart		
11	OUT_STATUS	Programmable signal output		
40	RESTART_FBK	Feedback/Restart		
12	OUT_STATUS	Programmable signal output		
13	OUT_TEST1	Short circuit detected output		
14	OUT_TEST2	Short circuit detected output		
15	OUT_TEST3	Short circuit detected output		
16	OUT_TEST4	Short circuit detected output		
17	INPUT1	Digital input 1		
18	INPUT2	Digital input 2		
19	INPUT3	Digital input 3		
20	INPUT4	Digital input 4		
21	INPUT5	Digital input 5		
22	INPUT6	Digital input 6		
23	INPUT7	Digital input 7		
24	INPUT8	Digital input 8		

* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

Blue-highlighted cells apply only to M1S controller. See manual for further information.



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Controlling two safety devices with a Light Curtain with EDM and manual reset

pc	IVI	OSAIC	M1 or M1	15	o
24VDC	24VDC	1 24 VDC	0 VDC 4	OVDC	OVDC
24VDC 24VDC	24VDC 24VDC	2 MAST_EN1 3 MAST_EN2	MASTER ENABLE THIS MUST BE PERMANENTLY HELD HIGH FOR M1 TO OPERATE		
		13 OUT_TEST1 14 OUT_TEST2 15 OUT_TEST3 16 OUT_TEST4	TEST OUTPUTS FOR SHORT CIRCUIT TEST REFER TO MANUAL		
		17 INPUT1 18 INPUT2 19 INPUT3 20 INPUT4 21 INPUT5 22 INPUT6	8 DIGITAL INPUTS WHEN WIRING DUAL CHANNEL DEVICES PLEASE NOTE THAT ALL THE PINS NEED TO BE CONSECUTIVE		
		23 INPUT7 24 INPUT8 1 PAIR OF SC		SD = DEV SAFETY / SD1 A1 (C)	ICE SUITABLE FOR IPPLICATIONS
	SD2	STATE OUTP 400mA OUT 7 REST_FBK1	RESTART FEEDBACK NO.1		
		1 PAIR OF SC STATE OUTP 400mA OUT	UTS OSSD2_A 9 OSSD2_B 10		
		2 STATUS OUTPUTS	RESTART FEEDBACK NO.2	► TO	PLC INPUT 2 STATUS

M	M1 or M1S Module Connections				
Terminal	Signal	Description			
1	24VDC	24VDC power supply			
2*	MASTER_ENABLE1	Master Enable 1			
3*	MASTER_ENABLE2	Master Enable 2			
4	0VDC	0VDC power supply			
5	OSSD1_A	Statio autout 1			
6	OSSD1_B	Static output 1			
7	RESTART_FBK	Feedback/Restart			
'	OUT_STATUS	Programmable signal output			
	RESTART_FBK	Feedback/Restart			
0	OUT_STATUS	Programmable signal output			
9	OSSD2_A	Statia autout 2			
10	OSSD2_B	Static output 2			
11	RESTART_FBK	Feedback/Restart			
	OUT_STATUS	Programmable signal output			
12	RESTART_FBK	Feedback/Restart			
12	OUT_STATUS	Programmable signal output			
13	13 OUT_TEST1 Short circuit detec				
14	OUT_TEST2	Short circuit detected output			
15	OUT_TEST3	Short circuit detected output			
16	OUT_TEST4	Short circuit detected output			
17	INPUT1	Digital input 1			
18	INPUT2	Digital input 2			
19	INPUT3	Digital input 3			
20	INPUT4	Digital input 4			
21	INPUT5	Digital input 5			
22	INPUT6	Digital input 6			
23	INPUT7	Digital input 7			
24	INPUT8	Digital input 8			

* Terminals 2 and 3 are not connected on the M1S.

Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

Blue-highlighted cells apply only to M1S controller. See manual for further information.







Specifying nodes when using multiple modules of the same type

(Example shows M1 used with four MI802 input/output expansion units)



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NODE SEL

The NODE_SEL0 and NODE_SEL1 inputs (on the SLAVE units) are used to attribute a physical address to the slave units with the connections shown in the table below:

NODE SEL	NODE_SEL1 (Terminal 3)	NODE_SEL0 (Terminal 2)
NODE 0	0 (or not connected)	0 (or not connected)
NODE 1	0 (or not connected)	24VDC
NODE 2	24VDC	0 (or not connected)
NODE 3	24VDC	24VDC



You cannot use the same physical address for multiple units of the same type. Each unit must have a unique address.

🤠 Config	uration					
M1	MI8O2	~ MI8O2	~ MI8O2	~ M	1802	~ -
<u></u>	<u> </u>	0000	n <mark>ne</mark>	<u>CO</u>	<u> </u>	
>=3.0 ~	Node 0	 Node 1 	V Node 2	2 ~ N	lode 3	~

Output blocks when using specific cards



The standard OSSD output block "OSSD," which is used for most MOSAIC cards, will only allow for a dual-wire OSSD signal, as shown below.



The following cards utilize a different type of output:

- MOSAIC-M1S
- MOSAIC-MI804
- MOSAIC-MO4L

The output block "Single-Double OSSD" allows the use of a single-wire or dual-wire OSSD signal.





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MBEI EtherNet/IP Communications Module

Configuration, data management and communication



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Configuring the ReeR MBEI EtherNet/IP interface module



To configure the MBEI module, it must first be added to the module configuration with the Mosaic Safety Designer software. Here's how:

- Connect a USB cable to the M1 module.
- In the Mosaic Safety Designer software, go to the Project menu and choose "Change Configuration."
- In an available slot, choose the "MB BUS" option at the top and select the "MBEI" option at the bottom.
- Click on the Communication Menu and choose "Send configuration."



Configuring the ReeR MBEI EtherNet/IP interface module

(continued)

Change the USB cable from the M1 module to the MBEI module to configure its settings and start the BUS Configurator software.

Then click on the **Connect** button to view the current settings of the module.



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The **IP address** and **Subnet mask** should be configured to be compatible with the subnet of the EtherNet/IP scanner/client device. If the MBEI will need to be accessible through a router (via Explicit messaging), configure the **Gateway** address for the IP address of the router. Typically, using the setting of "Auto" for the Baudrate will be sufficient for most devices as the port will negotiate to the proper setting.

Disable the **Analog Data**

selection. This will affect the size

🐻 BUS Configurator - User Interface V. 4.0.0 File Settings Connect Write Ext. code (Ext. code Obtain IP address automatical Gatewa 0x05 0x41 DNS1 DNS2 O 10Mbit, half duple O 10Mbit, full duples O 100Mbit, half duplex O 100Mbit, full duplex 1: 2.0.0 MAC Address: 00-30-11-1A-30-4A Schematic CRC: AF3A

and could create an error with the IO Message connection.

Click on the Write button after the settings have been configured.



NOTE: The MBEI module supports four concurrent TCP connections from TCP EtherNet/IP clients using Unconnected Messaging. Any connection attempt when four connections exist will be denied. Only one Class 1 IO Message or Class 3 Connected Explicit Message from a device is supported.

How data is packed into the EtherNet/IP bytes

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IO Messaging (Class 1 Connected)				
Byte Offset	Description			
Output Data (O->T)				
0	Fieldbus input byte 0			
1	Fieldbus input byte 1			
2	Fieldbus input byte 2			
3	Fieldbus input byte 3			
	Input Data (T->O)			
0	System status			
1	Reserved			
2	Input status byte 0			
3	Input status byte 1			
4	Input status byte 2			
5	Input status byte 3			
6	Input status byte 4			
7	Input status byte 5			
8	Input status byte 6			
9	Input status byte 7			
10	Input status byte 8			
11	Input status byte 9			
12	Input status byte 10			
13	Input status byte 11			
14	Input status byte 12			
15	Input status byte 13			
16	Input status byte 14			
17	Input status byte 15			
18	Fieldbus input feedback byte 0			
19	Fieldbus input feedback byte 1			
20	Fieldbus input feedback byte 2			
21	Fieldbus input feedback byte 3			
22	Probe status byte 0			
23	Probe status byte 1			
24	Probe status byte 2			
25	Probe status byte 3			
26	OSSD status byte 0			
27	OSSD status byte 1			
28	OSSD status byte 2			
29	OSSD status byte 3			

How data is packed into the EtherNet/IP bytes (continued)

Automa

Explicit (Class 3 or Unconnected)				
	Input Data			
Class:	162 (0xA2)			
Instance: 1				
Attribute:	5			
Size:	30 bytes			
Data Definition:				
Same format as IO Message Input Data (T->O)				

Output Data			
Class:	162 (0xA2)		
Instance:	257		
Attribute:	5		
Size:	4 bytes		
Data Definition:			

Same as IO Message Output Data (O->T)

CPU Errors 0						
Class: 162 (0xA2)						
Instance:		3				
Attribute:	5					
Size:	91	oytes				
	Data Definition:					
Offset Byte	Offset Byte Description Size (Bytes)					
0	Module	1				
1	Error Code	1				
2	Error Address	4				
6	Firmware Version	1				
7	Extended Code 0	1				
8	Extended Code 0	1				

CPU Errors 1					
Class:	Class: 162 (0xA2)				
Instance:	4				
Attribute:		5			
Size:	9 b	ytes			
Data Definition:					
Offset Byte	Description	Size (Bytes)			
0	Module	1			
1	Error Code	1			
2	Error Address	4			
6	Firmware Version	1			
7	Extended Code 0	1			
8	Extended Code 0	1			

How data is packed into the EtherNet/IP bytes (continued)

Automa

IBC

	Input Diagnostics	
Class:	162 (0xA2)	
Instance:	5	
Attribute:	5	
Size:	32 bytes	
	Data Definition:	
Offset Byte	Description	Size (Bytes)
0	Diagnostic Index Error1	1
1	Diagnostic Code Error1	1
2	Diagnostic Index Error2	1
3	Diagnostic Code Error2	1
4	Diagnostic Index Error3	1
5	Diagnostic Code Error3	1
6	Diagnostic Index Error4	1
7	Diagnostic Code Error4	1
8	Diagnostic Index Error5	1
9	Diagnostic Code Error5	1
10	Diagnostic Index Error6	1
11	Diagnostic Code Error6	1
12	Diagnostic Index Error7	1
13	Diagnostic Code Error7	1
14	Diagnostic Index Error8	1
15	Diagnostic Code Error8	1
16	Diagnostic Index Error9	1
17	Diagnostic Code Error9	1
18	Diagnostic Index Error10	1
19	Diagnostic Code Error10	1
20	Diagnostic Index Error11	1
21	Diagnostic Code Error11	1
22	Diagnostic Index Error12	1
23	Diagnostic Code Error12	1
24	Diagnostic Index Error13	1
25	Diagnostic Code Error13	1
26	Diagnostic Index Error14	1
27	Diagnostic Code Error14	1
28	Diagnostic Index Error15	1
29	Diagnostic Code Error15	1
30	Diagnostic Index Error16	1
31	Diagnostic Code Error16	1

How data is packed into the EtherNet/IP bytes (continued)

reci

	OSSD (Output) Diagnostics	
Class:	162 (0xA2)	
Instance:	6	
Attribute:	5	
Size:	32 bytes	
	Data Definition:	
Offset Byte	Description	Size (Bytes)
0	Diagnostic Index Error1	1
1	Diagnostic Code Error1	1
2	Diagnostic Index Error2	1
3	Diagnostic Code Error2	1
4	Diagnostic Index Error3	1
5	Diagnostic Code Error3	1
6	Diagnostic Index Error4	1
7	Diagnostic Code Error4	1
8	Diagnostic Index Error5	1
9	Diagnostic Code Error5	1
10	Diagnostic Index Error6	1
11	Diagnostic Code Error6	1
12	Diagnostic Index Error7	1
13	Diagnostic Code Error7	1
14	Diagnostic Index Error8	1
15	Diagnostic Code Error8	1
16	Diagnostic Index Error9	1
17	Diagnostic Code Error9	1
18	Diagnostic Index Error10	1
19	Diagnostic Code Error10	1
20	Diagnostic Index Error11	1
21	Diagnostic Code Error11	1
22	Diagnostic Index Error12	1
23	Diagnostic Code Error12	1
24	Diagnostic Index Error13	1
25	Diagnostic Code Error13	1
26	Diagnostic Index Error14	1
27	Diagnostic Code Error14	1
28	Diagnostic Index Error15	1
29	Diagnostic Code Error15	1
30	Diagnostic Index Error16	1
31	Diagnostic Code Error16	1



How data is packed into the EtherNet/IP bytes (continued)

	CPU Errors 0		
Class:	162 (DxA2)	
Instance:	7	7	
Attribute:	Ę	5	
Size:	2 by	2 bytes	
Offset Byte	Description	Size (Bytes)	
0	CRC Byte 0	1	
1	CRC Byte 1	1	

How to view the EtherNet/IP byte mapping



To view the EtherNet/IP byte mapping, change back to the Mosaic Safety

Designer software and either open the project or connect back to the M1 module and open the project. Click on the "Print Report" icon on the toolbar.





NOTE: This is not the same as the Print functions under the File menu.

Scroll towards the end of the document until the **Module BUS ETHERNET_IP** section is reached. The address mapping will be shown in this section. This mapping will vary depending upon the hardware configuration.

The MBEI module supports Class 1 IO Messaging, Class 3 Connected Explicit Messaging and Unconnected Explicit Messaging.

Class 1 IO Messaging parameters:

- Input (T->O) Connection Point = 100 (0x64), size 30 bytes
- Output (O->T) Connection Point = 150 (0x96), size 4 bytes
- Configuration Data Connection Point = 5, Size 0 (The Configuration segment is optional for devices that support this).
- The 4-byte Status Header should be included in the Output data.

Class 3 Connected Explicit and Unconnected Explicit parameters:

- Input Data (Status data):
 - Service = Get Single Attribute = 14 (0x0e)
 - Class = 162 (0xa2)
 - Instance = 1
 - Attribute = 5
 - Size = 30 bytes
- Output Data (FIELDBUS INPUT):
 - Service = Set Single Attribute = 16 (0x10)
 - Class = 162 (0xa2)
 - *Instance* = 257
 - Attribute = 5
 - Size = 4 bytes
- Errors data CPU 0
 - Service = Get Single Attribute = 14 (0x0e)
 - Class = 162 (0xa2)
 - Instance = 3
 - Attribute = 5
 - Size = 9 bytes

How to view the EtherNet/IP byte mapping (continued)



- Errors data CPU 1
 - Service = Get Single Attribute = 14 (0x0e)
 - Class = 162 (0xa2)
 - Instance = 4
 - Attribute = 5
 - Size = 9 bytes

• Input diagnostics

- Service = Get Single Attribute = 14 (0x0e)
- Class = 162 (0xa2)
- Instance = 5
- Attribute = 5
- Size = 32 bytes
- OSSD diagnostics
 - Service = Get Single Attribute = 14 (0x0e)
 - Class = 162 (0xa2)
 - Instance = 6
 - Attribute = 5
 - Size = 32 bytes
- Project CRC
 - Service = Get Single Attribute = 14 (0x0e)
 - Class = 162 (0xa2)
 - Instance = 7
 - Attribute = 5
 - Size = 2 bytes

Data mapping



Module BUS ETHERNET IP MB BUS: Installed Firmware version >= 2.0 Process data mapping (Class 1 Connection) Assembly instance 96h (Connection point T->O Consuming Instance) Byte offset | Size | Name | USINT | Fieldbus input byte 0 0 1 | USINT | Empty | USINT | Empty 2 3 | USINT | Empty T->O connection type: Point-to-point, Multicast Assembly instance 64h (Connection point O->T Producing Instance) Byte offset | Size | Name 0 | USINT | Mosaic Status | USINT | Reserved 1 2 | USINT | M1 Input 3 | USINT | MI802 Node 0 | USINT | MI8 Node 0 4 5 | USINT | Empty 6 | USINT | Empty 7 | USINT | Empty 8 USINT | Empty 9 | USINT | Empty 10 | USINT | Empty 11 | USINT | Empty 12 | USINT | Empty 13 | USINT | Empty 14 | USINT | Empty 15 | USINT | Empty 16 | USINT | Empty | USINT | Empty 17 18 | USINT | Fieldbus input byte 0 feedback 19 | USINT | Empty | USINT | Empty 20 21 | USINT | Empty | USINT | Probe status byte 0 (00÷07) 22 23 | USINT | Probe status byte 1 (08÷15) 24 | USINT | Empty 25 | USINT | Empty 26 | USINT | OSSD status byte 0 (00÷07) 27 | USINT | OSSD status byte 1 (08÷15) 28 | USINT | Empty 29 | USINT | Empty 30 | REAL | Analog data 0 34 | REAL | Analog data 1 38 | REAL | Analog data 2 42 | REAL | Analog data 3 46 REAL | Analog data 4 | Analog data 5 50 REAL | REAL | Analog data 6 54 58 | REAL | Analog data 7 62 REAL | Analog data 8 | Analog data 9 66 REAL 70 | REAL | Analog data 10 74 | REAL | Analog data 11 78 REAL | Analog data 12 82 | REAL | Analog data 13 86 | REAL | Analog data 14

| REAL | Analog data 15



90

NOTE: Everything past offset byte 29 does not exist in the ADC version of the M1 and should be ignored.

Data mapping (continued)



O->T connection type: Point-to-point Supported trigger types: Cyclic, COS

Assembly instance 05h (Configuration) Set this instance to 0 $\,$

Explicit messaging To access Errors data, Input diagnostics, OSSD diagnostic and Project CRC, the service 0x0E (Get attribute single) shall be used.

Name	1	Class	T	Instance		Attribute	T	Length ()	byte)	L.	Access type
Fieldbus inputs	Т	A2h	T	101h		05h	T	4		L	Set/Get
System I/O	I.	A2h	T	01h	I	05h	T	30			Get
Analog data	Т	A2h	T	204h		05h		64		L	Get
Errors data CPU 0	Т	A2h	T	03h		05h	T	9		L.	Get
Errors data CPU 1	Т	A2h	T	04h		05h	T	9		L	Get
Input diagnostics	Т	A2h	T	05h		05h	T	32		Ľ	Get
OSSD diagnostics	Т	A2h	T	06h		05h		32		L	Get
Project CRC	1	A2h	T	07h		05h	T	2		Ľ	Get

Acyclic data format

Errors data CPUx for	mat
Name	Size
Module	USINT
Error code	USINT
Error address	UDINT
Firmware version	USINT
Extended code 0	USINT
Extended code 1	USINT

Input diagnostic	s fo	rmat
Name		Size
Diagnostic inde	x	USINT
Diagnostic code	• I	USINT

A maximum of 16 Input diagnostics are transferred. If more diagnostics are present on the system, only the first 16 are available on the fieldbus

OSSD diagnostics format Name | Size Diagnostic index | USINT Diagnostic code | USINT

A maximum of 16 OSSD diagnostics are transferred. If more diagnostics are present on the system, only the first 16 are available on the fieldbus

Project CRC format Name | Size CRC byte 0 | USINT CRC byte 1 | USINT

Data mapping (continued)



Fieldbus Input byte description Fieldbus input byte 0 Bit 0: FIELDBUS INPUTO Bit 1: FIELDBUS INPUT1 Fieldbus Output bytes description Mosaic Status Bit 0: Mosaic on line Bit 1: Diagnostic present Bit 2: CPU0, 1 Error M1 Input Bit 0: Function Block 1 E-Stop M1 Bit 2: Function Block 2 E-Gate M1 MI802 Node 0 Bit 0: Function Block 3 ESPE MI802 - 0 Bit 2: Function Block 4 S-Mat MI802 - 0 MI8 Node 0 Bit 0: Function Block 5 E-Gate MI8 - 0 Bit 6: Function Block 6 E-Gate MI8 - 0 Fieldbus Input feedback Byte0: Fieldbus input byte 0 feedback Byte1: Empty Byte2: Empty Byte3: Empty Probe status Probe status byte 0 (00÷07) Bit 0: FieldBus Probe 0 Bit 1: FieldBus Probe 1 Bit 7: FieldBus Probe 7 OSSD status byte 0 (00÷07) Bit 4: OUTPUT1 Bit 5: OUTPUT2 Input diagnostic 1: Function Block 1 (E-Stop M1) 2: Function Block 2 (E-Gate M1) 3: Function Block 3 (ESPE MI802-0) 4: Function Block 4 (S-Mat MI802-0) 5: Function Block 5 (E-Gate MI8-0) 6: Function Block 6 (E-Gate MI8-0) OSSD diagnostic 1: OUTPUT1 (MO4-0)

2: OUTPUT2 (MO4-0)

Data mapping (continued)



In the previous section that details the bit breakdown, notice that the description for each section is correlated to the Byte offset at the beginning of the EtherNet/IP Mapping details.

An illustration of this is shown below:





NOTE: The final section describes an older style mapping for units prior version 2.0. This will NOT apply to ADC units.

MB BUS: Installed Firmware version < 2.0

Input diagnostics

Automation Direct

The Input Diagnostics are read by using Explicit Messaging to Class 162 (0xa2), Instance 5, Attribute 5. The Input diagnostics can display 16 possible errors. Each error has a IO Index value to display which device is in error and the Diagnostic Code which is the actual error and the Diagnostic Code which is the actual error for the location.

code. The values for the IO Index are shown in the Print Report. The error codes for the Inputs are shown below. The most recent error is at the top of the list (lowest byte offset). As the errors are corrected, they move up the table.

	0	SSD Diagnostics
0	Input Diagnostics OK	
1	Not moved from zero	Both switches have to go to rest condition. This error is commonly seen when one of the required Inputs from a device is missing.
2	Concurrent failed	Both switches have to change state simultaneously
3	Concurrent failed hand 1	Wrong connection on one side of a two-hands switch
4	Concurrent failed hand 2	Wrong connection on one side of a two-hands switch
7	Switch inconsistent	The selector should not have more than one input set
8	Switch disconnected	The selector should have at least one input set
10	OUT_TEST error	OUT_TEST diagnostics present on this input
11	Second input KO	Redundancy check failed on input
12	OUT_TEST diagnostics OK	
13	Output connected to other inputs	Test output not connected to the right input
14	Output OK but input connected to 24VDC	Stuck input
15	Short circuit between photocell test and photocell input	Photocell response time too slow
16	No response from photocell	The test signal on the photocell emitter is not seen on the receiver
17	Short circuit between photocells	The test signal is present on two different photocells
18	MAT disconnected	Wrong mat connection
19	Output inconsistent with feedback	The test signal on input is present on more than one OUT_TEST
20	Connection incorrect	The test signal is present on more than one input
21	Output stuck	The test signal on the input is not present on the OUT_TEST
22	Second OUT_TEST KO	Redundancy check failed on OUT_TEST
23	MV2 proximity mnissing	Proximity not present/Proxy not working
24	MV2 encoder missing	Encoder not present/Encoder not powered
25	MV2 encoder Proximity missing	Device connected incorrectly
26	MV2 Proximity 1, Proximity 2 missing	Both proxies must be connected
27	MV2 encoder 1, encoder 2 missing	Both encoders must be connected
28	MV2 error congruence frequencies	Redundancy check failed on measurement
29	MV2 encoder supply missing	Encoder not properly fed
30	MV2 encoder error	Encoder signals with duty cycle and/or phase displacement not correct
*133 (0x85)	TWO-HAND concurrent failed	Two-hands switch has to change state simultaneously
*134 (0x86)	Not started	Start test failed
*137 (0x89)	Waiting for restart	The input has manual reset and has not been restarted

* Diagnostic values 133, 134 and 137 do not provide visual error message on the LED Mosaic.

The Output (or OSSD) Diagnostics are read by using Explicit Messaging to Class 162

Code which is the actual error code. The values for the IO Index are shown in the Print Report. The error codes for the Outputs are shown below. The most recent error is at the top of the list (lowest byte offset). As the errors are corrected, they move up the table.

	0	SSD Diagnostics
0	OSSD diagnostics OK	
1	Enable missing	
2	Waiting for restart OSSD	
3	Feedback K1/K2 missing	
4	Waiting for other micro	Redundancy check failed on OSSD
5	OSSD power supply missing	
6	Exceeded maximum time restart	
7	Feedback K1/K2 external not congru- ous CAT2	Applicable to MOR4 MOR458 modules configured in CAT2
8	Waiting for feedback K1/K2	Feedback K1 K2 in transition
9	Overload OSSD output	
10	OSSD with Load set to 24V	

(0xa2), Instance 6, Attribute 5. The Output diagnostics can display 16 possible errors. Each error has a IO Index value to display which device is in error and the Diagnostic



Productivity Series Example Class 1 IO Messaging



Go to **Hardware Configuration** and click on the **EtherNet/IP** tab. Click on the **Generic Client** text on the right-hand side and drag over to the working area to create a new device.

Hardware Configuration		×
▲ 🗹 💱 🔖 - @		•
CPU GS Drives EtherNet/IP CPoE ProNET		
Ree 10.11.0.21	Drag "Generic Client" over to workspace to create new device.	Import EDS File EtherNet/IP Device Generic Client



Fill in the IP address of the MBEI module. Click on the **+** and choose **Add IO message.** Click on the **T->O (INPUT)** tab and fill in as shown below.

EtherNet/IP Client Properties		×
Use Structure	ReeR ~	• •••
Device Name ReeR TCP Connected	TCPConnected ~	·
Ethernet Port CPU-ETH-Ext V Adapter Name	AdapterName ~	
IP Address 10.11.0.21 Vendor ID	VendorID ~	
TCP Port Number 44818 TCP/IP Error	TcpIpError ~	·
Close unused CIP Session after 30 secs		
Swap Byte Order		
MSG1 [I/O] MSG2 [EXP]		
Enable Msg1Enable Connection Online	Msg1ConnOnline 🗸 🗸	
General Status	Msg1GenStatus 🗸	
Enable Routing Slot Number 0 Extended Status	ReeR_Msg1_ExtStat ~	
Status Description	Msg1StatusDesc 🗸	
EtherNet/IP Client Properties Device Name ReeR Device Name ReeR TCP Connected TCPConnected TCPConnected Adapter Name Adapter Nam		
EtherNet/IP Client Properties × × EtherNet/IP Client Properties × × Lise Structure ReeR • • • • • • • • • • • • • • • • •		
RPI Time (msec) 250		
Assembly Instance/Connection Point 100 (0x64)		
Message Size from Array (bytes) 30 Datatype Integer, 8 Bit Unsigned, 1D Array Data Array Mosaic_Status_Bytes v (100 elements) Number of Elements 30 🐳		
Monitor	OK Cancel H	elp



Click on the **O->T (OUTPUT)** tab and fill in as shown below.

therNet/IP Client Properties			
	🗹 Use Structure	ReeR	~
Device Name ReeR	TCP Connected	TCPConnected	~
Ethernet Port CPU-ETH-Ext 🗸	Adapter Name	AdapterName	~
IP Address 10.11.0.21	Vendor ID	VendorID	~
TCP Port Number 44818	TCP/IP Error	TcpIpError	~
Close unused CIP Session after 30 secs			
Swap Byte Order			
MSG1 [I/O] MSG2 [EXP]			
Enable Msg1Enable ~	Connection Online	Msg1ConnOnline	~
	General Status	Msg1GenStatus	~
Enable Routing Slot Number 0	Extended Status	ReeR_Msg1_ExtStat	~
	Status Description	Msg1StatusDesc	~
T->O (INPUT) O->T (OUTPUT) CONFIG DATA			
Originator To Target (OUTPUT) Data		-	
Include Status Header (When checked the message size	e will be increased by 4 bytes)		
RPI Time (msec) 250			
Assembly Instance/Connection Point 150 (0x96			
Message Size from Array (bytes) 4			
Datatype Integer, 8 Bit Unsigned	I, 1D Array		
Data Array FIELDBUS_INPUT_BYI	(4 elements)		
Number of Elements 4 🜩			
J			
Monitor		OK Cancel	Help

Automation Direct

Click on the **CONFIG DATA** tab. Leave this option disabled. It will also work if you enable this option, enter in a value of 5 for the **Assembly Instance/Connection Point** field and choose number of elements 0.

therNet/IP Client Properties				
	Use Structure	ReeR	~	
Device Name ReeR	TCP Connected	TCPConnected	~	
Ethernet Port CPU-ETH-Ext 🗸	Adapter Name	AdapterName	~	
IP Address 10.11.0.21	Vendor ID	VendorID	~	
CP Port Number 44818	TCP/IP Error	TcpIpError	~	
Close unused CIP Session after 30 secs				
Swap Byte Order				
MSG1 [I/O] MSG2 [EXP]				
Enable Msg1Enable ~	Connection Online	Msg1ConnOnline	~	
	General Status	Msg1GenStatus	\sim	
Net/IP Client Properties Device Name ReeR Ethernet Port CPU-ETH-Ext IP Address 10.11.0.21 Port Number 44818 Close unused CIP Session after 30 secs Swap Byte Order MSG1 [I/O] MSG2 [EXP] able Msg1Enable MSG1 Enable 0 T->O (INPUT) O->T (OUTPUT) CONFIG DATA Configuration Data Assembly Instance/Connection Point 0 (0x0) Array Tag Parameter Table Message Size from Array (bytes) 0 Datatype Data Array Number of Elements 0	Extended Status	ReeR_Msg1_ExtStat	~	
	Status Description	Msg1StatusDesc	\sim	
T->O (INPUT) O->T (OUTPUT) CONFIG DATA				
Configuration Data				
Assembly Instance/Connection Point 0 (0x0.)				
Array Tag Parameter Table				
Message Size from Array (bytes) 0				-
Datatype				
Data Array	(0 elements)			
Number of Elements 0				
				_
Monitor		OK Cancel	Help	ρ

Automation Direct

Notice the mapping of the bits below as compared to the Print Report illustrated earlier in this document. Note that the Print Report utilizes an offset into the data starting at 0 while the Productivity Series PLC uses an offset of 1.



Productivity Series Example Class 3 Explicit (or Unconnected Explicit)

for each of the GET instructions.

In the example below, there is only one "write" (SET). It is only triggered when a change to the value of the FIELDBUS INPUTs is desired. The 'read' (GET) instructions are polled on a 250ms interval by using a simple counter to increment through the 5 instructions. There are additional permissive bits

1

INTER

This rung will set the value for the FIELDBUS INPUT bits ReeR EMSG Set - ETHERNET/IP EXPLICIT MESSAGE Device Name ReeR Connection Unconnected MSG Service Generic In Progress InProgress Complete Complete Send_ReeR_EMSG_Set Success Success Service Do 16 Class ID 162 Attribute ID 5 Instance ID 257 Output Elements 4 Output Data Array FIELDBUS_INPUT_BYTE Error Error Enable 1 Timeout Timeout Exception String^{ExcRes} Send ReeR EMSG Set RST) 1.1 This is a poll timer to send out the GET requests on a 250ms interval. ReeR PolITMR.Done SIMPLE TIMER Preset Value 25 Current Value ReeR_PolITMR.Curren On Delay Done ReeR_PolITMR.Done Time Up -1/4 2 ReeR_PolITMR.Done SIMPLE COUNTER Preset Value 5 Current Value InterlockCNT.Curren Done InterlockCNT.Done Count Up 3 I NT.Done ┥┟ 3.1 This is a GET request to read back the static bytes from the Mosaic unit ReeR_EMSG_Get - ETHERNET/IP EXPLICIT MESSAGE ReeR_EMSG_Get - ETH Device Name ReeR Connection Unconnected MSG Service Generic Service ID 14 Class ID 162 Attribute ID 5 Instance ID 1 Input Elements 30 IP EXPLICIT MESSAGE In Progress InProgress Complete Complete Success Success Error Error Timeout Timeout Exception Response String ReeR_EMSG_Get_Enable InterlockCNT.Current 0 Enable 4 Input Data Array Mo aic_Status_Bytes This is a GET request to read back the CPU0 Errors from the Mosaic unit ReeR EMSG Get - ETHERNET/IP EXPLICIT MESSAGE ReeR_EMSG Get - ETHERNET (//# EXPLICIT MESANGE Device Name ReeR In Progress InProgress Connection Unconnected MSG Complete Complete Service Generic Success Success Service 10 14 Error Error Error Class ID 162 Timeout Timeout Arthobie ID 5 Exception ExcResp Instance ID 3 Response String ExcResp Instance ID 3 Response String ExcResp CPU0Errors_Get_Enable InterlockCNT.Current 1 Enable 5 Service ID 14 Class ID 162 Attribute ID 5 Instance ID 3 Input Elements 9 Input Data Array CPU0_Errors This is a GET request to read back the CPU1 Errors from the Mosaic unit.
 ReeR_EMSG_Get - ETHERNET/IP EXPLICIT MESSAGE

 Device Name ReeR
 In Progress InProgress

 Connection Unconnected MSG
 Complete Complete

 Service Generic
 Success Success

 Service Io 14
 Error Error
 CPU1Errors Get Enable InterlockCNT.Current 2 Success Success Error Error Timeout Timeout Exception Response String Enabl Service ID 14 Class ID 162 6 ł Class ID 162 Attribute ID 5 Instance ID 4 Input Elements 9 Input Data Array CPU1_Errors

Productivity Series Example Class 3 Explicit (or Unconnected Explicit) *(continued)*

Automation Direct

The final rung moves over the Diagnostic IO Index and error code. The example shows only the first error location for each diagnostic block of 16 (Input and Output). To break out all 16 errors, repeat the example for all 16 locations.





Do-more and BRX PLCs only do Unconnected Explicit Messaging. The "write" (SET) instruction is triggered only when the FIELDBUS INPUT values change. Unsigned words (V registers) are used for the source and destination data in this example. The bit of word assignments is shown at the end of this example to illustrate where the bits map into the data being read and written. They correspond to the mapping in the Print Report shown earlier in this document.



Do-more/BRX Example *(continued)*



The last two rungs break out the diagnostic IO Index and error code to make it easier to read. These two rungs only break out the first error for each block (Inputs and Outputs). To break out all 16 errors for each block, use the same method shown in these rungs for all 16 registers.



Do-more/BRX Example *(continued)*



This table shows the bit-of-word mapping.

Element	Nickname
V0:0	FIELDBUS_IN0
V0:1	FIELDBUS_IN1
V0:2	FIELDBUS_IN2
V0:3	FIELDBUS_IN3
V0:4	FIELDBUS_IN4
V0:5	FIELDBUS_IN5
V0:6	FIELDBUS_IN6
V0:7	FIELDBUS_IN7
V10 *	
V10:0	Mosaic_Online
V10:1	Diag_Present
V10:2	CPU0_Error
V11:0	FB1_Estop_M1
V11:2	FB2_EGate_M1
V11:8	FB3_ESPE_MI802
V11:10	FB4_SMat_MI802
V12:0	FB5_EGate_MI8
V12:6	FB6_EGate_MI8
V19:0	FBUS_INSTAT0
V19:1	FBUS_INSTAT1
V19:2	FBUS_INSTAT2
V19:3	FBUS_INSTAT3
V19:4	FBUS_INSTAT4
V19:5	FBUS_INSTAT5
V19:6	FBUS_INSTAT6
V19:7	FBUS_INSTAT7
V21:0	FBUS_PROBE0
V21:1	FBUS_PROBE1
V21:2	FBUS_PROBE2
V21:3	FBUS_PROBE3
V21:4	FBUS_PROBE4
V21:5	FBUS_PROBE5
V21:6	FBUS_PROBE6
V21:7	FBUS_PROBE7
V23:4	OSSD_Out1
V23:5	OSSD_Out2

Modbus TCP/IP Communications Module

Configuration, data management and communication

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Configuring the Reer MBEM Modbus TCP interface module



To configure the MBEM module, it must first be added to the module configuration with the Mosaic Safety Designer software. Here's how:

- Connect a USB cable to the M1 module.
- In the Mosaic Safety Designer software, go to the Project menu and choose "Change Configuration."
- In an available slot, choose the "MB BUS" option at the top and select the "MBEM" option at the bottom.
- Click on the Communication Menu and choose "Send configuration."



Configuring the Reer MBEM Modbus TCP interface module



(continued)

Change the USB cable from the M1 module to the MBEM module to

configure its settings and start the BUS Configurator software. Then... Click on the **Connect** button to view the current settings of the module.

The **IP address** and **Subnet mask** should be configured to be compatible with the subnet of the Modbus TCP client device.

If the MBEM will need to be accessible through a router, configure the **Gateway** address for the IP address of the router.

The MBEM module listens on the standard Modbus TCP port 502.

The **Baudrate** section can be used to change the Ethernet port settings. Typically, using the **Auto** setting will be sufficient for most devices as the port will negotiate to the proper setting.

Click on the **Write** button after the settings have been configured.

Settings				
	Error 0		Error 1	
nnect Write	Module	Error address	Module	Error address
	FW	Ext. code 0	FW	Ext. code 0
ameters	Error code	Ext. code 1	Error code	Ext. code 1
ddress	Fieldbus Input	Analog data	Diagnostic Input	Diagnostic Output
Obtain IP address automatically	76543210	0	0	0
 Select the IP address 	000000000	0x00 1		
		0x00		
IP address 10 . 11 . 0 . 20		0x00	2	2
ubnet mask 255 . 255 . 0 . 0		10x00 - 5		
Sateway 0 0 0 0		0x05 6	3	3
	100000000	0x05 7		
0.0.0.0	20000000	0x41 8	4	4
0.0.0.0	30000000	0x00 9	5	5
	40000000	0x00 10		
		0x00 11	6	6
audrate		0x00 12		
	:	0x00 14	7	7
MODBUS TCP	900000000	0x00 15		
	1000000000	0x00	•	• •
Auto	1100000000	0x00	9	9
 10Mbit, half duplex 		0.00		
10Mbt. full duplex		0x00	10	10
	15 0 0 0 0 0 0 0 0	0x00		
 100Mbit, half duplex 	Probe		11	11
○ 100Mbt full dupley	00000000	0x03	12	12
		0x00		
	3	0x00	13	13
	OSSD			
	000000000	0x30	14	14
	10000000	0x00	15	15
	2	0x00	10	10



NOTE: The MBEM module supports four concurrent Modbus TCP connections from Modbus TCP clients. Any connection attempt when four connections exist will be denied.

How data is packed into the Modbus registers

This table shows a basic layout of how the data is packed into the Modbus registers.



	Modbus Add	ressing		
Mosaic	Modicon Style	Protocol (FC = Function Code)	Description	Read/Write
000h	400001	FC3/6/16 Offset 0	Fieldbus input bytes 1/0 (High/Low)	Write
001h	400002	FC3/6/16 Offset 1	Fieldbus input bytes 3/2 (High/Low)	Write
002h - 0FFh	400003 - 400256	FC3/6/16 Offset 2 - 255	Reserved	Write
100h	400257	FC3 Offset 256	System Status (low byte)	Read
101h	400258	FC3 Offset 257	Input status bytes 1/0 (High/Low)	Read
102h	400259	FC3 Offset 258	Input status bytes 3/2 (High/Low)	Read
103h	400260	FC3 Offset 259	Input status bytes 5/4 (High/Low)	Read
104h	400261	FC3 Offset 260	Input status bytes 7/6 (High/Low)	Read
105h	400262	FC3 Offset 261	Input status bytes 9/8 (High/Low)	Read
106h	400263	FC3 Offset 262	Input status bytes 11/10 (High/Low)	Read
107h	400264	FC3 Offset 263	Input status bytes 13/12 (High/Low)	Read
108h	400265	FC3 Offset 264	Input status bytes 15/14 (High/Low)	Read
109h	400266	FC3 Offset 265	Fieldbus input feedback bytes 1/0 (High/Low)	Read
10Ah	400267	FC3 Offset 266	Fieldbus input feedback bytes 3/2 (High/Low)	Read
10Bh	400268	FC3 Offset 267	Probe status bytes 1/0 (High/Low)	Read
10Ch	400269	FC3 Offset 268	Probe status bytes 3/2 (High/Low)	Read
10Dh	400270	FC3 Offset 269	OSSD status bytes 1/0 (High/Low)	Read
10Eh	400271	FC3 Offset 270	OSSD status bytes 3/2 (High/Low)	Read
10Fh - 110h	400272 - 400273	FC3 Offset 271 - 272	Analog data float 0	Read
111h - 112h	400274 - 400275	FC3 Offset 273 - 274	Analog data float 1	Read
113h - 114h	400276 - 400277	FC3 Offset 275 - 276	Analog data float 2	Read
115h - 116h	400278 - 400279	FC3 Offset 277 - 278	Analog data float 3	Read
117h - 118h	400280 - 400281	FC3 Offset 279 - 280	Analog data float 4	Read
119h - 11Ah	400282 - 400283	FC3 Offset 281 - 282	Analog data float 5	Read
11Bh - 11Ch	400284 - 400285	FC3 Offset 283 - 284	Analog data float 6	Read
11Dh - 11Eh	400286 - 400287	FC3 Offset 285 - 286	Analog data float 7	Read
11Fh - 120h	400288 - 400289	FC3 Offset 287 - 288	Analog data float 8	Read
121h - 122h	400290 - 400291	FC3 Offset 289 - 290	Analog data float 9	Read
123h - 124h	400292 - 400293	FC3 Offset 291 - 292	Analog data float 10	Read
125h - 126h	400294 - 400295	FC3 Offset 293 - 294	Analog data float 11	Read
127h - 128h	400296 - 400297	FC3 Offset 295 - 296	Analog data float 12	Read
129h - 12Ah	400298 - 400299	FC3 Offset 297 - 298	Analog data float 13	Read
12Bh - 12Ch	400300 - 400301	FC3 Offset 299 - 300	Analog data float 14	Read
12Dh - 12Eh	400302 - 400303	FC3 Offset 301 - 302	Analog data float 15	Read
12Fh - 22Fh	400304 - 400560	FC3 Offset 303 - 559	Reserved	Read
230h	400561	FC3 Offset 560	Error CPU0 bytes Error Code/Module (High/Low)	Read
231Fh - 232h	400562 - 400563	FC3 Offset 561 - 562	Error CPU0 Error Address	Read
233h	400564	FC3 Offset 563	Error CPU0 bytes Firmware Ver/Extended Code 0 (High/Low)	Read
234h	400565	FC3 Offset 564	Error CPU0 byte Extended Code 1 (Low)	Read
235Fh - 23Fh	400566 - 400576	FC3 Offset 565 - 575	Reserved	Read

How data is packed into the Modbus registers *(continued)*



	Modbus Add	Iressing		
Mosaic	Modicon Style	Protocol (FC = Function Code)	Description	Read/Write
240h	400577	FC3 Offset 576	Error CPU1 bytes Error Code/Module (High/Low)	Read
241Fh - 242h	400578 - 400579	FC3 Offset 577 - 578	Error CPU1 Error Address	Read
243h	400580	FC3 Offset 579	Error CPU1 bytes Firmware Ver/Extended Code 0 (High/Low)	Read
244h	400581	FC3 Offset 580	Error CPU1 byte Extended Code 1 (Low)	Read
245Fh - 24Fh	400582 - 400592	FC3 Offset 581 - 591	Reserved	Read
250h	400593	FC3 Offset 592	Input diagnostic 1 bytes index/code (High/Low)	Read
251h	400594	FC3 Offset 593	Input diagnostic 2 bytes index/code (High/Low)	Read
252h	400595	FC3 Offset 594	Input diagnostic 3 bytes index/code (High/Low)	Read
253h	400596	FC3 Offset 595	Input diagnostic 4 bytes index/code (High/Low)	Read
254h	400597	FC3 Offset 596	Input diagnostic 5 bytes index/code (High/Low)	Read
255h	400598	FC3 Offset 597	Input diagnostic 6 bytes index/code (High/Low)	Read
256h	400599	FC3 Offset 598	Input diagnostic 7 bytes index/code (High/Low)	Read
257h	400600	FC3 Offset 599	Input diagnostic 8 bytes index/code (High/Low)	Read
258h	400601	FC3 Offset 600	Input diagnostic 9 bytes index/code (High/Low)	Read
259h	400602	FC3 Offset 601	Input diagnostic 10 bytes index/code (High/Low)	Read
25Ah	400603	FC3 Offset 602	Input diagnostic 11 bytes index/code (High/Low)	Read
25Bh	400604	FC3 Offset 603	Input diagnostic 12 bytes index/code (High/Low)	Read
25Ch	400605	FC3 Offset 604	Input diagnostic 13 bytes index/code (High/Low)	Read
25Dh	400606	FC3 Offset 605	Input diagnostic 14 bytes index/code (High/Low)	Read
25Eh	400607	FC3 Offset 606	Input diagnostic 15 bytes index/code (High/Low)	Read
25Fh	400608	FC3 Offset 607	Input diagnostic 16 bytes index/code (High/Low)	Read
260h	400609	FC3 Offset 608	Output diagnostic 1 bytes index/code (High/Low)	Read
261h	400610	FC3 Offset 609	Output diagnostic 2 bytes index/code (High/Low)	Read
262h	400611	FC3 Offset 610	Output diagnostic 3 bytes index/code (High/Low)	Read
263h	400612	FC3 Offset 611	Output diagnostic 4 bytes index/code (High/Low)	Read
264h	400613	FC3 Offset 612	Output diagnostic 5 bytes index/code (High/Low)	Read
265h	400614	FC3 Offset 613	Output diagnostic 6 bytes index/code (High/Low)	Read
266h	400615	FC3 Offset 614	Output diagnostic 7 bytes index/code (High/Low)	Read
267h	400616	FC3 Offset 615	Output diagnostic 8 bytes index/code (High/Low)	Read
268h	400617	FC3 Offset 616	Output diagnostic 9 bytes index/code (High/Low)	Read
269h	400618	FC3 Offset 617	Output diagnostic 10 bytes index/code (High/Low)	Read
26Ah	400619	FC3 Offset 618	Output diagnostic 11 bytes index/code (High/Low)	Read
26Bh	400620	FC3 Offset 619	Output diagnostic 12 bytes index/code (High/Low)	Read
26Ch	400621	FC3 Offset 620	Output diagnostic 13 bytes index/code (High/Low)	Read
26Dh	400622	FC3 Offset 621	Output diagnostic 14 bytes index/code (High/Low)	Read
26Eh	400623	FC3 Offset 622	Output diagnostic 15 bytes index/code (High/Low)	Read
26Fh	400624	FC3 Offset 623	Output diagnostic 16 bytes index/code (High/Low)	Read
270h	400625	FC3 Offset 624	Project CRC bytes Low/High (High/Low)	Read



To view the Modbus address mapping, change back to the Mosaic Safety Designer software and either open the project or connect back to the M1 module and open the project. Click on the **Print Report** icon on the toolbar.





NOTE: This is not the same as the Print functions under the File menu.

Scroll towards the end of the document until the **Module BUS MODBUS TCP** section is reached. The Modbus address mapping will be shown in this section. This Modbus mapping will vary depending upon the hardware configuration.

The **Fieldbus input byte description** describes bits that can be written to by a Modbus TCP Client device. All of the other registers are status data to be read by the Modbus TCP Client device.

Scrolling down further shows a more detailed breakdown of the data contained within these Modbus registers:

Module BUS MODBUS TCP					
MP PHS. Tratallad Firmura					
Mb bus: installed filmwar	e version >= 2.0				
Register mapping					
Register(s) Size	Name				
000h Low byte UINT8	Fieldbus input byte 0				
000h High byte UINT8	Empty				
001h Low byte UINT8	Empty				
001h High byte UINT8	Empty				
002h-0FFh -	Reserved				
100h Low byte UINT8	Mosaic Status				
100h High byte -	Reserved				
101h Low byte UINT8	M1 Input				
101h High byte UINT8	MI802 Node 0				
102h Low byte UINT8	MI8 Node 0				
102h High byte UINT8	Empty				
103h Low byte UINT8	Empty				
103h High byte UINT8	Empty				
104h Low byte UINT8	Empty				
104h High byte UINT8	Empty				
105h Low byte UINT8	Empty				
105h High byte UINT8	Empty				
106h Low byte UINT8	Empty				
105h High byte UINT8	Empty				
107h Low byte UINT8	Empty				
10%h Lew bute UINT8	Empty				
108h Low byte UINT8	Empty				
108h High byte UINT8	Empty Fieldbug input buts 0 feedback				
109h High bute UINTO	Fretubus input byte o reedback				
107h Low byte UINTO	Empty				
10Ab High bute UINTO	Empty				
10Bh Low byte UINTO	Probe status byte 0 (00-07)				
10Bh High bute UINTO	Probe status byte 0 (00.07)				
TODU UTĂU DĂCE OIMIO	riobe status byte i (00:13)				

How to view Modbus address mapping (continued)



10Ch	Low byte	T.	UINT8	L	Empty
10Ch	High byte	T.	UINT8	I.	Empty
10Dh	High byte	T.	UINT8	I.	OSSD status byte 0 (00÷07)
10Dh	Low byte	T.	UINT8	I.	OSSD status byte 1 (08÷15)
10Eh	High byte	Т	UINT8	I.	Empty
10Eh	Low byte	I.	UINT8	T	Empty

Register(s)		Size		Name
230h Low byte	I.	UINT8	I.	CPU0 Error - Module
230h High byte	I.	UINT8	I.	CPU0 Error - Error Code
231h-232h	I.	UINT32	I.	CPU0 Error - Error Address
233h Low byte	I.	UINT8	I.	CPU0 Error - Installed Firmware version
233h High byte	I.	UINT8	I.	CPU0 Error - Extended code 0
234h Low byte	I.	UINT8	I.	CPU0 Error - Extended code 1
235h-23Fh	I.	-	I.	Reserved
240h Low byte	I.	UINT8	I.	CPU1 Error - Module
240h High byte	I.	UINT8	I.	CPU1 Error - Error Code
241h-242h	I.	UINT32	I.	CPU1 Error - Error Address
243h Low byte	I.	UINT8	I.	CPU1 Error - Installed Firmware version
243h High byte	I.	UINT8	I.	CPU1 Error - Extended code 0
244h Low byte	T.	UINT8	I.	CPU1 Error - Extended code 1
245h-24Fh	I.	-	T	Reserved

Regis	ster(s)	L	Size	L	Name		
250h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 1
250h	High byte	L	UINT8		Input:	Diagnostic	code 1
251h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 2
251h	High byte	L	UINT8	T	Input:	Diagnostic	code 2
252h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 3
252h	High byte	L	UINT8	Т	Input:	Diagnostic	code 3
253h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 4
253h	High byte	L	UINT8	T	Input:	Diagnostic	code 4
254h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 5
254h	High byte	L	UINT8	I.	Input:	Diagnostic	code 5
255h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 6
255h	High byte	L	UINT8	T	Input:	Diagnostic	code 6
256h	Low byte	L	UINT8	Т	Input:	Diagnostic	Index 7
256h	High byte	L	UINT8	T	Input:	Diagnostic	code 7
257h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 8
257h	High byte	L	UINT8	T	Input:	Diagnostic	code 8
258h	Low byte	L	UINT8		Input:	Diagnostic	Index 9
258h	High byte	L	UINT8	T	Input:	Diagnostic	code 9
259h	Low byte	L	UINT8	T	Input:	Diagnostic	Index 10
259h	High byte	L	UINT8	T	Input:	Diagnostic	code 10
25Ah	Low byte	L	UINT8	T	Input:	Diagnostic	Index 11
25Ah	High byte	L	UINT8	I.	Input:	Diagnostic	code 11
25Bh	Low byte	L	UINT8	1	Input:	Diagnostic	Index 12
25Bh	High byte	L	UINT8	T	Input:	Diagnostic	code 12
25Ch	Low byte	L	UINT8	Т	Input:	Diagnostic	Index 13
25Ch	High byte	L	UINT8	T	Input:	Diagnostic	code 13
25Dh	Low byte	L	UINT8	I.	Input:	Diagnostic	Index 14
25Dh	High byte	L	UINT8	T	Input:	Diagnostic	code 14
25Eh	Low byte	L	UINT8	T	Input:	Diagnostic	Index 15
25Eh	High byte	I.	UINT8	T	Input:	Diagnostic	code 15
25Fh	Low byte	I.	UINT8	L	Input:	Diagnostic	Index 16
25Fh	High byte	I.	UINT8	T	Input:	Diagnostic	code 16

A maximum of 16 Input diagnostics are transferred. If more diagnostics are present on the system, only the first 16 are available on the fieldbus



(continued)

260h	Low byte	UINT8	OSSD:	Diagnostic	Index 1
260h	High byte	UINT8	OSSD:	Diagnostic	code 1
261h	Low byte	UINT8	OSSD:	Diagnostic	Index 2
261h	High byte	UINT8	OSSD:	Diagnostic	code 2
262h	Low byte	UINT8	OSSD:	Diagnostic	Index 3
262h	High byte	UINT8	OSSD:	Diagnostic	code 3
263h	Low byte	UINT8	OSSD:	Diagnostic	Index 4
263h	High byte	UINT8	OSSD:	Diagnostic	code 4
264h	Low byte	UINT8	OSSD:	Diagnostic	Index 5
264h	High byte	UINT8	OSSD:	Diagnostic	code 5
265h	Low byte	UINT8	OSSD:	Diagnostic	Index 6
265h	High byte	UINT8	OSSD:	Diagnostic	code 6
266h	Low byte	UINT8	OSSD:	Diagnostic	Index 7
266h	High byte	UINT8	OSSD:	Diagnostic	code 7
267h	Low byte	UINT8	OSSD:	Diagnostic	Index 8
267h	High byte	UINT8	OSSD:	Diagnostic	code 8
268h	Low byte	UINT8	OSSD:	Diagnostic	Index 9
268h	High byte	UINT8	OSSD:	Diagnostic	code 9
269h	Low byte	UINT8	OSSD:	Diagnostic	Index 10
269h	High byte	UINT8	OSSD:	Diagnostic	code 10
26Ah	Low byte	UINT8	OSSD:	Diagnostic	Index 11
26Ah	High byte	UINT8	OSSD:	Diagnostic	code 11
26Bh	Low byte	UINT8	OSSD:	Diagnostic	Index 12
26Bh	High byte	UINT8	OSSD:	Diagnostic	code 12
26Ch	Low byte	UINT8	OSSD:	Diagnostic	Index 13
26Ch	High byte	UINT8	OSSD:	Diagnostic	code 13
26Dh	Low byte	UINT8	OSSD:	Diagnostic	Index 14
26Dh	High byte	UINT8	OSSD:	Diagnostic	code 14
26Eh	Low byte	UINT8	OSSD:	Diagnostic	Index 15
26Eh	High byte	UINT8	OSSD:	Diagnostic	code 15
26Fh	Low byte	UINT8	OSSD:	Diagnostic	Index 16
26Fh	High byte	UINT8	OSSD:	Diagnostic	code 16

A maximum of 16 OSSD diagnostics are transferred. If more diagnostics are present on the system, only the first 16 are available on the fieldbus

Register(s)		Size		Name		
270h Low byte	I.	UINT8	I.	Project	CRC	High byte
270h High byte		UINT8		Project	CRC	Low byte

(continued)

```
Fieldbus Input byte description
Fieldbus input byte 0
Bit 0: FIELDBUS INPUTO
Bit 1: FIELDBUS INPUT1
Fieldbus Output bytes description
Mosaic Status
Bit 0: Mosaic on line
Bit 1: Diagnostic present
Bit 2: CPU0, 1 Error
M1 Input
Bit 0: Function Block 1 E-Stop M1
Bit 2: Function Block 2 E-Gate M1
MI802 Node 0
Bit 0: Function Block 3 ESPE MI802 - 0
Bit 2: Function Block 4 S-Mat MI802 - 0
MI8 Node 0
Bit 0: Function Block 5 E-Gate MI8 - 0
Bit 6: Function Block 6 E-Gate MI8 - 0
Fieldbus Input feedback
Byte0: Fieldbus input byte 0 feedback
Byte1: Empty
Byte2: Empty
Byte3: Empty
Probe status
Probe status byte 0 (00÷07)
Bit 0: FieldBus Probe 0
Bit 1: FieldBus Probe 1
Bit 7: FieldBus Probe 7
OSSD status byte 0 (00÷07)
Bit 4: OUTPUT1
Bit 5: OUTPUT2
Input diagnostic
1: Function Block 1 (E-Stop M1)
2: Function Block 2 (E-Gate M1)
3: Function Block 3 (ESPE MI802-0)
4: Function Block 4 (S-Mat MI802-0)
5: Function Block 5 (E-Gate MI8-0)
6: Function Block 6 (E-Gate MI8-0)
OSSD diagnostic
```

1: OUTPUT1 (MO4-0) 2: OUTPUT2 (MO4-0)



(continued)

In the previous section that details the bit breakdown, notice that the description for each section is correlated to the Byte offset at the beginning of the Modbus TCP/IP Mapping details.

An illustration of this is shown below:





NOTE: The final section describes an older style mapping for units prior version 2.0. This will NOT apply to ADC units.

MB BUS: Installed Firmware version < 2.0

Registers 250h-25Fh (input diagnostic errors)

Automation Direct

Registers 250h-25Fh contain the Input diagnostic errors. The High byte points to the device that has an error (note the device numbers shown in the Input Diagnostic section in the Print Report output). The Low byte contains the error code itself. The table below indicates the possible errors, their explanations and possible resolutions for these errors.

OSSD Diagnostics						
0	Input Diagnostics OK					
1	Not moved from zero	Both switches have to go to rest condition. This error is commonly seen when one of the required Inputs from a device is missing.				
2	Concurrent failed	Both switches have to change state simultaneously				
3	Concurrent failed hand 1	Wrong connection on one side of a two-hands switch				
4	Concurrent failed hand 2	Wrong connection on one side of a two-hands switch				
7	Switch inconsistent	The selector should not have more than one input set				
8	Switch disconnected	The selector should have at least one input set				
10	OUT_TEST error	OUT_TEST diagnostics present on this input				
11	Second input KO	Redundancy check failed on input				
12	OUT_TEST diagnostics OK					
13	Output connected to other inputs	Test output not connected to the right input				
14	Output OK but input connected to 24VDC	Stuck input				
15	Short circuit between photocell test and photocell input	Photocell response time too slow				
16	No response from photocell	The test signal on the photocell emitter is not seen on the receiver				
17	Short circuit between photocells	The test signal is present on two different photocells				
18	MAT disconnected	Wrong mat connection				
19	Output inconsistent with feedback	The test signal on input is present on more than one OUT_TEST				
20	Connection incorrect	The test signal is present on more than one input				
21	Output stuck	The test signal on the input is not present on the OUT_TEST				
22	Second OUT_TEST KO	Redundancy check failed on OUT_TEST				
23	MV2 proximity mnissing	Proximity not present/Proxy not working				
24	MV2 encoder missing	Encoder not present/Encoder not powered				
25	MV2 encoder Proximity missing	Device connected incorrectly				
26	MV2 Proximity 1, Proximity 2 missing	Both proxies must be connected				
27	MV2 encoder 1, encoder 2 missing	Both encoders must be connected				
28	MV2 error congruence frequencies	Redundancy check failed on measurement				
29	MV2 encoder supply missing	Encoder not properly fed				
30	MV2 encoder error	Encoder signals with duty cycle and/or phase displacement not correct				
*133 (0x85)	TWO-HAND concurrent failed	Two-hands switch has to change state simultaneously				
*134 (0x86)	Not started	Start test failed				
*137 (0x89)	Waiting for restart	The input has manual reset and has not been restarted				

* Diagnostic values 133, 134 and 137 do not provide visual error message on the LED Mosaic.

Registers 260h-26Fh (output diagnostic errors)



Registers 260h – 26Fh contain the Output diagnostic errors. The High byte points to the device that has an error (note the device numbers shown in the Output Diagnostic section in the Print Report output). The Low byte contains the error code itself. The table below indicates the possible errors, their explanations and possible resolutions for these errors.

OSSD Diagnostics					
0	OSSD diagnostics OK				
1	Enable missing				
2	Waiting for restart OSSD				
3Feedback K1/K2 missing4Waiting for other micro5OSSD power supply missing					
		Redundancy check failed on OSSD			
6	Exceeded maximum time restart				
7	Feedback K1/K2 external not congru- ous CAT2	Applicable to MOR4 MOR458 modules configured in CAT2			
8 Waiting for feedback K1/K2		Feedback K1 K2 in transition			
9	Overload OSSD output				
10	OSSD with Load set to 24V				



Productivity Series Example

(continued)



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Since CLICK does not support bit of word, COPY instructions are used to move over the register values in the DH addresses to C bits. Nicknames are assigned to show where the bits are mapped to the registers.

This example uses the mapping from the example Print Report illustrated earlier in this document.



(continued)



Automat

rec







	This rung unpacks the bits coming back from the Input IO Index/Diagnostic Value register to repack them into separate words (DH100 and DH101). The IO Index register will contain the device number in error. The Diag Val error contains the actual error code.	Co	ру		Unpack
14		Src	5	🖬 DH5	57
		De	s BBC2	221	B C236
		Cor	ру		Pack
		Src	: BC2	221	🖪 C228
		De	Mosa s	ic_Input_ DH1	_IO_Index 00
		Cor	ру		Pack
		Src	c 🖪 C2	229	🖪 C236
		De	Mosai s	ic_Input_ III DH1	_Diag_Val 01

15	This rung unpacks ti register will contain Always_ON BSC1	ie bits coming back from the Output IO Index/Diagnostic Value register to repack them into separate words (DH102 and DH103). The IO Index he device number in error. The Diag Val error contains the actual error code.	Co Sr	ру	DH	Unpack
			De	s B	C241	D C256
			Co	ру		Pack
			Sr	c 🖪	C241	E C248
			De	Mo: I S	saic_Outpi III DH	ut_IO_Index 102
			Co	ру		Pack
			Sr	c 🖪	C249	B C256
			De	Mo: I S	saic_Outpi II DH	ut_Diag_Val 103

Address	👷 Data Type	Nickname
C1		FIELDBUS_IN0
C2		FIELDBUS_IN1
C3		FIELDBUS_IN2
C4		FIELDBUS_IN3
C5		FIELDBUS_IN4
C6		FIELDBUS_IN5
C7		FIELDBUS_IN6
C8	RWBBIT	FIELDBUS_IN7

(continued)



C101		Mosaic_Online
C102		Diag_Present
C103		CPU0_Error
C104		
C105		
C106		
C107		
C108	RW BBIT	
C109	RW BBIT	
C110	RW BBIT	
C111	RW BBIT	
C112	RW BBIT	
C113	RW BBIT	
C114		
C115	RW BBIT	
C116	RW BBIT	
C117	RW BBIT	
C118	RW BBIT	
C119	RW BBIT	
C120	RW BBIT	
C121	RW BBIT	FB1_Estop_M1
C122	RW BBIT	
C123	RW BBIT	FB2_EGate_M1
C124	RW BBIT	
C125	RW BBIT	
C126	RW BBIT	
C127	RWBBIT	
C128	RWBBIT	
C129	RWBBIT	FB3_ESPE_MI802
C130	RW BBIT	
C131		FB4_SMat_MI802

(continued)



C:	141	RW BB	Π	FB5_EGate_MI8
C	142	RWBB	п	
C	143	RWBB	п	
C	144	RWBB	п	
C	145	RWBB	Π	
C	146	RWBB	Π	
C	147	RWBB	Π	FB6_EGate_MI8
C	148	RWBB	п	
C	149	RWBB	Π	
C	150	RWBB	п	
C	151	RWBB	п	
C	152	RWBB	п	
C	153	RWBB	п	
C	154	RWBB	п	
C	155	RWBB	п	
C	156	RWBB	п	
C	157	RWBB	п	
C	158	RWBB	п	
C	159	RWBB	п	
C	160	RWBB	п	
C	161	RWBB	п	FIELDBUS_IN_STAT0
C	162	RWBB	п	FIELDBUS_IN_STAT1
C	163	RWBB	п	FIELDBUS_IN_STAT2
C	164	RWBB	п	FIELDBUS_IN_STAT3
C	165	RW BB	п	FIELDBUS_IN_STAT4
C	166	RW BB	п	FIELDBUS_IN_STAT5
C	167	RW BB	п	FIELDBUS_IN_STAT6
C	168	RWBB	п	FIELDBUS_IN_STAT7

(continued)



C181	RW BBIT	FIELDBUS_PROBE0
C182	RW BBIT	FIELDBUS_PROBE1
C183	RW BBIT	FIELDBUS_PROBE2
C184	RW BBIT	FIELDBUS_PROBE3
C185	RW BBIT	FIELDBUS_PROBE4
C186	RW BIT	FIELDBUS_PROBE5
C187	RW BIT	FIELDBUS_PROBE6
C188	RW BIT	FIELDBUS_PROBE7
C189	RW BIT	
C190	RW BIT	
C191	RW BIT	
C192	RW BBIT	
C193	RW BBIT	
C194	RW BBIT	
C195	RW BBIT	
C196	RW BIT	
C197	RW BIT	
C198	RW BBIT	
C199	RW BIT	
C200	RW BIT	
C201	RW BIT	
C202	RW BBIT	
C203	RW BIT	
C204	RW BIT	
C205	RW BIT	OSSD_Out1
C206		OSSD_Out2



Bit of word was utilized for this example to make the code easier. The nickname assignments to the correct bit of words are shown at the end of the code.

This mapping was derived from the example Print Report illustrated earlier in this document.

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2	then set "Chg_FIELDBUS_IN" to true. This will send out 1 Modbus Write command to update that bit(s). Chg_FIELDBUS_IN C100	MWX	Modbus Network Write
		Device IP Address TCP Port Number Unit ID Function Code Modbus Address 4 To Modbus Offset Address Number of Modbus Registers From Do-more Memory Addres On Success, Set bit On Error, Set bit Exception Response	(@intMod1CPClient 10.11.0.20 502 255 16 - Write Multiple Registers + offset value entered below 1 1 ss V0 C10 C11 D0
		Chg_FIELDBU C100 (RST	s_in)
2	To read the status values from the other Mosaic status registers, set the "En_Mosaic_Stat" bit to true. This will read the values at a 250ms rate. En_Mosaic_Stat C101	MRX	Modbus Network Read
3		Device IP Address TCP Port Number Unit ID Function Code Modbus Address 4 From Modbus Offset Address Number of Modbus Registers To Do-more Memory Address Do-more Range Continuous at Interval On Success, Set bit On Error, Set bit Exception Response	@IntModTCPClient 10.11.0.20 502 255 3 - Read Holding Registers + offset value entered below 257 15 V10 V10 - V24 0.250s C12 C13 D1

(continued)

	To read the status values from the other Mosaic status registers, set the "En_Mosaic_Stat" bit to true. This will read the values at a 250ms rate.		
	C101	MRX	Modbus Network Read
4		Device IP Address TCP Port Number Unit ID Function Code Modbus Addre From Modbus Offset A Number of Modbus Re To Do-more Memory A Do-more Range Continuous at Interval On Success, Set bit On Error, Set bit Exception Response	@IntModTCPClient 10.11.0.20 255 3 - Read Holding Registers ss 4 + offset value entered below ddress 561 gisters 65 ddress V25 V25 - V89 0.250s C14 C15 D2
	This rung breaks apart the Input IO Diagnostic register into 2 values: the IO Index value and the Diagnostic Value. The IO Index indicates the device number that is in error and the Diagnostic Value indicates the error code.		
~	ST1		MOVE Move Value
5			Source V57:B0 Destination Input_IO_Index
			MOVE Move Value Source V57:B1 Destination Input_Diag_Val
	This rung breaks apart the Output IO Diagnostic register into 2 values: the IO Index value and the Diagnostic Value. The IO Index indicates the device number that is in error and the Diagnostic Value indicates the error code.		
6	ST1		MOVE Move Value
U			Source V73:B0 Destination Output_IO_Index
			MOVE Move Value Source V73:B1 Destination Output_Diag_Val
	•		

Automatio

Direct

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(continued)

Element Nickname	
V0:0	FIELDBUS_IN0
V0:1	FIELDBUS_IN1
V0:2	FIELDBUS_IN2
V0:3	FIELDBUS_IN3
V0:4	FIELDBUS_IN4
V0:5	FIELDBUS_IN5
V0:6	FIELDBUS_IN6
V0:7	FIELDBUS_IN7
V10 *	
V10:0	Mosaic_Online
V10:1	Diag_Present
V10:2	CPU0_Error
V11:0	FB1_Estop_M1
V11:2	FB2_EGate_M1
V11:8	FB3_ESPE_MI802
V11:10	FB4_SMat_MI802
V12:0	FB5_EGate_MI8
V12:6	FB6_EGate_MI8
V19:0	FBUS_INSTAT0
V19:1	FBUS_INSTAT1
V19:2	FBUS_INSTAT2
V19:3	FBUS_INSTAT3
V19:4	FBUS_INSTAT4
V19:5	FBUS_INSTAT5
V19:6	FBUS_INSTAT6
V19:7	FBUS_INSTAT7
V21:0	FBUS_PROBE0
V21:1	FBUS_PROBE1
V21:2	FBUS_PROBE2
V21:3	FBUS_PROBE3
V21:4	FBUS_PROBE4
V21:5	FBUS_PROBE5
V21:6	FBUS_PROBE6
V21:7	FBUS_PROBE7
V23:4	OSSD_Out1
V23:5	OSSD Out2