# ReeR MOSAIC

# SUPPLEMENTAL MANUAL


Please refer to the Safety Components Disclaimer which follows these examples

# ⚡ WARNING ~

Thank you for purchasing automation equipment from Automationdirect.com®, doing business as, AutomationDirect. We want your new automation equipment to operate safely. Anyone who installs or uses this equipment should read this publication (and any other relevant publications) before installing or operating the equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

Our products are not fault-tolerant and are not designed, manufactured or intended for use or resale as on-line control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of the product could lead directly to death, personal injury, or severe physical or environmental damage ("High Risk Activities"). AutomationDirect specifically disclaims any expressed or implied warranty of fitness for High Risk Activities.

If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 1-770-844-4200.

This publication is based on information that was available at the time it was printed. At AutomationDirect we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

# Trademarks

This publication may contain references to products produced and/or offered by other companies. The product and company names may be trademarked and are the sole property of their respective owners. AutomationDirect disclaims any proprietary interest in the marks and names of others.

# ReeR MOSAIC Supplemental Manual Contents

## ReeR Mosaic Wiring Examples



## MBEI EtherNet/IPCommunications Module

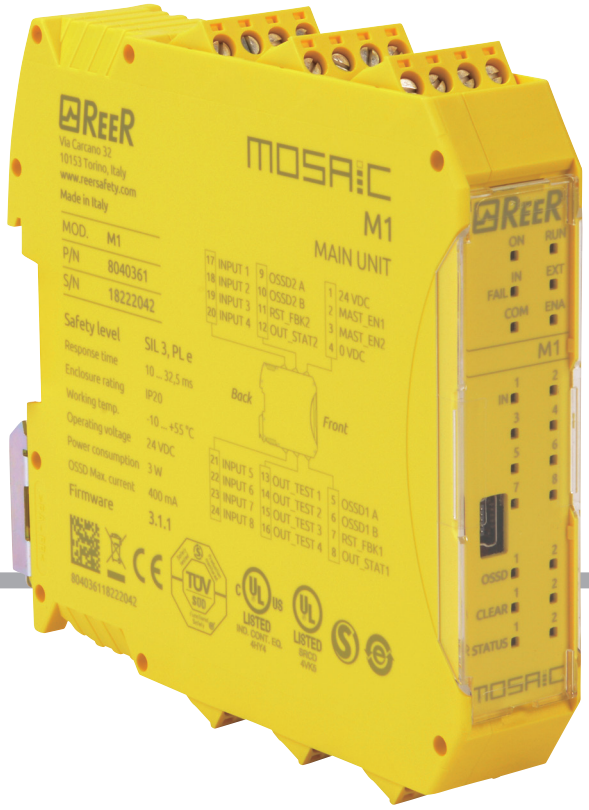
*Configuration, data management and communication*



## MBEM Modbus TCP/IP Communications Module

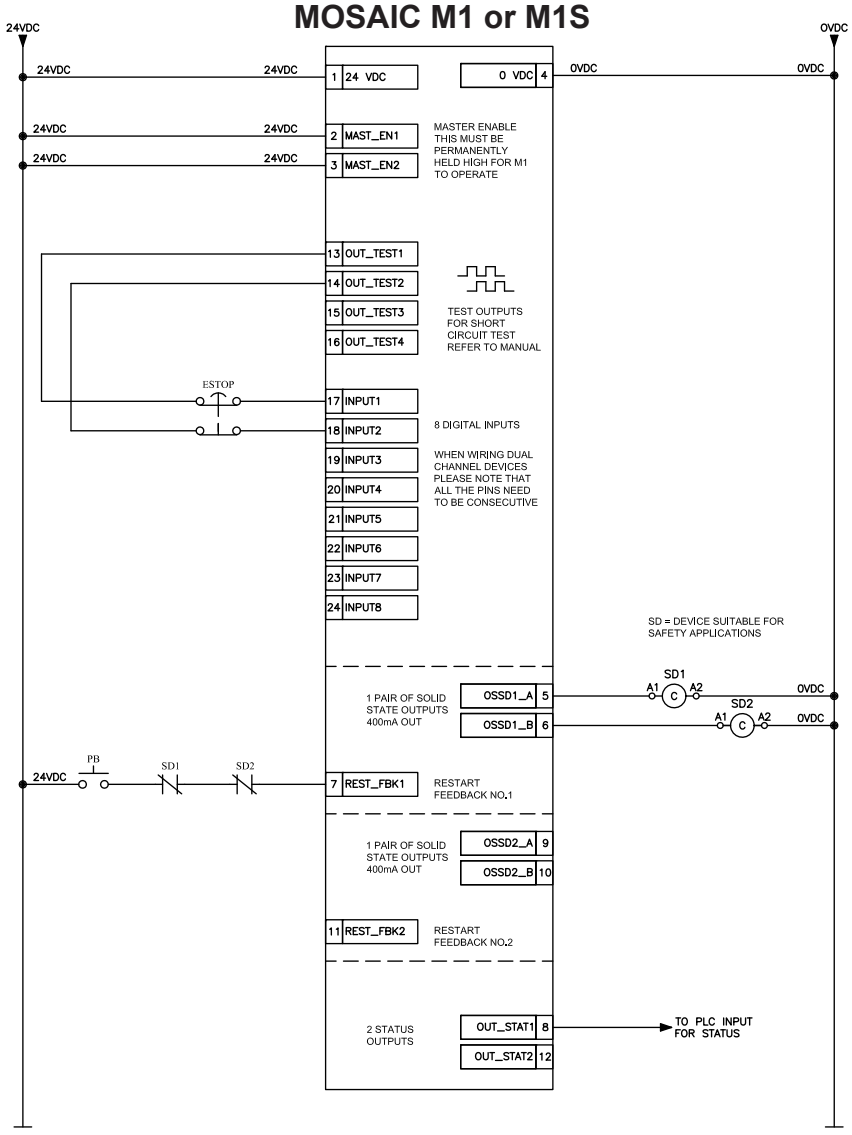
*Configuration, data management and communication*

# ReeR MOSAIC




## Wiring examples

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

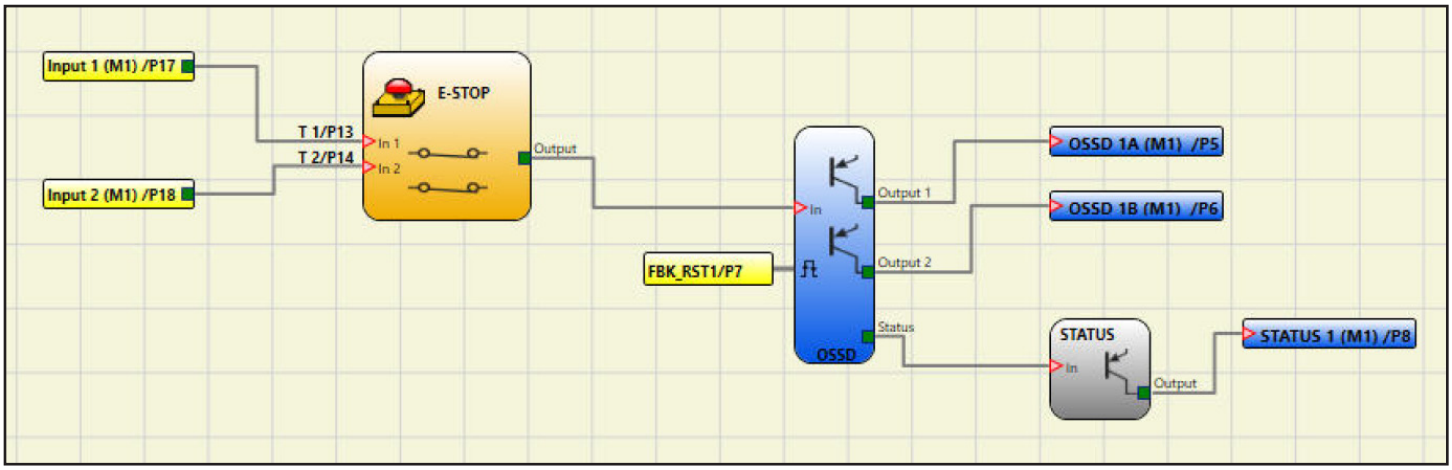



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

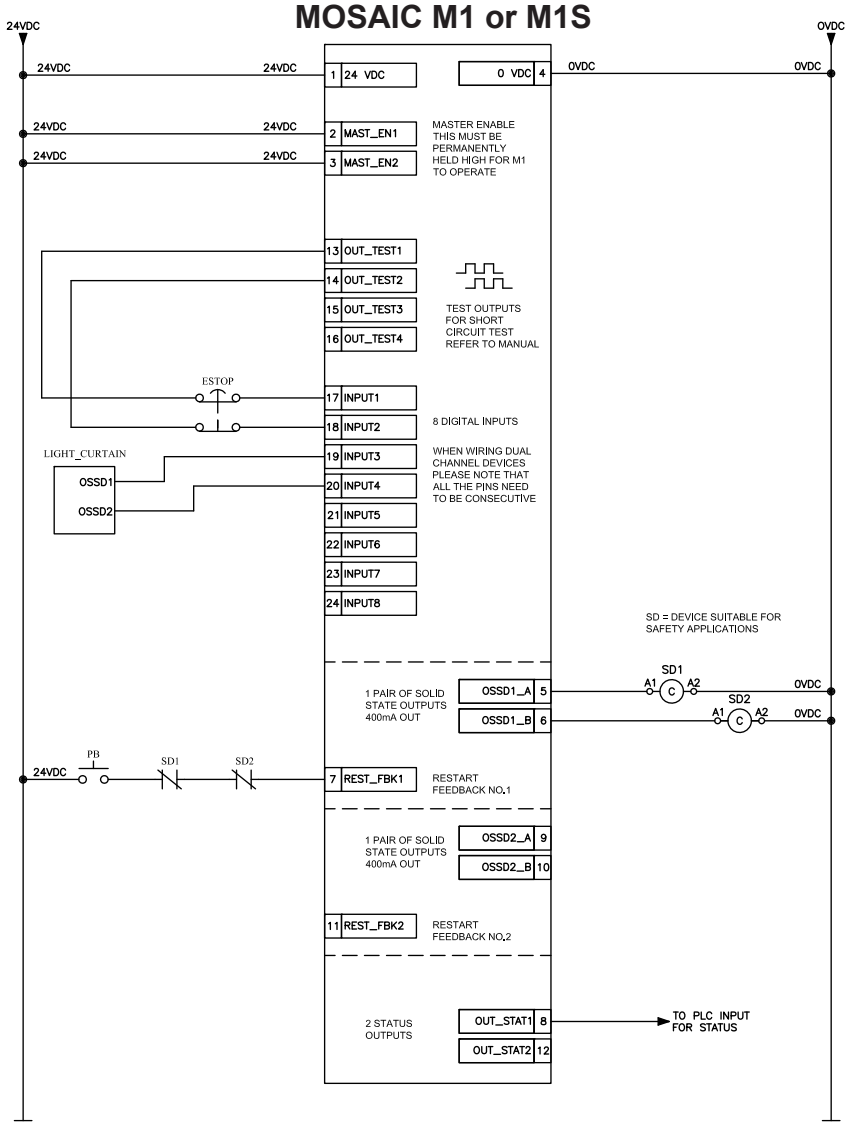
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

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

## MOSAIC M1 or M1S

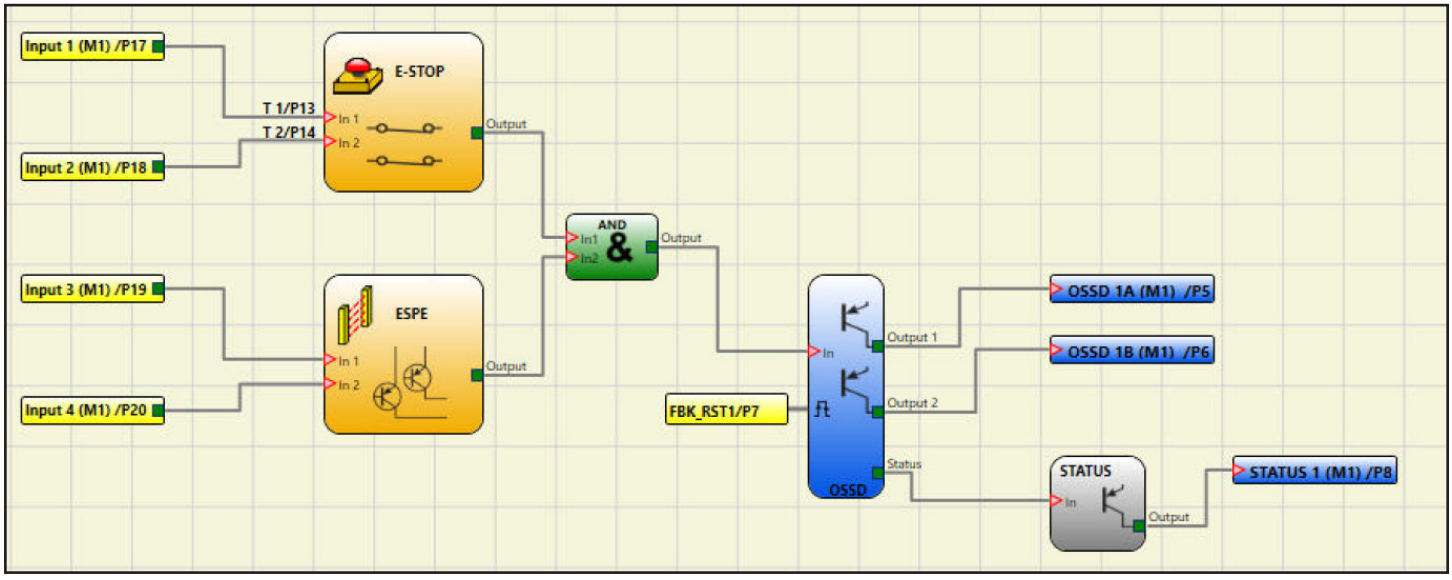



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

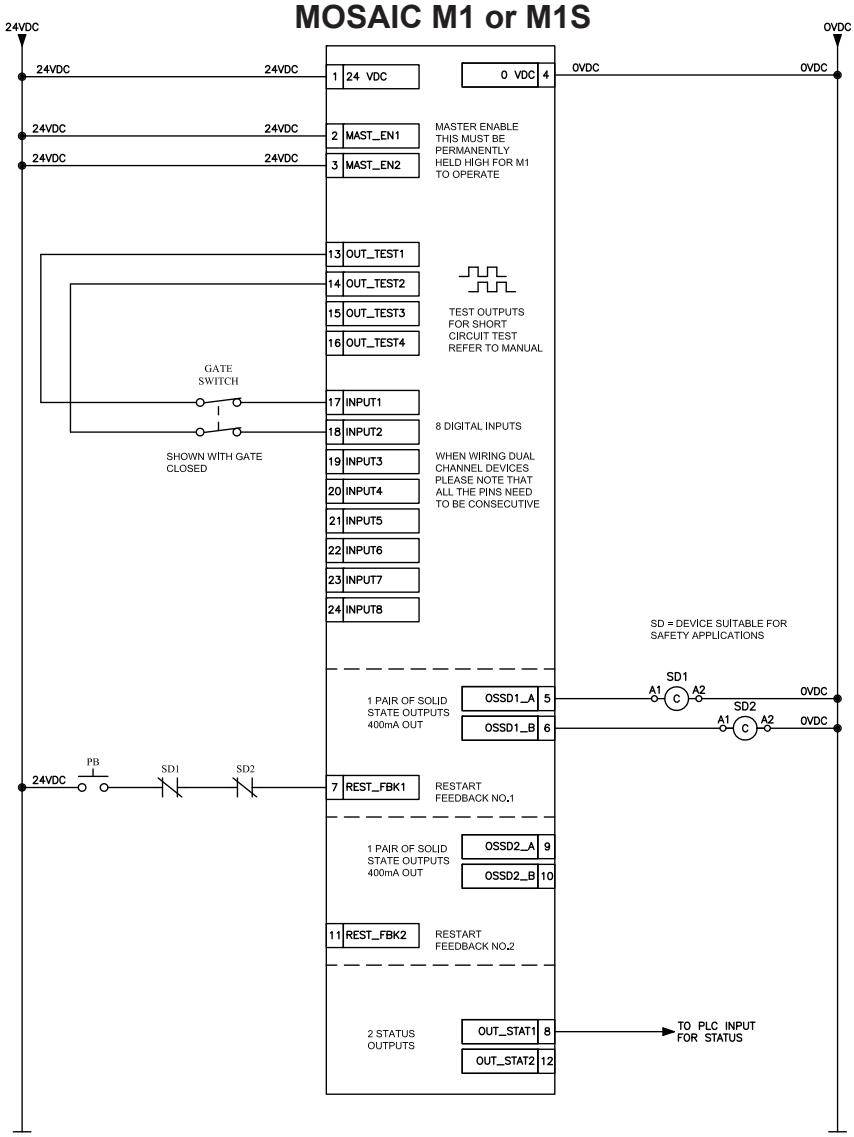
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

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

## MOSAIC M1 or M1S

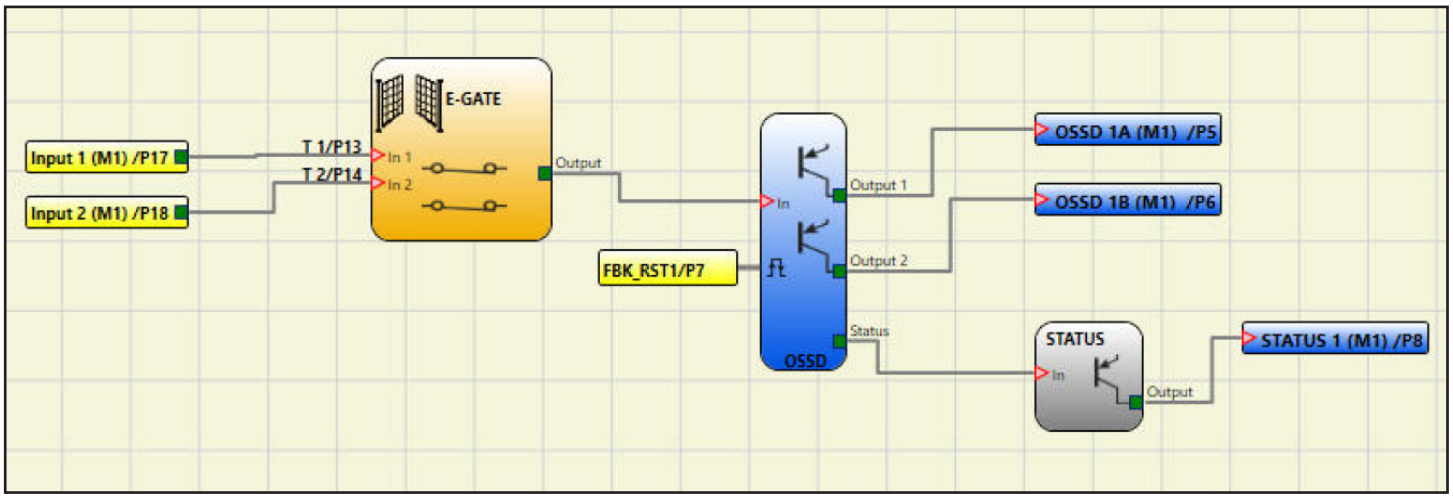



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

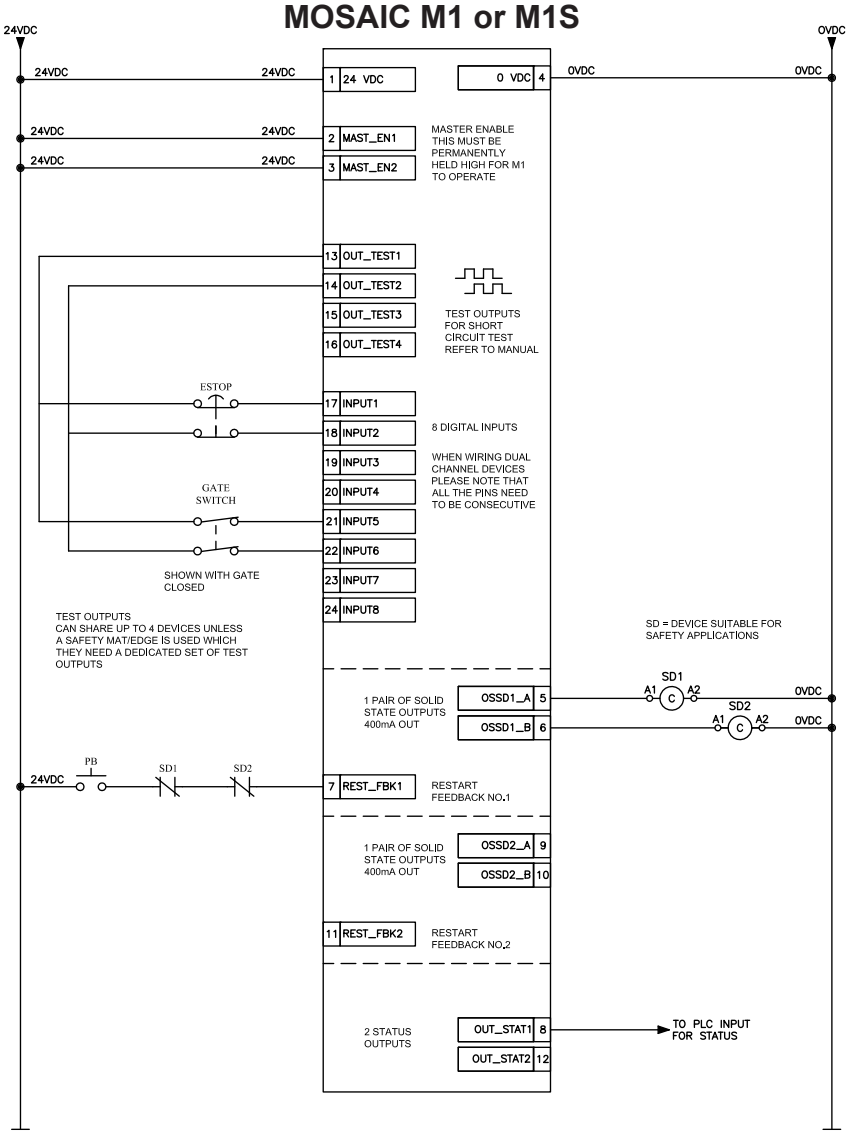
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

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

## MOSAIC M1 or M1S

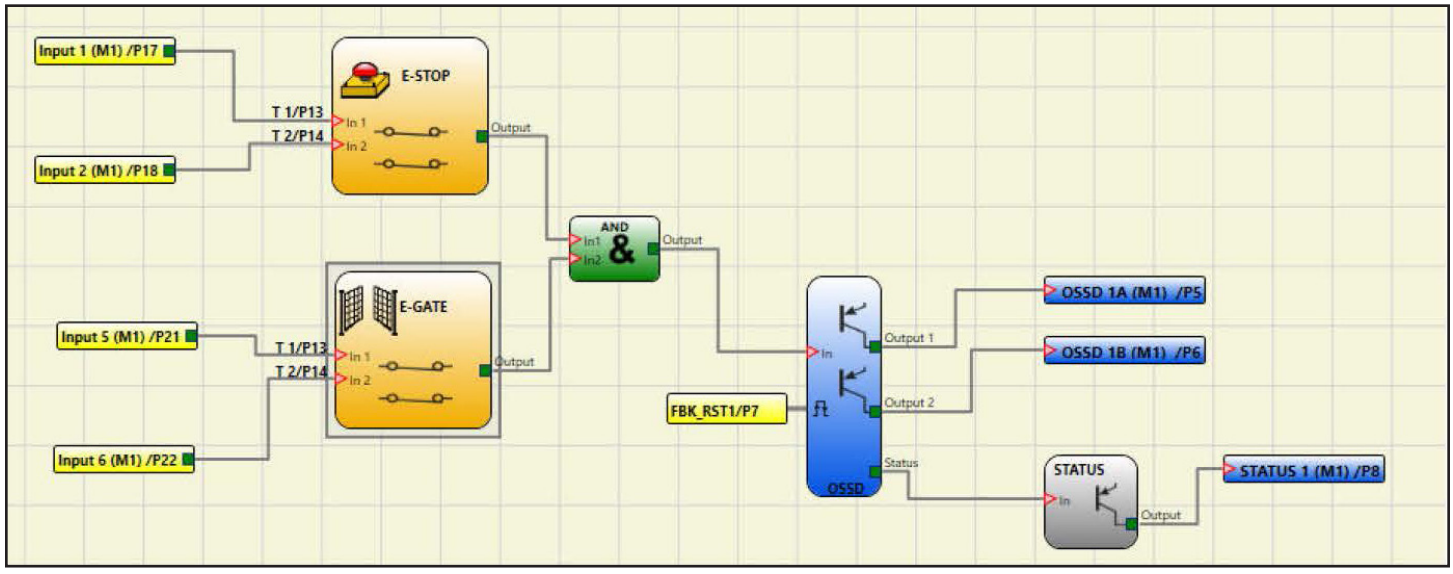



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

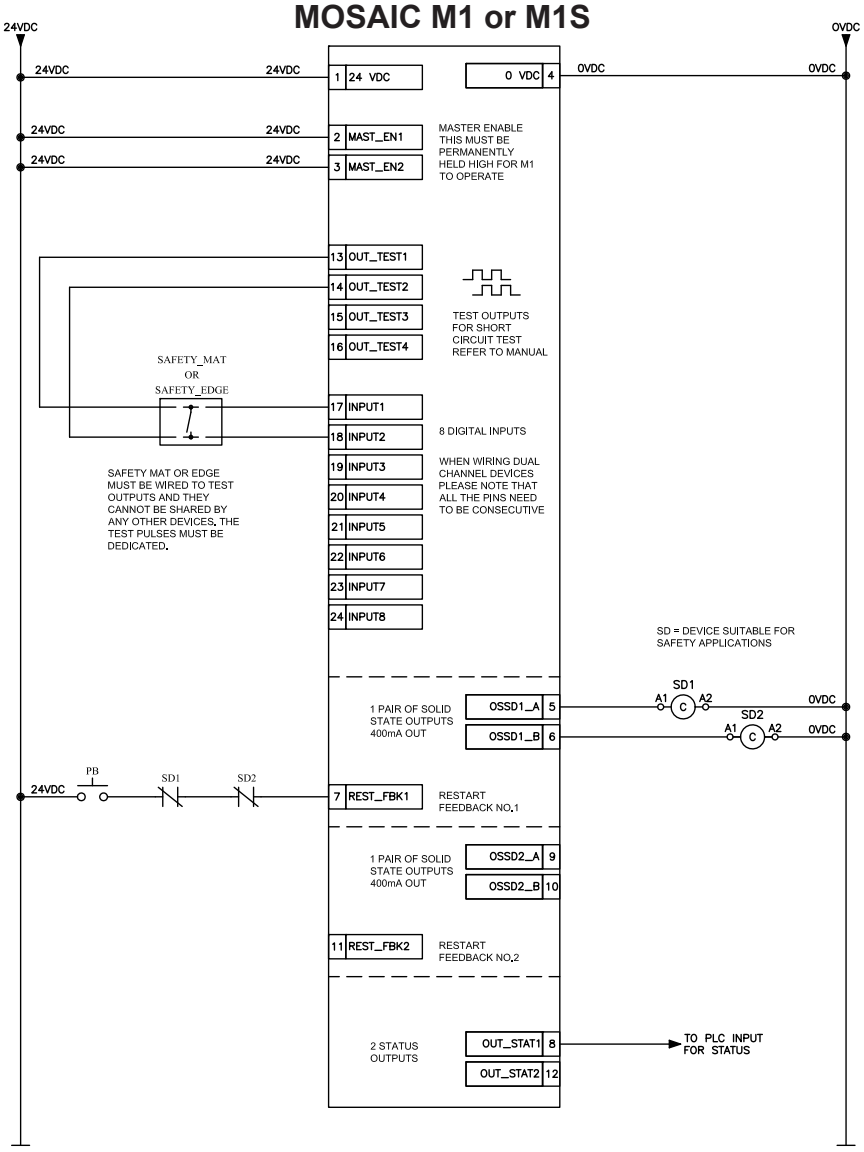
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

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

## MOSAIC M1 or M1S

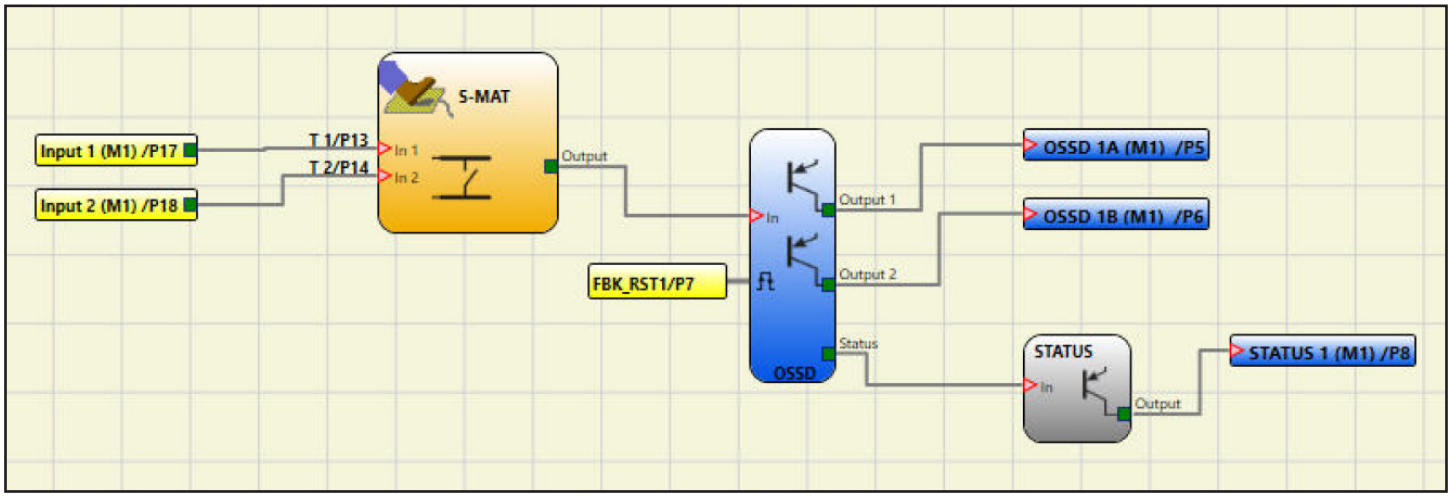



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

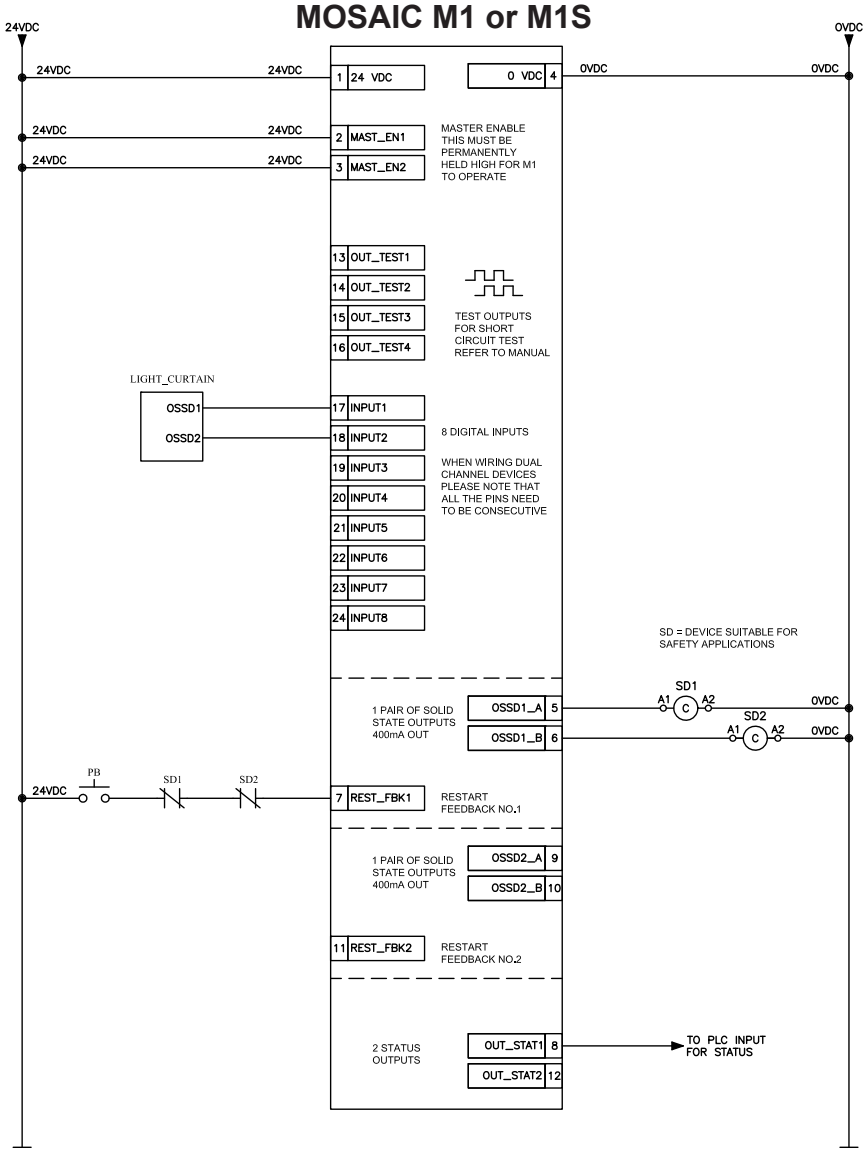
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

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

## MOSAIC M1 or M1S

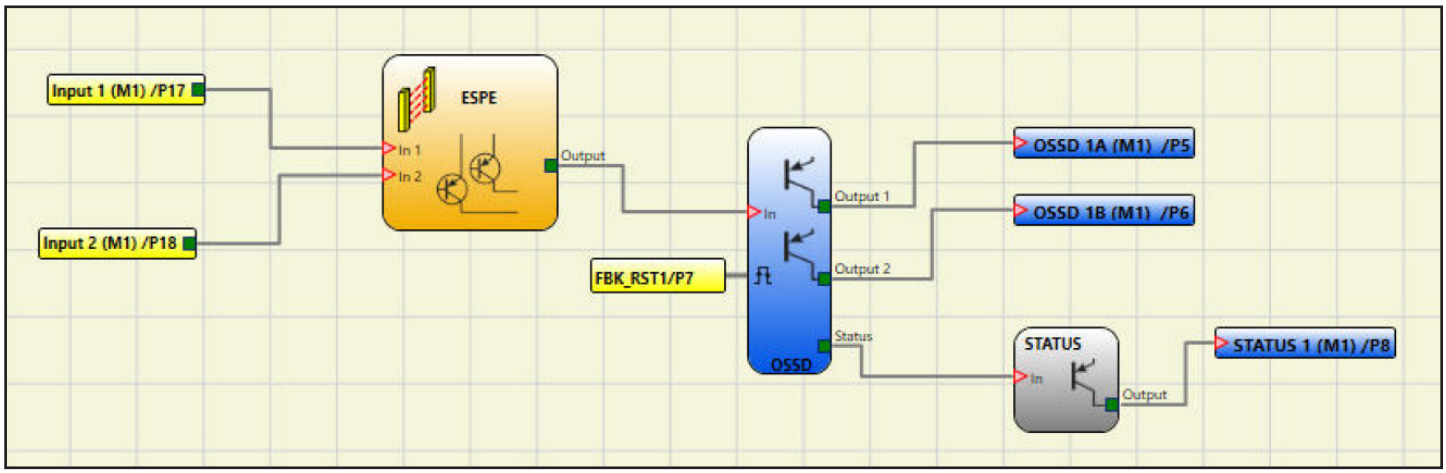



| M1 or M1S Module Connections | | |
|---|---|---|
| **Terminal** | **Signal** | **Description** |
| **1** | 24VDC | 24VDC power supply |
| **2*** | MASTER_ENABLE1 | Master Enable 1 |
| **3*** | MASTER_ENABLE2 | Master Enable 2 |
| **4** | 0VDC | 0VDC power supply |
| **5** | OSSD1_A | Static output 1 |
| **6** | OSSD1_B | |
| **7** | RESTART_FBK | Feedback/Restart |
| | OUT_STATUS | Programmable signal output |
| **8** | RESTART_FBK | Feedback/Restart |
| | 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 |
| | 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.

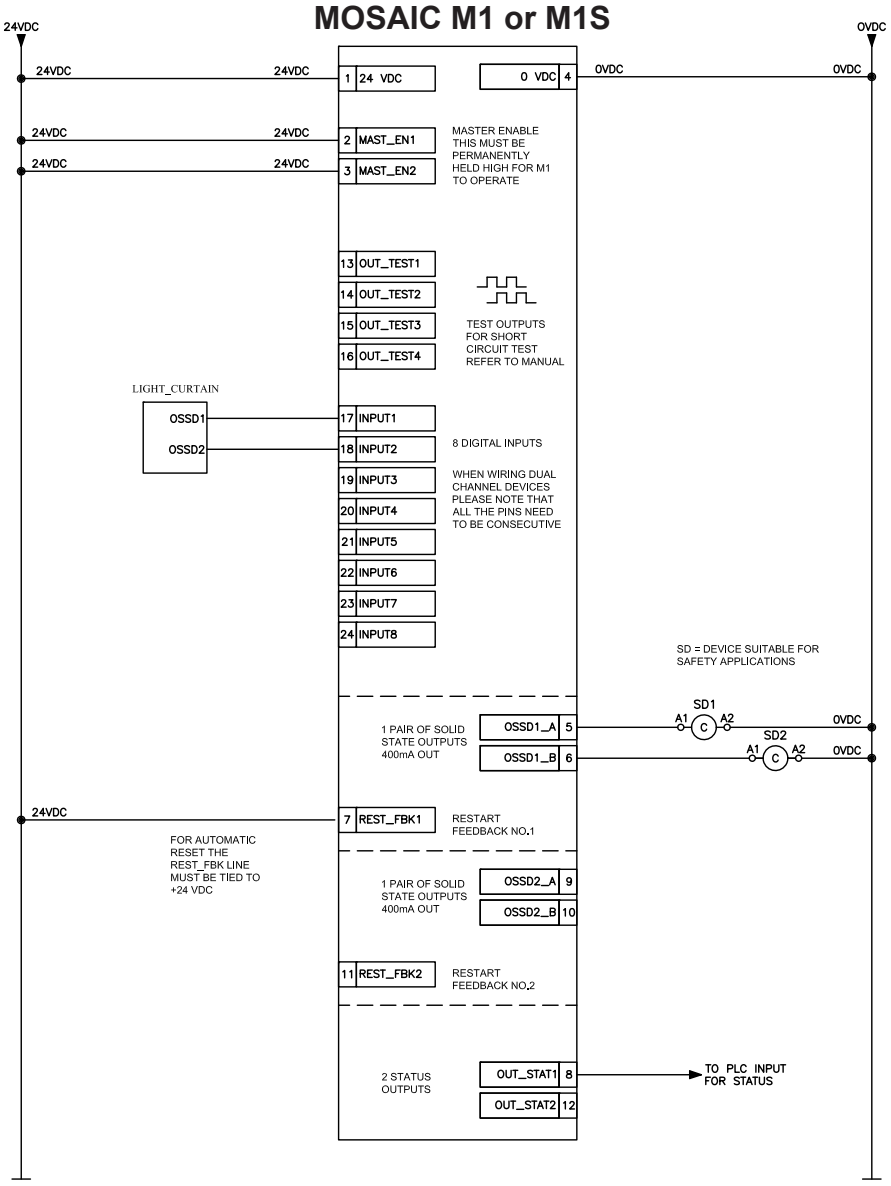
Note: The MOSAIC M1 or M1S Master Controller includes a USB 2.0 connector for connection to a computer and the MSD (Mosaic Safety Designer) configuration software. A USB cable is available as an accessory.

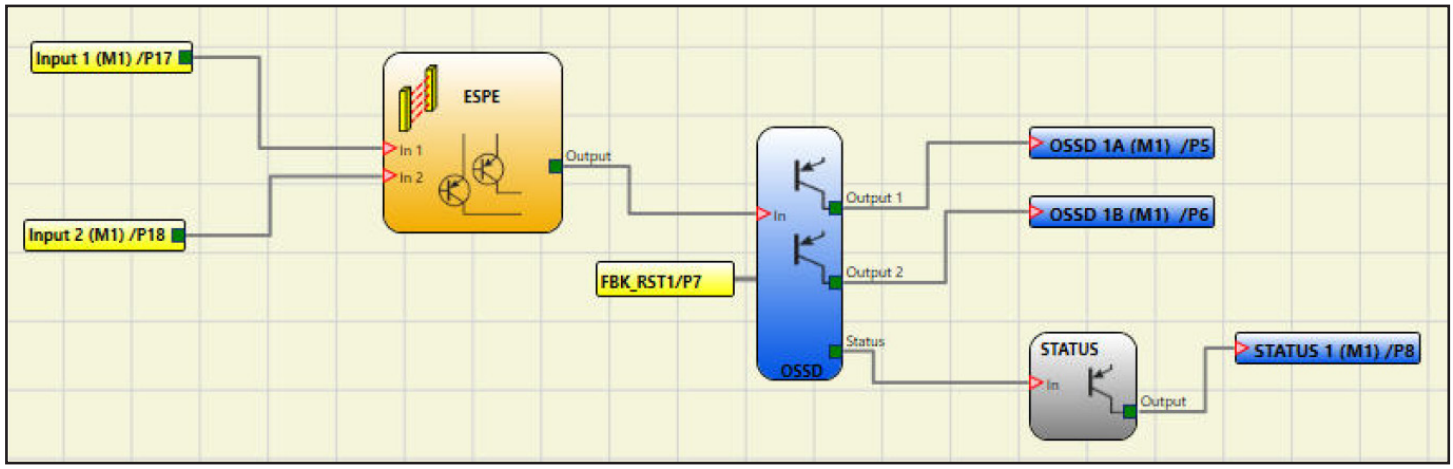
**Blue-highlighted cells apply only to M1S controller. See manual for further information.**




**Please refer to the Safety Components Disclaimer which follows these examples**

# Controlling two safety devices with a Light Curtain with automatic reset

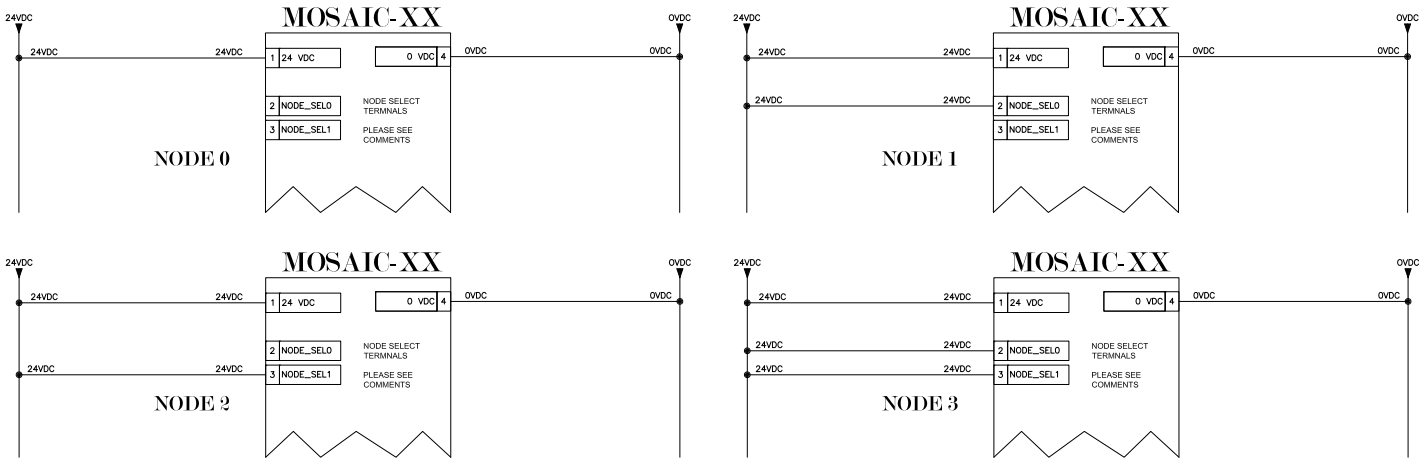



**Please refer to the Safety Components Disclaimer which follows these examples**

# Specifying nodes when using multiple modules of the same type

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

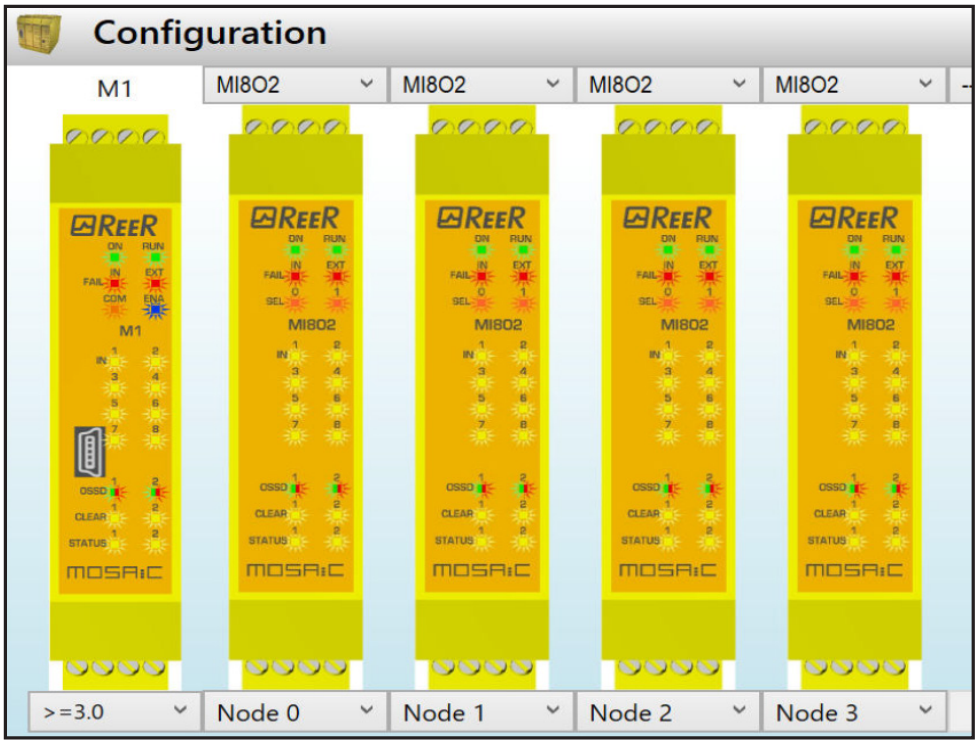



## NODE SEL

**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 |

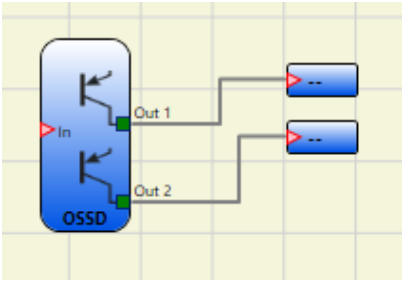
**NOTE** **You cannot use the same physical address for multiple units of the same type. Each unit must have a unique address.**




**Please refer to the Safety Components Disclaimer which follows these examples**

# Output blocks when using specific cards

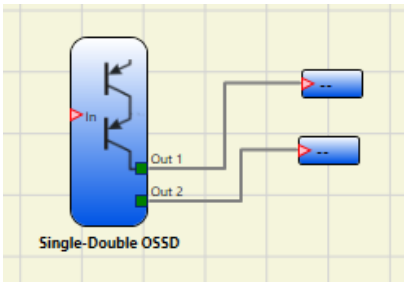
**The standard OSSD output block "OSSD," which is used for most MOSAIC cards, will only allow for a dual-wire OSSD signal, as shown below.**




**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.**



**Warning: Safety products sold by AutomationDirect are Safety components only.**

**The purchaser/installer is solely responsible for the application of these components and ensuring all necessary steps have been taken to assure each application and use meets all performance and applicable safety requirements and/or local, national and/or international safety codes as required by the application. AutomationDirect cannot certify that our products used solely or in conjunction with other AutomationDirect or other vendors' products will assure safety for any application.**

**Any person using or applying any products sold by AutomationDirect is responsible for learning the safety requirements for their individual application and applying them, and therefore assumes all risks, and accepts full and complete responsibility for the selection and suitability of the product for their respective application. AutomationDirect does not provide design or consulting services, and cannot advise whether any specific application or use of our products would ensure compliance with the safety requirements for any application.**

# MBEI

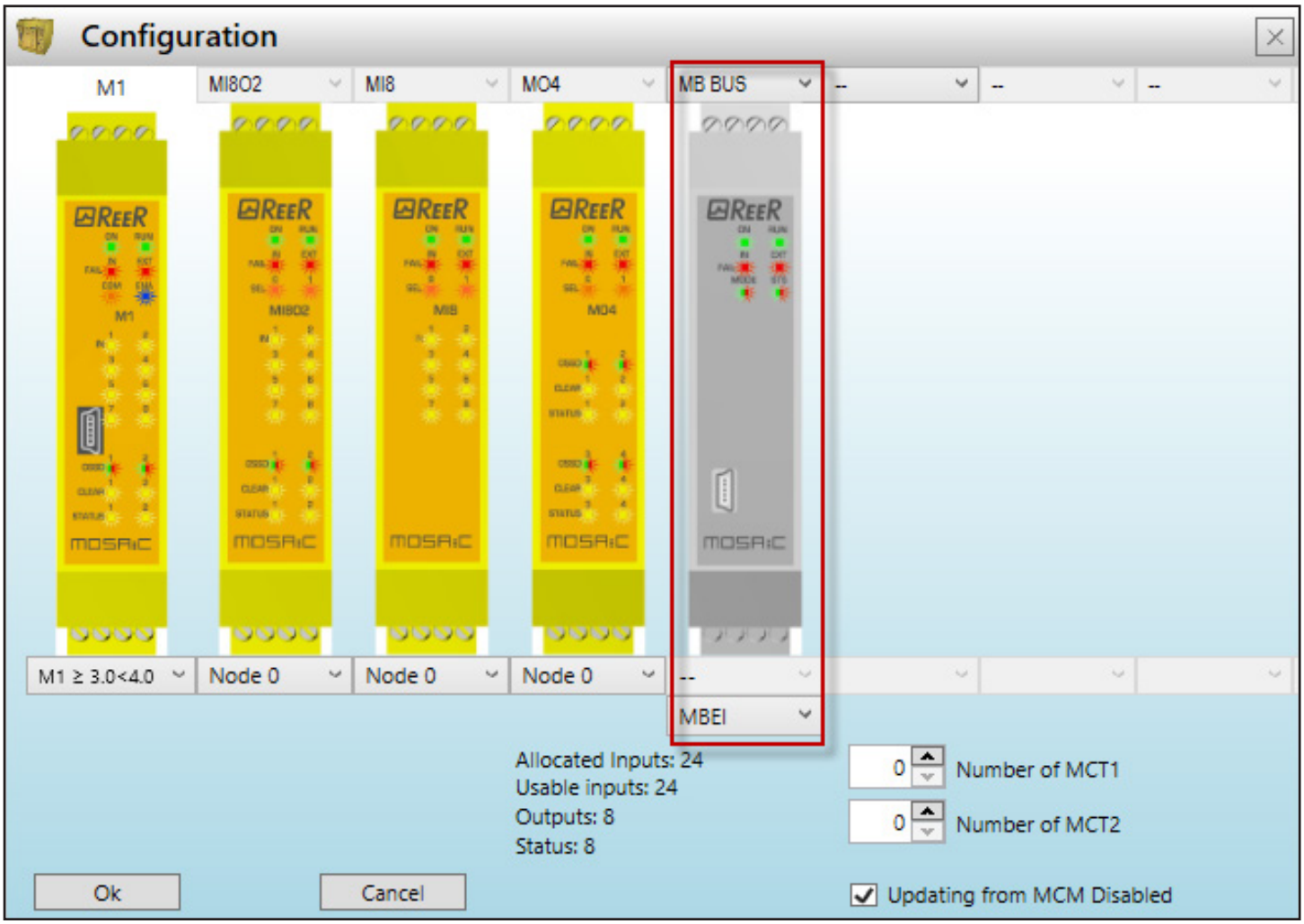
## EtherNet/IP Communications Module


## Configuration, data management and communication

# 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."

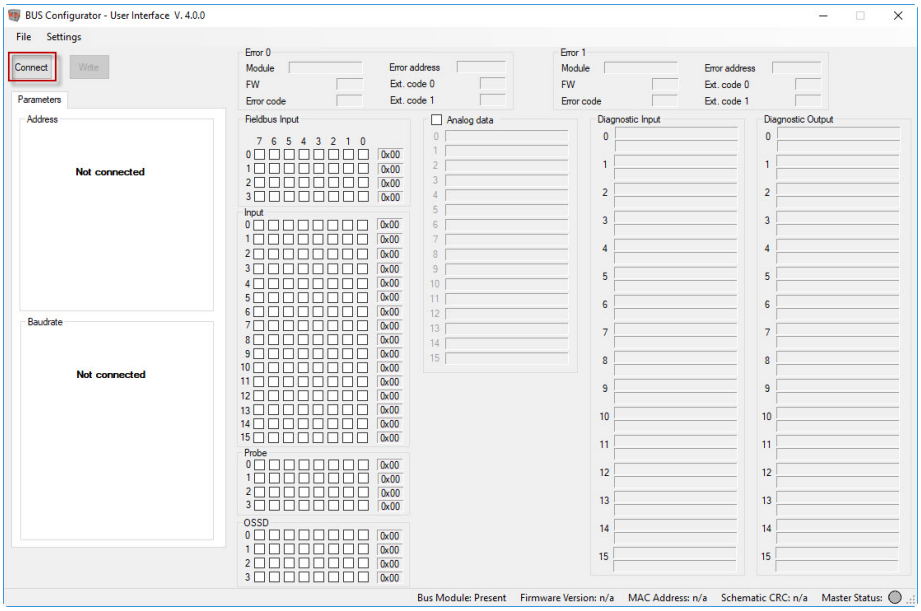


# Configuring the ReeR MBEI EtherNet/IP interface module

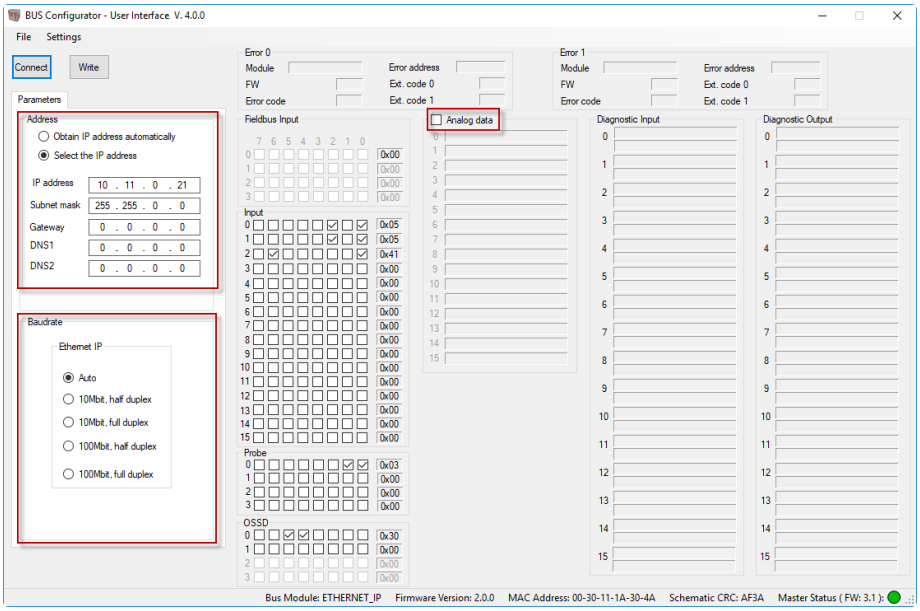
*(continued)*

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.




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 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

| 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)*

| 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: | 9 bytes | |
| **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 |

| CPU Errors 1 | | |
|---|---|---|
| Class: | 162 (0xA2) | |
| Instance: | 4 | |
| Attribute: | 5 | |
| Size: | 9 bytes | |
| **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)*

| 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)*

| 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 (0xA2) | |
| Instance: | 7 | |
| Attribute: | 5 | |
| Size: | 2 bytes | |
| **Data Definition:** | | |
| **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 Un-connected 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
0           | USINT | Fieldbus input byte 0
1           | USINT | Empty
2           | USINT | Empty
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
1           | USINT | Reserved
2           | USINT | M1 Input
3           | USINT | MI8O2 Node 0
4           | USINT | MI8 Node 0
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
17          | USINT | Empty
18          | USINT | Fieldbus input byte 0 feedback
19          | USINT | Empty
20          | USINT | Empty
21          | USINT | Empty
22          | USINT | Probe status byte 0 (00÷07)
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
50          | REAL  | Analog data 5
54          | REAL  | Analog data 6
58          | REAL  | Analog data 7
62          | REAL  | Analog data 8
66          | REAL  | Analog data 9
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
90          | REAL  | Analog data 15
```

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

Acyclic data format

Errors data CPUx format

| Name | Size |
|---|---|
| Module | USINT |
| Error code | USINT |
| Error address | UDINT |
| Firmware version | USINT |
| Extended code 0 | USINT |
| Extended code 1 | USINT |

Input diagnostics format

| Name | Size |
|---|---|
| Diagnostic index | USINT |
| Diagnostic code | 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 |

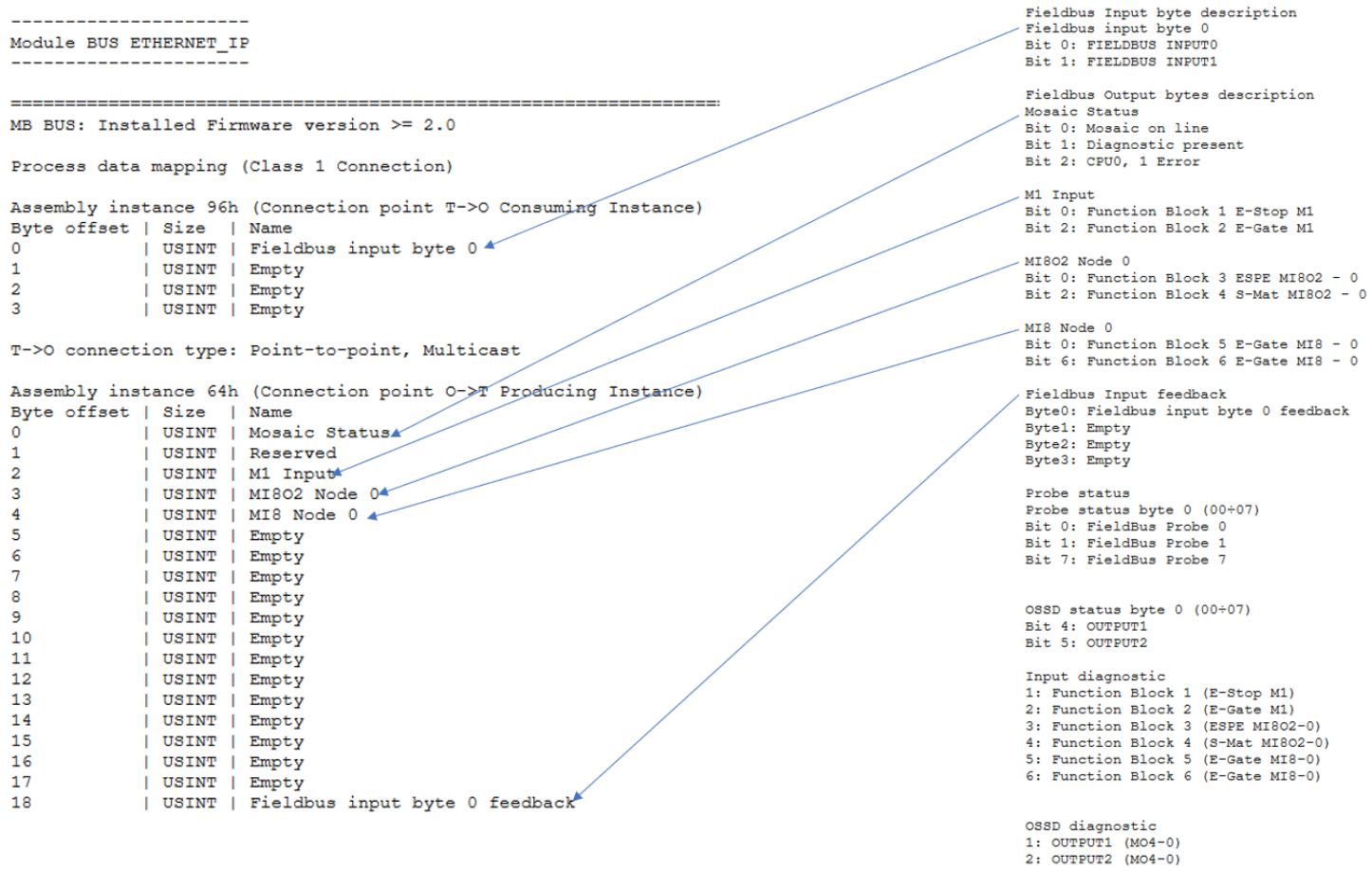
# Data mapping
*(continued)*

```
Fieldbus Input byte description
Fieldbus input byte 0
Bit 0: FIELDBUS INPUT0
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

MI8O2 Node 0
Bit 0: Function Block 3 ESPE MI8O2 - 0
Bit 2: Function Block 4 S-Mat MI8O2 - 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 MI8O2-0)
4: Function Block 4 (S-Mat MI8O2-0)
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

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 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.

| OSSD Diagnostics | | |
|---|---|---|
| 0 | Input Diagnostics OK | |
| 1 | Not moved from zero | Both switches have to go to rest condition.<br>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.

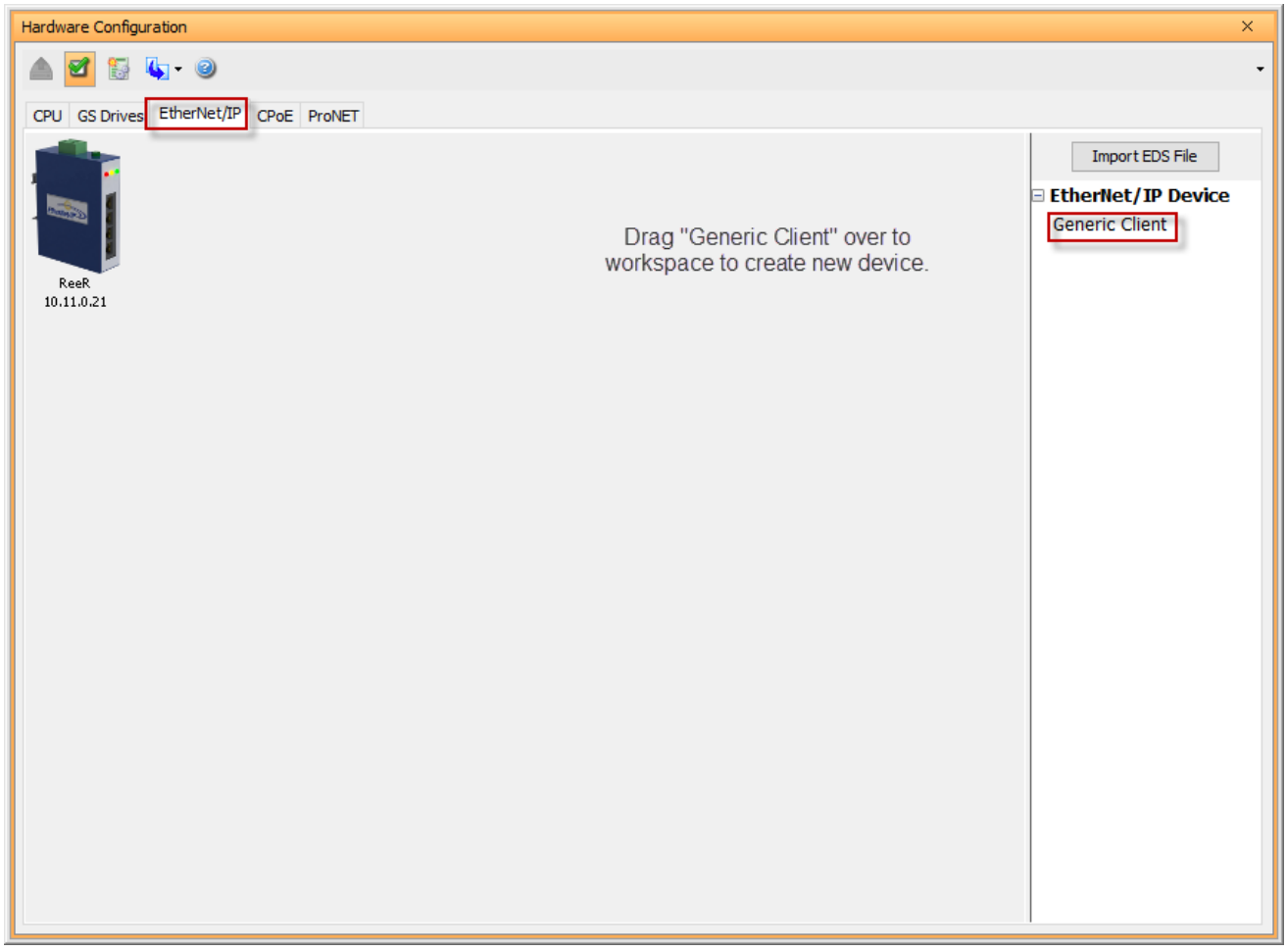
# Output diagnostics

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

| OSSD 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 congruous 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 | |

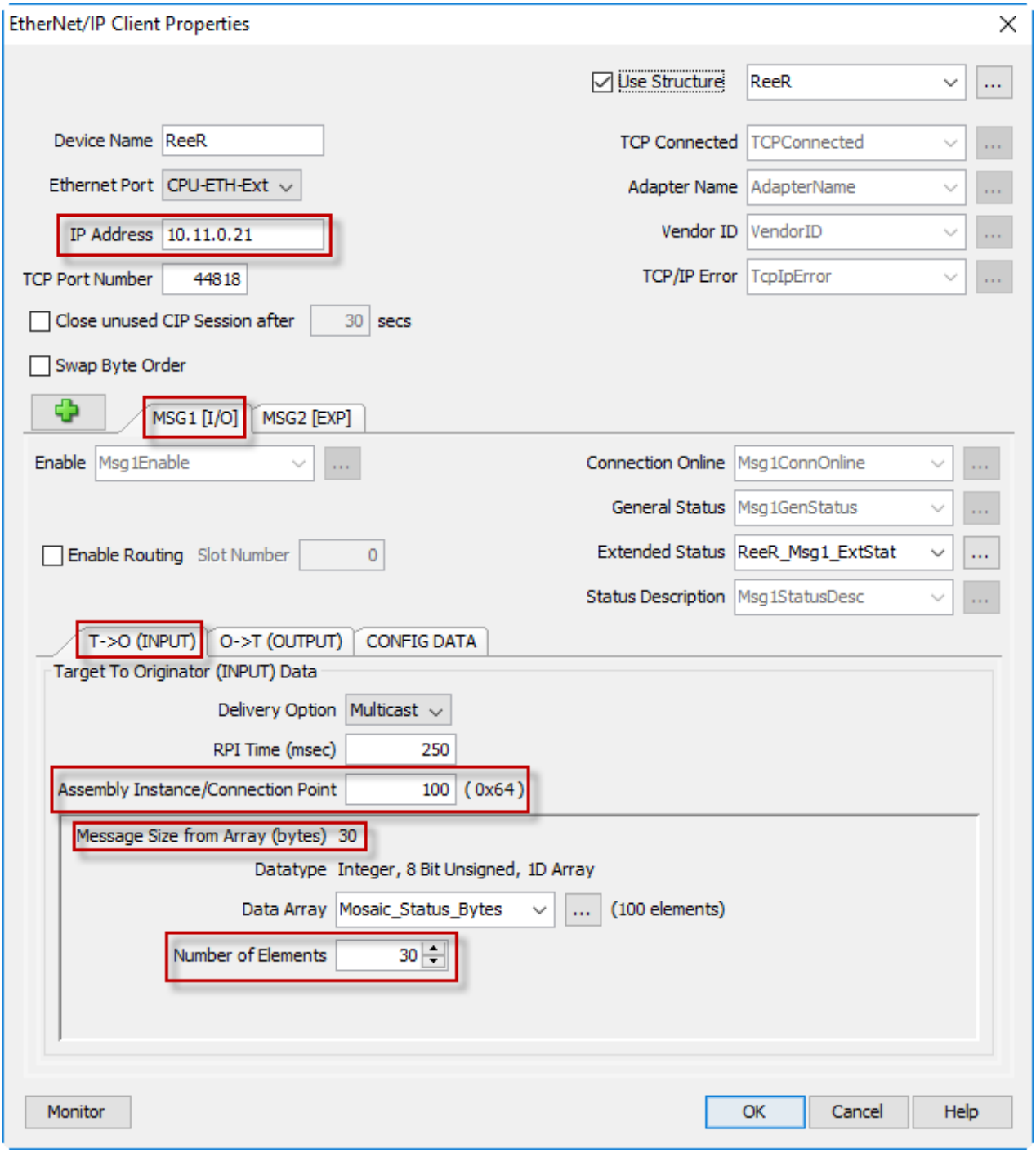
# Productivity Series Example
## Class 1 IO Messaging

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.



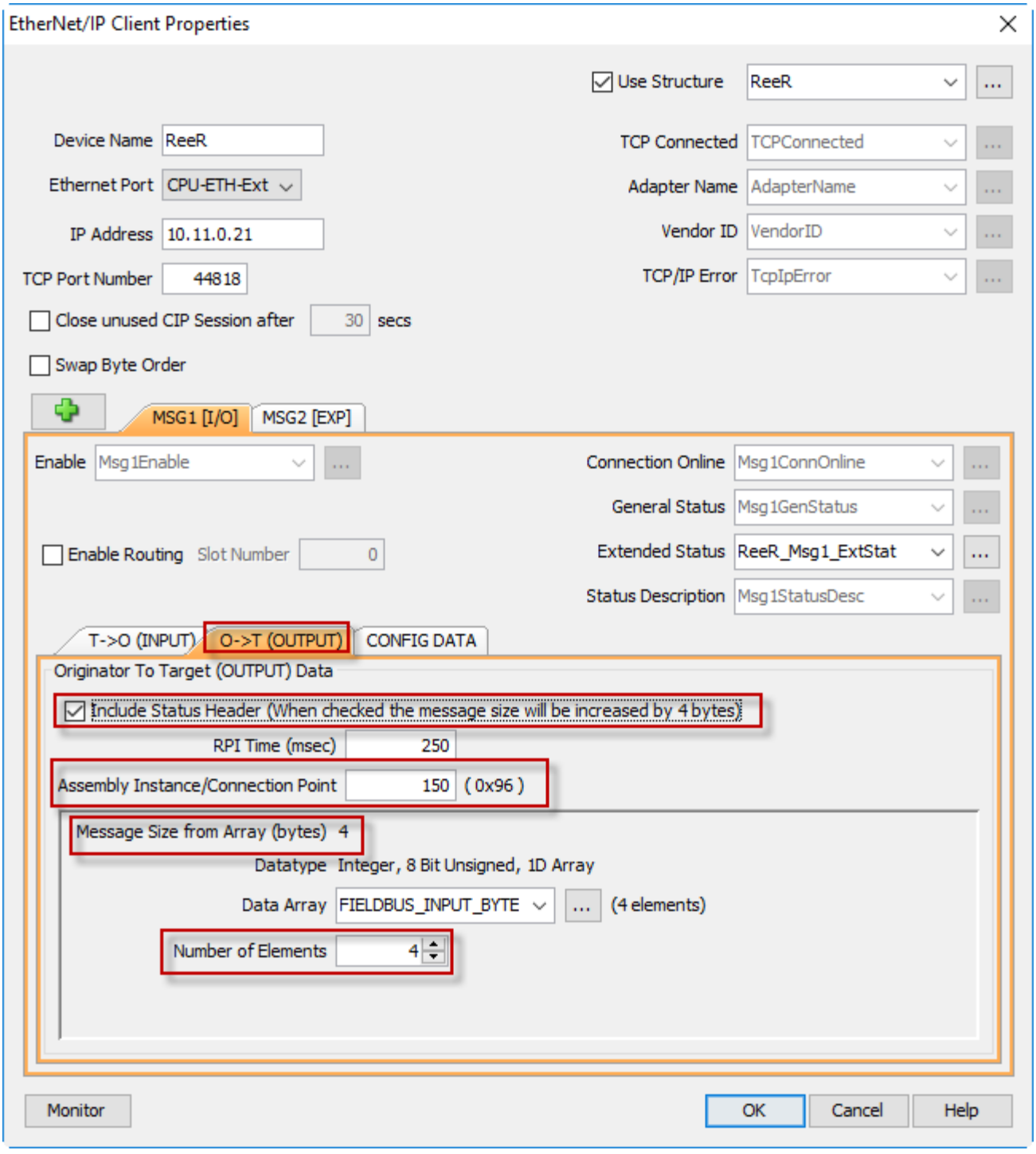
# Productivity Series Example
## Class 1 IO Messaging
## *(continued)*

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.



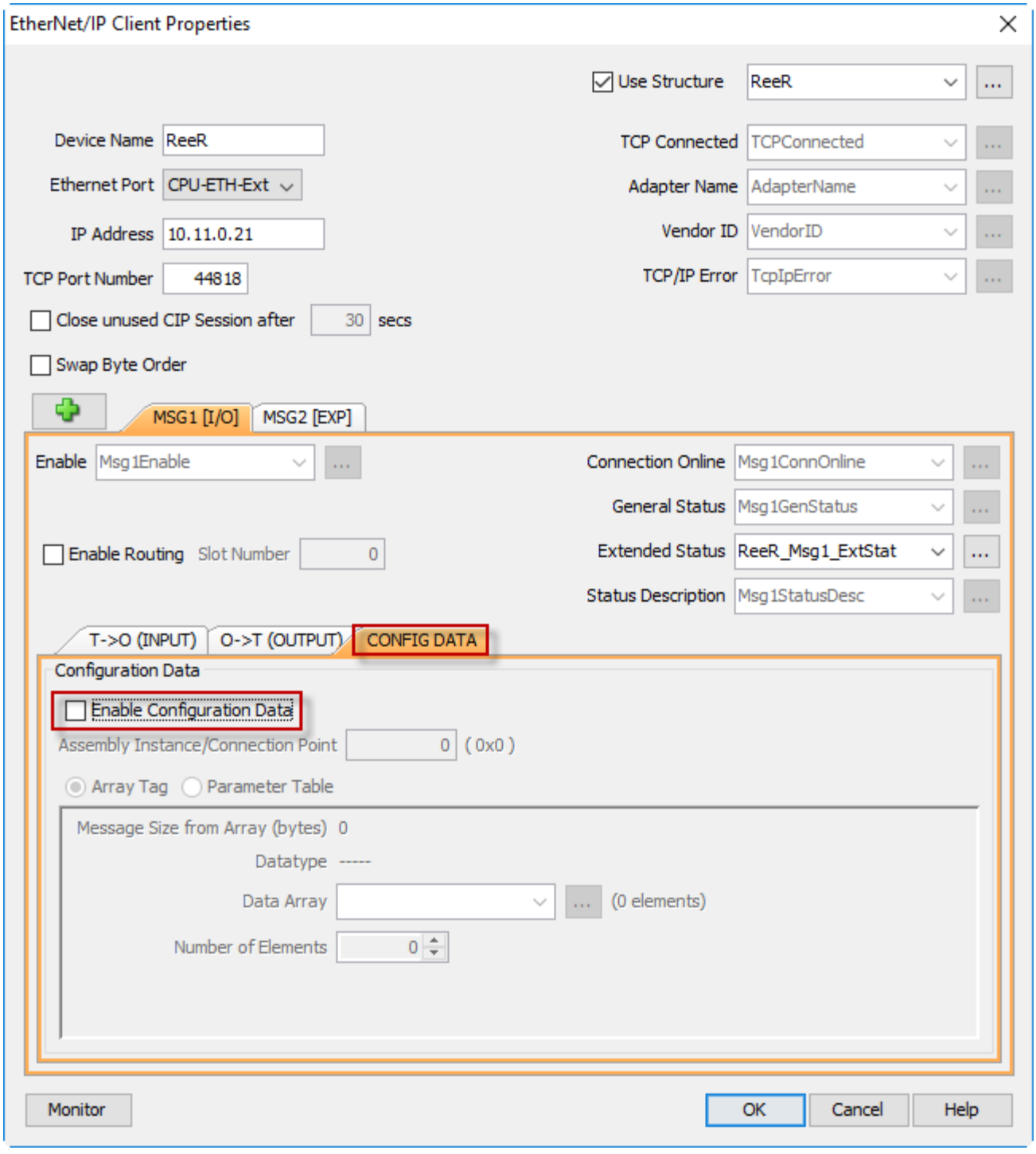
# Productivity Series Example
## Class 1 IO Messaging
## *(continued)*

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



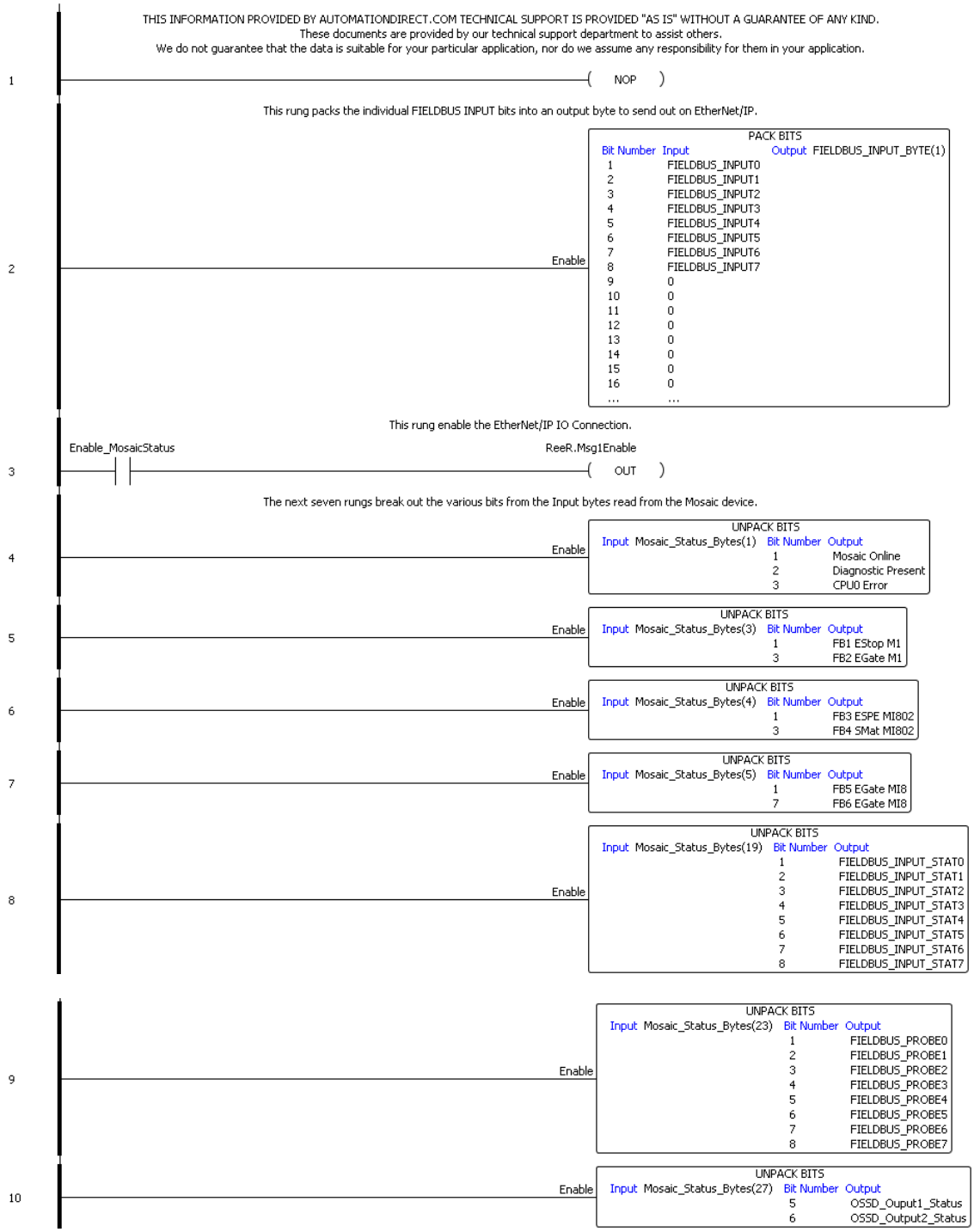
# Productivity Series Example
## Class 1 IO Messaging
## *(continued)*

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.



# Productivity Series Example
## Class 1 IO Messaging
## *(continued)*

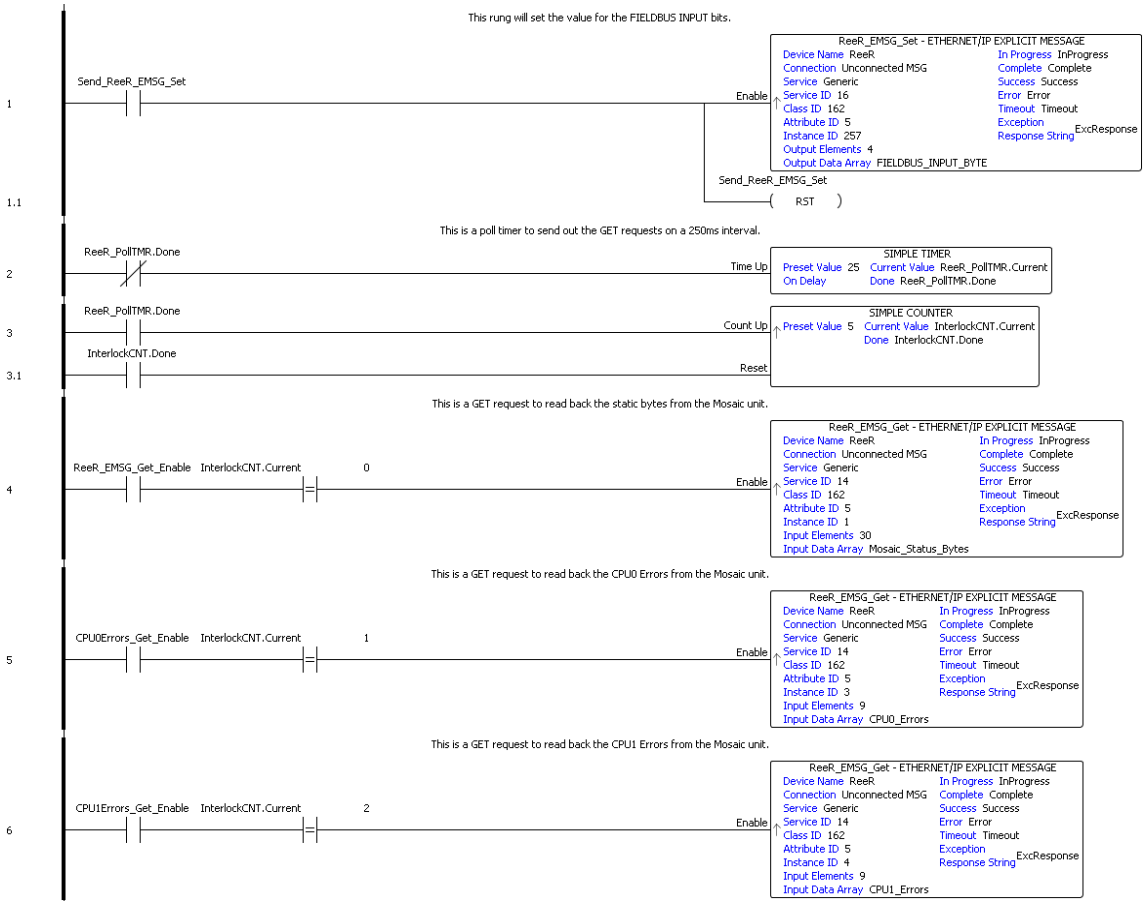
Notice the mapping of the bits below as compared to the Print Report illustrated earlier in this document. Note that the Print Report utilizes an offset into the data starting at 0 while the Productivity Series PLC uses an offset of 1.



# Productivity Series Example

## Class 3 Explicit (or Unconnected Explicit)

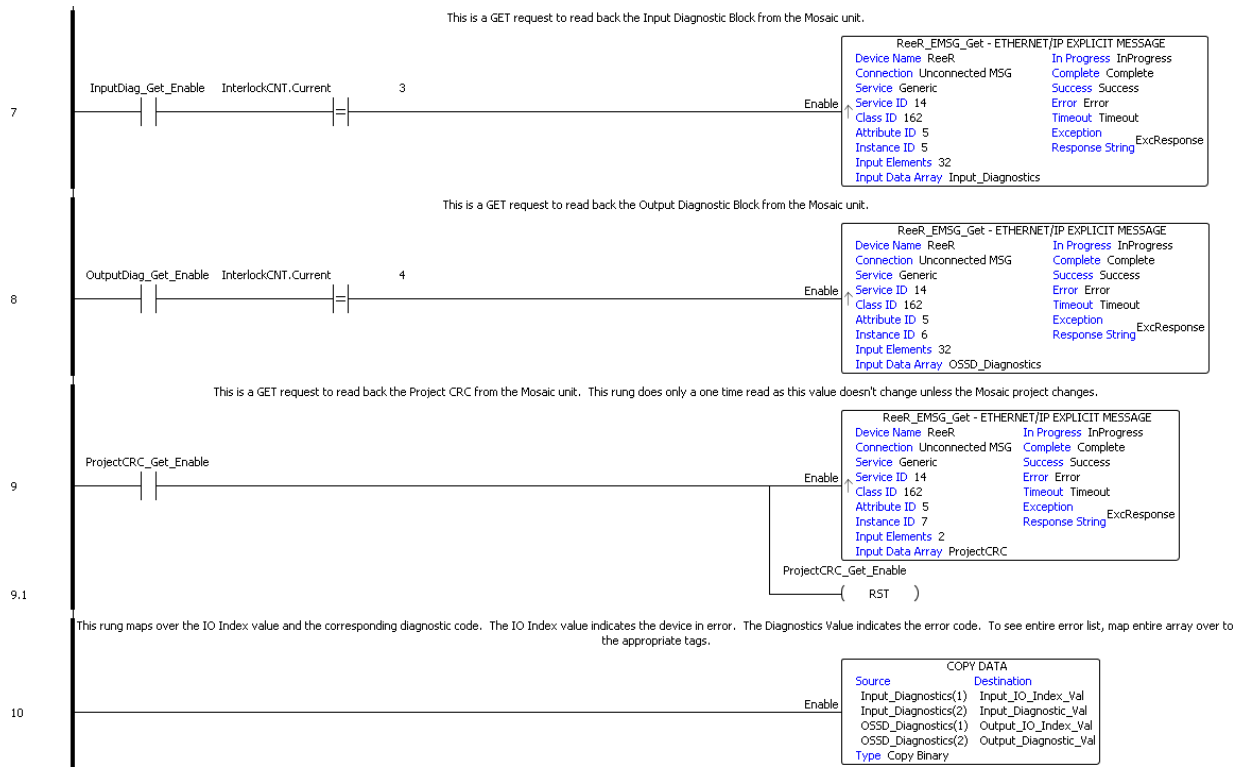
In the example below, there is only one “write” (SET). It is only triggered when a change to the value of the FIELDBUS INPUTs is desired. The ‘read’ (GET) instructions are polled on a 250ms interval by using a simple counter to increment through the 5 instructions. There are additional permissive bits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



# Productivity Series Example

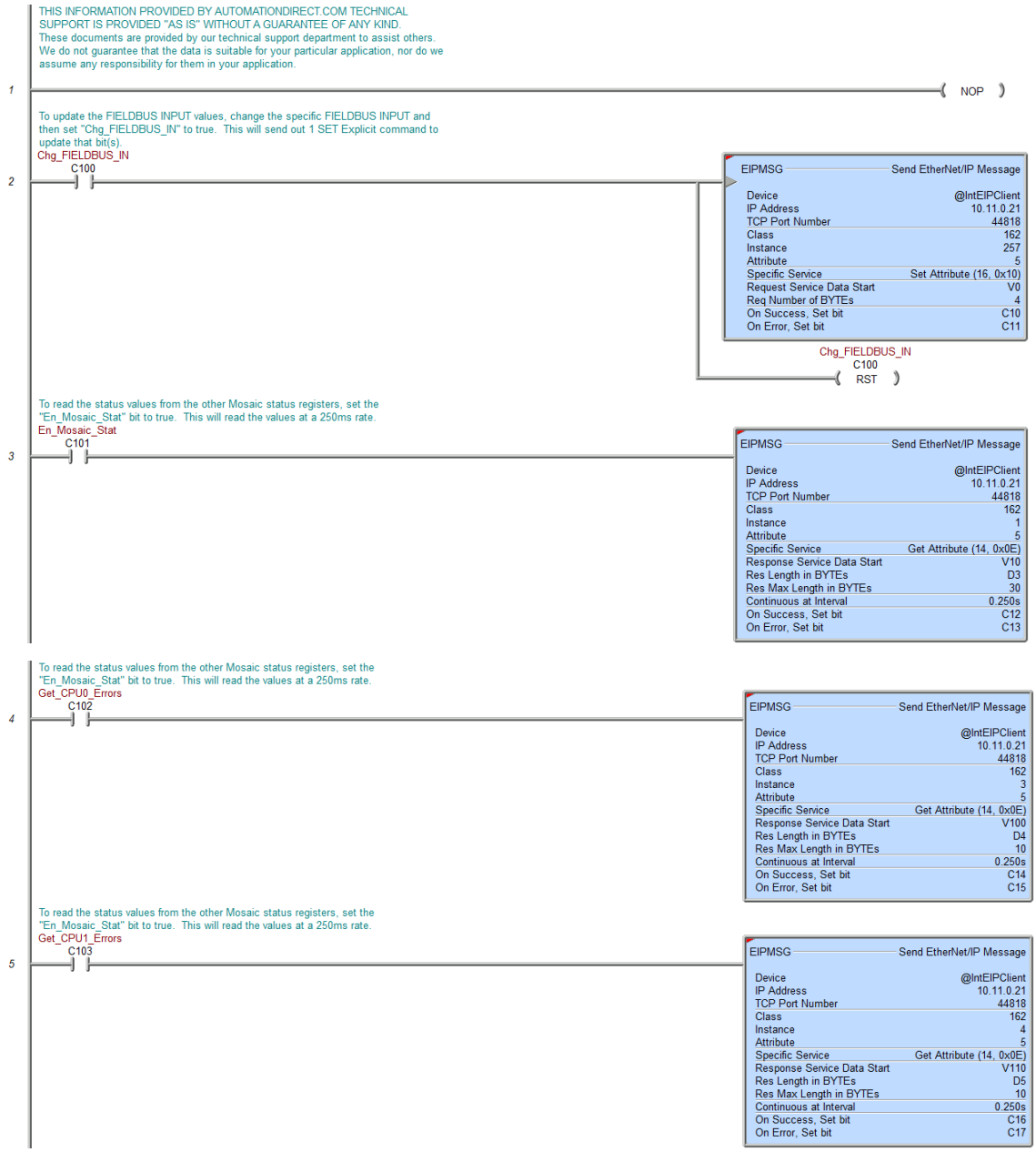
## Class 3 Explicit (or Unconnected Explicit) *(continued)*

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.



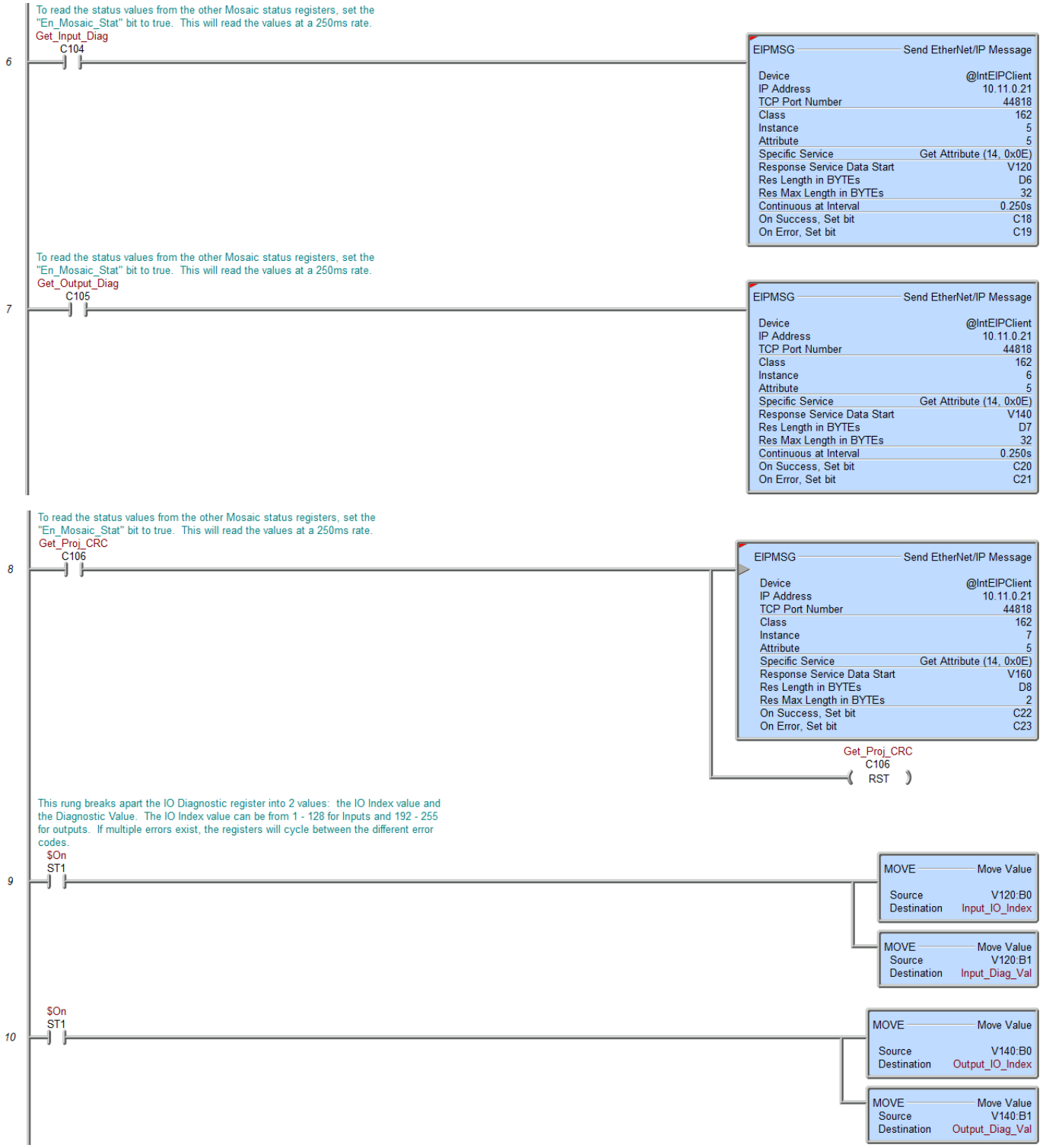
# Do-more/BRX Example

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 |

# MBEM

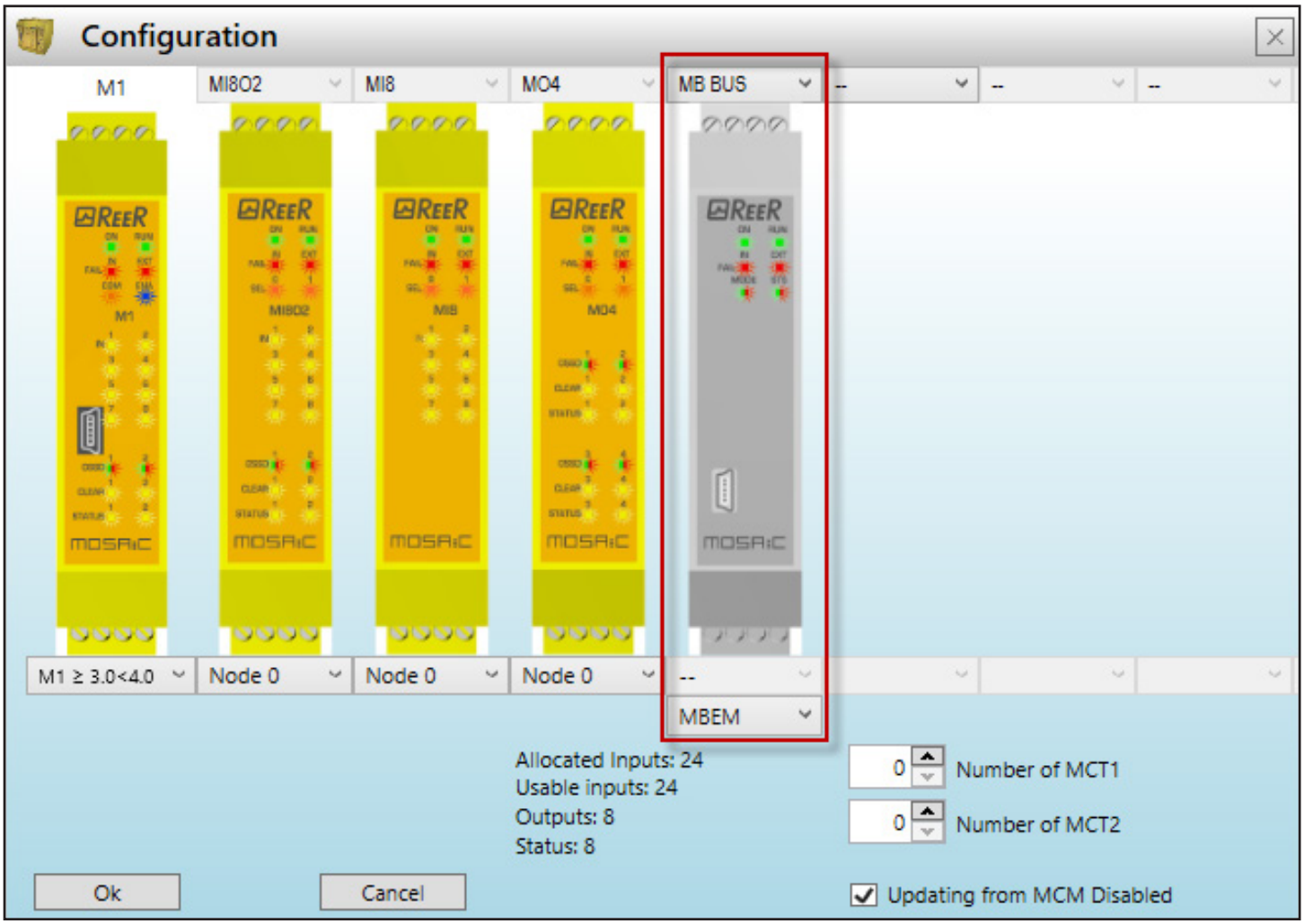
## Modbus TCP/IP Communications Module


## Configuration, data management and communication

# 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."

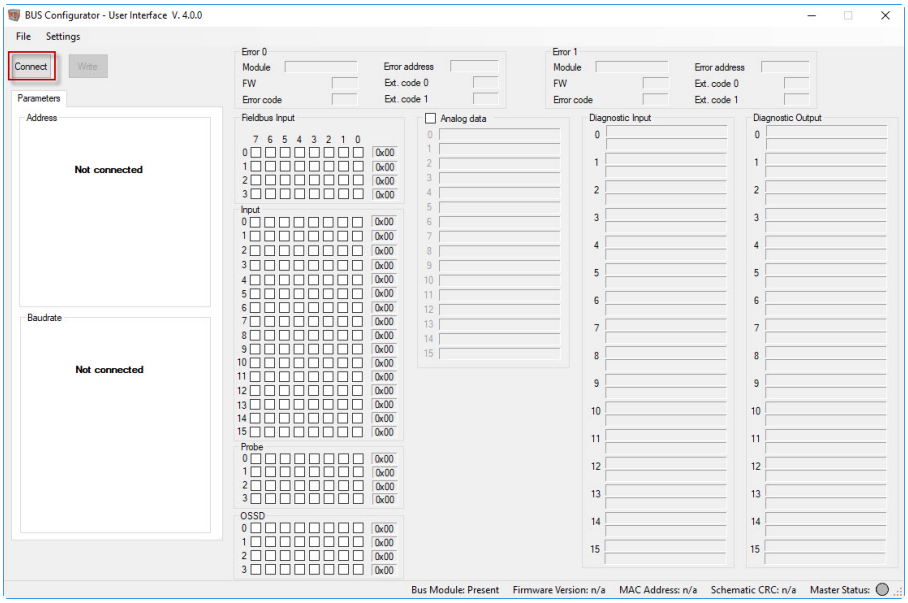


# Configuring the Reer MBEM Modbus TCP interface module

*(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.

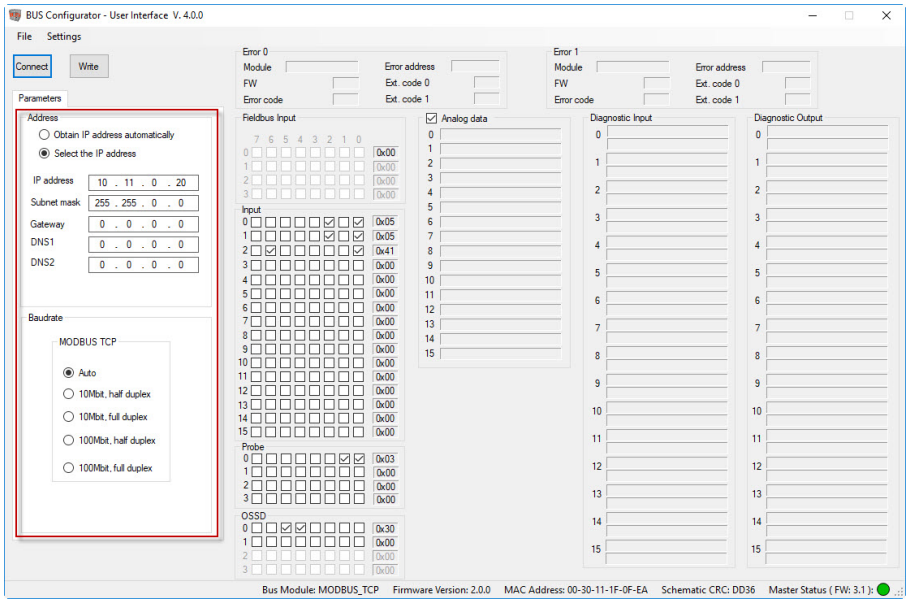



The **IP address** and **Subnet mask** should be configured to be compatible with the subnet of the Modbus TCP client device.
If the MBEM will need to be accessible through a router, configure the **Gateway** address for the IP address of the router.

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.




**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 Addressing | | | Description | Read/Write |
|---|---|---|---|---|
| Mosaic | Modicon Style | Protocol (FC = Function Code) | | |
| 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 Addressing | | | Description | Read/Write |
|---|---|---|---|---|
| Mosaic | Modicon Style | Protocol (FC = Function Code) | | |
| 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 |

# How to view Modbus address mapping

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
--------------------

============================================================
MB BUS: Installed Firmware 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  | MI8O2 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
106h High byte  | UINT8  | Empty
107h Low byte   | UINT8  | Empty
107h High byte  | UINT8  | Empty
108h Low byte   | UINT8  | Empty
108h High byte  | UINT8  | Empty
109h Low byte   | UINT8  | Fieldbus input byte 0 feedback
109h High byte  | UINT8  | Empty
10Ah Low byte   | UINT8  | Empty
10Ah High byte  | UINT8  | Empty
10Bh Low byte   | UINT8  | Probe status byte 0 (00÷07)
10Bh High byte  | UINT8  | Probe status byte 1 (08÷15)
```

# How to view Modbus address mapping
(continued)

| | | |
|---|---|---|
| 10Ch Low byte | UINT8 | Empty |
| 10Ch High byte | UINT8 | Empty |
| 10Dh High byte | UINT8 | OSSD status byte 0 (00÷07) |
| 10Dh Low byte | UINT8 | OSSD status byte 1 (08÷15) |
| 10Eh High byte | UINT8 | Empty |
| 10Eh Low byte | UINT8 | Empty |

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

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

# How to view Modbus address mapping
(continued)

| Register(s) | Size | Name |
|---|---|---|
| 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 | UINT8 | Project CRC High byte |
| 270h High byte | UINT8 | Project CRC Low byte |

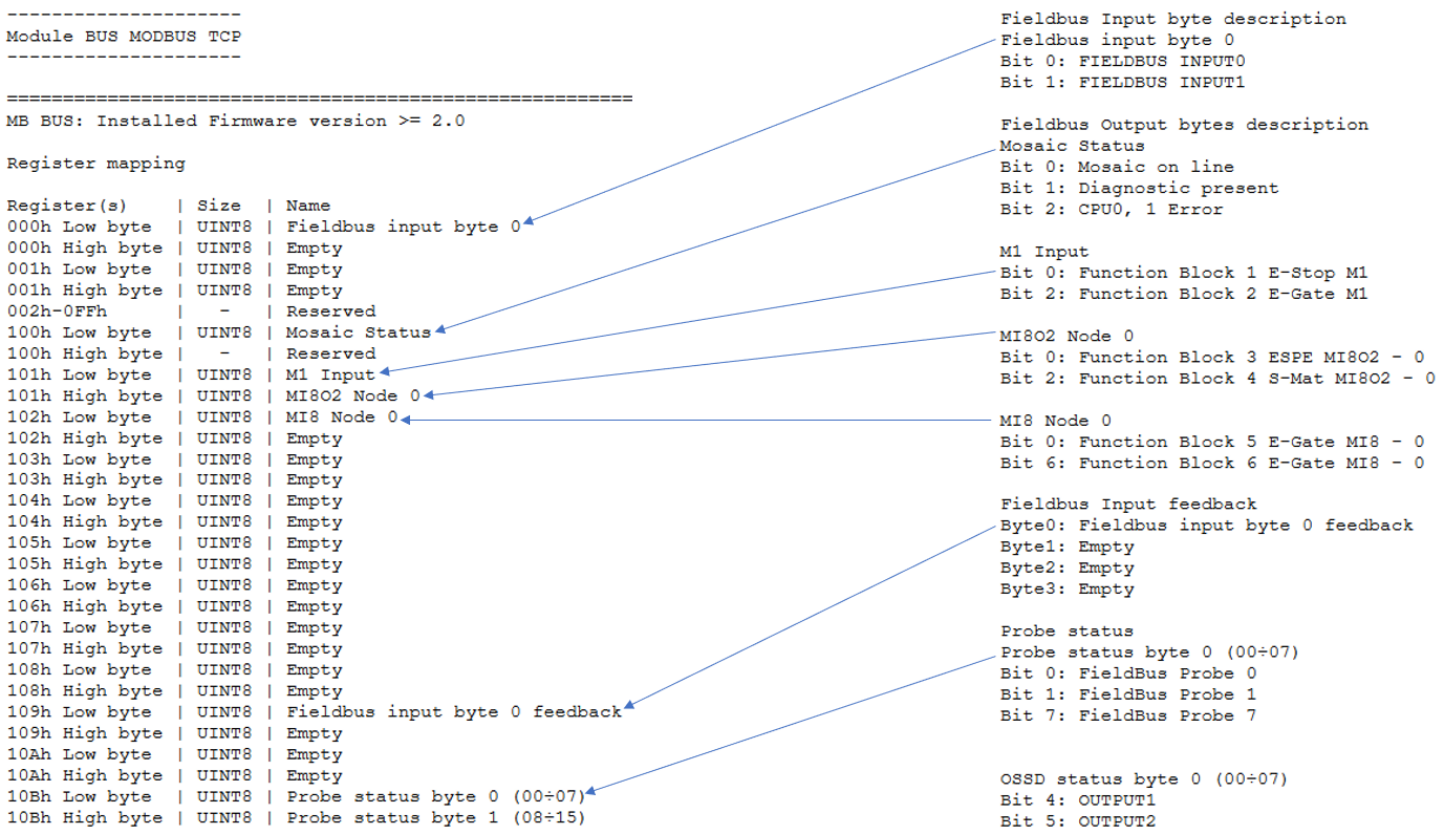
# How to view Modbus address mapping
(continued)

```
Fieldbus Input byte description
Fieldbus input byte 0
Bit 0: FIELDBUS INPUT0
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

MI8O2 Node 0
Bit 0: Function Block 3 ESPE MI8O2 - 0
Bit 2: Function Block 4 S-Mat MI8O2 - 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 MI8O2-0)
4: Function Block 4 (S-Mat MI8O2-0)
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)
```

# How to view Modbus address 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 Modbus TCP/IP Mapping details.

An illustration of this is shown below:



```
----------------------
Module BUS MODBUS TCP
----------------------

=======================================================
MB BUS: Installed Firmware 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  | MI8O2 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
106h High byte  | UINT8  | Empty
107h Low byte   | UINT8  | Empty
107h High byte  | UINT8  | Empty
108h Low byte   | UINT8  | Empty
108h High byte  | UINT8  | Empty
109h Low byte   | UINT8  | Fieldbus input byte 0 feedback
109h High byte  | UINT8  | Empty
10Ah Low byte   | UINT8  | Empty
10Ah High byte  | UINT8  | Empty
10Bh Low byte   | UINT8  | Probe status byte 0 (00÷07)
10Bh High byte  | UINT8  | Probe status byte 1 (08÷15)
```

```
Fieldbus Input byte description
Fieldbus input byte 0
Bit 0: FIELDBUS INPUT0
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

MI8O2 Node 0
Bit 0: Function Block 3 ESPE MI8O2 - 0
Bit 2: Function Block 4 S-Mat MI8O2 - 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
```

**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)

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.<br>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)

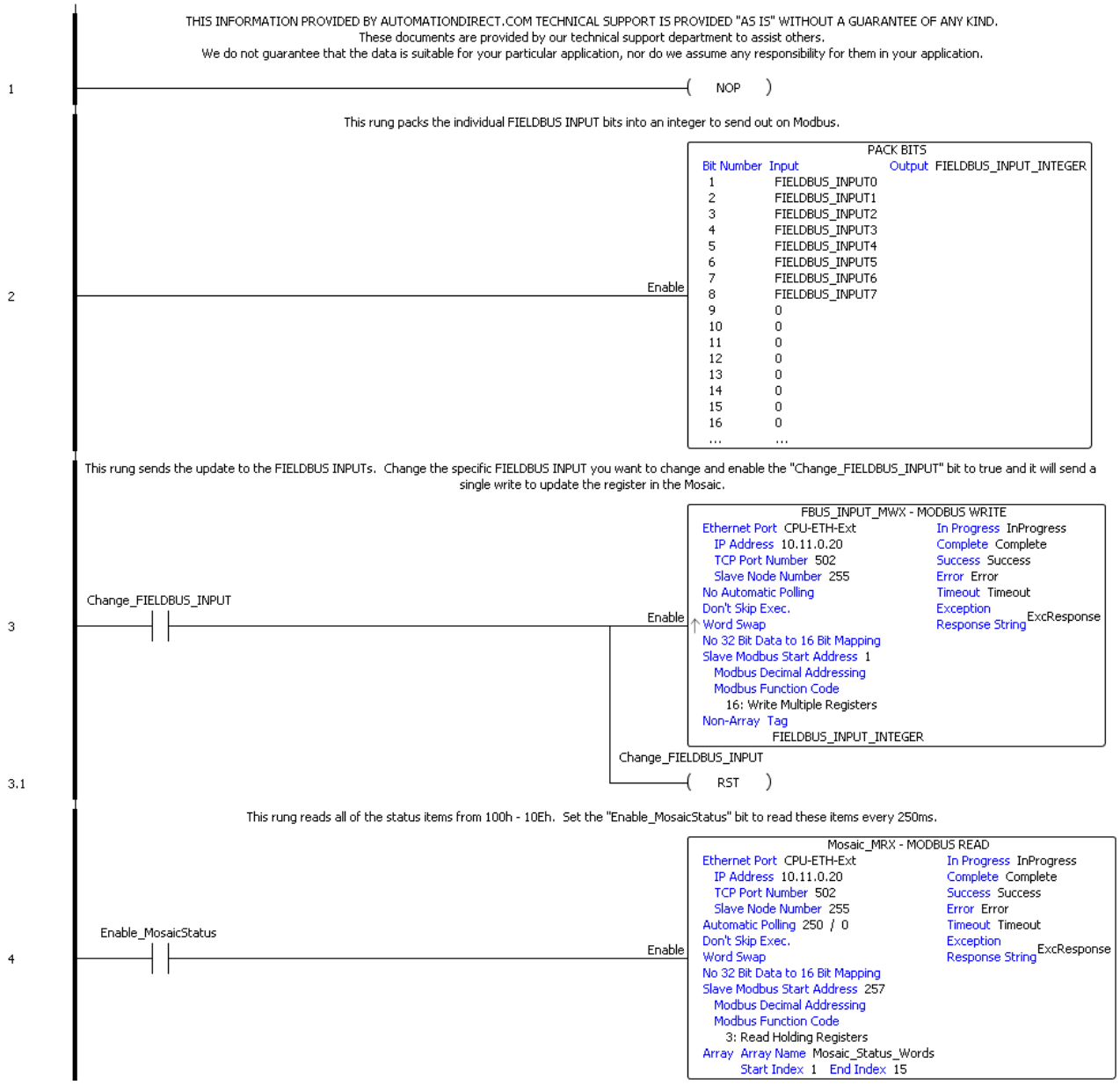
Registers 260h – 26Fh contain the Output diagnostic errors. The High byte points to the device that has an error (note the device numbers shown in the Output Diagnostic section in the Print Report output). The Low byte contains the error code itself. The table below indicates the possible errors, their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

| OSSD Diagnostics | | |
|---|---|---|
| 0 | OSSD diagnostics OK | |
| 1 | Enable missing | |
| 2 | Waiting for restart OSSD | |
| 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 congruous 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

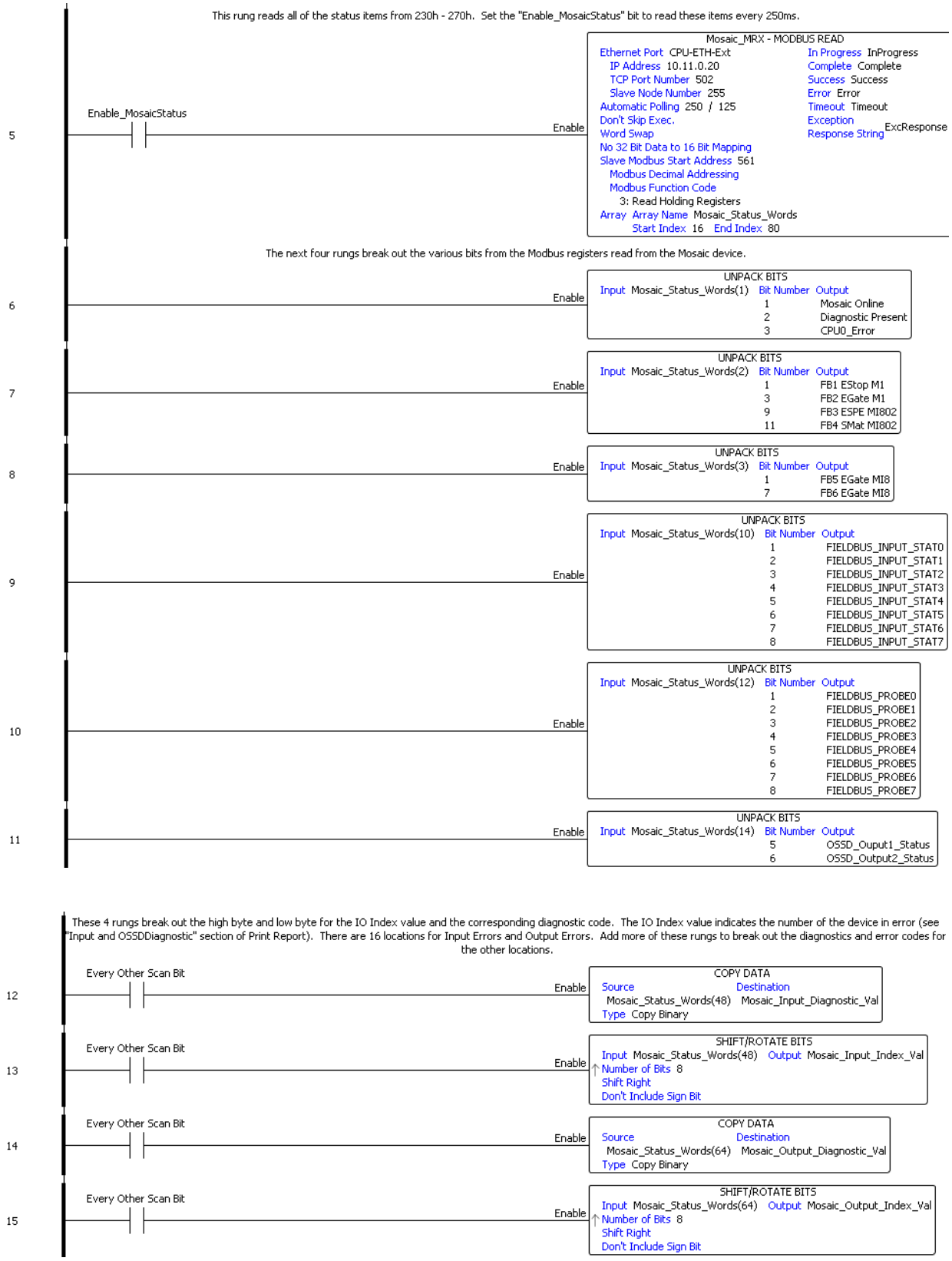
The example uses the device mapping from the Print Report example shown earlier in this document.

Note that the Print Report starts at offset 0 but the Productivity Series starts at offset 1.



# Productivity Series Example

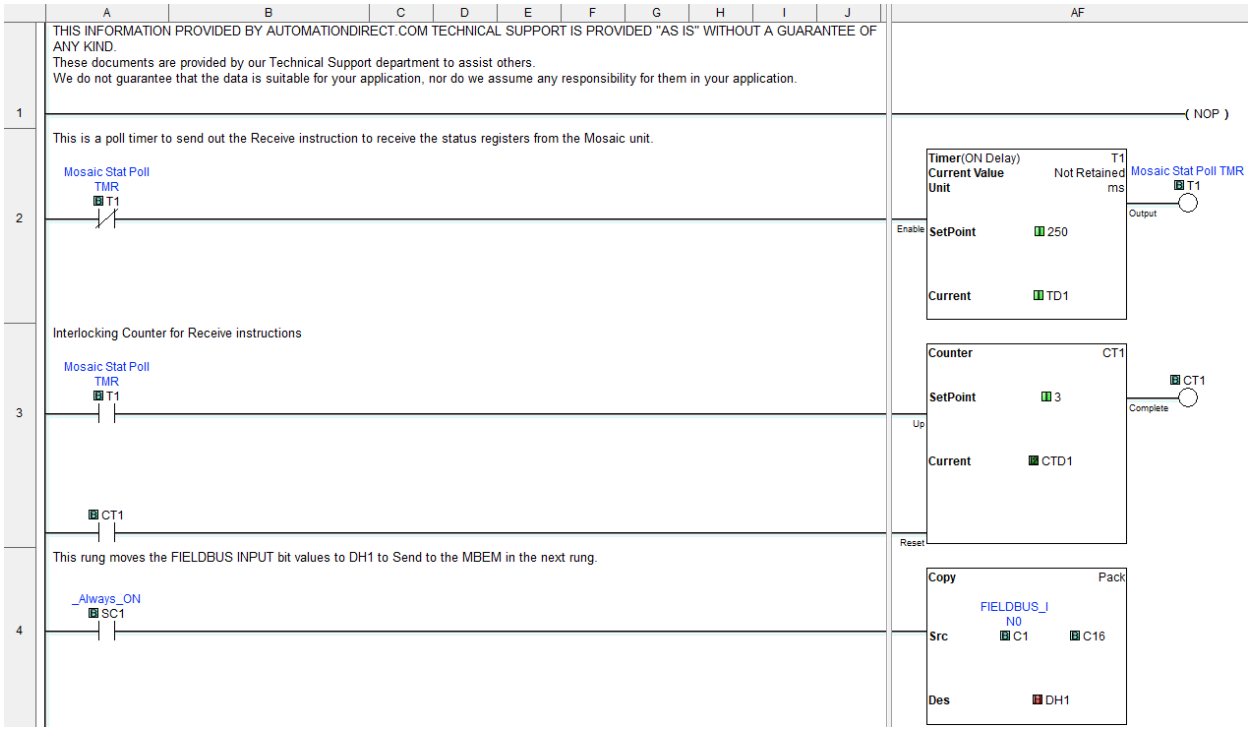
(continued)

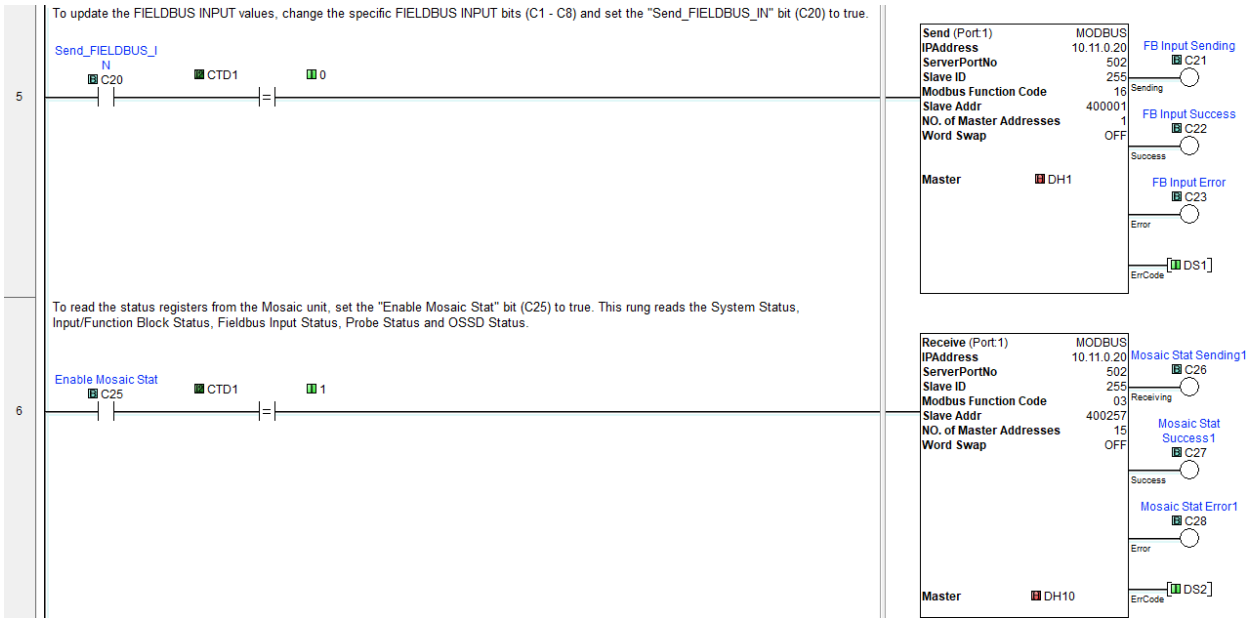


# CLICK Example

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.

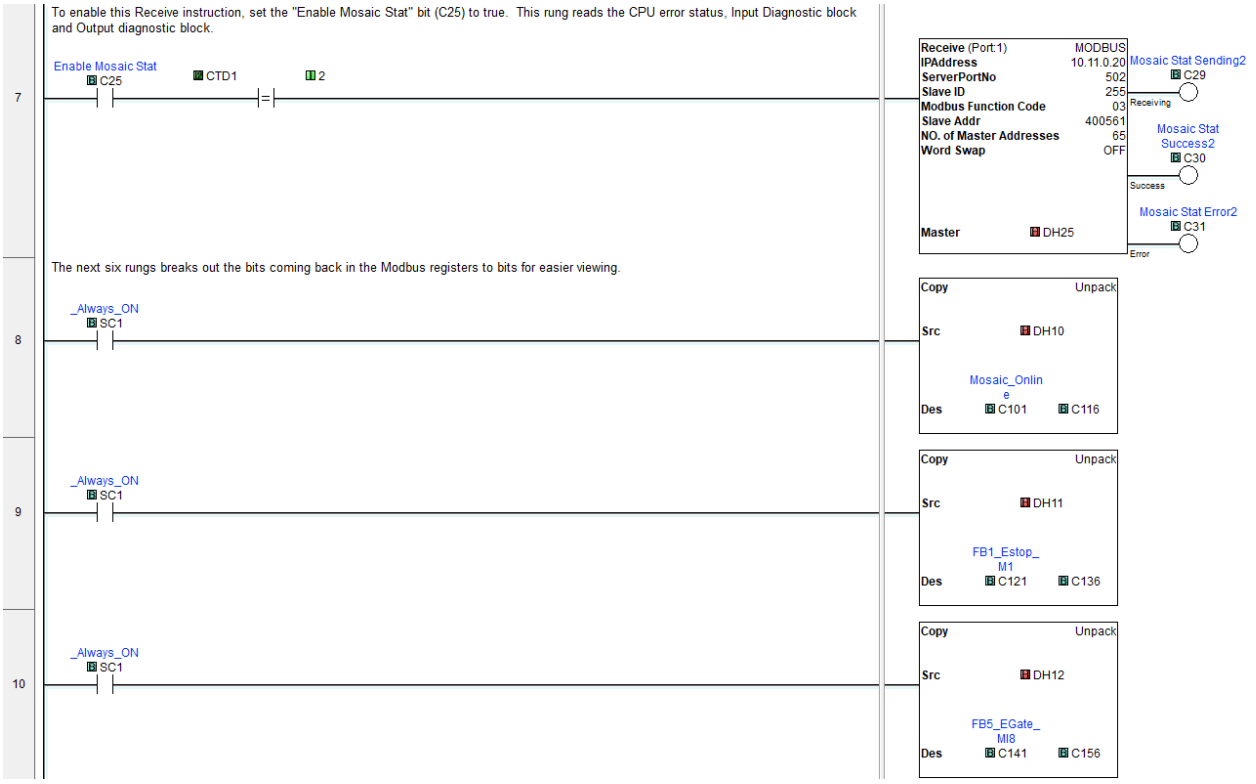
This example uses the mapping from the example Print Report illustrated earlier in this document.

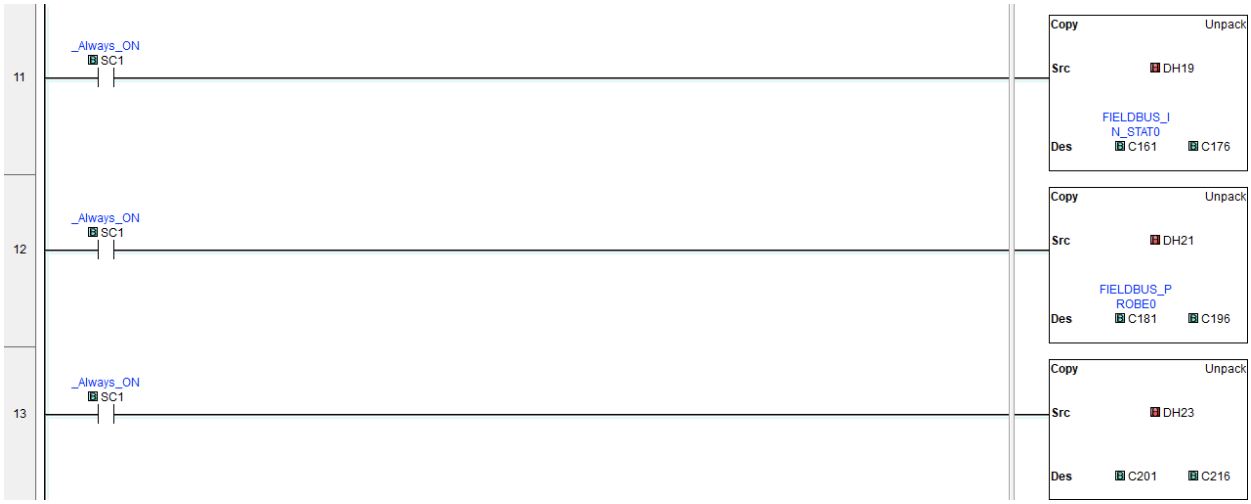


# CLICK Example

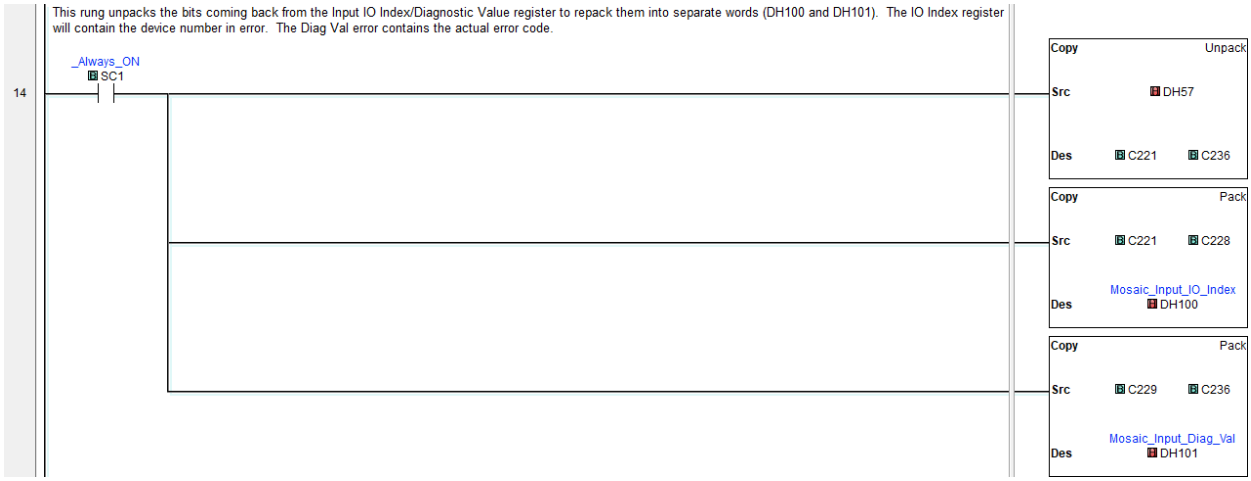
(continued)

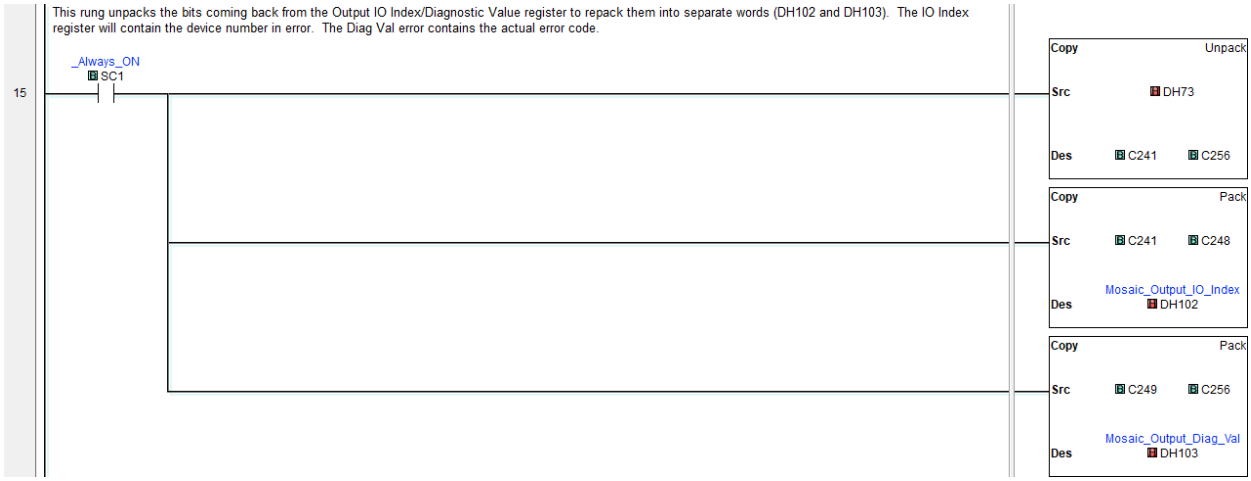


# CLICK Example

(continued)




| Address | | Data Type | Nickname |
|---|---|---|---|
| C1 | RW | BIT | FIELDBUS_IN0 |
| C2 | RW | BIT | FIELDBUS_IN1 |
| C3 | RW | BIT | FIELDBUS_IN2 |
| C4 | RW | BIT | FIELDBUS_IN3 |
| C5 | RW | BIT | FIELDBUS_IN4 |
| C6 | RW | BIT | FIELDBUS_IN5 |
| C7 | RW | BIT | FIELDBUS_IN6 |
| C8 | RW | BIT | FIELDBUS_IN7 |

# CLICK Example

(continued)

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

# CLICK Example

(continued)

| | | | |
|---|---|---|---|
| C141 | RW | BIT | FB5_EGate_MI8 |
| C142 | RW | BIT | |
| C143 | RW | BIT | |
| C144 | RW | BIT | |
| C145 | RW | BIT | |
| C146 | RW | BIT | |
| C147 | RW | BIT | FB6_EGate_MI8 |
| C148 | RW | BIT | |
| C149 | RW | BIT | |
| C150 | RW | BIT | |
| C151 | RW | BIT | |
| C152 | RW | BIT | |
| C153 | RW | BIT | |
| C154 | RW | BIT | |
| C155 | RW | BIT | |
| C156 | RW | BIT | |
| C157 | RW | BIT | |
| C158 | RW | BIT | |
| C159 | RW | BIT | |
| C160 | RW | BIT | |
| C161 | RW | BIT | FIELDBUS_IN_STAT0 |
| C162 | RW | BIT | FIELDBUS_IN_STAT1 |
| C163 | RW | BIT | FIELDBUS_IN_STAT2 |
| C164 | RW | BIT | FIELDBUS_IN_STAT3 |
| C165 | RW | BIT | FIELDBUS_IN_STAT4 |
| C166 | RW | BIT | FIELDBUS_IN_STAT5 |
| C167 | RW | BIT | FIELDBUS_IN_STAT6 |
| C168 | RW | BIT | FIELDBUS_IN_STAT7 |

# CLICK Example

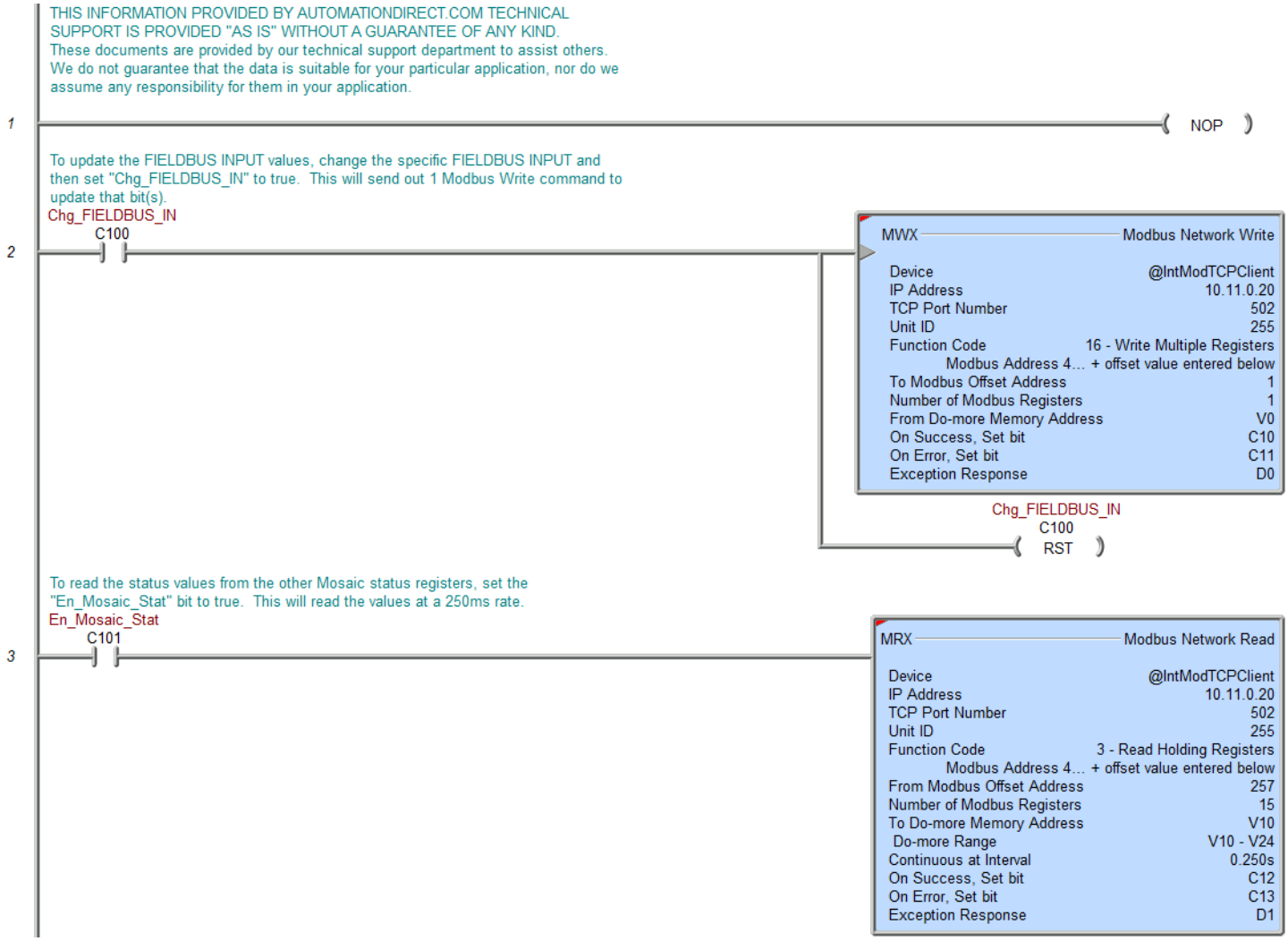
(continued)

| | | | |
|---|---|---|---|
| C181 | RW | BIT | FIELDBUS_PROBE0 |
| C182 | RW | BIT | FIELDBUS_PROBE1 |
| C183 | RW | BIT | FIELDBUS_PROBE2 |
| C184 | RW | BIT | FIELDBUS_PROBE3 |
| C185 | RW | BIT | 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 | BIT | |
| C193 | RW | BIT | |
| C194 | RW | BIT | |
| C195 | RW | BIT | |
| C196 | RW | BIT | |
| C197 | RW | BIT | |
| C198 | RW | BIT | |
| C199 | RW | BIT | |
| C200 | RW | BIT | |
| C201 | RW | BIT | |
| C202 | RW | BIT | |
| C203 | RW | BIT | |
| C204 | RW | BIT | |
| C205 | RW | BIT | OSSD_Out1 |
| C206 | RW | BIT | OSSD_Out2 |

# Do-more/BRX Example

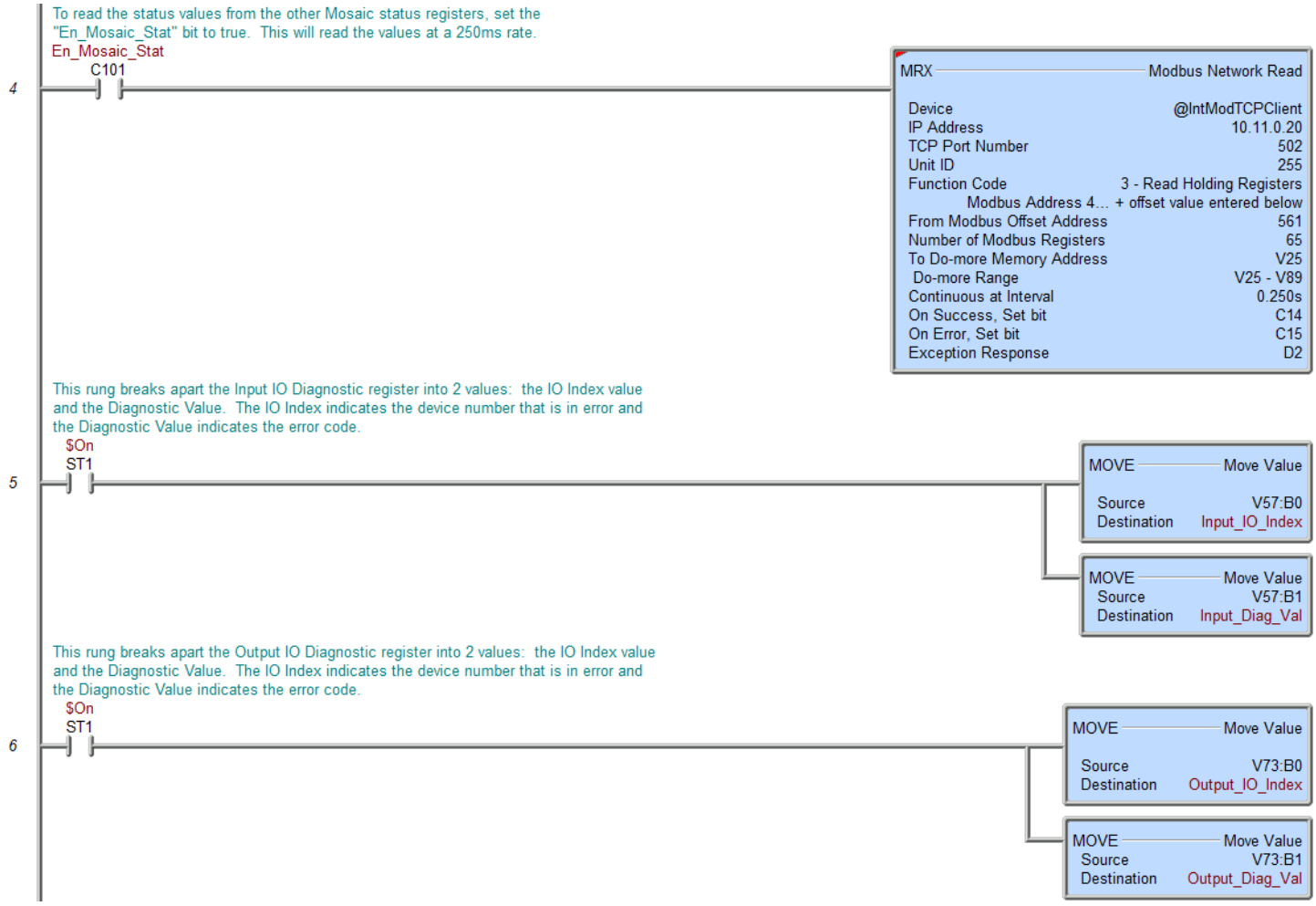
Bit of word was utilized for this example to make the code easier. The nickname assignments to the correct bit of words are shown at the end of the code.

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



# Do-more/BRX Example

(continued)



# Do-more/BRX Example

(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 |