Quick Start Guide: Interfacing Modular IO Header M-EIP-H v	vith Allen Bradley Communication Module on EtherNet/IP
Doc Num: N18011AAMG01	Published Date: 01 <sup>st</sup> April 2019

Interfacing Modular IO Header M-EIP-H with Allen Bradley Communication Module on EtherNet/IP



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## **Scope of Document**

This is a Quick Start Guide to interface Mitsubishi Electric India make Modular IO Header module 'M-EIP-H' with Allen-Bradley make Communication module (e.g. 1756-EN2T, 1756-EN2TR) on EtherNet/IP network.

### Prerequisites

- 1. Allen Bradley Studio 5000 Logix Designer- Standard Edition or onwards
- 2. Modular IO setup
  - a.Modular IO Configurator Tool V1.5.0.0 or onwards.

b.EDS file M-EIP-H\_0\_1.eds

Download above files from Mitsubishi Electric India website.

#### References

- a. Modular IO User Manual [Manual Number: N16001AAMH]
- b. M-EIP-H EtherNet/IP Object Classes, Messages and Services [Manual number: N18011AAMG03]
- c. EtherNet/IP Network Configuration User Manual [Publication Number: ENET-UM0010-EN-P-May 2016]
- d. EtherNet/IP Embedded Switch Technology Application Guide [Publication Number: ENET-AP005F-EN-P-October 2014]

Follow the steps below to interface Modular IO station with ControlLogix EtherNet/IP Communication Module.

- 1. Prepare Hardware Setup
- 2. Install Modular IO Configurator Tool
- 3. Configure Modular IO station using Modular IO Configurator Tool
- 4. Register M-EIP-H EDS file in Studio 5000
- 5. Configure M-EIP-H with Studio 5000 Logix Designer
- 6. Monitor Status, IO Data and Diagnostics

Refer subsequent sections which explain necessary steps in detail.

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# 1. Hardware Setup

Diagram below shows setup with Allen Bradley PLC with EtherNet/IP communication module and Modular IO station as an adapter.



Commented [V1]: Cable type for Studio 5000 Commented [A2R1]: Mentioned in diagram

Modular IO station provides 2 Ethernet ports (ETH1 and ETH2; Layer 2 switch with DLR support). So, it supports star, line, ring topology. User should wire and configure accordingly.



Note: It is necessary to power cycle Header module to effect the change in DIP switch setting.

Commented [V3]: Show with 2 ports
Commented [A4R3]: Modified accordingly.

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# 2. Install Modular IO configurator Tool

This is one-time activity. You should have following installer files stored at the same location on your PC.

- a. ModularIOConfiguratorSetupx.x.x.x.exe
- b. ModularIOCommunicationComponentx.x.x.x.exe

x.x.x.x is a version of the software.

#### Software setup requirement:

Processor	Intel core i3 or Higher version
Disk space	200 MB
RAM memory	2GB or Higher
Screen resolution	1280 x 768 or Higher
Platform	Windows 7 (64 bit/ 32 bit)/ Windows 8 (64 bit)/ Windows 8.1 (64 bit)/ Windows 10 (64 bit)
USB interface	USB 2.0

Following steps explain how to install Modular IO Configuration Tool.

1. RunModularIOConfiguratorSetupx.x.x.x.exe. It will open Modular IO Configuration Tool Setup wizard



 Connect the Modular IO Header module (M-EIP-H) to the machine using USB (2.0) cable. For the first time, the driver automatically is searched and configured. Please wait for few minutes while this step is executed.



2. Click on Finish button to complete Modular IO Configuration Tool Setup



4. Once the driver is successfully installed, following message will appear.



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# 3. Configure Modular IO Station

This section explains configuration and special features of Modular IO Configurator Tool.

## 3.1 Configuration of Modular IO Station

Example here shows configuration of following modules.

Description	Ordering Code	Quantity
EtherNet/IP Header Module	M-EIP-H	1
16 Digital Input, 24 VDC, Sink Type Module (Negative Common)	M-16D	1
16 Digital Output, 24 VDC, Source Type Module	M-16TE	1
2 Channel Universal Analog Input Module	M-UAD2	1
2 Channel Analog Output Voltage/ Current Module	M-DA2	1

Following steps explain how to configure Header module in a Modular IO Configurator Tool.

- 1. Open modular IO configurator tool. View screen layout as below
- 2. Click on to create new project.



CREATE PROJECT	×
Project Name	Enter Project Name
SampleProject	Browse path
Path	
D:\Instllable\Application Backup	Browse
Bus Type	Select Bus Type as
Ethernet/IP	EtherNet/IP
	Create Cancel

3. Click on to add and configure M-EIP-H header module

ADD HEADER				×	
Headers	M-EIP-H EtherNet/TP Header Mode	se.		No M-EP-H	
	SVDC backplane current Field supply current Number of IO modules	2A Max 10A Max 63 Max		10 Hindest	
			10-45502055 - 546 - 465 - 66 - 6 - 6 - 6 - 6 - 6	APULL OII OII OII OII	
ld user name					
Station Number	PR-LLP-11			Click Add b	uttor
			Add	Cancel	

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4. Select M-EIP-H from Project Organizer window and click on Parameter tab.

MODULAR IO CC		RATOR : SAMPLE	PROJECT*					
Home Documentatio	n Setu	ip Help						
	BB		5 🖬 🕇 🛛		M-EIP-M mo	param dule	neters of	
Project			Edit	Check	$\geq$ $\sim$		II IO Map	
Project Organiser 👻 🖡		System	IO Data	Param	eters Help			
4 SampleProject			Parameter Name		Project Value		Online Value	Comment
M-EIP-H	E	General parameter				7	To set IP address	on Modular
		IP address			192 . 168 . 3	100	IO station, refer s	ection 1.
		Subnet mask			255 . 255 . 25	5.0	Hardware Setup	
		Gateway address					Ciaranaio ootap	
		Action on fatal erro	r	Conti	nue N/W communication	•	Defines action on fa	atal error to any slot including header. Stop or o
		Output hold / clear		Clear		•	Defines output stat	e of IO modules when disconnected from netw
	-							

User can set following parameters from Modular IO Configurator Tool

- IP address (first three octets).
- Subnet mask and Default gateway.
- Define behavior of M-EIP-H module during fatal error.
- Define behavior of IO's, when it disconnected from network.
- Refer "N16001AAMH Modular IO User Manual" for more details.

5. Click on function to open dialog box of "Add module ", which shows list of IO modules grouped as per IO module type.

Select M-16D Digital Input module and M-16TE Digital output module from list of IO module type.

		10011000022	
20 Modes 1 Analog inget 2 Analog output 2 Analog output 3 Analog output 3 Analog output 3 Analog output 3 Analog output 3 Analog 4 Analog	K. San type model/bupdite 15 Sink, Negative cannon 2400C dmA at 2400C 20ms 55mA	D Modeler 1 Analog aptyr 2 Digital inger 2 Digital inger 4 bigital oxport 6 Digital inger 6 bigital oxport 6 bigital oxport 6 bigital oxport 6 bigital oxport 6 bigital oxport 7 bigital oxport 8 bigi	Left Barder Jacobs Gauser type smallel. Tamatas, Saurce 2000 (Cl fts 10/0002) including right (Cl fts 10/002) Including Cl fts 10/002 including right (Cl fts 10/002) Salaria (Cl fts 10/002) including right (Cl fts 10/
User Name M-16D_0 Click	Add button	User Name M-16TE_1	Click Add button

Note: Follow the above procedure to add other modules as required.



- 7. User should attach Bus End module (M-BE) at the last slot position if there are 16 or more IO modules.
- 8. Connect Header module to your machine via standard USB cable.

Click on 🞍 to download the configuration to connected Header module. This pop ups progress window as shown below.



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## 3.2 Special Features of Modular IO Configurator Tool

1. Scan IO modules connected to Header module:

Tool facilitates quick configuration of a modular IO station if setup is available with IO modules attached to the Header module. Using "Scan IO Module" function, tool can read the list of IO modules (other than system modules) physically attached to the Header module.

elect Header module and click on Onli CAN IO MODULES XEET Serving	Ine function Click here to	OPENS following v	vindow of Scar	n IO Mo
odules Found 0 Progress		Modules Found 5 Progress		
Slot Module		Start 0 M.CCB-H 1 M.H00 3 M.H02 4 M.H02 4 M.H02	Module	
Add modules to Project Ok			dd modules to Project Ca	ncel
Add modules modules to th replacing exis	s to project to add IC le Header module by sting IO modules if an	/.		

#### NOTE:

System modules are passive modules. Hence, Header module cannot detect presence of System modules in a modular IO station. So, System modules do not appear in the list after scan.

2. Output test in online monitoring mode:

This is online feature and useful to test output module locally even when Header module is not connected to the fieldbus/ network. User can write individual output (True/ False to digital output module and channel data to analog output module) and test individual output.

Follow the steps as below, to write outputs for test purpose.

- 1. Click on function to be connect to Header module. Icon changes to and Status bar is updated as ONLINE.
- 3. Select output module to test output and then select "IO Data" tab.
- 4. Select individual output DO nn (for Digital output) or CHn (for Analog output).
- 5. Select option as
  - Force to true/ Force to False/ No Force for Digital output and
  - Enter value between -32768 and 32767 for Analog output.
  - Colour of Forced values change to red.
- 6. Repeat step 5 for other output module as required.
- Click on Online function 2 to write Forced values to Actual values. Forced value overwrites Field bus values.

After writing output values to actual values, color of Forced values change to blue.

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- 8. Change in digital output is indicated by output LED indication on the digital output module. User can measure actual output signal to test digital output and analog output
- For digital output, function "Enable/ Disable output test" pand "Write values" are used as shown below.

In online monitoring mode, select digital output module, here M-16TE is selected as an example. By default, forcing of output is disable.

paniser • 4	System	Data	Parameters	Help			
a	Channel	Data Type	Local Address	Field Bus Value	Forced Value		Actual Value
M-EIP-H (Online)	<ul> <li>Digital output</li> </ul>						
[1] M-16D_0	Digital output 00-07	BYTE	QX 0	0		2	0
[2] M-16TE_1	DO 00	BOOL	QX 0.0	False	No Force	•	False
[3] M-UAD2_2	DO 01	BOOL	QX 0.1	False	No Force		False
🙀 [4] M-DA2_3	DO 02	BOOL	QX 0.2	False	No Force		False
	DO 03	BOOL	QX 0.3	False	No Force	*	False
	DO 04	BOOL	QX 0.4	False	No Force	-	False
	DO 05	BOOL	QX 0.5	False	No Force		False
	DO 05	BOOL	QX 0.6	False	No Force		False
	DO 07	BOOL	QX 0.7	False	No Force	*	False
	Digital output 10-17	BYTE	QX 1	0			0
	DO 10	BOOL	QX 1.0	False	No Force	-	False
	00 11	BOOL	QX 1.1	False	No Force		False
	00 12	BOOL	QX 1.2	False	No Force		False
	DO 13	BOOL	QX 1.3	False	No Force		False
	DO 14	BOOL	QX 1.4	False	No Force		False
	00 15	BOOL	QX 1.5	False	No Force		False
	DO 16	BOOL	QX 1.6	False	No Force		False
	DO 17	BOOL	QX 1.7	False	No Force		False
						c	ollapse Al Clear Forces

Click on function Clicon changes color to red Click on function Clicon changes color to red Click on function Clicon changes and allows

n 🖿 In 🖻 I			<b>†</b> ‡	~	₽ <u>3</u> ₹ ₹	م 🕒 🍥	) 📝	Diagnostics	/		
Project		Edit		Check	I	Online		. 10	Map		
aject Organiser 🔹 🖗	_	System	10 Data		Parameters	Help					
AI I		Channel	Data Type	Local	Field Bus Value	Forced Value	2	Actual Value	-	Forced Value	
M-EIP-H (Online)		Digital output									
[1] M-16D_0	^	Digital output 00-07	BYTE	QX 0	0			0			3
[2] M-16TE_1		DO 00	BOOL	QX 0.0	False	No Force	-	False		Force to TRUE	
[3] M-UAD2_2		DO 01	BOOL	QX 0.1	False	No Force		False		Force to TRUE	
🙀 [4] M-DA2_3		DO 02	BOOL	QX 0.2	False	No Force		Faise	_	No Force	
		DO 03	BOOL	QX 0.3	False	No Force		False		No Force	
		DO 04	BOOL	QX 0.4	False	No Force	•	False		No Force	
		DO 05	BOOL	QX 0.5	False	No Force		False		No Force	
		DO 05	BOOL	QX 0.6	False	No Force		False		No Force	
		DO 07	BOOL	QX 0.7	False	No Force		False		No Force	
	-	Digital output 10-17	BYTE	QX 1	0		:	0		No Torce	
		DO 10	BOOL	QX 1.0	False	No Force	-	False		No Force	
		DO 11	BOOL	QX 1.1	False	No Force		False		No Force	
		DO 12	BOOL	QX 1.2	False	No Force		False		No Force	
		DO 13	BOOL	QX 1.3	False	No Force		False		No Force	
		DO 14	BOOL	QX 1.4	False	No Force		False		No Force	
		00.15	8001	OX 1.5	Ealer	No Farm	-	Ealer	-	No Force	
							Collapse	All Clear Forced	Values	No Force	
							_			140 Force	

After selection of either Force to TRUE or Force to FALSE, online changed force value for output turns red as shown above.

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Clicking on function 2 writes online changed force value to actual value and force value changes colour as blue as below.

17 🖿 🖿 🖻 🖻	🔒 🗈 b 🛍	<b>† ‡</b>		₽ <b>3</b> ± ±	و 🕒 🎯	Diagnostics
ject Organiser 🔹 🖡	System	IO Data	_	Parameters	Help	
AI	Channel	Data Type	local-	Field Res Value	Formed Value	Actual Value
M-EIP-H (Online)	Digital output					
[1] M-16D_0	Digital output 00-07	BYTE	QX 0	0	3	
[2] M-16TE_1	DO 00	BOOL	OX 0.0	False	Force to TRUE	False
[3] M-UAD2_2	DO 01	BOOL	QX 0.1	False	Force to TRUE	False
🙀 [4] M-DA2_3	DO 02	BOOL	QX 0.2	False	No Force	False
	DO 03	BOOL	QX 0.3	False	No Force ·	False
	DO 04	BOOL	QX 0.4	False	No Force	False
	DO 05	BOOL	QX 0.5	False	No Force *	False
	DO 06	BOOL	QX 0.6	False	No Force -	False
	DO 07	BOOL	QX 0.7	False	No Force *	False
	Digital output 10-17	BYTE	QX1	0		
	DO 10	BOOL	QX 1.0	False	No Force	False
	00 11	BOOL	QX 1.1	False	No Force	False
	DO 12	BOOL	QX 1.2	False	No Force ·	False
	DO 13	BOOL	QX 1.3	False	No Force ·	False
	DO 14	BOOL	QX 1.4	False	No Force	False
	00.15	8001	OV 1.5	Eniza	No Course of T	Entra
					c	Slapse All Clear Forced Vi
> Mes	nages					

## NOTE:

Output test is possible only if modular IO station is healthy. Confirm status of modular IO station using LED indications on Header module.

Forcing of output continues as long as modular IO station is powered on and in ONLINE monitoring mode. When user tries to go OFFLINE, tool prompt user to clear forced values.

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# 4 Register M-EIP-H module EDS file in Studio 5000

This is one-time activity necessary to use M-EIP-H module as an adapter. Open Studio 5000 configuration software and follow the steps below.

- - EDS file(s)" well Automation's EDS Wizard Options What task do you want to complete? 1 Register an EDS file(s). This option will add a dev <u>B</u> e(s) to our Unregister a device. This option will remove a • red by an EDS file from Create an EDS file This option creates Ð Click Next  $\mathcal{V}$ < Back Next > Cancel

2. It starts EDS Wizard. Select option "Register an

3. Select option "Register a single file"



5. Graphical Image of M-EIP-H module be shown below.



4. It pops up EDS File Installation Test Result as shown in the window below.

Rockwell Automation's EDS Wizard	2 <b>- - -</b>
EDS File Installation Test Results This test evaluates each EDS file for errors in the EDS file. This test does not guarantee EDS file validity.	
B (□ Installation Test Results	-
Cusan meternice documents menp-h_eds menp-h_0_2 eds	
Vew fie Click Next Click Next Cancel	

6. Click Finish to complete EDS Wizard.

Rockwell Automation's EDS Wig	ard 📃
	You have successfully completed the EDS Wizard.
	This is the lat of errors that were detected.
	Finish

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# 5 Configure M-EIP-H Module with Studio 5000

M-EIP-H module can be configured Studio 5000 by two methods.

- Configuration using M-EIP-H\_0\_1.eds.
   This provides fixed size for input and outputs (128 byte input + 128 byte output) even though Modular IO station has less size of input output.
- Configured using Generic Ethernet Module.eds.
   This allows user to change input output size from 1 to 496 bytes as per Modular IO configuration.

### 5.1 Using module EDS (Fixed Data Size)

Refer steps below to configure M-EIP-H module using module EDS

- 1. Create a New Project in Studio 5000 and Select ControlLogix Controller (1756-L71)
- 2. Add EtherNet/IP Communication module (1756-EN2TR) to controller



Commented [V5]: Change screen as per sequence

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#### 3. Set IP address of EtherNet/IP Communication Module (1756-EN2TR) in General tab.



4. Select New Module from Controller organizer and add M-EIP-H from Module Type



**Commented [V6]:** Explain from IP address setting from user perspective.

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7. Set Requested Packet Interval (RPI from connection)



8. Downloads configuration to controller from Communication  $\rightarrow$  Download



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**Commented [V7]:** Show consistency is settings e.g it is Private Network for scanner module.

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# 5.2 Using Generic Ethernet EDS (Variable Data Size)

Refer steps 1 to 3 to configure Ethernet/IP Communication module (1756-EN2TR) from section 5.1. 1. Add Generic Ethernet Module as shown below

	- 🚜 🔩 🛅	🖕 📝 🖉 🔍 🤤 Select language.			
I ERIN S	elect Module Type				
E OK	[				
Energy Storage	Catalog Module Discovery Favor	tes			
E UO Path:					
ncy ve	Enter Search Text for Module T	Clear Filters			Show Filters ¥
ntroller Organizer 🗸 🗸 🗙					
Controller Sample_Application	Catalog Number	Description	Vendor	Category	
- Controller Tags	E121	Rowserve 208Vac/240Vac/325Vdc	Reliance Electric	DPI to EtherNet/IP	
Controller Fault Handler	E141	Rowserve 400Vac/480Vac/650Vdc	Reliance Electric	DPI to EtherNet/IP	
- Power-Up Handler	E151	Rowserve 600Vac/810Vdc	Reliance Electric	DPI to EtherNet/IP	
- 🖼 Tasks	CNB	FLOWSERVE IPS - 208/240V	Allen-Bradley	DPI to EtherNet/IP	
E- 2 MainTask	CNB	FLOWSERVE IPS - 400/480V			
B-La MainProgram	CNB	FLOWSERVE IPS - 600V Select	t Generic F	thernet module	
Unscheduled Programs	SMC-50-E	Fully Solid-State Smart Motor Co			
- Motion Groups	SMC-50-ER	Fully Solid-State Smart Motor Control	_		_
- Construction of the second s	FX5-ENET/1P	FX5-ENET/IP	caubishi Electri	Communications Adapter	
Add-On Instructions	ETHERNET-MODULE	Genetic Ethernet Module	Alen-Bradley	Communication	
- Data Types	ETHERNET-BRIDGE	Generic EtherNet/IP CIP Bridge	Alien-Bradley	Communication	
-Let User-Defined	1753-L28888k GPUC 1600	GuardPLC 1600	Allen-bradley	Programmable Logic Controller	
- Cent Strings	1753-L32888x-8A GPLC	GuardPLC 1800	Allen-bradley	Programmable Logic Controller	
Add-On-Defined	6V21/6VG1/6VN1_	GV5000 208V3c/240V3c/325V0c	Helance Electric	DPI to Etherwet/IP	
E Credefined	DV41/DV31/DVR1	CV5000 400vac/460vac/650vac	Pleance Electric	DP110 Etherwet/IP	
Module-Define	Mag 200 Cater	D Deceder	Cases Cases	Communication	
Trends Right Click and S	elect Map 500 Same	ID Reader	Cognex Corporat	Communication	12
Logical Mo	Man 8000 Series	ID Beader	Connex Comoral	Communication	
New Module	PENETX	InView EtherNet/IP	Alen-Bradley	Human-Machine Interface	
⊟	2097-V32PR5	Kinetix 300, 10A, 240V, Integrated Filter	Alen-Bradley	Drive	
- 31 [0] 1756-L71 St phication	2097-V33PR6	Kinetix 300, 12A, 240V, No Filter	Allen-Bradley	Drive	
⊟ [1] 1756-EN2TR control_Station	2097-V31PR0	Kinetix 300, 2A, 120/240V, No Filter	Allen-Bradley	Drive	
- as Ethernet	2097-V32PR0	Kinetix 300, 2A, 240V, Integrated Filter	Allen-Bradley	Drive	
	2097-V33PR1	Kinetix 300, 2A, 240V, No Filter	Allen-Bradley	Drive	
	2097-V34PR3	Kinetix 300, 2A, 480V, No Filter	Allen-Bradley	Drive	
	2097-V31PR2	Kinetix 300, 4A, 120/240V, No Filter	Allen-Bradley	Drive	
	2097-V32PR2	Kinetix 300, 4A, 240V, Integrated Filter	Allen-Bradley	Drive	
	2097-V33PR3	Kinetix 300, 4A, 240V, No Filter	Allen-Bradley	Drive	
				Clic	k Croato

2. Enter parameters of Generic Ethernet Module

General Cor	nnection	Module Info						
Type:	ETHER	NET-MODULI	E Generic Ether	net Module				
Vendor: Parent:	Allen-Bra Control	adley Station	Enter Nodu	le Name				
Na <u>m</u> e:	Station	I_Generic_ED	os	Connection Para	Assembly	Size:	Set Input size	]
Description.			~	Input:	110	23	(16-bit)	
_		Set	TP address	O <u>u</u> tput:	100	6	Set Outpu	ıt siz
Comm Format Address / H	: Data - I lost Name			<u>C</u> onfiguration:	1	0	(8-bit)	
IP <u>A</u> ddre	ess: 1	92 . 168 .	1.1	<u>S</u> tatus Input:			_	
⊚ <u>H</u> ost Na	me:		Cli	Status Output:				

Note: Input size and Output size can be set as per IO configuration of Modular IO station. Refer "Section- 3 (6)".

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# Commented [V8]: Provide note for refrence of section 3



3. Download configuration to controller from Communication  $\rightarrow$  Download.



# 5.3 DLR Configuration Setting of Studio 5000 Logix Designer

Follow the steps below to configure Allen Bradley EtherNet/IP Communication Module (1756-EN2TR) as DLR Ring Supervisor mode as explained below.

1. Right-Click on EtherNet/IP Communication module i.e. 1756-EN2TR of Project Organiser and select properties

Refer "ENET-AP005F-EN-P-October 2014" document for more information about Device Level Ring (DLR) network



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## 2. Select "Network" tab of Module properties

ieneral   Connection   HSNe	tWorx   Module Info   Internet Protocol   Port Configuration   Network   Time Sync
Network Topology:	Ring Advanced
Network Status:	Normal
Active Ring Supervisor: Active Supervisor Precedence:	0 Select "Enable Supervisor Mode" for DLR configuration
🔽 Enable Supervisor Mod	de +
Ring Faults Detected:	1 Reset Counter 🔶
Supervisor Status:	Active
Last Active Node on Port	2: 192.168.1.6 Verify Fault Location
	Refresh communication.
	Select OK

3. Set Ring parameters i.e. Beacon Interval, Beacon Timeout of Ring network from Advanced option of Network tab. Recommended to keep Ring parameters as Default.

Network Topology:	Ring				
Active Ring Supervisor:	192.168.1.3	1			
Active Supervisor Precedence:	250				
Supervisor Mode:	Enabled				
Supervisor Precedence:	250				
Supervisor Status:	Active				
Ring Parameters					
Beacon Interval:	100000	μs			
Beacon Timeout:	400000	μs			
Ring Protocol VLAN ID:	10				
				Set	•
			_	 )	_

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# 6 Monitor Status, IO data and Diagnostics

# 6.1 Monitor Network Status

Ethernet I/P network status for scanner and adapter stations can be monitored using

- LED indications on Header module
- Studio 5000 Logix Designer Application
- Modular IO configurator Tool

## Using LED indications on Header module

Communication between Scanner and M-EIP-H is confirmed by LED indications on Header module. Refer LED label on Header module as below.



Sr. No	LED	Color	Status	Description
1	PW	Green	ON	System power to Header module is ON
2	MS	Green	ON	Device operational
3	NS	Green	ON	Device on-line and has at least one CIP connection is established
4	I/O PW	Green	ON	Field power to Header module is ON
5	I/O	Green	ON	Header module is powered ON and communicating with IO module and no error is present.

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### Using Studio 5000 Logix Designer Application

Follow the steps below to monitor network status as explained below.

- 1. Go Online, from Communication  $\rightarrow$  Go Online
- Verify "Warning Signal" on the added module in the I/O Controller Organizer tree of I/O Configuration. During Fault mode, IO configuration tree changes its colour to "Yellow Exclamatory mark "as below.



 Fault information is displayed on "Connection" window of EtherNet/IP Communication Module (1756-EN2TR) as below. Refer Rockwell Automation Publication 1756-PM014L-EN-P-November 2018 for more details.

Name	Requested Packet Interval (RPI) (ms)	Input Type	Input Trigger	r
xclusive Owner	5.0 🗢 2.0 - 9999.9	Unicast 🗨	Cyclic	-
Inhibit Module				
] Inhibit Module	Moda			
Inhibit Module	Mode			
] Inhibit Module  Major Module fault error code Module Fault	Mode			
Inhibit Module Major Module fault error code Module Fault (Code 16#0204) Connection Request Error: Comm	Mode Action request lined out.			
Inhibit Module Major Module fault error code Module Fault (Code 16#0204) Connection Request Error: Connection	Mode ection request timed out.			

# Using Modular IO Configurator Tool



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Open configuration file and connect via USB port. Click on diagnostic function "Header Diagnostics"

, to monitor EtherNet/IP diagnostic information of connected Header module.

Modular IO station provides 2 Ethernet ports (ETH1 and ETH2; Layer 2 switch with DLR support). User can connect any one of the port of Modular IO station. Accordingly, diagnostics of the port can be monitored.

HEADER DIAGNOSTIC INFORMATION : [QQQ]

	Diagnostics	Value	Description
Slots 48-63	EtherNet/IP		
Interface (ETH1)	Communication D	Diagnostic	
Interface status			Ethernet interface status ( 0 : Link down, 1: Link up).
Interface speed		100	10MB or 100MB.
Interface (ETH2)			
Ethernet Link (ETH	1)		
Received byte cou	nt	6591008	Number of bytes received.
Received unicast fr	ames count	13564	Number of unicast frames received.
Received non unic	ast frames count	4649	Number of non-unicast frames received.
Sent byte count		6544459	Number of bytes transmitted.
Sent unicast frame	s count	13309	Number of unicast frames transmitted.
Sent non unicast fi	ames count	0	Number of non-unicast frames transmitted.
Large error count		0	Number of frames received with large frame error.
Align error count		0	Number of frames received with alignment error.
FCS error count		0	Number of frames received with CRC/FCS error.
Receive error coun	t	0	Number of frames with other receive errors.
Single collision cou	unt	0	Number of frames transmitted after single collision.
Multi collision cou	nt	0	Number of frames transmitted after multiple collisions.
Drop count		0	Number of frames dropped after excessive collisions.
Sent error count		0	Number of frames with other transmit errors.
Ethernet Link (ETH	2)		
CIP Diagnostics			
DLR			

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## 6.2 Monitor IO data

After communication between Communication module and M-EIP-H is established, Header module exchanges IO data with local IO modules are as follows.

Select option "Logic  $\rightarrow$  Monitor Tags / Edit Tags" from Menu Tool option to view tags of M-EIP-H as below.



The table below shows how header memory IX,IW,SB,QX and QW is mapped to Input memory and Output memory of Communication module .

	Input memory area				Output men	nory area
Module	Local Address	Tag Name		Module	Local Address	Tag Name
M 16D	IX0	MEI_DUT:I.Data[0]		M 16TE	QX0	MEI_DUT:O.Data[0]
W-16D	IX1	MEI_DUT:I.Data[1]		IVEIGIE	QX1	MEI_DUT:O.Data[1]
	114/0	MEI_DUT:I.Data[2]			014/0	MEI_DUT:O.Data[2]
MUADO	1000	MEI_DUT:I.Data[3]		M-DA2	QVVU	MEI_DUT:O.Data[3]
IVI-UAD2	1) A / A	MEI_DUT:I.Data[4]			0.1/1	MEI_DUT:O.Data[4]
	1001	MEI_DUT:I.Data[5]				MEI_DUT:O.Data[5]
	SB0	MEI_DUT:I.Data[6]				
	SB1	MEI_DUT:I.Data[7]				
	SB16	MEI_DUT:I.Data[22]				

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IO data can be monitored on individual Header module using Modular IO Configurator Tool

Following steps explain how to monitor IO data and diagnostics of a modular IO station in online mode,

- 1. Click on function T to connect to Header module. Icon changes to and Status bar is updated as ONLINE.
- Select Header module in Project Organiser window and click on tab "IO data" to monitor diagnostics (SB memory) of Header module.

Project	Edit	1 Cieta 1					
gest organiser	System	ID Data	Parameters	Help			
M M HP H (Dallac)	Charnel	Data Type	Local Address	Field Bus Value	Forced Value	- A-1	ual Value
[1] M-160_0	* Diagendir summary	WORD	58.0 - 58.1	0			c
[2] M-16TE_1	(a) Slot status						
[3] M-UAD2_2	* Slot status 0.7	BYTE	58.2	31			31
14) M-DA2,3	" Slot status 8.15	RVTE	58.3	0			0
	* Slot status 16.23	BY7E	58.4	0			0
	" Slot status 24.31	RVTE	58.5	0			0
	* Slot status 32.39	BY7E	58.6	0			0
	" Slot status 40.47	BYTE	S8 7	0			0
	" Slot status 48.55	8978	58.8	0			0
	* The sec 27 23	0.077	C9 8	0			
	Son Hand 30,03	8112					
	2010017.01	2112	~~				

 Select IO module in Project Organiser window and click on tab "IO data" to monitor IX of selected M-16D module.

Croaniser • #		Andrea IV			1000		
Yest Burlant		apann N	Constant of the local division of the local	Paral States	The p	Printing states	And a local division
M M-EP-H (Online)		Disite incert	Care ())e		THE REAL PROPERTY OF		
11 M-160 0		Digital input 00-07	EVTC.	DK D			
21 M-16TE_1		D1 00	ROOL	IX 0.0	Taise		False
[3] M-UAD2_2		DI DI	8001	2001	False		Faine
141 M-DA2_3		DI 02	BOOL	BX 0.2	False		False
		DI 03	BOOL	3K03	Tabe	*	False
	DI	DI 04	BOOL	DK0.4	False		False
		DI 05	BOOL	10.05	False		False
		DI 05	BOOL	IX 0.6	False		False
		DI 07	BOOL	3K0.7	False		False
	10	Digital input 10-17	BYTE	D 1	0		0
		DI 10	BOOL	IK 1.0	False		False
		DI 11	BOOL	R11	False		False
		DI 12	BOOL	DK 1.2	False		Faise
		DI 13	BOOL	B(13	False	•	False
		DI 14	BOOL	DCL4	False		False
		DI 15	BOOL	241.5	False	*	Faise
		DI 16	BOOL	DK1.6	False	100	False
		DI 17	BOOL	341.7	False		False

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 Select IO module in Project Organiser window and click on tab "IO data" to monitor QX of selected M-16TE module.

Project		Check		🕘 🔎 🚺 🧐 🖓 🔇 Diagnos	tics IO Map	
ect Organiser 🔹 🖡	System	Data	Parameters	Help		
Test_Project	Channel	Data Type	Local Address	Field Bus Value	Forced Value	Actual Value
[1] M-16D_0	* Digital output 00-07	BYTE	QX 0	0		0
[2] M-16TE_1	DO 00	BOOL	QX 0.0	False	No Force	* False
[3] M-UAD2_2	DO 01	BOOL	QX 0.1	False	No Force	* False
🙀 [4] M-DA2_3	DO 02	BOOL	QX 0.2	False	No Force	* False
	DO 03	BOOL	QX 0.3	False	No Force	* False
	DO 04	BOOL	QX 0.4	False	No Force	* False
	DO 05	BOOL	QX 0.5	False	No Force	* False
	DO 06	BOOL	QX 0.6	False	No Force	* False
	DO 07	BOOL	QX 0.7	False	No Force	* False
	* Digital output 10-17	BYTE	QX1	0		0
	DO 10	BOOL	QX 1.0	False	No Force	* False
	DO 11	BOOL	QX 1.1	False	No Force	* False
	DO 12	BOOL	QX 1.2	False	No Force	* False
	DO 13	BOOL	QX 1.3	False	No Force	* False
	DO 14	BOOL	QX 1.4	False	No Force	* False
	DO 15	BOOL	QX 1.5	False	No Force	* False
	DO 16	BOOL	QX 1.6	False	No Force	* False
	DO 17	BOOL	QX 1.7	False	No Force	* False

Note: Follow the above procedure to monitor IO data of M-UAD (IW) and M-DA2 (QW).

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# 6.3 Monitor Diagnostics

Detailed diagnostics of Ethernet ports ETH1/ETH2 and each IO module in individual Modular IO station can be monitored locally as explained below.

- Click on function to connect to Header module. Icon changes to and Status bar is updated as ONLINE.
- 2. Click on diagnostic function "Header Diagnostics" 😳 for monitoring diagnostic information of connected Header module.

This pops up following window of "HEADER DIAGNOSTIC INFORMATION".

Identification     Version Info     Hardware     IP setting	Nagnostics	Value	Description	Expa
Identification     Version Info     Hardware     IP setting	liagnostics	Value	Description	
Identification     Version Info     Hardware     IP setting				
Version Info     Hardware     IP setting				
<ul> <li>Hardware</li> <li>IP setting</li> </ul>				
IP setting				
Memory size				
<ul> <li>Header scan time</li> </ul>				
Diagnostic Summary				
+ Slots 0-15				
<ul> <li>Slots 16-31</li> </ul>				
+ Slots 32-47				
+ Slots 48-63				
<ul> <li>Interface (ETH1)</li> </ul>				
<ul> <li>Interface (ETH2)</li> </ul>				
• Ethernet Link (ETH1)				
• Ethernet Link (ETH2)				
CIP Diagnostics				
DLR				

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Header diagnostics are categorized for easy monitoring. User can monitor individual parameter by expanding individual diagnostic.as shown below.

HEAL	DER DIAGNOSTIC INFORMATION : [QQQ	]	
	Diagnostics	Value	Description
ition 🦳	Siagnostic Summary		
nmary	No. of configured slots	5	No. of configured slots.
	No. of detected slots	5	No. of detected slots.
t wise	Status	0	Bitwise status of header module.
dules 🧹	slots 0-15		
	Detected	000000000011111	Bitwise module detection status.
*	Healthy	000000000011111	Bitwise module health status.
-	IO error	000000000000000000000000000000000000000	Bitwise status of module mismatch or absent.
*	COM error	000000000000000000000000000000000000000	Bitwise status of module COM error after power ON.
*	Fatal error	0000000000000000	Bitwise status of module fatal error.
•	Non-fatal error	000000000000000000000000000000000000000	Bitwise status of module non-fatal error.
nerNet/IP	Slots 16-31		
agnostic	• Slots 32-47		
	• Slots 48-63		
	Interface (ETH1)		
-	Interface status	1	Ethernet interface status ( 0 : Link down, 1: Link up).
-	Interface speed	100	10MB or 100MB.
	Interface (ETH2)		
	Ethernet Link (ETH1)		
<b>•</b>	Received byte count	137658	Number of bytes received.
-	Received unicast frames count	717	Number of unicast frames received.
-	Received non unicast frames count	49	Number of non-unicast frames received.
-	Sent byte count	2525360	Number of bytes transmitted.

3. Slot diagnostic information provides configured modules and present modules, hardware versions and firmware versions of present modules, slot level error code, etc.

Click on function "Slot diagnostics" 🍪 to monitor slot diagnostics.

This pops up following window of "SLOT DIAGNOSTIC INFORMATION".



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