

BusWorks[®] Series 9xxEN w/Ethernet/IP BusWorks[®] Series XT1xx2 w/Ethernet/IP 10/100MB Industrial Ethernet I/O Modules

Application Note – Ethernet/IP

Communicating with Acromag Series 9xxEN-60xx, XTxxx2-xxx and NTE2xxx-xxxx Ethernet/IP Modules from a Compact Logix PLC Device

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This document illustrates a procedure for configuring message commands to Acromag Busworks[®] Ethernet/IP modules using ladder logic programming software and a Compact Logix Programmable Controller. Acromag assumes no responsibility for any errors that may occur in this document, and makes no commitment to update, or keep this information current. Be sure to visit Acromag on the web at **www.acromag.com.**

COMMUNICATING WITH COMPACT LOGIX CONTROLLERS

This document illustrates a procedure for configuring message commands intended for Acromag Busworks[®] Series Ethernet/IP modules using ladder logic programming software and a Compact Logix Programmable Controller. It is assumed that the user has a working knowledge of ladder logic programming, the RSLogix5000 software, and the Compact Logix hardware.

Configuring I/O Connection in RSLogix 5000

Controller Sample_Program Controller Tags Controller Tags Controller Fault Handler Power-Up Handler MainTask MainTask MainTask MainProgram Unscheduled Programs Unscheduled Programs Controller Fault Handler Motion Groups Unscheduled Programs Strings Mule-Defined Module-Defined Module-Defined Module-Defined Module-Defined Module-Defined Module-Defined					
CompactBus Local		New Module Copy Paste Delete	Ctrl+X Ctrl+C Ctrl+V Del		
Status Module Fault		Cross Reference Properties	Ctrl+E	-	
Select Module Type					
Type: ETHERNET-MOD	ULE				
Туре	Desc	ription			
1757-FFPC/A	1757	Foundation Fiel	dbus Pr	ocess Controller	^
1769-L32E Ethernet Port	10/10	00 Mbps Ethern	et Port c	n CompactLogix5332E	
1769-L35E Ethernet Port	10/10	JO Mbps Ethern	et Port c	n CompactLogix5335E	
1788-EN2DN/A	1788	Ethernet to Dev	/iceNet	Linking Device Didag Turibad Dair Madia	
1788-ENBT/A	1788 TU/TUU Mbps Ethernet Bridge, Twisted-Pair Media 1788 10/100 Mbps Ethernet Bridge w/Enhanced Web Services				
1700-EWED/A	1766-EWEB/A 1786 10/100 Mbps Ethernet Bridge W/Ennanced Web Services 1794.6ENT/6 1794.10/100 Mbps Ethernet 6danter Twisted-Pair Media				
Drivelogiy5730 Ethernet	17 34 10710	107100 MDps E	et Port o	Auapter, i wisteu-nall Meula In Drivel ogiv5730	
File M	anti	otorsko si juli z i areni	Net/IP		

 From a new or existing project, right click on the Compact Logix Ethernet controller (shown as 1769-L32E in this example) and select New Module.

 In the Select Module Type box, select Ethernet-Module as shown in the example, and click [OK].

Generic Ethern

E Discussion CENED (E) (Ethernet /IP Panelview PowerFlex 700 Vector-21... PowerFlex 700 Vector Drive (208/240V) via 20-COMM-E PowerFlex 700 Vector-41... PowerFlex 700 Vector Drive (400/480V) via 20-COMM-E PowerFlex 700 Vector-61... PowerFlex 700 Vector Drive (600V) via 20-COMM-E

Analog 🔽 Digital 🔽 Communication 🔽 Motion 🔽 Controller

-

ΟK

☑ Other ☑ Specialty I/O

Cancel

ETHERNET-MODULE

Show Vendor: All

Select All

Clear All

Help

Module Properties - LocalENB (ETHERNET-	MODULE 1.1)
Type: ETHERNET-MODULE Generic Ethern Vendor: Allen-Bradley Parent: LocalENB Name:	et Module
Description:	Assembly Instance: Size: Input: 125 (32-bit)
Comm Eormat: Data - DINT Address / Host Name	Configuration: 0 (8-bit) Status Input:
C Host Name:	Status Output:
Cancel < Bac	k Next > Finish >> Help

Module Prop	erties - LocalENB (ET	HERNET-M	ODULE 1.1)			X
Type: Vendor: Parent: Na <u>m</u> e:	ETHERNET-MODULE Gen Allen-Bradley LocalENB ACR0964EN	eric Ethernet	Module Connection Para	ameters		Size varies based on Module. See Table Below:
Descri <u>p</u> tion:	Acromag 964EN-6012			Assembly Instance:	Size:	
			Input: O <u>u</u> tput:	12	3	т (16-ы) т (16-ы)
Comm <u>F</u> ormat Address / F	: Data - INT		<u>C</u> onfiguration:	128	0	🕂 (8-bit)
	ess: 128 . 1 . 1	. 101	<u>S</u> tatus Input:			
C Host Na	ime:		Status Output:			
	Cancel	< Back	Next >	Finish	>>>	Help

3. The **Module Properties** window should automatically open. Under the **Name** box, type in the name of the module. In the example below left, the 964EN module is used.

> The type of **Communication Format** used by all modules is **Data – INT.**

Note: Once the [Finish] button is pressed, the Comm format of the module cannot be changed.

Under the Address / Host Name box, the IP Address must be selected and the IP Address of the module typed in. In the example at left, the IP Address of the module is 128.1.1.101, but this will vary depending on the address of your Compact Logix controller. See chart on next page for Comm Format and Connection Parameters.

	Comm	Inp Assy	Input	Outp Assy	Output
Module Type	Format	Instance	Size	Instance	Size
981/2/3EN-6012	Data-INT	100	1	112	1
961/2EN-6006	Data-INT	100	6	112	3
963/4EN-6012	Data-INT	100	12	112	3
965EN-6004	Data-INT	100	4	112	5
965EN-6006	Data-INT	100	6	112	5
966EN-6004	Data-INT	100	4	112	3
966EN-6006	Data-INT	100	6	112	3
972/3EN-6004	Data-INT	100	1	112	7
972/3EN-6006	Data-INT	100	1	112	9
951/2EN-6012	Data-INT	100	5	112	9
XT11x2	Data-INT	101	5	100	4
XT1212/XT1222	Input	101	9	100	NA
	Data-INT-Run/Program				
XT1232/XT1242	Input	101	17	100	NA
	Data-INT-Run/Program				
XT1532	Data-INT	101	2	100	5
XT1542	Data-INT	101	2	100	9
NTE2xxx	Data-INT	101	164	100	68

Use the Chart at left or the Assembly Object in the manual to fill out the **Comm Format** and **Connection Parameters**.

*Configuration Assemble Instance = 128 with Size = 0 for all modules.

When all data is entered and correct, click on the [Finish] button

Note: If you have frequent communication errors or dropouts, consult the BusWorks Manual for the Input Conversion Rate or Output Update Rate, and adjust your PLC RPI rate as required. Some units, particularly Temperature Modules, take up to 480ms to process the inputs and periodically, another 240ms for Cold Junction Compensation before RPI's can be accommodated. In this case, an RPI of 1,000ms is recommended to solve the problem.

I/O Commands Using the Assembly Object

🛿 RSLogix 5000 - Sample_Progra	m [1769-L32E]*			
Eile Edit View Search Logic Communicatio	ns <u>T</u> ools <u>W</u> indow Help			
	- £\$&&		Q	
	Path: AB_ETHIP-1\128.1.1.75\Backpla	ine\0 🔻	1 &	
Program III Program Mode No Forces Controller OK Battery OK I/O OK	Favorites Bit Timer/Counter	I)(L)- (Input/Output 🔏 Corr	Ipare	
E Contoller Sample - Cram	Controller Tags - San	nple_Program	n(controlle	r) 💶 🗆
Controller Tags	Scope: Sample_Program(co V Show	r Isnow All	Sort: Tag Na	ame 💌
Controller Endender	Tag Name 🛆	Value 🗧 I	Force Mask 🗧 🗧	Style
Power-Up Handler	+ ACRO964EN:C	{}	{}	
🖻 🕾 Tasks	- ACRO964EN:I	{}	{}	
🖻 🤕 MainTask	ACR0964EN:I.Data	{}	{}	Decimal
🗄 🛶 MainProgram	+ ACR0964EN:I.Data[0]	19624		Decimal
Unscheduled Programs	+ ACR0964EN:I.Data[1]	19642		Decimal
E-G Motion Groups	+ ACR0964EN:1.Data[2]	19626		Decimal
Ungrouped Axes	+ ACR0964EN:I.Data[3]	20001		Decimal
- Contra Turana	+ ACR0964EN:I.Data[4]	20012		Decimal
Liber Defined	+ ACR0964EN:I.Data[5]	19642		Decimal
Stringe	+ ACR0964EN:I.Data[6]	19627		Decimal
Prodefined	+ ACB0964EN;I.Data[7]	19626		Decimal
	Monitor Tags Edit Tag	js /]

_ - X 🛿 RSLogix 5000 - Sample_Program [1769-L32E]* Eile Edit View Search Logic Communications Tools Window Help 🗎 🛋 🏉 👗 📾 🖻 🖂 🗌 🖸 💰 🔈 📴 🔽 🔍 🖸 Path: AB_ETHIP-1\128.1.1.75\Backplane\0 - * Run 🚺 📕 Run Mode Ś. Controller OK • No Forces 🔒 🗖 і/о ок No Edits ✓ ► Favorites A Bit A T X ٥ 🛿 Controller Tags - Sample_Program(controller) 🗖 🗖 -😂 Controller Sample_Program Scope: Sample_Program(co 💌 Show All ▼ Soft Tag Name -🖉 Controller Tags Tag Name Force Mask ♦ Style Controller Fault Handler △ Value + ACR0964EN:C 🗀 Power-Up Handler 😂 Tasks - ACBO964EN1 {...} {...} 🖶 🤯 MainTask 🗄 🛱 MainProgram + ACR0964EN:I.Data {...} {...} Decimal ACR0964EN:0 {...} {...} Decimal Unscheduled Programs - ACR0964EN:0.Data les Motion Groups ▶ + ACR0964EN:0.Data[0] 24106 Decimal 🗀 Ungrouped Axes + ACR0964EN:0.Data[1] Decimal 🗀 Trends + ACR0964EN:0.Data[2] Decimal 🖯 Data Types 🖃 🙀 User-Defined 🕀 🙀 Strings 🗄 🙀 Predefined ✓ Monitor Tags / Edit Tags / 🗄 🛄 Module-Defined 🔄 I/O Configuration

- 1. Download the project to the Compact Logix Controller.
- Double-click on Controller Tags. On the bottom of the Controller Tags window, click on the tab labeled Monitor Tags.

- To read the Discrete and Analog Input Data (where applicable), expand the ACRO9xx:I tag, and then the ACRO9xx:I.data tag. The input data will be continuously updated.
- To write to the Discrete and Analog output data, (where applicable) expand the ACRO9xx:O tag, and then the ACRO9xxO.data tag. Enter the data value in the corresponding data value box. When the data is entered, turn the CPU key to Run Mode.

Note: When the CPU is in run mode, Discrete/Analog Output Data is being continuously written to the module.

Configuring Explicit Message Commands (900EN Only, Not Applicable to XT/NT)

🕷 RSLogix 5000 - SAMPLE [1769-L32E]*		
Eile Edit View Search Logic Communications Tools	Window Help	
	- 388 • 29 00	
	Path: AB_ETHIP-1\128.1.1.75\Backplane\0 🖌 😹	
Offline B RUN No Forces C BAT No Edite BAT	H Heil CriP LTH MEG EGU MEG LEG GRT Image: Second	
	Controller Tags - SAMPLE(controller)	
Controller SAMPLE	Scope: SAMPLE(controller) V Show Show All V Sott	Tag Name
Controller Fault Landler	B Tas Name	
Power-Up Handler		
🖻 🔄 Tasks		AD:ETHERNET
E G MainTask		ABIE I HERNET
H 🛶 MainProgram		AB:ETHERNET
Unscheduled Programs	+-ACHU972EN:I	AB:ETHERNET
		AB:ETHERNET
Trends	+ ACR0983EN:C	AB:ETHERNET
🖃 🔄 Data Types	+-ACR0983EN:I	AB:ETHERNET
- 🙀 User-Defined	+ ACR0983EN:0	AB:ETHERNET
🗄 🛱 Strings	► T-READ_CONTROL	MESSAGE
🗄 🛄 Predefined		INT
⊞- under Befined		MESSAGE
E	TH-WRITE VALUE	INT
ETHERNET_MODULE ACROSSEN	*	
ETHERNET-MODULE ACRO963EN		-
ETHERNET-MODULE ACRO972EN	Monitor ags ↓ Edit Tags ↓	► //

 Double-click on Controller Tags in the Controller Organizer box. At the bottom of the Control Tags window, select the Edit Tags tab.

👪 RSLogix 5000 - SAMPLE [1769-L32E]*		- 7 🛛
<u>File Edit View Search Logic Communications Tools</u>	Window Help	
	- <u>KKK F</u> <u>P</u>	
	Path: AB_ETHIP-1\128.1.1.75\Backplane\0 🚽 🛣	
Offline - RUN No Forces CK No Edits - I/O	Favorites CHP LIM ME0 EGU NE0 LES GRT Favorites CHI Timer/Counter Input/Output Compare	
(<u> </u>	Controller Tags - SAMPLE(controller)	
Controller SAMPLE	Scope: SAMPLE(controller) - Show: Show All - Sort:	Tag Name 💌
Controller Fault Handler	P Tag Name △ Alias For Base Tag	Туре
E - Tasks	+ ACR0964EN:I	AB:ETHERNET
📄 🤤 MainTask	+ ACR0964EN:0	AB:ETHERNET
🗄 🕞 MainProgram	ACR0972EN:C	AB:ETHERNET
Unscheduled Programs	+ ACR0972EN:I	AB:ETHERNET
E G Motion Groups	+ ACR0972EN:0	AB:ETHERNET
Ungrouped Axes	+ ACRO983EN:C	AB:ETHERNET
Parts Trends		AB:ETHERNET
Liser-Defined	+ ACROSSERVO	AD STUSPAST
+ R Strings	HE-BEAD CONTROL	MESSAGE
🕀 🙀 Predefined		INI
🛨 🙀 Module-Defined		MESSAGE
🖻 🔄 I/O Configuration		INT
[1] 1769-L32E Ethernet Port LocalENB	* 	
ETHERNET-MODULE ACRO983EN		
ETHERNET-MODULE ACRO964EN	✓ ► \ Monitor Tags \ Edit Tags /	

2. In an empty Tag Name box, add two names for either a read or a write.

> For **Type**, select one of the tag names to be a **Message** (the controller), and the other set as an **Int** (data values). In the given example, there are four tags. Two are for module reads, and the other two are for writes.

To enter data for the write tag, click on the **Monitor Tags** tab, and click on the desired data box under the column **Value**.

Configuring Explicit Message Commands (900EN Only)



Configuration* Communication Tag Message Lype: CIP Generic Service Get Attribute Single Source Length: Source Length: Bestination READ_VALUE Bestination Readby Tag Instance: 1 Attribute: 1 (Hex) Destination READ_VALUE Image: Image:	Message Configuration - READ_CON	NTROL 🔀
Message Lype: CIP Generic Service Get Attribute Single Source Element: Type: Source Length: (Bytes) Service (Hex) Class: F6 (Hex) Ocde: (Hex) Class: F6 (Hex) Destination READ_VALUE Instance: 1 Attribute: (Hex) Destination READ_value Image: Code: Instance: 1 Attribute: 1 (Hex) New Tag Enable Enable Waiting Start Done Done Length: 0 Error Code: Extended Error Code: Timed Out * Error Path: Error Text: Timed Out *	Configuration [*] Communication Tag	
Service Get Attribute Single Source Element: Image: Source Length: Image: Bytes Service e (Hex) Class: F6 (Hex) Destination READ_VALUE Image: Betweet Instance: 1 Attribute: 1 (Hex) Destination READ_VALUE Image: Betweet Instance: 1 Attribute: 1 (Hex) New Tag Enable Enable Waiting Start Done Done Length: 0 Error Code: Extended Error Code: Timed Out Error Path: Error Text: Image: Betweet Image: Betweet	Message <u>Type:</u> CIP Generic	•
 Enable Enable Waiting Start Done Done Length: 0 Error Code: Timed Out Error Path: Error Text: 	Service Type: Get Attribute Single Source Service e (Hex) Class: F6 (Hex) Destinal Instance: 1 Attribute: 1 (Hex)	Element:
Error Path: Error Text:	Enable Enable Waiting Start Don Error Code: Extended Error Code:	e Done Length: 0 □ Timed Out ❤
OK Cancel Apply Help	Error Path: Error Text: OK Car	ncel Apply Help

- In the Controller Organizer box, expand the MainTask and MainProgram folders. Double-click MainRoutine.
- To add a MSG command, click on the Input/Output tab on the Language Element toolbar, and click MSG.
- In the MSG box, click on the Message Control box and select the Message Tag. In this example, the Read_Control tag was selected. The Tag chosen for a Message Control must be a Message Datatype.
- 6. Click the " ... " button to the right of **Message Control**.
- 7. In the Message Configuration box, set the Message Type to CIP Generic. The Service Type can be set to either Set Attribute Single for a write, or Get Attribute Single for a read. The example shown is setup to read Object/Class F6, Instance 1 & Attribute 1.

The **Destination** box is the data tag where data read from the module will be stored. In the example, tag READ_VALUE was chosen.

Note: The locations for the attributes are found in the User's Manual under the Ethernet/IP section.

Configuring Explicit Message Commands (900EN Only)

Message Configuration - WRIT	E_CONTROL
Configuration [*] Communication Tag	
Message <u>Type:</u> CIP Generic	<u> </u>
Service Set Attribute Single	Source Element: WRITE_VALUE
Service 10 (Hex) <u>C</u> lass: 80 (Hex) Code: 1 (Hex) <u>Instance</u> (Hex)	Source Length: 2 (Bytes) Destination Vew Tag
🔘 Enable 🔘 Enable Waiting 🕥 Start	Done Done Length: 0
Error Code: Extended Error Code: Error Path: Error Text:	Γ Timed Out 🕿
OK.	Cancel <u>A</u> pply Help

Message Configuration - READ_CONTROL
Configuration Communication Tag
Path: ACR0964EN
Communication Method © CIP © DH+ Channel: © CIP With Source Link: Source ID Source Link:
Connected Cache Connections
Enable Enable Waiting Start Done Done Length: 0
Error Code: Extended Error Code: Timed Out Error Path: Error Text:
OK Cancel Apply Help

8. For an attribute write, the Service Type must be changed to Set Attribute Single. The Class, Instance, and Attribute are located in the User's manual. The Source Element is a data tag that will contain the value(s) to be written to the attribute. The Source Length is the number of Bytes to be sent to the attribute. This information is found in the User's manual under the Data Type column.

> **NOTE:** To avoid communication errors for multiple Set/Get commands, validate the previous MSG command before sending the next command.

 In the Message Configuration box, click the Communication tab, click Browse, and select the module to send the message. Click OK to save changes and close the box.

Configuring Explicit Message Commands (900EN Only)...

This Step For Attribute Writes Only

8 RSLogix 5000 - Sample_Program [1769-L32E]*

Eile Edit View Search Logic Communications Tools Window Help



10. (Attribute Writes Only): To write to a module, in the Controller
Organization box, right click on the module and click on properties. In the Module Properties window, click on the Connection tab and check the Inhibit Module box. Click [OK] to save changes.

Note: When the module is inhibited, I/O connection to the assembly object is locked.

11. Download the program to the Compact Logix Controller and switch to run.

- 7×



Notes:

The following table shows the revision history for this document:

Release Date	Version	EGR/DOC	Description of Revision		
09-DEC-2004	А	RH/KLK	Initial Acromag release		
	•				
	•				
	•				
28-AUG-2014	F	RH/ARP	Add XT15x models to parameter chart		
19 APR 2021	G	HWW/AMM	Add note regarding communication errors or dropouts (Pg. 5).		
14-NOV-2022	Н	BW/BC	Add NT Series & Restrict Explicit Messaging to 900EN Only.		