

EtherNet/IP Network Configuration

Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example







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Cat No. QSG_FZM1_ROCKWELLPLC_EIP



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Overview

This document will allow a user to setup an EtherNet/IP Tag Data Link between an Omron FZ3 Vision System and a Rockwell ControlLogix 5561 Controller. This tag Data Link will consist of 20 Bytes (Command Area) from the Rockwell Controller to Omron FZ3 and 48 Bytes (Response Area) from the Omron FZ3 to Rockwell Controller.

Note: The setup for a Rockwell CompactLogix would be identical.

1-1 Hardware and Network Configuration

1-1-1 Network Physical Setup



Phoenix Ethernet Switch



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1-1-2 Communication Processing Flow (EtherNet/IP)

Send area (Command area)

Communication direction Target -> Originator (FZ3) Data size 20 bytes

Receiving area (Response area/Data Output area)

Communication direction Originator (FZ3) -> Target Data size 48 bytes (Response area + Data Output area)





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1-2 FZ3 EIP Network Settings Configuration

1-2-1 Command Area from AB to FZ3



1-2-2 Response Area from FZ3 to AB

Respons	Response area																
Master ← S	lave (F	Z3)															
Response are	ea	Bit															
top channel	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Name
+0												RUN	OR		BUSY	FLG	Control output
+1																GATE	(2CH)
+2 +3 CMD-CODE													Command code (2CH)				
+4 +5 RES-CODE															Response code (2CH)		
+6 +7 RES-DATA				Response data (2CH)													
Signal	Si	ignal name Function															
CMD-FLG	Comm bit	and c	ompl	etion	Turns ON when command execution is complete.												
GATE	Data o comple	utput etion I	oit		Turns ON when data output is complete.												
BUSY	Comm in prog	and e ress l	xecu bit	tion	Turns ON when command execution is in progress.												
OR	OR Overall judgement Units ON when the overall judgement result is NG. (The OR signal is output when the checkbox for [Output] is se ADJUST window.)					selected in the											
RUN	RUN w	indov	v		Turns ON when the controller is set to the RUN window.												
CMD-CODE	Comm	and c	ode		Returns the executed command code.												
RES-CODE	Respo	nse c	ode		Sto	Stores the response from the executed command.											
RES-DATA	Respo	nse d	ata		Sto	Stores the response data from the executed command.											

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1-2-3 Data Area FZ3 to AB

Data area	Data area																
Master ← Slav	Master ← Slave (FZ3)																
Output area	Bit																
top channel	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Name
+0																	
+1	DAI	A0															Output data 0
+2																	
+3	DAI	DATA1							Output data 1								
+4																	
+5	DAT	DATA2							Output data 2								
+6																	
+7	DAI	A3															Output data 3
+8																	
+9	DAI	A4															Output data 4
+10																	
+11	DAT	A5															Output data 5
+12																	
+13	DAT	DATA6						Output data 6									
+14																	
+15	DAT	A7															Output data 7

1-2-4 FZ3 Controller Startup Settings

Communications protocol for Ethernet/IP is configured in the Startup settings menu. Settings will be applied after the data has been saved and the controller rebooted.

🔜 FZ-	Main								
Scene	View	Measure	Data	System	Tool	He	lp		
			А	Came Comm Contr Scree	ra hunicat roller :n capti	ion ure	•	0.Sc Date-time setting Language setting Eap control setting	ene Group 0 27.Scene 27 utput OFF Freeze
								Startup setting Select RUN mode RUN mode view setting Create shortcut Encoder trigger setting Password setting	ł
								System initialization System restart	



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1-2-5 FZ3 Communication Startup Settings

Select the Communications Tab and choose the options shown below.

SI	artup setting					
	Basic	Communic	ation	Operation m	node	
	Communication r	nodule selec	τ			
	Serial(Ethernet)		Norma	al(UDP)		-
	Serial(RS-232C)	(422)	Norma	al		-
	Parallel		Standa	ard Parallel I/O		-
	Fieldbus		EtherN	let/IP		-
			<u> </u>			
					ок	Cancel

Click the <u>OK</u> button to accept.



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1-2-6 FZ3 EtherNet Address Settings

After restarting, the communications menu will display the options for Ethernet settings.

🔜 FZ-	Main								
Scene	View	Measure	Data	System	Tool	Other	r		
	Δ		Camera 🕨 🕨				0.Scene Group 0		
			A	Comm	Communication Controller			Standard Parallel I/O	31.Scene 31
				Contr				RS-232C/422:Normal	output OFF
			Scree				Ethernet:Normal(UDP)	Freeze	
					Screen capture 🕨			EtherNet/IP	110020

The Ethernet menu will provide the address settings.

Enter the IP Address, Subnet Mask, Default Gateway, and DNS Server to match your network. This example:

IP Address: 192.168.1.191 Subnet Mask: 255.255.255.0 Default Gateway & DNS Server: 192.168.1.1

Etherne	et							
Add	ress setting							
0	C Obtain an IP address automatically							
	Use the following IP addre	:88						
	IP address:	10	5	5	100			
	Subnet mask:	255	255	255	0			
	Default gateway:	10	5	5	110			
C	DNS server:	10	5	5	1			
Inp	ut/Output setting							
I	input mode :	Normal						
I	input form :	ASCII						
C)utput IP address :	0	0	0	0			
I	input/Output port No. :	9600						
H	Help			ок	Cancel			

Click the <u>OK</u> button to accept.



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1-2-7 FZ3 EtherNet/IP Address Settings

The EtherNet/IP menu will provide communications conditions.

EtherNet/IP	
Setting	1
Output control :	None
Output period [ms] :	10.0
Output time [ms] :	5.0
Timeout [s] :	10.0

Choose the appropriate Timing settings for your network and application. For this example program the default settings are OK.

Please refer to the Timing Chart (EtherNet/IP) from Section 7 of the <u>FZ3 User's Manual Z290</u> for for a detailed outline of I/O timing.



EtherNet/IP Network Configuration

Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example

1-3 Rockwell ControlLogix Processor Configuration.

1-3-1 Open Existing or Create a new Project

Open the RSLogix Programming Software using the current project that is in the PLC.

🗧 RSLogix 5000 - Logix in F23_EIP_Test.ACD [1756	L6118.11]*	_ # ×
Offline D. FRUN No Forces F DAT	Window Hep Image: Control Control Image: Controw Image: Control Contr	
Reduction 14	x x revorites (Add-On (Addens (A De (A Tear/Couter (A)))) MainProgram - MainRoutine*	
Controller Loga: Controller Loga: Controller Fault Handler Power-Up Handler MainProgram Program Tags MainProgram Program Tags Motion Groups Motion Groups Motion Groups Motion Groups Data Types Add-On Instructions Data Types Add-On Defined Strings Add-On Defined Strings Motion Configuration Trends Motion Configuration Trends Motion Configuration Trends Motion Configuration Trends Motion Configuration Trends Motion Configuration Trends Motion Configuration (1) TS6-ENCT Ethernet, Module (1) TS6-ENCT Ethernet, Module		
X Type Lackler Disgram (Main)	MainRoutine*	-



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1-3-2 Ethernet Module Settings

Right Click the 1756-EN2T Ethernet Module in the I/O Configuration section of the Project Workspace and Select Properties. Name the module "Ethernet Module". Enter the IP Address (192.168.1.195) and Set the correct Slot Number for the Ethernet Module.

RSLogix 5000 - Logix in F23_LIP_Test.ACD [1756 File Edit View Search Logic Communications Tools	-16110.11]*	_ 6 ×
Controler Logs	Polic Adjustment (1990) Polic Adjustment (1990)	×
Controller Tags Controller Fault Handler Power-Up Handler Power-Up Handler Power-Up Handler Power-Up Handler Notice Strategy Motion Groups Data Types Data Types Software Add-On Defined Predefined Pr	General Connection Module Into Internet Protocol Pot Configuration RSNetWork Type: 1756 EN2T 1756 10/100 Migs Elfvernet Bidge, Twisted Pair Media Drange Type. + Vendoc Alen-Bladley Elfvernet Address Parent Local Elfvernet Address Description:	7, MODULE C T, MODULE C T, MODULE C T, MODULE C 0 0 C 0 10 0 0 0
Construction Status Ortline Module Fault	Status: Offine Cancel Help	

Right Click on the 1756-ENBT/A Module and select "New Module".

Click the **OK** Button to accept



EtherNet/IP Network Configuration

Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example

1-3-3 Create New Generic Ethernet Module

Right Click the 1756-EN2T Ethernet Module in the I/O Configuration section of the Project Workspace and Select New Module.

Scroll down and Select "ETHERNET MODULE Generic Ethernet Module".

Office Enclose Enclose <th< th=""><th></th><th></th><th></th></th<>			
Controller Logis Controller Logis Controller Tags Controller Fault Handler Controller Fault Handler Controller Fault Handler Controller Fault Handler Controller Fault Handler Product Tags Controller Fault Handler Michael Data Types Controller Fault Handler Controller Fault Handler Controller Fault Handler Controller Fault Handler Controller Fault Handler Controller Tags Controller Tags Control	Select Module Module Description Vendor 1788 EWEBIA 1788 10(100 Mbps Ethernet Bridge w[Enhanced Web Serv. Alen-Bradey 1794-AENT 1791 10(100 Mbps Ethernet Adapter, Twisted-Fuir Media Alen-Bradey EtherBisT38 EtherNet 10(100 Mbps Ethernet Adapter, Twisted-Fuir Media Alen-Bradey EtherBisT48EX0000, Generic EtherNet/IP CIP Bridge Alen-Bradey Alen-Bradey Alen-Bradey EtherBisT48EX0000, Generic EtherNet/IP CIP Bridge Alen-Bradey Alen-Bradey Stratix 8000 26 Port Managed Switch Alen-Bradey Alen-Bradey Stratix 8000 18 Port Managed Switch Alen-Bradey Alen-Bradey Stratix 8000 19 Port Managed Switch Alen-Bradey Alen-Bradey Find Add Feronte Men-Bradey Bis Calepoy Bis Vendor Favorites	Change Type_+ 2168 1 195 + 100 00 100 100 100 100 100 100	
Cescription Status Office Module Fault P	Status: Offine OK Cars	et Vicoly Help	

Choose OK to accept.



EtherNet/IP Network Configuration

Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example

1-3-4 Configure Generic Ethernet Module

Double Left Click on the 1756-EN2T Ethernet Module in the I/O Configuration section of the Project Workspace.

This screen is for the configuration of the remote connection to the Omron FZ3.

Offline D. FRUN No Forces D. F DK No Edta Bat Finderdory Sta	Ale Children Control Cont	<u>@</u>
Controller Coge Controller Logix Controller Logix Controller Logix Controller Fault Handler Controller Informat Controller Fault Handler Controller Controller Fault Handler Controller Controller Fault Handler Controller Controler Controller Controller Controller Controller	Module Properties: Ethernet. Module (ETHERNET-MODULE 1.1) X General Connection Module Info Type: ETHERNET-MODULE Generic Ethernet Module Yendor: Allen-Bradley Parent: Ethernet, Module Name: [723]Node131 Connection Parameters Assembly Instance: Description: [623 Vision System Ethernet IP Instance: Size: Comm Format: [014a : 01911 Instance: Size: Address: 132 : 168 : 1 : 191 Output: [0 : 100 : 5 : 102 :	1jpe + T_MODULEO T_MODULE 195
Module Defined Tags	Status: Offine DK Cancel A:	teb

Enter "FZ3_Node 191" for the Name. Select Data-DINT for the Comm Format. Enter "192.168.1.191" for the IP Address. Enter "101" for the Input Instance. Note: This is the Produced Instance # of the FZ3. Enter the Size as 12 DINT (= 48 Bytes). Enter "100" for the Output Instance. Note: This is the Consumed Instance # of the FZ3. Enter the size as 5 DINT (= 20 Bytes). Enter "1" for the Configuration Instance with a size of "0".

Click the <u>OK</u> button to accept.



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Select Connection Tab to continue the Module Setup. Enter "10.0 ms" for the RPI (Requested Packet Interval) Check the "Use Unicast Connection over EthernetIP" Checkbox.



Click the <u>OK</u> button to accept. Click the <u>OK</u> button to complete the Module Setup.



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1-3-5 Communication Controller Tags Generated

The ControlLogix EtherNet/IP configuration is complete. Note: The Software has automatically generated Input, Output, and Configuration Tags.

FX3_Node191:C	Not Used
FX3_Node191:I	12 DINT Variables (48 Byte Input)
FX3_Node191:0	5 DINT Variables (48 Byte Output)





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Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example

1-3-6 Create Program Tags (Optional)

The ControlLogix Controller allows definition of tags with Alias to give the Controller tags user friendly tag names for programming.

Select TASKS, MAIN TASK, PROGRAM Tags, Edit Tags Enter a tag name and assign to the appropriate Controller Tag.

	Path: ABLETHEP.TVTS216811	Image: State of the state o	<u>.</u>	
orinder Gepeizer - 9 X El-S Controler Logis	Program Tags - MainProgram			
Controler Tags	Scope ManProgram Show	(pali tage	1 Sector Sector	T Y.
Power-Up Handler	Name	II Alas For	Base Tag	Data Te
E C Tasks	FZ3, Bury	FZ3_Node1911Data(0)1(C)	F23_Node1911Data[0]1(C)	BOOL
🗄 🐼 Manifask	±/FZ3_Command_Code	FZ3_Node191:0.Data[1][C]	FZ3_Node191:0.Diate(1)[C]	DINT
HanProgram	F23_Command_Complete	FZ3_Node1911.0 ata[0].0(C)	#23_Node191:LD-ata[0];0[C]	BOOL
Program Tags	F23_Command_Execute	FZ3_Node191:0.Data[0].0[C]	FZ3_Node191:0.Data[0].0[C]	BOOL
C Unscheduled Programs / Phases	FZ3_Data_Output_Complete	FZ3_Node1911.Data(0),16(C)	FZ3_Node1911.Data[0].16(C)	BOOL
🖹 🔠 Motion Groups	FZ3_Data_Request	FZ3_Node191:0.Data(0].16(C)	FZ3_Node191:0.D-MA(0):16(C)	BOOL
- Cingrouped Axes	+ FZ3_0vtput_0ata0	FZ3_Node1911.D ata(4)(C)	FZ3_Node1911.Data[4][C]	DINT
- Add-On Instructions		FZ2_Node1911Data(5)[C)	FZ3_Node1911.D.#a(5)(C)	DINT
🖻 🚭 Data Types	+ F23_0utput_Data2	FZ3_Node1911.D ata(6)[C)	FZ3_Node1911.Data(6)(C)	DINT
I User-Defined	± #23_0utput_0.sta3	F23_Node1911Data(7][C)	F23_Node1911.D.eta(7)[C)	DINT
Add On Defined	±+Z3_0utput_0sta4	FZ3_Node1911Data(8)[C)	FZ3_Node1911.0.ata(8)(C)	DINT
F Int Predefined	±FZ3_0ulpul_0ata5	F23_Node1911.Data(9)[C)	F23_Node1911Data(9)(C)	DINT
Module-Defined	±#Z3_0ulpul_0.sta5	FZ3_Node1911.Data(10)(C)	FZ3_Node1913.Data(10)(C)	DINT
- El Trends	±+Z3_0utput_Data7	FZ3_Node1911Data[11][C]	FZ3_Node1911Data[11][C]	DINT
🗄 🔁 1/0 Configuration	FZ3_Overal_Judgement	FZ3_Node191:1.D ata[0] 3(C)	FZ3_Node191:LData[0] 3(C)	BOOL
1756 Backplane, 1756-A7		FZ3_Node191:I.D ata(2)[C)	FZ3_Node1913.Data[2][C]	DINT
I I I I I I I So that Elhernet Module	FZ3_Response_Data	FZ3_Node1911.Data(3)[C)	FZ3_Node1511.Data(3)(C)	DINT
ETHERNET-MODULE FZ	I FZ3_Return_Command_Code	FZ3_Node1911.Data(1)(C)	FZ3_Node1911.Data(1)(C)	DINT
1756-EN2T Ethernet_M	FZ3_Flun_Window	FZ3_Node1911.Data(0).4(C)	FZ3_Node1511.Data[0].4(C)	BOOL
- 🖞 [2] 1756-IB16 DC_Input_Module	2			
[4] 1756-0081 Relay_Output_M+	14			50



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Omron FZ3 Vision System to Rockwell ControlLogix Controller Communication Example

1-3-7 Simple Single Measurement Program

RSLogin 5000 - Login in FZ3_EIP_TestACD [1:	56-161 (8.11)*=(Handrogram - Manifootine*)	
Real Hun Control of Co	Ale ETHP 1/152 168 1 159/28 as galered 5 Ale ETHP 1/152 1159/28 as galered 5 Ale ETHP 1/152 168 1	عالم المراجع ال معالم المراجع ال
Controller Logs	Image: State of the state o	Move sessurement command to the F23. Move Source 1640010_1010 Dest. F23_Connexid_Code =F23_Node191:0 Dest()- 105509 + F23_Connexid_Execute =F23_Node191:0 Dest()- 105509 + Complete Complete
	(Crist)	

1-3-8 Configuration and Programming Complete

Select "Communications" and "Download" to send this configuration to the PLC.

The configuration is complete. The Tag Data Link should now be operational.

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