

Technical Note

Rockwell Automation ControlLogix PLC Communications with 4B Watchdog Super Elite via a ProSoft Technology PLX31-EIP-MBTCP



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ProSoft Technology

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Configuring one or more Watchdog Super Elites to communicate with a Rockwell Automation ControlLogix PLC through a ProSoft Technology PLX31-EIP-MBTCP gateway

Summary:

This example will guide the user through connecting a Rockwell ControlLogix PLC to communicate with Watchdog Super Elite monitoring systems by way of a ProSoft Technology EtherNet/IP to Modbus TCP gateway.

Equipment Used:

- Rockwell Automation
 - Logix 5571 ControlLogix Processor
 - 1756-EN3TR ControlLogix Ethernet Bridge
 - $\circ \quad Studio \ 5000 \ \ Control Logix \ Configuration \ Software$
- 4B Components
 - WDC4V46C (2) Watchdog Super Elite Monitoring System
- ProSoft Technology
 - PLX31-EIP-MBTCP EtherNet/IP to Modbus TCP gateway
 - ProSoft Configuration Builder ProSoft Configuration Software



Procedure:

Set the IP address on the WDC4V46C Devices

Refer to the 4B documentation to set the IP addresses of the WDC4V46C.

http://www.go4b.com/watchdog

- 1) Open the ProSoft Configuration Builder (PCB) .ppf project file attached.
 - a. If you don't have a copy of PCB you can download a free copy by visiting <u>www.ProSoft-</u> <u>Technology.com</u>

The sample configuration has been set up to communicate with 10 WDC4V46C monitoring systems. By default only one connection has been enabled.

S ProSoft Configuration.ppf - ProSoft Configuratio	n Builder	- Andread -	-	
File View Project Tools Help				
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⊡- 🛄 Default Project	Name	Status	Information	1
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PRO Series			No preview available.	
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		6	Open Cancel	
	•			÷.
Ready		_	New	Module CAP NUM SCRL

Image 1



2) Expand the PLX31-EIP-MBTCP line

The ProSoft gateway has ten Modbus TCP client connections. Each of these connections can be used to communicate with one WDC4V46C.

Then expand the MBTCP Client 0 line right click on MBTCP Client 0 Commands and select Configure from the shortcut menu

FroSoft Configuration.ppf - ProSoft Configuration	Builder			
File View Project Tools Help				
Default Project	Name	Ctatur	Information	
Default Location	PLX31-FIP-MRTCP	Configured	PLX31-FIP-MRTCP	
PLX31-EIP-MBTCP	PLX30	EIMT	1.00	
Comment	Comment	Values OK		E
EIP Class 3 Server	EIP Class 3 Server	Values OK		
EIP Class 1 Connection	EIP Class 3 Client 0	Values OK		
EIP Class 3 Client 0	EIP Class 3 Client 1	Values OK		
EIP Class 3 Client 1	EIP Class 3 UClient 0	Values OK		
EIP Class 3 UClient 0	MBCTP Servers	Values OK		
HILL MBTCP Servers	MBTCP Client 0	Values OK		
B MBTCP Client 0	MBTCP Client 1	Values OK		
B MBTCP Client 0	MBTCP Client 2	Values OK		
MBTCP Client 0 Com d-				
H MBTCP Client 1 Cop	ent 0 Com	ands]		
H MBTCP Client 2 Past	te			
H MBTCP Client 3 Con	figure able	Internal Address	Poll Interval Reg Count	Swap Code
🕀 💑 MBTCP Client 4	z yes	100	0 100	No Change
🗄 💑 MBTCP Client 5	3 Yes	200	0 100	No Change
🗄 💑 MBTCP Client 6	4 NO	300	0 100	No Change
H MBTCP Client 7	End			
HINTOP Client 8				
MBTCP Client 9				
CommonNet				
Ethernet Configuration				
	•			+
		PL>	X31-EIP-MBTCP (Verified IP: 192.168.22.10) CAP NUM SCRL

Image 2

The first three commands are enabled and the last command is disabled. The WDC4V46C has 208 Modbus Registers containing status data. The remaining 181 registers are reserved for future use.

3) In the Edit commands window, the Node IP Address fields will need to be changed for each command. These Node IP Addresses should match the IP address configured for the first WDC4V46C. Do this by selecting the command line, and then the edit row button located at the bottom of the window. Click Ok when done to save the changes.



	Edit -	MBTCP Clien	t 0 Commands	1.1			Inter (
		Enable	Internal Address	Poll Interval	Reg Count	Swap Code	1	Node IP Address	Serv Port	Slave Address	ModBus Function	MB Address in Device	Comment
	1	Yes	0	0	100	No Change	1	192.168.22.11	502	1	FC 4 - Read Input Registers(3K)	0	
-	2	Yes	100	0	100	No Change	1	192.168.22.11	502	1	FC 4 - Read Input Registers(3×)	100	
1	3	Yes	200	0	100	No Change	1	192.168.22.11	502	1	FC 4 - Read Input Registers(3K)	200	
1	4	No	300	0	100	No Change	1	192.168.22.11	502	1	FC 4 - Read Input Registers(3K)	300	
En	able V	alue Status - O	ĸ										
<u>s</u>	et to D)efaults	Add Row In	sert Row	Delete Row	Move Up	Mov	ve Dow <u>n</u>					
	Edit	Row C	opy Row	aste Row		OK	C	Cancel					



4) If using two Watchdogs, follow the same procedure for MBTCP Client 1. Again, the Node IP Address field should be changed to match the second WDC4V46C. <u>Additionally, all 4 commands will be disabled by default, so you will need to enable 1, 2, and 3 in the row edit.</u>

Edit -	- МВТСР С	lient 1 Commands											
	Enable	Internal Address	Poll Interval	Reg Count	Swap Code	Node IP Address	Serv Port	Slave Address	ModBus Function	MB A	ddress in Device	Comment	
√ 1	No	400	0	100	No Change	192.168.22.12	502	1	FC 4 · Read Input Registers(3X)	0			
√2	No	500	0	100	No Change	192.168.22.12	502	1	FC 4 · Read Input Registers(3X)	100			
√3	No	600	0	100	No Change	192.168.22.12	502	1	FC 4 · Read Input Registers(3K)	200			
√ 4	No	700	0	100	No Change	192.168.22.12	502	1	FC 4 - Read Input Registers(3X)	300			
						Ec	dit - Row 1						
							Enable Internal A Poll Interv Reg Count Swap Cod Node IP A Serv Port Slave Add	ddress al t ddress ress	Yes 400 0 100 No Change 192.168.22.12 502		Enable Yes Yes No Conditional		
Node IP	Address Va	alue Status - OK					ModBus Fu MB Addres Comment	inction in Device	FC 4 - Read Input Reg 0	isters(3)	Definition: 0, 1, 2 This field defi not the comm	nes whether or hand is to be	
Set to I	Defaults	Add Row	Insert Row	Delete Row	Move Up	Move Dow <u>n</u>					conditions.	under what	
<u>E</u> dit	Row	Copy Row	Paste Row		OK	Cancel					0 = The com and will not b	mand is disabled eexecuted in the	Ш
Image 4													

- 5) If you are using more than two Watchdogs, follow step 4 for enabling and assigning IP addresses to each additional Watchdog. Leave commands for unused Watchdogs disabled.
- 6) Once the command configuration is complete, right click on the Ethernet Configuration line to configure the IP settings of the ProSoft gateway



e View Broject Tools Help				
	·			
Default Project	Name	Status	Information	
B DI V31_EID_METCD	V WATTEP	All Tags Good		
E Comment				
EIP Class 3 Server				
🕀 💑 EIP Class 1 Connection				
EIP Class 3 Client 0				
B _ A EIP Class 3 Client 1				
AMBTCR Sequer				
HAN MBTCP Client 0				
B MBTCP Client 0				
MBTCP Client 0 Command				
B-MBTCP Client 1	[WATTCP]			
MBTCP Client 1	, netmask	255.	255.255.0	
H-& MBTCP Client 2	' gateway	: 192.	168.22.1	
🗄 💑 MBTCP Client 3				
B MBTCP Client 4				
🗈 💑 MBTCP Client 5				
BICP Client b				
H-& MBTCP Client 8				
HBTCP Client 9				
🗉 💑 CommonNet				
Ethernet Configuration				
Parte				
Configure				
Download				







7) Download the new configuration to the gateway by right clicking the PLX31-EIP-MBTCP line and selecting Download from PC to Device from the shortcut menu



🗊 ProSoft Configuration ppl - ProSoft Configuration Duilder								
File View Project Tools Help								
E Default Project	Name	Status	Information					
E a Default Location	PLX31-EIP-MBTCP	Configured	PLX31-EIP-MBTCP					
E PLX31-EIP-MBTG	ALU3A	EIMT	1.00					
E & Comment		Values OK						
EIP Class 3 Se Rename		Values OK						
B a EP Class 1 C Copy	1	Values OK						
Paste PD Class 3 Cl Paste	610	Values OK						
m S ED Class 3 C		Values OK						
The MRTCP Server		Values OK						
H MBTCP Clier		Values OK						
Henty Venty		Values OK						
B - B MBTCP Clier View Configuration								
Hand MBTCP Clier Write to Compact Fl	lash nation			<u>^</u>				
MBTCP Clier Export Configuration	in File(s) 200 27	2016 11:12						
MBTCP Clier Load Config File	1: Jun. 27	, 2016 11:17						
B-25 MBTCP Clier Add External File	tev: 1.02	. 004						
B A METCH Clier	50.10							
H-2 MBTCP Clier	to Device 00.0D.8D. trsion: 4.	00.00:80:A2:02:75 Frsion: 4.4.1 Build 1						
Device	e to PC							
Ethernet Con Diagnostics	Iguracion							
my	y_ip	: 192.16	68.22.10 55.255.0					
ga	ateway	192.16	68.22.1					
	Module configuration							
(M Mo Mo	Module] odule Type : PLX31-EIP- odule Name : PLX31-EIP-	МВТСР МВТСР						
J.	Module Comment] Put Comment Here							
[EIP Class 3 server] Server File Size : 100								
	[EFF Class L Connection] Input Data Address 0 Orbupt Data Address 248 Orbupt Data Address 2000 Output Size 248							
<u>(</u> e	EIP Class 1 Connection	2]						
In	nput Data Address	: 250	IT.					
Download to module				PLX31-EIP-MBTCP (Verified IP: 192.168.22.10) CAP NUM SCRL				

Image 7

8) Enter the IP address of the gateway in the Ethernet field then click the DOWNLOAD button

STEP 1: Select Communication Path:	
Select Connection Type: Ethernet	Browse Device(s)
Ethernet: 192 . 168 . 22 . 10	Use Default IP
CIPconnect:	CIP Path Edit
	RSWho
STEP 2: Transfer File(s):	
DOWNLOAD Abort	Test Connection
OK	Cancel

Image 8



The gateway is now communicating with the WDC4V46C.

Using the supplied Studio 5000 sample, the tags to read the status data from two WDC4V46C's have been created.

J Logix Designer - Watchdog_Sample [1756-L71 23.1	.2]* - [Controller Tags - Wat	chdog_Sample(controlle						
Eile Edit View Search Logic Communication	tions <u>T</u> ools <u>W</u> indow <u>H</u>	<u>H</u> elp						_ 8 ×
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Redundancy NO	Favorites A	dd-On 🔏 Alarms 🔏 Bit	🖌 Timer/Counter 🖌 I					
Controller Organizer 🔷 🕈 🗙	Scope: Notchdog_S	amı 👻 Show: All Tags	1		-	Y. Enter Nan	ne Filter	•
😑 🔄 Controller Watchdog_Sample	Name	2814 Alias For	Base Tag	Data Type Descrit	tion External Access	Constant	Stule	Properties
Controller Tags	MSG trigger			BOOL	Read/Write		Decimal	Extended Pr
Controller Fault Handler	±-Watchdog1_Data			INT[208]	Read/Write		Decimal	
Power-op Hanuler				MESSAGE	Read/Write			T Data
A MainTask	⊕-Watchdog1b			MESSAGE	Read/Write			Produced Connection
📄 🚭 MainProgram	±-Watchdog2_Data			INT[208]	Read/Write		Decimal	Consumed Connection
- 🖉 Program Tags				MESSAGE	Read/Write			
🛄 MainRoutine				MESSAGE	Read/Write			
🗀 Unscheduled Programs / Phases	2							
🖨 🔄 Motion Groups								
Data Types								
User-Defined								
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- 🦗 Add-On-Defined								
🗑 🛄 Predefined								E
Irends								
- III 1756 Backplane 1756-A7								
111 1756-1 71 Watchdog Sample								
- 1 [2] 1756-EN3TR Ethernet Bridge								
	() Monitor Tags λ	Edit Tags /		•				► a

The sample PLC code will read the status data from two WDC4V46C's. Follow the same structure to read data from additional WDC4V46C's.



J Logix Designer - Watchdog_Sample [1756-L71 23.1	2]*- [MainProgram - MainRoutine*]	
<u>Eile Edit View Search Logic Communicat</u>	tions <u>T</u> ools <u>W</u> indow <u>H</u> elp	_ 8 ×
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No Forces		
No Edits	 < H ⊟ ⊨ +F +/F () (0) (0) > 	
Redundancy D.g	Favorites & Add-On & Alarms & Bit & Timer/Counter & 1	
Controller Organizer 👻 🕂 🗙	街 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Controller Lags	Miss_trigger	MSG
Power-Up Handler		Message Control Vatchdog1a CDN
🖨 🚔 Tasks		
🗐 🧠 MainTask		MSG-
Program Tags	_	Message Control Watchdog1b(DN)-
🚺 MainRoutine		-(ER)
Unscheduled Programs / Phases		E
Ungrouped Axes	MSG_trigger	MSG-
Add-On Instructions	1 1 1 - 3 E	Message (EN) Message Control Watchdog2a (IN)
🖶 🚝 Data Types		-Ceró-
Strings		MSG
Add-On-Defined		Message (EN)
Predefined		Message Control Watchdog2b
Trends		
🗁 🔄 I/O Configuration		
🚍 🛲 1756 Backplane, 1756-A7	(End)	
[1] 1756-L71 Watchdog_Sample		
Ethernet		
) MainRoutine'	•
	MainProgram	Þ
Ready		Rung 0 of 2 APP VER

Message Configuration - Watchdog1a	Message Configuration - Watchdog1a
Configuration Communication Tag	Configuration Communication Tag
Message <u>Type:</u> CIP Data Table Read 🔹	Path: Ethernet_Bridge, 2, 192.168.22.10 Browse
Source Element: INT_data[0] Number Of Elements: 200 ♀ Destination Element: Watchdog1_Data ↓ New Tag	Ethernet_Bridge, 2, 192.168.22.10 Broadcast: Communication Method GP DH+ Channet CPW/th Source ID Source Link: Compacted Cache Connections Large Connection
C Enable C Enable Waiting C Start Done Length: 200 Error Code: Extended Error Code: Timed Dut Error Path: Error Text:	C Enable ○ Enable Waiting ○ Start
OK Cancel Apply Help	OK Cancel Apply Help

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ControlLogix to 4B Watchdog Super Elite

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Message Configuration - Watchdog1b	Message Configuration - Watchdog1b
Configuration Communication Tag	Configuration Communication Tag
Message Type: CIP Data Table Read Source Element: INT_data[200]	Path: Ethernet_Bridge, 2, 192 168 22 10 Browse Ethernet_Bridge, 2, 192 168 22 10
Number Of Elements: 8 - Destination Element: Watchdog1_Data New Tag	Broadcast: Communication Method GP OH Channet 'A' Postantial list D
	CIP With Source ID Source Link: 0 To Destination Node: 0 To (Octal)
	Cache Connections + Large Connection
C Enable C Enable Waiting C Start C Done Done Length: 0	C Enable C Enable Waiting C Start C Done Done Length: 0
O Error Code: Extended Error Code: Timed Out ← Error Path: Error Text:	O Error Code: Extended Error Code: Timed Out ← Error Path: Error Text:
OK Cancel Apply Help	OK Cancel Apply Help

Device	Message Type	Source Element	Number of Elements	Destination Element	Communication Path
WDC4V46C - 1	CIP Data Table Read	INT_data[0]	200	Watchdog1_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 1	CIP Data Table Read	INT_data[200]	8	Watchdog1_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 2	CIP Data Table Read	INT_data[400]	200	Watchdog2_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 2	CIP Data Table Read	INT_data[600]	8	Watchdog2_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 3	CIP Data Table Read	INT_data[800]	200	Watchdog3_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 3	CIP Data Table Read	INT_data[1000]	8	Watchdog3_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 4	CIP Data Table Read	INT_data[1200]	200	Watchdog4_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 4	CIP Data Table Read	INT_data[1400]	8	Watchdog4_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 5	CIP Data Table Read	INT_data[1600]	200	Watchdog5_Data	Ethernet_Bridge, 2, 192.168.22.10

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WDC4V46C – 5	CIP Data Table Read	INT_data[1800]	8	Watchdog5_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 6	CIP Data Table Read	INT_data[2000]	200	Watchdog6_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 6	CIP Data Table Read	INT_data[2200]	8	Watchdog6_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 7	CIP Data Table Read	INT_data[2400]	200	Watchdog7_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 7	CIP Data Table Read	INT_data[2600]	8	Watchdog7_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 8	CIP Data Table Read	INT_data[2800]	200	Watchdog8_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 8	CIP Data Table Read	INT_data[3000]	8	Watchdog8_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 9	CIP Data Table Read	INT_data[3200]	200	Watchdog9_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C – 9	CIP Data Table Read	INT_data[3400]	8	Watchdog9_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 10	CIP Data Table Read	INT_data[3600]	200	Watchdog10_Data	Ethernet_Bridge, 2, 192.168.22.10
WDC4V46C - 10	CIP Data Table Read	INT_data[3800]	8	Watchdog10_Data	Ethernet_Bridge, 2, 192.168.22.10

Each CIP Data Table Read has a maximum length of 200 words. A second message is required to poll the remaining 8 words of data from each Watchdog. In the sample, there are only tags created to retrieve the status data from two Watchdog's.







Reference

The network settings for all the devices in this example is configured as follows:

Device	IP Address	Subnet Mask	Gateway
WDC4V46C (1)	192.168.22.11	255.255.255.0	192.168.22.1
WDC4V46C (2)	192.168.22.12	255.255.255.0	192.168.22.1
PLX31-EIP-MBTCP	192.168.22.10	255.255.255.0	192.168.22.1
1756-EN3TR	192.168.22.9	255.255.255.0	192.168.22.1



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