Toyopuc PC3/PC2 Ethernet Driver Help

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Toyopuc PC3/PC2 Ethernet Driver Help

Help version 1.039

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Overview

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Overview

The Toyopuc PC3/PC2 Ethernet Driver provides an easy and reliable way to connect Toyopuc PC3/PC2 Ethernet devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with Toyopuc PC3, PC2 and PC10G series PLCs using the Ethernet communications interface. The Toyopuc PC3/PC2 Ethernet driver supports extensive diagnostics tags and the Toyopuc PC3/PC2's multi point read features. For more information, refer to **Diagnostics Tags** and **Multi Point Read Support**.

Device Setup

Supported Devices

Toyopuc PC3, PC2 and PC10G series The PC2 model selection can be used with PC3 > PLCs operating in the PC2 Interchange mode.

Note: This driver is limited to 1024 devices.

Communication Protocol

Toyopuc PC3/PC2 Ethernet Computer Link Protocol

Connection Timeout

This parameter specifies the time that the driver will wait for a connection to be made with a device. Depending on network load, the connect time may vary with each connection attempt. The default setting is 5 seconds. The valid range is 1 to 30 seconds.

Note: Making a connection with a device can be very time consuming. When connecting with multiple devices located at different IP addresses or port numbers, define an additional Toyopuc Ethernet channel in the OPC Server project for this unique device. Connecting to multiple devices using the Relay Command through a single IP and port number will not cause a new connection to be opened and will not incur a connection delay.

Port Number

This parameter specifies the port number that will be used to connect to the Toyopuc PLC. The Toyopuc EN-I/F Ethernet PC3/PC2 module supports eight ports for communications. Each port must be dedicated to a single connection. When specifying a port number, ensure that no other Ethernet node will attempt to use this port number on the target Toyopuc PLC. The same port number can be used when communicating with multiple Toyopuc PLCs.

Device IDs

The Device ID, specified as YYY.YYY.YYY.YYY[P1,L1, S1, L2, S2, P3, L3, S3], is used to specify the Device IP address along with Relay Command Link/Exchange information on the Ethernet network. YYY designates the Device IP address: each YYY byte should be in the range of 0 to 255.

Note: A request can be relayed through one device to another by using a Relay Command. This is established by appending a link/exchange path to the Device IP. The following image illustrates the use of the routing path:



A routing command can only be issued through a maximum of four devices. Routing allows the Ethernet driver to request data from non-Ethernet devices. To request data from Device 3, the driver can route a command through Device 1 onto Device 2 then to Device 3.

Examples

Defining a Device ID to request data from Device 1. Device ID: 205.167.7.101.
 Defining a Device ID to request data from Device 3. Device ID: 205.167.7.101[L1,S1,L2,S2].

Note: Lx and Sx represent the Link/Station numbers assigned to a device. Consult the Toyopuc PC2 EN-I/F Manual and HPC Link Manual for more information on link/station numbers. The L and S must be included as part of the Relay routing information when specifying a Device ID. The Px represents the program number for PC3J systems. The Px value should precede the link variable on each layer of the route.

Example

Device ID: 205.167.7.101[P2,L1,S1,P1,L2,S2].

Cable Connections



Diagnostics Tags

Diagnostics Tags provide information on how the Toyopuc PC3/PC2 Ethernet driver is performing at both the channel level and device level. At the channel level, diagnostics tags provide information that covers all operations performed by the driver when communicating with any PLC on the network. At the device level, diagnostics tags provide information that pertains only to the device under which the diagnostic tags have been requested.

Tag Name	Functional Description
ChannelReadTime	Contains the amount of time in milliseconds required to read all currently active data for all devices on this channel. This value is a signed long.
ChannelHighTime	Contains the amount of time in milliseconds of longest read cycle. This value is a signed long.
ChannelLowTime	Contains the amount of time in milliseconds of shortest read cycle. This value is a signed long.
ChannelReadsPerformed	Contains a count of the reads performed on this channel for all devices. This is a signed long and will roll over.
ChannelWritesPerformed	Contains a count of the writes performed on this channel for all devices. This is a signed long and will roll over.
ChannelTimeouts	Contains a count of the number of timeout/message failures that have occurred for all devices. The _ChannelTimeouts count is for any error that may occur on a message attempt. The value does not necessarily indicate how many messages failed to be sent altogether. It should be used to diagnose possible communication issues with specific devices. This is a signed long and will roll over.

Channel Level Diagnostics Tags

Device Level Diagnostics Tags

Tag Name	Functional Description
DeviceReadTime	Contains the amount of time in milliseconds required to read a block of data from the specified device. This value is a signed long.
DeviceHighTime	Contains the longest amount of time in milliseconds required to read a block of data from the specified device. This value is a signed long.
DeviceLowTime	Contains the shortest amount of time in milliseconds required to read a block of data from the specified device. This value is a signed long.
DeviceReadsPerformed	Contains a count of the reads performed on this device. This is a signed long and will roll over.
DeviceWritesPerformed	Contains a count of the writes performed on this device. This is a signed long and will roll over.
DeviceTimeouts	Contains a count of the number of timeout/message failures that have occurred on the specified device. The _ DeviceTimeouts count is for any error that may occur on a message attempt. The value does not necessarily indicate how many messages failed to be sent altogether. It should be used to diagnose possible communication issues with this specific device. This is a signed long and will roll over.
DeviceMultiPointReads	Contains a count of the number of Multi Point read requests that are currently being used to acquire all data that is marked for Multi Point operation. This tag can be used to tune Multi Point read operation. The goal of course being to limit the number of Multi Point reads being done to the lowest count possible, preferably 1. This is a signed long and will roll over.

Note: All diagnostics tags are Read/Write. The only value that can be written to the tags is zero (which will clear or reset them).

Multi Point Read Support

The Toyopuc PLC supports the ability to read data spread randomly throughout the PLC using a single command. By using this command, users can read crucial data items quickly and efficiently. The Toyopuc PC3/PC2 Ethernet driver automatically attempts to make the use of the Multi Point command both easy and efficient. Any memory type that can be acquired by the Toyopuc PC3/PC2 Ethernet driver can be part of a Multi Point read command. To mark a particular data item to be part of a Multi Point request, simply place the '#' character in front of any current address. The table below is shown with the addition of the '#' character to each address. For information on the maximum data that can be read with a multi point command, refer to **Multi Point Limitations**.

There are some things that should be considered when using the Multi Point read functions. The Multi Point command can increase the speed of the data acquisition but if overused, it will need to make multiple Multi Point commands to read all the requested data. When this occurs, the overall performance of the driver will be reduced. The key is to use the Multi Point command wisely.

The driver will automatically group data from memory types like bit memory into 16 bit values. For example, for the PC3 model, if P1-X1, P1-X3, P1-X4, P1-X6, P1-X9, P1-XA, P1-XB are marked as part of a Multi Point read using the '#', users would enter an address of #P1-X1, #P1-X3, #P1-X4, #P1-X6, #P1-X9, #P1-XA, #P1-XB. These seven items would be placed into a single 16 bit value; therefore, users would use only one of the 128 16 bit values available in a single Multi Point read command. The 7 items were grouped together because the address of each bit fell within a single 16 bit word value of X memory. If 7 items like #P1-X1, #P1-X20, #P1-X55, #P1-X77, #P1-X99, #P1-XAA, #P1-XBB are entered as part of a Multi Point read, each bit in this case would require an entire 16 bit value in the Multi Point read command to receive the data. Plan the data usage in the controller. If possible, make sure that the bits being read are grouped closely. This prudent planning applies primarily to the bit memory types. Register memory requires a single 16 bit value (two 16 bit values in the case of DWords) for each register that is added to the Multi Point read.

By using this information, users can plan the Multi Point reads. The Toyopuc PC3/PC2 Ethernet driver can perform as many Multi Point reads as are needed to acquire all the data that has been marked for Multi Point operation. Remember, however, that the driver will run slower when there are many read being run. To determine how many Multi Point read requests the Toyopuc Ethernet PC3PC2 driver is using to acquire all currently defined Multi Point data, use the special diagnostic tag "_DeviceMultiPointReads". For more information on this tag, refer to **Diagnostics**.

The Multi Point read operation can be combined with the normal data reads of the Toyopuc PC3/PC2 Ethernet driver. For example, if a block of 50 D registers consecutively ordered is being read, it may be more efficient to read the 50 D registers as part of a normal block read and save the space in the Multi Point read function for data

that is spread more randomly throughout the PLC memory. Use the diagnostics tags to help determine the most efficient way of acquiring the data for the application.

Multi Point Limitations

For tags belonging to device models PC3 Device and PC10G Device, the maximum data requested for the data types are as follows:

Boolean: 1024* Byte: 128 Word: 64 DWord: 32

*If contiguous booleans are requested, the request will be done in one Multi Point read.

Combination of any of the above data types in a single multi request has to be within the following limit: (No. of Booleans/16) + (No. of Bytes/2) + No. of Words + (No. of DWords * 2) <= 64

For tags belonging to device model PC2/PC2 Interchange, the maximum data requested for the data types are as follows:

Boolean: 2048* Byte: 256 Word: 128 DWord: 64

*If contiguous booleans are requested, the request will be done in one Multi Point read.

Combination of any of the above data types in a single multi request has to be within the following limit: (No. of Booleans/16) + (No. of Bytes/2) + No. of Words + (No. of DWords * 2) <= 128

Memory Type	Syntax	Data Types	Access
Edge Relay (P)	#P0000-#P01FF #P000-#P01F #P000-#P01E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Keeping Relay (K)	#K0000-#K02FF #K000-#K02F #K000-#K02E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Specific Relay (V)	#V0000-#V00FF #V000-#V0F #V000-#V0E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Timer Bits (T)	#T0000-#T01FF #T000-#T01F #T000-#T01E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Count Bits (C)	#C0000-#C01FF #C000-#C01F #C000-#C01E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Link Relay (L)	#L0000-#L07FF #L000-#L07F #L000-#L07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
I/O Relay (X)	#X0000-#X07FF #X000-#X07F #X000-#X07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
I/O Relay (Y)	#Y0000-#Y07FF #Y000-#Y07F #Y000-#Y07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Internal Relay (M)	#M0000-#M07FF #M000-#M07F #M000-#M07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Specific Register (S)	#S0000-#S03FF #S0000-#S03FE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
Timer/Present Value Register (N)	#N0000-#N01FF #N0000-#N01FE	Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write

Memory Types Shown with the Multi Point Marker

Link Register (R)	#R0000-#R07FF #R0000-#R07FE	Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Data Register (D)	#D0000-#D2FFF #D0000-#D2FFE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
File Register (B)	#B0000-#B1FFF #B0000-#B1FFE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
Extended I/O Relay (EX)	#EX0000-#EX07FF #EX000-#EX07F #EX000-#EX07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended I/O Relay (EY)	#Y0000-#Y07FF #Y000-#Y07F #Y000-#Y07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Internal Relay (EM)	#EM0000-#EM1FFF #EM000-#EM1FF #EM000-#EM1FE	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Keep Relay (EK)	#EK0000-#EK0FFF #EK000-#EK0FF #EK000-#EK0FE	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Special Relay (EV)	#EV0000-#EV0FFF #EV000-#EV0FF #EV000-#EV0FE	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Timer Bits (ET)	#ET0000-#ET07FF #ET000-#ET07F #ET000-#ET07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Counter Bits (EC)	#EC0000-#EC07FF #EC000-#EC07F #EC000-#EC07E	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Link Relay (EL)	#EL0000-#EL1FFF #EL000-#EL1FF #EL000-#EL1FE	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Edge Direction (EP)	#EP0000-#EP0FFF #EP000-#EP0FF #EP000-#EP0FE	Boolean Byte, Word, Short, BCD DWord, Long, LBCD	Read/Write
Extended Data Register (U)	#U0000-#U7FFF #U0000-#U7FFE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
Extended Timer/Counter Value (EN)	#EN0000-#EN07FF #EN0000-#EN07FE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
Extended Setup Value Register (H)	#H0000-#H07FF #H0000-#H07FE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write
Extended Special Register	#ES0000-#ES07FF #ES0000-#ES07FE	Byte, Word , Short, BCD DWord, Long, LBCD	Read/Write

Configuration Ladder for EN-I/F Ethernet Module

In order to make multiple connections to the Toyopuc PLC PC2/PC3, users must connect with different Port IDs in each client connection. In order to do this, the ports in the ladder program must be initialized. The example below shows how to initialize the Ethernet card for one connection port. The following parameters are assumed:

- 1. The ethernet module link number is 3.
- 2. The PC IP address is being set to 192.168.1.1(C0,A8,01,01).
- The module allows 8 connections. This example specifies 1.
 The port will be opened as "TCP," "passive partner unspecified."
- 5. The port number for the first connection is 1000h (4096).
- 6. The file memory 0th operand corresponds with data register D000.
- 7. Data Registers D0100–D0105 are used for writing file memory.

Ladder for Initializing the Ethernet Card

8

Toyopuc PC3/PC2 Ethernet Driver Help -[Start] Value is 1/on first scan -1 voe H -{ FIL1 00 → D0000L → D0009H] Clear Data F → D0000] Initial Request On { WMOV 0001h → D0004] IP Address Assigned to the PLC C0A80101 -{ DMOV 0001h D0006] Connection Used -{ VMMOV D0008] Indicates Unspecified TCP Partner Connection -{ WMOV 0200h - WMOV 1000h D0009] Port Number for connection Flag to show link availability -[WMOV 300Ch → D0100] Link 3 0Ch byte designation → D0101] D0004 designated - WMOV 2008h → D0102] File memory address 8 designated -{ WMOV 0008h D0100 D0101 → D0102] Writing into file memory -{ SPW -{ WMOV 0001h → D0106] Non-reception timer value (1 Minute) -[WMOV 3002h → D0107] Link 3.2 bytes designated - WMOV 220Ch → D0108] D0106 designated 00E2h → D0109] File memory E2 operand designated -{ WMOV D0107 D0108 → D0109] Writing non-reception timer value into the file memory -{ SPW -{ WMOV 3001h → D0103] Link 31 byte designated 2000h → D0104] D0000 designated -{ WMOV 0000h → D0105] File memory address 0 designated -{ WMOV -[SPW D0103 D0104 → D0105] Writing into file memory

Note: For more information, refer to Toyopuc PC2 or PC3 EN-1/F Users Manual.

Configuring the FL/ET-T-V2 Ethernet Module

Before the FL/ET-T-V2 card can be used for communications, it needs to be configured to use PCWIN. At this point, users should know how to configure PCWIN to connect to the PLC. For more information, refer to the *Toyopuc FL/ET-T-V2 Ethernet Module Users Manual*.

1. To start, open PCWIN.

9

PCwin - 770N ANDON SYSTEM SB (03-09-06)_ALL_TMMTX_TEST.prj	
File Library Edit View Xchange CPU Monitor Setup Window ME-NET Tool Opt	ion Cad Help
	2 曲 医 年 月 元 書 教
]月月時為 時時時間 前時前前前 ●回図 ■ 野野!	🖁 ENGLISH 🔄 🔛 🔣
✤ PC33 USB cable connection	··· · · · · · · · · · · · · · · · · ·
770N ANDON SYSTE Ibray Project DataFiles Parameter CPU Mode CPU Status I/O Module Interrupt Menu Link Parameter Program name RUN Status at the Err Scan Time Timer Program 1 I/O ILadder Sequence SFC Program 2 Program 3	PCwin
Mo	dule[CPU/COM3:]

2. Read the existing program and parameters from the PLC by clicking on **CPU** | **Read Data**. Select the proper option.



- 3. Once the ladder is loaded, click on **Project** | **Parameter** and then select **I/O Module**.
- 4. Verify that the Ethernet Card is configured in the PLC.

I/O module setup		×
Rack No. 0 0 0 1 0 2 0 0 8 0 9 0 A 0	3 0 4 0 5 0 6 0 7 B 0 C 0 D 0 E	Setup(S) Current value(C)
Slot No.(Z) Allocated Points	Module Name	
0 64 1 00 2 00 3 00 4 00 5 00 6 00 7 00	PC3JG-P(PNP) Not implemented Time chart module, computer link, Ethernet S-NET Not implemented Not implemented Not implemented Not implemented Not implemented	
	OK Cancel	

- 5. Click **OK** to close.
- 6. Click **Project** | **Parameter** and then double-click on **Link Parameter**.

Link narar	meter list	× r3		
Link No.(L) Rack N	lo. Slot No.	Link module name	
1	0	0	DLNK-M2	
2				Link setup(S)
3		3. *		
4				DistailDi
5	- 41			(Ne(orlb))
6	15	62		
7	- E	1.1		All clear(C)
8	34 S	33		

7. In the **Program No.** field, select the program that the configuration will be placed in. Click **Link Setup**.

Slot No.	(S)
2	•
	-
OK	Cancel
	Slot No.

- 8. In the **ProgramName Link** dialog, select the **Rack No.** and **Slot No.** where the module is located.
- 9. In the Link module name field, select Ethernet from the drop-down list. Click OK.
- 10. In the Link Parameter Setup dialog, select the new link. Next, click the Detail button.
- 11. Enter the card's IP address in the **Own Node IP Address** field.

Two Node IP Address - 0 0 0	0		OK
	. •		Cancel
Set Used Open Protocol		Own Nod Port No.	e Other Node Table No.
Connection1 : TCP Active Open	*	0	0
Connection2 : TCP Active Open	*	0	0
Connection3 : TCP Active Open	¥	0	0
Connection4 : 🔲 TCP Active Open	*	0	0
Connection5 : 🗖 TCP Active Open	*	0	0
Connection6 : TCP Active Open	*	0	0
Connection7 : 🔽 TCP Active Open	×	0	0
Connection8 : 🗂 TCP Active Open	¥	0	0
Other Node Table	Initialize		
Timers	Initialization based on initialized based on Initialized based on In	Link Param ial Seguen	eter ce Program
Sub-Net Mask and Gateway IP Address	(Programming of Initia	Sequence	is necessary)

12. Check the **Used** checkbox for Connection1. Up to 8 connections can be configured.

13. In the **Open Protocol** field, select **TCP Destination Non-Specified Passive Open** from the drop-down list.

14. Enter the appropriate value in the **Own Node Port No**. field. In the example shown below, the number 4096 has been entered.

wn Node IP Addres	s: 192.168.1.	55		OK
2701				Cancel
Set Used	Open Protocol		Own Node Port No.	Other Node Table No.
Connection1 : 🔽	TCP Destination Non-Spe	cified Passive Open 💌	4096	0
Connection2:	TCP Active Open	<u>×</u>	0	0
Connection3 :	TCP Active Open	<u>¥</u>	0	0
Connection4 :	TCP Active Open	<u>-</u>	0	0
Connection5 : 🗂	TCP Active Open	<u>~</u>	0	0
Connection6 : 🕅	TCP Active Open	<u>×</u>	0	0
Connection7:	TCP Active Open	<u>*</u>	0	0
Connection8:	TCP Active Open	<u>*</u>	0	0
Other No	de Table	Initialize		
Tim	ers	Initialization based on initialization based on la	Link Parame	ster Program
		 Programming of Initia 	al Sequence	is necessary

15. Now that the connection is configured, click **Sub-Net Mask and Gateway IP Address**. These values should be set by the IT Manager. For simple networks, match the sub-net mask and gateway IP address that are configured in the PC's network configuration.

16. Click **OK** when finished.

When changing them.	ually cha read the	inge instr	the fo uction	low ma	ing pa nual c	ramet arefui
Sub Net Mark	255	255	255		0	
Gateway JP Address	192	168	. 20		0	
cialeway in Address .	100 .	100	• •	•	~	

17. Click on **Timers**. This dialog allows the Ethernet connection to reset if a network error forces a dropped connection between the server and the device. By default, the Non-Reception Timer is set to Disable (which means permanent waiting).

Timers	×
There is no need to usually change the following parameters. When changing them, read the instruction manual carefully.	
Reset wait resending times	7
C Disable	
Enable Resending Time: 10 [Times] (3-10)	
Non-Reception Timer	
Disable (means permanent waiting) Unit	
C Enable Set Value : C [Sec] C [Min]	
Response Timer : 6 [Sec] (1-255)	
Resending Timer(Data): 5 [x100ms] (3-600)	
Resending Timer(SYN/FIN) : 5 [x100ms] (3-600)	
Close Timer: 10 [Sec] (2-60)	
Packet alive Time : 10 [Times] (1-255)	
IP Assembly Timer : 10 [Sec] (1-255)	
OK Cancel	

18. Under Non-Reception Timer, click Enable.

19. To set the timer resolution, enter a value in the **Set Value** field. Under **Unit**, select seconds or minutes. A value of less than a minute is recommended. This setting should not be faster than the poll rate.

20. Click OK to finish.

Configuring the PC10G-CPU for Ethernet Communications

Before the PC10G-CPU can be used for Ethernet communications, it must be configured using PCWin version 10 or above. The following example first shows how to configure the built-in Ethernet port L2 and then shows how to connect to the PC with PCWin to the PC10G-CPU using a USB connection.

1.10 Start, open rewin	1.	То	start,	open	PCWIN
------------------------	----	----	--------	------	--------------

PCwin - UNTITLE.PRJ	
Eile Library Edit View Xchange CPU Monitor Setup Window	ME- <u>N</u> ET <u>T</u> ool <u>O</u> ption <u>C</u> ad
Help	
D 🛎 🖬 🐰 🖪 🖻 🥔 😢 그 으 🗛 📃	ע אא א א ש א א ד
F F2 F3 F4 F5 F6 F7 F8 F8 F6 F6 F8 F8 F8 F8	
	2 🛒 🚏 🍄 🎝 ENGLISH
← Test Connection	
🗰 Library 🚯 Project	
Project "	
庄 💼 DataFiles	
III ⊕ — Parameter	
III England -	
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	
Ladder Sequence	
⊡	
📗 🚊 LD	
🛄 🛄 🛄 Ladder Sequence	
	PCwin
	Module[ETHERNET]

2. To setup the communication between PCWin and PC10G-CPU, click **Setup** | **Setup Communication Module**. If it is the first time configuring PCWin, select **Addition** and then make the selections as shown below.

Communica	tion Module Setup		×
Target :	CPU - USB	Condition	Via-link
Comment :	Test Connection		
Description Select mo condition set Via-Li	n odule and then check commur s. For Ethernet[Link] and CPU[nk.	iication Link],	OK Cancel

3. Next, make sure that the COM_SERV icon (shown on the bottom right side of the screen) appears as shown below. The red icon indicates that the connection between PCWin and PC10G-CPU hasn't been established yet. There are two possible solutions:

- Check the cable connections.
- Reinstall the USB driver that came with the PCWin setup.

🔂 11:31 AM

4. **Optional:** To monitor PC10G data from PCWin, go to the menu bar and click **Option | Configuration**. Then, select **Compatibility** and make the selections as shown in the image below.

Configuration	×
File Operation Define Shortcut key Library 3 languages Compatibility	
CPU mode PC10 Standard/PC3JG separate to enable the settings. PC10 Extention to enable the settings.	
 PC10 mode to enable the settings. The display form of the PC10 enhancing address is made interchangeable Ver.9. In case of PC10, as for I/O figure network figure equipment information memory you write to the both of 1 and 2. 	
OK Cancel	

5. Back in the Project Window, select the **Project** tab. Then, click **Parameters** | **Link Parameter**.

Lin	ik param	eter se	tup				×
	Program N • P1 (lo. O P2	O P3	Co (from Net	mpare(<u>P)</u> work.Drawing)	<u>A</u> utomat (from Netwo	ic setting ork Drawing)
Г	Link parar	neter list					
	Link No.(<u>L</u>) Rack	No. Slot No.	Lin	k module name		
	1						
	2	•					Link setup <u>(S)</u>
	4						Distail(D)
	5	•					
	7	:					All clear(C)
	8	•	-				
L							
				ОК	Cancel		

- 6. Click **Link setup(S)** and make the following selections:
 - Rack No.(R) Built-in
 - Slot No. (S) L2 Link
 - Module Name Ethernet

7. Click **OK**.

Program1 Link <1>	×
Rack No.(<u>R)</u> Built-in	Slot No.(<u>S)</u> L2 ▼
Link module name	
Clear(<u>C</u>)	OK Cancel

8. Click **Detail(D)**. In this dialog, the following parameters may be specified:

- In **Own Node IP Address**, set the desired IP address of the Ethernet Port.
- In **Own Node Port No.**, set the desired Port Number. In this example, 4096 is used.

Ethernet P1 L1 RBuilt	-in 5		×		
Own Node IP Address :	10 . 10 . 110 . 76		ОК		
			Cancel		
Set					
Used	Open Protocol	Own No Port No.	ode OtherNode . TableNo.		
Connection 1 🔽	TCP Destination Non-Specified Passive Open 💌	4096	D		
Connection 2 🗔	TCP Active Open	0	0		
Connection 3 🗖	TCP Active Open	0	0		
Connection 4	TCP Active Open	0	0		
Connection 5 🗖	TCP Active Open	0	D		
Connection 6 🗖	TCP Active Open	0	0		
Connection 7	TCP Active Open	0	0		
Connection 8 🗖	TCP Active Open] [0	0		
Other Node Table					
<u> </u>	s	i Link Parar iitial Seque	neter nce Program		
Sub-Net Mask and <u>G</u> a	teway IP Address	al Sequenc	e is necessary)		

9. Click **Sub-Net Mask and Gateway IP Address** and specify the desired subnet and gateway settings.



- 10. Once finished, click **OK**.
- 11. Click **OK** again. Then, click **Yes**.

PCwin	
1	Valid parameter has been set. Initialization based on this parameter is selected. Is OK?
	<u>Y</u> es <u>N</u> o

12. Save the project. In this example, the name "TestProject" is used.

Transferring Configuration Settings to the PC10G-CPU

1. Click CPU | Write Data | All Program+Parameter+Comment. Alternatively, click CPU | Write Data | Parameter. The invoked window should appear as shown below.

Note: If the CPU is in Run Mode, it will need to be stopped. To do so, click CPU | Stop/Release Stop.

CPU Write Dat	a	
	Write Preparation is Complete.	
	Writing to CPU?	
Confirmation of	the data to write	
Project :	TESTPROJECT.PRJ	
Write Data :	All Program+Parameter+Comment	
✓ Writes pro	ject data, at the same time.	
🔲 Writes I/O	and Network Drawing data, at the same time.	
	Yes <u>N</u> o	

2. Once the download is complete, the following window should appear.



3. Power cycle the PC10G-CPU for the new settings to take effect.

Data Type Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8 bit value
	bit 0 is the low bit
	bit / is the high bit
Word	Unsigned 16 bit value
	bit 0 is the low bit
	bit 15 is the high bit
Short	Signed 16 bit value
	bit 0 is the low bit
	bit 14 is the high bit
	bit 15 is the sign bit
DWord	Unsigned 32 bit value
	hit 0 is the low hit
	hit 31 is the high hit
Long	Signed 32 hit value
Long	
	bit 0 is the low bit
	bit 30 is the high bit
	bit 31 is the sign bit
BCD	Two byte packed BCD
	Value range is 0-9999. Behavior is undefined for values beyond this
	range.
LBCD	Four byte packed BCD
	Value range is 0-99999999. Behavior is undefined for values beyond
	this range.

Address Descriptions

The Toyopuc PC3 driver supports the PC2 PLC, PC3 PLC and PC10G PLC. When configuring the OPC Server application, users must choose a PLC model type when defining a device connection. Based on that model selection, two different PLC data addressing modes will be available to access data within the PLC. Select a link from the following list to obtain specific address information for the model of interest.

PC2/PC2 Interchange PC3 Device PC10G

PC2/PC2 Interchange Mode Address Descriptions

When the PC2 model has been selected, the Toyopuc Computer Link Protocol supports the following addresses. These address types are only available when using a PC2 PLC or using a PC3 PLC in PC2 Interchange mode. For more information, refer to **Addressing Examples**.

Note: The valid address range of each memory type depends on the data type being accessed. Please refer to the Syntax and Data Types columns below. The valid range (syntax) is shown on the same line as the data type(s). For example, the valid range for Edge Relay is P0000-P01FF if the data type being accessed is Boolean. If the data type being accessed is byte, word, short or BCD, the valid range is P000-P01F. If the data type is DWord, Long or LBCD, the valid range is P000-P01E. The default data types for dynamically defined tags are shown in **bold**.

Memory Type	Syntax	Data Type	Access
Edge Relay (P)	P0000-P01FF	Boolean	Read/Write
	P000-P01F	Byte*, Word, Short, BCD	
	P000-P01E	DWord, Long, LBCD	
Keeping Relay (K)	K0000-K02FF	Boolean	Read/Write
	K000-K02F	Byte*, Word, Short, BCD	
	K000-K02E	DWord, Long, LBCD	
Specific Relay (V)	V0000-V00FF	Boolean	Read/Write
	V000-V0F	Byte*, Word, Short, BCD	
	V000-V0E	DWord, Long, LBCD	
Timer Bits (T)	T0000-T01FF	Boolean	Read/Write
	T000-T01F	Byte*, Word, Short, BCD	
	T000-T01E	DWord, Long, LBCD	
Count Bits (C)	C0000-C01FF	Boolean	Read/Write
	C000-C01F	Byte*, Word, Short, BCD	
	C000-C01E	DWord, Long, LBCD	
Link Relay (L)	L0000-L07FF	Boolean	Read/Write
	L000-L07F	Byte*, Word, Short, BCD	
	L000-L07E	DWord, Long, LBCD	
I/O Relay (X)	X0000-X07FF	Boolean	Read/Write
	X000-X07F	Byte*, Word, Short, BCD	
	X000-X07E	DWord, Long, LBCD	
I/O Relay (Y)	Y0000-Y07FF	Boolean	Read/Write
	Y000-Y07F	Byte*, Word, Short, BCD	
	Y000-Y07E	DWord, Long, LBCD	
Internal Relay (M)	M0000-M07FF	Boolean	Read/Write
	M000-M07F	Byte*, Word, Short, BCD	
	M000-M07E	DWord, Long, LBCD	
Specific Register (S)	S0000.0S0000.F-S03FF.0S03FF.F	Boolean	Read/Write
	S0000-S03FF	Byte*, Word , Short, BCD	
	S0000-S03FE	DWord, Long, LBCD	
Present Value Register	N0000.0N0000.F-N01FF.0N01FF.F	Boolean	Read/Write
(N)	N0000-N01FF	Byte*, Word , Short, BCD	
	N0000-N01FE	DWord, Long, LBCD	
Link Register (R)	R0000.0R0000.F-R07FF.0R07FF.F	Boolean	Read/Write
	R0000-R07FF	Byte*, Word , Short, BCD	
	R0000-R07FE	DWord, Long, LBCD	
Data Register (D)	D0000.0D0000.F-D02FFF.0D2FFF.F	Boolean	Read/Write
	D0000-D2FFF	Byte*, Word, Short, BCD	
	D0000-D2FFE	DWord, Long, LBCD	

File Register (B)	B0000.0B0000.F-B01FFF.0B1FFF.F	Boolean	Read/Write
	B0000-B1FFF	Byte*, Word , Short, BCD	
	B0000-B1FFE	DWord, Long, LBCD	

*Low/High Byte Modifier

An optional Low (L) or High (H) byte modifier can be appended to any address. This modifier instructs the driver that the low or high byte of the address word is requested. For more information, refer to <u>Addressing</u> Examples.

Note: When adding a static tag with a low/high byte modifier, the data type must be set to Byte. For more information on static vs. dynamic tags consult the OPC Server's online documentation.

Multi Point Read Support

Multi Point Read Support allows the Toyopuc Ethernet PC3 driver to read data from multiple memory types (based on program number) in a single request. The Multi Point read function is available for both the PC3 and PC2 models and can be used across HPC link modules using Relay routing. For more information, refer to <u>Multi Point</u> Read Support.

Diagnostics Tags

The Diagnostics Tags provide information on how the Toyopuc Ethernet PC3 driver is performing. For more information, refer to **Diagnostic Tags**.

Array Support

All memory types support arrays, which can be of any data type. Only the following exceptions apply:

1. Byte arrays are not supported (this also means that low/high byte modifiers cannot be used with array syntax).

Boolean arrays are not supported for bit within word type addresses. For example, addresses like 'S0000.0' cannot be used with array notation. Discrete types support Boolean arrays.
 Multi Point read is not supported for arrays.

3. Multi Point read is not supported for arrays.

The array size cannot exceed the internal block size of 512 bytes. Array syntax is specified by adding '[r]' (rows) or '[r][c]' at the end of the address string. [r]: rows, [c]: columns.

Addressing Examples

1. Request 'Specific Relay FF' from program 1 --> P1-VFF.

2. Request High Byte of 'Data Register 10' --> D10H.

3. Request 'Data Register 1000' --> D1000.

4. Request Long value (2 consecutive 16 bit registers) starting at 'Link Register 7E' in program 1 --> P1-L7E@LONG (set data type to Long for static tags, or append '@LONG' to address for dynamic tags. For more information on static vs. dynamic tags consult the OPC Server online Help.

5. Request 20 bits starting at 'I/O Relay 256' --> X0256[20](set data type to BOOLEAN for static tags, or append '@BOOLEAN' to address for dynamic tags).

6. Request 24 bits starting at 'Edge Relay 100' --> P0100[4][6](set data type to BOOLEAN for static tags, or append '@BOOLEAN' to address for dynamic tags).

7. Request 16 words starting at 'Specific Register 64' --> S0064[4][4].

8. Request 50 LBCDs starting at 'File Register 6' --> B0006[50](set data type to LBCD for static tags, or append '@LBCD' to address for dynamic tags).

PC3 Address Descriptions

When the PC3 model has been selected, the Toyopuc Computer Link Protocol supports the following addresses. These address types are only available when using a PC3 PLC. For more information, refer to Addressing Examples.

Note: The valid address range of each memory type depends on the data type being accessed. Please refer to the Syntax and Data Types columns below. The valid range (syntax) is shown on the same line as the data type(s). For example, the valid range for Edge Relay is P0000-P01FF if the data type being accessed is Boolean. If the data type being accessed is byte, word, short or BCD, the valid range is P000-P01F. If the data type is DWord, Long or LBCD, the valid range is P000-P01E. The default data types for dynamically defined tags are shown in **bold**.

Memory Type	Syntax*	Data Type	Access
Edge Relay (P)	P0000-P01FF	Boolean	Read/Write
	P000-P01F	Byte**, Word, Short, BCD	
	P000-P01E	DWord, Long, LBCD	
Keeping Relay (K)	K0000-K02FF	Boolean	Read/Write
	K000-K02F	Byte**, Word, Short, BCD	
	K000-K02E	DWord, Long, LBCD	
Specific Belay (V)	V0000-V00EE	Boolean	Read/Write
	V000-V0F	Byte**, Word, Short, BCD	neuu, mnee
	V000-V0E	DWord, Long, LBCD	
Timer Bits (T)	T0000-T01FE	Boolean	Read/Write
	T000-T01F	Byte**, Word, Short, BCD	
	T000-T01E	DWord, Long, LBCD	
Count Bits (C)	C0000-C01FF	Boolean	Read/Write
	C000-C01F	Byte**, Word, Short, BCD	,
	C000-C01E	DWord, Long, LBCD	
Link Relay (L)	L0000-L07FF	Boolean	Read/Write
	L000-L07F	Byte**, Word, Short, BCD	
	L000-L07E	DWord, Long, LBCD	
I/O Relay (X)	X0000-X07FF	Boolean	Read/Write
	X000-X07F	Byte**, Word, Short, BCD	
	X000-X07E	DWord, Long, LBCD	
I/O Relay (Y)	Y0000-Y07FF	Boolean	Read/Write
-, · · · · · · · · · · · · · · · · · · ·	Y000-Y07F	Byte**, Word, Short, BCD	
	Y000-Y07E	DWord, Long, LBCD	
Internal Relay (M)	M0000-M07FF	Boolean	Read/Write
	M000-M07F	Byte**, Word, Short, BCD	
	M000-M07E	DWord, Long, LBCD	
Specific Register (S)	S0000.0S0000.F-S03FF.0S03FF.F	Boolean	Read/Write
	S0000-S03FF	Byte**, Word, Short, BCD	
	S0000-S03FE	DWord, Long, LBCD	
Present Value Register	N0000.0N0000.F-N01FF.0N01FF.F	Boolean	Read/Write
(N)	N0000-N01FF	Byte**, Word , Short, BCD	
	N0000-N01FE	DWord, Long, LBCD	
Link Register (R)	R0000.0R0000.F-R07FF.0R07FF.F	Boolean	Read/Write
	R0000-R07FF	Byte**, Word, Short, BCD	,
	R0000-R07FE	DWord, Long, LBCD	
Data Register (D)	D0000.0D0000.F-D02FFF.0D2FFF.F	Boolean	Read/Write
5 ()	D0000-D2FFF	Byte**, Word , Short, BCD	,
	D0000-D2FFE	DWord, Long, LBCD	
File Register (B)	B0000.0B0000.F-B01FFF.0B1FFF.F	Boolean	Read/Write
	B0000B1FFF	Byte**, Word , Short, BCD	,
	B0000B1FFE	DWord, Long, LBCD	
Extended I/O Relay (EX)	EX0000-EX07FF	Boolean	Read/Write
	EX000-EX07F	Byte**, Word, Short, BCD	
	EX000-EX07E	DWord, Long, LBCD	
Extended I/O Relay (EY)	EY0000-EY07FF	Boolean	Read/Write
, , , , ,	EY000-EY07F	Byte**, Word, Short, BCD	,
	EY000-EY07E	DWord, Long, LBCD	
Extended Internal Relay (EM)	EM0000-EM1FFF	Boolean	Read/Write
	EM000-EM1FF	Byte**, Word, Short, BCD	,
	EM000-EM1FE	DWord, Long, LBCD	
Extended Keep Relay (EK)	EK0000-EK0FFF	Boolean	Read/Write
. , , , , ,	EK000-EK0FF	Byte**, Word, Short, BCD	
	EK000-EK0FE	DWord, Long, LBCD	
Extended Special Relay (EV)	EV0000-EV0FFF	Boolean	Read/Write
	EV000-EV0FF	Byte**, Word, Short, BCD	,
	EV000-EV0FE	DWord, Long, LBCD	

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Extended Timer Bits (ET)	ET0000-ET07FF	Boolean	Read/Write
	ET000-ET07F	Byte**, Word, Short, BCD	
	E1000-E107E	DWord, Long, LBCD	
Extended Counter Bits (EC)	EC0000-EC07FF	Boolean	Read/Write
		Byte**, Word, Short, BCD	
		DWord, Long, LBCD	
Extended Link Relay (EL)		Boolean	Read/Write
		Byte**, Word, Short, BCD	
			D 1044 11
Extended Edge Direction (EP)		Boolean	Read/Write
		Byte**, Word, Short, BCD	
			Deed (Muite
Extended Data Register (U)		Boolean	Read/Write
		DWord Long LBCD	
Extended Timer/Counter		Boolean	Dood /Write
Value (EN)		Byto** Word Short BCD	Read/ Write
		DWord Long LBCD	
Extended Setup Value		Boolean	Read/Write
Register (H)	H0000-H07FF	Byte** Word Short BCD	Reddy Write
	H0000-H07FE	DWord, Long, LBCD	
Extended Special	ES0000.0ES0000.F-ES07FF.0ES07FF.F	Boolean	Read/Write
Register (ES)	ES0000-ES07FF	Byte**, Word , Short, BCD	,
	ES0000-ES07FE	DWord, Long, LBCD	
Extended Input Relay (GX)	GX0000-GXFFFF	Boolean	Read/Write
	GX000-GX0FFF	Byte**, Word, Short, BCD	
	GX000-GX0FFE	DWord, Long, LBCD	
Extended Output Relay (GY)	GY0000-GYFFFF	Boolean	Read/Write
	GY000-GY0FFF	Byte**, Word, Short, BCD	
	GY000-GY0FFE	DWord, Long, LBCD	
Extended Internal Relay (GM)	GM0000-GMFFFF	Boolean	Read/Write
	GM000-GM0FFF	Byte**, Word, Short, BCD	
	GM000-GM0FFE	DWord, Long, LBCD	

*Syntax

Addresses should be prefixed with "P1-", "P2-" or "P3-" to denote which PLC program in the PC3 contains the desired address. For example, to read data register D10 from program 2 in the PC3, use the following address syntax: P2-D10. If the device is in PC2 Interchange mode, use "P1-" to reference data.

Note: The extended addresses do not use the "P1-", "P2-", or "P3-" program indicator. If that is done, an error message will be generated in the OPC server message window. Extended addresses must be entered without any program number. For example, to request Extended I/O Relay (EX) 6FF, use the following syntax: EX6FF.

****Low/High Byte Modifier**

An optional Low (L) or High (H) byte modifier can be appended to any address. This modifier instructs the driver that the low or high byte of the address word is requested. For more information, refer to **Addressing Examples**.

Note: When adding a static tag with a low/high byte modifier, the data type must be set to Byte. For more information on static vs. dynamic tags, consult the OPC Server online help.

Multi Point Read Support

Multi Point Read Support allows the Toyopuc PC3/PC2 Ethernet driver to read data from multiple memory types (based on program number) in a single request. The Multi Point read function is available for both the PC3 and PC2 models and can be used across HPC link modules using Relay routing. For more information, refer to <u>Multi</u> Point Read Support.

Diagnostics Tags

The Diagnostics Tags provide information on how the Toyopuc PC3/PC2 Ethernet driver is performing. For more information, refer to **Diagnostic Tags**.

Array Support

All memory types support arrays, which can be of any data type. Only the following exceptions apply:

1. Byte arrays are not supported (this also means that low/high byte modifiers cannot be used with array syntax).

Boolean arrays are not supported for bit within word type addresses. For example, addresses like 'S0000.0' cannot be used with array notation. Discrete types support Boolean arrays.
 Multi Point read is not supported for arrays.

The array size cannot exceed the internal block size of 512 bytes. Array syntax is specified by adding '[r]' (rows) or '[r][c]' at the end of the address string. [r]: rows, [c]: columns.

Addressing Examples

1. Request 'Specific Relay FF' from program 1 --> P1-VFF.

2. Request High Byte of 'Data Register 10' from program 2 --> P2-D10H.

3. Request Data Register 1000 from program 3 --> P3-D1000.

4. Request Extended I/O Relay 6FF --> EX6FF.

5. Request Long value (2 consecutive 16 bit registers) starting at 'Link Register 7E' in program 1 --> P1-L7E@LONG (set data type to Long for static tags, or append '@LONG' to address for dynamic tags. For more information on static vs. dynamic tags consult the OPC Server online Help.

6. Request 20 bits starting at 'I/O Relay 256' from program 2 --> P2-X0256[20] (set data type to BOOLEAN for static tags, or append '@BOOLEAN' to address for dynamic tags).

7. Request 24 bits starting at 'Edge Relay 100' from program 1 --> P1-P0100[4][6] (set data type to BOOLEAN for static tags, or append '@BOOLEAN' to address for dynamic tags).

8. Request 16 words starting at 'Specific Register 64' from program 3 --> P3-S0064[4][4].

9. Request 50 LBCDs starting at 'File Register 6' from program 1 --> P1-B0006[50](set data type to LBCD for static tags, or append '@LBCD' to address for dynamic tags).

PC10G Address Descriptions

When the PC10G model has been selected, the Toyopuc Computer Link Protocol supports the following addresses. These address types are only available when using a PC10G PLC. For more information, refer to **Addressing Examples**.

Note 1: The PC10G model also accepts arrays. For example, U0000[2][2].

Note 2: The valid address range of each memory type depends on the data type being accessed. Please refer to the Syntax and Data Types columns below. The valid range (syntax) is shown on the same line as the data type(s). For example, the valid range for Edge Relay is P0000-P01FF if the data type being accessed is Boolean. If the data type being accessed is byte, word, short or BCD, the valid range is P000-P01F. If the data type is DWord, Long or LBCD, the valid range is P000-P01E. The default data types for dynamically defined tags are shown in **bold**.

Memory Type	Syntax*	Data Type	Access
Edge Relay (P)	P000-P1FF P00-P1F P00-P1E	Boolean Byte**, Word, Short, BCD DWord, Long, LBCD	Read/Write
Edge Relay (P)	P1000-P17FF P100-P17F P100-P17E	Boolean Byte**, Word, Short, BCD DWord, Long, LBCD	Read/Write
Keeping Relay (K)	K000-K2FF K00-K0F K00-K0E	Boolean Byte**, Word, Short, BCD DWord, Long, LBCD	Read/Write
Specific Relay (V)	V00-VFF V0-VF V0-VE	Boolean Byte**, Word, Short, BCD DWord, Long, LBCD	Read/Write
Specific Relay (V)	V1000-V17FF V100-V17F V100-V17E	Boolean Byte**, Word, Short, BCD DWord, Long, LBCD	Read/Write
Timer Bits (T)	T000-T1FF	Boolean	Read/Write

		Buto** Word Short BCD	
	T00-T1E	DWord, Long, LBCD	
Timer Bits (T)	T1000-T17FF	Boolean	Read/Write
	T100-T17F	Byte**, Word, Short, BCD	,
	T100-T17E	DWord, Long, LBCD	
Count Bits (C)	C000-C1FF	Boolean	Read/Write
	C00-C1F	Byte**, Word, Short, BCD	
	C00-C1F	DWord, Long, LBCD	
Count Bits (C)	C1000-C17FF	Boolean	Read/Write
	C100-C17E	Byte** Word Short BCD	Redu/ Write
	C100-C17E	DWord Long LBCD	
Link Polov (L)		Boolean	Dood /W/rito
LITIK Relay (L)		Boulean Buto** Word Short PCD	Redu/ Write
		DWord Long LBCD	
Link Delay (L)		Beeleen	Dead/W/rite
LINK Relay (L)		Boolean	Read/write
		Byle ^{***} , Word, Short, BCD	
	LIUU-LZFE	Dword, Long, LBCD	
I/O Relay (X)	X000-X/FF	Boolean	Read/Write
		Byte**, Word, Short, BCD	
	X00-X7E	DWord, Long, LBCD	
I/O Relay (Y)	Y000-Y7FF	Boolean	Read/Write
	Y00-Y7F	Byte**, Word, Short, BCD	
	Y00-Y7E	DWord, Long, LBCD	
Internal Relay (M)	M000-M7FF	Boolean	Read/Write
	M00-M7F	Byte**, Word, Short, BCD	
	M00-M7E	DWord, Long, LBCD	
Internal Relay (M)	M1000-M17FF	Boolean	Read/Write
	M100-M17F	Byte**, Word, Short, BCD	
	M100-M17E	DWord, Long, LBCD	
Specific Register (S)	S000.0-S3FF.F	Boolean	Read/Write
	S000-S3FF	Byte**, Word, Short, BCD	
	S000-S3FE	DWord, Long, LBCD	
Specific Register (S)	S1000.0-S13FF.F	Boolean	Read/Write
	S1000-S13FF	Byte**, Word, Short, BCD	
	S1000-S13FE	DWord, Long, LBCD	
Present Value Register	N000.0-N1FF.F	Boolean	Read/Write
(N)	N000-N1FF	Byte**, Word , Short, BCD	
	N000-N1FE	DWord, Long, LBCD	
Present Value Register	N1000.0-N17FF.F	Boolean	Read/Write
(N)	N1000-N17FF	Byte**, Word, Short, BCD	,
	N1000-N17FE	DWord, Long, LBCD	
Link Register (R)		Boolean	Read/Write
	R000-R7FF	Byte**, Word, Short, BCD	
	R000-R7FE	DWord, Long, LBCD	
Data Register (D)	D0000.0-D2FFF.F	Boolean	Read/Write
	D0000-D2FFF	Byte**, Word, Short, BCD	
	D0000-D2FFE	DWord, Long, LBCD	
FB Escape Area (11)	11,0000,0-11,1EFE E	Boolean	Read/Write
	11 0000-11 1 FEF	Byte** Word Short BCD	Reddy Write
	11 0000-11 1 FFF	DWord Long LBCD	
SEC (1S)	150000 0-15FFF F	Boolean	Read/Write
51 C (55)	150000-15FFF	Byte** Word Short BCD	Reddy write
	150000-15FFF	DWord Long LBCD	
Extended I/O Below		Beeleen	Dood /Write
(EV)		Buto** Word Short BCD	Redu/ write
		DWord Long LBCD	
			Dec. 1/04/11
			Read/write
(=1)		Byte**, word, Snort, BCD	
	EYUU-EY/E	Dwora, Long, LBCD	

Extended Internal Relay	EM0000-EM1FFF	Boolean	Read/Write
(EM)	EM000-EM1FF	Byte**, Word, Short, BCD	,
	EM000-EM1FE	DWord, Long, LBCD	
Extended Keep Relay	EK000-EKFFF	Boolean	Read/Write
(EK)	EK00-EKFF	Byte**, Word, Short, BCD	,
	EK00-EKFE	DWord, Long, LBCD	
Extended Special Relay	EV000-EVFFF	Boolean	Read/Write
(EV)	EV00-EVFF	Byte**, Word, Short, BCD	,
	EV00-EVFE	DWord, Long, LBCD	
Extended Timer Bits	ET000-ET7FF	Boolean	Read/Write
(ET)	ET00-ET7F	Byte**, Word, Short, BCD	,
	ET00-ET7E	DWord, Long, LBCD	
Extended Counter Bits	EC000-EC7FF	Boolean	Read/Write
(EC)	EC00-EC7F	Byte**, Word, Short, BCD	,
	EC00-EC7E	DWord, Long, LBCD	
Extended Link Relay	EL0000-EK1FFF	Boolean	Read/Write
(EL)	EL000-EK1FF	Byte**, Word, Short, BCD	,
	EL000-EK1FE	DWord, Long, LBCD	
Extended Edge Direction	EP000-EPFFF	Boolean	Read/Write
(EP)	EP00-EPFF	Byte**, Word, Short, BCD	,
	EP00-EPFE	DWord, Long, LBCD	
Extended Data Register	U000000-U1FFFF.F	Boolean	Read/Write
(U)	U00000-U1FFFF	Byte**, Word, Short, BCD	,
	U00000-U1FFFE	DWord, Long, LBCD	
Extended Timer/Counter	EN0000-EN7FF	Boolean	Read/Write
Value (EN)	EN000-EN7FF	Byte**, Word , Short, BCD	
	EN000-EN7FE	DWord, Long, LBCD	
Extended Setup Value	H0000-H7FFF	Boolean	Read/Write
Register (H)	H000-H7FF	Byte**, Word , Short, BCD	
	H000-H7FE	DWord, Long, LBCD	
Extended Special Register	ES0000-ES7FFF	Boolean	Read/Write
(ES)	ES000-ES7FF	Byte**, Word , Short, BCD	
	ES000-ES7FE	DWord, Long, LBCD	
Extended Input Relay	GX0000-GXFFFF	Boolean	Read/Write
(GX)	GX000-GXFFF	Byte***, Word, Short, BCD	
	GX000-GXFFE	DWord, Long, LBCD	
Extended Output Relay	GY0000-GYFFFF	Boolean	Read/Write
(GY)	GY000-GYFFF	Byte**, Word, Short, BCD	
	GY000-GYFFE	DWord, Long, LBCD	
Extended Internal Relay	GM0000-GMFFFF	Boolean	Read/Write
(GM)	GM000-GMFFF	Byte**, Word, Short, BCD	
	GM000-GMFFE	DWord, Long, LBCD	
Extended Buffer Register	EB00000.0EB3FFFF.F	Boolean	Read/Write
(EB)	EB00000-EB3FFFF	Byte**, Word , Short, BCD	
	EB00000-EB3FFFE	DWord, Long, LBCD	
Extended Flash Register	FR000000.0FR1FFFF.F	Boolean	Read/Write
(FR)	FR000000-FR1FFFFF	Byte**, Word, Short, BCD	
	FR000000-FR1FFFE	DWord, Long, LBCD	

*Syntax

Addresses should be prefixed with "P1-", "P2-" or "P3-" to denote which PLC program in the PC3 contains the desired address. For example, to read data register D10 from program 2 in the PC3, use the following address syntax: P2-D10. If the device is in PC2 Interchange mode, use "P1-" to reference data.

Note: The extended addresses do not use the "P1-", "P2-", or "P3-" program indicator. If that is done, an error message will be generated in the OPC server message window. Extended addresses must be entered without any program number. For example, to request Extended I/O Relay (EX) 6FF, use the following syntax: EX6FF.

**Low/High Byte Modifier

An optional Low (L) or High (H) byte modifier can be appended to any address. This modifier instructs the driver that the low or high byte of the address word is requested. For more information, refer to **Addressing Examples**.

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Note: When adding a static tag with a low/high byte modifier, the data type must be set to Byte. For more information on static vs. dynamic tags, consult the OPC Server's online documentation.

Multi Point Read Support

Multi Point Read Support allows the Toyopuc PC3/PC2 Ethernet driver to read data from multiple memory types (based on program number) in a single request. The Multi Point Read function is available for the PC10G model and can be used across HPC link modules using Relay routing. The memory types 'EB', 'FR' and 'U' (greater than address 0x7FFF) do not support the multipoint functionality. For more information, refer to Multi Point Read Support.

Addressing Examples

1. Request 'Specific Relay 100' from program 1 --> P1-V100.

- 2. Request 'Edge Relay 1000' from program 2 --> P2-P1000.
- 3. Request High Byte of 'Data Register 10' from program 2 --> P2-D10H.
- 4. Request Data Register 1000 from program 3 --> P3-D1000.
- 5. Request Extended I/O Relay 6FF --> EX6FF.
- 6. Request Extended Buffer Register 17FFF --> EB17FFF.

7. Request Long Value (2 consecutive 16 bit registers) starting at 'Link Register 7F' in program 1 --> P1-L7F@LONG (set data type to Long for static tags or append '@LONG' to address for dynamic tags).

Note: For more information on static vs. dynamic tags, refer to the OPC Server's help documentation.

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Missing address Device address '<address>' contains a syntax error Address '<address>' is out of range for the specified device or register Data Type '<type>' is not valid for device address '<address>' Device address '<address>' is Read Only Array size is out of range for address '<address>' Array support is not available for the specified address: '<address>'

Device Status Messages

Device '<device name>' is not responding Unable to write to '<address>' on device '<device name>'

Device Error Codes

Error Response Data: Error Code Table

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Missing address Device address '<address>' contains a syntax error Address '<address>' is out of range for the specified device or register Data Type '<type>' is not valid for device address '<address>' Device address '<address>' is Read Only Array size is out of range for address '<address>' Array support is not available for the specified address: '<address>'

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type: Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify the address is correct; if it is not, re-enter it in the client application.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' is Read Only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

Array size is out of range for address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified statically is requesting an array size that is too large for the address type or block size of the driver.

Solution:

Re-enter the address in the client application to specify either a smaller value for the array or a different starting point.

Array support is not available for the specified address: '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified statically contains an array reference for an address type that doesn't support arrays.

Solution:

Either re-enter the address in the client application to remove the array reference or correct the address type.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages

Device '<device name>' is not responding Unable to write to '<address>' on device '<device name>'

Device '<device name>' is not responding

Error Type: Serious

Possible Cause:

- 1. The driver cannot create a socket connection between the device and the Host PC.
- 2. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting
- device setting.
- 3. The IP address for the device is incorrect.
- 4. The TCP/IP Port specified in device settings is incorrect.

Solution:

- 1. Verify that the Ethernet connections between the PC and the network are functional.
- 2. Increase the Request Timeout setting so that the entire response can be handled.
- 3. Verify that the Ethernet connections between the device and the network are functional.
- 3. Verify that the specified IP address matches the Device IP.
- 4. Verify that the specified TCP/IP Port matches the port used by the device.

Unable to write to '<address>' on device '<device name>'

Error Type:

Serious

Possible Cause:

- 1. The driver cannot create a socket connection between the device and the Host PC.
- 2. The IP address for the device is incorrect.
- 3. The TCP/IP Port specified in device settings is incorrect.

Solution:

- 1. Verify that the Ethernet connections between the PC and the network are functional.
- 2. Verify that the Ethernet connections between the device and the network are functional.
- 3. Verify that the specified IP address matches the Device IP.
- 4. Verify that the specified TCP/IP Port matches the port used by the device.

Error Response Data: Error Code Table

Error Code	Error Description
11	Inability to process data because of faulty CPU Module Hardware.
20	Fixed Data (ENQ) within relay command is not "05."
21	Faulty transfer number (there is erroneous transfer byte number within the relay command).
23	Erroneous command code.
24	Erroneous subcommand code.
25	Erroneous command-format data byte.
26	Erroneous function-call operand number.
31	Attempting to write data into the field where any writing is prohibited during a sequence operation or to use the function call (which is pro- tected from any execution) during a sequence operation.
32	A command that is defeated during a stop continuity is activated during a stop continuity.
33	Attempting to execute a debug function call despite non-debug mode.
34	Access prohibited owing to access-prohibited configuration.
35	Non-executable owing to execution-priority limiting configuration.
36	Non-executable owing to execution-priority limiting configuration by another device.
39	Attempting to start scanning without any reset after writing I/O point- number parameters or I/O allocation point-number parameters.
3C	During a fatal failure, a command has issued that is not executable dur- ing a fatal failure.
3D	Non-executable due to competing process while a different-factor com- mand is executed.
3E	Non-executable command due to reset existence.
3F	Non-executable command due to stop duration.
40	Address of a reading/writing command or of "address+data number" of a command is out of range.
41	Word/byte number is out of range.

42	Non-designated data is sent.
43	Erroneous function/call operand.
52	Though any timer or counter is employed, a command for read- ing/writing the set/recent values is issued.
66	No reply is sent from link module with the link exchange No. specified by a relay command (owing to no existence of specified link module, power OFF, faulty circuit, or etc.).
70	Non-exectuable module with the link exchange No. specified by a relay command (owing to erroneous link No. designation or faulty link mod- ule).
72	No reply is sent from link module with the link exchange No. specified by relay command (owing to no existence of specified link module, power OFF, faulty circuit, or etc.).
73	Multiple relay commands were issued to the same link module from the CPU module and the link module could not process the commands. Send commands again.

Note: Codes taken from Toyopuc document: <u>TOYOPUC PC3J/PC2J FL/ET-T-V2 Instruction Manual</u>.

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