### **Application Note**



# 2500 Series® Programmable Automation Control System

## Communicating between 2500 Series® Processors and PowerFlex 753 Drives using Ethernet/IP and 2500P-ACP1

The 2500P-ACP1 Application Coprocessor supports Ethernet/IP communications with up to 40 Ethernet/IP devices via I/O Scanner, I/O Adapter, Explicit Message Adapter, and Tag Client interfaces. This Application Note shows how to configure the ACP1 for communications with a Rockwell PowerFlex 753 drive using Workbench. The PowerFlex drive uses a PowerFlex 20-750-ENETR dual-port Ethernet/IP option module. In this example we will use a data structure to hold the drive variables. Use of a data structure allows us to quickly add more drives into the application.

IMPORTANT NOTE: Configuring Ethernet/IP communications requires 2500P-ACP1 Firmware V3.03 or above,



#### and Workbench V1.3 or above.

#### Step 1: Open a Project.

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File View Tools Window Help								
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File Add New								
Project	Project wizard				×			
Specify folder and file name, then click "next"	Project Mizika  Project Mizika  Project From template  From template  Numport  Create a new project  Create a new project  Destination folder : Name:  Comment:	C:\Users\rpeck559\Desktop PowerFlex753	) Next	Cancel	Browse			×
Ready.	Build Cross references R	untime Call stack Breakpoints	Digital sampling trace Prompt	HMI Code Checker	0 x 0	0.0	100%	
ready		110	project	0,0	0.00	0,0	20070 878	111

Step 2: Specify Target's (ACP1 module) IP address. **Language** specifies the start-up mode and can be changed later. **T5 Runtime** is the protocol native to Workbench and the ACP1 module (and the Zenon HMI software as well). Port# 1100 is the defined port for interface between Workbench and the ACP1 module. Then click **Next**.

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File View Tools Window Help		
19	🚡 본 Sg 🖥 🖆 🔎	
Workspace	Programs   Language:   FBD: Function Block Diagram   Compiling options <ul> <li>Debug</li> <li>Release</li> </ul> Communication options <li>Settings:</li> <li>172.18.9.1531100</li> <li></li> Protocol:   TS Runtime      Other Cother Edit initial values with the Recipe editor	
Ready	No project 0, 0	0 × 0 0,0 100% 👫

Step 3: The ACP1 is the Scanner and the PowerFlex drive is the Adapter, so select **Ethernet/IP I/O Scanner (client)**. We are not using **Binding over Ethernet** but this can remain checked with the default Port# of 9000. (This is used for communications between ACP1 and similar devices using the Data Exchange protocol.) Then click **Finish**.

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Step 4: If you are connected over the network, choosing **Auto-Detect** will connect to the specified IP address and return the **Firmware Version** of the ACP1 module. Choose 2500P-ACP1 as the **CTI Product Type** and then click **OK**.

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Choose 2500-ACP1 as Product Type and enter the firmware version , OR click Auto-Detect to que- ry the module for this information	Project wizard         ×           Project wizard         ×	×

Step 5: Double-click on **Fieldbus Configurations**. Because we already specified the Ethernet/IP I/O Scanner (client) in Step 3, this driver automatically appears in the configuration window.



Step 6: Click on the **Insert Master/Port** symbol, then type in the **Address** of the PowerFlex drive in the Server pop-up box. Add optional **Description.** The **Configuration Instance** is defined by Rockwell as "6" (reference "PowerFlex 20-750-ENETR Dual-port Ethernet/IP Option Module, page 100—excerpt below). Then click **OK**.

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Workspace         ▲       PowerFlex753         ▶       ■         Exception programs         ▲       Programs         B Main         ▲       Watch (for debugging)         ■       Soft Scope         ■       Initial values         ♥       Fieldbus Configurations         ♥       Binding Configurations         ♥       Global defines         ▲       Variables         ►       Types         ➡       (All Projects)	Click on "Insert Master/ Port	Name         Value           IP-Address	Y Name G G R P M P M P M P M P M P M P M P M N N N N N N N N N N N N N N N N N N N
Enter the IP address, a name for the drive, and set Configuration Instance =6	Server X Address: 172 · 18 · 9 · 75 Description: PowerFlex 753 Drive Configuration Instance: 6 Edit 9 Price	ority 32 bit header RPI (ms)	< Name
	Build		

Box	Assembly Instance	Size
Input	1 (This value is required.)	The value varies based on the number of <i>Host</i> <b>[DL From Net xx]</b> parameters that are used for your application (see details in <u>step 6</u> ).
Output	2 (This value is required.)	The value varies based on the number of <i>Host</i> <b>[DL To Net xx]</b> parameters that are used for your application (see details in <u>step 6</u> ).
Configuration	<b>6</b> (This value is required.)	<b>0</b> , this value is required.

Enter the number of 32 bit words that are required for your I/O in the Input Size and Output Size boxes. At least three 32 bit words must be set for the Input Size. The option module uses the32 bit Logic Status, 32 bit Feedback, and a 32 bit word that is dedicated for memory allocation of the Generic Ethernet module profile.

The option module also uses the 32 bit Logic Command and 32 bit Reference, which requires at least two 32 bit words for the Output Size. If any or all sixteen 32 bit Datalinks of the drive are used, the Input and Output Size settings must be increased accordingly. See <u>Selecting</u> Step 7: Expand the **Server** and double-click the **Target to Originator** (Input). In the **IO/Object** pop-up box, change the **Instance** to "1" (refer to table in previous Step) and the **Size** (in bytes) to "76". Referring to the table on page 10 (page 106 of the "PowerFlex 20-750-ENETR Dual-port Ethernet/IP Option Module user manual), we are using the Generic Profile for the Input which has up to 19 Double-Integers (19\*4=76 bytes). Although it is not necessary to configure all the datalink items, we will do so here. Change the **Priority** to "High" and leave the **32 bit idle header** unchecked. In "Description" we usually enter "Drive to ACP1" to make it easy to remember the direction of this data. Then click **OK**.

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File Edit View Insert Project Tools Window Help

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Workspace	IO Drivers
<ul> <li>Workspace</li> <li>PowerFlex753</li> <li>Exception programs</li> <li>Main</li> <li>Watch (for debugging)</li> <li>Soft Scope</li> <li>Initial values</li> <li>Fieldbus Configurations</li> <li>Binding Configuration</li> <li>Global defines</li> <li>Variables</li> <li>Types</li> <li>(All Projects)</li> </ul>	Image: Second secon
	Symbol DDTs (max)
	RPI: (ms)
	Description Drive to ACP1
	Build

Step 8: Double-click the **Originator to Target for** the Output definition. The 32 bit header is assumed here and therefore the **32 bit idle header** box is checked. The **Instance** and **Size** are similarly derived from the table referenced in the previous Step. Enter "ACP1 to Drive" for description, then click **OK**.

CTI Workbench - PowerFlex753

File Edit View Insert Project Tools Window Help

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Workspace	IO Drivers *
Image: Image	Image: Symbol     Image: Sym
	ACP1 to Drive

DINT	Output 1/0		Input I/O Using					
DINI	output i/o	DINT	Drive Add-on Profile	DINT	Generic Profile			
0	Logic Command	0	Logic Status	0	Padword			
1	Reference	1	Feedback	1	Logic Status			
2	DL From Net 01	2	DL To Net 01	2	Feedback			
3	DL From Net 02	3	DL To Net 02	3	DL To Net 01			
4	DL From Net 03	4	DL To Net 03	4	DL To Net 02			
5	DL From Net 04	5	DL To Net 04	5	DL To Net 03			
6	DL From Net 05	6	DL To Net 05	6	DL To Net 04			
7	DL From Net 06	7	DL To Net 06	7	DL To Net 05			
8	DL From Net 07	8	DL To Net 07	8	DL To Net 06			
9	DL From Net 08	9	DL To Net 08	9	DL To Net 07			
10	DL From Net 09	10	DL To Net 09	10	DL To Net 08			
11	DL From Net 10	11	DL To Net 10	11	DL To Net 09			
12	DL From Net 11	12	DL To Net 11	12	DL To Net 10			
13	DL From Net 12	13	DL To Net 12	13	DL To Net 11			
14	DL From Net 13	14	DL To Net 13	14	DL To Net 12			
15	DL From Net 14	15	DL To Net 14	15	DL To Net 13			
16	DL From Net 15	16	DL To Net 15	16	DL To Net 14			
17	DL From Net 16	17	DL To Net 16	17	DL To Net 15			
	•			18	DL To Net 16			

#### Table 4 - ControlLogix Controller I/O Image for PowerFlex 750-Series Drives (32 bit Logic Command/Status, Reference/Feedback, and Datalinks)

Step 9: There are three system variables we want to add. Highlight the **Drive to ACP1** connection, right click and select "insert variable". Click the Diagnostic/Control radio button and select "Server OK", then click the OK button. Repeat this process to add the "I/O Connection OK" and "Last UCMM error" variables.

IO Drivers *		
📔 🔺 🗘 Ethernet/IP I/C	) Scanner (client)	
💂 🛛 🔺 🏯 Server 172	.18.9.75 - PowerFlex 753 Drive	
📅 💷 [i/o] 1 [7	'6] - Drive to ACP1	
<b>III</b> [i/o] 2 [7	21 - ACP1 to Drive	
- [vo] = [v		
-		
<b>UH</b>	Variable	X
<b>TH</b>		
	Variable	
\$\$		ОК
	Symbol: ???	
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. <u>.</u> .		
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	Onset: 0 Format: Bit	
	Bit: 0	
	Diagnostic / Control	
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	Server OK	
Cumbral	I/O connection OK	1.
Symbol	Last UCMM error	MO

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	IO Drivers *
	📙 🔺 😳 Ethernet/IP I/O Scanner (client)
	💂 🔺 🏯 Server 172.18.9.75 - PowerFlex 753 Drive
	🚆 🔺 🔟 [i/o] 1 [76] - Drive to ACP1
	Server OK: ???
	I/O connection OK: ???
	💼 Last UCMM error: ???
	🚟 🔤 [i/o] 2 [72] - ACP1 to Drive
	*
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Step 10. Next we want to set all these driver variables as integers. To do this, highlight each variable in turn, and in the editing pane to the left, double-click the "format" field and set the format as "32-bit unsigned". Do this for each of the three driver variables.

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IO Drivers           Image: CTI 2500 Data Cache           Image: CTI 2500 Deta Cache           Image: CTI 2500 IP = '172.18.9.141'           Image: CTI 2500 IP = '172.18.9.171'           Image: CTI 2500 IP = '172.18.9.171' <th>^</th> <th>Name Symbol Offset Bit Format Mode</th> <th>↓ ↓ 0 3 S</th> <th>/alue FD00.ServerOK Bit 8 bit-signed 15 bit-signed</th> <th></th>	^	Name Symbol Offset Bit Format Mode	↓ ↓ 0 3 S	/alue FD00.ServerOK Bit 8 bit-signed 15 bit-signed	
Im [i/o] 1 [76] - Drive to ACP1     Server OK: VFD00.ServerOK     I/O connection OK: VFD00.IOConnection     Last UCMM error: VFD00.LastUCMMErr	iOl or 🗸	Range (Low) Range (High) Signal (Low) Signal (High)		32 bit-signed 8 bit-unsigned 16 bit-unsigned 32 bit-unsigned 32 bit-fact	
 -◆				64 bit-float	Nam

Step 11. Now we will create a data structure which holds all the variables for the drive. Using a structure allows us to rapidly add multiple drives into the application without creating a new set of variables for each drive.

Open the data structure window by clicking on the icon in the toolbar. The "Data Types" window will open:



Click the "Insert Type" icon in the toolbar in the Data Type window.

6	Dat	a Types						
	1 %	η E >	< ( ⋿) →	9.0	<b>#</b>   "B			
Y	Name		Туре	Dim.	Init value	User	Tag	Description

A NewStructure type will be created.

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	5 Data Types							
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٦	Name	Туре	Dim.	Init value	User	Tag	Description	
	NewStru	ucture						

Double click the NewStructure name to bring up the editing box. Enter the name for the structure and a description. Click OK.

		•   10	1		10		
			2 🤍				
Y	Name	Туре	Dim.	Init value	User	Tag	Description
	互 Edit Stru	cture			×		
	Name	PowerFlex7	53				
	Comment						
	Description						
	This structur and driver va drive.	e holds all the ariables for a f	input, PowerF	output, lex 753	~		
	<				>		
	ОК	Ca	ncel	He	lp		
S	Data Types						
	🔏 🔁 🖻 🗙	🖪 🏷   🗳	<b>) (?</b>	Hand Initiation		Tee	

_										
Y	Name		Type Dim. Init value			User Tag				
	E	PowerFl	ex753							

Now we will add the elements to the structure. Use the "Insert Variable" icon to add each element. First add the driver variable names which will be tied later to the driver variables. Set each type to "DINT" (double integer). We select this type because the PowerFlex753 drive communicates using 32-bt words.

5	Data Types			_		
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Y	Name	Туре	Dim.	Init value	User	Tag
	PowerFlex753					
	ServerOK	DINT				
	IOConnectionOK	DINT				
	LastUCMMError	DINT				

Referring to Table 4 on page 10, add all the other drive parameters, first from the "Output I/O" list, then from the "Input I/O— Generic" list. Set the type for each to DINT. Close the Data Type window when finished.

互 Data Types							$\times$
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Y Name	Туре	Dim.	Init value	User	Tag	Description	
PowerFlex753						·	
ServerOK	DINT						
IOConnectionOK	DINT						
LastUCMMError	DINT						
LogicCommand	DINT						
Reference	DINT						
DLfromNet01	DINT						
DLfromNet02	DINT						
DLfromNet03	DINT						
DLfromNet04	DINT						
DLfromNet05	DINT						
DLfromNet06	DINT						
DLfromNet07	DINT						
DLfromNet08	DINT						
DLfromNet09	DINT						
DLfromNet10	DINT						
DLfromNet11	DINT						
DLfromNet12	DINT						
DLfromNet13	DINT						
DLfromNet14	DINT						
DLfromNet15	DINT						
DLfromNet16	DINT						
Padword	DINI						
LogicStatus	DINI						
Feedback	DINI						
DLtoNet01	DINI						
DLtoNet02	DINT						
DLtoNet03	DINT						
DLtoNet04	DINT						
DLIONeIU5	DINT						
DLIONelU0	DINT						
DLIONeI07	DINT						
DLIUNEIU0	DINT						
DLIONel09	DINT						
DLIONELTO	DINT						
DLtoNet12	DINT						
DLIONet12	DINT						
DL toNet14	DINT						
DL toNet15	DINT						
DL toNet16	DINT						
DEIONOTIO	2111						
<							>
Structures Enumerated B	it Fields						

Step 12. Now we will attach the variables we created to the Ethernet/IP drive connection. First we need to create an instance of the structure for this drive. In the variable editing window, highlight "Global Variables" and right click. Select "Add Variable"



A "NewVar" will be created. Double-click on "NewVar" to rename the variable for this first drive. We'll call it VFD00.



Now double-click on the "type" where it says BOOL, and select "PowerFlex753" from the drop-down box. This is the data structure we previously created.

Y Name	Туре	Dim.	Attrib.		Syb.	Init
Global y VFD00     RETAIN     Main     B pOnBa     B pOnDiv     pShutD     pStartu	MBSIaveTCF PID PLS PowerFlex75 R_TRIG RAMP RS sema SerIO SERIO_B sig_gen SigPlay SR	PEx 3		~		
< 5	STRING():					

	Туре		Dim.	Attrib.
Global va	ariables			
000	PowerFlex7	53		
RETAIN	variables			
Main				
pOnBad	Index			
pOnDivZ	ero			
pShutDo	own			
pStartup	)			
	Global va 000 RETAIN Main pOnBad pOnDivZ pShutDo pStartup	Type Global variables D00 PowerFlex7 RETAIN variables Main pOnBadIndex pOnDivZero pShutDown pStartup	Type Global variables D00 PowerFlex753 RETAIN variables Main pOnBadIndex pOnDivZero pShutDown pStartup	TypeDim.Global variables000PowerFlex753D00PowerFlex753PowerFlex753RETAIN variablesMainpOnBadIndexponBadIndexpOnDivZeropShutDownpStartupStartup

Next, click and hold on the VFD00 name and drag it to the box below the variable list. Then expand the list by clicking the arrow to the left of "VFD00".

Y Name Type		Dim.	Attrib.	Syb.	- h
Global variables					
VFD00 PowerF	lex753				
RETAIN variable	S				
Main	-				
B pOnBadIndex					
<sup>™</sup> pOnDivZero					
D pShutDown					
D pStartup					
1					>
				_	-
Name	Value				
VFD00					^
.ServerUK					
JUConnectionUK					
LastUCMMError					
.LogicCommand					
.Reterence					
DLfromNet01					
DLfromNet02					
DL fromNot04					
DL fromNet05					
DL fromNet05					
DL fromNet07					
DL fromNet08					
DL fromNet09					
DL fromNet10					
DL fromNet11					
DI fromNet12					
DI fromNet13					
DI fromNet14					
DI fromNet15					
DI fromNet16					
Padword					
LogicStatus					
.Feedback					
.DLtoNet01					
.DLtoNet02					
.DLtoNet03					
DLtoNet04					$\mathbf{\vee}$
					X

We will use this list to drag variable names over to our Ethernet/IP connections. First, drag the three driver variables (one at a time over to their corresponding locations in the "Drive to ACP1" connection.

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	IO Drivers
	<ul> <li>Connection OK: VFD00.LastUCMMError</li> <li>Last UCMM error: VFD00.LastUCMMError</li> <li>I/0 2 1721 - ACP1 to Drive</li> </ul>
	**

Next highlight the "ACP1 to Drive" connection. In the variable list, highlight all the variables beginning with LogicCommand and ending with DLfromNet16. Drag these into the pane beneath the Ethernet/IP connections.

101	Drivers *				
臣	▲ - Ethernet/IP I/O Scanner (client)			Name	Value
恭	🔺 🏯 Server 172.18.9.75 - PowerFlex 753 Dr	ive		Туре	I/O: Outputs (Originator to targe
*日	🔺 🌆 [i/o] 1 [76] - Drive to ACP1			Instance	2
#_	🖵 Server OK: VFD00.ServerOK	Size	72		
-	I/O connection OK: VFD00.IOCo	nnectionOK		Connection type	Point to point
	Last UCMM error: VFD00.LastU	CMMError		Priority	High
	▷ 🎯 [i/o] 2 [72] - ACP1 to Drive			32 bit header	
				RPI (ms)	100
ç,				Description	ACP1 to Drive
₽					
÷					
÷.					
	Symbol	Offset	Bit	Format	Mode
	VFD00.LogicCommand	0	0	Bit	Data exchange
	VFD00.Reference	0	0	Bit	Data exchange
	VFD00.DLfromNet01	0	0	Bit	Data exchange
	VFD00.DLfromNet02	0	0	Bit	Data exchange
	VFD00.DLfromNet03	0	0	Bit	Data exchange
	VFD00.DLfromNet04	0	0	Bit	Data exchange
	VFD00.DLfromNet05	0	0	Bit	Data exchange
	VFD00.DLfromNet06	0	0	Bit	Data exchange
	VFD00.DLfromNet07	0	0	Bit	Data exchange
	VFD00.DLfromNet08	0	0	Bit	Data exchange
	VFD00.DLfromNet09	0	0	Bit	Data exchange
	VFD00.DLfromNet10	0	0	Bit	Data exchange
	VFD00.DLfromNet11	0	0	Bit	Data exchange
	VFD00.DLfromNet12	0	0	Bit	Data exchange
	VFD00.DLfromNet13	0	0	Bit	Data exchange
	VFD00.DLfromNet14	0	0	Bit	Data exchange
	VFD00.DLfromNet15	0	0	Bit	Data exchange
	VFD00.DLfromNet16	0	0	Bit	Data exchange



#### Now, for each variable in the pane, change the "format" from "Bit" to "32 bit-unsigned"

10 [	)rivers *				
臣	Ethernet/IP I/O Scanner (client)			Name	Value
묘	🔷 🔺 🏯 Server 172.18.9.75 - PowerFlex 753 Drive	Э		Tvpe	I/O: Outputs (Originator to target)
*8	🔺 💷 [i/o] 1 [76] - Drive to ACP1			Instance	2
	Server OK: VFD00.ServerOK			Size	72
*	I/O connection OK: VFD00.IOConn	iectionOK		Connection type	Point to point
	📮 Last UCMM error: VFD00.LastUCN	/MError		Priority	High
	III [i/o] 2 [72] - ACP1 to Drive			32 bit header	
				RPI (ms)	100
ç,				Description	ACP1 to Drive
8+					
+					
_					
$\frac{1}{4}$					
	Symbol	Offset	Bit	Format	Mode
	VFD00.LogicCommand	0	0	32 bit - unsigne	ed Data exchange
	VFD00.Reference	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet01	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet02	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet03	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet04	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet05	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet06	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet07	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet08	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet09	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet10	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet11	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet12	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet13	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet14	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet15	0	0	32 bit - unsigne	ed Data exchange
	VFD00.DLfromNet16	0	0	32 bit - unsigne	ed Data exchange

Finally, highlight the "ACP1 to Drive" connection, right-click, and select "Renumber offsets". The will automatically renumber the offsets for each variable in the connection buffer.

10 0	)rivers *					
冒	▲ -C+ Ethernet/IP I/O Scanner (client)			Name	Value	
恭	🔺 🏯 Server 172.18.9.75 - PowerFlex 753 Dr	ive		Туре	I/O: Outputs (Originator to f	targ
●目	🔺 🔟 [i/o] 1 [76] - Drive to ACP1	Instance	2			
,	Server OK: VFD00.ServerOK	Size	72			
Ľ	I/O connection OK: VFD00.IOCo	nnectionOK		Connection type	Point to point	
琩	Last UCMM error: VFD00.LastU	CMMError		Priority	High	
78	Image: March Ma			32 bit header		
				RPI (ms)	100	
Ş				Description	ACP1 to Drive	
₽						
F	Symbol	Offset	Bit	Format	Mode	
_	VFD00.LogicCommand	0	0	32 bit - unsigne	d Data exchange	_
. <u>↑</u> .	VFD00.Reference	4	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet01	8	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet02	12	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet03	16	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet04	20	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet05	24	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet06	28	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet07	32	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet08	36	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet09	40	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet10	44	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet11	48	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet12	52	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet13	56	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet14	60	0	32 bit - unsigne	d Data exchange	
	VFD00.DLfromNet15	64	0	32 bit-unsigne	d Data exchange	
	VFD00.DLfromNet16	68	0	32 bit-unsigne	d Data exchange	

Step 13. Now repeat step 12, assigning the variables beginning with "Padword" and ending with "DLtoNet16" to the "Drive to ACP1" connection. Don't forget to renumber when finished.

IO D	IO Drivers *								
E	⊿ 📀 Ethernet/IP I/O Scanner (client)			Name	Value				
뮮	🔺 🗸 Server 172.18.9.75 - PowerFlex 753 Driv	/e		Туре	I/O: Inputs (Target to originator)				
*日	Image: [i/o] 1 [76] - Drive to ACP1			Instance	1				
	Image:			Size	76				
			Connection type	Point to point					
			Priority	High					
		32 bit header							
_				RPI (ms)	100				
ç,				Description	Drive to ACP1				
旺									
		04.1	L D 1						
÷	Symbol	Uffset	Bit	Format	Mode   H				
Ť.	VFD00.ServerOK	0	0	32 bit - unsigned	d Server OK				
+	VFDU0.IOConnectionOK	0	0	32 bit - unsigned	d I/O connection OK				
	VFD00.LastUCMMError	0	0	32 bit - unsigned	d Last UCMM error				
	VFD00.Padword	0	0	32 bit - unsigned	d Data exchange				
	VFD00.LogicStatus	4	0	32 bit - unsigned	d Data exchange				
	VFD00.Feedback	8	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet01	12	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet02	16	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet03	20	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet04	24	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet05	28	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet06	32	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet07	36	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet08	40	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet09	44	0	32 bit-unsigned	d Data exchange				
	VFD00.DLtoNet10	48	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet11	52	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet12	56	0	32 bit-unsigned	d Data exchange				
	VFD00.DLtoNet13	60	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet14	64	0	32 bit - unsigned	d Data exchange				
	VFD00.DLtoNet15	68	0	32 bit-unsigned	d Data exchange				
	VFD00.DLtoNet16	72	0	32 bit-unsigned	d Data exchange				

Step 14. OPTIONAL -do this step only if you want to read the drive setup data from a PLC and write the drive status data back to a PLC.

Open the fieldbus editing screen.

🖬 CTI Workbench - PowerFlex753

File Edit View Insert Project Tools Window H	Help	
) *   -   🔛 🗃 🔍 🖉 🕞 🖼 👘 👘 🖌 🐳 👘	🔍 🛗 🕹 😘 🙆 🗖 🖏 👘 📾 📲	
Workspace	rivers	
PowerFlex753	Ethernet/IP I/O Scanner (client)	Name
<ul> <li>Exception programs</li> <li>Programs</li> <li>Main</li> <li>Watch (for debugging)</li> <li>Soft Scope</li> <li>Initial values</li> <li>Fieldbus Configurations</li> <li>Binding Configuration</li> <li>Global defines</li> </ul>	A	
Types	IP Address Config. instance Flags (DEM) Configuration	data Des
🗎 (All Projects)	172.18.9.75 6 0	Pov

Click on the "Insert Configuration" icon. From the dropdown list, select CTI 2500 Data Cache. Then click OK.

Add Configuration	$\times$
Choose a configuration          (AII)         CAMP Client         CTI 2500 Data Cache         CTI 2500P-ACP1 I/O         Ethernet/IP Adapter (server)         Ethernet/IP Tag Client         MODBUS Master         MODBUS Slave         Ethernet/IP         MODBUS	OK Cancel

Next, click the "Insert Master/Port" icon.



#### Complete the IP address information for the Host PLC you will be communicating with. Then click OK.

CTI 2500 PLC Information	$\times$
CTI 2500 PLC IP Address 172 . 18 . 9 . 141	
PLC Time Slice (ms)	
Interface Type	
Host Controller Connection Status Bit (STW267) Not Used $$	
OK Can	cel

Click on the "Insert Slave/Data Block" icon.





Complete the information for memory type and starting address. Here we will read the drive command information from V-memory [DINT] starting at V1000. We use DINT because the all the drive data is formatted in 32-bit words.

Memory Type / Starting Address				$\times$
Memory Category				
Common     Drum	О Loop	Alarm		
Memory Type	V Memory (V) [DI	ΙT]	~	
Starting Address			1000	
Cache Direction		Read From PLC	~	
Enable Automatic Variable Declara	ation			
Automatic Variable Declaration				
Variable Prefix	V			
Number of		1		
		ОК	Cancel	

Click OK to proceed. Repeat the process to add a "Write to V-memory" block beginning at V1100. This is where we'll store the data read from the drive.



Now we will use the same "drag and drop" procedure we used in step 12, to populate the variables read from / written to the PLC. First highlight the "Read from PLC" block (the first V-memory block). From the variable list at the right, highlight the variable beginning with ".LogicCommand" and going through ".DLfromNet16". Drag these into the box below the fieldbus configurations:

101	)rivers *							
眉	🔺 🔜 CTI 2500 Data Cache		Name		Value		🍸 Nar	me Ty
몼	CTI 2500 IP = '172.18.9.141'		Memor	/ Туре	V Memory (V) [DIN]	1		🙆 Global vari
*8	V Memory (V) [DINT] (1000)		Starting	Address	1000		V	FD00 P
	V Memory (V) [DINT] (1100)		Cache	Direction	Read From PLC		(	CTI RE S
	Ethernet/IP I/O Scanner (client)							💾 RETAIN va
	▲ 盎 Server 172.18.9.75 - PowerFlex 753 Driv	/e						🗋 Main
	Image: March 10 [i/o] 1 [76] - Drive to ACP1							🕆 pOnBadIn
	▷ 📖 [i/o] 2 [/2] - ACP1 to Drive							🕆 pOnDivZei
<u>\$</u> 2								pShutDow
₽								pStartup
	Symbol	Offset						
•	VED00 LogicCommand	Ω					<	
·‡·	VFD00.Reference	0					Name	
	VFD00.DLfromNet01	0					ritanio	Leat ICMMErra
	VFD00.DLfromNet02	0						LasioComman
	VFD00.DLfromNet03	0						Reference
	VFD00.DLfromNet04	0						DI fromNet01
	VFD00.DLfromNet05	0						DI fromNet02
	VFD00.DLfromNet06	0						DI fromNet03
	VFD00.DLfromNet07	0						.DLfromNet04
	VFD00.DLfromNet08	0						.DLfromNet05
	VFD00.DLfromNet09	0						.DLfromNet06
	VFD00.DLfromNet10	0						.DLfromNet07
	VFD00.DLfromNet11	0						.DLfromNet08
	VFD00.DLfromNet12	0						.DLfromNet09
	VFD00.DLfromNet13	0						.DLfromNet10
	VFD00.DLfromNet14	0						.DLfromNet11
	VFD00.DLfromNet15	U						.DLfromNet12
	VFDUU.DLtromNet16	U	3					.DLfromNet13
								.DLfromNet14
								.DLfromNet15
								.DLfromNet16
	1							Padword

Repeat this process to populate the "ServerOK, IOConnectionOK, LastUCMMError, and Padword-DLtoNet16" variables to the "Write to V-memory" block. Use the "renumber offsets" command as we did in Step 12 to renumber the offsets in both V-memory blocks".

1 133	3 7 7 1 - 20 0 - 20				
10	Drivers				
E	🔺 🔜 CTI 2500 Data Cache	1	Name	Value	Name
恭	🔺 🦉 CTI 2500 IP = '172.18.9.141'		Memory Type	V Memory (V) [DINT]	🔺 🏛 Globa
*	V Memory (V) [DINT] (1000)		Starting Address	1100	VFD00
	Memory (V) [DINT] (1100)		Cache Direction	Write to PLC	CTI RE.
	Ethernet/IP I/O Scanner (client)				RETA
	▲ 🏯 Server 172.18.9.75 - PowerFlex	753 Drive			🗋 Main
	🔺 🌆 [i/o] 1 [76] - Drive to ACP1				🖺 pOnB
	📮 Server OK: VFD00.Serve	rOK			ီး pOnD
di se	I/O connection OK: VFD0	0.IOConnectionOI			🗋 pShut
8	📮 Last UCMM error: VFD00	.LastUCMMError 💊	1		🗋 pStari
8+	Symbol	Offset			
÷	VFD00.ServerOK	0			<
. <b>.</b> .	VFD00.IOConnectionOK	1			
*	VFD00.LastUCMMError	2			Name
	VFD00.Padword	3			✓ VFD00
	VFD00.LogicStatus	4			.ServerOk
	VFD00.Feedback	5			.IOConnec
	VFD00.DLtoNet01	6			.LastUCM
	VFD00.DLtoNet02	7			.LogicCor
	VFD00.DLtoNet03	8			.Referenc
	VFD00.DLtoNet04	9			.DLfromNi
	VFD00.DLtoNet05	10			.DLfromNi
	VFD00.DLtoNet06	11			.DLfromNi
	VFD00.DLtoNet07	12			
	VFD00.DLtoNet08	13			DLfromNi DLfromNi
	VFD00.DLtoNet09	14			DETROMINI
	VFD00.DLtoNet10	15			DLITOTTINI DI fromM
	VFD00.DLtoNet11	16			DL from No
	VFD00.DLtoNet12	17			DLfromN
	VFD00.DLtoNet13	18			
	VFD00.DLtoNet14	19			DI from No
	VFDUU.DLtoNet15	20			DI fromNi
	VFDUU.DLtoNet16	21			DI fromNi
					DI fromNi
					DI fromNi
					.Padword

Step 15: Compile and Download. To compile, click the "Compile" icon at the top.



If there are no compile errors (shown in red in the "build" tab at the bottom, then we're ready to download and run.

Click the "Online" icon at the top.

ndow	Help		
5  🤊	🔍 🛗 🏭 😘 🟠 🖿 🚱 🔛 📷 🔊		
	IO Drivers		
	Image: CTI 2500 Data Cache         Image: CTI 2500 IP = '172.18.9.141'         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive         Image: CTI 2500 IP = '172.18.9.75 - PowerFlex 753 Drive	Name Memory Type Starting Address Cache Direction	Valu VM 1001 Rec
	- Symbol Offset		

Then click the "download" icon:



After the download completes, click the "resume cycle to cycle" icon to start the program:

He	lp				
G.		i   🏭 😘 🖆 📕 🚱   💼 🎥 🍠 STOP	- 🕅 🕷 🕯	± ● 한 단 년 🖤	° 🤹
		[IO Drivers]		$\mathbf{\vee}$	
	眉	🔺 🔜 CTI 2500 Data Cache		Name	Value
	믔	CTI 2500 IP = '172.18.9.141'		Memory Type	V Memory (V) [DIN"
	*日	V Memory (V) [DINT] (1000)		Starting Address	1000
		Memory (V) [DINT] (1100)		Cache Direction	Read From PLC
	$\square$	Ethernet/IP I/O Scanner (client)			
	囲	▲ 孟 Server 172.18.9.75 - PowerHex 753 Driv	3		
	謂	<ul> <li>Image: Bit (10) T [76] - Drive to ACP1</li> <li>Image: Bit (12) T [76] - ACP1 to Drive</li> </ul>			
	25				
	214				
	₽4				
	(F)	Symbol	Offset		
	_	VFD00.LogicCommand=11	0		
		VFD00.Reference=-639303680	1		
		VFD00.DLfromNet01=0	2		







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