The following example involves the HMI device and the PLC device undergoing a connection with each other and exchanging/modifying each other's data.

No.	Device	Number
1.	P5070N1 HMI (Any HMI can be used)	1
2.	FBs-10MAR2-AC (Other PLC devices can also be used)	1
3.	Ethernet Cable	3
4	Ethernet Hub	1
5	Computer	1

The equipment used includes (but is not limited) the following items:

HMI and PLC wiring settings:

The Ethernet hub should be connected with the computer, HMI device, and PLC device all simultaneously.

To connect with USB, refer to the FvDesigner Software User's Guide.

HMI and FvDesigner settings:

Create a new project, choose the corresponding HMI device, in this case the P5070N1. When selecting the PLC, add a link, go to link settings, then [Interface Type], choose to use Direct Connection (Ethernet), then choose FATEK Automation Corp. for the manufacturer, then select the product series, in this case, FATEK F Bs / B1 / B1z / HB1 (TCP). For the IP Address, you can go to the official website to download the PLC/Ethernet tool, URL:

http://www.fatek.com/en/technical.php?act=software&catId=12

If you want to select other connection methods, please refer to the FvDesigner software manual, Chapter 2 – System / 2.3 – Link / 2.3.1 – Device/PLC settings.



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			? 📃							
Link Setting										
Name	Link0									
Interface Type	Direct Link(Ethernet)									
Manufacturer	FATEK Automation Corp.									
Product Series	FATEK FBs/B1/B1z/HB1 (TCP)									
Interface Setting										
Basic Comm. I	Error Handling Advanced									
IP Address	192.168.1.178	Timeout(ms)	1000 ‡							
Port	500	Command Delay(ms)	0 .							
		Retry Count	2 ‡							
Device Specific Sett	ing									
Sub-links										
Device Name	0									
Device Name Station Number	0		t Set in Register							
Device Name Station Number	0		Set in Register							
Device Name Station Number	0		Set in Register							
Device Name Station Number	0		🗘 🗌 Set in Register							
Device Name Station Number Dink Status	0		Set in Register							
Device Name Station Number Dink Status	0		🗘 🗔 Set in Register							
Device Name Station Number	0		🗘 🗌 Set in Register							
Device Name Station Number Link Status	0		🗘 🗔 Set in Register							
Device Name Station Number	0		CY							

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Images of the demo are shown below:



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FATEK® Combining HMI and PLC with Example



To create these screens...

- Go to the [Design] tab and select [New Screen] to add a screen.
- Go to the [Draw] tab and select [Text] to insert text onto your screen.



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The following figure shows the settings of the Selector List. The different types of text in the Text Library will appear in the list. For more details, refer to the FvDesigner Software User's Manual Chapter 13.4

http://www.fatek.com/en/download.php?f=data/ftp/HMI/P5/document/FvDesigner_User_M anual_en.pdf

Name LP0000	Setting Display Op	eration					
Comment	Switch Name	整體中文	T	B	(W)	S	Æ
Preview	Play Audio while Press	sing		Bit	Word	Screen	Function
	Execute when Item is	Selected		Switch	Switch	Change	Switch
王 德的文 :	Switch 1. 繁體中文						
	Write Address	\$U:V203000					
Switch List	Data Type	16Bit-UINT	*				
Switch 繁體中文	Action	Write Data	*				
2	Constant	0					
Choose he lesired							
anguage n the box.	Notification						

Drag the Change Screen Switch in the Lamp/Switch section of the toolbox and place it onto your screen. The button used in this example is a button that sends the user to the next page.





The figure below shows the properties of the Switch Screen switch.

Change Screen Propertie	es		? X
Name SB0000	Setting Display Opera	tion	1
Comment	Execute while Releasin		
Preview	Play Audio while Pressir		
	Enable Multi-functic		
	Туре	Screen Change	•
	Screen	BS2(unnamed)	•
	Change User Level	0	÷
			OK Cancel

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Select the screen you want to switch to when the button is pressed. In the example, the selected screen is BS2.

Use the **[**Bit Switch **]** from the **[**Lamp/Switch **]** section in the Toolbox and create 5 switches ranging from "Y0" to "Y4".

Instead of placing the switches and lamps one by one, you can use the Multi-Copy function by right clicking the element you want to duplicate and specifying how many and in which direction you want them to be placed.



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😢 Bit Switch Properties					? ×
Name BB0000	Setting Display Open	ration			
Comment	Execute while Releasin				
Preview	Play Audio while Pressir				
	Enable Multi-functic				
	Write Address	@0:Y0			
	Monitor Address	@0:Y0		✓ identical to Write Address	
				Enable Extended Lamp Feature	
	Action	Bit Invert	Ŧ		
	Duration				
	Execute Scripts				
				ОК	Cancel

When selecting the address, for device, select the link you created when starting the project. 'Y' is the contact type and the 0 after it differentiates it from other Y's.

In this example for switch "YO", the address we will be entering is @0:YO.

For the action, select "Bit Invert". This will make it so when the switch is not pressed, the value is 1 and when it is pressed, the value is 0.



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Next, place 5 lamps, one for each bit switch. Again, to save time and effort, you can use the Multi-Copy tool to speed up the process.

For the address, use the same one as the bit switch under the lamp. The lamp is just used as an indicator for whether the switch is pressed down or not. Address is @0.V0 for the first.

🧭 Lamp Properties				? <mark>- × -</mark>
Name SL0000	Setting Display C	peration		
Comment	Address			
Preview	Туре	Bit OWord	d	
	Addres	@0:Y0	Enable Extended L	amp Featu
	State			
	Number of States	2	¢	
				OK Cancel

11

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Use the [Numeric Input/Display] object in the [Numeric/Text] section of the toolbox. Create 5 objects ranging from "R0" to "R4". Use the Multi-Copy function to save time.



The following image on the right is the Numeric Input/Display properties. For the address, we are going to be using the 'R' address. For the first display, the address is @0:R0

me ND0000	Setting Display	Alarm O	peration			
omment	Display					
Draview	Monitor Address	@0:R0				
icite.	Data Type	16Bit-UI	NT			
	Total Digits	5		÷		
12345	Digit Places	þ		÷	Address	
	Default Range	Max	65535		Address	
		Min	0		Address	
	Input					
	Allow Input Sou	irce (Pop-up Keypad	0)n-screen Keypad	O USB Barcode Scanner
	Key	pad [Default	-		
	🗹 Default Rang Ma	x [65535	- A	ddress	
	Mir	n [0	- A	ddress	
	Write different Ad	dress				
	Notification					
	Post Processing					
	Gain/Offset					
	(y=Ax+B) Max./Min.					
						OK Cancel

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The following objects shown in the image below on the left are meters. These meters can track a specific address and display the magnitude of the number at the address. They can be found in the [Graph] section in the Toolbox.



The image above on the right is the properties of the meter object. For this example, we set the meter address to @0:R0 to track the value of that address. When the number changes, the graph will follow it.



For this next step, you need to first download the WinProLadder program. You can find it by clicking on the URL link here:

http://fatek.com/en/technical.php?act=software&catId=10

				Login / Register	□ 繁體中文 □ 简体	中文 🛛
FATEK®	Company News	Products Suppo	ort Member	Contact Us	PLEASE ENTER YOUR	REYWOR
Support		25)				
Advanced	्र हर	TECHNIC	AL SUPPORT			2 marine 2
Brochure Downloads		WITH HIGH QU COMPREHENS	ALITY TECHNOLOGY	TO PROVIDE YOU	THE MOST	
User's Manual Downloads		,				
Software Downloads	WinProladder			index ··· Support	• Sollware Downie	paus »
PLC	Softwa	re Name	Version	Size	Updated	Тур
- WinProladder	Winproladder for DOS				2013-02-25	UR
- FBs-30GM - FBs-CMZBR software	WinProladderChangeN	ote	WinProladder V3.27 ChangeNote		2017-04-21	UF
OS update Tools Ethernet Module Configure Tools	WinProladder		V3.27 Build 20213-1	3.06MB	2017-05-11	UF
FP-08 OS update Tools Communication Server	WinProladder		V3.26 Build 20008	3.06MB	2017-02-21	UF
- FBs-PLC USB Port Driver	WinProladder		V3.25 Build 19327	3.06MB	2017-01-19	UF
- Vom SoftWare - BPEP SoftWare	WinProladder		V3.25 Build 19118	3.11MB	2016-05-23	UF
- CBCAN SoftWare - CBEH SoftWare	WinProladder		V3.24 Build 17705	3.09MB	2014-08-20	UF
	WinProladder		V3.23 Build 17205-1	3.09MB	2014-03-28	UF

When the download is complete, go ahead and open up the WinProLadder program. With the program opened, click file, new project, and select the PLC device you are currently using.



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WinPro	Ladder	-								
ile Edit	View	Project	Ladder	PLC T	ool V	/indow	Help			
New P	roject		Ctrl+N							
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Printe	r Setup Content 9	, Setup	Ctrl+ D							
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Project Proiect I Model N Descript	Informati Name F ame F × 21 ion :	ion Project0 FBe-20M tachable 0KHz pul	C PLC Mode Series: FBs-	el Points ▼ 24 ✔ OK	s: 	Edit Mode Ma Cance		HSC (ma S-485).	ax. 10	K
Project Proiect I Model N Descript	Informati	ion Project0 FBe-20M tachable 0KHz pul	C PLC Mode Series: FBs-	el Points 24 ✔ OK	s: X	Edit Mode MA Cance		HSC (me S-485).	ax. 10	K
Project Proiect I Model N Descript	Informati	ion Project0 =Be-20M tachable 0KHz pul Calenda	C PLC Mode Series: FBs-	el Points ✓24 ✔ OK	s: 	Edit Mode ▼ MA \$ Cance		HSC (ma S-485).	ax. 10	K

The ladder program example is shown in the following image.



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FATEK® Combining HMI and PLC with Example



Ladder function description:

When the value of R1 is greater than 0, then the value of R1 is incremented by 1 until R1 is equal to 100. When R1 is less than 100, the value is decremented by 1 until R1 is equal to 0.

N003 – The T50 contact is a 0.1s timer. The PV value is 5, so each cycle (every time R1 increases or decreases by 1) takes 0.5 seconds to complete.

N006 – This network uses an incremental function. Whenever T50 and Y20 are closed, the value of R1 will increase by 1 every 0.5 seconds.

N007 – This network uses a descending function. When T50 is closed and Y20 is open, the value of R1 is decremented by 1 every 0.5 seconds.

N009 – This network uses the numeric comparison function. When R1 is equal to 100,Y20 will be open, so the decrement function will start and the incremental function will stop.

N012 – This network also uses the numeric comparison function. When R1 is equal to 0, Y20 will be closed, so the incremental function will start and the decrement function will stop.

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The simulation test:

In FvDesigner, go to the Project tab, and press simulation. Make sure to check "On-line (10mins) "before you start the simulation.

Simulation			_ 🗆 🗙
▲ 🖵 Host ▲ 🦱 連結0 🧊 0	Run Simulation 〇 Off-line ④ General 連続	On-line(10mins)	
	Project HMI Model Version Creator Note	an Fatek\Desktop\HMI + PROLADDER\HMI&PLC.frp P5070N 184 unnamed	Open Help Exit

Once the FvDesigner simulation is running, go to WinProLadder, click PLC and then click On-Line.



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A window will pop up and because the PLC is connected by Ethernet, the connection name will be TCP. Check whether the IP address is correct and press ok. If the IP address is wrong, press edit and type in the right one.

On-Line				×
	Connection Name	8		Auto Check
	Advanced	<u>A</u> dd	<u>E</u> dit	Delete
	Details Attribute Station Number Medium	Data 1 Internet(TC	P)	
	IP Port No.	192.168.0.1 500	78	
			ОК	Cancel

Website: www.fatek.com



Once successfully connected, press "Run PLC" to start the program.



Click on the icon with a magnifying glass to add a monitoring page. This page, shown below, shows the value of the contacts and whether they are enabled or not.

[File Edit Vi	ew Proj	ect Lad	der PLC Too	Window	Help									- 8 ×
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	b → 1992	- 192	- 🐜 - 🕮 -	🙊 🗸 🖷 .	- 18	🏁 👻 📑 🛛 🜄 🗣		а. нь,						
	445-60	(2) (3) 4	R) -∕↑↓-	 — I →				1						
∭ k≎ ' 5 ' 6 ''0	116 28	14 MP	ÎR Î Î PÎN	н Гу			atus Page							
Project0 [F	Bs-10M	A]					50							
⊡ - 📆 System	Configu	ration												
🗉 🔛 Ladder	Diagrar	n				NO	01		1. Sec. 1. Sec	1.1			1.1	1.1
🕀 🖶 Table I	Edit													
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	Y2	Enable	OFF	B2	Decimal	23								
	Y3	Enable	OFF	R3	Decimal	99								
	Y4	Enable	OFF	R4	Decimal	0								
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View the simulation screen and the WinProLadder program on your monitor at the same time. Observe what happens to the WinProLadder program when you press buttons Y0 to Y4.

n Configuration r Diagram Edit			N001									
ent Page tuchecon		2	N002		a 3	- ×						
Ref. No.	Status	Data		Ref. No.	Status	Data			Tra .			
YO	Enable	ON		RO	Decimal	9						
Y1	Enable	OFF		R1	Decimal	28		6	6	6	6	0
Y2	Enable	ON		R2	Decimal	23						
Y3	Enable	OFF		R3	Decimal	99		YO	Y1	Y2	Y3	Y4
Y4	Enable	ON		R4	Decimal	0	and the second s	0	0	0	0	0
				T50	OFF	2						
				Y20	Enable	ON						
										Go to the third pa	ge	FATEK
			NOID		a							
			NOII							FATEK		
			NO12									

In the HMI simulation screen, try entering a value, such as "23" into one of the numeric input/display objects. Observe the response of the WinProLadder program.



As you can see, once 23 is inputted onto the R2 address, the R2 contact value on the WinProLadder program also changes to 23.

