# Chapter 20 Ethernet Communication and Multi-HMIs Connection

By using the Ethernet network, the EB8000 provides following methods for data transmission:

- **1. HMI to HMI communication**
- 2. PC to HMI communication
- 3. Operate the PLC connected with others HMI

There are two ways of the Ethernet communication; the one is to use RJ45 straight through cable with hub, and another one is to use RJ45 crossover cable. In the second way there is no need to use hub, and it is limited to the condition of point to point connection (HMI to HMI, or PC to HMI). The following descriptions will show how to set up and perform the Ethernet connection in each way.

(a). With hub connection



(b). With point to point connection



#### 1. HMI to HMI Communication



Individual of HMI can monitor and control each other's data through the Ethernet network. By using the system reserved register (LB and LW). The one HMI can master performance of others HMI, and it can handle requests from a maximum of 32 others HMI simultaneously.

Here is an example of communicating between two HMIs (HMI A and HMI B).

When HMI A wants to use the set bit object to control the [LB123] node of HMI B, the procedure for setting the project on HMI A as follows: Example the IP address of HMI A is "192.168.1.37" and HMI B is "192.168.1.38".

#### Step 1

Running the EB8000, and select [Device Table] tab on the [System Parameter Settings] menu, set a remote HMI and fill the IP address and Port number of HMI B. (The picture below shows the contents of HMI A's project.)

Device Properties
Name : HMI B
• HMI OPLC
Location : Remote Settings IP : 192.168.1.38 (Port = 8000)
IP Address Settings
IP address : 192 · 168 · 1 · 38 Port no. : 8000
OK Cancel
Interval of block pack (words) : 5
OK Cancel

Sy	stem Parameter	Settings				
[]	Device Model	General 3	Security Font Extended Memory	Printer Serve	r	
	Device list :					
	No.	Name	Location	Device type	Interface	I/F Proto
	Local HMI	Local HMI	Local	MT6056T/	Disable	N/A
	Remote HMI 1	HMI B	Remote(IP:192.168.1.38, Port=8000)	MT8xxxx	Ethernet	TCP/IP

Select "HMI B" for [PLC name] on the Set Bit Object's Properties, and download project to HMI A.

New Set Bit Object	×
General Security Shape Label	
Description :	
PLC name : HMI B	
Write address	
Device type : LB	
Address : 123	
Address format : ddddd [range : 0 ~ 11999]	
Index register	
Write after button is released	
Attribute	51
Set style : Toggle 💙	

# Step 3

Create HMI B's project, no need to set remote HMI, just select "Local HMI" for [PLC name] on the Bit Lamp Object's Properties, and download project to HMI B. Now, HMI A can operate the content of the [LB123] of HMI B.

1	Syst	em Parame	eter Setting	çs.					×
	De	vice Mod	el Genera	d Security	Font Extended M	lemory Pr	inter Server		
		Device list :							
		No.	Name	Location	Device type	Interface	I/F Protocol	Station no.	
		Local HMI	Local HMI	Local	MT8121T (800 x 600)	Disable	N/A	N/A	

Bit Lamp Object's l	Properties 🔀
General Shape	Label Profile
Description :	
Read address	
PLC name :	Local HMI
Device type :	LB
Address :	123 System tag
Address format :	ddddd [range : 0 ~ 11999]

### 2. PC to HMI Communication



By using the simulator function of the EB8000, PC can catch data of HMI through the Ethernet network and save the data as files on computer.

PC can master HMI by operating the system reserved register (LB and LW) of HMI. In other words, also HMI can control PC's operation directly. For example, asking PC save data from HMI or PLC.

The number of HMIs mastered by PC is unlimited.

Example the PC is going to communicate with two HMIs (HMI A and HMI B), the procedure for setting project as follows:

Example the IP address of HMI A is "192.168.1.1" and HMI B is "192.168.1.2".

Step 1

Select "Local HMI" for [PLC name] on the Bit Lamp Object's Properties, and download project to HMI A and HMI B.

<b>S</b>	ystem Parame	eter Setting	şs.					×
٢	Device Mod	el Genera	1 Security	Font Extended M	iemory Pr	inter Server		
	Device list :							_
	No.	Name	Location	Device type	Interface	I/F Protocol	Station no.	
	Local HMI	Local HMI	Local	MT8121T (800 x 600)	Disable	N/A	N/A	

Bit Lamp Object's F	roperties 🔀
General Shape I	abel Profile
Description :	
Read address	
PLC name :	Local HMI
Device type :	LB
Address :	123 System tag
Address format :	ddddd [range : 0 ~ 11999]

Create PC's project, select the [Device Table] tab on the [System Parameter Settings], and then add two remote HMI, fill the IP addresses and Port number of HMI A and HMI B.

(The picture below shows the contents of PC's project.)

S	<b>ystem P</b> Device	aramet Model	er Settings General	Security Font Extended Memory Printer Server		
	Device l	ist :				
	No.		Name	Location Device type	Interface	1/F
	Local H	MI	Local HMI	Local MT8121T (800 x 600)	Disable	N/
	Remote	HMI 1	HMI B	Remote(IP:192.168.1.2, Port=8000) MT8xxx	Ethernet	TC
	Remote	$\rm HMI~2$	HMI A	Remote(IP:192.168.1.1, Port=8000) MT8xxx	Ethernet	TC
/ice	Propert	ies				
ſ	Name :	HMI A				
		⊙ HMI	C	PLC		
Loc	cation :	Remot	te	Settings IP : 192.168.1.1 (Port :	= 8000)	

Select target of PLC for [PLC name] on the Set Bit Object's Properties. If you intend to control the LB of HMI A, you have to select "HMI A" for [PLC name]. See the picture below.

New Set Bit Object
General Security Shape Label
Description :
PLC name : Remote HMI A
Write address
Device type : LB
Address : 123 System tag
Address format : ddddd [range : 0 ~ 11999]
Index register
Write after button is released
Attribute
Set style : Toggle 💌

Now, running this project on PC to performing the simulator function (either online or offline mode), and then LB123 of HMI A or B can be controlled by PC.



# 3. Operate the PLC connected with others HMI

Through the Ethernet network, PC or HMI A can operate remote PLC that is connected to HMI B; for example there is a Mitsubishi PLC connected to HMI B's COM 1, when PC or HMI A wants to read data of the PLC, the procedure for setting as follows:

Example the IP address of HMI B is "192.168.1.2".

Step 1

Select the [Device] tab on the [System Parameter Settings], and add Local PLC for Mitsubishi PLC type, setting all parameter of PLC correctly. And select target of PLC for [PLC name] on the Set Bit Object's Properties. After finished all of settings, download to HMI B.

As below is shows the project contents of HMI B.

		000	(						
evice 1	Model	General	Security	Font	Extended Mem	ory	Printer Server		
Device li	ist :								
No.		Name	Location	Device	type	Inte	erface	I/F Protocol	Sta
Local H	IMI	Local HMI	Local	MT8121	T (800 x 600)	Disa	de <b>e</b>	N/A	N/A
Local Pl	LC 1	PLC 1	Local	MITSUB	ISHI FX0n/FX2	COI	M1 (9600,E,7,1)	RS4854W	0
Device	Рторе	rties							
		<b>N D</b>	<u></u>			-			
		Name : PI		19221		-			
		0	HMI	⊙ PLC					
	Lo	ocation : Lo	ocal	*	Settings				
	DT								
	PL	C type : M	ITSUBISHI	FX0n/FX	2				~
	ΥL	C type : M V.:	ITSUBISHI 1.00, MITSI	I FX0n/FX UBISHI_F	2 7XON.so				~
	PL P	Ctype: M V.: LCL/F: P	ITSUBISHI 1.00, MITSI 5-495 A M	I FXOn/FX UBISHI_F	2 7XON.so PL	.C. de	fault station no	. 0	~
	PL P	C type : M V. LC I/F : R	ITSUBISHI 1.00, MITS 8-485 4 W	I FXOn/FX UBISHI_F	2 7XON.so PL	.C de	fault station no.	: 0	~
	PL	C type : M V. LC I/F : R COM : CC	ITSUBISHI 1.00, MITS 3-485 4 W 0M1 (9600,	I FXOn/FX UBISHI_F VBISHI_F	'2 7XON .so PL	C de	fault station no.	: 0 Settings	
	PL	C type : M V.: LC I/F : R: COM : CC	ITSUBISHI 1.00, MITS 5-485 4 W DM1 (9600, Use broadc	I FXOn/FX UBISHI_F E,7,1) ast comms	2 7XON.so PL and	C de	fault station no.	: 0 Settings	
	P	C type : M V. LC I/F : R: COM : CC	ITSUBISHI 1.00, MITS 8-485 4 W DM1 (9600, Use broadc	I FXOn/FX UBISHI_F E,7,1) ast comme	2 7XON .so PL and	C de	fault station no.	: 0 Settings	
	P	C type : M V. LC I/F : R; COM : CC	ITSUBISHI 1.00, MITSU S-485 4W DM1 (9600, Use broadc	I FX0n/FX UBISHI_F E,7,1) ast comma	2 7XON.so PL and	C de	fault station no.	: 0 Settings	
	P	C type : M V. LC I/F : R COM : CC	ITSUBISHI 1.00, MITS1 S-485 4 W DM1 (9600, Use broadc of block pa	I FXOn/FX UBISHI_F E,7,1) ast comme ck (words	2 7XON.so PL and ): 5	C de	fault station no.	: 0 Settings	
	P	C type : M V. LC I/F : R; COM : CC Interval Max. read-	ITSUBISHI 1.00, MITSU S-485 4W DM1 (9600, Use broadc of block pa command si	I FXOn/FX UBISHI_F E,7,1) ast comms ck (words ize (words	2 7XON.so PL and ): 5 ): 32	C de	fault station no.	: 0 Settings	
	P	C type : M V. LC I/F : R COM : CC Interval Max. read- Max. write-	ITSUBISHI 1.00, MITS S-485 4W DM1 (9600, Use broadc of block pa command si command si	I FX0n/FX UBISHI_F E,7,1) ast commu ck (words ize (words ize (words	2 7XON.so PL and ): 5 	C de	fault station no.	: 0 Settings	

Set Bit Object's Properties
General Security Shape Label Profile
Description :
PLC name : MITSUBISHI FX0n/FX2
C Write address
Device type : X
Address : 123
Address format : ooo [range : 0 ~ 377]
Index register
Write after button is released
Attribute
Set style : Toggle

Create new project for HMI A or PC, select the [Device] tab on the [System Parameter Settings], then add a remote PLC device. The IP address of remote PLC please set HMI B's. And others setting of PLC parameter must same as HMI B.

)evice	Model	General	Committe	Font	Extended Memory	Printer Server	
Devic	e list :	General	becomy	1011	Exerned Hemory		
No.		Name	Lo	cation		Device type	-
Loca	1 HMI	Local HM	I Loo	al		MT6056T/MT8056T (320 x 23	4)
Rem	ote PLC 1	PLC on H	MIB Rer	note(IP:1	92.168.1.2, Port=8000	) MITSUBISHI FX0n/FX2	
Device	Propert	ino					
	Loca	tion : Ren	note		Settings	IP : 192.168.1.2 (Port = 8000)	
	Locs PLC	tion : Ren type : MII	note ISUBISHI DO, MITSU	FX0n/FX	Settings 2 7XON.so	IP : 192.168.1.2 (Port = 8000)	
	Locs PLC PLC	tion : Ren type : MIT V.1.) C I/F : RS-	note ISUBISHI DO, MITSU 485 4 W	FX0n/FX	Settings 2 7XON .so PLC def	IP : 192.168.1.2 (Port = 8000)	
	Locs PLC PLC C	type : MIT V.1.) C I/F : RS- COM : CON	note ISUBISHI DO, MITSU 485 4 W 41	FXOn/FX	Settings 2 7XON .so PLC def	IP : 192.168.1.2 (Port = 8000)	
	Locs PLC PLC C	type : MIT V.1.) C 1/F : RS- COM : CON	note ISUBISHI DO, MITSU 485 4 W 41 11	FXOn/FX IBISHI_I	Settings 2 7XON.so PLC def and	IP : 192.168.1.2 (Port = 8000)	]

Step 3

In this case of using the set bit object to operate the Mitsubishi PLC connected to HMI B. Just need to select "PLC on HMI B" for [PLC name] on the Set Bit Object's Properties, then it is able to operate remote PLC connected to HMI B through PC execute simulator function or download to HMI A.

Set Bit Object's Properties
General Security Shape Label Profile
Description :
PLC name : PLC on HMI B
Write address
Device type : X
Address : 123
Address format : ooo [range : 0 ~ 377]
🗌 Index register
Write after button is released
Attribute
Set style : Toggle 💌