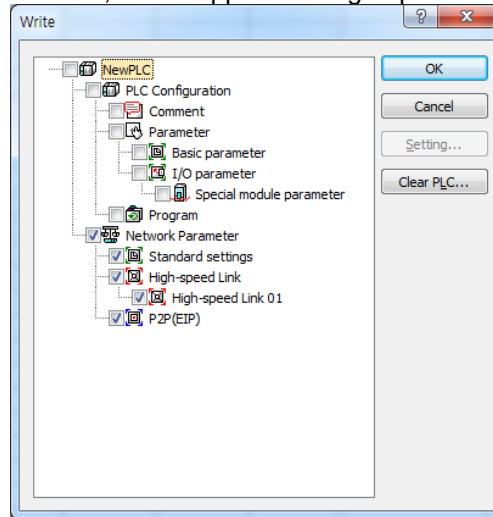


Save area	Address	The data memory address to save the received data which is transmitted by the destination station. 1) XGK: P, M, K, F(subsection), T, C, U, Z, L, N, D, R, ZR 2) XGI/XGR: I, Q, M, L, K, U, R, W, F(subsection) Refer to the list of XGT CPU memory device in appendix for available range of each memory area.
Save area Word size	Size (Word)	The data size of received block in word unit

[Table 6.4.3] High-speed link settings

(15) Downloading High-speed link parameters.

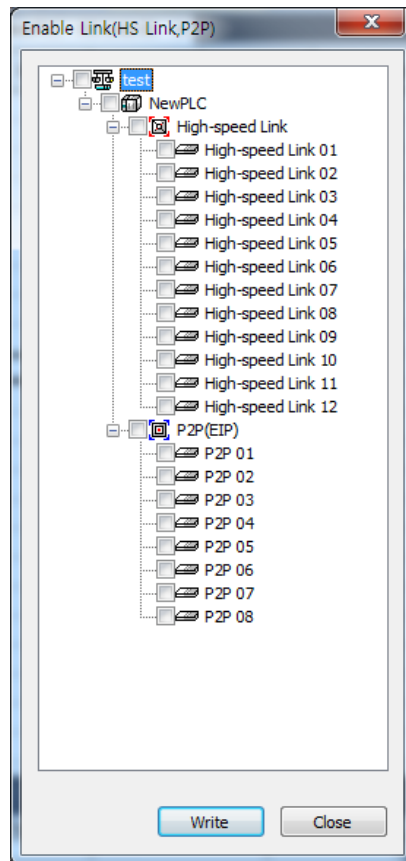
After High-speed link parameters setting is complete, select [Online] - [Write (standard settings, HS link, P2P)] on XG5000, check applicable High-speed link and then click [OK].



[Fig. 6.4.7] Write Parameters Screen

(16) High-speed link parameters enable

Select [Online] – [Communication module setting] - [Enable Link] on XG5000, check applicable High-speed link and click [Write]. If High-speed link enabled, HS LED will be turned ON on the module’s LED display to start High-speed link.



[Fig. 6.4.8] Link Enable Screen

## 6.5 High-speed Link Information

### 6.5.1 High-speed Link Flags

When High-speed link service is used to exchange data between communication modules of two or more stations, it provides a checking method of High-speed link service status for the user through High-speed link information so to confirm reliability of the data read from the destination station via the High-speed link. In other words, the communication module synthesizes the data received up to that time at intervals of a specific time and lets the user know if High-speed link is operated as in parameters specified by the user through High-speed link information where the whole information of Run-link(\_HSxRLINK) and Link-trouble(\_HSxLTRBL) to provide the whole information of the communication, and the individual information of \_HSxSTATE, \_HSxTRX, \_HSxMOD and \_HSxERR to provide communication status for registered items in the parameters are contained. The user can use the information in keyword format when programming, and also monitor the High-speed link status using the monitor function of the High-speed link information. Prior to its application, the user is requested to check the reliability of the communication data through High-speed link information of Run-link and Link-trouble when operating several PLCs with High-speed link service. [Table 6.5.1] shows the functions and definition of the High-speed link information.

Classification	Run-link	Link-trouble	Tx/Rx status	Operation Mode	Error	HS link status
Information type	Whole information	Whole information	Individual information	Individual information	Individual information	Individual information
Keyword name (x=HS link No.)	_HSxRLINK	_HSxLTRBL	_HSxTRX[n] (n=0~127)	_HSxMOD[n] (n=0~127)	_HSxERR[n] (n=0~127)	_HSxSTATE[n] (n=0~127)
Data type	Bit	Bit	Bit-Array	Bit-Array	Bit-Array	Bit-Array
Monitor	Available	Available	Available	Available	Available	Available
Program	Available	Available	Available	Available	Available	Available

[Table 6.5.1] The definition of High-speed link information.

Select [Variable/Comment] on the XG5000 project window to display [Fig. 6.5.1] as shown below. From this window drag the device to be monitored on to the variable monitor window.

	PLC	Program	Variable/Device	Value	Type	Device/Variable	Comment
1	NewPLC	<GLOBAL>	%LX0	10	BOOL	_HS1_RLINK	All stations are OK in HS link 1
2	NewPLC	<GLOBAL>	%LX1	10	BOOL	_HS1_LTRBL	Trouble after _HS 1 RLINK on
3	NewPLC	<GLOBAL>	%LX32	10	BOOL	_HS1_STATE000	Total states of HS link 1-block 000
4	NewPLC	<GLOBAL>	%LX160	10	BOOL	_HS1_TRX000	Normal communication with HS link 1-block 000
5	NewPLC	<GLOBAL>	%LX288	10	BOOL	_HS1_SETBLOCK000	Setting of HS link 1-block 000
6	NewPLC	<GLOBAL>	%LX416	10	BOOL	_HS2_RLINK	All stations are OK in HS link 2
7	NewPLC	<GLOBAL>	%LX544	10	BOOL	_HS2_MOD032	Operation mode of HS link 2-block 032
8							

[Fig. 6.5.1] Variable monitor window

### (1) Run-link (\_HSxRLINK)

As the whole information it shows if High-speed link is normally executed through the user defined parameters, whose status will be kept 'On' if once 'On' until Link Enable is 'Off', and also will be 'On' under the conditions specified below.

- A) If Link Enable is 'On'.
- B) If all the register list settings of parameters are specified normally.
- C) If all the data applicable to the parameters register list is transmitted and received as specified in the period.
- D) If the status of all the destination stations specified in the parameters is Run and with no error at the same time.

### (2) Link-trouble (\_HSxLTRBL where x is HS link No.(1~12))

As the whole information it shows if High-speed link is normally executed through the user defined parameters, which will be turned 'On' if condition to be turned 'On' the Run-link flag is violated when Run-link is On, and will be turned Off if the condition is recovered.

### (3) Tx/Rx status (\_HSxTRX[0..127] where x is HS link No.(1~12))

As individual information it shows the operation status of High-speed link parameters on the register list up to 128 registered items' Tx/Rx information. If the Tx/Rx operation of the registered items is agreeable to the Tx/Rx period, the applicable bit will be turned On, and if not, it will be turned Off.

(4) Operation mode (`_HSxMODE[0..127]` where x is High-speed link No.(1~12))

As individual information it shows the operation status of High-speed link parameters on the register list up to 128 registered items' operation mode information just like the max. register number. If the station specified in the register item is in Run mode, the applicable bit will be turned On, and if in Stop/Pause/Debug mode, it will be turned Off.

(5) Error (`_HSxERR[0..127]` where x is High-speed link No.(1~12))

As individual information it shows the operation status of High-speed link parameters on the register list up to 128 registered items' error information just like the max. register number. The error displays the general status of the PLC which fails to execute the user program. If the destination station PLC is normal, it will be turned Off, and if abnormal, it will be turned On.

(6) HS link status (`_HSxSTATE[0..127]` where x is High-speed link No.(1~12))

As individual information it shows the operation status of High-speed link parameters on the register list up to 127 registered items' High-speed link status just like the max. register number, which synthesizes the information of the individual items to display the general information of the registered items. In other words, if the applicable list's Tx/Rx status is normal with the operation mode of Run and with no error, it will be turned On, and if the conditions above are violated, it will be turned Off.

### 6.5.2 Monitor of High-speed link information

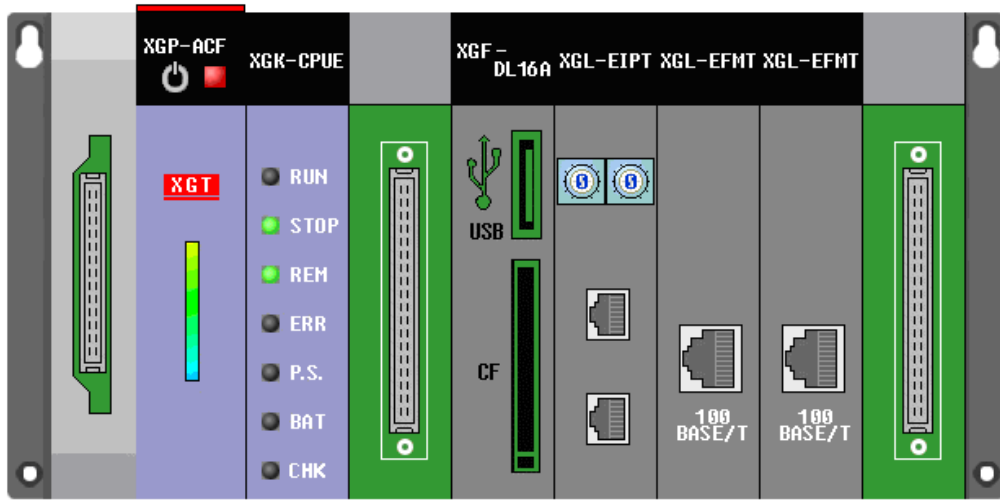
High-speed link information can be checked through the variable monitor on the monitor menu when XG5000 is online state, or through the XG5000 diagnosis service.

(1) Variable monitor

Variable monitor is a function to register the variables to be monitored and monitor the selected variables. Select [View] - [Variable Monitor Window] to display the variable registration screen as shown in [Fig. 6.5.1], and there select [Flag] directly to select and register High-speed link information flag one by one on the screen of the variable flags list. At this time, since `_HSxSTATE[n]`, `_HSxERR[n]`, `_HSxMOD[n]` and `_HSxTRX[n]` are the flags of array type, the user needs directly to select the array numbers which stand for the register numbers inside the parameters.

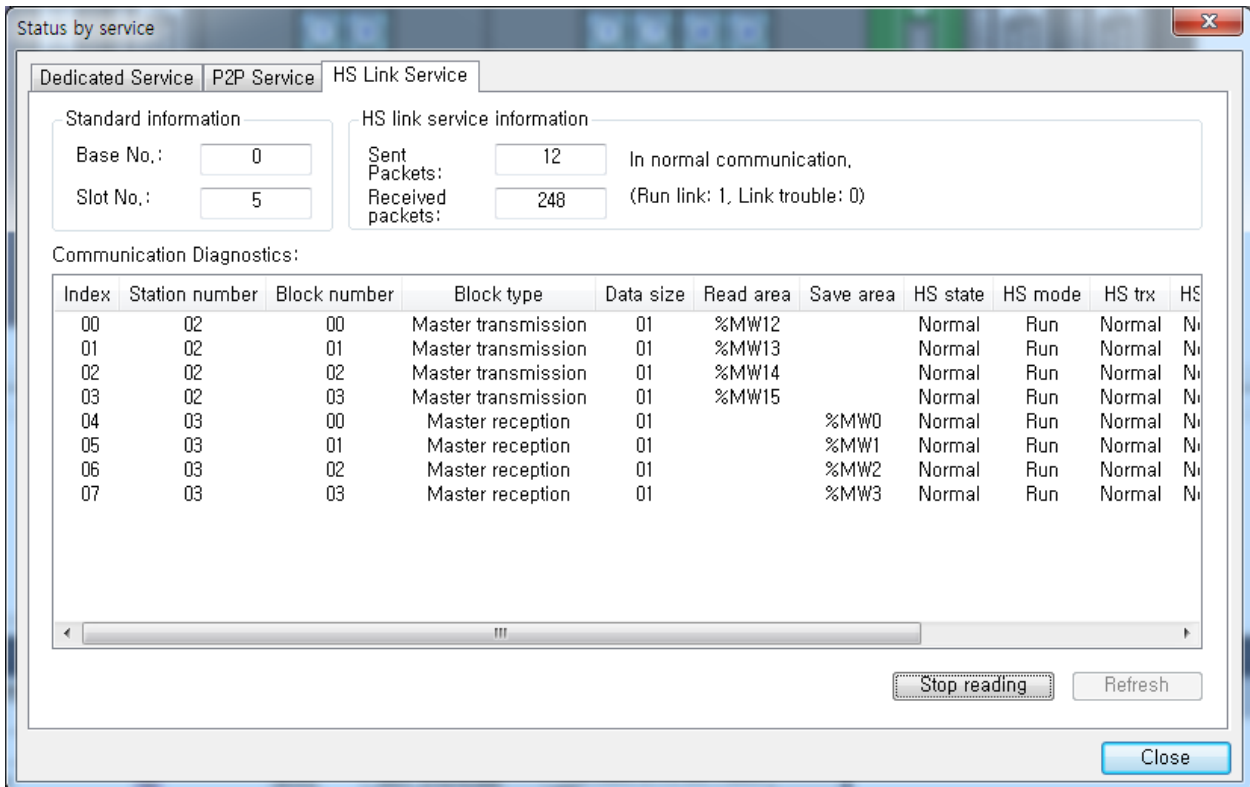
(2) High-speed link monitor from the XG5000 diagnosis services

- A) It will be available through the menu [Connect] -> [Online] -> [Communication module setting] -> [System Diagnosis] on XG5000.



[Fig. 6.5.2] System Diagnosis

(3) With the mouse cursor placed on the applicable module, click the right button of the mouse and select 'Status for Respective Services' to open [Fig. 6.5.3] screen as shown below.

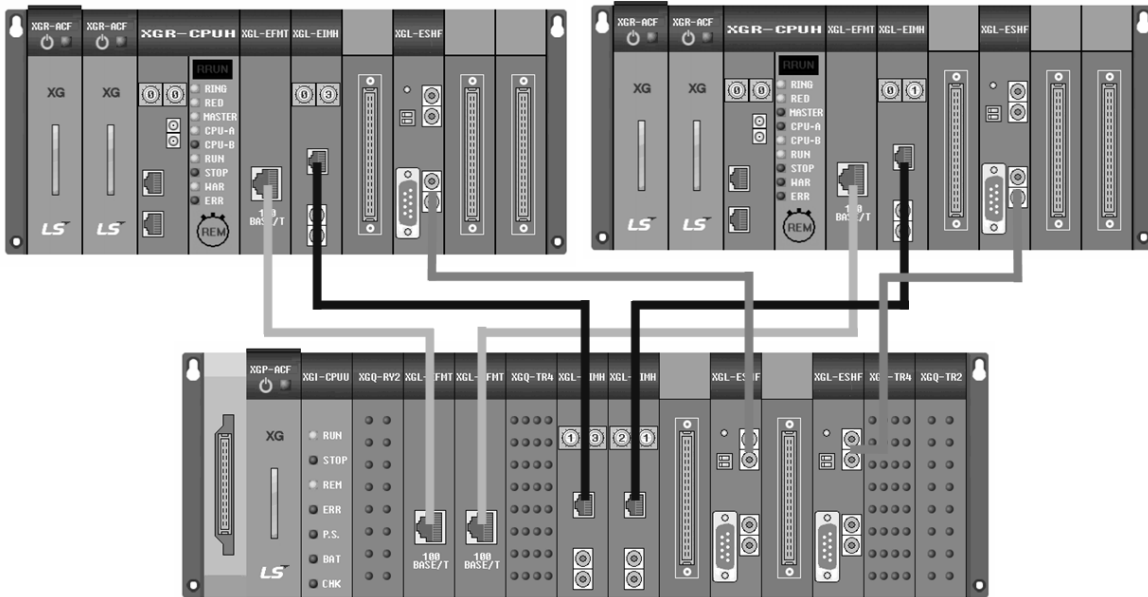


[Fig. 6.5.3] XG5000 Diagnosis Services (status for respective services)

## 6.6 High Speed Link at Redundant system

### 6.6.1 In case of redundant network

When configuration redundant NET, station number and IP address of A-Side and B-side can be set without restriction. Namely, they can use same station number (IP address) or different station number because their networks operate respectively. There is no restriction.



[Fig 6.6.1] Redundant network configuration

#### (1) In case XGR is transmission mode and XGK(I) is reception mode

##### 1) Publication of sequence number

When sending the data at XGR, The first 1 word should publish the sequence number (SEQ\_NO), this sequence number increases by 1 every scan.

##### 2) User data

The data to send actually is set other parts except the first 1 word. Since communication module of MASTER and STANDBY always execute same service at XGR system, the reception side should determine which data to get. And when there is error in one side, the reception part needs program to get the data of another side and not to get the data of one in error. The reception part can receive the correct data by receiving the data of updated sequence number.

##### 3) Input data setting of reception side

Reception part take the data of updated sequence number as input data regardless of A-Side or B-Side and memories the sequence number. Generally, scan time of Standby communication module is slower than that of Master communication module with amount of 1 scan. So reception part takes the data of Master side as input data and memorizes the sequence number at that time. Though there is data from Standby side, reception part ignores that data considering not updated sequence number.

If communication of one side is not available because of line error, the data having the not updated sequence number is not taken as input. So the user can take advantage of redundant system.

4) Function Block for High Speed Link

At XGR and XGI, there is function block to deal with the reception data. And at XGK, there is no function block. So apply the program acting as Function Block. Refer to Ch6.7

5) TX/RX method by using sequence number is standard algorithm. If there is special pattern according to user application, the user can't use this.

**(2) In case XGK(I) is transmission mode and XGR is reception mode**

1) TRX setting

Make the two modules of XGK(I) send same data by same setting. At this time, sequence number is not necessary. Take the data entering to the Master as input data and considering the network error, use the STATE FLAG as condition to take the input data. If STATE FLAG is OFF, copy the data of Standby to Master by SYNC instruction and take it as input data

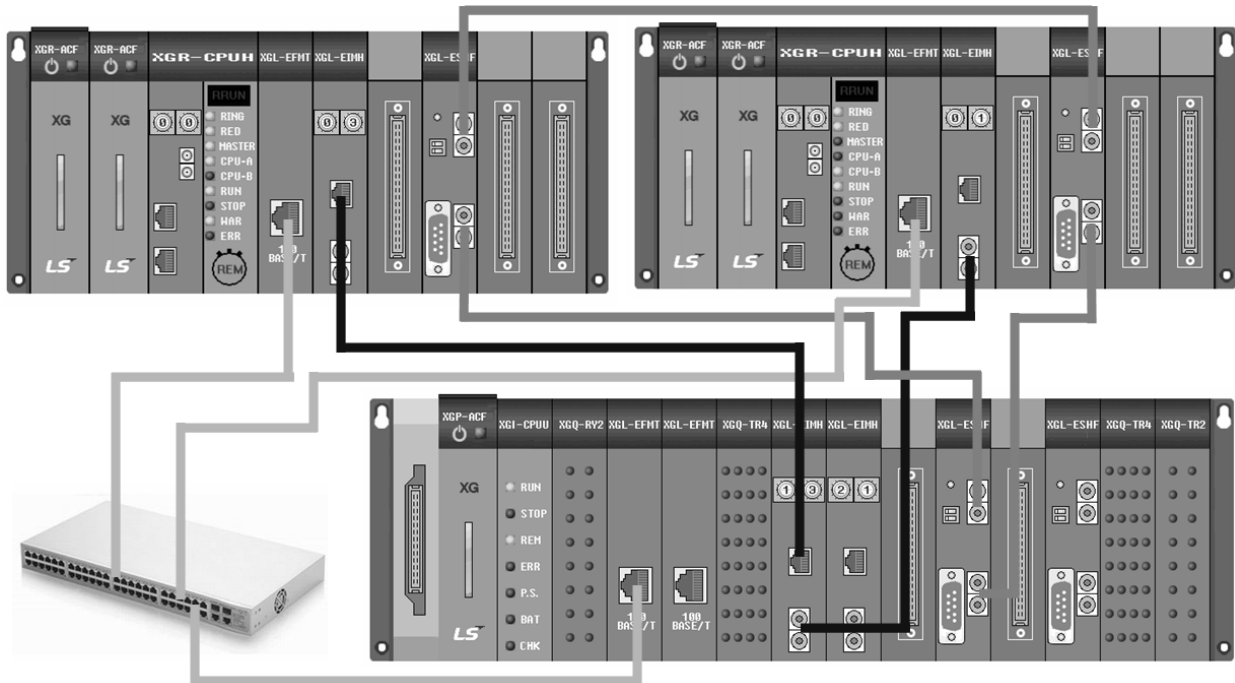
**Note**

(1) For block setting, A-Side and B-Side is used in same manner. So station number of TX is different, take the double of block.



### 6.6.2 In case of single network

In case of single network, A-Side and B-Side are in the same network so station number and IP address should be different.



[Fig 6.6.2] Single network configuration

(1) In case XGR is transmission mode and XGK(I) is reception mode

1) Data TRX

In case of transmission, since station to receive is only one, communication setting is same with that of XGK(I)-XGK(I). In the reception side, when FLAG is ON, receive the data of A-Side and when FLAG is OFF, receive the data of B-Side

(2) In case XGK(I) is transmission mode and XGR is reception mode

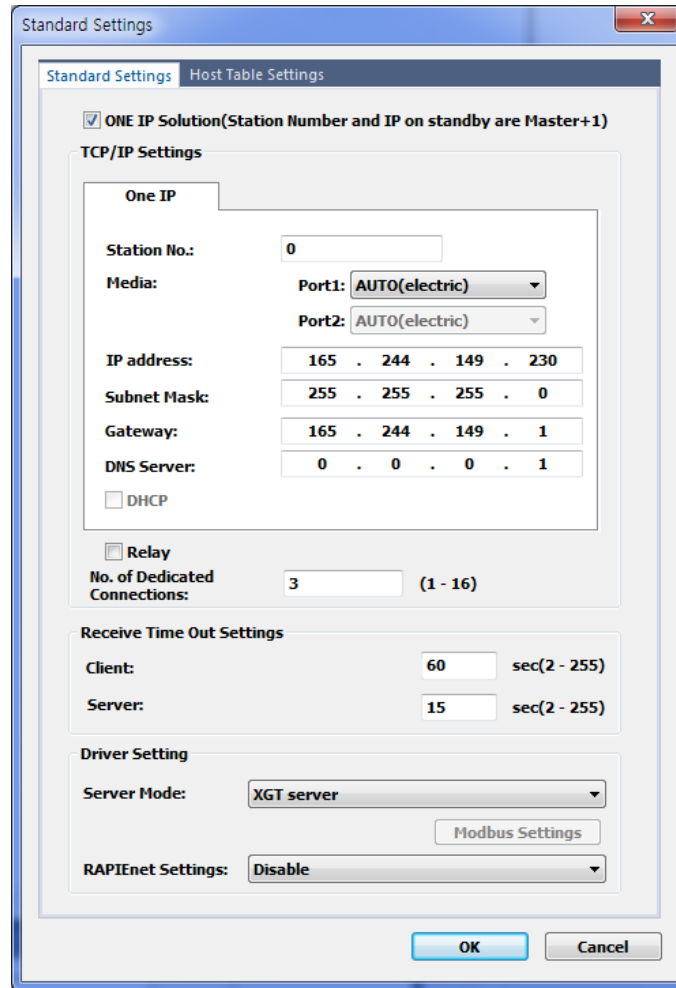
1) Data TRX

Make the XGK(I) send the same data to two communication module. In the reception side, take the data entering to Master as input data and use STATE FLAG as input condition of SYNC instruction to copy the Standby data to Master

**6.7 High Speed Link Setting Program Example**

**6.7.1 In case of redundant system**

- (1) In case XGR is transmission mode and XGK(l) is reception mode
  - 1) Communication setting (XGR transmission side)
    - a) Stand parameter setting (When One IP Solution is used and same HS link station number is applied)



[Fig 6.7.1] Communication redundant standard setting

b) HS link block setting (In case sequence number is saved in Block 0)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	A-side:0, B-side:0	0	%MW0	1		
1	MASTER	Send	A-side:0, B-side:0	1	%MW100	2		

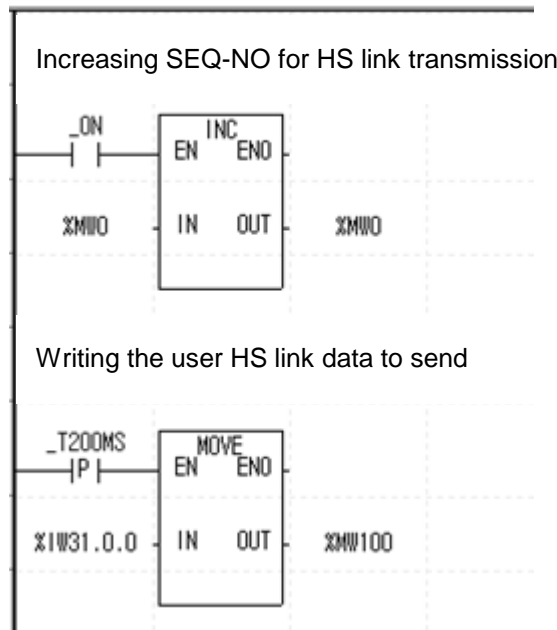
[Fig 6.7.2] HS link block setting including sequence

c) HS link block setting (In case of setting sequence number (First Word) and user data in Block 0)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	A-side:0, B-side:0	0	%MW100	3		

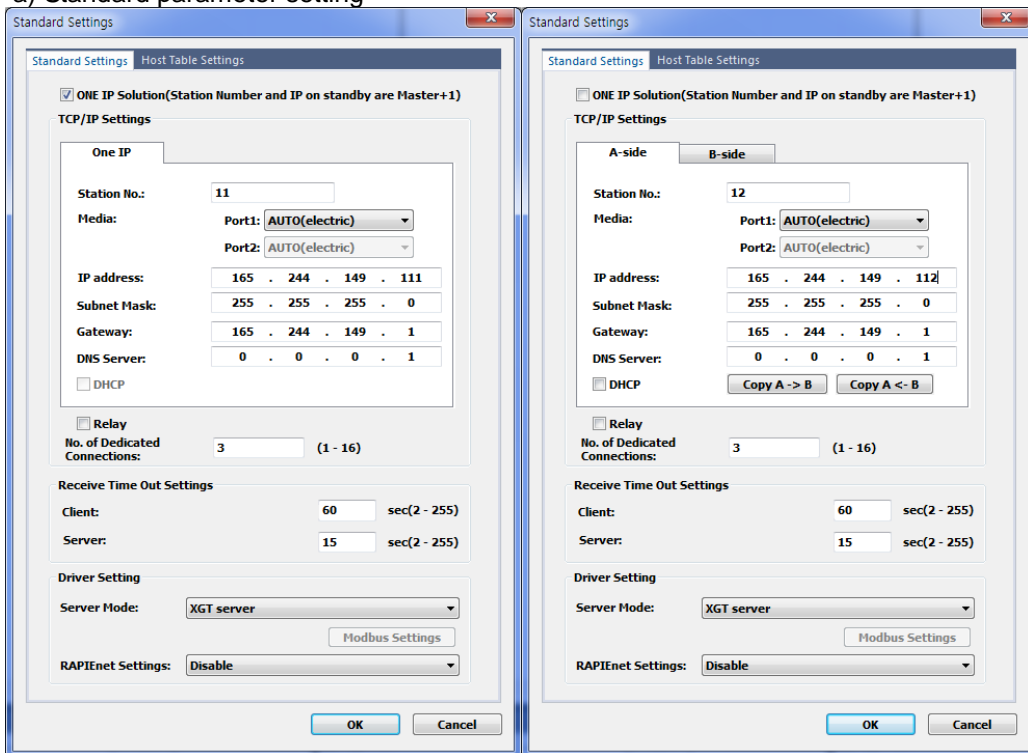
[Fig 6.7.3] HS link block setting not including sequence

- 2) Ladder program (XGR reception side)
  - a) Increase the sequence number in the first Block and set the data to send in the second Block



[Fig 6.7.4] sequence program setting screen

- 3) Communication setting (XGK(I) reception part)
  - a) Standard parameter setting



Standard setting of Comm. Module connected to A-Side

Standard setting of Comm. Module connected to B-Side

[Fig 6.7.5] Reception communication standard setting

## Chapter 6 High-speed Link Service

### b) HS link block setting (Comm. module connected to XGR A-Side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	0	0			%MW10	1
1	MASTER	Receive	0	1			%MW110	2

[Fig 6.7.6] HS link parameter setting including sequence reception

The user can set SEQ-NO and user data in one block like the figure below

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	0	0			%MW109	3

[Fig 6.7.7] HS link parameter setting not including sequence reception

### c) HS link block setting ( Comm. module connected to XGR B-Side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	0	0			%MW20	1
1	MASTER	Receive	0	1			%MW120	2

[Fig 6.7.8] HS link parameter setting including sequence reception

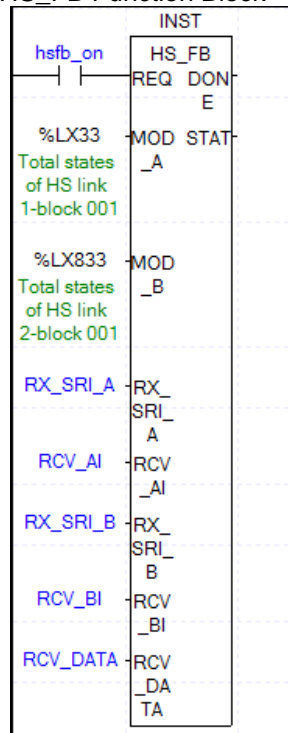
The user can set SEQ-NO and user data in one block like the figure below

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	0	0			%MW119	3

[Fig 6.7.9] HS link parameter setting not including sequence reception

## 4) Ladder program (XGK(I) reception side)

### a) Setting the input data by using HS\_FB Function Block

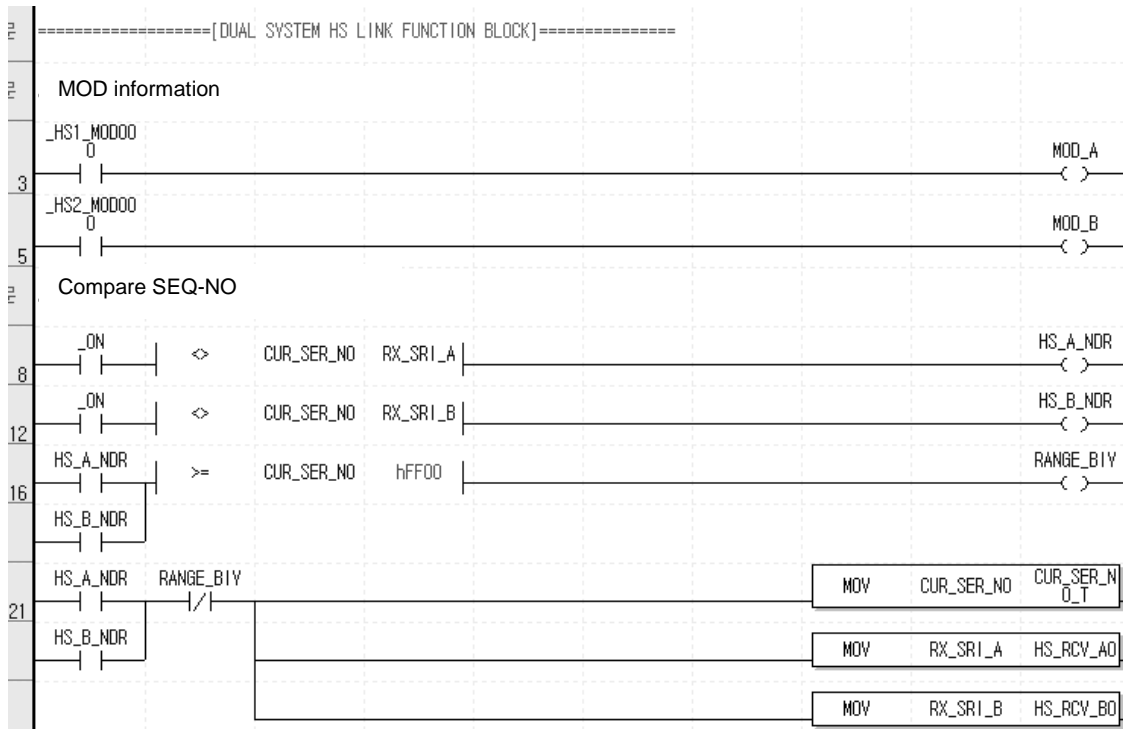


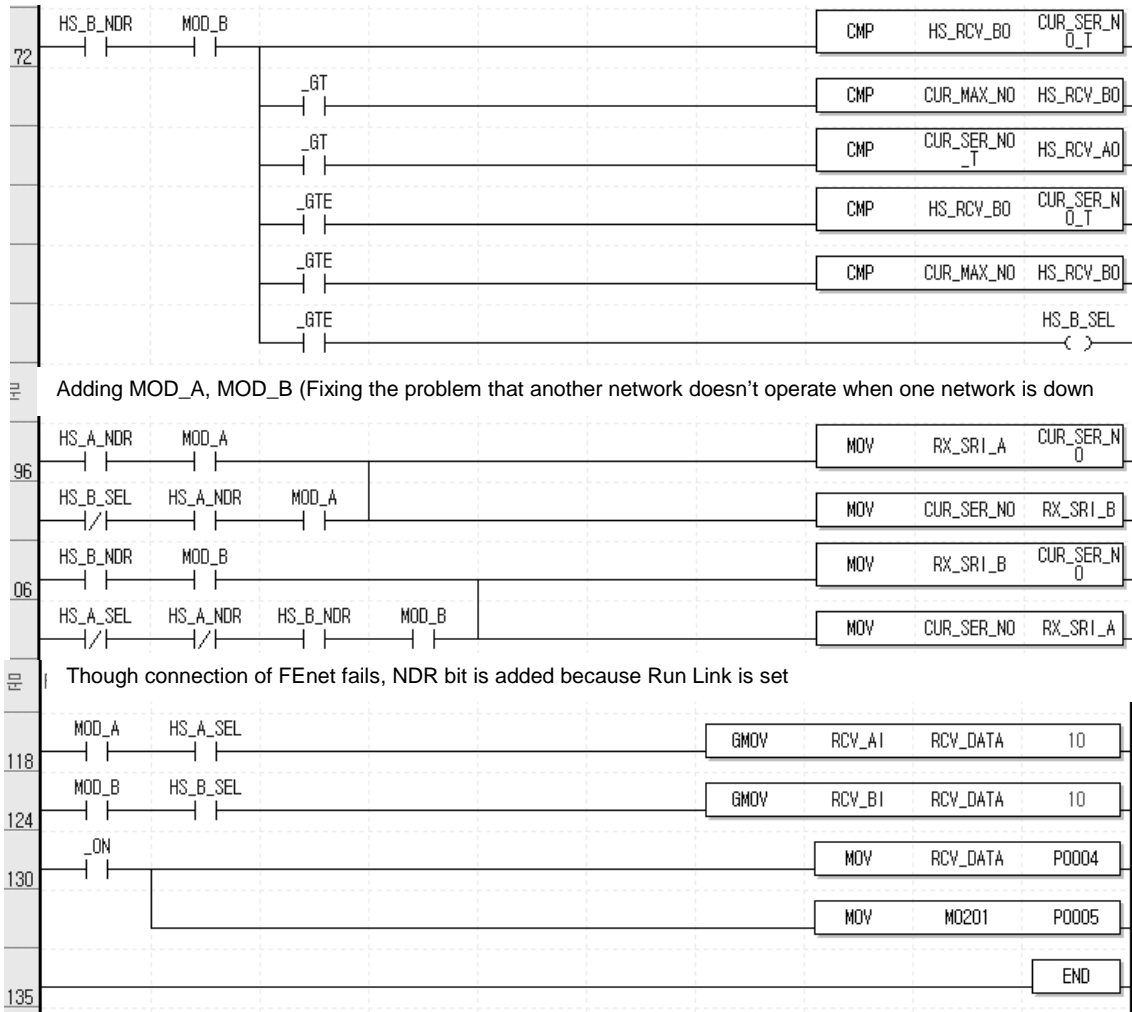
[Fig 6.7.10] Function Block for redundant HS link reception data

Classification	Contents
MOD_A	STATE FLAG about HS link input block of A-Side
MOD_B	STATE FLAG about HS link input block of B-Side
RX_SRI_A	SEQ No. of A-Side (Device setting (Word) of HS link first input block)
RCV_A1	Reception data of A-Side (flexible Array)
RX_SRI_B	SEQ No. of B-Side (Device setting (Word) of HS link first input block)
RCV_B1	Reception data of B-Side (flexible Array)
RCV_DATA	Input data considering SEQ No. of A-Side, SEQ No. of B-Side and STATE

b) HS link reception ladder program at XGK

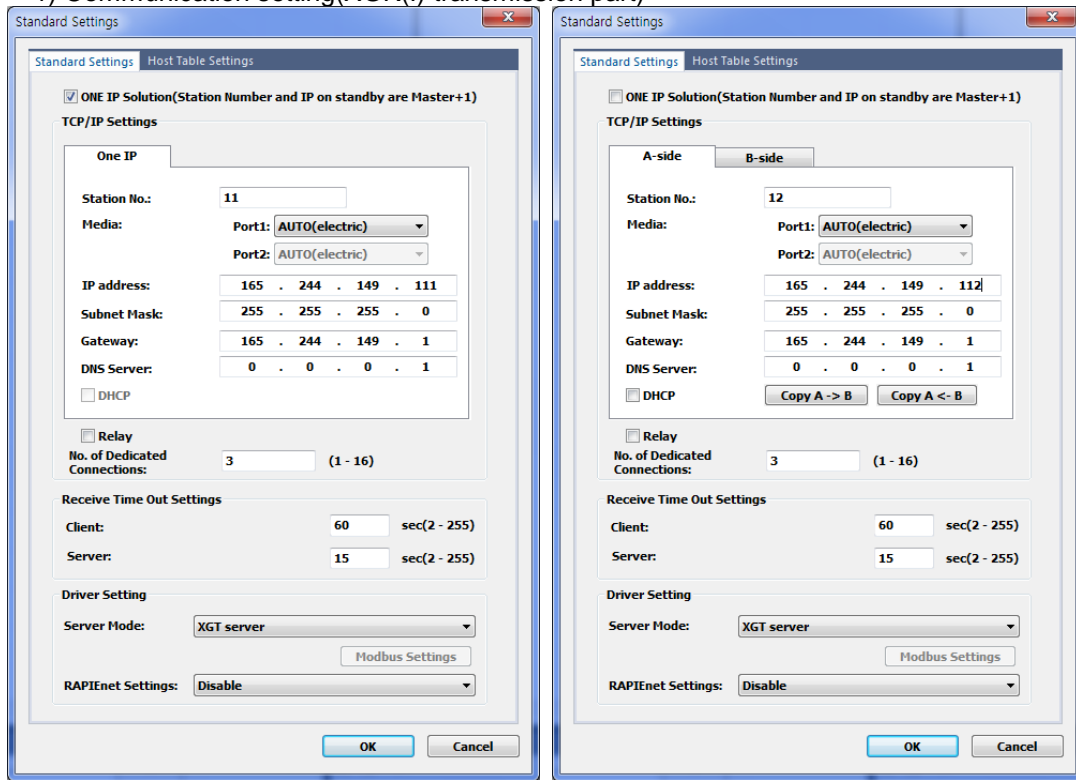
Since Function block is not provided at XGK, refer to the following ladder. Input SEQ-No. of A-Side/B-side at RX\_SRI\_A/B and input device of input data at RCV\_A1/B1. MOV instruction is set as size of 10 at the bottom item. Considering size of input, fix them. For other items, refer to Function Block used XGR(I) of same name.





(2) In case XGK(I) is transmission mode and XGR is reception mode

1) Communication setting(XGK(I) transmission part)



Standard setting connected to A-Side      Standard setting connected to A-Side  
 [Fig 6.7.11] Single standard setting

a) HS link block setting (Comm. module connected to XGR A-Side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	11	0	%Mw100	200		
1	MASTER	Send	11	1	%Mw100	200		

[Fig 6.7.12] A-SIDE High Speed Link parameter setting

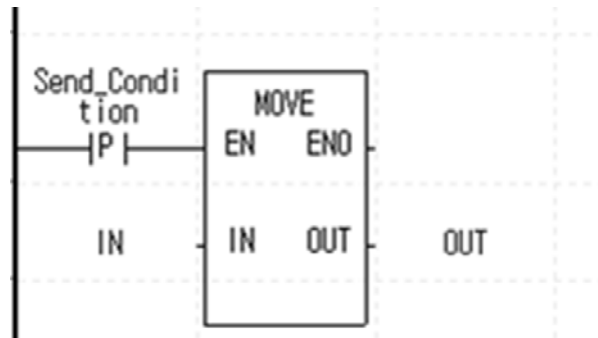
b) HS link block setting (Comm. module connected to XGR B-Side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	12	0	%Mw100	200		
1	MASTER	Send	12	1	%Mw100	200		

[Fig 6.7.13] B-SIDE High Speed Link parameter setting

2) Ladder program (XGK(I) reception side)

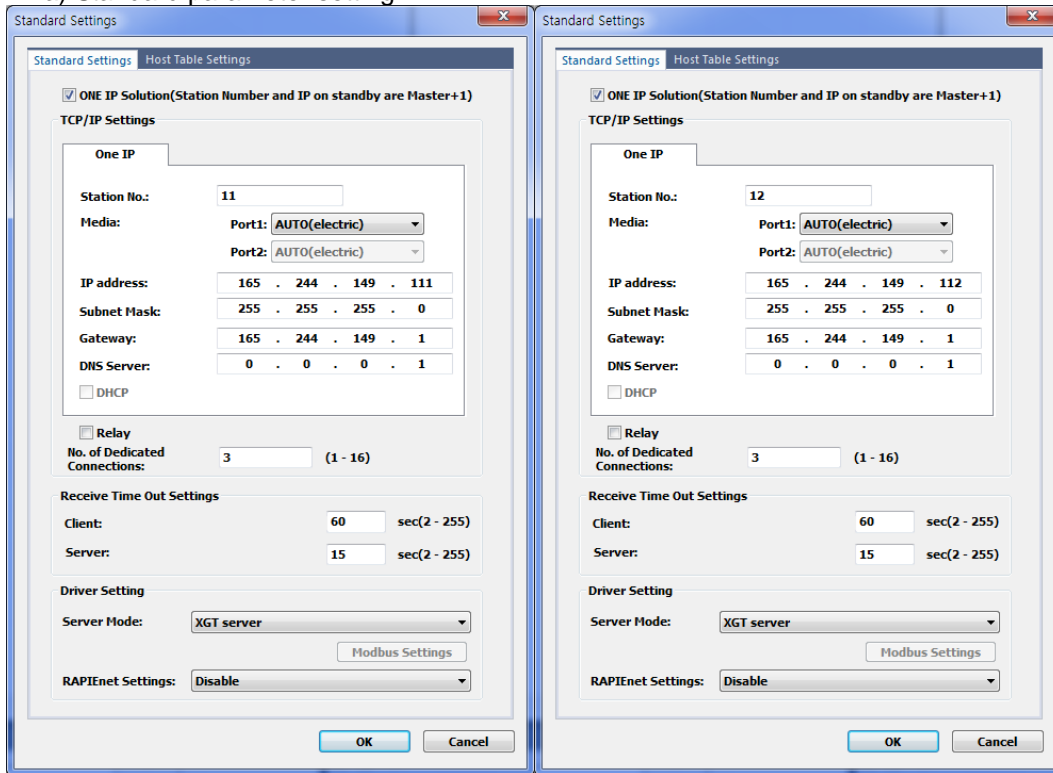
High speed link reception data setting



[Fig 6.7.14] Ladder program to send data



3) Comm. setting (XGR reception side)  
 a) Standard parameter setting



[Fig 6.7.15] redundant reception side standard setting

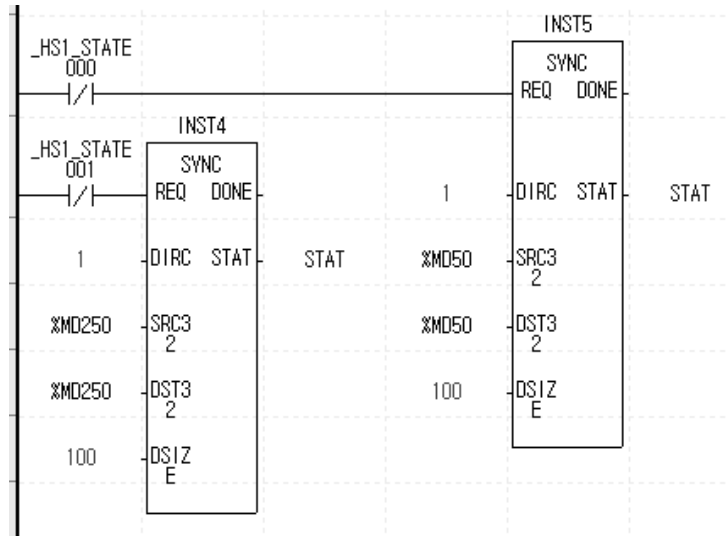
b) Block setting

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	11	0			%MW100	200
1	MASTER	Receive	11	1			%MW500	200
2	MASTER	Receive	12	0			%MW100	200
3	MASTER	Receive	12	1			%MW500	200

[Fig 6.7.16] Redundant HS link reception parameter setting

4) Ladder program (XGR reception side)

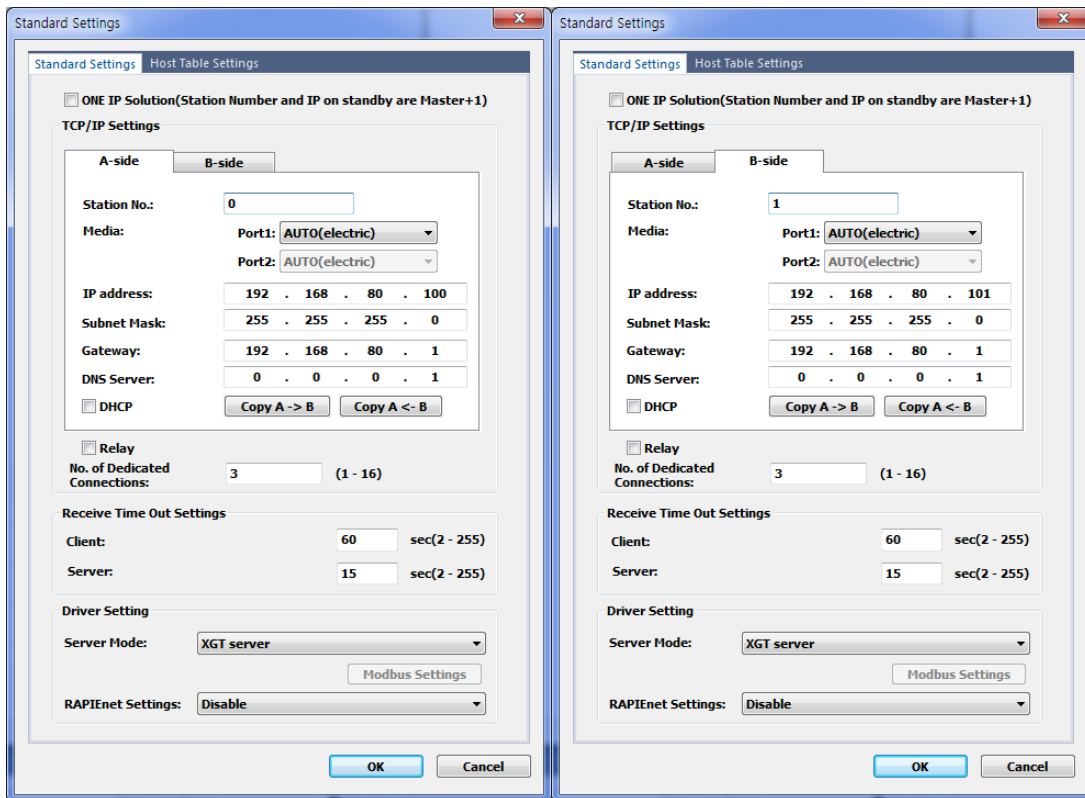
In case network is normal, the user can take data of Master side but in case network is not normal, the user copy the data of Standby to Master and take it as input data by using STATE FLAG and SYNC instruction. At this time, user should set all reception block of both A/B-Side so use STATE FLAG not \_HSx\_LTRBL as a condition to check network status



[Fig 6.7.17] Ladder program through SYNC instruction

### 6.7.2 In case of single network

- (1) In case XGR is transmission mode and XGK(I) is reception mode
- 1) Communication setting (XGR reception side)

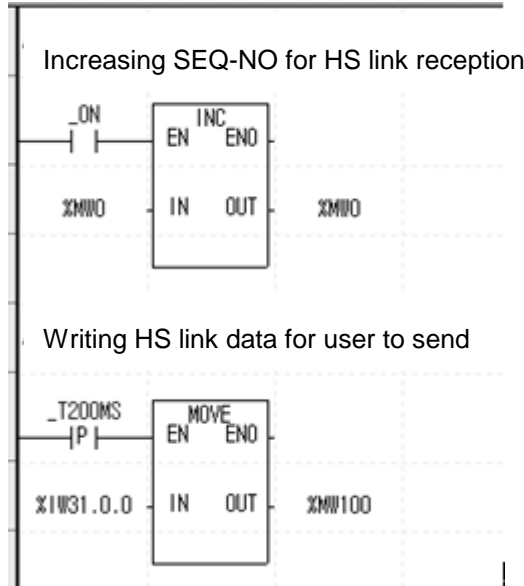


[Fig 6.7.18] redundant standard setting

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	A-side:0, B-side:1	0	%MW0	1		
1	MASTER	Send	A-side:0, B-side:1	1	%MW100	2		

[Fig 6.7.19] Redundant HS link parameter setting including SEQ-No.

2) Ladder program (XGR reception side)



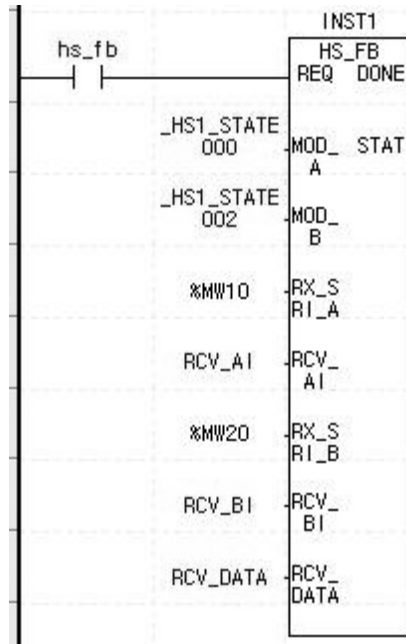
[Fig 6.7.20] sequence ladder program

3) Communication setting(XGK(I) reception side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	0	0			%MW10	1
1	MASTER	Receive	0	1			%MW100	2
2	MASTER	Receive	1	0			%MW20	1
3	MASTER	Receive	1	1			%MW120	2

[Fig 6.7.21] Reception side Hs link parameter setting including SEQ-No.

4) Ladder program (XGK(I) reception side)



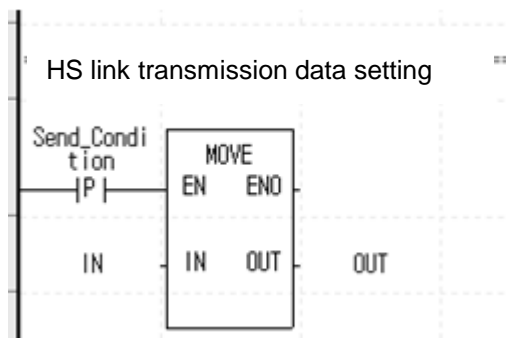
[Fig 6.7.22] HS link reception FB setting

(2) In case XGK(I) is transmission mode and XGR is reception mode  
 1) Communication setting (XGK(I) reception side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Send	11	0	%Mw0	200		
1	MASTER	Send	11	1	%Mw1000	200		

[Fig 6.7.23] HS link parameter setting

2) Ladder program (XGK(I) transmission side)



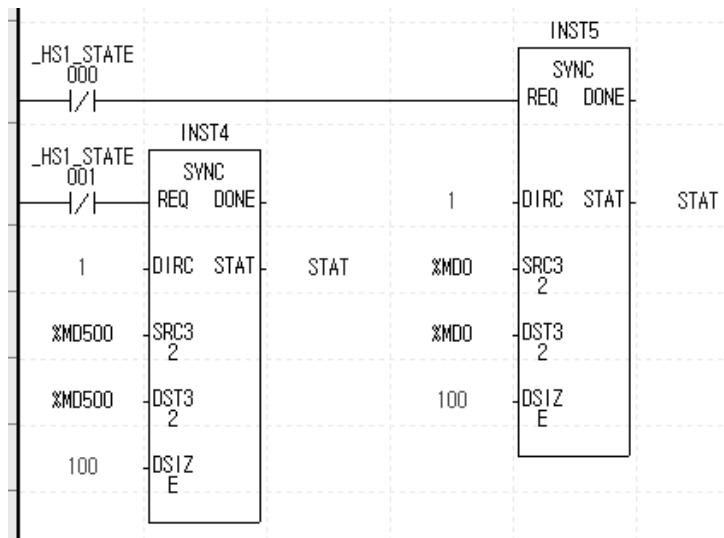
[Fig 6.7.24] Ladder program setting screen

3) Communication setting (XGR reception side)

Index	Station type	Mode	Station number	Block number	Read area	Read area Word size	Save area	Save area Word size
0	MASTER	Receive	11	0			%Mw0	200
1	MASTER	Receive	11	1			%Mw1000	200

[Fig 6.7.25] Redundant reception Hs link parameter setting

4) Ladder program (XGR reception side)



[Fig 6.7.26] Ladder program through SYNC instruction

# Chapter 7 P2P Service

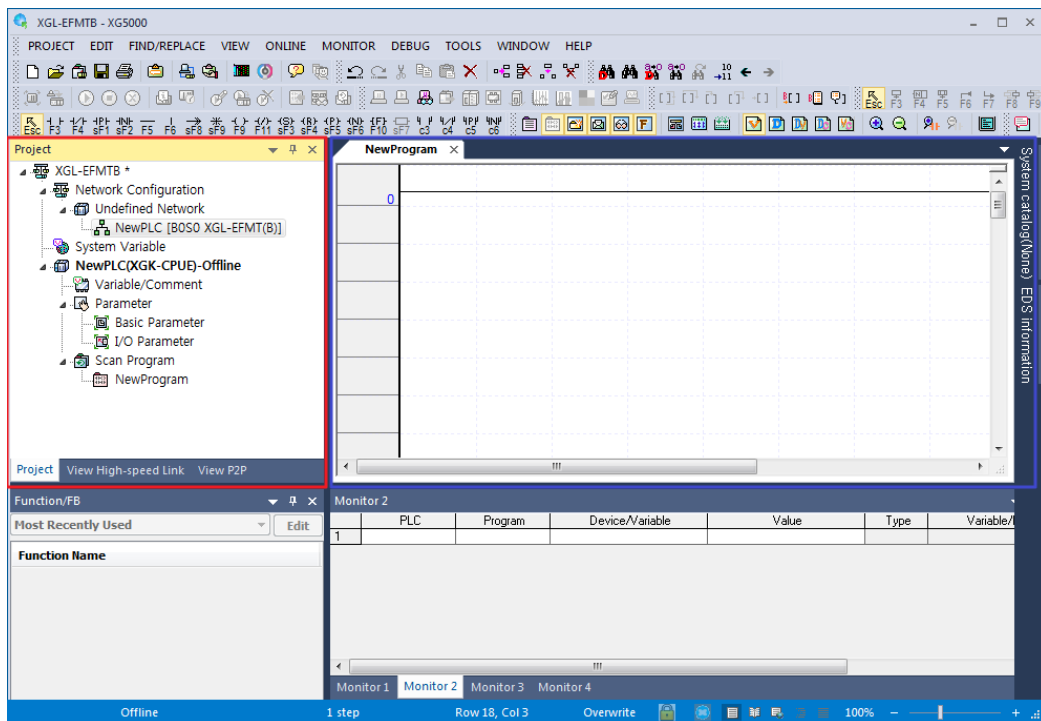
## 7.1 Introduction

### 7.1.1 Introduction to P2P service

P2P service executes Master operation of the communication module as realized with parameters setting which was with function blocks (instruction). 8 P2P instructions available in FEnet I/F module are Read, Write, Write\_NC, Send, Send\_NC, Receive, ESend and EReceive.

P2P service's registration and edit is executed in XG5000 where up to 8 P2P parameters can be setup. Respective P2P parameter is composed of up to 64 P2P blocks.

[Fig. 7.1.1] shows an example of P2P parameters setting window in XG5000.



[Fig. 7.1.1] Setting window of XG5000's P2P parameters

#### (1) P2P parameters registration window

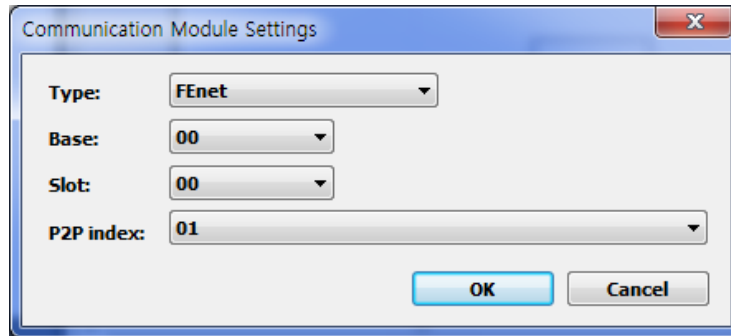
- Up to 8 P2P parameters can be setup.
- Multiple P2P parameters can be setup for an identical communication module.
  - However, Enable is available only for 1 parameter among the multiple P2P parameters for the identical communication module.
- Respective P2P parameter is composed of P2P channel, P2P block, user defined frame and e-mail.

#### (2) P2P edit window

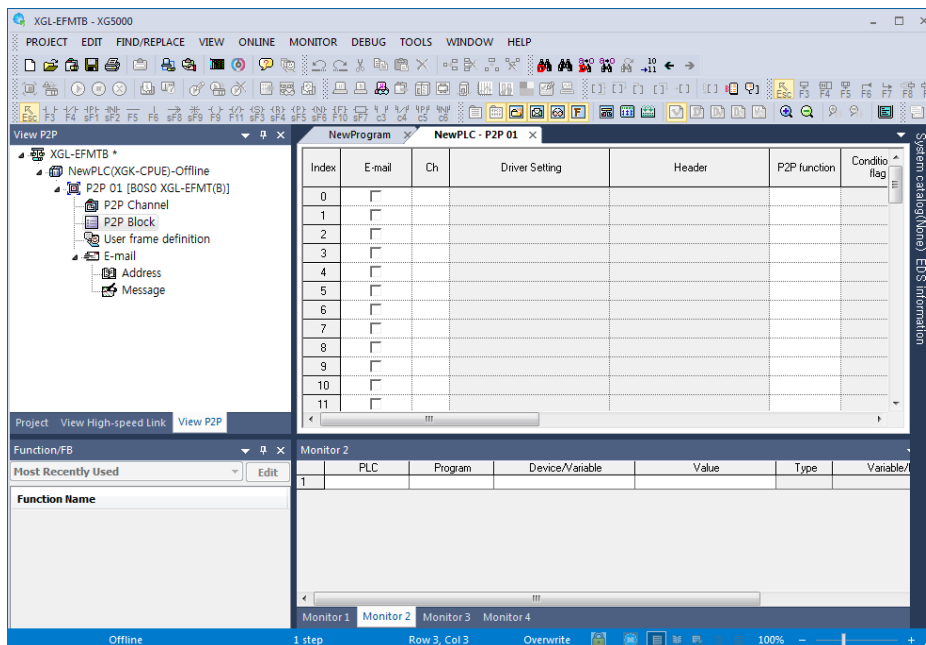
- Up to 64 P2P blocks can be registered and edited.
- Separate frame registration is available for respective drivers.

## 7.1.2 Configuration of P2P parameters

In order to use P2P service the user needs to execute setting for the operation desired on the P2P parameters window. Specify type, base and slot as desired on the P2P screen to display P2P parameters setting screen composed of 4 kinds of information as shown in the figure below;



[Fig. 7.1.2] P2P parameters module setting



[Fig. 7.1.3] Setting and registration screen of P2P parameters

- (1) P2P channel
  - Logical channel of P2P Service (IP, PORT, dedicated driver) to be executed can be setup.
  - User defined frame, XGT client and MODBUS TCP client setting available.
  - Communication device setting available which uses other protocol than XGT/MODBUS TCP.
- (2) P2P block
  - 64 P2P blocks setting separately operated.
- (3) Define user frame
  - Registration of user defined frames.
- (4) E-mail
  - Frame registration to transmit and receive e-mail frames.

## 7.2 Type of P2P Service

### 7.2.1 Type of P2P Instructions

(1) P2P instructions

6 instructions are available for programming P2P communication service, and each instruction will be used with different purpose according to respective service methods as described in the table below, for reference.

Classification	Instruction	Purpose
XGT Client	Read	Reads the area specified by destination station.
	Write	Transmits native station's area data to destination station.
	Write_NC	Transmits native station's area data to destination station. (No confirmation)
User defined frame	Send	Transmits native station's area data to destination station.
	Send_NC	Transmits native station's area data to destination station. (No confirmation)
	Receive	Saves the data received from destination station.
Modbus Client	Read	Reads the area specified by destination station.
	Write	Transmits native station's area data to destination station.
E-mail	ESend	Transmits a message if an event occurs.
	EReceive	Receives a message if an event occurs.

[Table 7.2.1] Type of P2P instructions

#### Note

1) Difference between Write (Send) and Write\_NC (Send\_NC)

In general P2P communication, it sends the request data at start condition, and then it sends the request data again at next start condition after receiving the response. If you use "Write\_NC (Send\_NC)" instruction, it sends data at next start condition without receiving response. Because of that, faster communication is available. The Read (Receive) service that requires response does not support this option.

※ TX data for one start condition should be less than 3KB. If not, communication error may occur

2) For Write\_NC, Send\_NC instructions, the following version is needed.

Item	Version
XG5000	V3.61 or above
XGR CPU	V1.91 or above



### 7.2.2 Type of P2P Service

(1) XGT Enet Client/XGT Cnet Client (OS V6.0 or above)

XGT Client service is used to communicate between XGT FEnet I/F modules. Through its own protocol built-in without additionally defined frame, the user can specify communication settings simply with basic settings of channel, data type (BIT, BYTE, WORD, etc.) and memory area. Use port No.2004 for TCP, and port No.2005 for UDP protocol.

(2) User defined frame

This service is used to communicate between XGT FEnet I/F module and other company's Ethernet devices. Since the communication protocol of devices based on Ethernet is differently defined by different makers, all kinds of communication drivers can not be provided for respective device. Thus, the user is allowed to edit appropriately to the characteristics of the applicable communication module, for which the user needs to specify User Defined Frame and then define the Ethernet user's frames with basic structure composed of Header, Body and Tail. Up to 16 channels can be specified.

(3) Modbus Client / Modbus RTU (OS v6.0 or above) / Modbus ASCII(V6.0 or above) client

XGT FEnet supports Modbus protocol widely used as of now as well as User Defined protocol.

(4) RAPIEnet Client (OS v6.0 or above)

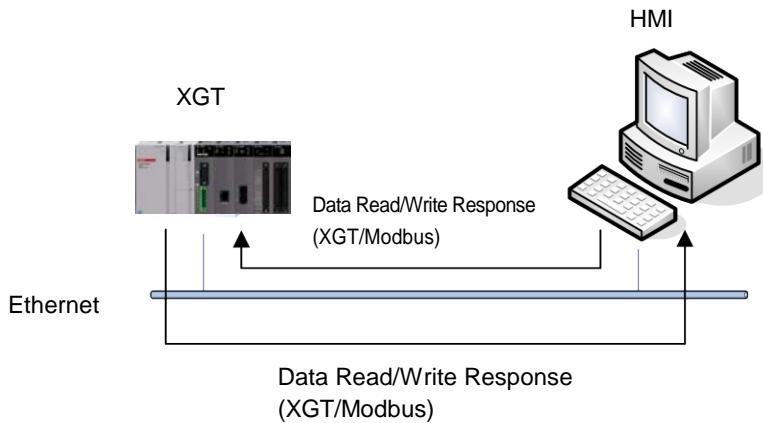
RAPIEnet client service can be used if RAPIEnet is enabled in basic parameter.

## 7.3 How to Set P2P Service

### 7.3.1 Ethernet (server) driver

(1) Driver setting

Ethernet (server) driver stands for the protocol built-in XGT FEnet module. 2 kinds of server protocol, XGT server and MODBUS TCP/IP, are built-in XGT FEnet I/F module. Ethernet(server) driver can be used to communicate between Ethernet devices with XGT or MODBUS TCP/IP protocol. The destination station in Ethernet communication system is generally MMI (or HMI), where communication is available with the correspondent device only through parameters setting without additional communication programming by user. [Fig. 7.3.1] shows the typical example of communication with MMI PC with Ethernet driver used, where FEnet responds if MMI PC requests to read or write data.



[Fig. 7.3.1] Example of Ethernet (server) driver application

(2) Type of Ethernet (server) drivers

Driver types available are as specified below;

Type	Description
XGT Enet server	XGT FEnet dedicated protocol by LSIS
XGT Cnet server (OS v6.0 or above)	XGT Cnet dedicated protocol by LSIS
Modbus TCP/IP server	Open type of protocol by Modicon
Modbus ASCII server (OS v6.0 or above)	Open type of protocol by Modicon
Modbus RTU server (OS v6.0 or above)	Open type of protocol by Modicon
RAPIEnet server (OS v6.0 or above)	RAPIEnet protocol by LSIS

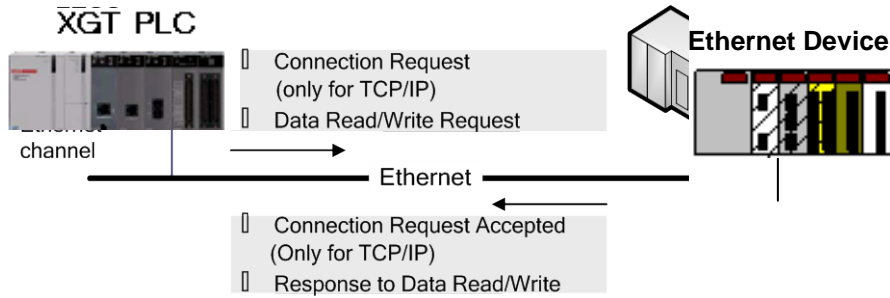
[Table 7.3.1] Types of Ethernet (server) drivers

### Notes

- (1) The number of drivers is changeable according to specified Ethernet channel.  
Be careful! If Ethernet channel is specified, the number of drivers available will be decreased as many as specified.
- (2) Ethernet (server) driver supports 1:N communication, where accordingly, several master devices can take data through a specified port connected with.
- (3) Each port of server can be connected simultaneously up to 64.

7.3.2 P2P channel

Ethernet P2P channel is used when XGT FEnet I/F module executes the master function of communication with built-in XGT protocol or user defined protocol.



[Fig. 7.3.2] Application of P2P channel information

(1) Setting of P2P channel

FEnet I/F module can send and receive data using up to 16 channels, which is composed of IP address and port No. for two Ethernet devices. The number of channels available for P2P service is the maximum number of channels (16) minus the number of dedicated connections in the basic parameters (The number of P2P channels = 16 – the number of dedicated connections).

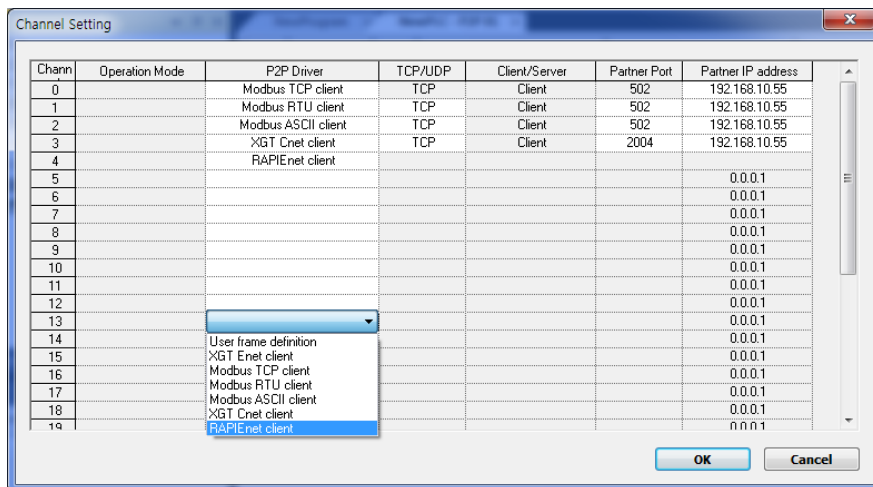
The maximum number of channels for modules with V6.0 or above is 32 regardless of the number of dedicated connections.

P2P communication is available with simple parameters setting to communicate with the device using XGT or Modbus TCP protocol for user’s convenience. And for the communication with other devices than described above, user can directly define frames as necessary.

In addition, messages and e-mail addresses can be registered to transmit and receive e-mail frames (ASCII supports).

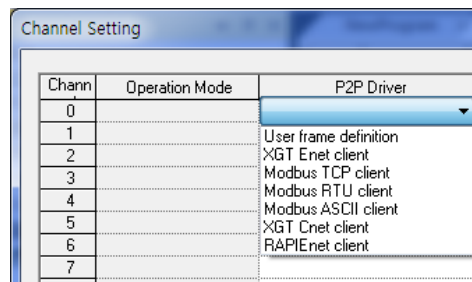
However, it is not necessary to set the channel for e-mail communication.

If P2P channel is selected on the P2P setting window, the P2P channel setting window will appear as follows:



[Fig. 7.3.3] P2P channel settings window

If the desired port is selected, “P2P Channel Settings” window will appear for the user to define P2P driver type applicable for the port.



[Fig. 7.3.4] P2P driver client setting

Drivers and details available in XGT FEnet I/F are as follows;

Items		Details
P2P Driver	User frame definition	Used to send/receive data with user defined frame.
	XGT Enet client	XGT dedicated (Built-in) protocol (The user doesn't need to define the frame)
	XGT Cnet client (OS V6.0 or above)	XGT dedicated Cnet protocol. It communicates with LSIS Cnet I / F module connected with LTE modem.
	Modbus TCP client	MODBUS TCP protocol of MODICON
	Modbus ASCII Client (OS V6.0 or above)	MODBUS ASCII protocol of MODICON
	Modbus RTU Client (OS V6.0 or above)	MODBUS RTU protocol of MODICON
RAPIEnet Client (OS V6.0 or above)	Set RAPIEnet client. (However, RAPIEnet must be enabled in the basic parameter.)	
TCP/UDP	Selects TCP or UDP. If user select Modbus TCP, this item is fixed as TCP	
Client/Server	Select Client/Server. If user select the protocol as XGT/Modbus TCP, this item is fixed as Client	
Partner Port	Inputs port number of partner. When defining protocol as User frame definition, user can define port number. H400~H1024 For XGT client, this item is fixed as 2004 and Modbus TCP client is fixed as 502.	
Partner IP address	Input IP address of Partner device	

[Table 7.3.2] Type of P2P driver clients

**Note****1) Partner IP address**

In case XGT is client, set the IP address of server device, If server uses DHCP for dynamic IP address, XGT can't communicate with server because IP address changes. So server have to use the fixed IP address.

If XGT or Modbus is selected as P2P driver type for the communication port, user defined frame can not be registered.

1) How to use Modbus driver

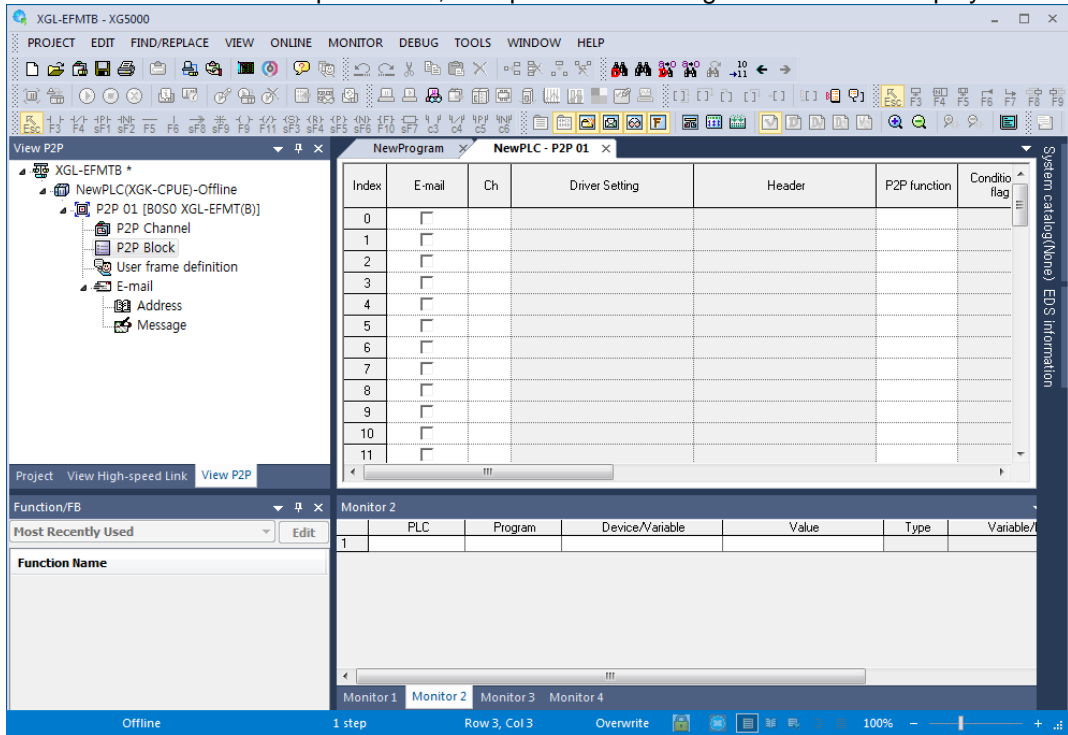
[Table 7.3.3] displays instructions and addresses of Modbus devices.

Code	Function code name	Modicon PLC data address	Remarks
01	Output Contact Status Read (Read Coil Status)	0XXXX(bit-output)	Bit Read
02	Input Contact Status Read (Read Input Status)	1XXXX(bit-input)	Bit Read
03	Output Register Read (Read Holding Registers)	4XXXX(word-output)	Word Read
04	Input Registers Read (Read Input Registers).	3XXXX(word-input)	Word Read
05	Output Contact 1 Bit Write (Force Single Coil)	0XXXX(bit-output)	Bit Write
06	Output Register 1 Word Write (Preset Single Register)	4XXXX(word-output)	Word Write
15	Output Contact Continuous Write (Force Multiple Coils)	0XXXX(bit-output)	Bit Write
16	Output Register Continuous Write (Preset Multiple Register)	4XXXX(word-output)	Word Write

[Table 7.3.3] Modbus TCP address MAP

### 7.3.3 P2P Block

If user select P2P block of relevant parameter, P2P parameter setting window will be displayed.



[Table 7.3.5] selection of P2P block

Up to 64 independent blocks are available. If user selects some block at XG5000, user can set the function of block.

Index	E-mail	Ch.	Driver Setting	P2P function	Conditional flag	Command type	Data type	No. of variables	Data size	Frame
0	<input type="checkbox"/>	0	XGT client	READ	F00092	Single	1 BYTE	1		
1	<input type="checkbox"/>									
2	<input type="checkbox"/>									
3	<input type="checkbox"/>									
4	<input type="checkbox"/>									

[Fig 7.3.6] P2P instruction

Each item is as follows

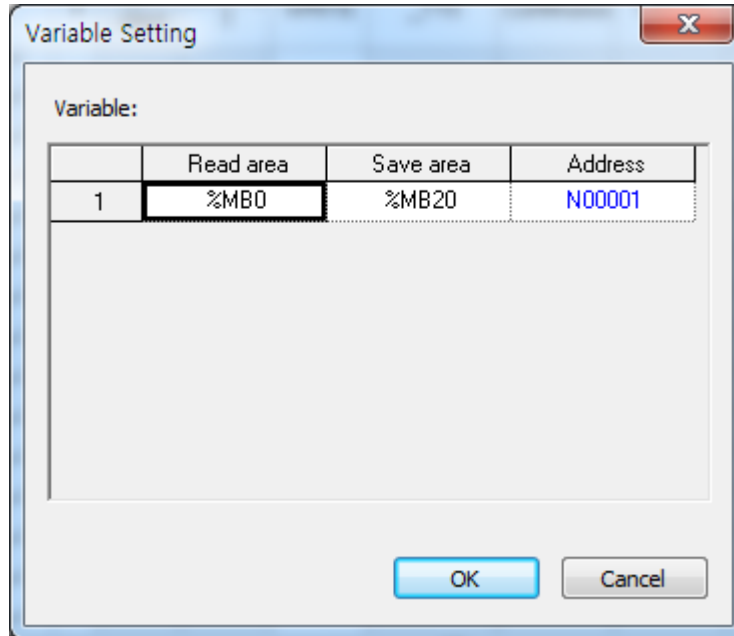
- (1) E-mail  
Used for E-mail service
- (2) Channel  
Select a communication port which will be used by the applicable block.  
The communication port for each block is decided when P2P Channel is setup, which can not be changed during Run.
- (3) Driver Setting  
Indicates communication driver set in P2P setting. When setting channel, driver is loaded automatically according to channel. If it is deleted at P2P channel setting, driver will be deleted automatically. For more detail, refer to CH7.3.2 P2P channel.



- (4) P2P function  
Let the driver execute READ or WRITE
  - 1) READ  
It is used when reading some area of partner device and save them. It is applied to XGT Client and Modbus TCP client driver  
Available memory area: P,M,K,F,T,C,U,Z,L,N,D,R,ZR,%Q,%I,%M etc.
  - 2) WRITE  
It is used when writing the data at some area of partner area. It is applied to XGT Client and Modbus TCP client driver. Single and Continuous Write are supported. Writing at up to 4 independent area is available.  
Available memory area: P,M,K,F,T,C,U,Z,L,N,D,R,ZR,%Q,%I,%M
  - 3) Send  
It is used when sending User defined protocol to external device. It is applied to user frame definition. Memory setting about Variable sized/Fixed sized variable of relevant frame should be set. Before using this function, defining the frame to send is necessary.
  - 4) Receive  
It is used when receiving frame from external device. User can't select same frame about each P2P Frame Receive function block. Rx function block about Rx frame determines one.
- (5) Condition flag  
Define the condition to operate P2P block. A bit device is available for condition flag and the P2P block will be operated at the rising edge of the condition flag.
- (6) Command type  
Decide details of Read operation. Single and Continuous are available for Instruction Type. Up to 4 memory areas are available for Single Read function, and Continuous Read reads as many bytes as defined on the 'Data Size' item.
- (7) Data type  
Define the format of the data the block will process. Bit, Byte, 2bytes (Word), 4bytes (Double Word) and 8bytes (Long Word) data can be processed in Single read function and BYTE only is available for Continuous read function.
- (8) Number of variables.  
It is activated when 'Single' is selected in the 'Instruction' field. Decide the number of areas to read. Up to 4 is available.
- (9) Data size  
It is activated when 'Continuous' is selected in the 'Instruction' field. Since BYTE is fixed in the Data type when XGT Client driver is used, Data Size can be assigned in BYTE size.
- (10) Frame  
Selects the relevant frame (Group) to execute communication in case of User frame definition

### (11) Setting

When setting XGT client or user definition frame, it defines the memory area to send/receive. In case of TX, it sets the area to send (M0000) and to save the data from partner device.



The image shows a dialog box titled "Variable Setting" with a close button (X) in the top right corner. Below the title, the text "Variable:" is displayed. A table with four columns is shown: "Read area", "Save area", and "Address". The first row contains the values "%MB0", "%MB20", and "N00001". The "Read area" cell is highlighted with a black border. Below the table is a large empty rectangular area. At the bottom of the dialog box are two buttons: "OK" and "Cancel".

	Read area	Save area	Address
1	%MB0	%MB20	N00001

### 7.3.4 User Defined Frame

Send/Receive frames must be defined if there are frames to be sent or received whose structure is different from the structure of XGT dedicated frame or Modbus TCP frames in the network. This is available only in P2P service.

All the frames are composed of Header, Data and Tail which can be omitted respectively.

In XGT, user defined frames are displayed with group name and frame name whose details are as follows;

(1) Group

- 1) Group of frames with identical header and tail.
- 2) Group registration surely necessary for the frame registration.

(2) Frame

- 1) Composed of Header, Body and Tail
- 2) Send/Receive frame shall be defined
- 3) Fixed and Variable size variables can be added to Body
- 4) Frame is composed of lots of segments, and up to 4 variable segments can be registered for a Body.

(3) Type of segments

Header, Body and Tail of the frame are composed of lots of segments, which can be registered on the frame edit window as below.

Segment	Frame	Size	Data	Assign memory	Conversion	Swap	Memory
00	Numerical constant	1	01	<input checked="" type="checkbox"/>			
01	String Constant	4	TEST	<input checked="" type="checkbox"/>			

[Fig. 7.3.7] Register of Segments

Segments used to configure the frame are numerical constant, String Constant, Fixed or Variable size variables.

Segment	Frame	Size	Data	Assign memory	Conversion	Swap	Memory
	Numerical constant			<input type="checkbox"/>			
	String Constant			<input type="checkbox"/>			

[Fig. 7.3.8] Add segment screen

1) Numerical constant

The part to be fixed as Constant shall be defined among frames, with the value of the data item specified in hexadecimal.

	Segment	Frame	Size	Data	Assign memory	Conversion
	00	Numerical constant	3	123456	<input type="checkbox"/>	
					<input type="checkbox"/>	

[Fig. 7.3.9] Numerical constant to select and input

2) String Constant

String Constant shall be registered among frames, with the value of the data item specified in ASCII code.

<input type="button" value="Up"/> <input type="button" value="Down"/> <input type="button" value="Add BCC"/> <input type="button" value="Add Line"/> <input type="button" value="Delete Line"/>						
	Segment	Frame	Size	Data	Assign memory	Conversion
	00	String Constant	4	ABCD	<input type="checkbox"/>	
					<input type="checkbox"/>	

[Fig. 7.3.10] String Constant to select and register

3) Fix sized variable

It is available only in the Body area of the frame, and used to process data whose size is as long as defined value (size is of Byte). Check "Assign memory" to read data from PLC memory when send frame is registered and save the received data on PLC Memory when receive frame is registered. Conversion and swap processing are available for the data when FENet module read data from PLC memory or save data on PLC memory.

<input type="button" value="Up"/> <input type="button" value="Down"/> <input type="button" value="Add BCC"/> <input type="button" value="Add Line"/> <input type="button" value="Delete Line"/>						
	Segment	Frame	Size	Data	Assign memory	Conversion
	00	Fix sized variable	4		<input type="checkbox"/>	

[Fig. 7.3.11] Fix sized variable to select and register

4) Variable sized variable

a) Available in the Body area of the frame

b) Send Frame

Used to change the length of frame.

Check “Assign memory” to configure the send frame with the data read from PLC memory.

c) Receive Frame

(a) Used to process the Variable sized data among the received frames.

(b) Registration available only in the last segment in the Body area.

Check “Assign memory” to save the data for the applicable segment among the received frames. (Swap and conversion are available)

Segment	Frame	Size	Data	Assign memory	Conversion	Swap	Memory
00	Variable sized variable			<input checked="" type="checkbox"/>	NONE	NONE	

[Fig. 7.3.11] Variable sized variable to select and register

(4) Data Conversion Processing

In order to convert data from Hexadecimal to ASCII code when frames are sent and received, or execute Byte swap, the applicable setting shall be specified on the frame edit window.

1) Conversion

- Hex To ASCII

Send: converts read data from PLC memory to ASCII code so to configure send frame.

Receive: converts received data to ASCII so to save.

- ASCII To Hex

Send: converts read data from PLC memory to Hexadecimal code so to configure send frame.

Receive: converts received ASCII code data to Hexadecimal code so to save.

Segment	Frame	Size	Data	Assign memory	Conversion	Swap
00	Variable sized variable			<input checked="" type="checkbox"/>	NONE	NONE

[Fig. 7.3.13] Data processing method to select

If 2 Words of PLC memory, MW100/101, are used for Send frame configuration, and the ASCII code 0x34353637 is saved on MW100/101, the applicable segment of the send frame will be filled with hexadecimal number '4567', when 'Hex To ASCII' is selected.

And when some of the received frames are saved as converted to Hex, 0x3435 3637 will be saved on PLC memory, if the value of applicable area is “4567”.

2) SWAP

- 2 Bytes : 2 Bytes swap of applicable part among Send/Receive frames
- 4 Bytes : 4 Bytes swap of applicable part among Send/Receive frames
- 8 Bytes : 8 Bytes swap of applicable part among Send/Receive frames

If h1234567811223344 is converted by respective methods above, its results are as follows;

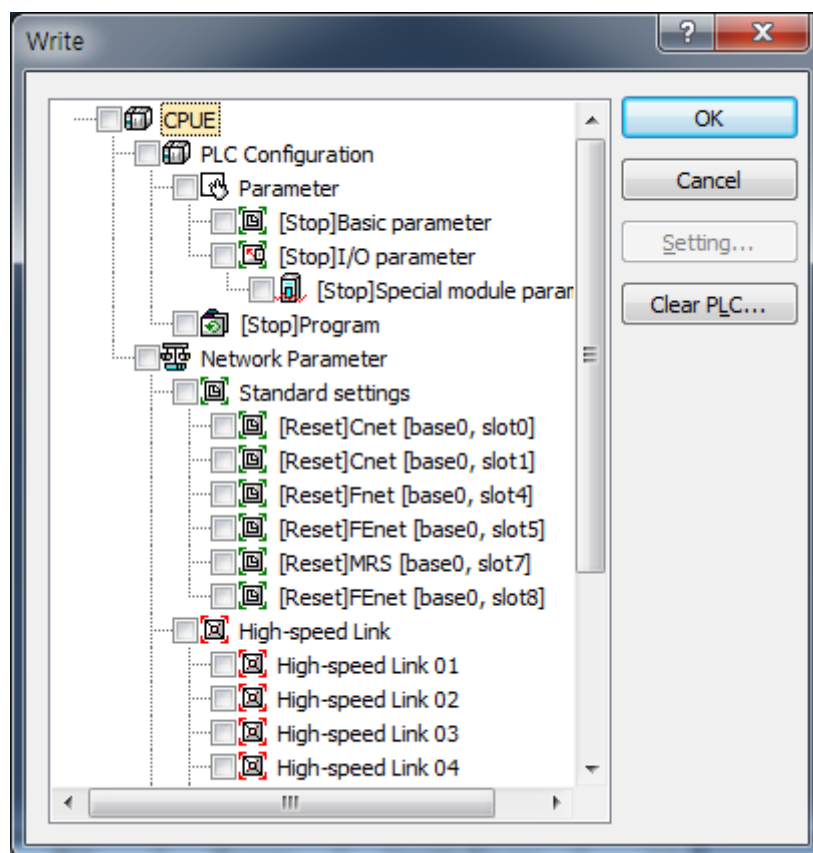
- 2 Bytes swap : h3412785622114433
- 4 Bytes swap : 7856341244332211
- 8 Bytes swap : 4433221178563412

## 7.4 P2P Service Operation

After P2P parameters are specified, download the parameters onto PLC CPU and start the P2P service. It is supposed that P2P parameters to download are already prepared and connection is available with the applicable PLC CPU.

### (1) P2P parameters downloading

In order to download the prepared P2P parameters, select [Online] → [Write] on XG5000 menu window to display the parameters downloading window, where registered basic setting, P2P parameters and HIGH-SPEED link parameters can be selected.



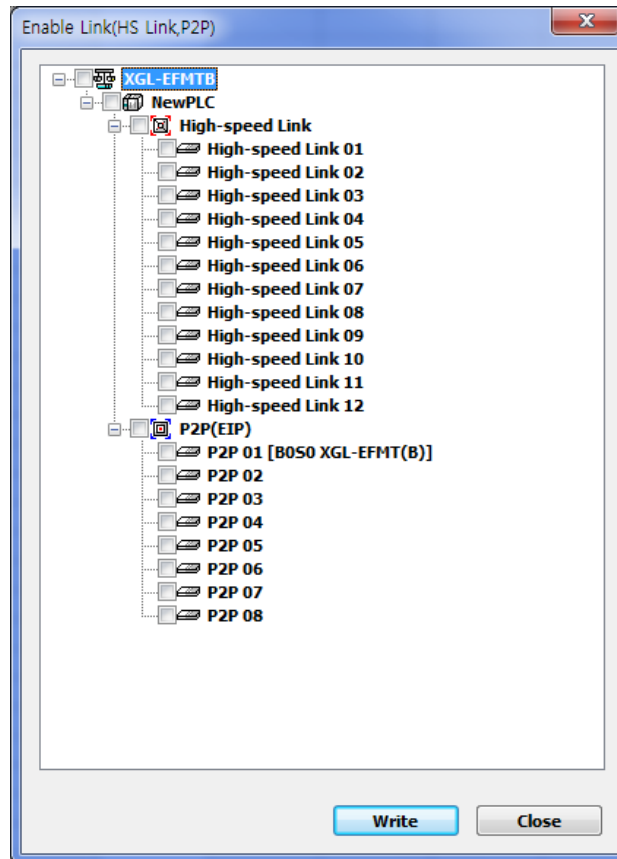
[Fig. 7.4.1] P2P parameters downloading

Among P2P 0~7, only the prepared P2P parameters will be displayed after sorted, where P2P parameters to download will be selected.

Click OK to download the P2P parameters onto CPU.

### (2) P2P service start

Even after P2P parameters are downloaded, P2P shall be started in order to start the P2P service. Select [Online] -> [Communication module setting] -> [Enable Link] (HS link, P2P)] on the menu.



[Fig. 7.4.2] Enable setting of P2P service

Select P2P parameters to start on the [Enable Link (HS link, P2P)] window. The P2P parameters already checked is during run, whose P2P service will stop if cancelled.

In order to confirm normal downloading and normal P2P service operation, select [System Diagnosis] on the menu.