Contents for bit array stored as USR_D in STATUS *function block* : [0]~[127]

Bit No.	Representative contents	Segment of bit	Detailed contents	Description
S[0]~ S[7]	CPU_TYPE	0x00	GM1	CPU type is indicated with the value of S[7]~S[0].
		0x01	GM2	
		0x02	GM3	
		0x03	GM4	
		0x04	GM5	
		0x05	GM3_FSM	
		0x06	GM3_FSM	
		0x07	SRU	
		0x08	FAM	
		0x09	PMU500	
		0x0A	PADT	
		0x0B	GM3_FSRM	
		0x10	GMR	
		0x22	GK3	
		0x23	GK4	
		0x24	GK5	
		0x25	GK3_FSM	
		0x26	GK3_FSM	
		0x27	GK6 A	
		0x28	GK6 B	
		0x5F	GM6 A	
		0x60	GM6 B	

S[8]~ S[15]	_VERSION_NO	S[8]~ S[11]	_VERSION_NO Lower indication	Ex.) If v3.1 is indicated (1: S[11]~S[8], indicated as decimal, 3 : S[15]~S[12], indicated as decimal)
		S[12]~ S[15]	_VERSION_NO Upper indication	

S[16]	_SYS_STATE	BIT 0	Local control	Indicates status that operation mode can be converted only by mode key or PADT.
S[17]		BIT 1	STOP	Indicates operation state of CPU.
S[18]		BIT 2	RUN	Indicates operation state of CPU.
S[19]		BIT 3	PAUSE	Indicates operation state of CPU.
S[20]		BIT 4	DEBUG	Indicates operation state of CPU.
S[21]		BIT 5	Cause of operation mode conversion	Converts operation mode using key.
S[22]		BIT 6	Cause of operation mode conversion	Converts operation mode using PADT.
S[23]		BIT 7	Cause of operation mode conversion	Converts operation mode using remote PADT.
S[24]		BIT 8	Cause of operation mode conversion	Converts operation mode using communication.
S[25]		BIT 9	Stop by STOP function	Stops after finishing scan by STOP function during RUN mode operation.

Bit No.	Representative contents	Segment of bit	Detailed contents	Description
S[26]	_SYS_STATE	BIT 10	Forced input	Indicates that forced On/Off for input contact is being executed.
S[27]		BIT 11	Forced output	Indicates that forced On/Off for output contact is being executed.
S[28]		BIT 12	Stop by ESTOP function	Immediately stops by ESTOP function during operation of RUN mode.
S[29]		BIT 13	No meaning	
S[30]		BIT 14	On monitoring	Indicates that external monitor for program and variable is being executed.
S[31]		BIT 15	Remote mode ON	Indication on operating in remote mode.

S[32]	_PADT_CNF	BIT 0	Local GMWIN connection	Bit which shows connection status of local GMWIN.
S[33]		BIT 1	Remote GMWIN connection	Bit which shows connection status of remote GMWIN.
S[34]		BIT 2	Remote communication connection	Bit which shows connection status of remote communication.
S[35]	_DOMAIN_ST	BIT 0	Basic parameter error	Flag which checks basic parameter and indicates the error.
S[36]		BIT 1	I/O parameter error	Flag which checks I/O configuration parameter and indicates the error.
S[37]		BIT 2	Program error	Flag which checks user-program and indicates the error.
S[38]		BIT 3	Access variable error	Flag which checks access variable and indicates the error.
S[39]		BIT 4	*High speed link* parameter error	Flag which checks *high speed link* parameter and indicates the error.

S[40]	_CPU_ER	BIT 0	CPU configuration error	Error flag which occurs when normal operation is impossible by self diagnosis error of CPU module, mounting different location from CPU mounting location in base, and multi CPU configuration error, and so on(For details, see _SYS_ERR).
S[41]	_IO_ER	BIT 1	Module type mismatch error	Representative flag which detects and indicates errors if I/O configuration parameter of each slot is different from configuration of actually mounted module, or if certain module is mounted in a slot in which it shouldn't be mounted(See _IO_TYER_N, _IOTYER[n]).
S[42]	_IO_TYER	BIT 2	Module mounting error	Representative flag which detects and indicates error when module configuration of each slot is changed during operation(See _IO_DEER_N, _IO_DEER[n]).
S[43]	_FUSE_ER	BIT 3	Fuse blowout error	Representative flag which detects and indicates error when fuse blowout occurs in a module that fuse is attached among modules of each slot(See _FUSE_ER_N, _FUSE_ER[n]).

Bit No.	Representative contents	Segment of bit	Detailed contents	Description
S[44]	_IO_RWER	BIT 4	I/O read/write error(failure)	Representative flag which indicates error when normal reading/writing of I/O module among module of each slot is impossible(See _IP_RWER_N, _IO_RWER[n]).
S[45]	_SP_IFER	BIT 5	Special/communication module interface error (failure)	Representative flag which indicates error when normal interface is impossible by initialization failure of special or communication module among modules of each slot or operation failure of module(See _IP_IFER_N, _IP_IFER[n]).
S[46]	_ANNUN_ER	BIT 6	Serious failure detection error of external device	Representative flag, which indicates failure detection occurrence when serious failure of external device is detected and written in _ANC_ERR[n] using user, program.
S[47]	Not available			
S[48]	_WD_ER	BIT 8	SCAN WATCH-DOG error	Error occurred when scan time of program exceeds SCAN WATCH-DOG TIME set by parameter.
S[49]	_CODE_ER	BIT 9	Program code error	Error occurred when invalid command is used during user program execution.
S[50]	_STACK_ER	BIT 10	STACK OVERFLOW error	Error that program stack exceeds normal area during program execution.
S[51]	_P_BCK_ER	BIT 11	Program error	Error that program memory is destroyed or execution is impossible by program error (See _DOMAIN_ST).

S[52]	_RTC_ERR	BIT 0	Warning RTC data error of system	Flag which indicates RTC data error.
S[53]	_D_BCK_ER	BIT 1	Data BACK_UP error	Flag, which indicates that normal hot or warm restart program execution is impossible and cold restart is executed because of data memory destruction by BACK_UP error. This can be used in initialization program. This is reset after initialization program is finished.
S[54]	_H_BCK_ER	BIT 2	Hot restart disable error	Flag, which indicates that hot restart time is exceeded or BACK_UP of operation data is not normally made when power failure is recovered during program operation and restart operation is executed according to parameter(warm or cold). This can be used in initialization program. This is reset after initialization program is finished.

Bit No.	Representative contents	Segment of bit	Detailed contents	Description
S[55]	_AB_SD_ER	BIT 3	Abnormal shutdown	Flag which warns that operation error may be occurred in process of existing data area when warm restart program is executed with power on again after program is stopped by power cut-off during execution. This can be used in initialization program. This is reset after initialization program is finished. This is also indicated when program is stopped during execution by 'ESTOP' function.
S[56]	_TASK_ERR	BIT 4	Task crash (regular period, external task)	Flag which indicates task crash when execution of identical task is repeatedly requested during user program execution(For details, see _TC_BMAP[n], _TC_CNT[n]).
S[57]	_BAT_ERR	BIT 5	Battery error	Flag which detects and indicates that batter voltage for user program and data memory backup is specification or less.
S[58]	_ANNUN_WR	BIT 6	Slight failure detection of external device	Representative flag, which indicates failure detection when slight failure of external device is detected and written in _ANC_WB[n] by user, program.
S[59]	Not available			
S[60]	Not available			
S[61]	_HSPMT1_ER	BIT 8	*High speed link* 1 error	Representative flags that check error of each *high speed link* parameter when *high speed link* is enabled and *high speed link* execution is impossible. This is reset when *high speed link* is disabled.
S[62]	_ HSPMT2_ER	BIT 9	*High speed link* 2 error	
S[63]	_ HSPMT3_ER	BIT 10	*High speed link* 3 error	
S[64]	_ HSPMT4_ER	BIT 11	*High speed link* 4 error	

6.3.7 Error received from communication module

This explains STATUS code when error bit of *function block* is set to 'On' after *function block* is executed.

1) Received error from communication module

Error No. (Decimal)	Description
0	Normal (No error)
1	Physical layer error of link side(Tx/Rx impossible) – Cause of self error and other station's power off, other station No. writing error, and failure, etc.
3	There is no identifier of *function block* to be received in communication channel. – Value not used in LGIS.
4	Data type mismatch
5	Reset received from other station – Value not used in LGIS.
6	Communication command of other station not ready(Receiver not enabled) – Value not used in LGIS.
7	Device state of remote station in wrong state – Value not used in LGIS.
8	Access denied to remote object
9	Communication commands of other station unable to process due to receiver overrun – Value not used in LGIS.
10	Time out for response waiting – When response has not been received from other station within a given time.
11	Structure error
12	Abort(Local/Remote) – Disconnected by serious error
13	Reject(Local/Remote) – Type unfitted to MMS, error caused by noise.
14	Communication channel setting error(Connect/Disconnect) – Error related to logical communication channel setting required during communication with service for PI/DOMAIN/GEN and other communication module(for Mini-MAP only)
15	High speed communication and connection service error
33	Cannot find variable identifier – Not identified in the range of access variable
34	Address error – Error of structure and range specified in specifications of communication module
50	Response error – When response not received as required or other station's CPU error
113	Object access unsupported – Out of VMD specific and symbolic address or exceeded max. value of data length
187	Received via another error code than specified code(Other company's communication code value) – Receiving another error code value than specified.

2) STATUS values indicated in CPU

(1) Error processed within *function block*

Error No. (Decimal)	Description
16	When position of computer communication module is wrongly specified.
17	Initialization error of communication module mounted in SLOT_NO
18	Input parameter setting error
19	Variable length error
20	Wrong response receiving from other station
21	When no response received from computer communication module (Out of waiting time - Time out)

(2) Status error related to remote(FSM) *function block*

Error No. (Decimal)	Description
128	FSM power error
129	BASE(Rack) No. error
130	Slot No. error
131	Module information error
132	Data range error(Invalid range)
133	Data type mismatch
136	Access failure(BUS access error)
137	Another error than specified code

6.3.8 Access variable registration

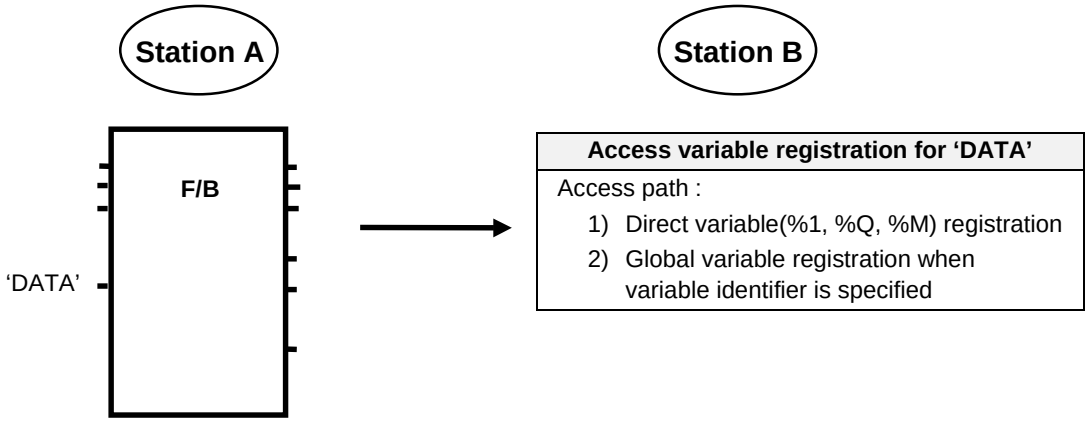


Fig. 6.3.8(A) Concept drawing of access variable setting

Direct variable and variable identifier can be used when user specifies the variable(VAR1~4) for data reading and writing during communication with other station. Direct variable can access memory, input, and output area, and only BOOL, BYTE, WORD, DWORD, and LWORD data type is possible. If variable identifier is used, different from direct variable, access for all data types are possible. But service is possible by accessing after variable identifier is registered in access variable area of other station. Namely, if variable identifier to be transmitted is 'DATA', receiving station should define which area is to be used for variable 'DATA'. At this time, there are two methods for location specification.

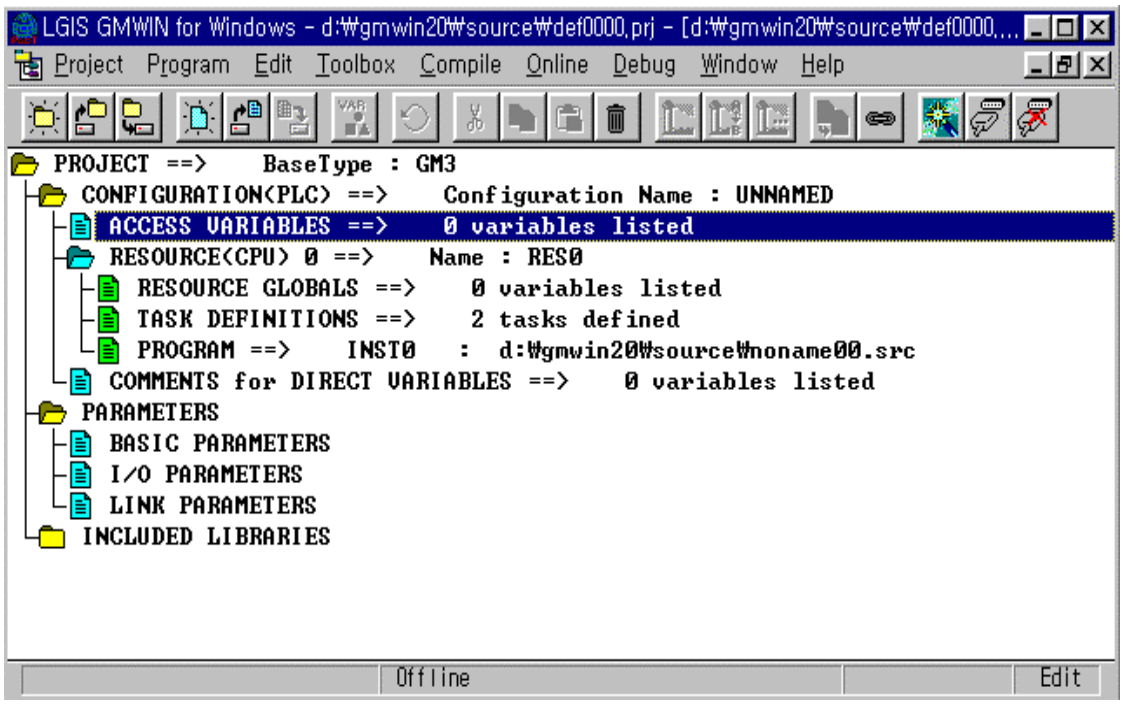


Fig. 6.3.8(B) Registration screen of access variable

1) Direct variable area(%I, %Q, %M) setting for access path name

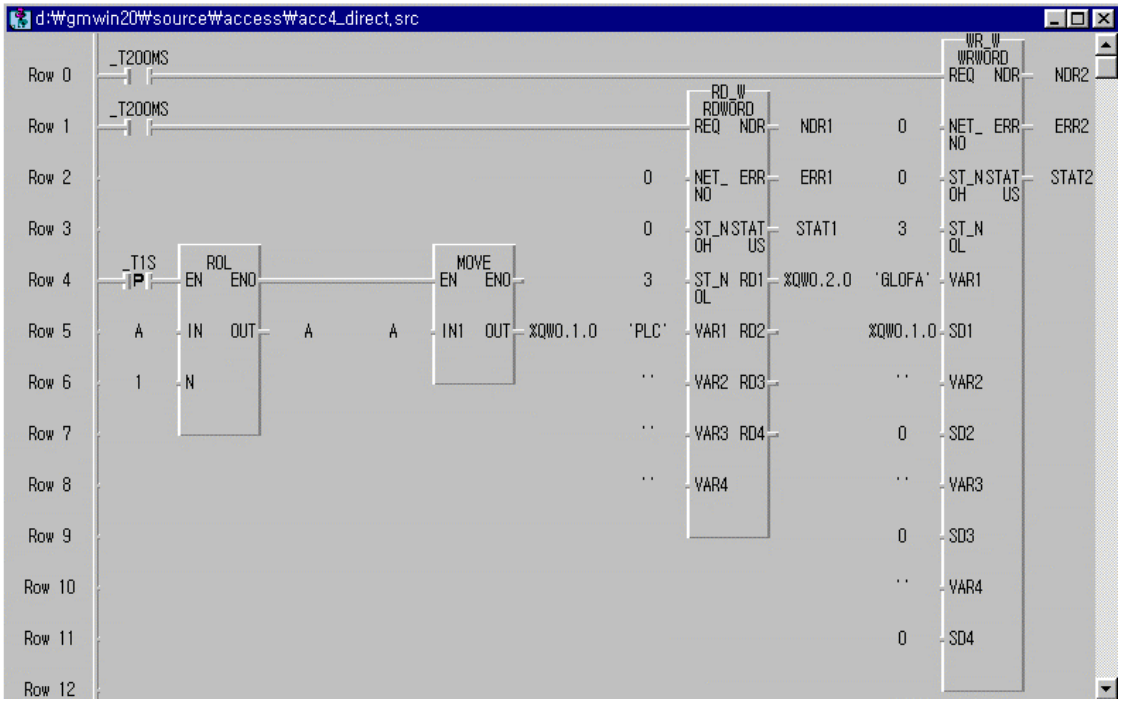


Fig. 6.3.8(C) Example of station A program

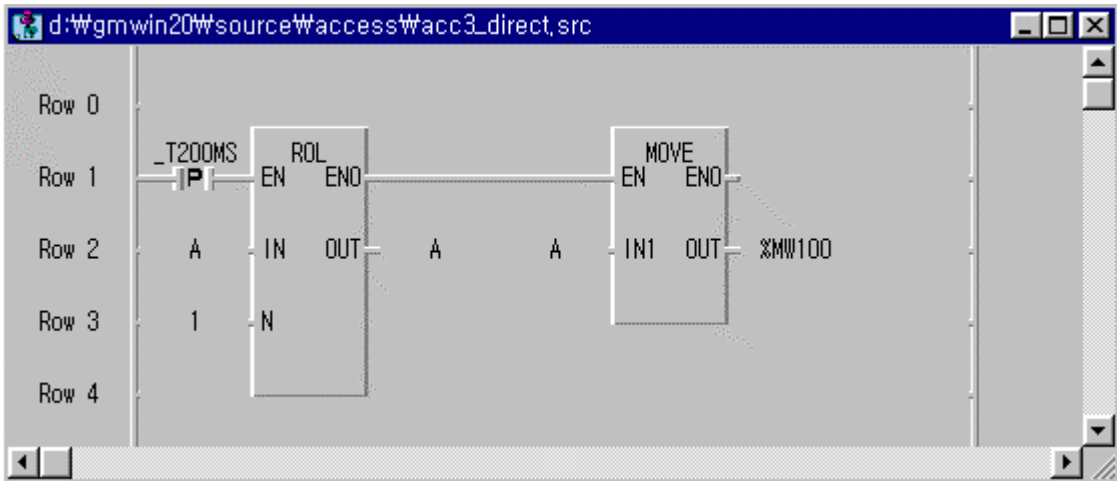


Fig. 6.3.8(D) Example of station B program

When station A reads variable 'PLC' or writes variable 'GLOFA' for station B, station B should define the type of data 'PLC' and 'GLOFA', and the location of variable 'PLC' and 'GLOFA'. To specify, enter PLC for access variable name in 'Access variable add/edit list' as Fig. 6.3.8(E)(Access variable name in 'Access variable add/edit' box is variable identifier, so user should register a name to be used for variable identifier in *function block* of other station. Namely, access is possible when the variable name is the same as variable identifier used in VAR1~4 which is input of *function block* used in program of other station) and enter %MW100 for access path, then variable PLC is allocated in the memory location of %MW100.

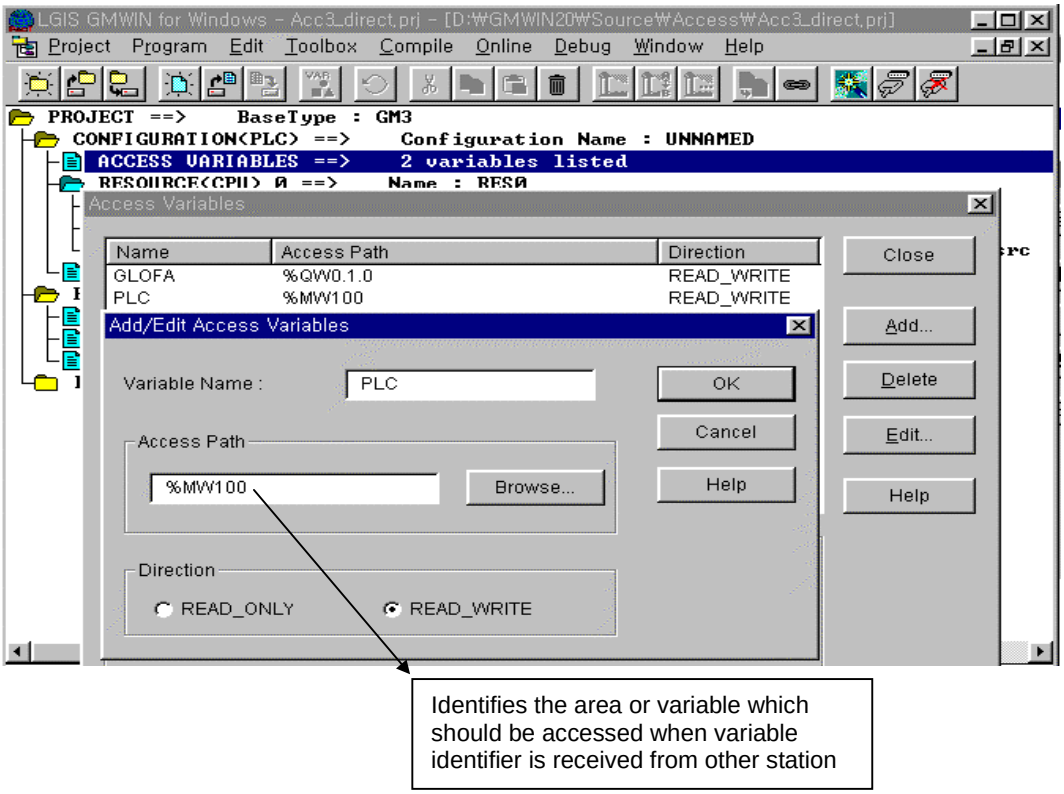


Fig. 6.3.8(E) Access variable registration

Therefore, To read 'PLC' of station B from station A is the same as to read data of %MW100 in station B. Specify path for variable 'GLOFA' as shown above(Data type used in transmitting station should be the same as that of receiving station).

2) Setting of variable identifier for access path

To use variable identifier that access path is not direct variable, user should register this variable identifier in 'Resource global variable' items, select 'Add' 'Search' in 'Access variable registration', and register global variable previously registered. Here explains example of global variable and access variable registration, when access variable is GLOFA and path of GLOFA variable is PLC_DATA.

Specify global variable registration as Fig. 6.3.8(F). Define data type the same as the type used in other station and specify memory allocation as automatic or user-defined (Ex. %MW100 for word type memory). If global variable registration is finished, chick OK to escape and select 'Access variable' and click 'Search' in 'Path list', then list for global variable previously specified is displayed as Fig. 6.3.8(G), and select appropriate global variable and click OK.

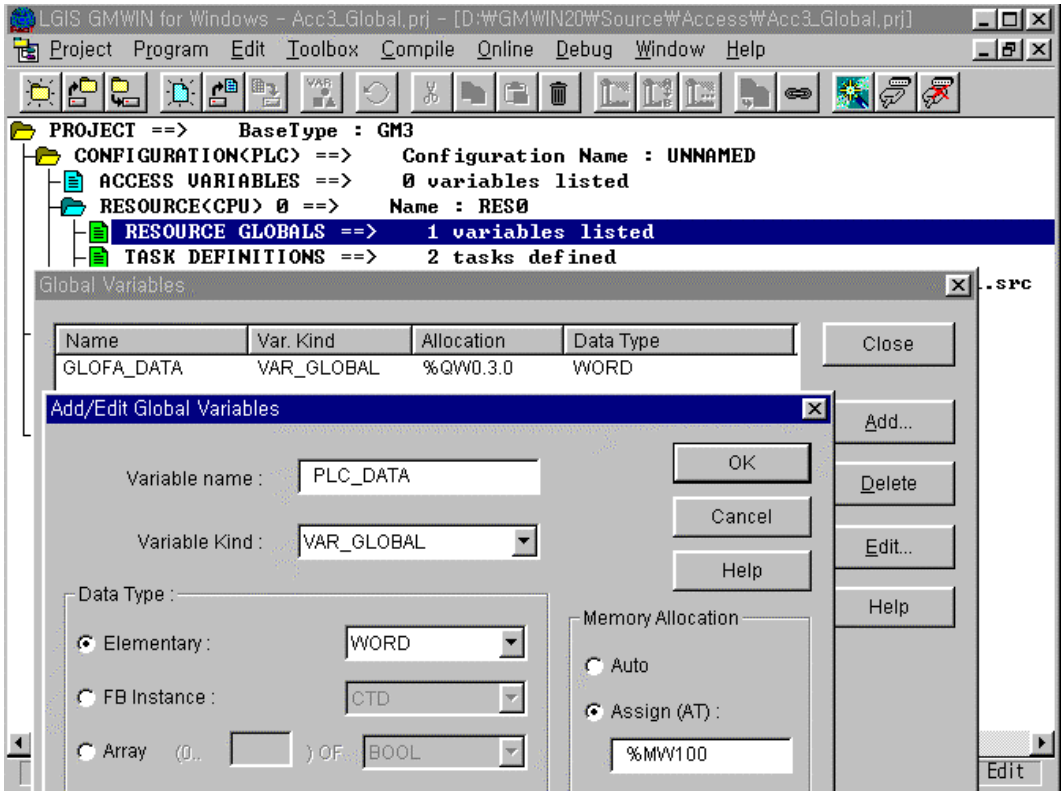


Fig. 6.3.8(F) Global variable registration

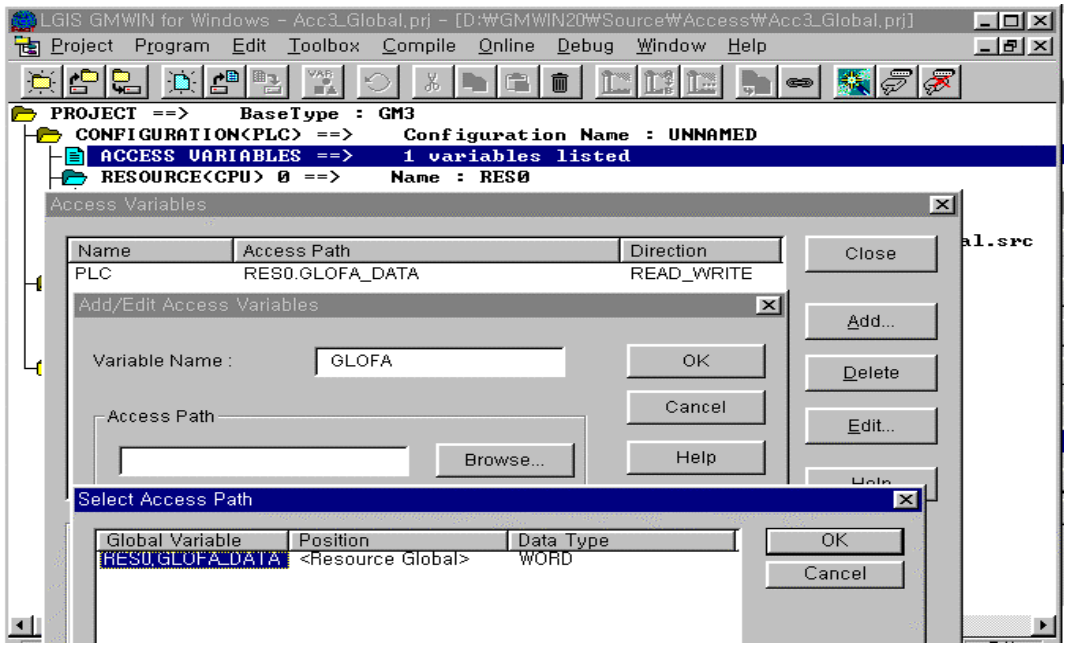


Fig. 6.3.8(G) Global variable selection

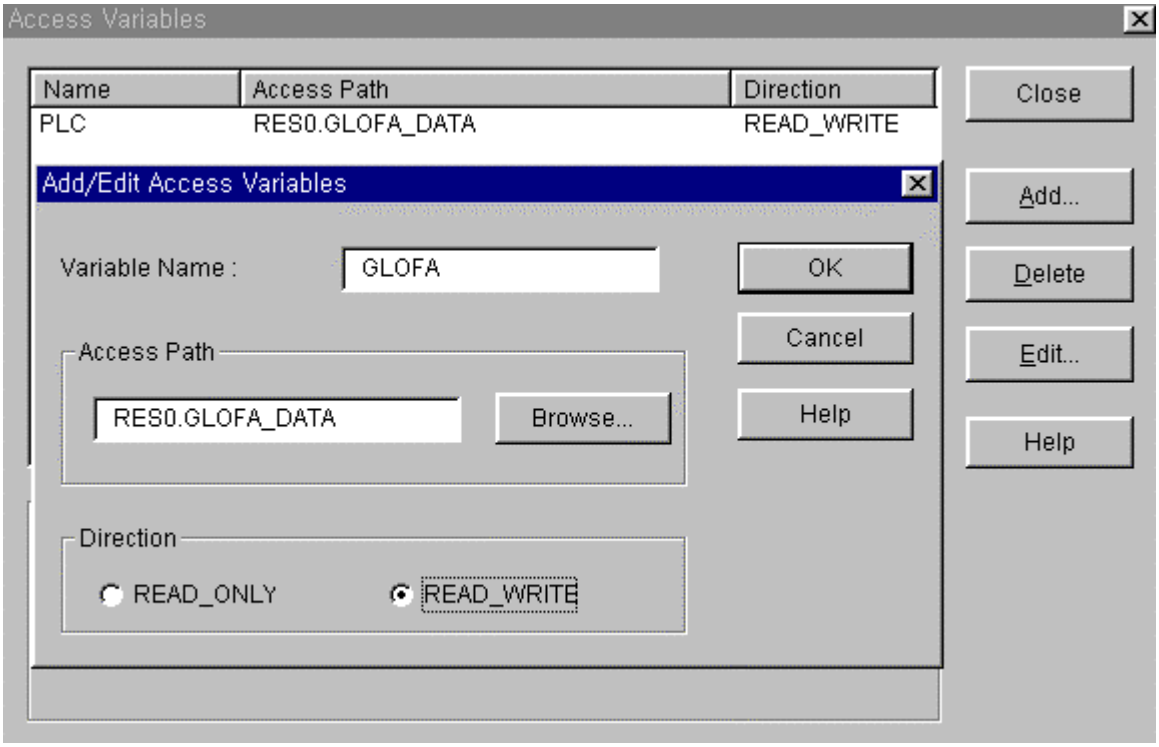


Fig. 6.3.8(H) Access path selection

Variable shown in 'Access variable list' as Fig. 6.3.8(H) shows path specification to access global variable, and default resource name of 'RES0' should be used for global variable specification.

Number of access variable can be registered up to Max.128 for GM1 and GM2 and 64 for GM3, GM4, GM5 and GM6.
In 'Access enable' item, select '☐Read' to allow reading of appropriate area through variable identifier from other station, and select '☐Read and write' to allow all of reading and writing.
In RES0.PLC_DATA of access path registration, RES0 means resource name(GM1 can use 4 CPU, so RES0, 1, 2, and 3 can be used. User may either use 4 GM1 CPU or use RES0 for resource name of GM2, GM3, GM4, GM5 and GM6 : default is RES0).

6.4 GMWIN remote connection service

6.4.1 Introduction

This function enables remote control of program preparation, download of user program, program debugging, and monitor in network system that PLCs are connected each other in Fnet or Mnet, without moving physical connection of GMWIN. Especially, user can access each device at one location without moving location when devices connected in network are apart distantly. GMWIN communication service generates following path to accomplish the goal.

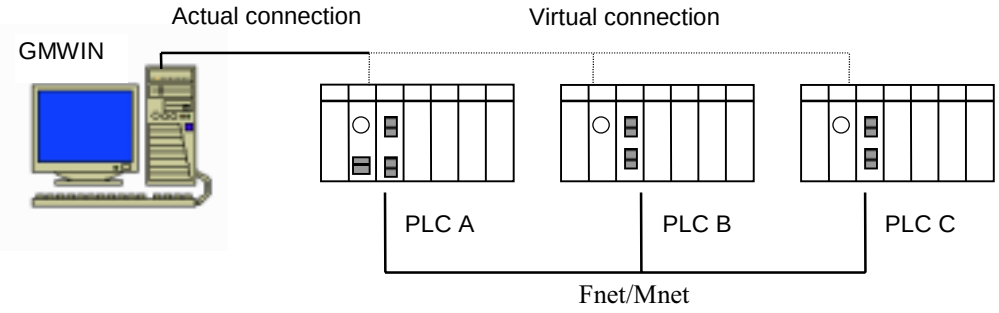


Fig. 6.4.1 Ex. of GMWIN remote connection network

In GMWIN of Fig. 6.4.1, let us suppose a network that RS-232C cable is connected to CPU module of PLC A station and PLC A, PLC B, and PLC C are connected each other with Fnet or Mnet. To access PLC C, choose communication module station number of PLC C(other station number to connect) and slot number of PLC A(slot number that communication module is mounted in PLC A which currently connected with GMWIN) at Remote 1/ Remote 2 connection in Project → Option… → Connect option menu. Then logical connection by RS-232C and Fnet/Mnet is made. This state is identical with the connection that RS-232C cable is connected to PLC C station, and functions of program preparation, download, debugging, and monitor are possible in PLC C as in PLC A. This communication service of GMWIN can be use to connect to the content of remote PLC location, and this can be used for maintenance and repair of PLC system.

6.4.2 GMWIN remote connection

Remote connection between PLCs connected with Fnet and Mnet can be connected with remote 1 or remote 2.

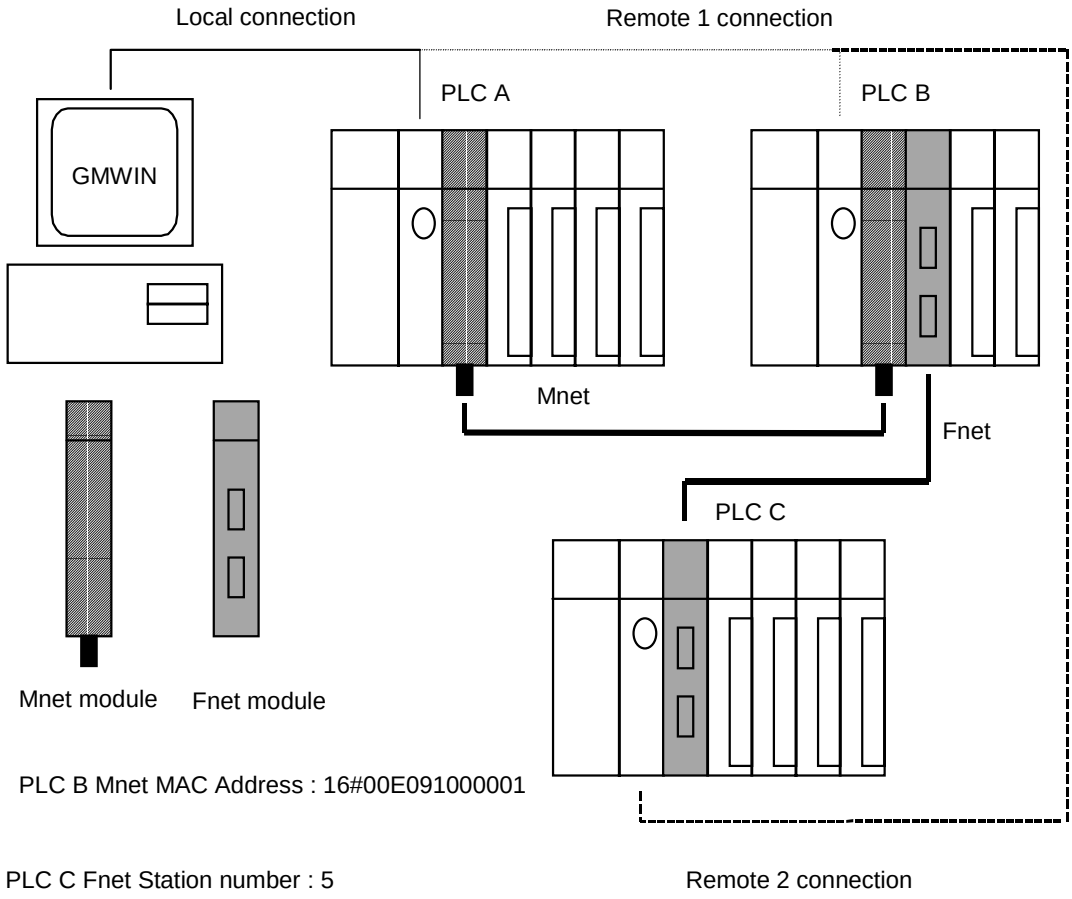
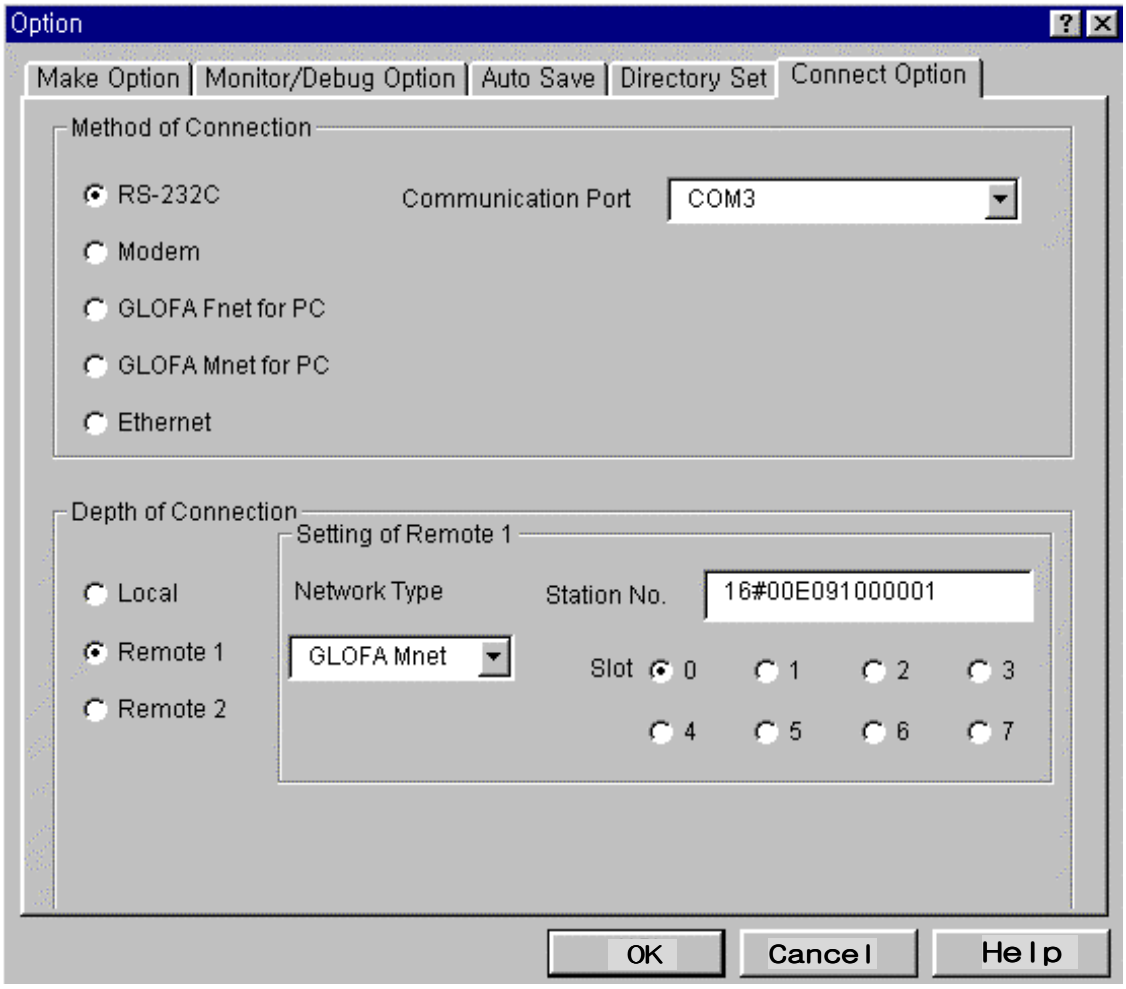


Fig. 6.4.2 Remote 1 , 2 connection

Fig. 6.4.2 shows the connection example of remote 1(PLC A, PLC B) and remote 2(PLC C) in a system configured with two network.

Remote 1 connection : GMWIN should be in off-line state for remote 1 connection. In this state, choose Project → Option… → Connect option menu from upper menu of program, and choose Remote 1 in connection level, then following screen will be displayed :



Network type setting :

Choose type according to network that remote 1 connection is made. In Fig. 6.4.2, choose GLOFA Mnet because remote 1 connection is connected with Mnet.

Station number setting :

Specify station number of communication module mounted in PLC which makes remote 1 connection(Module number of PLC B, 16#00E091000001, in Fig. 6.4.2). Station number is written on the case of module for GLOFA Mnet, and the value that is set on station number switch in front of module can be used for GLOFA Fnet. When user enters station number, the type of '16#00E09100****' is used for hexadecimal, and decimal figure without '16#' is used for decimal.

Slot number setting :

Select slot number of communication module mounted in PLC of self station, which makes remote 1 connection.

Click OK to escape from option screen when setting is finished, and select On-line → Connection.

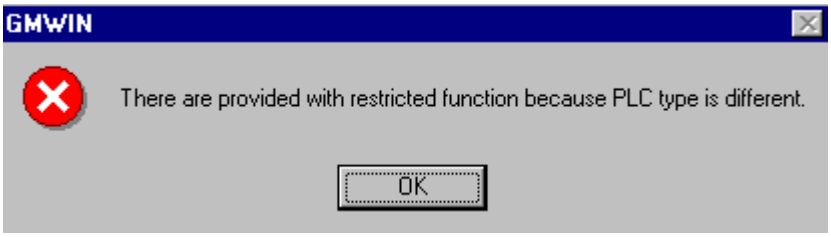
If remote 1 connection is normally made, following message is displayed :

If connection is failed, following message is displayed :

(Communication line error / internal protocol error)

(When setting value of remote connection is not proper)

If PLC that remote 1 connection is made is different from CPU type of project currently opened, following message is displayed and only restricted On-line menu can be selected.



The state that remote 1 connection is finished is state of logical connection, and this is the same as RS-232C cable is connected. All of On-line menu can be used(But this is not possible if PLC different from CPU type of project currently opened). Operation is finished with remote 1 connection and connection is cut off, then following message is displayed :

Remote 2 connection :

Remote 2 connection is made through following sequence ▶ GMWIN ▶ Mnet of PLC A ▶ Mnet of PLC B ▶ Fnet of PLC B ▶ Fnet module of PLC C.

GMWIN should be in off-line state for remote 2 connection, and in this state, choose Project → Option … → Connect option menu from upper menu of program, and choose and set Remote 2 in connection level.

Network type setting :

Choose type according to network that remote 1 and 2 connection are made. Network type of remote 1 and 2 connection can be different.

Station number setting :

Specify each station number of remote 1 connection and remote 2 connection. Enter 16#00E091000001 of PLC B station number for remote 1 connection, and enter station number 5 of PLC C for remote 2 connection. Station number is written on the case of module for GLOFA Mnet, and the value that is set on station number switch in front of module can be used for GLOFA Fnet. When user enters station number, the type of '16#?????' is used for hexadecimal, and decimal figure without '16#' is used for decimal.

Slot number setting :

For remote 1 connection, enter slot number 0 that communication module of PLC A is mounted for connection of PLC A ☐ PLC B and slot number 1 that communication module of PLC B is mounted for remote 2 connection of PLC B ☐ PLC C.

If user sets network type, station number, and slot number with value explained above, and clicks OK of dialogue box, and performs On-line connection, then remote 2 connection is made and following message is displayed.

In this case, remote 2 connection is finished. This is status of logical connection and this is the same as the connection that RS232C cable is connected to PLC C. User can use all of On-line menu. Operation is finished with remote 2 connection and connection is cut off, then following message is displayed :

If user cut off remote 1 connection, then connection is finished.

Next table shows relations connectable between connection requesting device(Client) that RS-232C cable is connected in GMWIN communication service and connecting device(Server) which connects it according to its request.