Chapter 8 Exercising program

Communication system using Cnet I/F module can be variously configured according to application fields. This chapter describes system configuration and exercise programming with various application fields supposed.

8.1 TM (Tele Metering) system using dedicated modem

In TM master/slave communication system with dedicated modem configured as in [Figure 8.1] through GLOFA Cnet I/F module, higher TM master on which 8 Cnet I/F modules are mounted performs data communication with 8 lower TM slave stations via dedicated modem. TM master uses GM2 CPU and TM slave uses GM4 CPU. And in this system, Cnet I/F module of slot No.0~7 in TM master inputs and outputs data through dedicated modem communication with 8 stations of slave station No.0~7.

[Figure 8.1] TM/TC dedicated modem system



[Table 8.1] describes TX/RX data mapping between TM master station and 8 slave stations. In master station as shown in [Table 8.1], 20 bytes data from %MB0 area is written to %MB200 area of slave station and 50 bytes data from %MB100 area of slave station is saved in starting %MB400 area of master station. TX/RX areas of slave stations are all the same in 8 stations and TX/RX area of master station is specified to Offset as much as the size of TX/RX data.

Area		Master stat	ion memory		Slave station memory			
Station No.	TX Area	Length	RX area	Length	TX area	Length	RX area	Length
Station 0	%MB0	20bytes	%MB400	50bytes	%MB100	50bytes	%MB200	20bytes
Station 1	%MB20	20bytes	%MB450	50bytes	%MB100	50bytes	%MB200	20bytes
Station 2	%MB40	20bytes	%MB500	50bytes	%MB100	50bytes	%MB200	20bytes
Station 3	%MB60	20bytes	%MB550	50bytes	%MB100	50bytes	%MB200	20bytes
Station 4	%MB80	20bytes	%MB600	50bytes	%MB100	50bytes	%MB200	20bytes
Station 5	%MB100	20bytes	%MB650	50bytes	%MB100	50bytes	%MB200	20bytes
Station 6	%MB120	20bytes	%MB700	50bytes	%MB100	50bytes	%MB200	20bytes
Station 7	%MB140	20bytes	%MB750	50bytes	%MB100	50bytes	%MB200	20bytes

[Table 8.1] TX/RX data map

8.1.1 Exercising program

As Ex.8.1.1 is 1:1 communication system via dedicated modem for TM master/slave communication, setting for dedicated modem communication in Cnet I/F module and 1:1 communication programming between Cnet I/F modules shall be prepared. Next is the procedure to follow the above in order. Basic parameters related communication should be identical between master/slave stations, and set as agreed with modem specification as below.

Communication Speed : 9600 BPS

Data bit : 8 bits

□ Start/Stop bit : 1 bit

Derity : None

1) Dedicated modem connection

Connect 9-pin cable with dedicated modem and Cnet I/F module via RS-232C channel. Refer to 4.4 How to connect to dedicated modem for connection type prior to connection between Cnet I/F module and dedicated modem.

2) Dedicated modem setting

Refer to user's manual for setting of operation type of dedicated modem as agreed with communication type with Cnet I/F module. Related items to communication with Cnet I/F module are to be set as follows. Dedicated modem shall be set identical between master/slave sides

Item	Setting contents	Remark
Communication speed	9600 BPS	Identical to Cnet I/F module
Data type	Asynchronous 10 bits	Data-8bits/Start-1bit/Stop-1bit
RTS-CTS delay	0 msec	Set to the smallest value
DTR control	Forced ON	
Comm mode	4-line type	As agreed with the dedicated line spec.

3) Setting of basic parameters

Mode and basic parameters need setting for TM master slave communication. [Table 8.2] describes setting items for this. For dedicated modem communication, apply setting to RS-232C channel.

[Table 8.2] Setting items			
Setting item	TM master module	TM slave module	Remark
Module name	G3L-CUEA	G4L-CUEA	
Channel mode	Stand-alone mode	Stand-alone mode	
Operation mode[Note1]	'3' : dedicated mode Ver.2.0	'3' : dedicated mode	
RS-232C station No.	Basic value(Not used)	0 ~ 7 station available	
RS-232C communication type	Dedicate	RS-232C channel setting	
RS-232C communication speed	9600 BPS/DATA 8 bits/	only valid	

Remark

[Note1] Cnet I/F module in TM master side shall be of Ver.2.0 or later as is in dedicated master mode to communicate. TM slave side as used in dedicated mode slave is available regardless of the version.

Next is setting screen of Frame Editor to be set as in [Table 8.2].

📩 Cnet Frame Editor (untitle	d,frm)		
<u>File Online Option Monitor</u>	Help		
Channel	eida	C DS422 side	
•• N3232	3100	• N3422 Side	
Basic Parameters			
Station: 00 🔹 Type	: Dedicated Modem 🝷	Init Command:	ATZ
Baud Rate: 9600 🔻	Data Bit: 8	•	Monitor Entry
			(• 4x32 C 4620
Parity: None <u>·</u>			0 10x20
Frame List			
0	Frame Informations-	Header:	
1	SC1: pull	SC5: pull	
3	301: nun	SGJ: null	
4	SGZ: null	5G0: nun	
6	SG3: null	SG7: null	
7	SG4: null	SG8: null	
δ 9 ↓	Tailer:	BCC: Nor	IE

Download setting values of Frame Editor via each RS-232C channel for basic setting.

4) GMWIN programming

If dedicated modem and Cnet I/F module have been set, GMWIN program shall be prepared in TM master station for master operation in dedicated communication. For master function service in dedicated communication, GM_RD/GM_WR Function Blocks shall be used, with library insertion selected from project menu prior to programming to add the communication library to project. Since TM master station is GM2, insert COMMUNI.1FB. Each dedicated master program is to be prepared for 8 TM master Cnet I/F modules. [Figure 8.2] shows a program for Cnet I/F module of master station slot 0. The program in [Figure 8.2] is composed of two parts of 2 Function Block programs and interlock program to allow communication in order through the interlock engaged in execution of Function Block.



[[]Figure 8.2] Dedicated master program

Setting values of RD_START variables used in interlock contact point are as follows. Initial value as an auto-variable is set to '1' to execute GM_RD Function Block in the first scan.

execute WRITE F/B first and then READ

F/B with RD_START ON.

N	/ariables						×
	Name :	RD_START		Direct \	ariable <u>C</u> omment		ОК
No. of Concession, Name	Name	Var. Kind	Allocation	Used	Data Type	-	<u>F</u> lag
0000	RD_START	VAR	<auto></auto>	*	BOOL		
Control of the	READ WR_START	VAR VAR	<auto> <auto></auto></auto>	*	FB Instance BOOL		Cancel
	WRITE	VAR	≺Auto≻	*	FB Instance		
1000	READ.NDR	VAR	<auto></auto>	*	BOOL		
SCHOOL ST	READ.ERR	VAR	<auto></auto>	*	BOOL		Help
2010	READ.STATUS	VAR	SAULU 2		USINI	- E	
Service Second	- Description	<u>A</u> dd	<u>D</u> elete		<u>E</u> dit		
	Name:RD_ Variable Kind Data Type: E Allocation: - Initial Value: Comments:	START : VAR GOOL :Auto> <default></default>					

Setting values of WR_START variables are as follows. Initial value is set to '0' in auto-variable after GM_RD Function Block is executed by interlock program to allow GM_WR Function Block executed.

Name	Var. Kind	Allocation	Used	Data Type	Close
RD_START READ WR_START WRITE	VAR VAR VAR VAR	<auto> <auto> <auto> <auto></auto></auto></auto></auto>	* * *	BOOL FB Instance BOOL FB Instance	<u>A</u> dd Delete
					<u>E</u> dit Help
Browse Glob	al Variables	ļ	Browse	in/Out Variables	J
Description Name : RD_8 Variable Kind Data Type : B Allocation : < Initial Value :	START : VAR OOL Auto> <default></default>				

Chapter 8 Exercising program

Program in [Figure 8.2] has used GM_RD Function Block to read data and GM_WR Function Block to write data of slave station No.0. To communicate the program in [Figure 8.2] with slave station No.0~7, prepare each program with slot No. and memory address set as agreed with [Table 8.1] to complete communication programming of dedicated communication master. [Figure 8.3] shows dedicated communication program of master station slot No.5 to communicate with slave station No.5.



[Figure 8.3] Communication program with slave station 5

8.2 Communication system between Cnet I/F modules using optical modem

Optical modem is mainly used in communication with mobile body which is hard to communicate with via communication cable. For communication with GLOFA PLC on mobile body in lineal motion like parking tower or GLOFA PLC which is fixed, RS-232C/RS-422 channel of the module shall be connected with optical modem. [Figure 8.4] shows communication system between GLOFA PLCs and with monitoring device via optical modem.



[Figure 8.4] Optical modem communication system

1~3 stations in [Figure 8.4] as of the module mounted on the fixed PLCs installed respectively at 1~3 floors in the parking tower communicate with monitoring device via RS-422 channel, and RS-232C channel communicates with station 4 on mobile body via optical modem. Module on mobile body moves vertically and horizontally as mounted on flatcar for car lift. Communication is performed with station 1 at 1st fl., station 2 at 2nd fl. and station 3 at 3rd fl. via optical modem. And only when horizontal position is in the specified allowance from other station's optical modem, communication is available in accordance with the communication characteristics of optical modem. Thus, communication is not allowed during vertical movement, while allowed during horizontal movement in the horizontal allowance as not changed from the fixed optical modem. Along with this method, information about mobile body's location and vehicles, and commands for loading/unloading vehicles can be transferred from monitoring device to mobile bodies. Monitoring device communicates in station 1 with station 3 via RS-422 communication, with dedicated communication master functions available.

8.2.1 Exercising program

RS-422 channel of 1~3 stations responds to reading/writing request of monitoring device through dedicated mode slave, thus, communication programming is not required for RS-422 channel in GLOFA-PLC. However, user defined program shall be prepared in user mode for RS-232C channel which operates as a master station to communicate with the module on mobile body. Because the module on mobile body operates as a dedicated mode slave, communication programming isn't necessary. In system as in [Figure 8.4], communication between monitoring device and module on mobile body is unavailable, thus, memory of PLC 1~3 stations shall be shared to change data with station 4 and monitoring device. [Table 8.3] describes communication with monitoring device and data TX/RX map between Cnet I/F modules for this.

\backslash	Area TX/RX map with monitoring device					TX/RX map between Cnet I/F modules			
Statio	on	ТΧ	Length	RX	Length	ТΧ	Length	RX	Length
No.		area	-	area		area		area	
dy	Station 1	%MB0	80bytes	%MB100	50bytes	%MB140	40bytes	%MB0	20bytes
Fixed bod	Station 2	%MB0	80bytes	%MB100	50bytes	%MB140	40bytes	%MB0	20bytes
	Station 3	%MB0	80bytes	%MB100	50bytes	%MB140	40bytes	%MB0	20bytes
Mobile body	Station 4	Direct cor (data	nmunication unava change via (with monitori nilable Cnet 1~3 stat	ng device iions)	%MB0	20bytes	%MB100	40bytes

[Table 8.3] Data TX/RX map

[Figure 8.5] Data TX/RX path



[Figure 8.5] describes TX/RX data path according to data TX/RX map in [Table 8.3] with the example of Cnet stations 1 & 4 and monitoring device. Cnet stations 2 & 3 are the same case as in communication via the identical path. Direct communication between monitoring device and station 4 on mobile body is unavailable in the figure, thus, data will be changed through station 1. As shown in [Figure 8.4], 20 bytes from %MB0 of station 1 is the saving area of data read from station 4 of mobile body, and via this area monitoring device starts reading data of station 4. To the contrary, when data is written from monitoring device to station 4, 50 bytes data is written from %MB100 address of station 1 and 10 bytes data of 50 bytes starting from %MB140 address is re-transmitted to station 4 to change data between monitoring device and station 4.

1) Optical modem connection

Connect 9-pin cable with Cnet stations 1,2,3 and optical modem via RS-232C channel. Since optical modem connection is same as in dedicated modem, refer to 4.4 How to connect to modem for connection between Cnet I/F module and dedicated modem. Optical modem on mobile body is connected with Cnet I/F module station 4 via RS-422 cable, thus, use optical modem which supports RS-422 communication for connection in accordance with RS-422's standard connection method.

2) Setting of basic parameters

Identical basic parameters shall be set in RS-422 channel of Cnet stations 1,2,3 for communication with monitoring device, and RS-232C channel shall be set to dedicated modem mode in operation of user mode to operate as a communication master station of Cnet station 4. [Table 8.4] describes setting items of Cnet I/F module for this. Set operation mode switch as specified in the table and prepare basic parameters through Frame Editor to download to Cnet I/F module and then to complete basic setting.

Setting item		Cnet on fixed body	Cnet on mobile body	Remark		
Operation mode switch		'4'	'3'			
RS-232C	Operation mode	User defined communication ^[Note]		Parameters in		
	Station No.	Basic value(Not used)		RS-232C channel of Cnet		
	Communication speed	19200bps	Not used	stations 1,2,3 shall be set identical.		
	Data/Stop	Data-8/Start-1/Stop-1				

Setting item		Cnet on fixed body	Cnet on mobile body	Remark	
	Operation mode	Dedicated communication	Dedicated communication	Communication	
RS-422	Station No.	Set 1,2,3 stations in order	Station 4	parameters shall	
	Communi- cation speed	19200 BPS	19200 BPS	monitoring	
	Data/Stop	Data-8/Start-1/Stop-1	Data-8/Start-1/Stop-1	device.	

Remark

[Note1] If module Ver.2.0 is used, set RS-232C channel to dedicated mode for dedicated master mode service so to simplify programming. Refer to 7.3 Dedicated communication master in the manual for programming procedure.

[Table 8.4] describes setting items of the module. Communication method and specification shall be set identical also for monitoring device and optical modem. Refer to user's manual of the applied product for setting of optical modem and monitoring device.

3) Programming

GMWIN program shall be prepared for user defined communication via RS-232C channel of Cnet stations 1,2,3 in system of [Figure 8.4], and frame for communication via dedicated communication protocol shall be also prepared in Frame Editor. RS-422 channel of Cnet 1,2,3 stations needs no additional communication programming because the monitoring device operates as a master station. Cnet station 4 needs no communication programming either because it operates as a dedicated mode slave. Data memory mapping is all identical for communication of Cnet 1,2,3 stations, thus, the same program may be shared in those 3 stations. Next is how to prepare the program in station 1.

A) Dedicated communication protocol to be used: Cnet station 1 shall prepare frame in user defined mode for communication through dedicated communication protocol of Cnet station 4. Use continuous reading/writing commands of direct variables in dedicated communication protocol to allow communication between station 1 and station 4 through TX/RX map between Cnet I/F modules in [Table 8.3]. Next is for protocol of dedicated communication slave to communicate through the map in [Table 8.3]. Refer to 7.2 in this manual for details.

U C01											
Classification	Header	Station No.	Command	Variable length	Variable name	Number of data	Data	Tail	BCC		
Frame	ENQ	H04	wSB	H06	%MB100	H28	40 bytes data	EOT	BCC		

① Continuous writing request of direct variables (writing 40 bytes to %MB100 of station 4)

② Response format to continuous writing request of direct variables (ACK response)

Classification	Header	Station No.	Command	Tail	BCC	
Frame	ACK	H04	wSB	ETX	BCC	

③ Continuous reading request of direct variables (reading 20 bytes from %MB0 of station 4)

Classification	Header	Station No.	Command	Variable Length	Variable Name	Number of data	Tail	BCC
Frame	ENQ	H04	rSB	H04	% MB0	H14	EOT	BCC

④ Response to continuous reading request of direct variables (ACK response)

Classification	Header	Station No.	Command	Number of blocks	Number of data	Data	Tail	BCC
Frame	ACK	H04	rSB	01	H14	20 bytes data	ETX	BCC

Remark

[Note1] Number of data in frame is in HEX unit

B) Frame edit : Edit and download 4 frames above to module using Frame Editor. Enter 4 frames as below. Next is frame entry screen.

Frame Name: GM_WR Header: [ENQ]	Tx/Rx:	Send	<u> </u>
Segment 1 Type: CONST J C HEX © ASCII	28 Segmen Type: N	t 5 IONE	
Segment 2 Type: ARRAY SD1 © Convert © None size: 40	Segmen Type: h	t 6 IONE 🔽	
Segment 3 Type: NONE	Segmen Type: N	t 7 IONE	
Segment 4 Type: NONE	Segmen Type: N	t 8- IONE	

Write request frame : GM_WR_REQ (TX frame)

Frame name above is 'GM_WR' entered as TX frame. Station No., command and variable as of CONST are registered in segment 1 and data TX area of ARRAY type is specified in segment 2. As is in ASCII communication, select Convert to convert TX data to ASCII figures. [BCC] is added behind the tail as the lower case 'w' is used in command with BCC type set as below. BCC type is identical all for dedicated communication frames.

BCC Setting	and the state of the second		×
Data Type			
• ASI	CII	C Hex	
Check Rule			
C Def	ault		
• SUI	41	C SUM	2
C XOI	81	CXOR	2
О МИ	L1	C MUL	2
Range :	H[0]~T[0]		ex) H[0]~T[0]
Complement :		Mask : &ff	ex) ^FF
	OK	Cancel	

Frame Name: GM_WR_ACK Header: [ACK]	Tx/Rx: Receive 💌
Segment 1	Segment 5
Type: CONST J 04wSB	Type: NONE
Segment 2	Segment 6
Type: NONE	Type: NONE
Segment 3	Segment 7
Type: NONE	Type: NONE
Segment 4	Segment 8
Type: NONE	Type: NONE

• Response frame to Write request: GM_WR_ACK (RX frame)

Frame name is 'GM_WR_ACK'. Response frame to Write request has no data, thus, enter only RX frame as of CONST in segment 1.

Frame Name: GM_RD Header: [ENQ]	Tx/Rx:	Send 💽
Segment 1 Type: CONST _ 04	rSB04%MB014 Segmen	nt 5 NONE
Segment 2	– Segmei	nt 6
Type: NONE	Type: [NONE
Segment 3	Segmer	nt 7
Type: NONE	Type:	NONE
Segment 4	Segmen	nt 8
Type: NONE	Type:	NONE

Read request frame : GM_RD (TX frame)

Frame name is 'GM_RD'. And as of TX frame, it requests reading of 14 bytes data in HEX.

• Response frame to Read request: GM_RD_ACK (RX frame)

The 4th Main Frame		×
Frame Name: GM_RD_ACK	Tx/Rx:	Receive •
Header: [ACK]	Immediate Response:	
Type: CONST V04rSB0114	Tupe: NONE	
	Type. NONE	
C HEX		
Segment 2	Segment 6	
Type: ARRAY - RD1	Type: NONE	-
© Convert © None size: 20		
– Seament 3		
	Type: NONE	-
Segment 4	Segment 8	
Type: NONE	Type: NONE	_
Tail: [ETX][BCC] BCC 9	Setting	OK Cancel

Frame name is 'GM_RD_ACK'. Since RX frame has a data, enter CONST in segment 1 and allocate 20 bytes of data RX area in ARRAY to segment 2. As in ASCII communication, select Convert to convert received ASCII data to HEX to allow receiving in figures.

 Total screen of frame entry: Next is the basic screen of Frame Editor where 4 frames are registered showing frames 0 ~ 3 are entered in frame list.



After frame edit above is finished, save the file and download the frame to Cnet I/F module to run RS-232C channel for preparation of operation. TX sequence of 4 frames is as shown in [Figure 8.6]. User defined program shall be prepared in GMWIN to allow TX/RX in order as in the figure.

[Figure 8.6] TX sequence of TX/RX frames



C) GMWIN programming : After frame edit is completed, prepare program via GMWIN to allow TX/RX in sequence as in [Figure 8.6]. Use SND_MSG/RCV_MSG Function Blocks to allow Cnet 1,2,3 stations in user defined mode to communicate with Cnet station 4 which is dedicated communication slave station, with library insertion selected from project menu prior to programming to insert COMMUNI.4FB. User defined TX/RX programs shall be set respectively for 1,2,3 stations. Data mapping is all identical for 3 stations, thus, the same program may be used. [Figure 8.7] shows program for data writing and its response frame receiving.



[Figure 8.7] Function Block program for data writing

Use SND_MSG Function Block in the figure to send 40 bytes of TX data to 'GM_WR' frame via RS-232C channel. TX point of time is controlled through 'WR_START'. In case of normal response after GM_WR frame is sent, execute RCV_MSG Function Block if 'GM_WR_ACK' frame is received with '_RCV0_232[1]' flag turned 'ON' among received flags in RS-232C channel. TX data is saved in SD1 area of SND_MSG Function Block, while 40 bytes data in variable area of 'SD_SAVE' is transmitted as in [Figure 8.7].

Next is setting screen of SD_SAVE variables. Memory of 41bytes is allocated to %MB140 address starting. Data size of TX variable shall be set at least identical to the data size to be sent.

Add/Edit Variables		X
Variable Name :	SD_SAVE	ОК
Variable Kind		Cancel
Variable Kind :	VAR	Help
Data Type		Memory Allocation
C Elementary :	BOOL	C Auto
O FB Instance :	CTD 🔽	Assign (AT) :
• Array (0 4	0) OF USINT	%MB140

[Figure 8.8] shows Function Block program for transmission of Read data.

[Figure 8.8] Function Block to read data



In [Figure 8.8], Read is requested via SND_MSG Function Block to read data and to respond to this, 20 bytes data is sent to GM_RD_ACK frame from dedicated slave station. If GM_RD_ACK frame is received, _RCV0_232[3] is 'ON' to execute RCV_MSG Function Block and save the received data to RD_SAVE area set to RX data variable. Memory for RD_SAVE is allocated to %MB0 area as below and data size shall be set at least identical to the size of the received data. Next is variable setting screen of RD_SAVE which is a saving variable of RX data.

Add/Edit Variables		X
Variable Name :	SD_SAVE	ОК
Variable Kind		Cancel
Variable Kind :	VAR 🔄	Help
Data Type		Memory Allocation
C Elementary :	BOOL	 Auto
O FB Instance :	CTD 🛃	Assign (AT) :
⊙ Array (0	20) OF USINT -	%MB0

[Figure 8.9] shows interlock program of Write data Function Block. If in normal communication, it allows TX/RX as in sequence shown in [Figure 8.6] and even in abnormal communication, it allows communication in the following sequence after waiting for response 1 sec.

[Figure 8.9] Interlock program to Write data



[Figure 8.10] shows interlock program of Read data Function Block. If in normal communication, it allows TX/RX as in sequence shown in [Figure 8.6] and even in abnormal communication, it allows communication in the following sequence after waiting for response 1 sec..





Prepare one program integrated by 4 programs above and let it downloaded to PLC through compile process, and then run the program to allow communication with dedicated communication slave station in user defined mode. Identical frame list and program can be also used in Cnet station 2 & 3. And if the program is run via compile and download, identical communication is available in station 2 & 3.

Remark

[Note1] Waiting time for response shall be set larger enough than max. response time estimated in consideration of frame length and data transmission speed.

8.3 GMWIN connection using dial-up modem

Cnet I/F module has a remote communication function via telephone line. With this function in the system as shown in [Figure 8.11], connect external modem to module and apply GMWIN connection via dial-up modem in PC to change programs and to monitor variables as described below. [Figure 8.11] shows an example of system configuration through dial-up modem and telephone line.

[Figure 8.11] GMWIN connection via dial-up modem



8.3.1 Exercising program

For GMWIN connection via dial-up modem, set operation mode of this module to GMWIN mode and dial-up modem connection mode, and connect modem with Cnet I/F module through modem setting and RS-232C cable.

1) Operation setting

[Table 8 5] Setting items

For dial-up modem connection with Cnet I/F module, set basic parameters as specified in [Table 8.5].

Setting item	TM master Cnet I/F module	Remark
Module name	G3L-CUEA	
Channel mode	Stand-alone mode	
RS-232C operation mode	GMWIN mode	
RS-232C station No.	Station 0	Setting available only in Ver.2.0
RS-232C communication type	Dial-up modem	
Modem initializing command	Set initial value as in the user's manual	Basic value, 'ATZ'
RS-232C communication speed	38400 BPS / DATA 8 bits / START 1 bit / STOP 1 bit	As agreed with the speed of dial- up modem

8 - 2 1

2) Operation setting

Connect 9-pin to 25-pin cable with dial-up modem and Cnet I/F module via RS-232C channel in the following type. [Table 8.6] Modem connection with Cnet I/F module

Cnet (9-pin) male			Modem side(25-pin) male	
Pin No.	Name	Connection No. and signal direction	Pin No.	Name
1	CD	←	CD	8
2	RXD	←	RXD	3
3	TXD	→	TXD	2
4	DTR		DTR	20
5	SG	← →	SG	7
6	DSR	<u> </u>	DSR	6
7	RTS	Ì►	RTS	4
8	CTS	←	CTS	5
9	RI		RI	22

3) Modem initializing

If mode setting and connection between modem and Cnet I/F module via cable are completed, link phone line to modem and let PLC powered on to initialize modem. Modem initializing is accomplished by modem initializing command set previously in Cnet I/F module after powered on. If modem has been successfully initialized, Cnet LED is displayed as below.





The figure above shows the case that modem has been initialized normally. If not initialized, TX LED will flash in a cycle of 1 sec. in the figure. If so, refer to Chapter 4 How to connect to dial-up modem in the manual to shoot the trouble.

4) Telephoning and remote connection

If modem has been initialized, Cnet I/F module waits for telephoning and remote connection from GMWIN in connection stand-by status. Since Cnet I/F module has no telephoning function, install modem on PC where GMWIN is mounted on to connect through telephoning. Next is how to make a phone call in GMWIN.

A) Install modem on PC. Internal modem can be applied to PC side.

B) Run GMWIN program and select method of connection from connect option in project option. Set method of connection type to modem and dial-up modem, and communication port and transmission speed which are set in internal or external modem linked with PC. Communication speed as is related with dial-up modem performance shall be set similar to that of modem.

Optio	n				? X
Mal	ke Option Monito	r/Debug Optic	on Auto Save Direc	ctory Set Connect Option	
	Method of Connecti	ion			
	C RS-232C		💿 Dial-up Modem	🔿 Dedicate Modem	
	Modem	Co	mmunication Port	COM2 -	
	O GLOFA Fnet for	r PC BP	s [38.4k 🔹	
	O GLOFA Mnet fo	r PC Ph	one No	0417-550-8379	
	C Ethernet	ETH	j	0411-550-0515]	
	Depth of Connectio	in			
	[Network Type	e Setting of F	Remote 1	
	Remote 1	GLOFA Che	et 🔽		
	O Remote 2				

- C) Select Remote 1 of depth of connection stages and set station No. as specified in Cnet I/F module. The station No. shall be surely input if the module is of Ver.2.0 or later. For the former versions, no need to set station No. because basic values are good enough for connection. Station numbers are not compared for GMWIN connection in the former versions.
- D) Select Connect in On-line after connection option setting to display dialog box for modem initializing.

Modem Status		×
	Initializing the modem	
	Cancel	

E) If COM port of modem is incorrectly set or connection with modem is abnormal, the following error message is displayed. In this case, inspect COM port or modem connection.



F) If telephoning is completed, GMWIN tries remote connection automatically and if remote connection is completed, program write and run/stop icon menus are activated as below.



- G) This means that remote 1 stage connection is completed just like the connection status that RS-232C cable is connected as moved, where all functions in On-line menu are available.
- H) To release connection in remote connection status, select Disconnect in On-line menu to display Disconnect menu box as in the figure below indicating Disconnected.



I) If connection is released, GMWIN hangs up the phone automatically to disconnect it.

J) If the phone is hung up normally, local and remote modem is restored to initial status to allow remote connection again via telephoning.

8.4 Communication with GOLDSEC MJUC24

With user defined mode in this module, communication with different model of device is available through function to define other company's protocol via Frame Editor in user defined mode. Next is how to communicate via GOLDSEC MJ71C24 computer link communication module of GOLDSEC PLC in GLOFA-PLC. [Figure 8.12] shows system configuration for communication with GOLDSEC PLC via RS-422 channel. 12-word data is read from D0100 of GOLDSEC PLC to save in starting %MW50 of GLOFA PLC in order, while GOLDSEC PLC is set to station 1.

[Figure 8.12] Communication between GLOFA PLC and GOLDSEC PLC



8.4.1 Exercising program

As shown in [Figure 8.12], Cnet I/F module operates as a master station in user defined mode. If total Read command of memory word unit is applied among dedicated protocols of GOLDSEC PLC, continuous reading of D area in GOLDSEC PLC is available. Set mode and basic setting items of Cnet I/F module and then prepare frame and GMWIN program for this service

1) Setting items

As in communication via RS-422 channel of Cnet I/F module, set operation mode and basic parameters for RS-422 channel. [Table 8.7] describes setting items of Cnet I/F module.

RS-422 channel setting item	Setting contents	Remark
Operation mode	Mode '2' user defined mode	RS-232C channel not used
RS-422 station No.	Basic value (Not used)	
Communication type	RS-422	Communication speed and basic
RS-422 basic parameters	9600 BPS / DATA 8 bits / START 1 bit / STOP 1 bit	communication spec. shall be as specified in spec. of MJ71UC24 computer link module.

[Table 8.7] Setting items

2) Communication protocol

Communication protocol to communicate with MJ71UC24 computer link module is as follows.





If GLOFA Cnet sends A) Read request frame first, MJ71UC24, to respond to this, reads data of applicable area to transmit B) Response data frame, and Cnet I/F module sends C) Immediately Response frame to inform MJ71UC24 of data received. Next is TX/RX frame structure.

A) Read request frame(Cnets' request : Read request of 12 words in D0100 of station 1)

Classification	Header	Station No.	PLC No.	Command	Message wait	Head device	Number of device
Frame	ENQ	01	FF	WR	0	D0100	0C

B) Response format to total Read (Response of MJ71UC24 side)

Classification	Header	Station No.	PLC No.	Data	Tail
Frame	STX	01	FF	Data (12 words) of D0100 address	ETX

C) Immediate response

Classification	Header	Station No.	PLC No.
Frame	ACK	01	FF

Next is for communication frame contents. Refer to the user's manual of GOLDSEC-M computer link unit for more information.

□ Station No. : Station No.(station 1) of MJ71UC24

D PLC No. : Set to FF

Command : WR (Total Read command of word unit in device memory)

D Message wait : Min. stand-by time until transmitted after frame is received.

□ Head device : 5 characters as a starting address in PLC memory

Dumber of devices: Data length to read (word unit)

Data : Data appropriate for the number of devices specified.

3) Frame edit

Define 3 frames above through Frame Editor.

A) Read request frame: Read request frame as of TX frame is configured in CONST where no ARRAY type is applied. Next is edit screen of Read request frame for transmission.

The 1th Main	Frame			×
Frame Name:	RD_REQ	Tx/Rx:	Send 🔹	
Header:	[ENQ]			
Segment 1 Type: CONS C HEX	T 01FFWR0D01	000C Segmer	nt 5 NONE T	

B) Total Read response frame : Response frame to Read request is defined by RX frame, while ARRAY variable is set to saving area of RX data behind PLC No.. As in ASCII communication, select Convert for data type to convert ASCII code into HEX value so to be received by PLC, and enter 24 as RX data is in byte unit.

The 2th Main Frame		×
Frame Name: RD_DATA	Tx/Rx:	Receive •
Header: [STX]	Immediate Response:	IMM_ACK
C		
Tupe: CONST VIOIFF	Segment 5	
	Type. NONE	
O HEX O ASCII		
Segment 2	Segment 6	
Type: ARRAY RD1	Type: NONE	-
Convert C None size:	24	
	[
Tupe: NONE	Tupe: NONE	
Type. NONE	Type. NONE	
- Segment 4	Segment 8	
		-
Tail: [ETX] BC	C Setting	OK Cancel

If RX frame is received, set IMM_ACK to immediate response to send IMM_ACK frame through immediate response from Cnet when RD_DATA is received. Immediate response frame is described below.

C) Immediate response frame : Define IMM_ACK frame as below for TX frame to send IMM_ACK frame from Cnet if

RD_I	DATA	frame	is	received.
------	------	-------	----	-----------

The 3th Main	Frame		×
Frame Name:	IMM_ACK	Tx/Rx:	Send •
Header:	[ACK]		
- Segment 1	T OIFF	Segment 5	5

Frame Editor screen where frame has been defined is as below. After frame edit above is completed, write frames and basic parameters via RS-422 channel through On-line connection and then run channel operation to finish preparation of Cnet operation.

📩 Cnet Frame Editor (untitle	d,frm)		
<u>File Online Option Monitor</u>	<u>H</u> elp		
Channel C RS232	side	• RS422 side	
Basic Parameters Station: 00 Type	: RS 422 -	Init Command:	ATZ
Baud Rate: 9600 <u>•</u> Parity: None <u>•</u>	Data Bit: 8 Stop Bit: 1	<u>·</u>	Monitor Entry © 4x32 © 16x20
Frame List	– Frame Informations –		
0 RD_REQ	Tx/Rx: Send	Header:	
2 IMM_ACK	SG1: null	SG5: null	
3	SG2: null	SG6: null	
5	SG3: null	SG7: null	
7	SG4: null	SG8: null	
8 9 -	Tailer:	BCC: Non	e

4) GMWIN programming

After frame edit and download are completed, prepare program in GMWIN to save TX/RX data of TX frames. Next figure shows GMWIN program for TX/RX communication with MJ71UC24. With 1 sec. timer, 'RD_REQ' frame is transmitted in a cycle of 1 sec. and 24 bytes of data received are saved in variable area of 'RD1' if 'RD_DATA' frame is received.

				GMWR SND_MSG BEQ NDB-
[1] WRACK.NDR WRACK.ERR		RCV_MSG REQ NDR	0	-SLOT ERR-
	0	- SLOT ERR _NO	1	- CH STAT
	1	CH STAT	'RD_REQ'	- FNAM
As a RX checking flag of RD DATA frame it turns on	'RD_DATA	A'- FNAMLEN1	SD	- SD1
if the frame registered as No.1 frame is received via	RD1	- RD1 LEN2	0	- LEN1
RS-422 channel of No.0 slot Cnet I/F module.	RD	- RD2 LEN3	SD	- SD2
	RD	- RD3 LEN4	0	- LEN2
	RD	- RD4	SD	- SD3
			0	- LEN3
			SD	- SD4
			0	- LEN4

RX data is saved in variable defined to RD1 of RCV_MSG Function Block with variable allocation set to %MB100 and with 25 ARRAY variables reserved to receive 24 bytes data.

Add/Edit Variables	X
Variable Name : RD1	ОК
Variable Kind	Cancel
Variable Kind : VAR 💽	Help
Data Type	Memory Allocation
C Elementary : BOOL	C Auto
C FB Instance : CTD	 Assign (AT) :
• Array (0 24) OF USINT	%MB100

8.5 Communication with MASTER-K 1000H

Communication between GLOFA-PLC and MASTER-K 1000H PLC will be described below. [Figure 8.14] shows the system where this module is connected with CPU communication port of MASTER-K 1000H via RS-232C. Programming for Cnet I/F module as of a master station to write data in MASTERK-K1000H output area in accordance with MASTER-K 1000H's dedicated communication protocol is described in the figure. It's an example for Read 10-word data from %MW100 address of GLOFA PLC and Write 10-word data to output areas of 5 cards from output card P00 of MASTER-K 1000H.

[Figure 8.14] Communication system between GLOFA PLC and MASTER-K PLC



RS-232C interface

8.5.1 Exercising program

Cnet I/F module operates as a master station in user defined mode, and writes data to MASTER-K 1000H via CPU port of MASTER-K 1000H PLC through dedicated protocol and WORD WRITE command among MASTER-K dedicated communication protocols, while MASTER-K 1000H operated as a slave station processes Write data request of GLOFA-Cnet to respond to the following result in the structure as shown in [Figure 8.14]. Prepare frame and GMWIN program for this after setting of Cnet I/F module mode and basic setting items.

1) Setting items

As in communication via RS-232C channel of Cnet I/F module, set operation mode and basic parameters for RS-232C channel. [Table 8.8] describes setting items of Cnet.

RS-232C channel setting item	Setting contents	Remark
Operation mode	Mode '2' user defined mode	RS-422 channel not used
RS-232C station No.	Basic value(Not used)	Communication speed and basic
Communication type	Null modem	communication spec. shall be as
	9600 BPS/DATA 8 bits	specified in spec. of MASTER-K 1000H
RS-232C basic parameters	/START 1 bit/STOP 1 bit	communication.

[Table 8.8] Setting items of Cnet I/F module

2) Communication cable connection and basic setting

Connect Cnet with computer communication port in MASTER-K 1000H CPU as shown in [Figure 8.15]. Handshakefree type of null modem connection in RS-232C communication is applied with MASTER-K 1000H communication type set to RS-232C communication and 9600 BPS/Data 8 bits/Start 1 bit/Stop 1 bit through DIP switch along with station No. set to station 5. Refer to the user's manual for MASTER-K series communication to set MASTER-K 1000H communication.

Cnet(9-pin)			MASTER-K1000 CPU	
Pin No.	Name	Connection No. and Signal direction	Pin No.	Name
1	CD		CD	8
2	RXD	*	RXD	3
3	TXD		TXD	2
4	DTR		DTR	20
5	SG		SG	7
6	DSR	← ┘	DSR	6
7	RTS	── →	RTS	4
8	CTS	 ←────┘	CTS	5
9	RI		RI	22

[Figure 8.15] 3-line connection between Cnet and MASTER-K 1000H (Handshake-free)

3) TX/RX sequence of communication frame

TX/RX procedure to communicate in MASTER-K 1000H computer communication type is as follows. Cnet I/F module operates as a master station and MASTER-K 1000H operates as a slave to respond to Cnet's request as shown in the figure.





When GLOFA Cnet sends A) Write request frame first, MASTER-K 1000H to respond to this, writes data to applicable area and sends B) Response frame. Next is TX/RX frame structure.

The word write nume (energies): write request of the words in the of station ty								
Classification	Header	Station No.	Command	Address	Number	Data	Tail	BCC
Frame	ENQ	05	W	P00	0A	20 bytes Data	EOT	
BCC calculation range					`)		

A) Word Write frame (Cnet's request : Write request of 10 words in P00 of station 1)

B) Response format to Word Write (Response of MASTER-K 1000H)

Classification	Header	Station No.	Command	Tail	BCC		
Frame	ACK	05	W	EOT	E0		
BCC calculation range							

Next is for communication frame contents. Refer to the user's manual of MASTER-K 1000H for more information.

□ Station No. : Station No. 5 (station No. of MASTERK-1000H)

Command : w (BCC checked in WORD WRITE with the lower case of command)

Address : P00 (P area of MASTER-K 1000H)

D Number : 0A (number of HEX data to write in word unit)

Data : Data to write in specified device

BCC : ASCII code sum of HEX data from station No. to tail.

3) Frame edit

Define 2 frames above through Frame Editor.

A) Write request frame : Write request frame as of TX frame is configured to send data via segment in ARRAY type to defined protocol. Next is Frame Editor screen of transmission frame edited. MK_WR is used for frame name, and the number of TX data is set to 20 bytes with station No. and constant command in CONST input to segment 1 and ARRAY variable to segment 2. ARRAY type is set to Convert to convert TX data to ASCII. As is TX frame, set TX/RX to Send.

The 1th Main Frame			×
Frame Name: MK_WR	Tx/Rx:	Send	•
Header: [ENQ]			
Segment 1	Segment	5	
Type: CONST 05wP0000A	Type: N(DNE 🗾	
C HEX • ASCI			
⊢Seament 2	Segment	6	
Type: ARBAY - SD1	Type: N(DNE -	
Convert C None size: 2	20		
Segment 3	Segment	7	
Type. NONE	1300. [10		
Segment 4	Segment	8	
Type: NONE	lype: N(DNE 📩	
Tail: [EOT][BCC] BC	C Setting	OK	Cancel

B) Response frame: To respond to Write frame, MASTER-K 1000H sends the response frame below. RX frame to receive this is defined as below. Set frame name to MK_ACK and enter '05w' of RX frame CONST data for station No. and command. RX frame has no data, thus, no need to set ARRAY segment. Set [BCC] behind the tail to let BCC checked. Since BCC uses lower case command in Cnet's request frame, let BCC checked in all TX/RX frames.

The 2th Main	Frame		and any and any areas		×
Frame Name: Header:	MK_ACK [ACK]	Tx/Rx: Immedia	ate Response:	Receive	
Segment 1 Type: CONS	T ⊻ 05₩		Segment 5 Type: NONE	<u>.</u>	
Segment 2 Type: NONE			Segment 6 Type: NONE	T	
Segment 3 – Type: NONE			Segment 7 Type: NONE	<u> </u>	
-Segment 4 - Type: NONE			Segment 8 Type: NONE	T	
Tail: [EO		BCC Setting		OK Ca	ncel

C) BCC checking : BCC sends / receives HEX data sum from station No. to tail with ASCII converted result attached to the tail. BCC setting is as follows.

and a second second		
)II	C Hex	
ault		
41	C SUM	2
1	C XOR	2
L1	C MUL	2
H[1]~T[0]		ex) HI01~TI01
NONE	Mask : tf	ex) ^FF
ОК	Cancel	
	CII ault 4 1 3 1 L 1 [H[1]~T[0] [NONE]	CII C Hex ault 4 1 C SUM 3 1 C XOR L 1 C MUL [H[1]~T[0] [NONE] Mask : Eff [OK] Cancel

D) Frame download : Download the prepared frame and basic parameters as above to Cnet I/F module and run RS-232C channel to complete basic setting for Cnet I/F module. Subsequently, prepare PLC program through GMWIN program.

4) GMWIN programming

After frame edit and download are completed, prepare TX/RX program with SND_MSG/RCV_MSG in GMWIN for TX/RX by the prepared frame. Program for frame transmission and RX data saving shall be also prepared in GMWIN. [Figure 8.17] shows GMWIN program for communication with MASTER-K 1000H. With 1 sec. timer, 'MK_WR' frame is transmitted in a cycle of 1 sec. and TX area of %MB200 is allocated in SD1 area of TX frame to transmit 20 bytes starting from %MW100 address. Download the program shown in [Figure 8.17] to PLC and run program to allow TX/RX through Cnet.



[Figure 8.17] MASTER-K 1000H communication program

8.6 Communication with HEX communication equipment

Communication with devices which communicate with GLOFA-PLC through HEX protocol is described as below. HEX communication needs only half amount of ASCII communication data, so it enables double speed communication comparatively even in the same communication speed. The figure shows an example of user defined mode communication of Cnet I/F module as a master station, with temperature controller which performs HEX communication. 12-word data per channel of temperature input 12 channels of temperature controller are read one by one and saved to %MB300 address of GLOFA PLC, and if No.0 bit input value of slot No.1 input module in GLOFA PLC is turned on, 24 bytes data is read from %MB1000 address and output to 12 channels of D/A output module of temperature controller in this program example. GLOFA Cnet I/F module and temperature controller perform 1:1 communication via RS-232C channel in the system configuration as shown in [Figure 8.18].

[Figure 8.18] Communication system of GLOFA-PLC with temperature controller



RS-232C interface

8.6.1 Exercising program

Cnet I/F module operates as a master station in user defined mode, and temperature controller operated as a slave responds to Read/Write data requests of GLOFA Cnet I/F module via RS-232C communication port in [Figure 8.18]. For this service, set mode and basic items of Cnet I/F module and then prepare frame and GMWIN program. As communication protocol of temperature controller is in HEX communication here, HEX value is to be defined in the frame of Cnet I/F module, which is supported only in Cnet Ver.2.0 or later. Ver.2.0

Remark

[Note1] When setting of constant in Frame Editor, HEX value can't be input, thus, former modules than Cnet Ver.2.0 are unavailable for the service. Frame Editor also shall be of Ver. 2.0 or later for the service.

1) Setting items

As in communication via RS-232C channel of Cnet I/F module Ver.2.0, set operation mode and basic parameters for RS-232C channel. [Table 8.9] describes setting items of Cnet I/F module.

[Table 8.9] Setting items of Cnet I/F module

RS-232C channel setting item	Setting contents	Remark	
Operation mode	Mode '2' user defined mode	RS-422 channel not used.	
RS-232C station No.	Basic value (Not used)	Communication speed and basic	
Communication type	Null modem	communication spec. shall be as specified	
	38400 BPS / DATA 8 bits	in spec. of temperature controller	
RS-232C basic parameters	/ START 1 bit / STOP 1 bit	communication.	

2) Communication cable connection and basic setting

RS-232C communication channel of temperature controller is connected with Cnet RS-232C channel. If Handshakefree type of null modem communication is applied to temperature controller, perform connection as shown in [Figure 8.19]. After that, set communication type of temperature controller identical to the communication type of Cnet I/F module in [Table 8.9] to complete basic setting for communication. Refer to the user's manual of temperature controller to set temperature controller.

Cnet(9-pin)			Temperature controller		
Pin No.	Name	Connection No. and signal direction	Pin No.	Name	
1	CD	←			
2	RXD	*	RXD	2	
3	TXD		TXD	3	
4	DTR				
5	SG		SG	7	
6	DSR	← ┘			
7	RTS	→			
8	CTS	←			
9	RI				

[Figure 8.19] 3-line connection between Cnet and temperature controller (Handshake-free)

3) Communication protocol of temperature controller

For communication between Cnet I/F module and temperature controller, communication type of temperature controller is to be informed of. The example describes how to prepare program supposing that communication protocol is as shown in [Figure 8.20].

[Figure 8.20] Communication protocol of temperature controller



A) Write request frame(Cnet's request : Write data of 12 channels in temperature controller)

Classification	Header	Device ID	Command	Address	Channel number	Data
Frame	[DLE][STX]	01	01	30	0c	12-word data
BCC calculation range						

BCC	Tail
	[DLE][ETX]

B) Read request frame(Cnet's request : Read temperature value of 12 channels in temperature controller)

Classification	Header	Device ID	Command	Address	Channel number	BCC	Tail
Frame	[DLE][STX]	01	02	80	0c		[DLE][ETX]
BCC calculation range							

Classification	Header	Device ID	Command	Status	Channel number	Data			
Frame	[DLE][ACK]	01	02	00	0c	12 word data			
BCC calculation range									

C)	Read res	ponse frame	(Temp	erature co	ntroller's r	esponse	: sends	temperatu	ire value o	f 12	channel	ls)
- /			`									- /

BCC	Tail			
	[DLE][EOT]			

Communication protocol in [Figure 8.20] is a protocol for HEX communication with data areas all in HEX except header and tail.

Communication frame is described next.

Header : Indicates start of frame with [DLE][STX] in request frame and continuous control characters of [DLE][ACK] in response frame.

Tail : Indicates end of frame with [DLE][ETX] in request frame and continuous control characters of [DLE][EOT] in response frame.

- Device ID : Means temperature controller No. with '01' used in.
- Command : Dependent on Read/Write commands, '01' for Write and '02' for Read command.
- Address : Memory address of temperature controller.
- Channel number : I/O channels number of temperature controller.
- Data : I/O channel data of temperature controller.
- Status : Indicates the status of response frame. '00' if displayed means response successful.
- BCC : HEX data sum from Device-ID next to header to BCC prior.

4) Frame edit

Define 3 frames above through Frame Editor to download to Cnet I/F module.

A) Write request frame : Write request frame as of TX frame is configured to send data to specified protocol through segment of ARRAY type. Next is Frame Editor screen of TX frame edited. CON_WR is entered in frame name, CONST in segment 1, HEX for channel number in Device-ID, ARRAY variable in segment 2 and 24 bytes for TX number of data. Enter None for Array type to send TX data in HEX without ASCII conversion. As is TX frame, set TX/RX to Send. Enter [BCC] in tail and set BCC as below with data only inside segment added to send 1 byte BCC data in HEX value together. Set the range of S[0]~S[27] as the data length of segment is 28 bytes.

me Name: CON_WR ader: [DLE][STX]	Tx/Rx: Send	•
gment 1	Segment 5	
ype: CONST 🚽 0101300C	Type: NONE 🔹	
HEX CASCII		
ament 2	Segment 6	
DE: ABBAY SD1		
Convert © None size: 2	4	
egment 3	Segment 7	
ype: NONE	Type: NONE	
equent 4	Segment 8	
regilient 4		
ype: NONE	Type: NONE	
ype: NONE	Type: NONE	
ype: NONE	Setting	<u></u>
it: IBCC]]DLE][ET BCC	C Setting	cel
ype: NONE E	C Setting OK Can	cel
ype: NONE it: IBCC][DLE][ET BCC C Setting Data Type C ASCII	C Setting OK Can	zel
it: IBCC]]DLE][ET BCC C Setting Data Type C ASCII	C Setting OK Can	sel
it: IBCC][DLE][ET BCC C Setting Data Type C ASCII Check Rule C Default	Setting OK Can	zel
it: IBCC DLE ET BCC it: IBCC DLE ET BCC C Setting Data Type C ASCII Check Rule C Default C SUM 1	Setting OK Can	sel
il: BCCJDLEJET BCC C Setting Data Type C ASCII Check Rule C Default G SUM 1 C XOR 1	Setting OK Can	el
il: IBCC][DLE][ET BCC C Setting Data Type C ASCII Check Rule C Default C SUM 1 C XOR 1 C MUL 1	C SUM 2 C SUM 2 C XOR 2 C MUL 2	el j
il: IBCC][DLE][ET BCC] il: IBCC][DLE][ET BCC] C Setting Data Type C ASCII Check Rule C Default C SUM 1 C XOR 1 C MUL 1 Pages : SIDI~SI271	Setting OK Can C SUM 2 C SUM 2 C XOR 2 C MUL 2	zel
il: IBCC][DLE][ET BCC] il: IBCC][DLE][ET BCC] C Setting Data Type C ASCII Check Rule C Default C SUM 1 C XOR 1 C MUL 1 Range : S[0]~S[27]	Setting OK Can C Sum 2 C SUM 2 C SUM 2 C MUL 2 ex) H[0]~T[0]	zel
il: IBCC][DLE][ET BCC il: IBCC][DLE][ET BCC C Setting Data Type C ASCII Check Rule C Default C SUM 1 C XOR 1 C MUL 1 Range : S[0]~S[27] Complement : NONE _ Max	Type: NONE Setting OK Cana ○ Hex ○ Hex ○ K Cana ○ Hex ○ Hox ○ Hox <tr< td=""><td>zel</td></tr<>	zel

B) Read request frame: It is TX frame to read channel data through temperature controller in Cnet. TX frame for Read request shall be registered as follows. Input CON_RD for frame name. Because TX frame has no data area, use just one segment set to Constant. Set [BCC] in front of tail and let [BCC] checked. BCC checking range and calculation method are same as in Write request frame.

The 2th Main Frame			×
Frame Name: CON_RD	Tx/Rx:	Send	•
Header: [DLE][STX]			
- Seament 1		5	
Type: CONST 🚽 0102800C	Type: N		
© HEX ⊂ ASCII			
r Segment 2	Segment	6	
Type: NONE	Type: N	ONE 🚽	
r Segment 3	Segment	7	
Type: NONE	Type: N	ONE 🔽	
⊂ Seament 4	Seament	8	
Type: NONE	Type: N		
Tail: [BCC][DLE][ET B(CC Setting	OK	Cancel

C) Read response frame : Set RX frame to receive TX frame which responds to Read request in temperature controller. The right figure shows setting screen of RX frame. CON_ACK is entered in frame name, ARRAY segment in RX data area of temperature controller's response frame, HEX in command, CONST where is out of '00' and ARRAY in STATUS area as RX data is HEX '00' with STATUS value checked in PLC program.^[Note1] Set RX data area to ARRAY and conversion option to None in order to allow RX data to be received in HEX value by PLC program.

The 3th Main Frame 🗵							
Frame Name:	CON_ACK	Tx/Rx:		Receive	·		
Header:	[DLE][ACK]	Immedi	ate Response:				
-Segment 1-			- Seament 5				
Type: CONS	т 🚽 0102		Type: NONE	•			
• HEX	ASCI						
-Segment 2-			Segment 6				
Type: ARRA	Y RD1		Type: NONE	•			
C Convert	None size:	1					
-Segment 3-			Segment 7				
Type: CONS	т 🚽 ОС		Type: NONE	•			
© HEX C	ASCII						
Segment 4			Segment 8				
Type: ARRA	Y 🚽 RD2		Type: NONE	•			
C Convert	• None size:	24					
Tail: [BCC		CC Setting		OK Cano	el		

Remark

[Note1] HEX data of CONST segment can be set in an even number unit in frame edit. If '00' is in CONST data, setting is unavailable. In this case, set only '00' area to ARRAY.

5) GMWIN programming

After frame edit and download are completed, prepare TX/RX program via SND_MSG/RCV_MSG in GMWIN for TX/RX of the prepared frames. [Figure 8.21] shows TX/RX program to read data of temperature controller. It requests Read by transmission of 'Temperature' Function Block in a cycle of 1 sec. and receives its response frame to 'Response' Function Block to save HEX data of STAUTS and temperature data of 24 bytes among RX data to RD_DATA area temporally. Temporal data of RD_DATA if STATUS value is '0' saves 24 bytes of RX data in starting %MB300 address in order through this program.



[Figure 8.21] Read data program of temperature controller

STATUS set to RD1 of 'Response' Function Block is auto-variable to save data set to ARRAY segment in Frame Editor to save RX data received in '00' of RX frame, and checks normal response as compared with this area. [Figure 8.22] shows a program to write data with temperature controller. 'TX button' as of variable allocated to %IX0.1.0, sends TX data if 'ON' entered. TX data allocates 'DA_DATA' to %MB1000 to send 24 bytes data from %MB1000.

Chapter 8 Exercising program

Add/Edit variables	×		
Variable Name : SEND Variable Kind Variable Kind : VAR	OK Cancel Help	SEND	THR_OUT SND_MSG REQ NDR
Data Type Elementary: FB Instance: Array (0,) OF BOOL	Memory Allocation C Auto Assign (AT) : %IX0.1.0	O O CON_WR	- SLOT ERR - _NO - CH STAT - US
Initial Value	Init. Array	DA_DAT/ 24)- SD1 - LEN1
Add/Edit Variables	×	ОИММУ	- SD2 - LEN2
Variable Name : DA_DATA Variable Kind Variable Kind : VAR	OK Cancel Help	DUMMY	- SD3
Data Type C Elementary : BOOL C FB Instance : CTD	Memory Allocation Auto Assign (AT) :	DUMMY	- LEN3 - SD4
	%MB1000	0	- LEN4
Comments			

[Figure 8.22] Write data program of temperature controller

After compile and link of programs in [Figure 8.21] and [Figure 8.22], let them downloaded to PLC CPU and run to start communication through the defined protocol.

8.7 Example of using G7L-CUEC

8.7.1 Dedicated communication master



The following describes the example of system configuration as above with GM7 basic unit operation.

- In master GM7 basic unit, data is changed through ROL Function and MOV Function in M area, written to output contact of slave GM7 basic unit, and then read again in master GM7 basic unit finally to be written to output contact of G7E-DR10A which is extended digital I/O module.

1) Communication parameter setting and program of slave station

A) Perform operations in slave station No.31.

B) Create new project file and new program for slave station.

<mark>∰</mark> GM₩IN for Windows - c:₩gmwin3,3e₩source₩ded_slave.prj Project P <u>r</u> ogram <u>E</u> dit <u>T</u> oolbox <u>C</u> ompile <u>O</u> nline <u>D</u> ebug <u>W</u> indow <u>H</u> elp	<u>- 🗆 ×</u>
Image: state	
🚼 c:\#gm\win3, 3e\#source\#ded_slave	- 🗆 🗵
Row 0	
Row 1	
Row 2	
Row 3	
Row 4	
诸 c:\#gmwin3, 3e\#source\#ded_slave, prj	- II ×
PROJECT ==> PLC Type : GM7 CONFIGURATION(PLC) ==> Configuration Name : UNNAMED	
- → ACCESS UARIABLES ==> Ø variables declared → RESOURCE(CPU) Ø ==> Name : RESØ	
RESOURCE GLOBALS ==> 0 variables declared	_
Arranges the windows as horizontal r Offline R0,C0	Edit

C) Select communication parameter in GMWIN parameters and double-click on it to open communication parameter menu window.

С	ommunicato	on Parameter	×
	Communica	ation Method	
	Station No	.o.: 31 •	
	Baud Rate	te : 57600 • Data Bit : 8 •	
	Parity Bit :	None 🔹 Stop Bit : 1 🔹	
	Commun	nication Channel	
	@ RS23	32C Null Modem or RS422/485	
	C RS23	32C Modem (Dedicated Line) Init. Command :	
	C RS23	32C Dial Up Modem ATZ	
	- Protocol and	d Mada	1
	-FIOLOCUI and	Timeout in Master Mode : 500 ms	
	Dedicato		
	C	Master Read Status of Slave PLC List	
	•	Slave	
	Modbus	V	
	0	Master Transmission Mode : ASCII	
	User Def	Slave	
	User Dell	Macter	
	0	Slave	
		Ok Cancel Help	

- Set parameters as below and click on OK button.

	Protocol and mode					
Station No. Baud rate Data Parity Stop Communication bit bit bit bit channel					Dedicated	
31	57600	8	None	1	RS232C null modem or RS422/485	Slave

D) Prepare program as in the figure below and let it downloaded to GM7 basic unit of slave station. Refer to user's manual of GMWIN for the details of programming and downloading.



2) Communication parameter setting and program of master station

A) Perform operations in master station No.1.

B) Create new project file and new program for master station.

∰GMWIN for Windows - c:₩gmwin3,3e₩source₩ded_master,prj Project Program Edit Toolbox Compile Online Debug Window Help	- 🗆 🗙
<u>*822 * 282 * 2 × 2 2 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2</u>	
Image: Second	
🚼 c:\ygmwin3, 3e\ysource\ded_master	
Row 0	-
Row 1	
Row 2	
Row 3	and a second s
Row 4	
Row 5	
Row 6	
In a ster. pri	
PROJECT ==> PLC Type : GM7 CONFICUENTION(PLC) ==> Configuration Name : UNNOMED	
ACCESS VARIABLES ==> Ø variables declared	
RESOURCE(CPU) 0 ==> Name : RES0	
TASK DEFINITIONS ==> 1 tasks defined	
COMMENTS for DIRECT VARIABLES ==> 0 variables declared	•
Arranges the windows as horizontal nonoverlap Offline R0,C0	Edit

C) Select communication parameter in GMWIN parameters and double-click on it to open communication

parameter menu window.

С	ommunicato	on Paramete	r			×
	-Communica	tion Method —				
	Station No).: <mark>1</mark>	•			
	Baud Rate	e: 5760	00 🔽	Data Bit	: 8	•
	Parity Bit :	Non	e 🔹	Stop Bit	: 1	•
	Commur	ication Chann	el			
	• R823	2C Null Mode	m or RS422/485	5		
	C RS23	2C Modem (D	edicated Line)	Init. Comm	and :	
	C RS23	2C Dial Up Mo	dem			
	– Protocol and	l Mode	Timeout in N	Aaster Mode :	500	ms
	Dedicate	-				
	Dedicate	u Master	T Rea	d Status of Slav	e PLC	List
	c	Slave				
	Modbus					
	0	Master	Transm	nission Mode :	ASCII	-
	Ucor Dofi	blave				
	Oser Deil	Master				
	0	Slave				List
		Ok	_	ancel	Help	

- Set parameters as below and click on entry list button.

		Protocol and mode							
Station	Baud	Data bit	Parity		Parity Stop bit		Communication	Dodicated	Read status
No.	rate	Dala Dil	bit	Stop bit	channel	Deulcaleu	of slave PLC		
					RS232C null				
1	57600	57600 8	None	1	modem or	Master	Not selected		
					RS422/485				

D) Press entry list button to activate entry list window.

Priv	ate 1										×
FE	ntry Lis	t									
	No.	Туре			Rea	d Area	Store A	vrea	Size		
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 8 9										
									atsis		
				De	lete		Сору		Edit		
						Ľ	Close		Hel	q	

E) Double-click on entry list 0 in entry list with mouse to open the window showing Private 1 Item 0 Edit.

Private I I0em Edit Station No.: 31 Mode Size(Word): 1 © Send	Master station area (station No.1)
	Slave station area (station No.31)
Ok Cancel Help	

- Set parameters as below and click on OK button.

Other station No.	Size	Mode	Area to read	Saving area
31	1	ТΧ	%MW0 (Refer to the figure above)	%QW0.0.0 (Refer to the figure above)

F) Entry list 0 can be confirmed as registered in entry list as in the figure below.

ivate 1					
Entry List					
No.	Туре		Read Area	Store Area	Size
0 St 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	ation Number: 31.Send			%.M/V/0	36.QVVI
		Delete		opy	Edit
				Close	Help

G) Double-click on entry list 1 with mouse again to enter entry list 1 as below.

Private 1 II	em Edit		×	
Station No. :	31	Mode C Send		
Size(Word) :	1	Receive		Slave station area (station No.31)
Area				
From C %MVV	○%IW ●%	QW 0.0.0		
To C %MVV	• %	QW 0.1.0		Master station area (station No.1)
Ok	Cancel	Help		

- Set parameters as below and click on OK button.

Other station No.	Size	Mode	Area to read	Saving area
31	1	RX	%QW0.O.O (Refer to the figure above)	%QW0.1.0 (Refer to the figure above)

H) Check if entry list 0 and entry list 1 are registered as in the figure below and then press Close button to go to communication parameter window.

Private 1		×
Entry List		
No. Type	Read Area Store Area	Size
0 Station Number : 31.Send 1 Station Number : 31.Receive 3 4 5 6 7 8 9 10 11 12 13 14 15	%MVV0 %QVVD.0.0	%QVV(= <u>%QVV(</u>
16 17 18 19		<u>×</u>
Delet	e Copy E	dit
	Close	Help

- I) Click on OK button in communication parameter window to complete parameter setting input.
- J) Prepare program as in the figure below and let it downloaded to GM7 basic unit of master station. Refer to user's manual of GMWIN for the details of programming and downloading.

GMWIN for Windows - c:\#gmwin3.3e\#source\#ded_master.prj							
<u>er</u> <u>er</u> <u>s</u> <u>s</u> <u>s</u> <u>s</u> <u>s</u> <u>s</u>							
[] + +/+ +P +N							
🚼 c :\gmwin3, 3e\source\ded_master							
Row 1 DATA - IN OUT DATA DATA - IN1 OUT % MWO							
Row 2 1 - N							
Row 3							
Row 4							
C:\#gmwin3,3e\#source\#ded_master.prj							
L LD] PROGRAM ==> INSTØ : c:\#gmwin3.3e\#source\#ded_							
PARAMETERS							
Arranges the windows as horizon Offline R7,C6 Edit							

K) 'DATA', variable of program is HFF in HEX as an initial value with WORD type as in the figure below.

Variables					×
Name : _[Variables List —	DATA		Direct V	ariable <u>C</u> omment	ОК
Name	Var. Kind	Allocation	Used	Data Type	<u>E</u> lag
DATA	VAR	<auto></auto>		WORD	
					Cancel
					Help
- Description	<u>A</u> dd	<u>D</u> elete]	<u>E</u> dit	
Name : DA Variable Kin Data Type : Allocation : Initial Value Comments	TA d : VAR WORD <auto> : 16#00FF :</auto>				

L) Set 'Enable Communication' in On-line status to execute master function in dedicated communication between LG GM7 basic units.

8.7.2 User's definition

Example of protocol-defined communication between GM7 basic units is described in system configuration as below.



Data in M area of master station is sent to slave station, successively saved in M area as received by slave station, output to direct variable, and then transmitted to the master station again as processed.

Master saves the received data to M area again, outputs to direct variable, processes and then sends the data to slave station again repeatedly.

1) Communication parameter setting and program of slave station

A) Perform operations in slave station No.1.

B) Create new project file and new program for slave station..

GMWIN for Windows – c:₩gmwin3,3e₩source₩ded_slave.prj	- 🗆 🗵
🚼 c:\gmwin3,3e\source\ded_slave	
Row 0	
Row 1	
Row 2	
Row 3	
Row 4	
🔁 c : \gm win 3, 3e\source \ded_slave, prj	- D ×
PROJECT ==> PLC Type : GM? CONFIGURATION(PLC) ==> Configuration Name : UNNAMED	
ACCESS VARIABLES ==> Ø variables declared	
RESOURCE GLOBALS ==> 0 variables declared	
Arranges the windows as horizontal r Offline R0,C4	0 Edit

C) Select communication parameter in GMWIN parameters and double-click on it to open communication parameter menu window.

Com	municator	n Param	ieter					×
	ommunicati	ion Metho	od ——— bd					
	Station No.	: [1	•				
	Baud Rate	: [9600	Ī	Data Bit	: 8	•	
	Parity Bit :	Ī	None	-	Stop Bit :	1	-	
Г	Communi	cation Ch	iannel —	_			_	
	RS232	C Null M	odem or f	RS422/485				
	C R8232	C Moder	n (Dedica	ited Line)	Init. Comm	and :		
	C RS232	C Dial U	o Modem					
	rotocol and l	Mode —	т	impout in Mar	tor Modo :	0		
				inteourni waa	ster would .	<u> </u>	1115	
	Dedicated							
	0	Master 		🗖 Read 8	Status of Slave	PLC	List	
	C :	Slave						
	· zuabom ·	Master						
	0	Slave		Transmis	sion Mode :	ASCII	7	
	User Defin	ed —						
	0	Master					List	
	۲	Slave					Elot	
		OI	<	Can	cel	He	elp	

• Set parameters as below and click on OK button.

Communication method			Protocol and mode			
Station No.	Baud rate	Data bit	Parity bit	Stop bit	Communication channel	User defined
1	9600	8	None	1	RS232C null modem or RS422/485	Slave

D) Click on entry list button to display the figure below.

O blat defined	- Frame Information	
1 Not defined 2 Not defined 3 Not defined 4 Not defined 5 Not defined 6 Not defined 8 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 13 Not defined 14 Not defined	Tx/Rx: Header: SG1: SG2: SG3: SG4: SG5: SG6: SG6: SG6: SG7: SG8: Tailer:	
	BCC:	

E) Double-click on frame list 0 to activate Frame 0 window and set as shown in the figure below.

Frame O	
Header: [ENQ]	Tx/Rx : Receive
Segment 1	Segment 5
Type: CONST SEND_FRAME	Type: NONE -
C Hex Input C ASCII Input Size: Byte	Hex Input O ASCII Input Size: Byte
Segment 2	Segment 6
Type: ARRAY - %MB0	Type: NONE
Receive by Hex Converting Size: 4 Byte	C Hex Input C ASCII Input Size: Byte
Segment 3	Segment 7
Type: NONE -	Type: NONE
C Hexinput C ASCII Input Size: Byte	Hex Input C ASCII Input Size: Byte
Segment 4	Segment 8
Type: NONE	Type: NONE -
Hex Input C ASCII Input Size Byte	C Hex Input C ASCII Input Size: Byte
Tailer: [EOT][BCC] BCC Setting	Ok Cancel

Item	Setting value
Header	[ENQ]
TX/RX	RX
Segment 1	Type : CONST, Field : SND_FRAME, ASCII input selection button
Segment 2	Type : ARRAY, Field : %MB0, Size : 4 bytes
Tail	[EOT][BCC]

F) After setting, press BCC setting button as "[BCC]" is set to tail, and set BCC as in the figure below if BCC setting window is activated and then click on OK button.

3CC Setting		
Data Type		
 ASCII 	O Hex	
Check Rule		
C Default		
C SUM 1	SUM 2	
C XOR 1	C XOR 2	
O MUL 1	C MUL 2	
Range. Intoletto		
Complement: None	Mask: ^ff	ex) ^FF FF
		&FF
Ok	Cancel	

Item	Setting value
Туре	ASCII
Туре	SUM 2
Range	H(0)~T(0), namely, from Head [ENQ] to Tail [EOT].
Complement	None
Mask	Apply masking with HFF through XOR.

G) After BCC setting, click on OK button in Frame 0 window to register the frame as in the figure below.

D Receive 1 Not defined 2 Not defined 4 Not defined 5 Not defined 6 Not defined 7 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 14 Not defined	To/Ro: Receive Header:[ENQ] SG1: constant SG2: hex[4] SG3: null SG4: null SG6: null SG6: null SG6: null SG7: null SG8: null Tailer:[EOT][BCC] BCC: SUM 2	
--	--	--

H) Double-click on the following frame list 1 and activate Frame 1 window to set as in the figure below.

Frame 1	×
Header : [STX]	Tx/Rx: Send
Segment 1	Segment 5
Type: CONST RCV_FRAME	Type: NONE -
C Hex Input C ASCII Input Bize: Byte	Hex Input ASCII Input Size: Byte
Segment 2	Segment 6
Type: ARRAY - %MB10	Type: NONE -
Send by ASCII Converting Size: 4 Byte	C Hex Input C ASCII Input Size: Byte
Segment 3	Segment 7
Type: NONE 💽	Type: NONE
C Hex Input C ASCII Input Size Byte	C Hex Input C ASCII Input Size: Byte
Segment 4	Segment 8
Type: NONE	Type: NONE
C Hex Input C ASCII Input Size Byte	C Hexinput C ASCILInput Size Byte
Tailer: [ETX] BCC Setting	Ok Cancel

Item	Setting value
Header	[STX]
TXRX	ТХ
Segment 1	Type : CONST, Field : RCV_FRAME, ASCII input selection button
Segment 2	Type : ARRAY, Field : %MB10, Size : 4 bytes
Tail	[ETX]

0 Receive 1 Send 2 Not defined 3 Not defined 4 Not defined 5 Not defined 6 Not defined 7 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 14 Not defined 15 Not defined	Frame Information Tx/Rx: Send Header:[STX] SG1: constant SG2: hex[4] SG3: null SG4: null SG5: null SG6: null SG7: null SG8: null Tailer:[ETX] BCC: Not Set.	
--	---	--

I) After frame setting, click on OK button in Frame 1 window to register the frame as in the figure below.

- J) Click on OK button to go to communication parameter setting and then click on OK button again to complete setting.
- K) Prepare program as in the figure and let it downloaded to GM7 basic unit of slave station.

Refer to user's manual of GMWIN for the details of programming and downloading.

 In the program, Function Block is used. Prior to Function Block service, double-click on the item of GMWIN 'Included libraries' to open Include Library window as below. Click on 'Add(A)... ' button to add COMM.7FB library and then press OK button.

×
Helts
~

If Frame 0 of RX frame is received, the value is saved in %MB0 of slave station. (Refer to frame setting of Frame 0.) The saved value of %MB0 at this time is output to direct variable, %QB0.0.0 and value output to direct variable, %QB0.0.0 is saved again to %MB10. If all the procedure is completed without error, Frame 1 in frame list is sent from Function Block. Frame 1 is the TX frame of 4 bytes data saved in %MB10.

GMWIN for Windows - c:\"gmwin3,3e\"source\"user_slave.prj
🞇 c:\gmwin3, 3e\source\user_slave
Row 0EN EN EN EN
Row 1 XMB0 IN1 OUT XQB0.0.0
Row 2
Row 3EN ENDREQ NDR
Row 4 XQB0.0.0 IN1 OUT XMB10 1 -FL_I ERR
Row 5
Row 6
LD] PROGRAM ==> INSTØ : c:\#gmwin3.3e\#source\#user_slave COMMENTS for DIRECT VARIABLES ==> Ø variables declared
PARAMETERS
Arranges the windows as horizontal no Offline R6,C8 Edit

- If Frame 0 of RX frame is not received, this program operates never.
- Surely set both master / slave stations to "Communication Enable" to start communication.
- 2) Communication parameter setting and program of master station
 - A) Perform operations in master station No.0.
 - B) Create new project file and new program for master station.

GMWIN for Windows - c:\gmwin3,3e\source\user_master.prj Project Program Edit Toolbox Compile Online Debug Window Help	_ 🗆 🗙
R H H M	
🚼 c :\gmwin3, 3e\source\user_master	
Row 0	
Row 1	
Row 2	
Row 3	
Row 4	
Row 5	
Rec : Wgmwin 3, 3eWsourceWuser_master, prj	
CONFIGURATION(PLC) ==> Configuration Name : UNNAMED	
RESOURCE(CPU) 0 ==> Name : RES0	
TASK DEFINITIONS ==> 1 tasks defined	. 💌
Arranges the windows as horizontal no Offline RO,	CØ Edit

C) Select communication parameter in GMWIN parameters and double-click on it to open communication parameter menu window.

Communicaton Parameter 🛛 🗙
Communication Method
Station No.: 0 🗸
Baud Rate : 9600 🔹 Data Bit : 8 💌
Parity Bit : None 🔹 Stop Bit : 1 💌
Communication Channel
RS232C Null Modem or RS422/485
C RS232C Modem (Dedicated Line) Init. Command :
C RS232C Dial Up Modem
Protocol and Mode
Timeout in Master Mode : 500 ms
Dodiestod
C Master Read Status of Slave PLC List
C Slave
Modbus
C Master Transmission Mode : ASCII
User Defined
C Slave
Ok Cancel Help

• Set parameters as below and click on OK button.

		Communica	tion method	ł		Protocol and mode
Station No.	Baud rate	Data bit	Parity bit	Stop bit	Communication channel	User defined
0	9600	8	None	1	RS232C null modem or RS422/485	Master

D) Click on entry list button to display the figure below.

Use	er Defined			×
	Frame List			
	0 Not defined 1 Not defined 2 Not defined 3 Not defined 4 Not defined 5 Not defined 6 Not defined 9 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 14 Not defined 15 Not defined		Frame Information Tx/Rx: Header: SG1: SG2: SG3: SG4: SG5: SG6: SG6: SG7: SG8: Tailer: BCC:	
		Ok	Cancel	

Frame O		×
Header: [ENQ]	Tx/Rx: Send -	
Segment 1	Segment 5	
Type: CONST SND_FRAME	Type: NONE	
C Hex Input C ASCII Input Size: Byte	C Hexinput C ASCII Input Size:	Byte
Segment 2	Segment 6	
Type: ARRAY - %MB0	Type: NONE -	
Send by ASCII Converting Size: 4 Byte	C Hexinput C ASCII Input Size:	Byte
Segment 3	Segment 7	
Type: NONE -	Type: NONE	
C HexInput C ASCII Input Size: Byte	C Hex Input C ASCII Input Size:	Byte
Segment 4	Segment 8	
Type: NONE	Type: NONE	
C Hex Input C ASCII Input Size: Byte	C Hexinput C ASCII Input Size:	Byte
Tailer: [EOT][BCC] BCC Setting	Ok Cancel	

E) Double-click on frame list 0 to activate Frame 0 window and set as shown in the figure below .

Item	Setting value
Header	[ENQ]
TX/RX	ТХ
Segment 1	Type : CONST, Field : SND_FRAME, ASCII input selection button
Segment 2	Type : ARRAY, Field : %MB0, Size : 4 bytes
Tail	[EOT][BCC]

F) After setting, press BCC setting button as "[BCC]" is set to tail, and set BCC as in the figure below if BCC setting window is activated and then click on OK button.

Data Type			
• AS	CII	C Hex	
Check Rule -			
C Det	ault		
C SU	M 1	SUM 2	
C XO	R 1	C XOR 2	
O MU	L1	O MUL 2	
Range :	H[0]~T[0]		ex) H[0]~T[0]
Complement :	None	▪ Mask: ^ff	ex) ^FF FF

Item	Setting value
Туре	ASCII
Туре	SUM 2
Range	H(0)~T(0), namely, from Head [ENQ] to Tail [EOT].
Complement	None
Mask	Apply masking with HFF through XOR.

G) After BCC setting, click on OK button in Frame 0 window to register the frame as in the figure below.

0 Send	Frame Information	
1 Not defined 2 Not defined 3 Not defined 5 Not defined 5 Not defined 6 Not defined 9 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 14 Not defined 15 Not defined	Tx/Rx: Send Header:[ENQ] SG1: constant SG2: hex[4] SG3: null SG4: null SG5: null SG6: null SG6: null SG8: null Tailer:[EOT][BCC] BCC: SUM 2	

H) Double-click on the following frame list 1 and activate Frame 1 window to set as in the figure below.

Frame 1	×
Header: [373]	TulRs: Receive
Segment 1	-Segment 5
Type: CONST - RCV_FRAME	Type: NONE -
C Hex Input C ASCII Input Soci Byte	C Healmont C water input
Segment 2	Segment 8
Type ARRAY - %WB10	Type NONE -
Receive by Hex Converting Bize: 4 Byte	C Hermoni C Ascillation Diff. 9/19
Segment 3	Segment 7
Type: NONE ·	Type: NONE .
Griekempet Crivephopen Birts Brie	🕫 Hex mont 🕐 decisional 🖓 👘 📕 Byte
Segment 4	Segment 6
Type: NONE	Type: NONE .
of records of estimate state Brief	Present Construct Ent Bre
Tailer: EDQ BCC Setting	Ok Cancel

Item	Setting value
Header	[STX]
TX/RX	RX
Segment 1	Type : CONST, Field : RCV_FRAME, ASCII input selection button
Segment 2	Type : ARRAY, Field : %MB10, Size : 4 bytes
Tail	[ETX]

I) After frame setting, click on OK button in Frame 1 window to register the frame as in the figure below.

0 Send 1 Receive 2 Not defined 3 Not defined 4 Not defined 5 Not defined 6 Not defined 8 Not defined 9 Not defined 10 Not defined 11 Not defined 12 Not defined 13 Not defined 14 Not defined 15 Not defined	Frame Information Tx/Rx: Receive Header:[STX] SG1: constant SG2: hex[4] SG3: null SG4: null SG6: null SG6: null SG7: null SG8: null Tailer:[ETX] BCC: Not Set.	
--	--	--

J) Click on OK button to go to communication parameter setting and then click on OK button again to complete setting.

k) Prepare program as in the figure and let it downloaded to GM7 basic unit of slave station.

Refer to user's manual of GMWIN for the details of programming and downloading.

 In the program, Function Block is used. Prior to Function Block service, double-click on the item of GMWIN 'Included libraries' to open Include Library window as below. Click on 'Add(A)... ' button to add COMM.7FB library and then press OK button.

Include Library	X	Include Library	×
Current Included Libraries	3	Current Included Librari	36
		c:tgmwin3.3etilbtcom	n.7fb
OK	Cancel Help	<u>ОК</u>	Cancel Help
 Operate Function 	n Block every 200ms to transr	nit Frame 0.	
GMWIN for Wind	lows - c:\gmwin3,3e\so	urce₩us <mark>_□</mark> ×	
Window Help	n <u>E</u> dit <u>T</u> oolbox <u>C</u> ompile	Online Debug	
	=		
		(R) (P) (N) (F) (F)	
T20042	SEND SHID HSG		
Row 0	REQ NDR		
Row 1 0 -	FL_I ERR		
Row 2	STAT US		
Row 3			
Row 4	EN ENO		
Row 5 XMB10	IN1 OUT XQB0.0.0		
Row 6			
Row 7	EN ENO		
Row 8 XQB0.0.0-	IN1 OUT %MBO		
Row 9			
Inserts librar	u Offline	R12.C9 Edit	
		, inter or reality	

- Frame 0 transmits 4 bytes value from %MB0 of master station to slave station.
- If Frame 1 is sent from slave station, the value is saved in %MB10. (Refer to frame setting of Frame 1.) The saved value of %MB10 at this time is output to direct variable, %QB0.0.0 as reversed logically, and the output value to direct variable, %QB0.0.0 is saved again to %MB0.

- Consequently, If 8 LEDs of master station are turned on, 8 LEDs of slave station are turned off. And if 8 LEDs of master station are turned off again, 8 LEDs of slave station are turned on.
- Surely set both master / slave stations to "Communication Enable" to start communication.