

# Appendix

## A1 Specification of LED indication

### 1) Appropriate type

G3L-CUEA, G4L-CUEA

### 2) LED indication specifications during normal operation

Cnet module indicates operation and transmission state via 16-point LED during normal operation.

#### 1) Operation state indication(when LED display switch not pushed)

LED#	LED name	Contents	Remark	
0	RS-232C	RUN	On during RS-232C channel operation	
1		TX	On during transmission via RS-232C	
2		RX	On during receive via RS-232C	
3		ACK	On during ACK transmission /Off after NAK transmission	
4		NAK	On during NAK transmission /Off after ACK transmission	
5		ERR	Protocol error/On during SIO-error	
6		MODEM	On during setting modem communication mode	
7		SYS-RUN	Flash during interfacing with CPU of PLC	When normal, On
8	RS-422	RUN	On during setting channel to RS-422	
9		TX	On during transmission via RS-422	
10		RX	On during receive via RS-422	
11		ACK	On during ACK transmission /Off after NAK transmission	
12		NAK	On during NAK transmission /Off after ACK transmission	
13		ERR	Protocol error/On during SIO-error	
14		RS-485	On during RS-485 setting/Off during RS-422setting	
15		SYS-ERROR	Flash during serious error occurrence	Reamrk <sup>1)</sup>

## Appendix

### <G6L-CUEB>

LED#	LED name	Contents	Remark
0	RS-232C	RUN	On during RS-232C channel operation
1		TX	On during transmission via RS-232C
2		RX	On during receive via RS-232C
3		ACK	On during ACK transmission /Off after NAK transmission
4		NAK	On during NAK transmission /Off after ACK transmission
5		ERR	Protocol error/On during SIO-error
6		MODEM	On during setting modem communication mode
7	SYS-RUN/ERR	Flash during interfacing with CPU of PLC	When normal, On

### <G6L-CUEC>

LED#	LED name	Contents	Remark
1	RS-422	RUN	On during setting channel to RS-422
2		TX	On during transmission via RS-422
3		RX	On during receive via RS-422
4		ACK	On during ACK transmission /Off after NAK transmission
5		NAK	On during NAK transmission /Off after ACK transmission
6		ERR	Protocol error/On during SIO-error
7		RS-485	On during RS-485 setting/Off during RS-422setting
8	SYS-RUN/ERR	Flash during serious error occurrence	Reamrk <sup>1)</sup>

#### Remark

- 1) When system hardware error or serious software error occurrence, this Flashes, and the error status is indicated with upper 5 Bit(LED '0'-'4').  
For the details, see '(3) LED indication specifications during abnormal operation'.

- 2) Station No./transmission specifications indication(when LED display switch pushed – Not applicable to G6L-CUEB/G6L-CUEC)

Station No. and transmission specifications are indicated through the LED on the top of module by On/Off of LED display switch in the front of computer link module. When switch first pushed, station No. is displayed, and when the switch pushed again after switch release, transmission specifications is displayed. According to this sequence, station No. and transmission specifications are repeatedly displayed in sequence whenever the switch pushed by once. For distinguishing LED indications of station No. and transmission specifications, No.'15' LED is used. When indicating station No., No.'15' LED becomes On, when indicating transmission specifications, it becomes Off, and the remaining LED indicates transmission specifications.

“ ς LED for Station No. indication

If LED display switch is pushed once, No.'15' LED becomes On as below Table, LEDs of No.'0-4' indicate the station No. for RS-232C channel, and LEDs of No.'8-12' indicate the station No. for RS-422 channel in binary value.

LED#	Bit value	Indication contents	Remark
0	d0	Range(0-1F) of RS-232C channel station No. indication	Binary value <sup>1)</sup>
1	d1		
2	d2		
3	d3		
4	d4		
5	Not used	Off during station No. indication	
6	Not used		
7	Not used		
8	d0	Range(0-1F) of RS-232C channel station No. indication	Binary value
9	d1		
10	d2		
11	d3		
12	d4		
13	Not used	Off during station No. indication	
14	Not used		
15		On during station No. indication	

**Remark**

- 1) To know the station No., it must be converted into hex from binary.

LED for transmission specifications :

If LED display switch is released and pushed again after pushed once, transmission specifications is displayed on LED. At this time, because No.' 15' LED becomes 'Off', user can know that it is indicating transmission specifications.

Transmission specifications is separately indicated according to RS-232C and RS-422 channels as below Table.

LED No.	Bit value	Indication contents	Remark
0	d0	Communication speed of RS-232C channel (300-38400bps)	Binary value <sup>1)</sup>
1	d1		
2	d2		
3		Data bit	On : 8 Bit/Off : 7 Bit
4		Parity Being/None	On : Being /Off : None
5		Even/Odd Parity	On : Even /Off : Odd
6		Stop Bit	On : 2 Bit /Off : 1 Bit
7	Not used	Off	
8	d0	Communication speed of RS-422 channel (300-76800bps)	Binary value
9	d1		
10	d2		
11		Data bit	On : 8 Bit/Off : 7 Bit
12		Parity Being/None	On : Being /Off : None
13		Even/Odd Parity	On : Even /Off : Odd
14		Stop Bit	On : 2 Bit /Off : 1 Bit
15		Off during transmission specifications indication	

**Remark**

1) Transmission speed is converted from 3-Bit values of d0-d2 to hex, of which value is shown as below Table. (see below Table) But, 76800 bps is provided in RS-422, and is available in Ver. 1.3 or later version of Cnet module.

LED value	LED lighting indication	RS-232C/RS-422 channel
0	-	300, 76800 bps
1	d0	600 bps
2	d1	1200 bps
3	d0, d1	2400 bps
4	d2	4800 bps
5	d0, d2	9600 bps
6	d1, d2	19200 bps
7	d0, d1, d2	38400 bps

### 3) LED indication specifications during abnormal operation

LED operations during abnormal operation is divided into two cases :

- 1) When in state of SYS-ERROR LED Off, the other error LED flashes at intervals, it means that installation of communication cable or parameter setting is abnormal or program preparation is abnormal. At this time, it can be solved by seeing chapter 9, Troubleshooting.
- 2) When serious H/W error occurrence, No.'15' LED(SYS-ERROR) flashes in period of 1 seconds, and the error state is indicated by LED No.'0-4'. This error means serious failure difficult to solve, so contact our company's Service center.
- 3) When serious H/W failure occurrence, the various errors are indicated by No.'0-4' LEDs, of which LED No.'0' is lower Bit(d0), LED No.'4' is upper Bit(d4), and these values are converted from binary into hex to indicate error code.

For example, if LED 0,1,2 are Off, and LED 3,4 are On, they become '00011000' in binary, which can be converted into hex, 18h. Also, if LED 0,2,4 are Off, and LED 1,3 are On, they become binary '00001010', and its hex becomes 0Ah. Like this, by converting error value, user can distinguish various errors by the following Table.

[ Error codes during serious failure occurrence ]

Error code(hex)	Error contents	Remark
1	CLM internal memory diagnosis error	H/W error
2	CLM common use memory reading/writing error	
3	CLM common use memory access error	
4	PLC CPU interface stop	
5	Flash memory reading/writing error	
6	UART(NS-16550) access error	
7	Operation mode setting error	
8	Reserved	
9	Address error	Other error
A	Invalid instruction	
B	Zero divide	
C-1F	Reserved	Not used

#### Remark

SYS-ERROR LED flashes in period of 1 sec.

#### **4) LED indication specifications during power on**

Computer link module performs self diagnosis through self H/W check and CPU and interface of PLC.

When self and PLC CPU interface checks are OK, after LED '0'-'5' become On in sequence, 232 channel LED and 422 channel LED become On, and 'RUN' LED become On, and then normal operation starts. If after power on error occurrence during self diagnosis, SYS-ERROR LED blinks, and LED of error occurrence item lights according to error code.

For the details, see 7.2 Diagnosis during power on.

## A2 Error Code Table

### A2.1 STATUS value(For user defined communication)

STATUS value	Meaning	Action to take	
H0E	14	There is no input or over 16 characters at FNAM.	Check the input or FNAM.
H10	16	Position of Cnet module is incorrectly specified.	Enter SLOT_NO value
H11	17	The specified slot for Cnet module is empty or Cnet module is not operating.	Check the specified slot and Cnet module
H12	18	Wrong parameter at FB (Example : CH, LEN1, ..)	Check the parameter of FB
H14	20	1) Incorrect Library has been used. 2) Response frame not requested has been received.	1) Verify prepared date of Library.(verify whether prepared date of [Communi.j <del>fb</del> ] file is after Oct. 1996.) 2) Verify receive frame of self station or transmission frame of other station again.
H15	21	Response from Cnet module has not been received.(waiting time exceeded)	Verify whether Cnet module is user defined communication mode.
H40	64	Operation of RS-232C/422 channel is not RUN.	Perform operation RUN with frame editor. (Menu:[On-line-Operation switching])
H41	65	Name used in frame editor and name used in <i>function block</i> do not fit each other.	Reconcile frame name used in frame editor and frame entered in FNAM.
H42	66	Frame name can not be found due to abnormal CPU during operation.(during tr)	1) Download frame again. 2) Verify whether there is abnormality in CPU.
H43	67	Frame specified in FNAM has not been received from other station.	1) Verify receive frame again. 2) Verify other station's transmission frame again.
H44	68	Frame has not been downloaded from frame editor.	Download frame.
H45	69	Error occurs during conversion ASCII; <del>HEX</del> .	Verify whether received data is ASCII or HEX again.
H46	70	Array size specified in frame editor and data size(specified in LENx) used in <i>function block</i> do not fit each other.	Confirm data size again and fit it. (Data size is Byte value.)
H64	100	Array type specified in SDx or RDx is wrong.	Fit array type with Unsigned Integer.
H67	103	Incorrect frame definition.	1) Verify contents of appropriate frame again with frame editor. 2) Download frame again.
H68	104	Frame has not been downloaded from frame editor.	Download frame.
H73	115	Operation mode is not user defined communication mode.	Correctly fit mode switch. User defined communication mode RS-232C : 0,2,4(0 is interlocking mode) RS-422/485 : 2,5,6

**A2.2 Error code during NAK occurrence(for dedicated communication)**

Error code	Error type	Contents	Action to take
H0001	PLC system error	Interface with PLC impossible	Power On/Off
H0011	Data error	* Error occurred when ASCII data value is converted into digits	Check whether another character than upper and lower cases(' ','-', '.'), and digits has been used, correct, and execute again.
H1132	Device memory error	* Wrong specified device memory	Inspect device type
H1232	Data size error	* Execution data number exceeding 120 Bytes	Correct data length
H1332	Data type error	* Data type mismatch between variables	Equalize data type
H1432	Data value error	* Data value not digits	Inspect data value
H2432	Data type error	* Data type mismatch with actual variable	Equalize variable and data type of PLC program
H2132 H7232	Access variable unregistered	* Variable name unregistered in access variable. * Allowed character used in variable name	Register variable name Correct variable name
H7132 H2232	Variable request format error	* M,I,Q area exceeding error * Request format not fit	Inspect format, correct, and then execute again.
H1152	Remote control not allowed	* 'Remote control by communication' not allowed in PLC parameter	Set remote control to allowed, and then execute again.
H7252	PLC not operated	* No PI to operate PLC	Create PI with PI creation command.
H2652	PI not created	* No Domain in PLC	Download Domain to PLC.
H4252	1) Operation mode change error  2) PI is already exist	1) Mode status • RUN→PI_STOP Only • PAUSE→PI_RESET, PI_RESUME • STOP→PI_START Only • DEBUG←→PI_RESET Only  The other error when operation mode change 2) Execute PI Create while PI is already exist.	1) Execute again with changeable operation mode.  2) PI delete before PI create
H4201 H4202 H4203 H4204	Operation mode change error	H4201 : Current mode RUN H4202 : Current mode STOP H4203 : Current mode PAUSE H4204 : Current mode Debug	Change mode to available operation mode and re-execute. (appears with the Cnet V1.5 or later)
H4142	Download initialization error	* When downloading with Domain not deleted	Verify Domain deleted/not. Set remote control by PLC basic parameter communication in GMWIN to allowed, and then execute again.
H4200	Domain delete error	When try to delete domain while PI is not deleted.	Try again after delete PI.

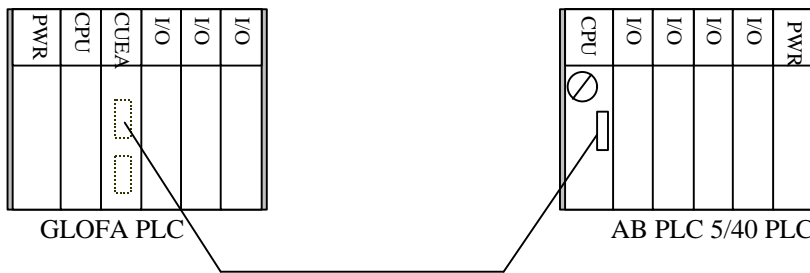
Error code	Error type	Contents	Action to take
H4242	Upload initialization error	<ul style="list-style-type: none"> <li>* Domain not downloaded.</li> <li>* Domain name mismatch.</li> </ul>	<p>Check domain deleted/not. Execute again after checking domain name.</p>
H4342	Down/upload sequence error	Frame number mismatch.	Execute again from beginning after adjusting frame number.
H4442	Down/upload initialization error	Initialization command not executed.	Execute again download/upload after executing initialization command.
H0090	Monitor execution error	Registration number of appropriate monitor not registered.	Execute again after registering monitor.
H0190	Monitor execution error	Registered number exceeding range	Execute again after adjusting monitor registration number to 31 or less.
H0290	Monitor registration error	Registered number exceeding range	Execute again after adjusting monitor registration number to 31 or less.
No response	No response	<ul style="list-style-type: none"> <li>* Station number error</li> <li>* BCC error</li> <li>* Main command / command type error</li> <li>* Header and tail character error</li> <li>* Cable error</li> <li>* Operation mode error</li> <li>* Communication speed and stop/data/parity bit error</li> <li>* PLC error</li> </ul>	Check and take actions for error contents that may occur

## A3 The communication with other manufacturer's PLC

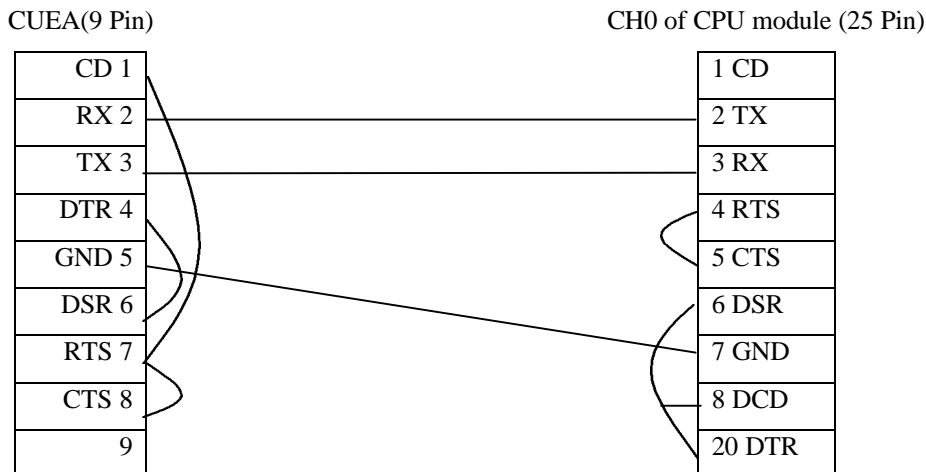
### A3.1 AB(PLC 5/20/30/40/50)

This chapter describes about communication between GLOFA Cnet module and AB PLC 5 series. (PLC 5/20, 30, 40, 50)

#### 1) System configuration



#### 2) Wiring diagram



#### 3) Parameter setting

A. Set parameters of GLOFA Cnet module and AB PLC 5 series as following;

Item	Cnet module. and AB PLC 5
Baud Rate	19200
Data Bits	8
Stop Bits	1
Parity	None
Device Address	0 ~ 31

\* Use the AB programming tool to set parameters of AB PLC 5.

#### 4) Protocol.

There is two methods to communicate with AB PLC 5, half duplex and full duplex.

**Half Duplex Protocol.**

3.1) Half Duplex Register RD request.

GLOFA Cnet	AB PLC
DLE SOH STN DLE STX DST SRC CMD STS TNS FNC OFF TNT ADDR SIZ DLE ETX BCC ==>	<== DLE ACK
DLE ENQ STN BCC ==>	<=== DLE STX DST SRC CMD STS TNS DATA DLE ETX BCC
DLE ACK==>	

3.2) Half Duplex Register WR request.

GLOFA Cnet	AB PLC
DLE SOH STN DLE STX DST SRC CMD STS TNS FNC OFF TNT ADDR DATA DLE ETX BCC.==>	<== DLE ACK
DLE ENQ STN BCC. ==>	<=== DLE STX DST SRC CMD STS TNS DLE ETX BCC
M Send). DLE ACK.	

3.3) Explanation of protocol.

- 1). DLE, STX, ENQ, ETX, EOT, ACK are ASCII Control code.
- 2). STN means the station number of AB PLC.
- 3). DST, SRC means the station number of DH+. (Set as 00 each).
- 4). CMD assigns the Register memory. (Assigned as 0F)
- 5). STS means STATUS. In the case of transmission, the OK or NOT OK of the result of the transmission by slave 00. (STS will be 00 when GLOFA Cnet module transmit.)
- 6). TNS is message ID of 2byte and created by master station. Slave will return it to the master station with attaching the result. (It is increased at every return).
- 7). FNC is function code related to read/write operation. 00 is write, 01 is read.
- 8). OFF is address offset of data while continuous data writing.
- 9). TNT (2 byte) shows the total number of continuous data in the word (16bit) unit.
- 10). ADDR is data memory address of AB PLC.  
 AB\_RD, AB\_WR written as user function block use the Logical ASCII Addressing method.

Example). Access 10<sup>th</sup> memory of 7 FILE of N of Integer area of AB PLC.

$$\begin{aligned} \text{ADDR} &= 00 \text{ '$N7:010' } 00 \\ &= 00 24 4e 37 3a 30 31 30 00 \end{aligned}$$

- 11). SIZ means 'size' and shows the number of demanded messages in the byte unit.

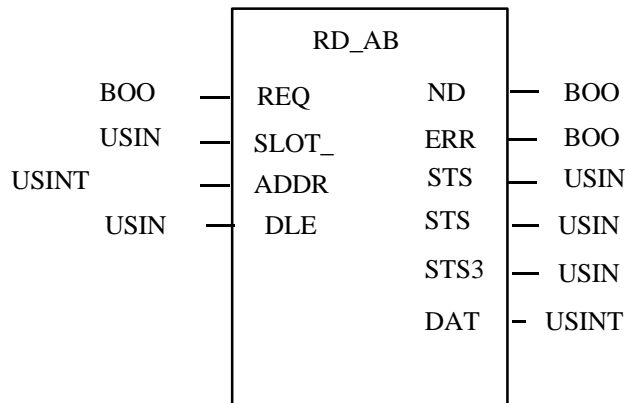
12).BCC is the 2's complementary value of the summation of STN,DST~DATA.

**5) FB(Function Block)**

RD\_AB and WR\_AB are function blocks for communication with AB PLC. To use these function blocks, communi.xfb, ab.xfb should be included in libraries.

**(1) RD\_AB(Read Data)**

Running the RD\_AB function block, the CPU module will process the data request command internally, then receive response and save data portion at the designated variable. The receive frame have the same name with the frame of 'FNAM' should be downloaded to the Cnet module before to run the function block. See 6.1.1.2 for more information about download method.

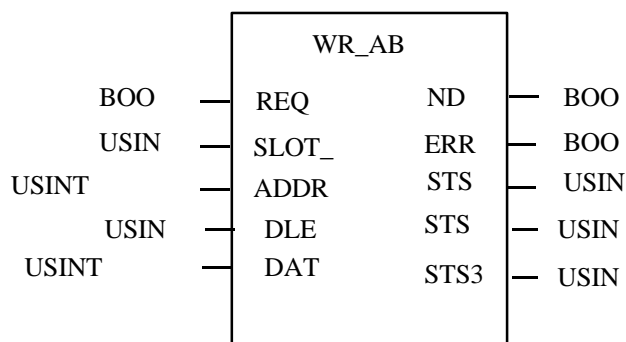


Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be masked during the service of FB)
SLOT_NO	SINT	Select the slot No. of communication module at which main FB will be run.
ADDR	USINT ARRAY	Assign the address of internal memory of AB PLC to be read. It is assigned with ASCII addressing and the example is, ADDR = 00 '\$N7:000' 00.
DLEN	USINT	The LEN (No. of byte) of word data to be read.

Output	Type	Description
NDR	BOOL	Turn on after the service is finished with no error and the correct response is received, and keep the ON status until the next function block is called.
ERR	BOOL	Turn on when format or communication service error is occurred and keep the ON status until the next function block is called. Turn on with transmission frame error, receiving error, time-out error, or receiving NAK message.
STS1	USINT	The relevant error code when transmission error is occurred
STS2	USINT	The relevant error code when receiving error or time out error
STS3	USINT	The relevant error code when NAK frame is received
DATA	USINT ARRAY	The variable used for storing received data.

**(2) WR\_AB(Write Data in RTU mode)**

Running WR\_AB function block after making the write command of AB and frame for receiving ACK response, GLOFA PLC CPU will calculate BCC and attach it at command. After receiving the response, the CPU module will calculate BCC of received data and compare it with received BCC. If there is no error, Cnet module will return the ACK message. The receive frame have the same name with the frame of 'FNAM' should be downloaded to the Cnet module before to run the function block. See 6.1.1.2 for more information about download method.



Input	Type	Description
REQ	BOOL	Function block will be operated at the rising edge. The falling edge will be ignored during operation.
SLOT_NO	SINT	Select the slot No. of communication module at which function block will be run.
ADDR	USINT ARRAY	Assign the address of the internal memory of AB PLC to be read. It is assigned as Direct ASCII addressing, and an example is, ADDR = 00 '\$N7:000' 00.
DLEN	USINT	The length of data to be written (unit : byte)
FNAM	STRING	Assign the name of receiving frame downloaded to Cnet module. (Max. 16 characters available) ex)' R_ACK'

Output	Type	Description
NDR	BOOL	Turn on after the service is finished with no error and the correct response is received, and keep the ON status until the next function block is called.
ERR	BOOL	Turn on when format or communication service error is occurred and keep the ON status until the next function block is called. If the frame name assigned at function block is not saved in Cnet module or format is not matched, this flag will be set and error code will be saved in STATUS.
STS1	USINT	The relevant error code when transmission error is occurred
STS2	USINT	The relevant error code when receiving error or time out error
STS3	USINT	The relevant error code when NAK frame is received

## 6) Example of program(*Read PLC 5 N7:000*)

### Example 1) Read data of N7:000 area of AB PLC 5

This example shows how to read data with assigned start point and numbers.

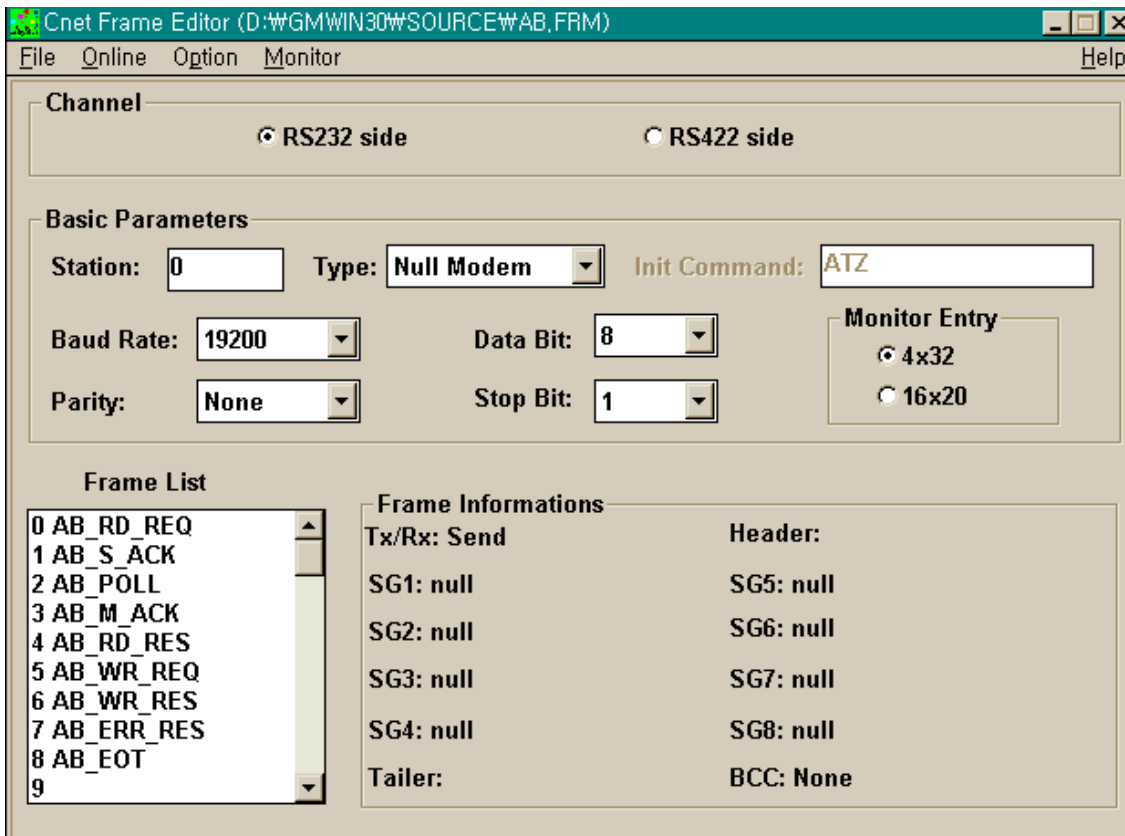
The protocol of AB PLC is shown as below.

REQUEST		RESPONSE	
Field Name	Example(Hex)	Field Name	Example(Hex)
DLE	10	DLE	10
SOH	01	STX	01
STN(Station No.)	00	DST	00
DLE	10	SRC	10
STX	03	CMD	0F
DST	00	STS	00
SRC	00	TNS	0000
CMD	0F	Data	XX
STS	00	Data	XX
TNS(word, increasing)	0000	Data	XX
FNC	01	Data	XX
OFFSET(word).	0000	Data	XX
TNT(word)=SIZE/2	0400	Data	XX
ADDR	00' \$N7:000' 00	Data	XX
SIZE(No. of byte).	08	Data	XX
DLE	10	DLE	10
ETX	05	ETX	05
Error Check (BCC)	-	Error Check.(BCC)	-

The above protocol frame shows only REQUEST frame and RESPONSE frame including data.

When actual communication, however, AB PLC send DLE ACK with REQUEST transmission and then GLOFA Cnet returns DLE SOH STN BCC. Then, AB PLC send RESPONSE frame and GLOFA Cnet will return DLE ACK.

A. First, set parameter of GLOFA Cnet. In this example, the parameter and transmit/receive frame is set as 19.2K communication speed, 8 data bit, none parity bit as following picture.



In the above screen,

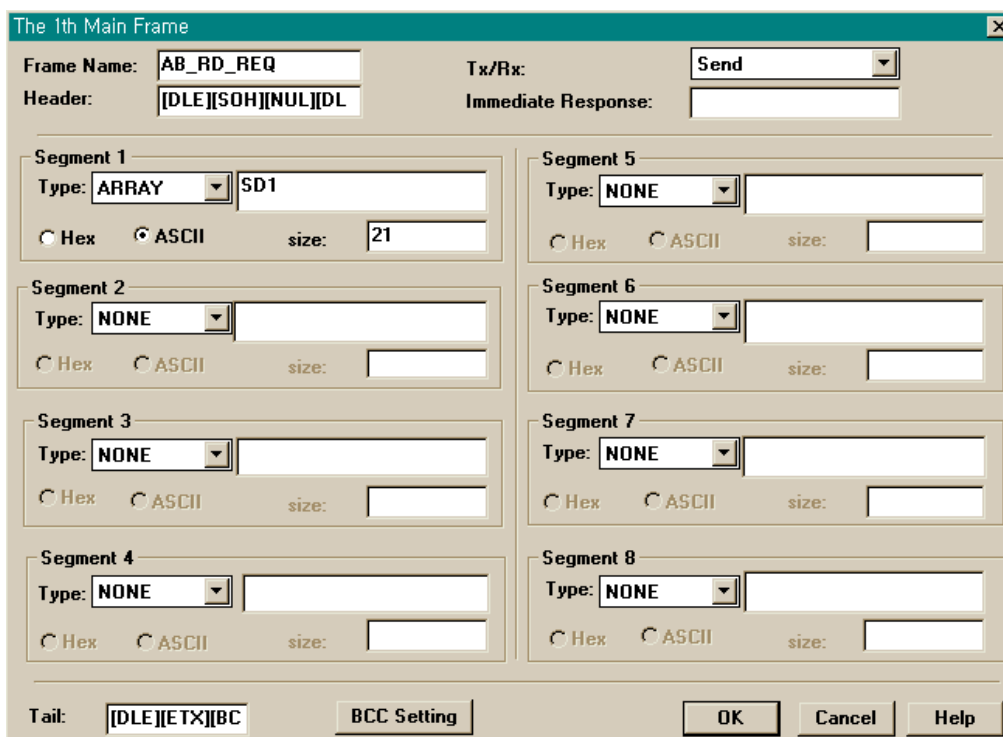
AB\_RD\_REQ frame = The data request frame which GLOFA Cnet sent to AB PLC.

AB\_S\_ACK frame = The returned frame which AB PLC return after receiving AB\_RD\_REQ

AB\_POLL = The data request frame which GLOFA Cnet sent to AB PLC after receiving AB\_S\_ACK.

AB\_RD\_RES = The data transmit frame which AB PLC sent to GLOFA Cnet after receiving AB\_POLL

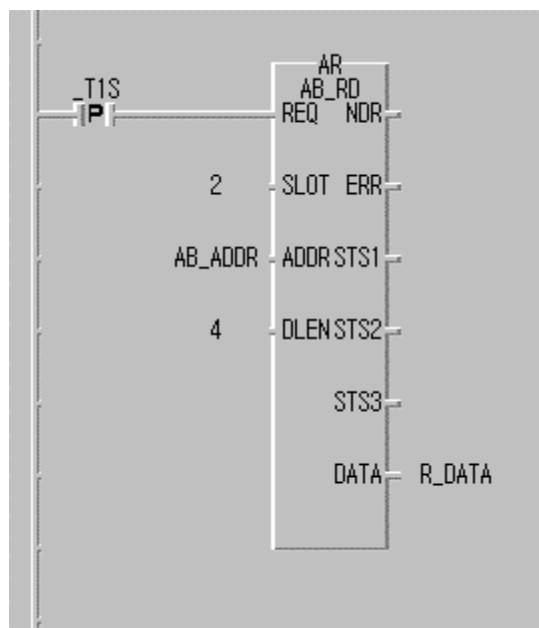
AB\_M\_ACK = The ACK frame which GLOFA Cnet send to AB PLC after receiving AB\_RD\_RES.



< Send frame >

B. Write a program with GMWIN.

The example of following runs reading operation by the 1 second interval. AB\_ADDR is array variable that have initial value as 00' \$N7:000'00(Hex : 00 24 4e 37 3A 30 31 30 00)

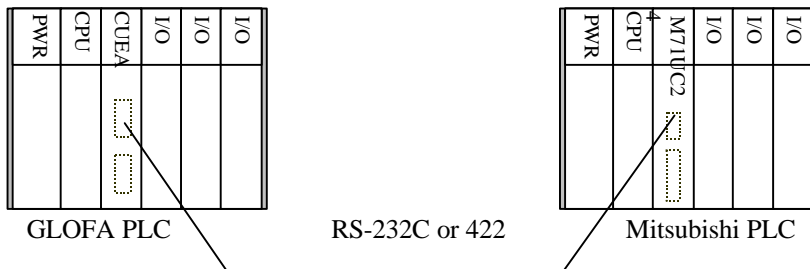


The usage of AB\_WR is same as AB\_RD.

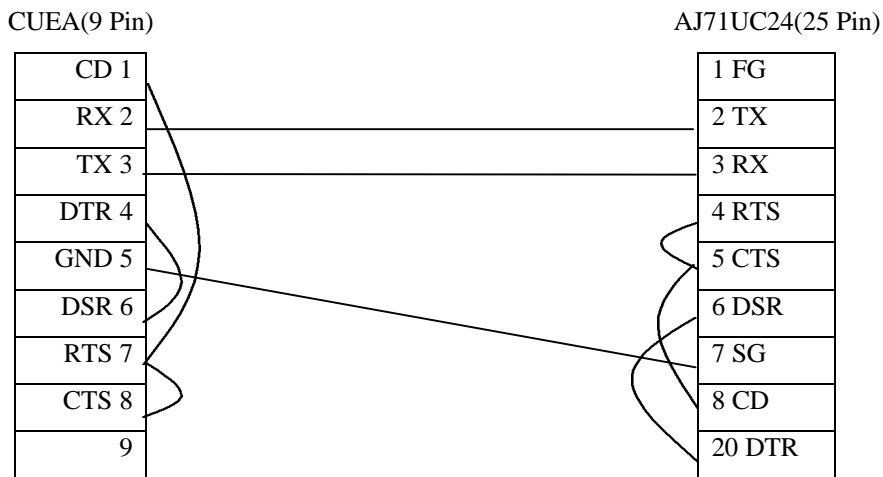
### A3.2 Mitsubishi(AJ71UC24)

In this chapter, it will be described how GLOFA PLC Cnet communicate with Mitsubishi PLC. (AJ71UC24)

#### 1) System configuration



#### 2) Wiring diagram

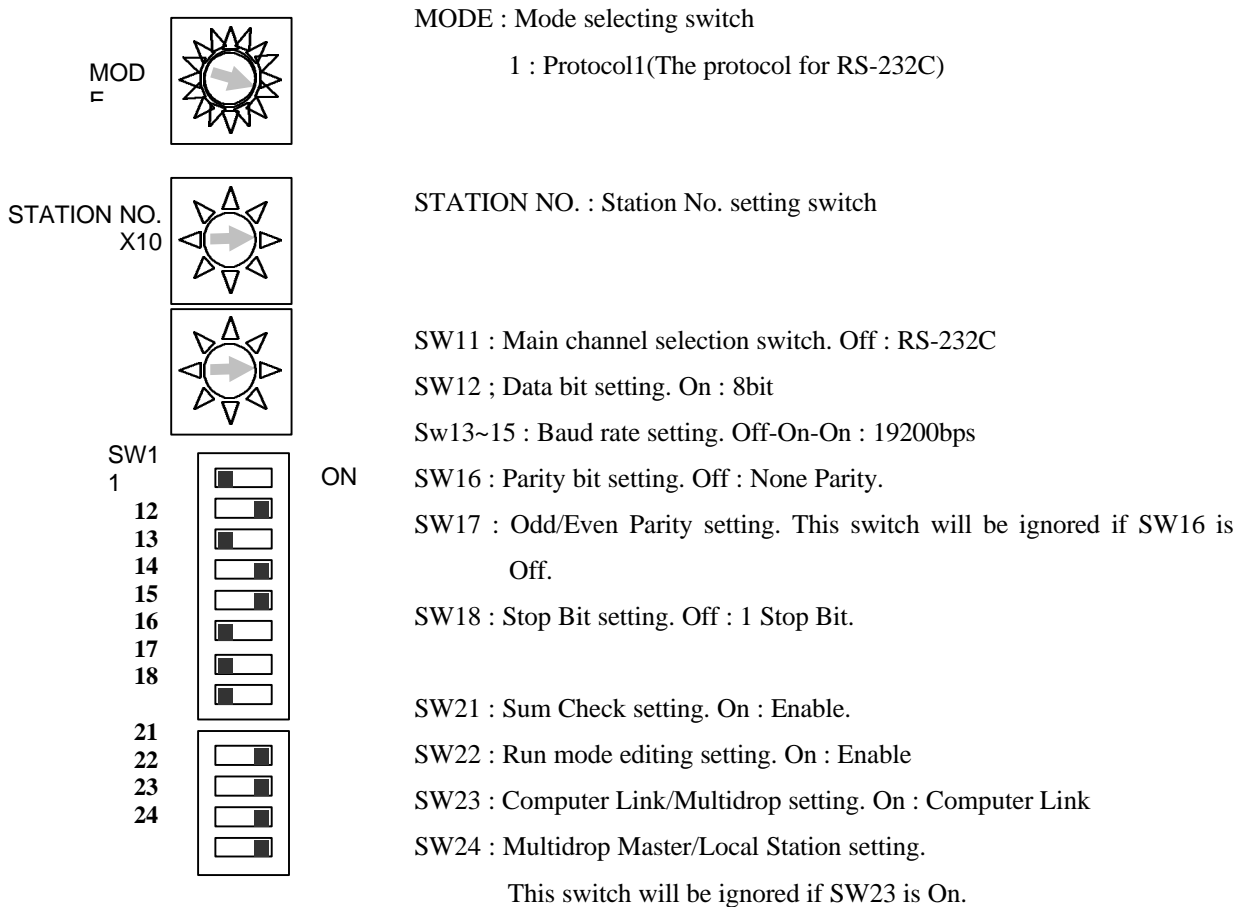


#### 3) Parameter setting

- a. Setting the parameters of GLOFA PLCÀ Çnet.

Item	Setting Value
Baud Rate	19200
Data Bits	8
Stop Bits	1
Parity	None
Device Address	0

- b. For setting the parameters of Mitsubishi PLC, use switches of front panel of PLC. Refer to the Mitsubishi's manual for detailed information of parameter setting. The following picture shows the setting of example.

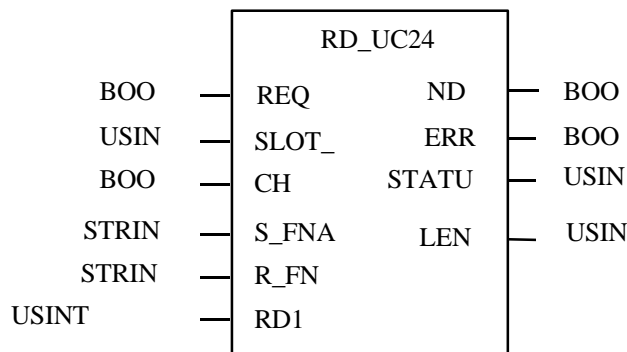


#### 4) FB(Function Block)

RD\_UC24 and WR\_UC24 are function blocks to communicate with Mitsubishi PLC. To use these function blocks, communi.xfb and m\_uc24.xfb should be included in library.

##### (1) RD\_UC24

Running the RD\_UC24 function block, the CPU module will process the data request command internally. After receiving response, CPU will save data portion at the variable designated in RD1 and turn on NDR. The receive frame have the same name with the frame of S\_FNAM and R\_FNAM should be downloaded to the Cnet module before to run the function block. See 6.1.1.2 for information of frame download method.

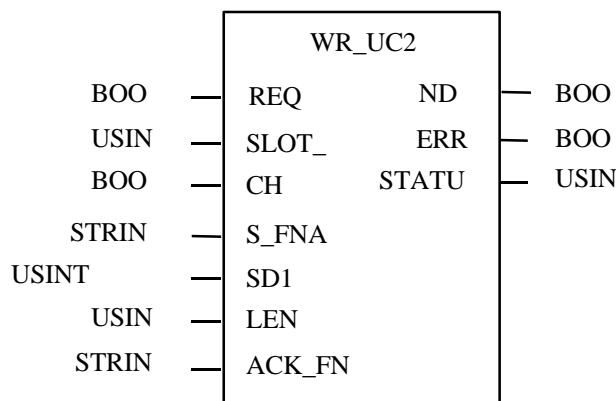


Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be masked during the service of FB)
SLOT_NO	USINT	Select the slot No. of communication module at which main FB will be run,
CH	BOOL	Select a protocol between RS-232C and RS-422 CH = 0 : Transmit through RS-232C channel CH = 1 : Transmit through RS-422
S_FNAM	STRING	Assign the name of frame that define the structure of transmit protocol. Max. 16 characters are available. ex)'RD_Y0060'
R_FNAM	STRING	Assign the name of frame that define the structure of receive protocol. Max. 16 characters are available. ex)'RCV_Y0060'
RD1	USINT ARRAY	The variable at which received data is stored.

Output	Type	Description
NDR	BOOL	Turn on after the service is finished with no error and the correct response is received, and keep the ON status until the next function block is called.
ERR	BOOL	Turn on when format or communication service error is occurred and keep the ON status until the next function block is called. If the frame assigned in function block is not stored in Cnet module or has different format, this bit will turn on and relevant error code is saved at STATUS.
STATUS	USINT	The relevant error code (when the ERR bit is on)
LEN	USINT	The No. of byte of received data

(2) WR\_UC24

Running WR\_UC24 function block after making the write command of Mitsubishi PLC and frame for receiving ACK response, GLOFA PLC CPU will transmit write command internally and turn on NDR bit when ACK signal is received. Frames defined in 'S\_FNAM' and 'ACK\_FNAM' should be downloaded to the Cnet module before run the function block. See 6.1.1.2 for information of frame download method.



Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be masked during the service of FB)
SLOT_NO	SINT	Select the slot No. of communication module at which main FB will be run.
CH	BOOL	Assign the channel for communication service. CH = 0 : Use RS-232C channel CH = 1 : Use RS-422 channel
S_FNAM	STRING	The name of transmit frame downloaded on the Cnet module. Max. 16 characters are available. ex)' WR_Y0060'
SD1	USINT ARRAY	The variable at which transmitting data is saved.
LEN1	USINT	The length of data to be transmitted. (Unit : byte)
ACK_FNA M	STRING	The name of receiving frame downloaded on the Cnet module. Max. 16 characters are available. ex)' ACK'

Output	Type	Description
NDR	BOOL	Turn on after the service is finished with no error and the ACK response is received. Keep the ON status until the next function block is called.
ERR	BOOL	Turn on when format or communication service error is occurred and keep the ON status until the next function block is called. If the frame assigned at function block is not saved in Cnet module or have different format, this flag will be set and error code will be saved in STATUS.
STATUS	USINT	The relevant error code when ERR flag is 1.

## 5) Program Example

### Example 1) Reading data from Mitsubishi PLC

This example shows how to read 2 word through the dedicated protocol of Mitsubishi PLC. Set communication parameters as described in chapter 3, and assume that output module is mounted at Y0060.

The communication of Mitsubishi is shown as below. For detailed information, refer the user's manual of A(M)J71UC24.

Inquiry frame  
(Cnet j æ  
AJ71UC24)

E N Q	St No.		PL C No.		Com- mand		Message Waittime	Head device						NO.of Device points		Sum check code	
	0 H3 0	0 H3 0	F H4 6	F H4 6	Q H5 1	R H52	0 H30	Y H5 9	0 H3 0	0 H3 0	0 H3 0	6 H36	0 H30	0 H30	2 H32	/ H37	4 H3 2

Response frame  
(AJ71UC24  
j æCnet)

S T X	St No.		PL C No.		Data for designated devices ( 2words = 8bytes)								E T X	Sum check code	
	0 H3 0	0 H3 0	F H4 6	F H46	1 H3 0	2 H3 0	3 H3 0	4 H3 0	A H30	B H30	C H30	D H30		H30	9 H3 0

Acknowledge  
frame  
(Cnet j æ  
AJ71UC24)

A C K	St No.		PL C No.	
	0 H3 0	0 H3 0	F H4 6	F H46

ACK frame is optional.

- C. First, set parameter of GLOFA Cnet as described in '3) parameter setting'. Set basic parameter as below picture, then make and download inquiry/response frame.

**Channel**

RS232 side       RS422 side

---

**Basic Parameters**

Station:     Type:     Init Command:

Baud Rate:     Data Bit:

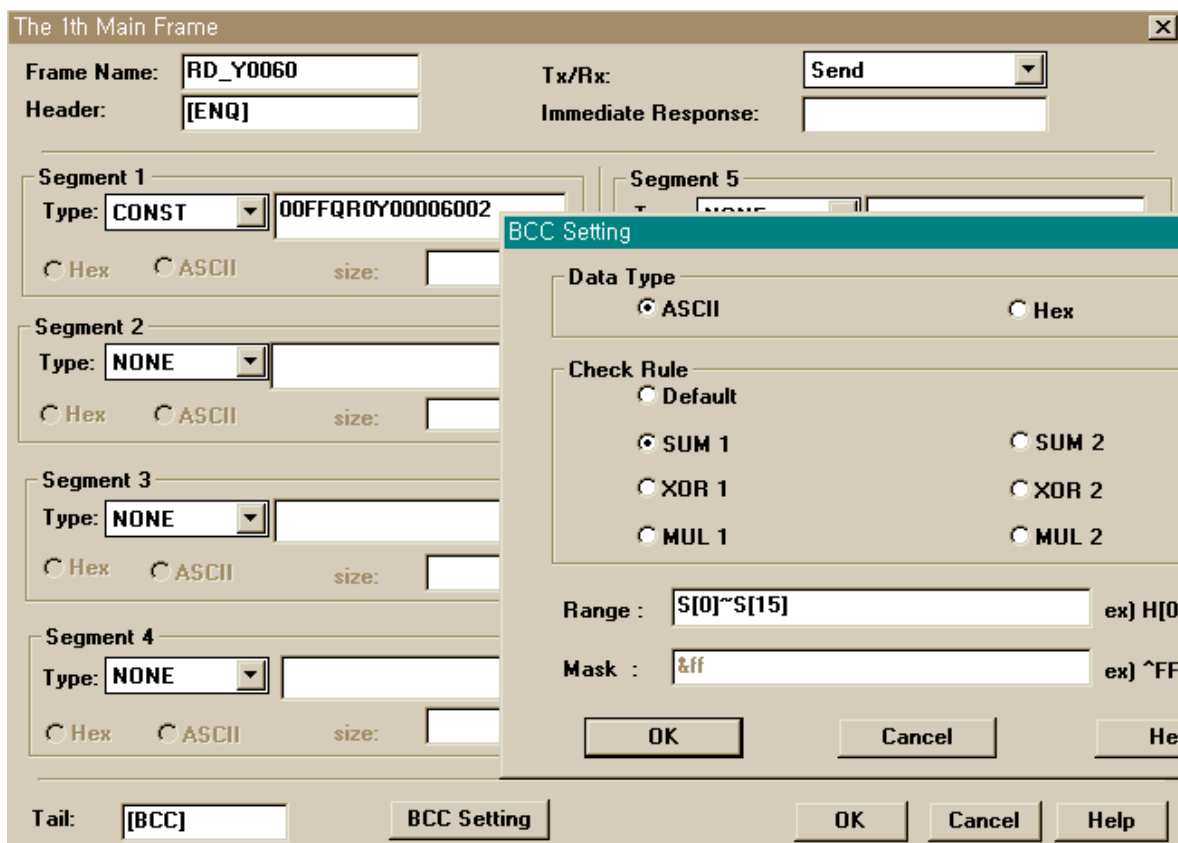
Parity:     Stop Bit:

**Monitor Entry**

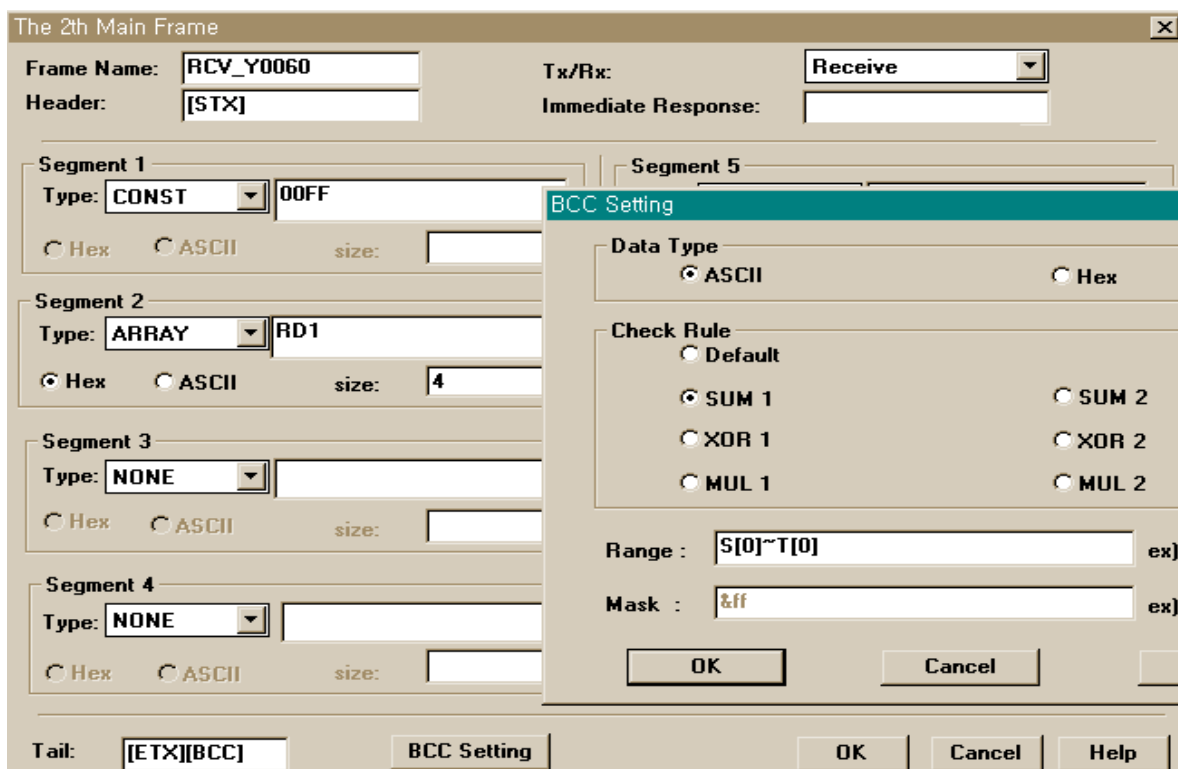
4x32

16x20

< Basic Parameter >



<Inquiry frame and BCC setting>

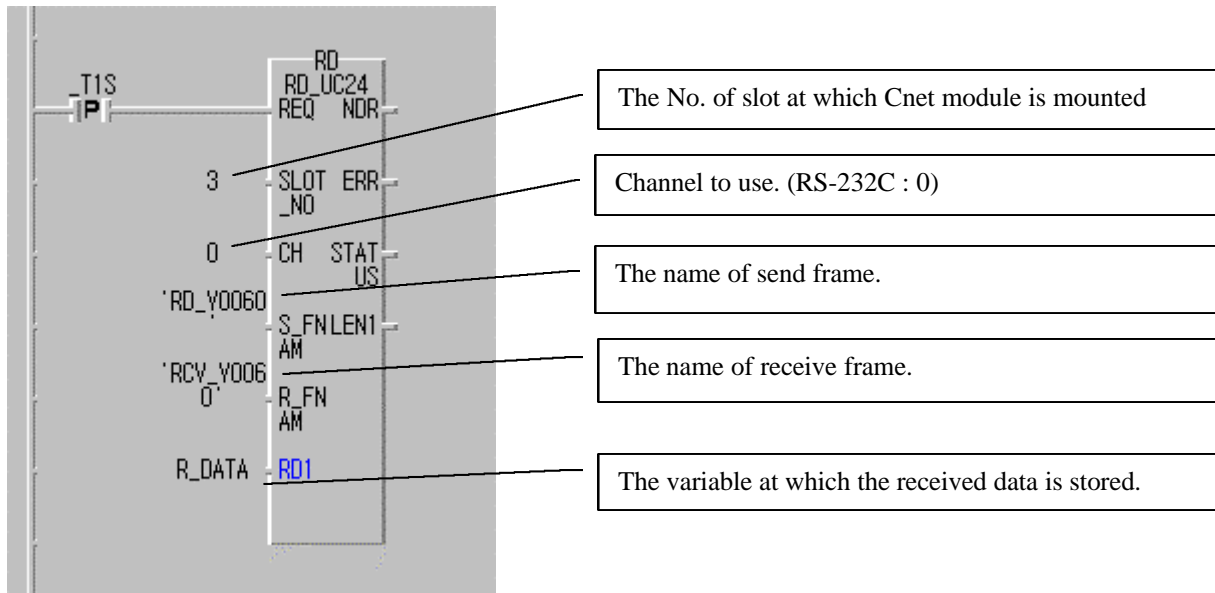


<Response frame and BCC setting>

D. Set parameters of AJ71UC24.

Use switches of front panel to set parameters, and in this example, set parameters as described in ‘3) parameter setting’

E. Make and download program with GMWIN.



F. Check the communication status through monitoring.

Check the communication status with monitoring functions of GMWIN. If error is occurred, perform troubleshooting action after check the actual received data of Cnet module with the monitoring function of frame editor.

**Example 2) Write data to Mitsubishi PLC**

This example shows how to write 2 word at the output device through the dedicated protocol of Mitsubishi PLC (RS-232C, Control Format1). Assume that parameter setting is same as example 1), and output module is mounted at Y0060.

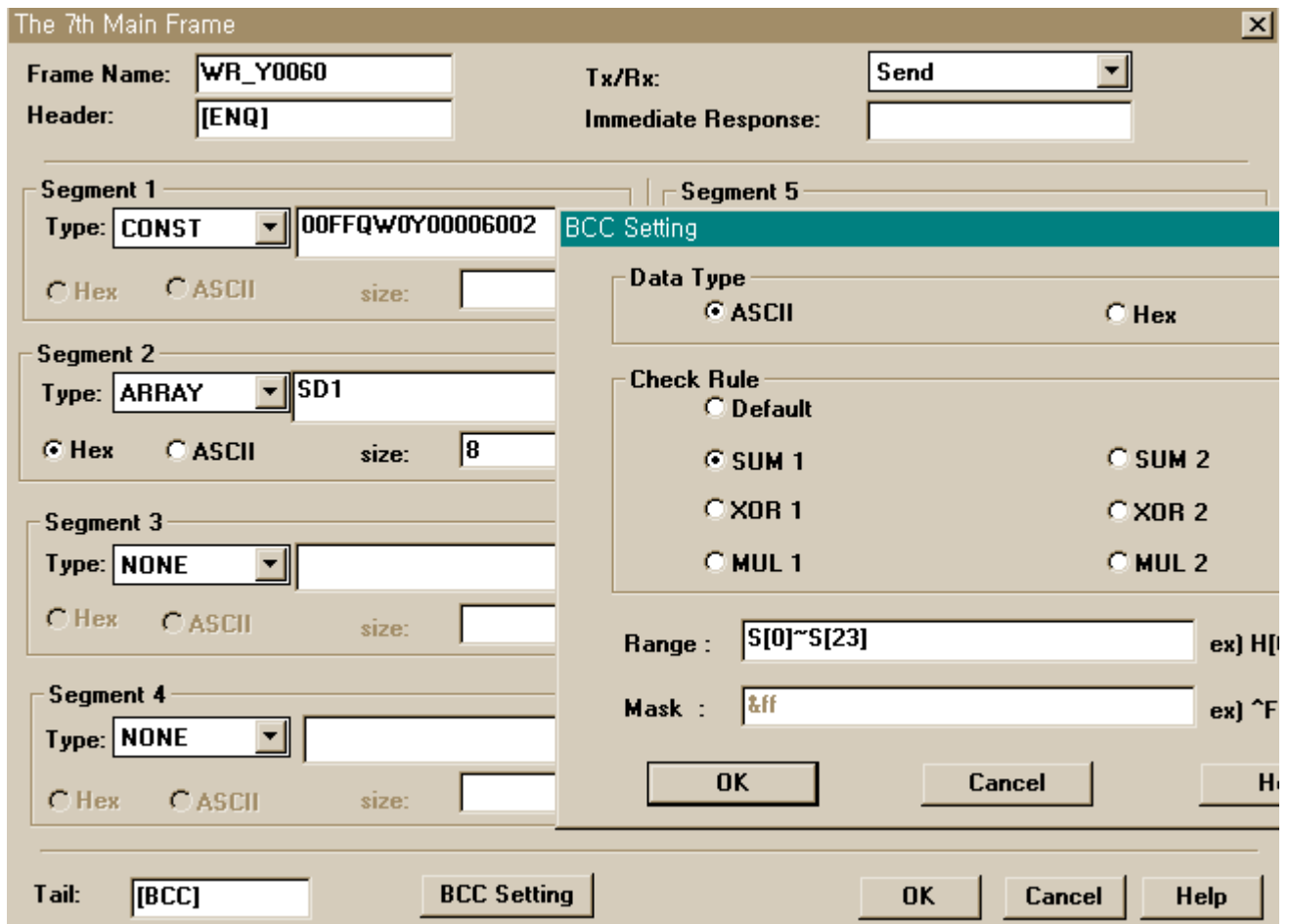
The communication protocol of Mitsubishi PLC is shown as below. For more information, please refer the user's manual of A(M)J71UC24.

Inquiry frame (Cnet ; æ AJ71UC24)	E	St	PL	Com	Message	Head device						NO.	Data for write				Sum									
	N	No	C	-	Wait							of	2 word				chk									
	Q	.	No	man	time							word					code									
	0	0	F	F	Q	W	0	Y	0	0	0	0	6	0	0	2	1	2	3	4	A	B	C	D	/	4
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
05	30	30	46	46	51	57	30	59	30	30	30	30	36	30	30	32	59	30	30	30	30	30	30	36	37	34

Acknowledge frame (AJ71UC24 ; æCnet)	A	St		PL
	C	No.		C
	K			No.
H06	0	0	F	F
	H3	H3	H4	H46
	0	0	6	

- A. First, set parameters of GLOFA Cnet as same as Example 1. Set basic parameters as following picture, then write and download transmit/receive frame.

< Basic parameters setting >



<Transmit frame and BCC setting>

The 11th Main Frame

Frame Name:  Tx/Rx:

Header:  Immediate Response:

Segment 1  
Type:    
 Hex  ASCII size:

Segment 2  
Type:    
 Hex  ASCII size:

Segment 3  
Type:    
 Hex  ASCII size:

Segment 4  
Type:    
 Hex  ASCII size:

Segment 5  
Type:    
 Hex  ASCII size:

Segment 6  
Type:    
 Hex  ASCII size:

Segment 7  
Type:    
 Hex  ASCII size:

Segment 8  
Type:    
 Hex  ASCII size:

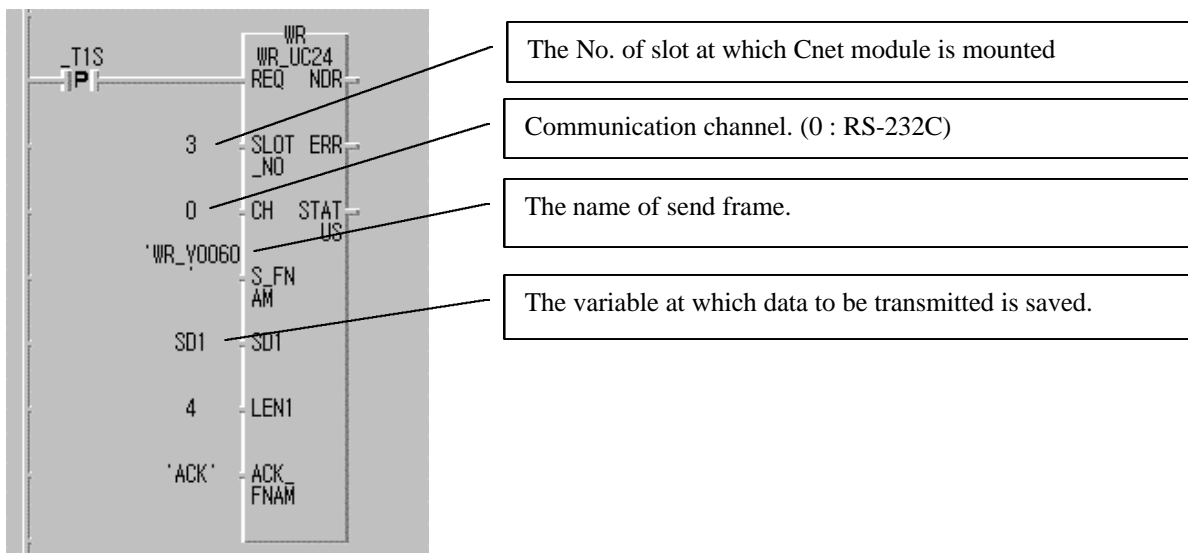
Tail:

<ACK response frame>

B. Set parameters of AJ71UC24.

To set parameters, use switches of front panel. Parameter values are same as '3 parameter setting'.

C. Write and download program with GMWIN.



D. Check the status of communication through monitoring function of GMWIN.

If communication error is occurred, perform troubleshooting action after check the actual transmitted data of Cnet module with the monitoring function of frame editor.

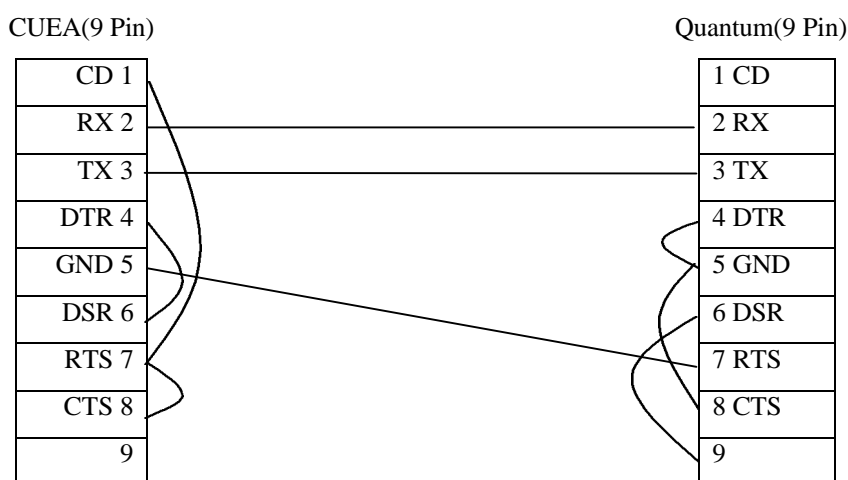
### A3.3 Modicon(Modbus)

In this chapter, it will be described that how GLOFA Cnet module communicate with Modicon PLC. (Modbus)

#### 1) System configuration



#### 2) Wiring diagram



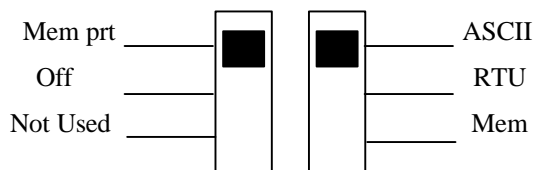
#### 3) Parameter setting

a. Setting parameters of GLOFA PLC Cnet.

Item	RTU mode	ASCII mode
Baud Rate	9600	2400
Data Bits	8	7
Stop Bits	1	1
Parity	Even	Even
Device Address	0 ~ 31	0 ~ 31

\* RTU or ASCII mode is depend on the configuration of Modicon PLC.

b. Parameters of Modicon PLC is fixed depending on mode setting as above table.  
Use dip switches at the front panel for mode setting.

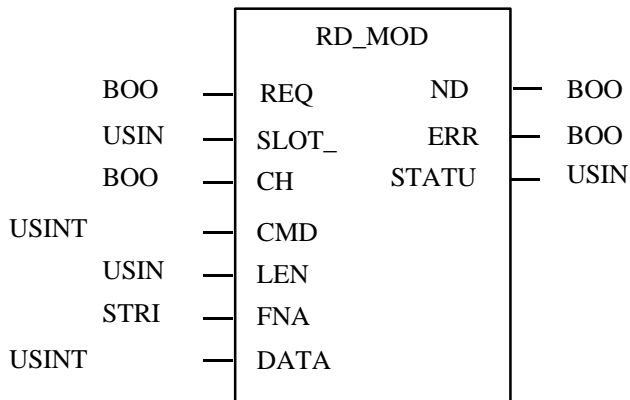


**4) FB(Function Block)**

Function blocks for communication with Modicon PLC are RD\_MODRTU,WR\_MODRTU(RTU mode) and RD\_MODASC,WR\_MODASC (ASCII mode). To use these FB, communi.xfb and modbus.xfb should be included in library.

**(1) RD\_MODRTU (Read Data in RTU mode)**

Running the RD\_MODRTU function block, the CPU module will process the data request command and send it with CRC. The received data will be stored into the designated variable if there is no CRC error. The receive frame, that has the same name with that of 'FNAM', should be downloaded at Cnet module. See 6.1.1.2 for more information of frame download method.

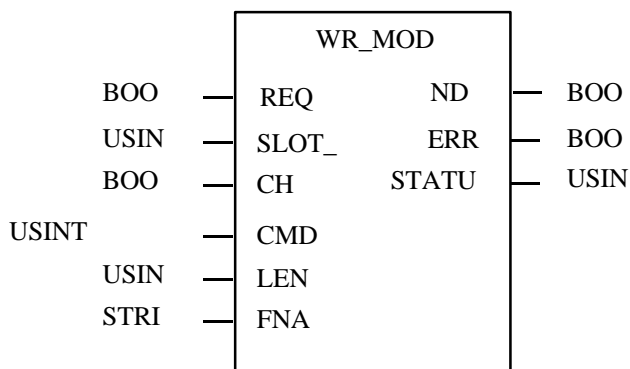


Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be ignored during the service of FB)
SLOT_NO	USINT	Select the slot No. of communication module at which the RD_MODRTU function block will be run.
CH	BOOL	Select type of channel between RS-232C and RS-422 CH = 0 : Use a RS-232C channel CH = 1 : Use a RS-422 channel
CMD	USINT ARRAY	The variable at which the data request command is stored. (CRC value is not required)
LEN	USINT	The No. of byte of command at CMD
FNAM	STRING	Assign the name of frame that define the structure of receive protocol. Max. 16 characters are available. ex) 'R_DATA'
DATA	USINT ARRAY	The variable at which received data excluding address, function, and CRC is stored.

Output	Type	Description
NDR	BOOL	This flag will be turned on after the service is finished with no error and the correct response is received. It keeps the ON status until the next function block is called.
ERR	BOOL	This flag will be turned on when format or communication service error is occurred and keep the ON status until the next function block is called. If the frame assigned in function block is not stored in Cnet module or has different format, this flag will be turned on and relevant error code is saved at STATUS.
STATUS	USINT	The relevant error code. (when the ERR flag is on)

**(2) WR\_MODRTU(Write Data in RTU mode)**

Running the WR\_MODRTU function block, the GLOFA CPU module will calculate the CRC of command and transmit the command with CRC. After receiving ACK response, the GLOFA CPU will turn on NDR flag if there is no CRC error. The frame has same name with that of 'FNAM' should be downloaded at Cnet module. See 6.1.1.2 for more information about download method.



Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be ignored during the service of FB)
SLOT_NO	USINT	Select the slot No. of Cnet module.
CH	BOOL	Assign the channel for communication service CH = 0 : Use RS-232C channel CH = 1 : Use RS-422 channel
CMD	USINT ARRAY	The variable at which the data write command is stored. (CRC value is not required)
LEN	USINT	The No. of byte of command at CMD
FNAM	STRING	Assign the name of frame that defines the structure of receive protocol. Max. 16 characters are available. ex)' R_ACK'

Output	Type	Description
NDR	BOOL	This flag will be turned on after the service is finished with no error and the ACK response is received. It keeps the ON status until the next function block is called.
ERR	BOOL	This flag will be turned on when format or communication service error is occurred and keep the ON status until the next function block is called. If the frame assigned in function block is not stored in Cnet module or has different format, this flag will be turned on and relevant error code is saved at STATUS.
STATUS	USINT	The relevant error code. (when the ERR flag is on)

## 5) Example of program (RTU mode)

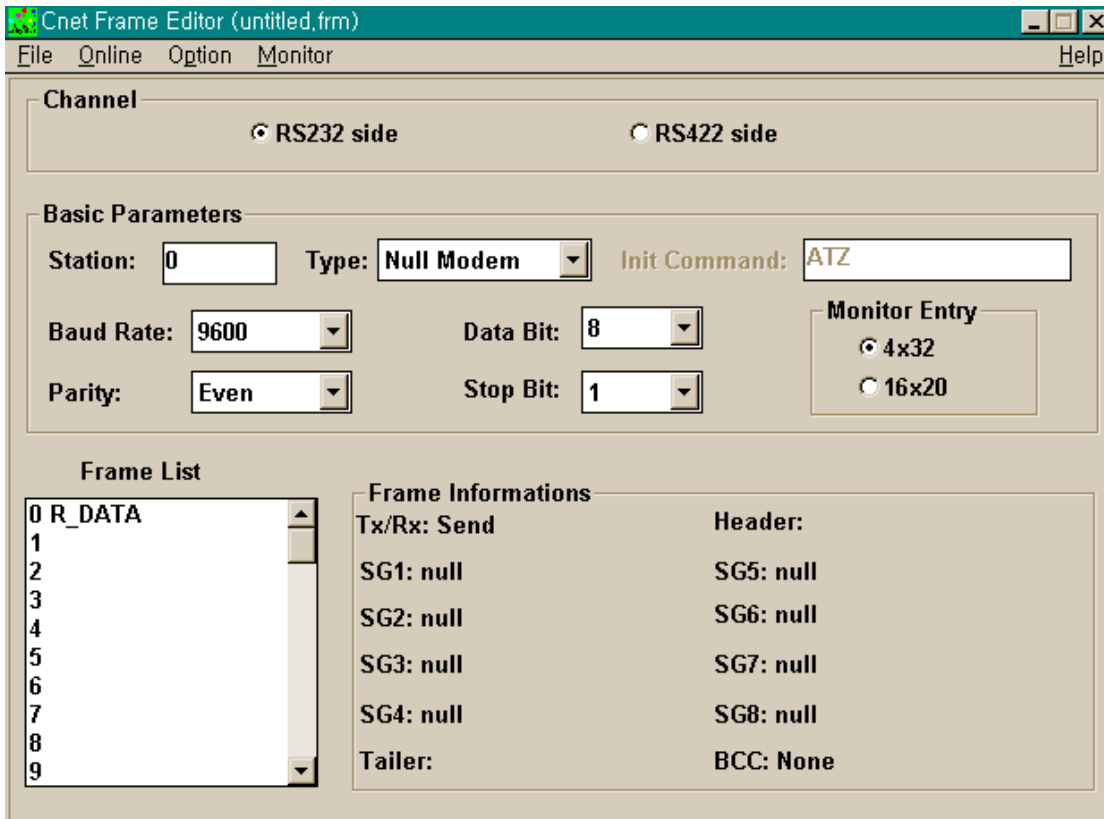
### Example 1) Read data(Coil status) from Modicon PLC

This example shows how to assign the start address and number of coil, and read coil status.

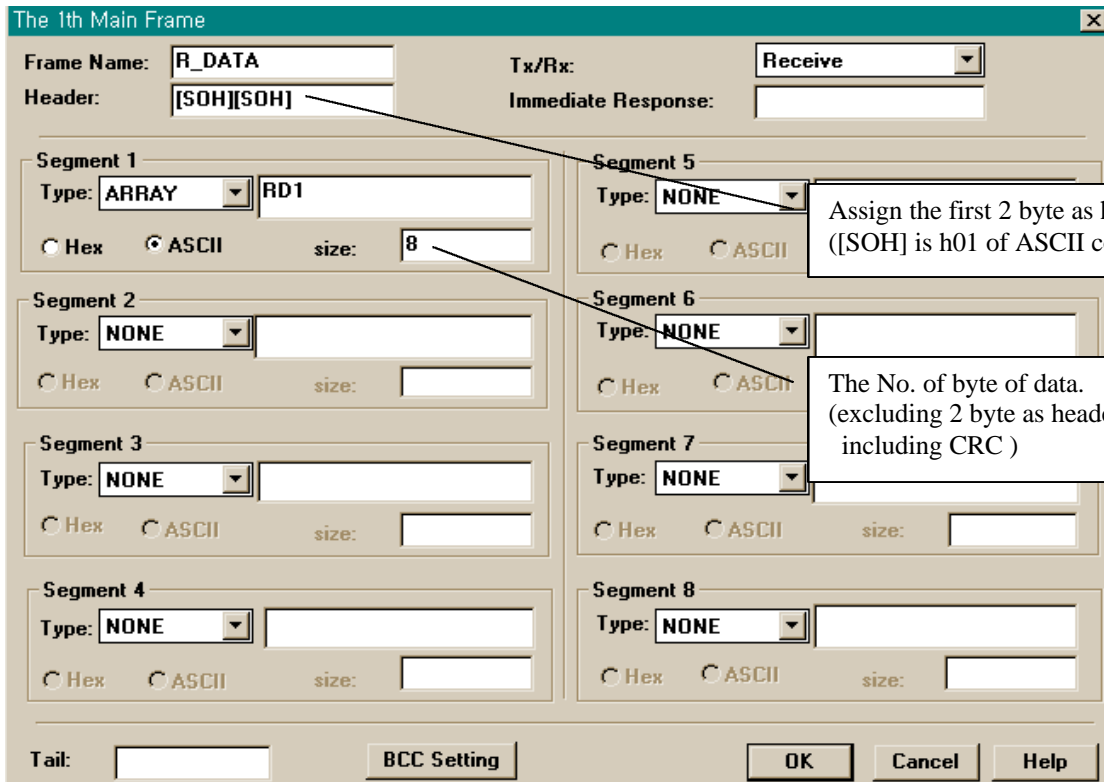
The protocol of Modbus is shown as below table. Refer 'Modbus Protocol Reference Guide' for more detailed information.

QUERY		RESPONSE	
Field Name	Example(Hex)	Field Name	Example(Hex)
Slave Address	01	Slave Address	01
Function	01	Function	01
Starting Address Hi	00	Byte Count	05
Starting Address Lo	13	Data(Coils 27-20)	Cd
No. of Points Hi	00	Data(Coils 35-28)	6B
No. of Points Lo	25	Data(Coils 43-36)	B2
Error Check (LRC or CRC)	-	Data(Coils 51-44)	0E
		Data(Coils 56-52)	1B
		Error Check (LRC or CRC)	-

- A. First, set parameters of GLOFA Cnet module. In this example, communication will be performed with RTU mode. Parameters and receive frame for RTU mode are shown as following picture.

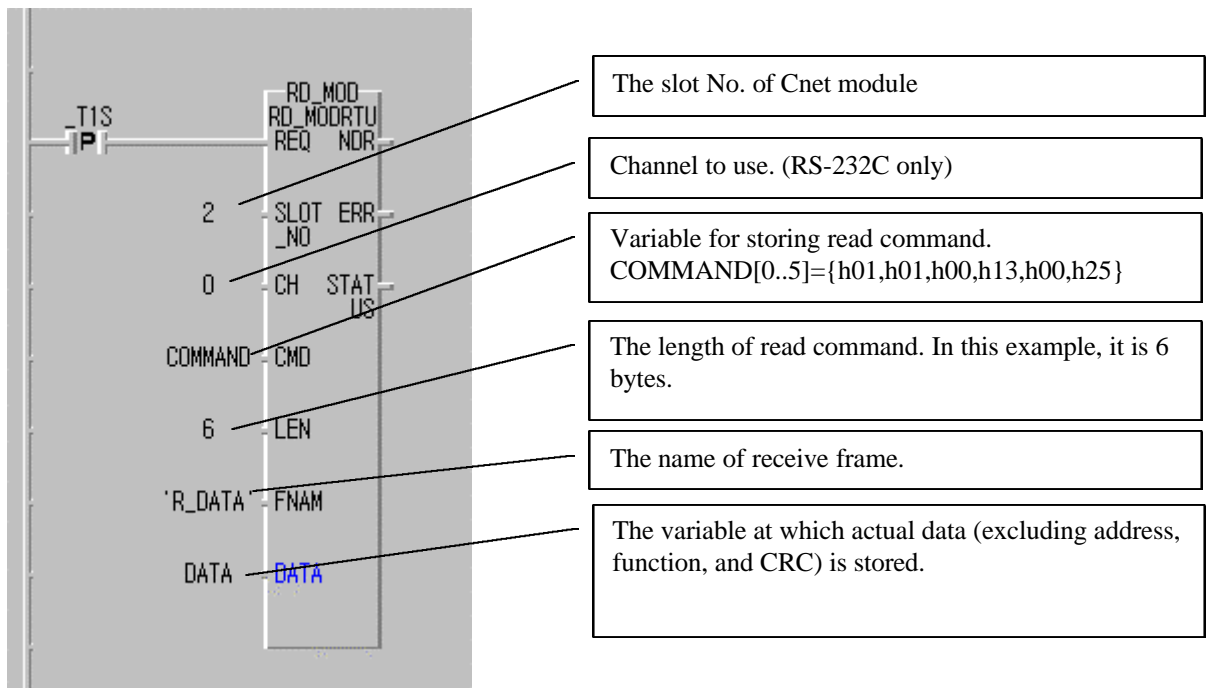


< Basic parameters >



<Receive parameter>

B. Write and download program with GMWIN.



C. Check the communication status through monitoring.

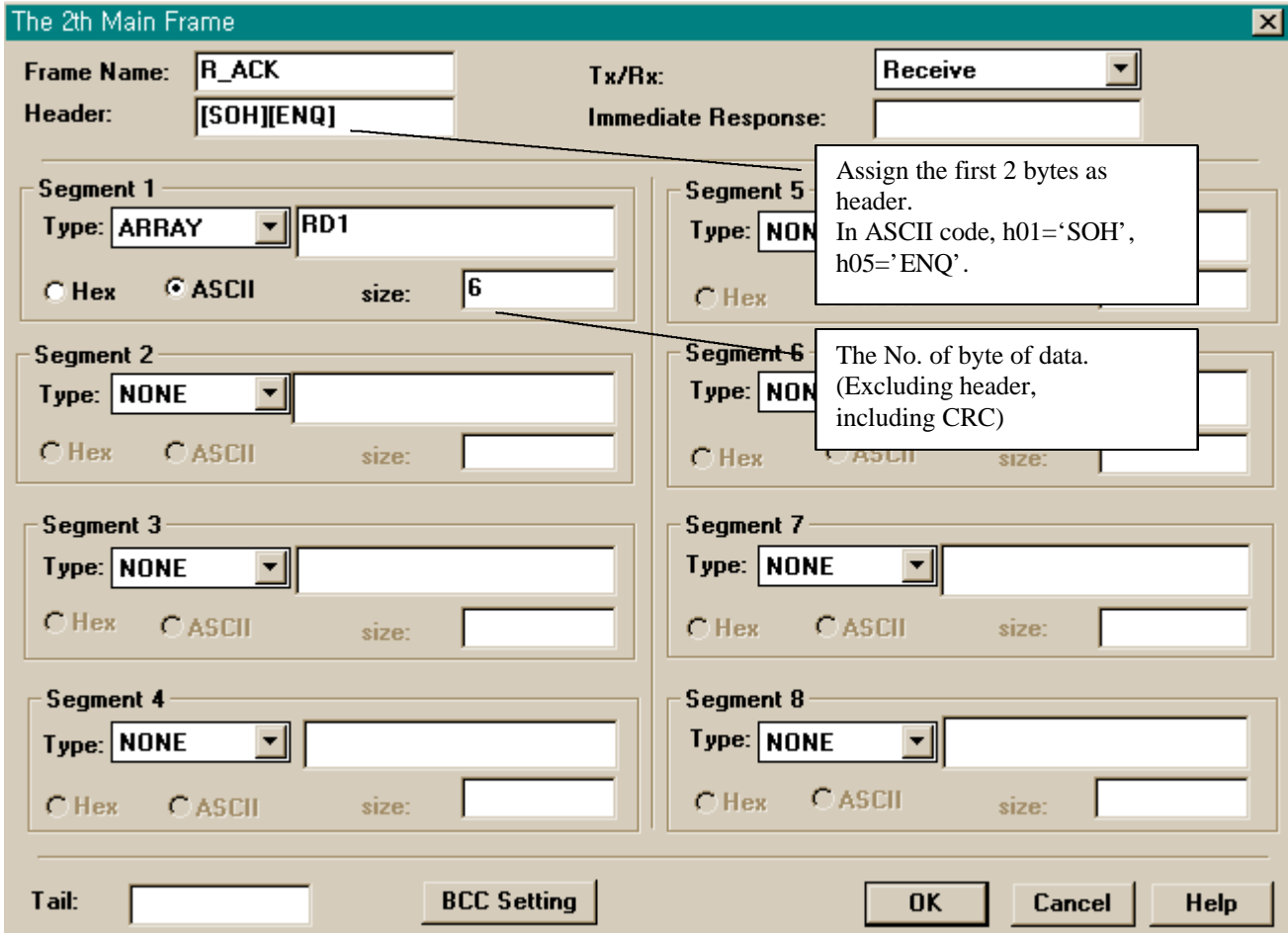
Check the communication status with monitoring functions of GMWIN. If error is occurred, perform troubleshooting action after check the actual received data of Cnet module with the monitoring function of frame editor.

**Example 2) Write data to Modicon PLC (Force Single Coil)**

This example shows how to assign the address of a coil (1 bit) and turn on/off that bit. The protocol of Modbus is shown as following table.

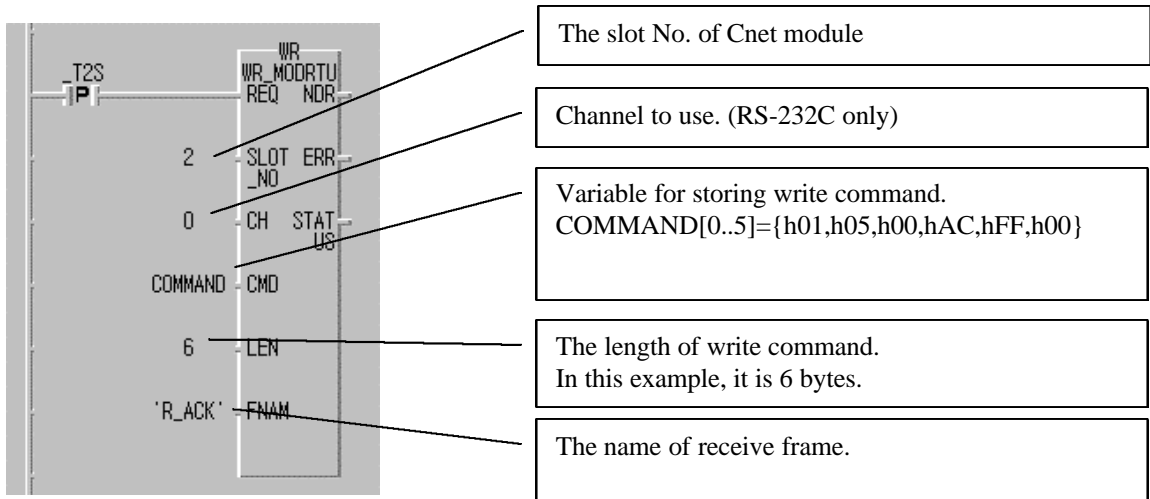
QUERY		RESPONSE	
Field Name	Example(Hex)	Field Name	Example(Hex)
Slave Address	01	Slave Address	01
Function	05	Function	05
Starting Address Hi	00	Starting Address Hi	00
Starting Address Lo	AC	Starting Address Lo	AC
No. of Points Hi	FF	No. of Points Hi	FF
No. of Points Lo	00	No. of Points Lo	00
Error Check (LRC or CRC)	-	Error Check (LRC or CRC)	-

- A. First, set and download parameters of GLOFA Cnet module. In this example, communication will be performed with RTU mode. Set and download parameters and receive frame as following picture. Normally, received data is same as transmitted data. Basic parameter setting is same as example 1.



<Receive frame>

- B. Write and download program with GMWIN.



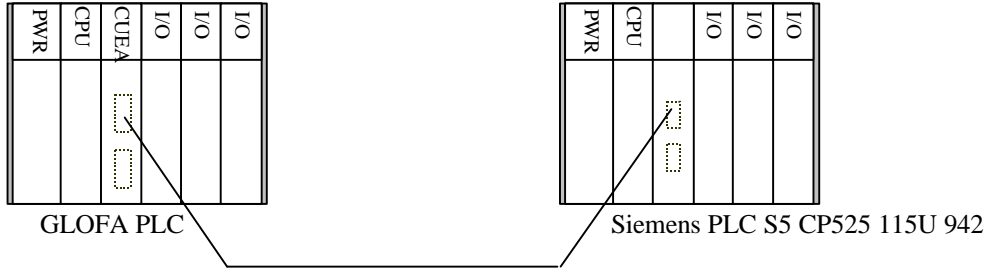
C. Check the status of communication through monitoring function of GMWIN.

If communication error is occurred, perform troubleshooting action after check the actual transmitted data of Cnet module with the monitoring function of frame editor.

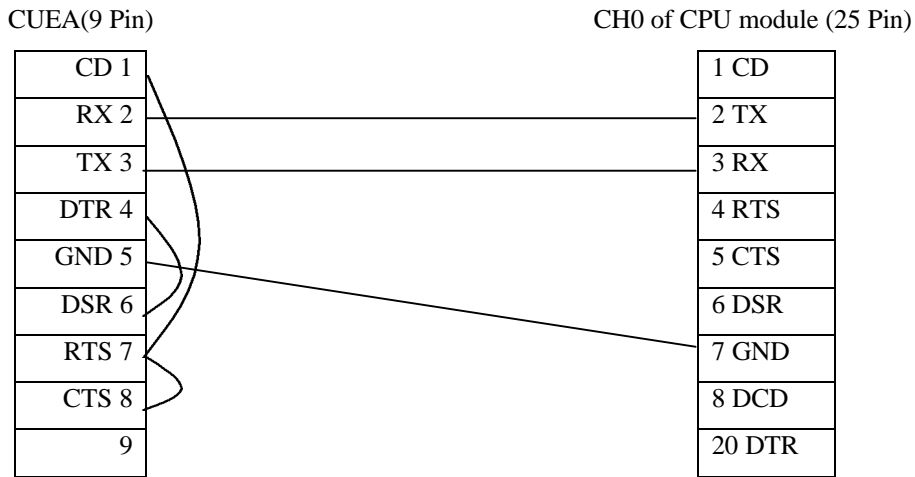
## A4.4 Simens(CP525)

This chapter will show how to communicate with SIEMENS PLC CP525 Coprocessor through RS-232C.

### 1) System configuration



### 2) Wiring diagram



### 3) Parameter setting

- a. Set parameters of GLOFA PLC Cnet module.

Item	Cnet module and CP 525
Baud Rate	19200
Data Bits	8
Stop Bits	1
Parity	Even

- 1) Parity and data bit of CP525 are fixed as EVEN and 8bit.
- 2) Communication speed (Baud rate) of CP525 : 110,150,300,600,1200,2400,4800,9600,19200.



Procedure 3964R Protocol.

4.2 SEND job

GLOFA Cnet	Simens PLC
STX (02H) ----->	
	<-----DLE(10H)
NUL (00H) ----->	
NUL (00H) ----->	
'A' (41H) ----->	
'D' (44H) ----->	
(0AH) ----->	
(01H) ----->	
(00H) ----->	
(32H) ----->	
(FFH) ----->	
(FFH) ----->	
Data 1----->	
Data 2----->	
Data 3----->	
Data 4----->	
-	
-	
Data x----->	
DLE (10H) ----->	
ETX (03H) ----->	
BCC ----->	
	<-----DLE(10H)
	<-----STX(03H)
DLE (10H) ----->	
	<-----1 st byte.
	<-----2 nd byte.
	<-----3 rd byte.
	<-----4 th byte.
	} Response STATUS
	<-----DLE(10H)
	<-----ETX(03H)
DLE (10H) ----->	

4.3 FETCH job

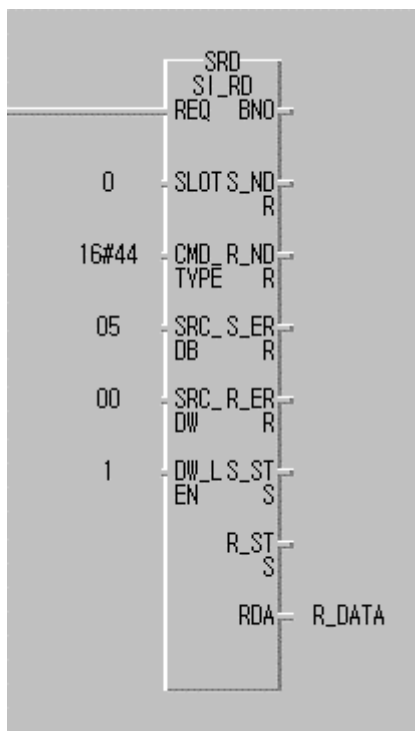
GLOFA Cnet	Simens PLC
STX (02H) ----->	
	<-----DLE(10H)
NUL (00H) ----->	
NUL (00H) ----->	
'A' (41H) ----->	
'D' (44H) ----->	
(0AH) ----->	
(01H) ----->	
(00H) ----->	
(32H) ----->	
(FFH) ----->	
(FFH) ----->	
DLE (10H) ----->	
ETX (03H) ----->	
	<-----DLE(10H)
	<-----STX(03H)
DLE (10H) ----->	
	<-----1 st byte.
	<-----2 nd byte.
	<-----3 rd byte.
	<-----4 th byte.
	} Response STATUS
	<-----Data 1
	<-----Data 2
	<-----Data 3
	<-----Data 4
	<----- -
	<----- -
	<-----Data x
	<-----DLE(10H)
	<-----ETX(03H)
DLE (10H) ----->	

### 5) FB(Function Block)

There are two function blocks for communication with SIEMENS PLC, SI\_RD and SI\_WR. Before to use these FB, make sure that communi.xfb, simens.xfb, and si\_bcc.xfb is included in library.

#### (1) SI\_RD(Fetch Job)

Running the SI\_RD function block, GLOFA PLC CPU will process and send the data read command internally. As receiving the response from SIEMENS PLC, GLOFA PLC CPU will save data at the designated variable. The receive frame have the same name with the frame of 'FNAM' should be downloaded to the Cnet module before to run the function block. See 6.1.1.2 for more information.

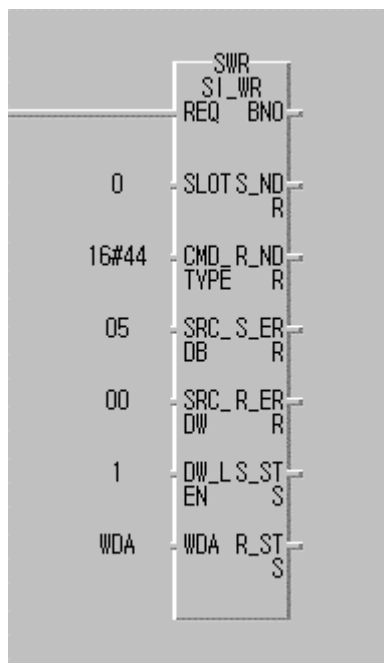


Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be ignored during the service of FB)
SLOT	SINT	Assign the slot No. of Cnet module at which the FB will be run.
CMD_TYP E	USINT	Assign the type of internal memory to be read of SIEMENS PLC. It is assigned with ASCII code format. For example, the 'D' area is 'h44' and the 'E' area is 'h45'.
SRC_DB	USINT	Assign the address of byte to be read.
SRC_DW	USINT	Assign the address of word to be read.

Output	Type	Description
S_NDR	BOOL	This flag will be turned on after the service is finished with no error and keep the ON status until the next FB is called.
S_ERR	BOOL	This flag will be turned on when format or communication service error is occurred.
R_NDR	BOOL	This flag will be turned on after the service is completed with no error and accurate data is received. This flag will keep the ON status until the next FB is called.
R_ERR	BOOL	This flag will be turned on when format or communication service error is occurred. (Send frame error, receiving error, receiving time0out error, NAK response) It will keep the ON status until the next FB is called.
S_STS	USINT	The relevant error code of transmission error
R_STS	USINT	The relevant error code of receiving error or time out error
RDA	USINT ARRAY	The variable at which received data is stored.

**(2) SI\_WR(SEND JOB)**

Running the SI\_WR function block, the GLOFA CPU module will calculate the CRC of command and transmit the command with CRC. After receiving ACK response, the GLOFA CPU will turn on NDR flag if there is no CRC error. The frame has same name with that of 'FNAM' should be downloaded at Cnet module. See 6.1.1.2 for more information about download method.



Input	Type	Description
REQ	BOOL	The function block will start service with rising edge. (The falling edge will be ignored during the service of FB)
SLOT	USINT	Assign the slot No. of Cnet module at which the FB will be run.
CMD_TYPE	USINT	Assign the type of internal memory to be read of SIEMENS PLC. It is assigned with ASCII code format. For example, the 'D' area is 'h44' and the 'E' area is 'h45'.
SRC_DB	USINT	Assign the address of byte to be read.
SRC_DW	USINT	Assign the address of word to be read.

Output	Type	Description
S_NDR	BOOL	This flag will be turned on after the service is finished with no error and keep the ON status until the next FB is called.
S_ERR	BOOL	This flag will be turned on when format or communication service error is occurred.
R_NDR	BOOL	This flag will be turned on after the service is completed with no error and accurate data is received. This flag will keep the ON status until the next FB is called.
R_ERR	BOOL	This flag will be turned on when format or communication service error is occurred. (Send frame error, receiving error, receiving time0out error, NAK response) It will keep the ON status until the next FB is called.
S_STS	USINT	The relevant error code of transmission error
R_STS	USINT	The relevant error code of receiving error or time out error

**6) Example of program (Reading data from PLC S5 CP 525)**

**Example 1) Reading data of 'D' area from SIEMENS PLC**

This example shows how to read data of PLC S5 with assigning the start address and numbers of data to be read. The protocol of SIMENS PLC is as following table.

REQUEST

Field Name	Example(Hex)
STX	02

NUL,NUL	00,00
'A'	41
'D'	44
SRC_DB	0A
SRC_DW	01
Data NO(high)	00
Data NO(low)	32
CPU	FF
NO	FF
DLE	10
ETX	05
Error Check(BCC)	-

DLE	10
-----	----

DLE	10
-----	----

RESPONSE

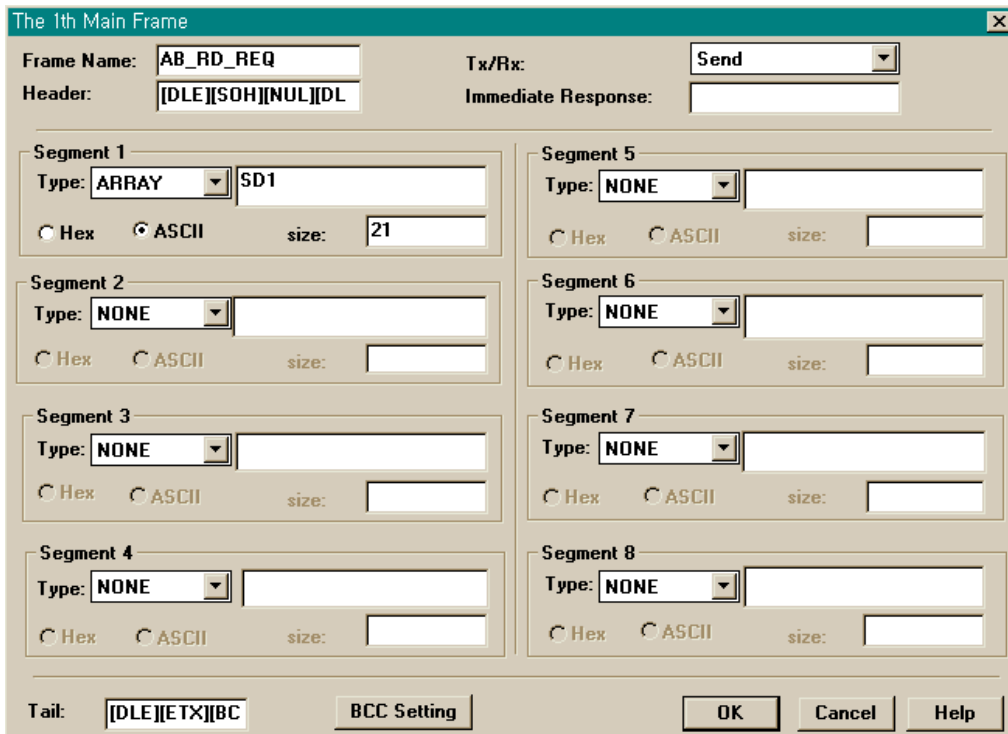
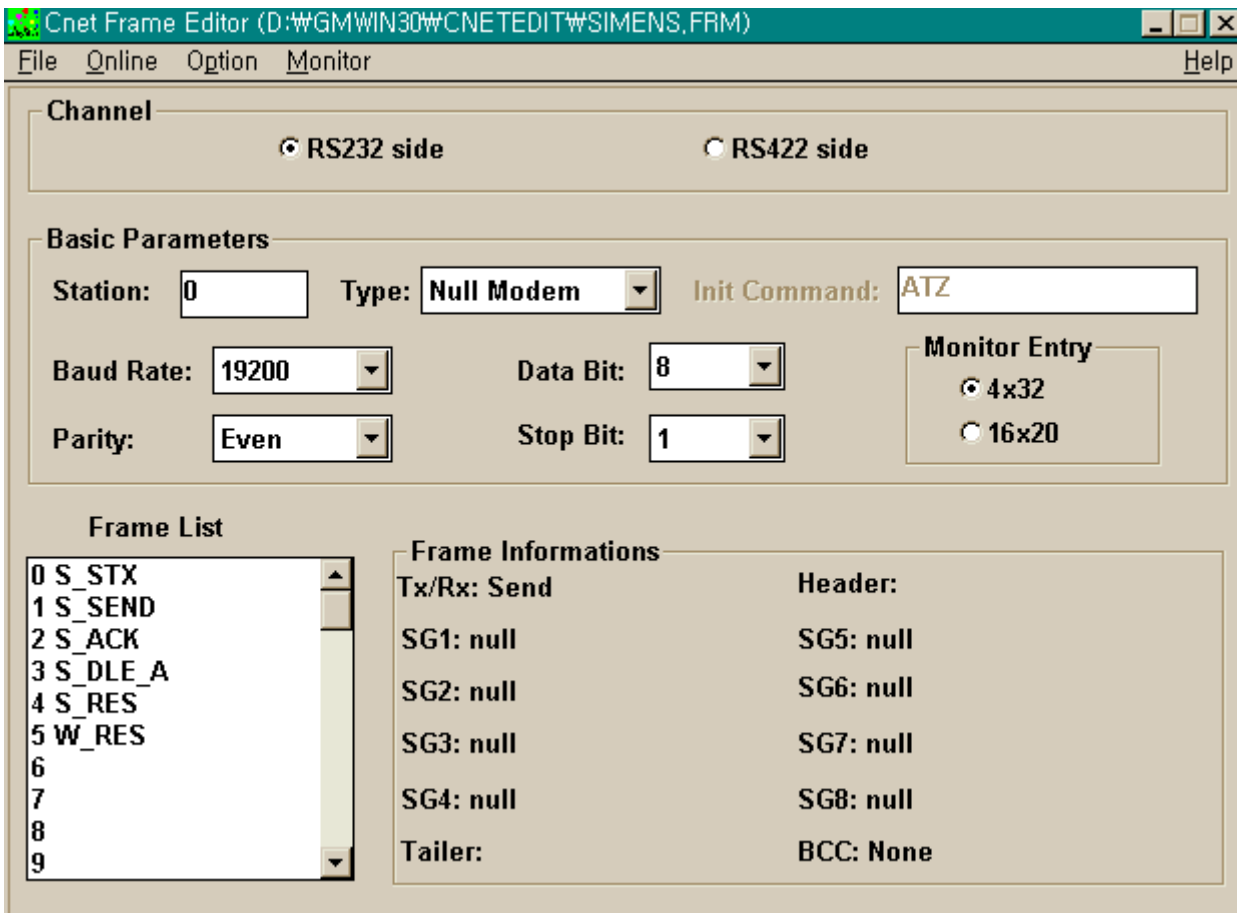
Field Name	Example(Hex)
------------	--------------

DLE	10
-----	----

DLE	10
STX	02

1 Byte	
2 Byte	
3 Byte	
4 Byte	
1 Data Byte	
2 Data Byte	
3 Data Byte	
4 Data Byte	
DLE	10
ETX	10
Error Check.(BCC)	

First, set parameters of GLOFA Cnet module. In this example, set and download parameters and receive frame as following pictures. (Baud rate : 19.2K, Data bit : 8 bits, {parity bit : None})



< Send frame >

A. Write and download program with GMWIN software.

