

Chapter 4 How to set operation

4.1 Operating mode setting

The operating mode of Cnet is set with operating mode switch on the front, and the interlocking/stand-alone mode or operation mode for each channel is determined according to the operating mode. Setting method of operating mode is, after selecting required mode adjusting switch values of operating mode with power off, set by power on. Operating mode is unchangeable even if switch values of operating mode are changed during operating, so after power necessarily off, change the switch values. Table 4-1 describes the operating modes according to switch values.

Table 4.1 Operating modes of other than G6L-CUEB/C

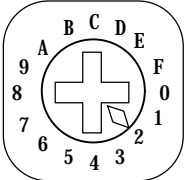
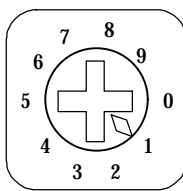
Switch type	Switch value of operating mode	Operating mode		Remark
		RS-232C	RS-422	
	0	User defined communication	User defined communication	Interlocking mode ¹⁾
	1	Dedicated communication	Dedicated communication	
	2	User defined communication	User defined communication	Stand-alone mode ²⁾
	3	Dedicated communication	Dedicated communication	
	4	User defined communication	Dedicated communication	Stand-alone mode
	5	Dedicated communication	User defined communication	
	6	GMWIN	User defined communication	
	7	GMWIN	Dedicated communication	
	8	Loop-back	Loop-back	Self diagnosis mode
	9~F	Reservation		Not used ³⁾

Table 4.2 Operating modes of G6L-CUEB/C

Switch type	Switch Value	Operating Mode	Remark
	0	User defined communication	
	1	Dedicated communication	
	2	GMWIN	
	3	Remote Mode	4)
	4	Test Mode	
	5	Not used	3)
	6	i "	
	7	i "	
	8	i "	
	9	Download Mode	

Remark

- 1) In interlocking mode, main channel is set to RS-232C, RS-422 is operated as data path of channel RS-232C(channel RS-422 disabled), and transmission spec. is operated according to RS-232C.
- 2) This is set in case that in stand-alone mode, channel RS-232C / RS-422 are operated in separately.
- 3) In case of setting to not used mode, because both of channel RS-232C/RS-422 are not operated, it should not be set.
- 4) On the 'Remote Mode', it is allowed to change mode with frame editor.

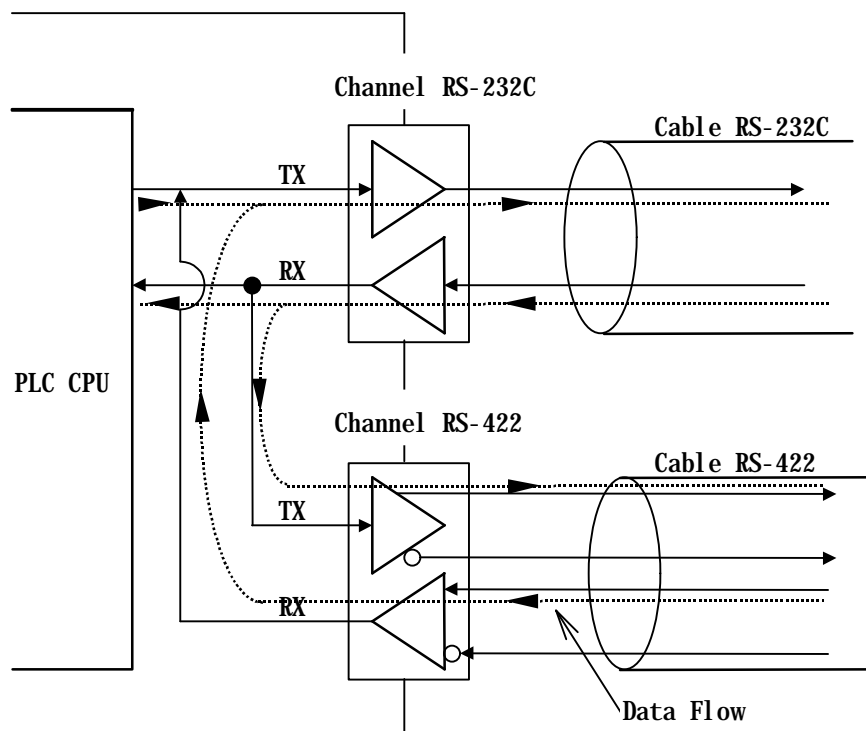
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4.1.1 Channel operation in interlocking mode

In interlocking mode, channel RS-232C and RS-422 are operated being interlocking each other. In other words, the data received via channel RS-232C is sent via channel RS-422, and the data received via channel RS-422 is sent via RS-232C in reverse.

In interlocking mode, main channel is automatically set to RS-232C, data is transmitted/received via channel RS-232C only, and the data received via channel RS-422 is automatically sent via channel RS-232C without receiving into Cnet module.

Figure 4.1 Data flow in interlocking mode



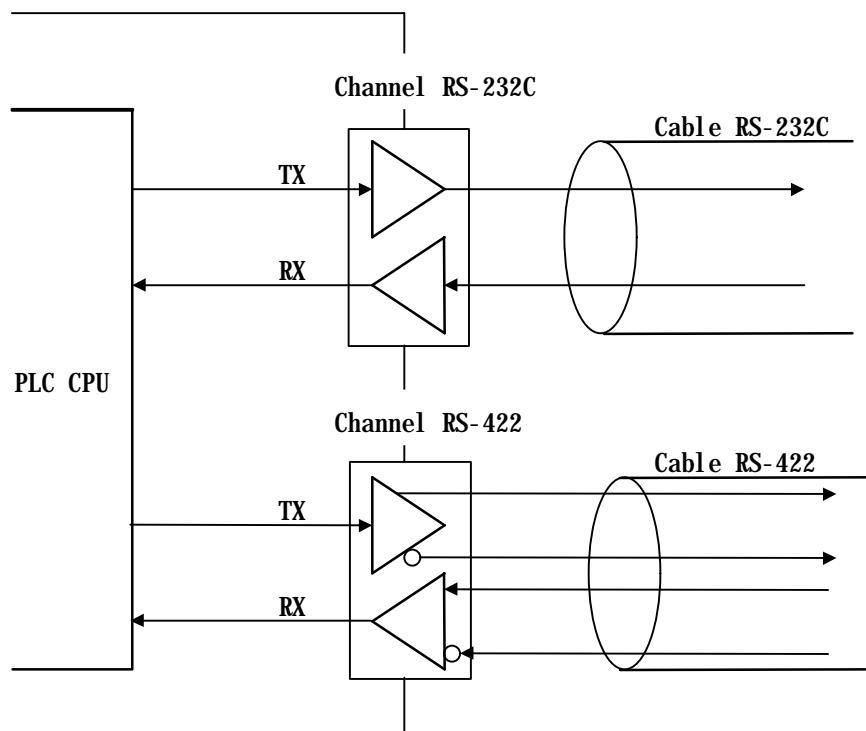
Remark

- 1) In interlocking mode, data is transmitted/received in accordance with setting values of channel RS-232C transmission spec., and the transmission spec. of channel RS-422 can be ignored.
- 2) In interlocking mode, modem can not be connected to RS-232C. During connecting modem, only after setting to the stand-alone mode (switch value range of 2-6), it must be used. In case that modem is set to be used in interlocking mode, channel RS-232C is operated as null modem mode.
- 3) Interlocking mode is not supported with GM6.

4.1.2 Channel operation of stand-alone mode

In stand-alone mode, channel RS-232C and RS-422 is operated independently each other, thus simultaneous Tx/Rx is possible. Therefore, transmission specifications are able to be set according to channel RS-232C and RS-422, and operating is started/stopped according to channel. Data flow of each channel in stand-alone mode is as follows :

Figure 4.2 Data flow in stand-alone mode



Remark

- 1) Mode change is impossible during operating. Only after power off, the mode switch value of the front must be set to required position.
- 2) Each writing according to channel RS-232C and RS-422 and setting according to transmission spec of the channels must be performed in frame editor before operating.

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4.1.3 Channel operating of self diagnosis mode(Loop-back)

Loop-back diagnosis is a function to check whether communication channel is normally operated by itself without connection with external devices or not, and operated only when the mode switch is '8' (In case of G6L-CUEB/G6L-CUEC, the mode switch is '4'). For the details of operating method, see 7.2, Loop-back diagnosis.

4.2 Method of serial interface

4.2.1 RS-232C interface

Channel RS-232C uses 9-pin connector(Female) for communication with external devices. The names and functions of pins, and data directions are as shown in the following Figure :

Figure 4.3 Pin specifications of 9-pin connector for RS-232C

Pin No.	Name	Contents	Signal direction (Cnet \leftrightarrow External devices)	Description
1	CD	Carrier Detect	←	Reports carrier detection of DCE to DTE.
2	RxD	Received Data	←	Received data signal
3	TxD	Transmitted Data	→	Transmitted data signal
4	DTR	Data Terminal Ready	→	Reports communication ready of DTE to DCE.
5	SG	Signal Ground	↔	Ground for signal
6	DSR	Data Set Ready	←	Reports communication ready of DCE to DTE.
7	RTS	Request To Send	→	Requests data transmission from DTE to DCE.
8	CTS	Clear To Send	←	Reports possibility of data transmission from DCE to DTE.
9	RI	Ring	←	Reports receiving ringing tone from DCE to DTE.

When connecting modem, communication type of RS-232C must be set to 'modem' with frame editor, and when not using modem, it must be set to null modem. But when the channel mode is an interlocking one, modem cannot be connected because it is operated as null modem even though setting to modem.

- DTE : Data Terminal Equipment
- DCE : Data Communication Equipment

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1) How to connect RS-232C connector during modem connection

Cnet can communicate with devices of long distance with modem connected, at this time modem and channel RS-232C must be connected as shown in Figure 4.4.

Figure 4.4 Cable connection between RS-232C and modem

Cnet(9-pin)		Connection No. and signal direction	Modem side(25-pin)	
Pin No.	Name		Name	Pin No.
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

2) How to connect connector for RS-232C in null modem mode

In null modem, connector is able to be connected in 7-line(with handshake) or 3-line(without handshake) type. Figure 4.5 is 7-line type connection method, and shows connection drawing when controlling CD(Carrier Detect) signal line by external devices.

Figure 4.5 Connection of 7-line type(with handshake)

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

If CD signal line is not controlled from external devices, it must be connected in 3-line type as shown in Figure 4.6 Recent PC does not control CD signal line, so when connecting with PC, it must be connected in 3-line type.

Figure 4.6 Connection of 3-line type(without handshake)

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

4.2.2 RS-422 Interface

Channel RS-422 uses 6-pin connector(Terminal block) for communication with external devices. The names and functions of pins, and data directions are as shown in the following Figure 4.7.

Figure 4.7 Pin specifications of 6-pin connector for RS-422

Pin No.	Name	Signal direction (Cnet<---->External device)	Description
1	RDA	←	Received data(+)
2	RDB	←	Received data(-)
3	SDA	→	Transmitted data(+)
4	SDB	→	Transmitted data(-)
5	S.G	↔	Signal ground line
6	F.G	↔	Frame ground line

Channel RS-422 makes connection external devices and RS-422 and RS-485(Multi-drop) possible. When RS-422 channel is used as multi-drop, set channel RS-422 to RS-485 communication in setting menu of RS-422 communication type of frame editor, and connect the terminals of RS-422 as shown in Figure 4.9.

Figure 4.8 shows an example of connecting communication cable on RS-422 communication.

Figure 4.8 RS-422 connection

Computer link side		Signal direction (Cnet<---->External device)	External communication device
Pin No.	Name		
1	RDA	←	SDA
2	RDB	←	SDB
3	SDA	→	RDA
4	SDB	→	RDB
5	S.G	↔	S.G
6	F.G	↔	F.G

Figure 4.9 RS-485 connection

Computer link side		Signal direction (Cnet<---->External device)	External communication device
Pin No.	Name		
1	RDA		SDA
2	RDB		SDB
3	SDA		RDA
4	SDB		RDB
5	S.G	↔	S.G
6	F.G	↔	F.G

Figure 4.9 shows how to connect RS-485 multi-drop communication. In case of multi-drop communication, to connect with external devices RDA and SDA, RDB and SDB of channel RS-422 should be connected each other. At this time half-duplex communication is run sharing Tx/Rx line, so channel RS-422 mode should be set to RS-485 in frame editor.

4.3 How to set transmission specifications

4.3.1 Setting items

In Cnet module, transmission specifications of data type such as transmission speed and data/stop bit, etc. are set through frame editor. Therefore user should set the following items in accordance with transmission specifications of the system to be used. Transmission specifications are to be written via Cnet by setting through frame editor included in GMWIN. The contents of which writing is finished are saved to flash memory inside computer link, so it does not change before rewriting is performed in frame editor.

When stand-alone mode, the setting should be separately performed according to channel RS-232C/RS-422. When interlocking mode, because it operates in the specifications of channel RS-232C, only setting for RS-232C is required.

Table 4.2 Transmission specifications

Item		Setting value	Default	Remark
Data type	Data bit	7 or 8	8-Bit	For stand-alone mode, two channel RS-232C/RS-422 operate separately, for interlocking mode, it operates in RS-232C setting mode
	Stop bit	1 or 2	1-Bit	
	Start bit	1 or 2	1-Bit	
	Parity	Even/Odd Parity None	None	
Baud rate (bps)		300/600/1200/2400/4800/9600/19200/38400/76800 ¹⁾	38400 bps	
Channel mode RS-232C		Modem/Null modem ²⁾ /Dedicated modem	Null modem	
Channel mode RS-422		RS-422/RS-485 ³⁾	RS-422	
Station No.		0-31	0	For dedicated mode

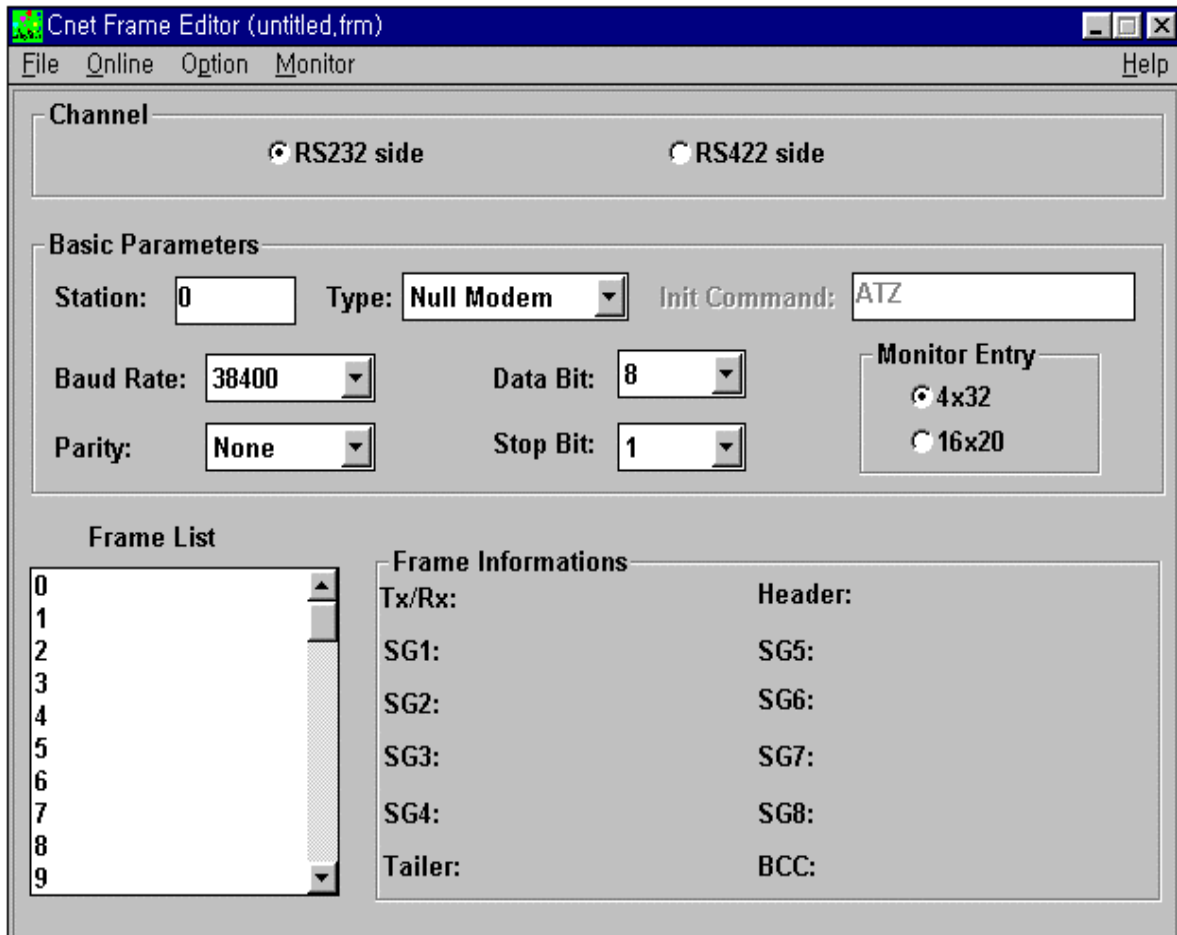
Remark

- 1) 76800 bps is provided in RS-422, it is available in Ver.1.3 or more of Cnet. (GM6 : Max. 38400bps)
- 2) Setting of modem mode is possible when the operating mode of stand-alone only. When interlocking mode, it operates in null modem mode.
- 3) When setting to RS-485, channel RS-422 is switched to half-duplex communication.

4.3.2 How to set

Transmission specifications are set by using frame editor, and the procedures are as follows :

- 1) Run frame editor in windows environment.
- 2) The following initial setting screen is displayed.



- 3) Select the communication channel to be set in the above screen.
- 4) Enter the station number to be used for Cnet. Station number must be one of 0-31.
- 5) Select communication type. For this, see the following Table :

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Table 4.3 Ex. of criteria for the selection of communication type

Communication channel	Communication type	Selection criteria
RS-232C	Dialup Modem	When communication with remote PC or remote connection with GMWIN using public line(telephone line).
	Null modem	When communication with local PC or external devices using cable directly connected(within 15m) is required.
	Modem	When modem communication using dedicated communication line.
RS-422	RS-422	When 1:N communication of full duplex type with external devices(within 500m).
	RS-485	When multi-drop communication of half duplex type with external devices (within 500m).

- 6) If RS-232C is set for modem communication, enter command for modem initialization. It will be set to 'ATZ' in default. Different setting may be necessary in some cases. For examples of setting, see the following Table :

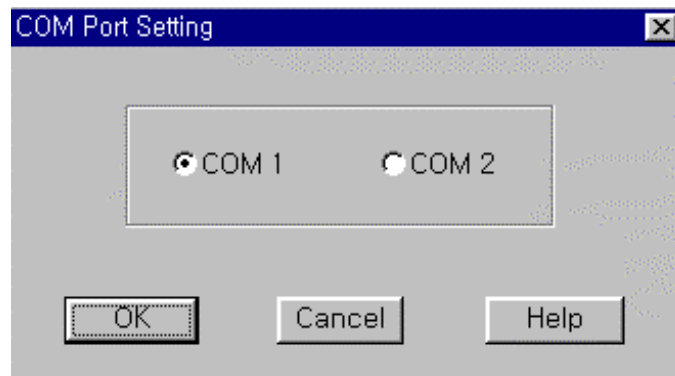
Table 4.4 Examples of modem initialization

Command ¹⁾	Contents	Remark
ATZ	Resetting modem	Operate modem again.
ATXn	Selection of extended result code n=0 : After waiting dial tone, dial. n=3 : After waiting as time specified in register S6, dial.	When connection of modem through using internal exchanger, command ATX3 must be entered for connection. If only telephone receiving is required, this command is unnecessary.
ATMn	Control of modem speaker n=0 : Speaker not operated. n=1 : Operated during procedure of connection only n=2 : Always operated	
AT&Cn	Selection of carrier detection n=0 : DCD(Data Carrier Detect) always operated n=1 : DCD operated during modem on-line only	For asynchronous modem, even if any communication is not connected, a message "on connection" may be indicated. In this case, if 'AT&C1' is entered, it operates normally.

Remark

- 1) The above initialization commands may be combined for use. For example, if command 'ATX1' and 'ATM1' are required to combine, it becomes 'ATX1M1'.

- 7) Set the other parameters(communication speed, data bit, parity, and stop bit).
- 8) After finishing parameter setting, write according to channel. Firstly, connect GMWIN cable between CPU module of PLC and PC.
- 9) If the following dialog box is opened as a result of selecting menu [Selection option-communication port] in frame editor, select serial port of PC side connected by GMWIN cable, and then click on the [OK] button.



- 10) Select menu [On-line]-[Connect] to connect with PLC. If the following screen is displayed, the connection is finished.

‘ Connection is completed’

If the connection failed, it has two causes as follows :

- 1) When there is no response within time.

‘ Time out error’

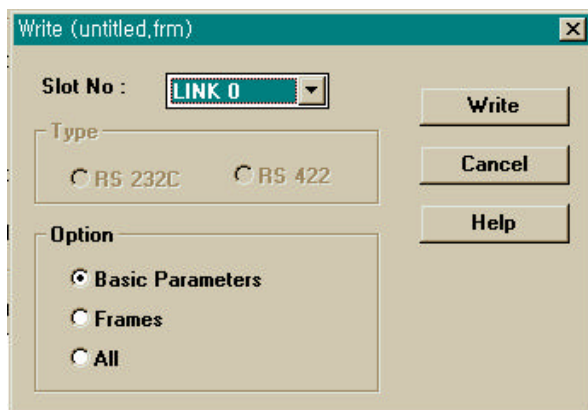
If the above message is displayed, it means that RS-232C cable between PC and PLC may not be connected, or the connection status may be bad. Thus, RS-232C cable connection status must be verified.

- 2) Failure of communication port opening
Another cause is wrong setting of communication port.

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If message 'Failure of communication port opening' is displayed, confirm communication port setting in option menu of frame editor, and ascertain if it is set repeatedly with mouse or other devices, and then try reconnection. Also ascertain if other program such as GMWIN using communication port is running.

- 11) After finishing connection, select menu [On-line]-[Write] to write parameters.

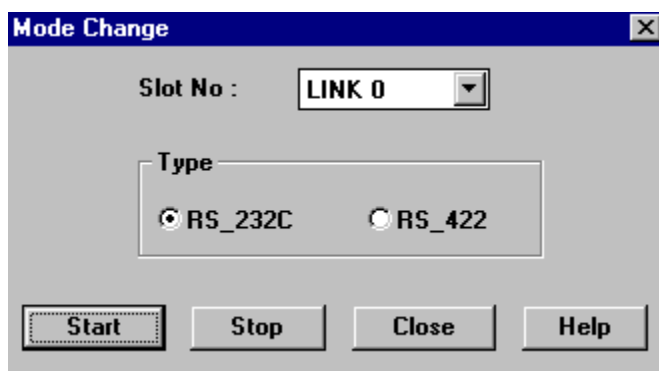


In writing box as above, set the position where computer link module to be written is mounted with slot number, and select writing with communication option set to 'basic parameter'.

Remark

If user defined frame is prepared, set to frame in communication option, only writing for frame is possible. Same as this, if user select 'Basic+Frame', writing for both of basic parameter and frame becomes possible.

If parameter writing is performed, Cnet operation stops. Therefore, after parameter writing is finished, select menu [On-line]-[Mode change] to start operation of Cnet. If slot number of computer link module and channel to be exchanged of operation are selected in below dialog box for operation exchanging, and the [Start] button is clicked on, the appropriate channel starts.



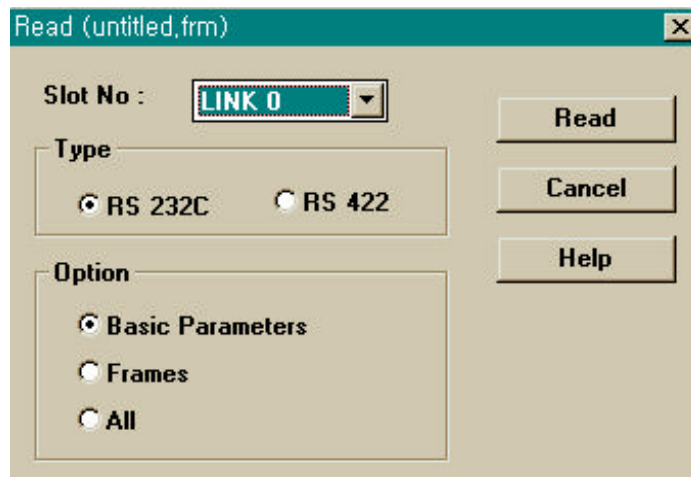
In these methods, after setting and writing basic parameter according to channel RS-232C/RS-422, run the appropriate channel to start operation.

4.3.3 Reading setting value

Confirming methods of basic parameter saved to flash memory of Cnet module is divided into two methods : a reading method by using frame editor ; and another method through LED indication.

Reading method of parameters by using frame editor is as follows(For the method confirming through LED indication, see 3.1.2, Specifications of LED indications.) :

- 1) Select [On-line]-[Connect] in basic screen of frame editor to finish the connection with PLC. The method of connection is same as described in 4.3.2.
- 2) After finishing the connection, selecting [On-line]-[Read], the following dialog box is displayed. In this, enter the number of Cnet's slot, communication type, and communication option, and select [Read] ...



If reading is finished, the basic values read are displayed in basic screen of frame editor. These values can be saved to a file.