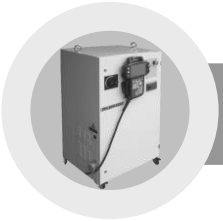
HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

WARNING

THE INSTALLATION SHALL BE MADE BY QUALIFIED INSTALLATION PERSONNEL AND SHOULD CONFORM TO ALL NATIONAL AND LOCAL CODES

Hyundai Robot

Hi5CC140401FMEN5



Hi5 Controller Function Manual

CC-Link

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

The information included in this manual is the property of HHI.
This manual may not be copied, in part or in full, without prior written authorization from HHI.
It may not be provided to any third party, nor used for any other purposes.

HHI reserves the right to modify the content of this manual without prior notification.

Printed in Korea – Apr. 2014. 5th Edition
Copyright ⓒ 2014 by Hyundai Heavy Industries Co., Ltd

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Contents

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

List of Figures

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

List of Tables

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

1 Introduction

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

1.1. Preliminary Knowledge

To understand this, you must have preliminary knowledge of the following.

- How to use Hi5 Controller
- How to install and utilize the CC-Link Fieldbus Network

1.2. About Fieldbus

Fieldbus is an industry open standard to operate the plant devices including sensor, button, and motor driver and operating interface with the PLC (Programmable Logic Controller) through a single communication cable.
Fieldbus provides intelligent service such as centrally monitoring or reconfiguring the overall network status and has the advantage of sending and receiving more detailed information (Operating mode setting, sensor error information etc.) than just the simple ON/OFF information with the sensor or switch.
Because Fieldbus uses a single cable, it reduces the time and cost required for wiring and simplified wiring is also advantageous in maintenance and repair. And unlike the non-deterministic response of Ethernet, Fieldbus provides guaranteed response speed of the data to satisfy the industrial usage for which critical time characteristic is significant.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

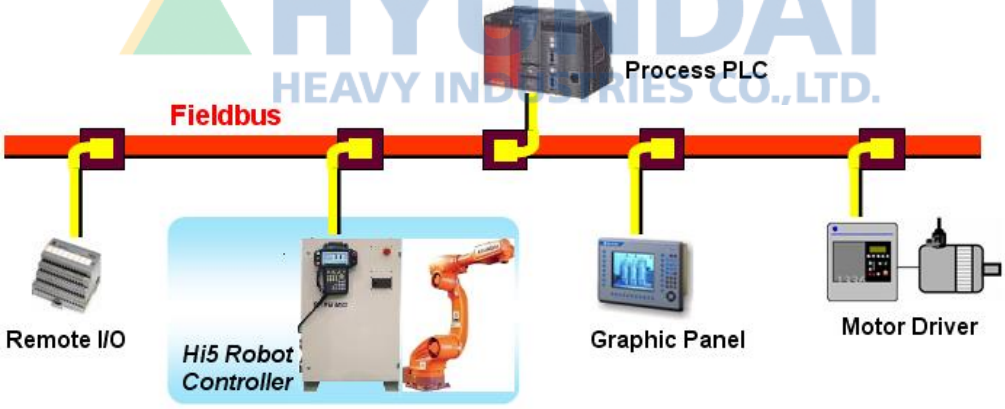


Figure 1.1 Fieldbus Network and Master/Slave Device

1 master device and multiple slave devices are connected in 1 Fieldbus network. Mast device searches/manages the overall network and exchanges data with the slave devices. Generally the PLC is the master device and other sensor, button and controller are the slave devices.

1.3. 2 Methods of Hi5 Controller Fieldbus Function

Hi5 Controller supports 2 methods of Fieldbus function as shown in [Table 1-1].

Table 1-1 Methods and Characteristics of Hi5 Controller Fieldbus Function

Item	BD57x CC-Link Board BD58A LDIO Board (For Hi5-C)	BD52x Multi-Communication Board
Installed module	BD57x CC-Link Slave Module	Hilscher COM Module
Number of modules that can be installed	1 Module	1 or 2 Module(s)
Support function	Slave	Both Master and Slave can be supported simultaneously
Supported protocol	CC-Link v2.0	Device Net Floppy Bus - DP
Connection to main board	CAN	BD500 Mother Board Bus
Input utilization method of Fieldbus for robot language	Input from X area of FB5 object Ex: WAIT FB5.X5	Input from X of FB1, FB3 object Ex: WAIT FB1.X5
Output utilization method of Fieldbus for robot language	Output to Y of FB5 object Ex: FB5.Y12=1	Output to Y of FB1, FB3 object Ex: FB3.Y12=1
Input utilization method of Fieldbus for internal PLC	Input from X of FB5 object	Input from X of FB1, FB3 object
Output utilization method of Fieldbus for internal PLC	Output to Y of FB5 object	Output to Y of FB1, FB3 object

This manual only describes the Fieldbus function using the BD57x CC-Link board (or BD58A LDIO board).

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

1.4. CC-Link Function of Hi5 Controller

The Hi5 controller is one of the CC-Link slave systems, which performs the I/O exchange with a CC-Link master in PLC or PC card form. In order to use the CC-Link function in the Hi5 controller, a BD570 CC-Link board or a BD58A LDIO board needs to be mounted.

The BD570 or BD58A board is available in different software versions, including the one exclusively for the CC-Link V1.0, CC-Link V2.0 or the one that supports both the CC-Link V1.0 and CC-Link V2.0 (Refer to [Table 1-2]).

If the software version of the BD570 or BD58A board is V2.01 or higher, it is required to set the version of the CC-Link of the teach pendant as V1.0 or V2.0. However, if the controller main software version is V31.10-00 or lower, the CC-Link version setting function will not be provided. In that case, the BD570 or BD58A board will run on the CC-Link V2.0. Refer to **[1.5 Hi5 Controller CC-Link Version Selection]** in order to use the CC-Link V1.0.

Table 1-2 Software version of BD570 and BD58A

SW version	Main SW version	CC-Link runs on	Remarks
V1.03 or lower	None applicable	CC-Link V1.0	Exclusive SW for the CC-Link V1.0
V2.00	None applicable	CC-Link V2.0	Exclusive SW for the CC-Link V2.0
V2.01 V2.02	V31.10-00 or lower	CC-Link V2.0	
	V31.10-01 or higher	CC-Link V1.0	Selects the CC-Link version in the teach pendant
		CC-Link V2.0	
V2.04 or higher	V31.10-00 or lower	CC-Link V1.0	Turn on the exclusive switch for the CC-Link V1.0 (Pin #1 of both the BD570 DSW1 and BD58A DSW2)
		CC-Link V2.0	Turn off the exclusive switch for the CC-Link V1.0 (Pin #1 of both the BD570 DSW1 and BD58A DSW2)
	V31.10-01 or higher	CC-Link V1.0	Can select the CC-Link version in the teach pendant
		CC-Link V2.0	

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

※ The version of the BD570 or BD58A board can be checked by selecting 『[F1]: Service』 → 『7: System diagnosis』 → 『1: System version』.

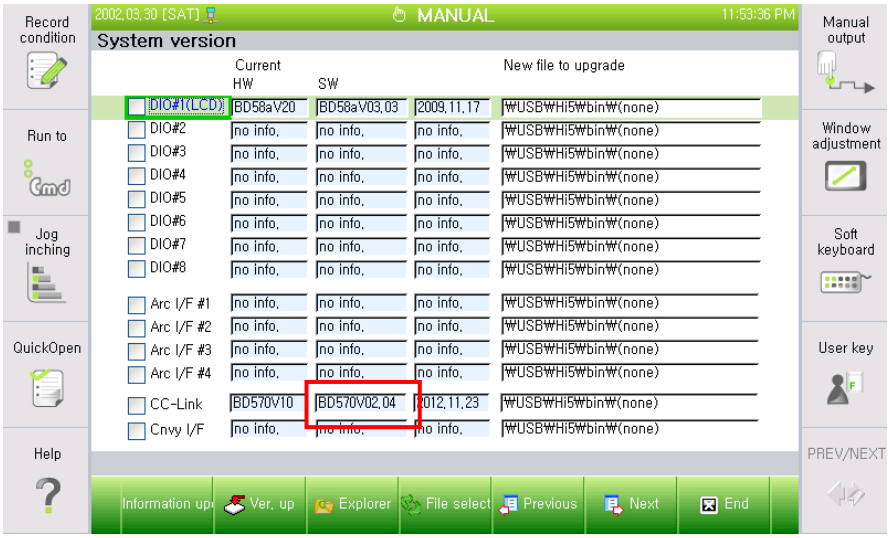


Figure 1.2 Checking of the version of the BD570 or BD58A board

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

The functional specification of the Hi5 controller is as shown below in [Table 1-3].

Table 1-3 CC-Link specifications of the Hi5 controller

Kind		Remote Device
Max. number of stations		4
Extension cycle setting (in case of CC-Link V2.0)		4 times, 2 times
Input	**CC-Link V2.0**	Max. 120 bytes (960-bit) (RWw0–59, RX0–127)
	CC-Link V1.0	Max. 32 bytes (256-bit) (RWw0–15, RX0–127)
Output	**CC-Link V2.0**	Max. 120 bytes (960-bit) (RWr0–9, RY0–127)
	CC-Link V1.0	Max. 32 bytes (256-bit) (RWr0–15, RY0–127)

※ CC-Link V2.0 expansion by two-time cyclic setting is only available at BD570/BD58A SW version V2.05 or higher.

1.5. Hi5 controller CC-Link version selection

If the software version of the BD570 or BD58A board of the Hi5 controller is V2.01 or higher that supports both the CC-Link V1.0 and CC-Link V2.0, it is required to set the Hi5 controller CC-Link in the same version as that of the CC-Link set in the master.

1.5.1. Teach pendant CC-Link version setting

As shown below, users can select the version of the CC-link of the BD570 or BD58A in the teach pendant BD57x fieldbus information and setting section. Refer to **[2. BD57x and BD58A fieldbus board setting]** for more details.

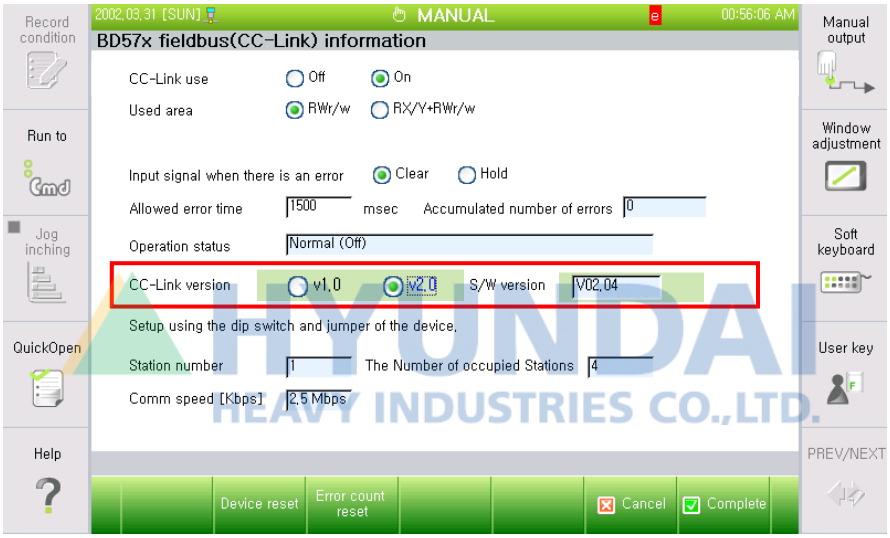


Figure 1.3 Screen for selecting a CC-Link version

※ The function of selecting the CC-Link version in the teach pendant is supported only when the version of the Hi5 controller main software is V31.31.10-01 or higher.

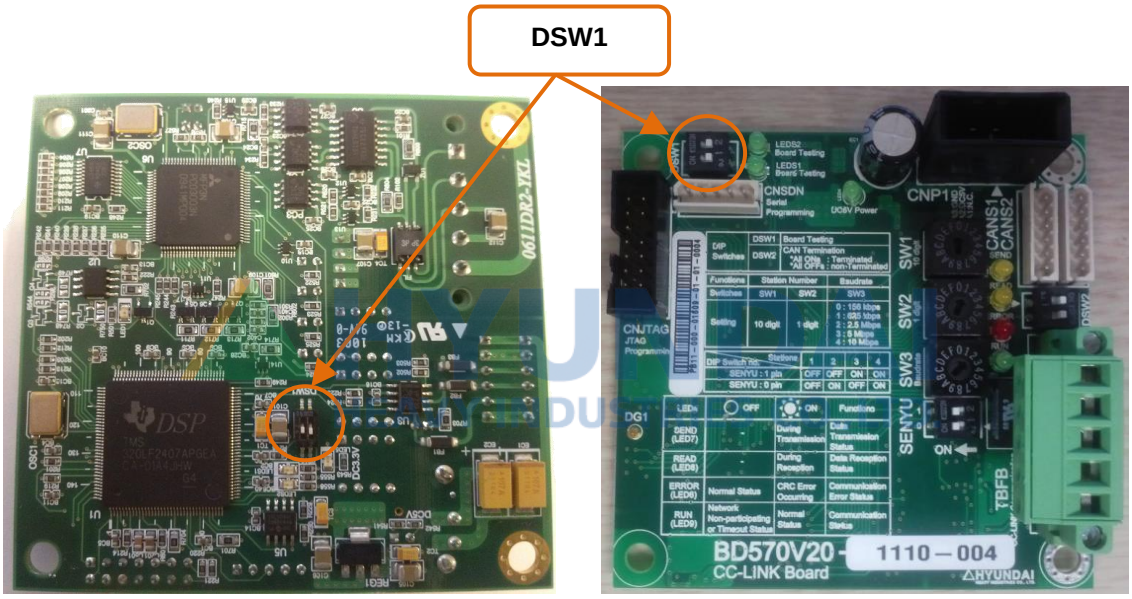
※ If the software version of the BD570 or BD58A is V2.01 or higher, and the main software version is V31.31.10-00 or lower, there are three ways, as shown below, to use the CC-Link V1.0.

- Upgrade the controller's main software to V31.31.10-01 or a lower version.
- Downgrade the software of the BD570 or BD58A to V1.03, which is exclusively for CC-Link V1.0.
- If the software version of the BD570 or BD58A is V2.04 or higher, an exclusive switch for the CC-Link V1.0 is required to be set.
  (Refer to the next page for more details)

1.6. Exclusive switch for the CC-Link V1.0 (SW V2.04 or higher)

This is for running the CC-Link V1.0 by setting the BD570 or BD58A board dip switch, regardless of the CC-Link version set in the teach pendant. This function will be effective when the application of the CC-Link V1.0 is necessary while the controller's main software version is V31.31.10-00 or lower and the software of the BD570 or BD58Aa board software is V2.04 or higher.

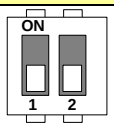
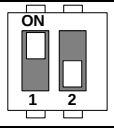
If the Pin #1 of the BD570 board DSW1 is turned on, the board will run exclusively on the CC-Link V1.0. On the other hand, if the Pin #1 is turned off, the board will run on the CC-Link version set in the teach pendant.
The BD570V10 board DSW1 is mounted on the back side of the board, while the switch is located on the front side of the board in the case of the BD570V20 board.



Back side of BD570V10 **Front side of BD570V20**

Figure 1.4 BD570 DSW1 location

Table 1-4 BD570 DSW1 setting

Switch name	CC-Link version	BD570 DSW1		Figure	Remarks
		1	2		
DSW1	V2.0/V1.0 (Selective)	OFF	No use		Condition when shipped
	Exclusively for V1.0	ON	No use		

If the Pin #1 of the BD58A board DSW2 is turned on, the board will run exclusively on the CC-Link V1.0 regardless of the CC-Link version set in the teach pendant.

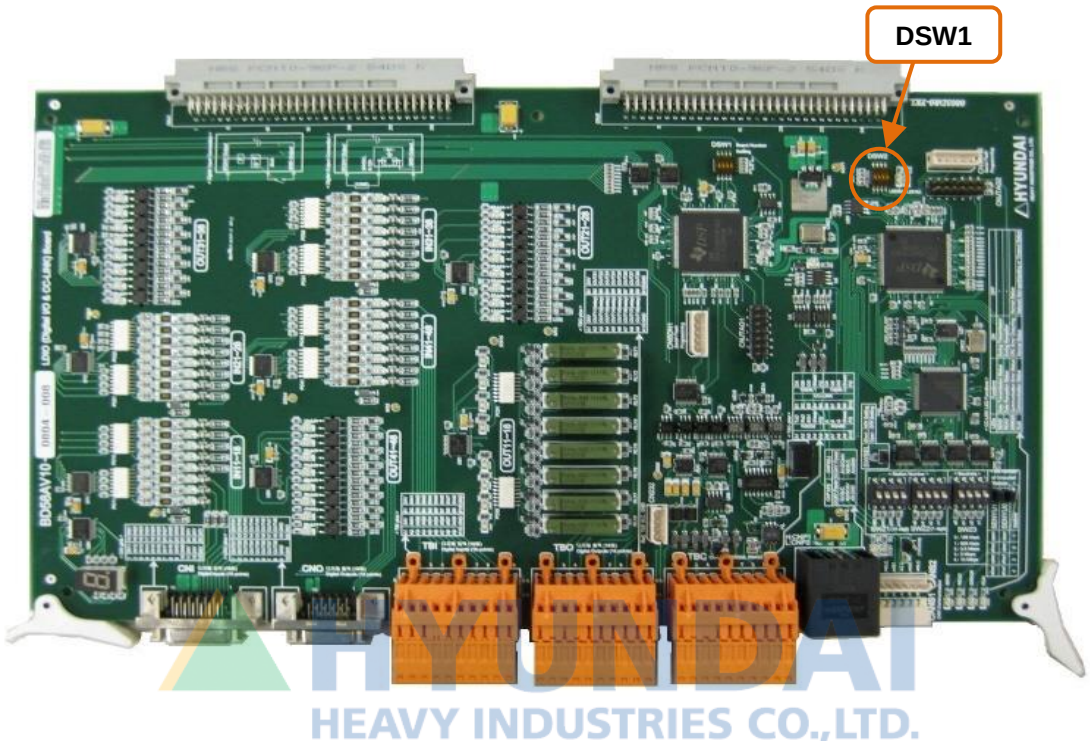
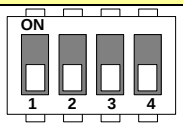
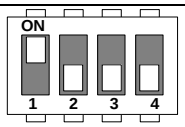


Figure 1.5 BD58A DSW1 location

Table 1-5 BD58A DSW2 setting

Switch name	CC-Link version	BD58A DSW2				Figure	Remarks
		1	2	3	4		
DSW2	V2.0/V1.0 (selective)	OFF	No use	No use	No use		Condition when shipped
	Exclusively for V1.0	ON	No use	No use	No use		

1.7. Basic Specification of CC-Link

[Table 1-6] shows the basic specifications of CC-Link

Table 1-6 CC Basic specification of CC-Link (use of terminal resistance of 110Ω)

Maximum number of remote stations	64 stations	
Transmission speed	**Cable length between stations**	**Maximum total cable length**
156kbps	20cm or above	1,200m
625kbps		900m
2.5Mbps		400m
5Mbps		160m
10Mbps		100m

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

2

BD57x, BD58A Fieldbus Board Setting

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

2.1. BD570V10 CC-Link setting

Station numbers are on BD570V10 board: 3 dip switches (SW1, SW2, and SW3) to set the communication speed, and 2 jumpers (SENYU0 and SENYU1) to set the number of stations.

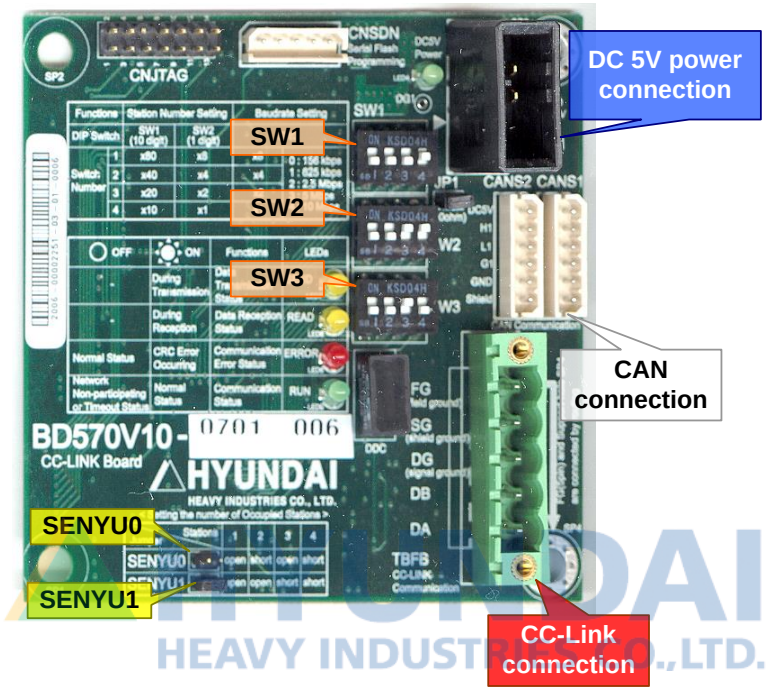


Figure 2.1 BD570V10 CC-Link module

Table 2-1 shows the individual functions of the dip switches related to the setting of the station number and communication speed.

Table 2-1 Switches for the setting of the station number and communication speed for BD570V10

Switch name	Switch number	Description
SW1	1	Station number setting (10 unit input): × 80
	2	Station number setting (10 unit input): × 40
	3	Station number setting (10 unit input): × 20
	4	Station number setting (10 unit input): × 10
SW2	1	Station number setting (1 unit input): × 8
	2	Station number setting (1 unit input): × 4
	3	Station number setting (1 unit input): × 2
	4	Station number setting (1 unit input): × 1
SW3	1	Baudrate setting: × 8
	2	Baudrate setting: × 4
	3	Baudrate setting: × 2
	4	Baudrate setting: × 1

Station number can be set in the range of “1~64”.

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Baudrate can be set with one of the 5 digits in the range of “0~4”. The speed for each number is described in [Table 2-2].

Table 2-2 BD570V10 CC-Link Speed Setting

Dip switch setting (Binary)	Speed
0 (0000)	156kbps
1 (0001)	625kbps
2 (0010)	2.5Mbps
3 (0011)	5Mbps

For example, if you want to set the speed of 2.5Mbps for Station 13, the dip switch is set as shown in [Figure 2.2].

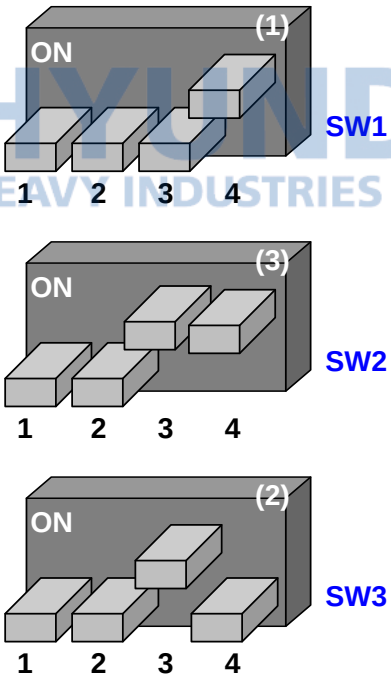


Figure 2.2 Example of Dip Switch Setting (Station Number: 13, Speed Number: 2)

Also, you can use the two jumpers, JP1 and JP2, to adjust the number of stations.

Table 2-3 Setting the number of occupied stations of BD570V10

SENYU0	SENYU1	Number of station
Open	**Open**	1
Short	**Open**	2
Open	**Short**	3
Short	**Short**	4

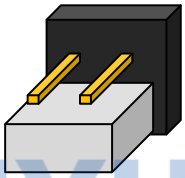


Figure 2.3 Example of Number of Station Setting (Number of Station: 3)

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

2.2. BD570V20 CC-Link setting

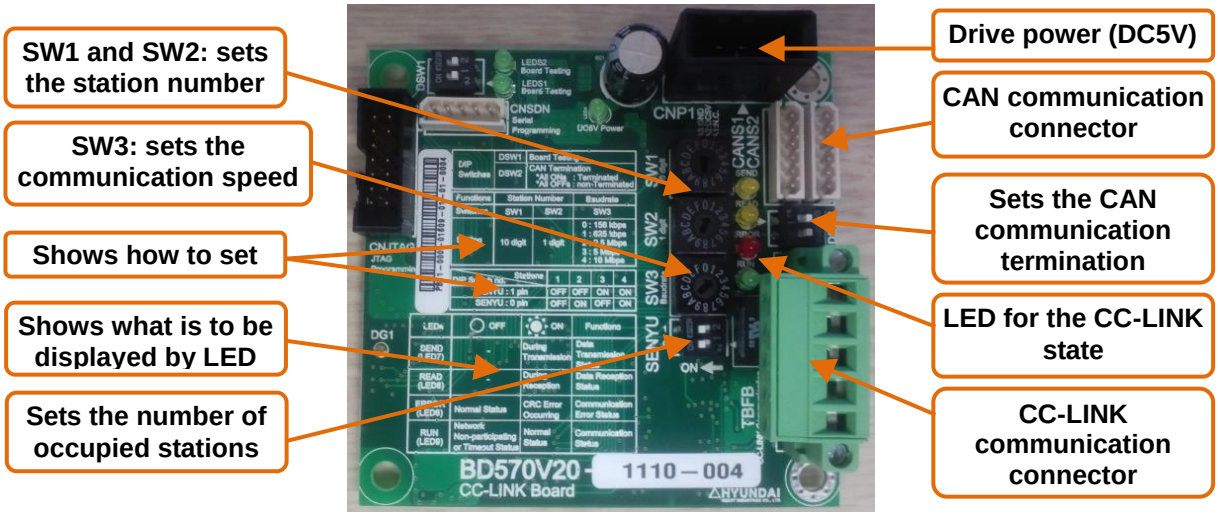
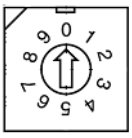
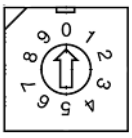
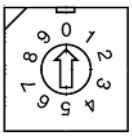


Figure 2.4 BD570V20 CC-Link module

The BD570V20 CC-Link fieldbus module has three rotary switches (SW1, SW2, and Sw3) to set the station number and the communication speed, and dip switches to set the number of occupied stations.
Table 2-4 shows the functions of individual switches for setting the station number and the communication speed.

Table 2-4 Switches for setting the station number and the communication speed of BD570V20

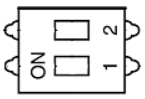
Switch name	Usage	Type	How to set	Setting when shipped
SW1	Station number (10 units)		Station number set = (SWZ1 setting value x 10) + SWZ2 setting value	"0"
SW2	Station number (1 unit)			"1"
SW3	Communication speed		0: 125 Kbps 1: 625 Kbps 2: 2.5 Mbps 3: 5.0 Mbps 4: 10 Mbps	"4"

The station number can be set within the range of "1–64".

It is possible to set the communication speed among the five levels of "0–4." Table 2-4 shows the speed for each number.

In addition, the SENYU dip switch can be used to adjust the number of stations.

Table 2-5 Setting the number of occupied stations of BD570V20

Switch name	Type	Switch number	How to set the occupied stations				Setting when shipped
			1	2	3	4	
SENYU		2 (SENYU1)	OFF	OFF	ON	ON	ON
		1 (SENYU0)	OFF	ON	OFF	ON	ON

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

2.3. BD58A LDIO Board CC-Link Setting and Connector

2.3.1. Setting of BD58AV10 and BD58AV20, and the connectors

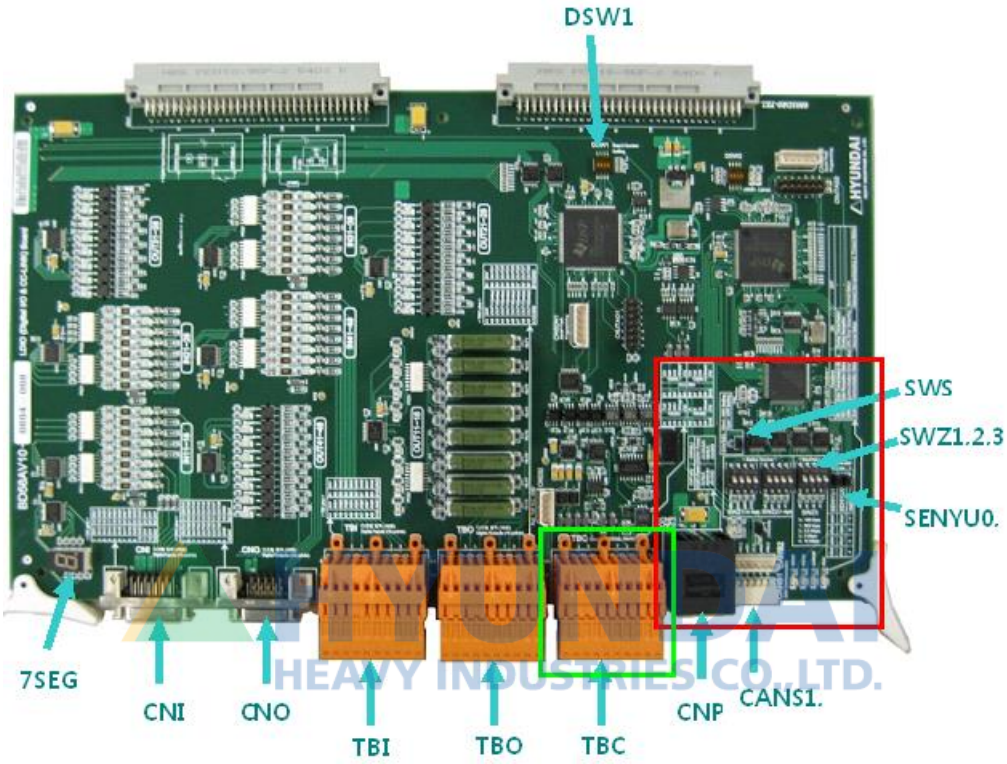


Figure 2.5 LDIO board (BD58AV10, BD58AV20)

As the exclusive board for Hi5-C Controller used for LCD production, BD58A LDIO board has the DIO board and CC-Link slave function and is installed on the track to ensure internal space of the controller.

Set by applying the same method that is used for BD570V10.

Table 2-6 Setting the station number and the communication speed for BD58AV10 and BD58AV20

Switch name	Switch number	Explanation	Remarks
SW1	1	Setting the station number (10 unit input): × 80	1~64
	2	Setting the station number (10 unit input): × 40	
	3	Setting the station number (10 unit input): × 20	
	4	Setting the station number (10 unit input): × 10	
SW2	1	Setting the station number (1 unit input): × 8	
	2	Setting the station number (1 unit input): × 4	
	3	Setting the station number (1 unit input): × 2	
	4	Setting the station number (1 unit input): × 1	
SW3	1	Setting the baudrate: × 8	0(0000)=156Kbps 1(0001)=625Kbps 2(0010)=2.5Mbps 3(0011)=5Mbps
	2	Setting the baudrate: × 4	
	3	Setting the baudrate: × 2	
	4	Setting the baudrate: × 1	

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 2-7 Setting the number of occupied stations of BD58AV10 and BD58AV20

SENYU0	SENYU1	Number of stations
Open	**Open**	1
Short	**Open**	2
Open	**Short**	3
Short	**Short**	4

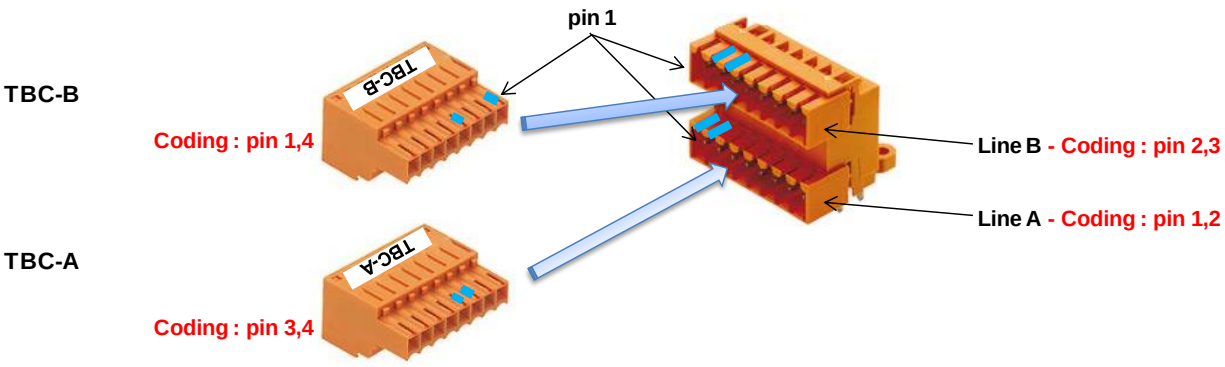


Figure 2.6 Terminal Block TBC for Serial Communication on LDIO Board (BD58A)

The purpose of TBC-A is for RS232 and RS485 communication, and TBC-B is the terminal block for CC-Link communication. Refer to [Table 2-8].

Table 2-8 Terminal Configuration of LDIO Board (BD58A) Terminal Block TBC

Terminal block name	Terminal number	Signal name	Function description
TBC - B	1	DA	CC-LINK DA line
	2	DB	CC-LINK DB line
	3	DG	CC-LINK ground
	4	Shield3	CC-LINK cable shield
	5	FG3	CC-LINK cable ground
	6	DA	CC-LINK DA line
	7	DB	CC-LINK DB line
	8	DG	CC-LINK ground
	9	Shield3	CC-LINK cable shield
	10	FG3	CC-LINK cable ground

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

2.3.2. Setting of BD58AV21 and the connectors

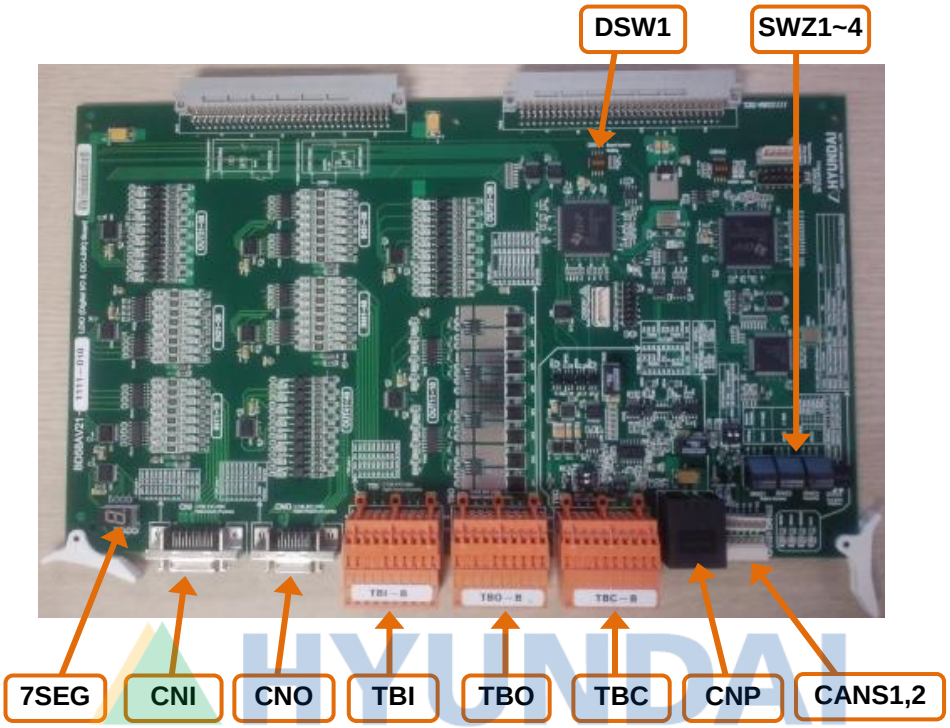


Figure 2.7 LDIO board (BD58A21)

Set by applying the same method that is used for BD570V20.

Table 2-9 BD58AV21 Setting the station number and the communication speed for BD58AV21

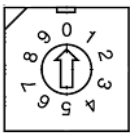
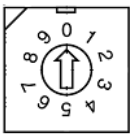
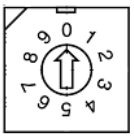
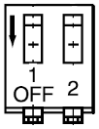
Switch name	Usage	Type	How to set	Setting when shipped
SW1	Station number (10 units)		Station number set = (SWZ1 setting value x 10) + SWZ2 setting value	“0”
SW2	Station number (1 unit)			“1”
SW3	Communication speed		0 : 125 kbps 1 : 625 kbps 2 : 2.5 Mbps 3 : 5.0 Mbps 4 : 10 Mbps	“4”

Table 2-10 Setting the number of occupied stations of BD58AV2

Switch name	Type	Switch number	How to set the number of occupied stations				Setting when shipped
			1	2	3	4	
SWZ4		1 (SENYU0)	OFF	ON	OFF	ON	ON
		2 (SENYU1)	OFF	OFF	ON	ON	ON

TBC-A is for the RS232 and RS485 communication, while TBC-B is a terminal block for the CC-Link communication. Connect the CC-Link communication cables as shown in the following table.

Table 2-11 Terminal configuration of the LD10 board (BD58A) terminal block TBC

Terminal block name	Terminal number	Signal name	Explanation of functions
TBC - B	1	DA	CC-LINK DA line
	2	DB	CC-LINK DA line
	3	DG	CC-LINK ground
	4	Shield3	CC-LINK cable shield
	5	FG3	CC-LINK cable ground
	6	DA	CC-LINK DA line
	7	DB	CC-LINK DB line
	8	DG	CC-LINK Ground
	9	Shield3	CC-LINK cable shield
	10	FG3	CC-LINK cable ground

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

3 Information and Setting

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

3.1. Basic Information and Setting

Select 『[F2]: System』 → 『2: Control parameter』 → 『2: Input/Output Signal Setting』 → 『11: BD57x fieldbus(CC-Link) information』

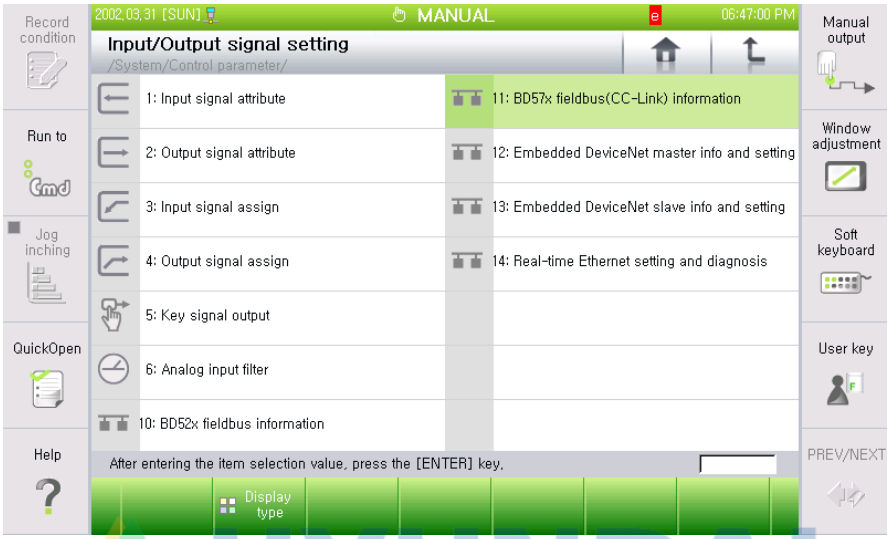


Figure 3.1 I/O Signal Setting Menu

When the operating condition is displayed as “Normal”, it means that BD57x is normally installed. But if BD57x is displayed as “Uninstalled”, it means that there is an issue with the installation of BD57x. Please recheck the CAN connection and power connection etc.

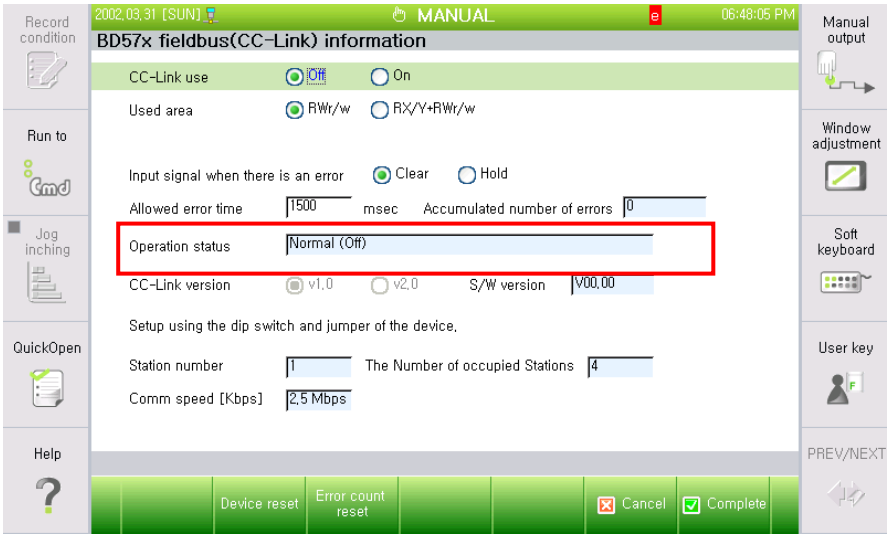


Figure 3.2 Fieldbus (CC-Link) Information and Setting

Station number, communication speed and number of stations are displayed in values set with the dip switch and jumper. Set whether to use only the RWr/w area or whether to mix the RX/Y and RWr/w area. When you set to RX/Y+RWr/w, the system signal setting is displayed so that you can set to use even the system area among the RX/Y areas to use as common I/O usage.
For meaning of used area and system signal setting, refer to [3.3].

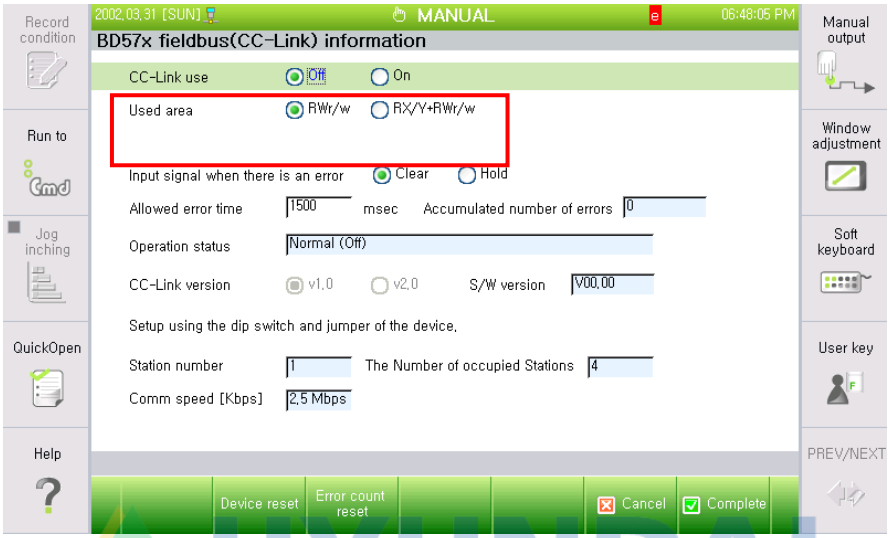


Figure 3.3 System Signal Setting

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

If the "Clear" condition is set to be applied to a case in which an error occurs, every FB5.X signal will be reset as "0" when an error occurs to the CC-Link communication. On the other hand, if the "Hold" condition is set, every input signal will maintain the last enabled value when an error occurs to the CC-Link communication.

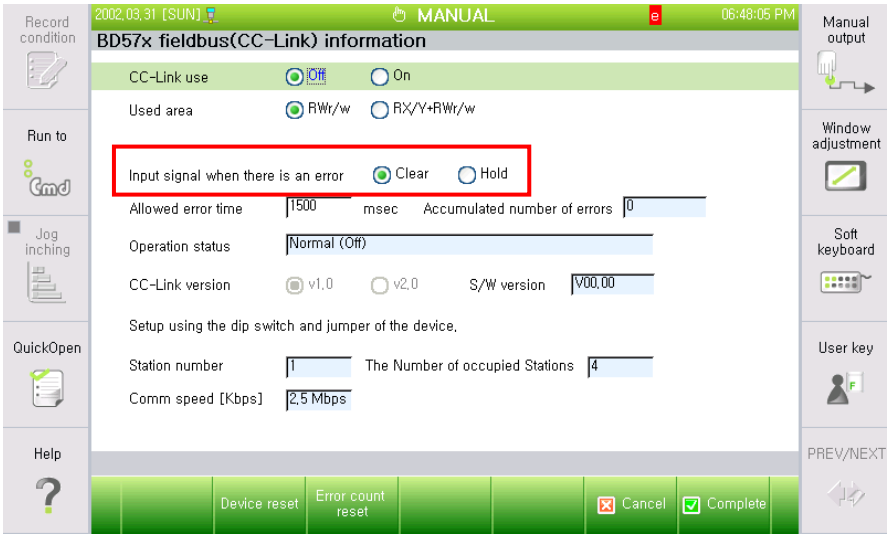


Figure 3.4 Setting of system signals

During the allowable error time, as long as the CC-Link communication error does not continue even when an error occurs to the CC-Link communication error, the “W0011 Fieldbus network connection error” warning will not be generated and there will be no fieldbus error.

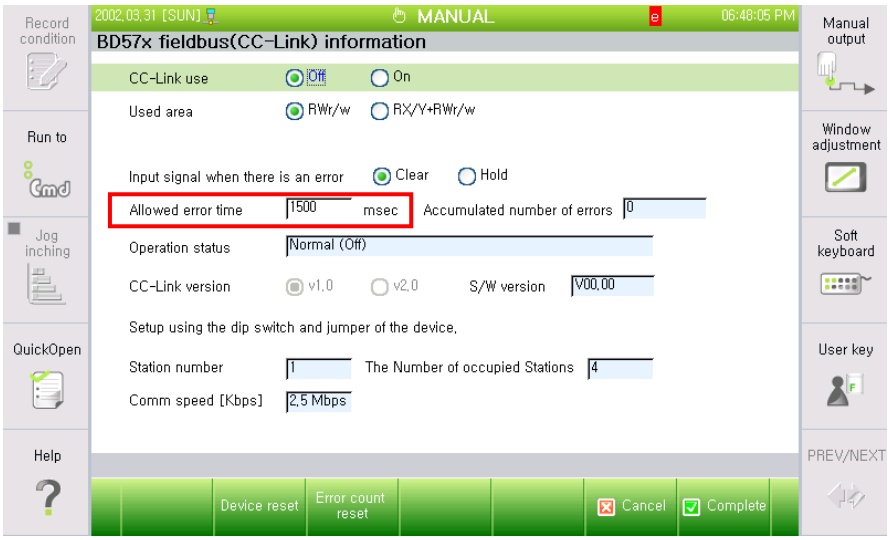


Figure 3.5 Setting of the allowable error time

The software of BD570 or BD58A supports both the CC-Link V1.0 and V2.0. It is possible to select the CC-Link version as desired.

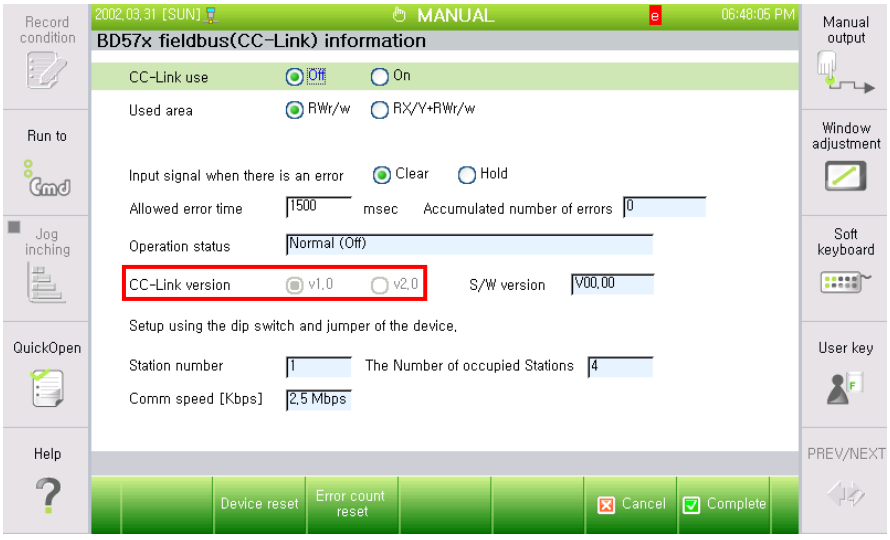


Figure 3.6 Setting of the CC-Link version

In CC-Link V2.0, expanded cyclic can be set to either 4 times or to 2 times.

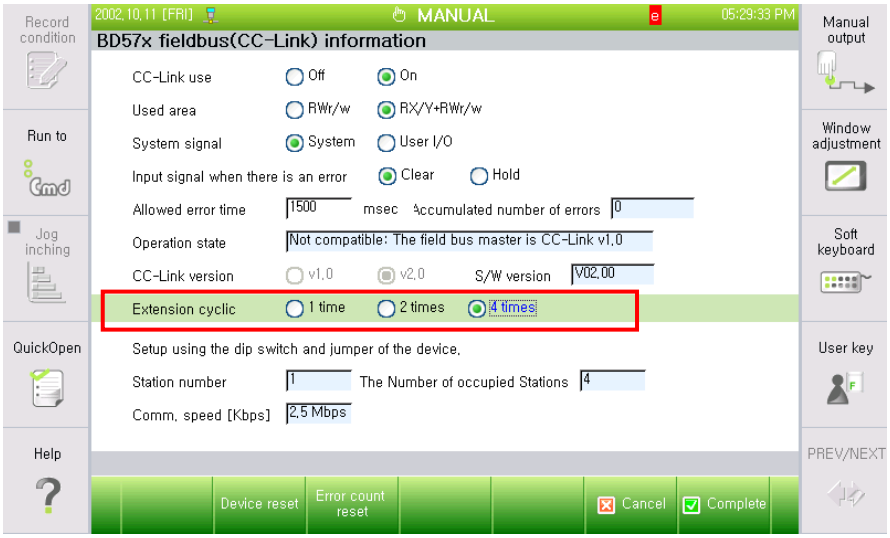


Figure 3.7 CC-Link V2.0 Expanded Cyclic Setting

Set the usage to On, and click on 『[F7]: Complete』 to save the Fieldbus setting to the “ROBOT.FBU” file and complete the setting.

If the BD57x Fieldbus module is not installed/used, set the Usage to “Off”. If the Fieldbus module is set to “On” and not installed, Fieldbus error warning message will be generated continuously.

3.2. Usable I/O Area (CC-Link V1.0)

Table 3-1, Table 3-2, Table 3-3, and Table 3-4 show information related to the usable I/O area and its corresponding Hi5 area, according to the number of occupied stations to be set, when CC-Link V1.0 is used for BD570 or BD58A. Bolded part in the table indicates the usable area.

Table 3-1 Usable I/O area of the CC-Link (CC-Link V1.0 and one station is occupied)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y00-1F	-	**RX/Y00-1F**	**FB5.X/YB1~4**
RX/Y20-3F	-	RX/Y20-3F	FB5.X/YB5~8
RX/Y40-5F	-	RX/Y40-5F	FB5.X/YB9~12
RX/Y60-7F	-	RX/Y60-7F	FB5.X/YB13~16
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB21~24**
RWr/w4-5	FB5.X/YB9~12	RWr/w4-5	FB5.X/YB25~28
RWr/w6-7	FB5.X/YB13~16	RWr/w6-7	FB5.X/YB29~32
RWr/w8-9	FB5.X/YB17~20	RWr/w8-9	-
RWr/w10-11	FB5.X/YB21~24	RWr/w10-11	-
RWr/w12-13	FB5.X/YB25~28	RWr/w12-13	-
RWr/w14-15	FB5.X/YB29~32	RWr/w14-15	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-2 Usable I/O area of the CC-Link (CC-Link V1.0 and two stations are occupied)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y00-1F	-	**RX/Y00-1F**	**FB5.X/YB1~4**
RX/Y20-3F	-	**RX/Y20-3F**	**FB5.X/YB5~8**
RX/Y40-5F	-	RX/Y40-5F	FB5.X/YB9~12
RX/Y60-7F	-	RX/Y60-7F	FB5.X/YB13~16
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB21~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
RWr/w8-9	FB5.X/YB17~20	RWr/w8-9	-
RWr/w10-11	FB5.X/YB21~24	RWr/w10-11	-
RWr/w12-13	FB5.X/YB25~28	RWr/w12-13	-
RWr/w14-15	FB5.X/YB29~32	RWr/w14-15	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-3 Usable I/O area of the CC-Link (CC-Link V1.0 and three stations are occupied)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y00-1F	-	**RX/Y00-1F**	**FB5.X/YB1~4**
RX/Y20-3F	-	**RX/Y20-3F**	**FB5.X/YB5~8**
RX/Y40-5F	-	**RX/Y40-5F**	**FB5.X/YB9~12**
RX/Y60-7F	-	RX/Y60-7F	FB5.X/YB13~16
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB21~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
RWr/w8-9	**FB5.X/YB17~20**	RWr/w8-9	-
RWr/w10-11	**FB5.X/YB21~24**	RWr/w10-11	-
RWr/w12-13	FB5.X/YB25~28	RWr/w12-13	-
RWr/w14-15	FB5.X/YB29~32	RWr/w14-15	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-4 Usable I/O area of the CC-Link (CC-Link V1.0 and four stations are occupied)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y00-1F	-	**RX/Y00-1F**	**FB5.X/YB1~4**
RX/Y20-3F	-	**RX/Y20-3F**	**FB5.X/YB5~8**
RX/Y40-5F	-	**RX/Y40-5F**	**FB5.X/YB9~12**
RX/Y60-7F	-	**RX/Y60-7F**	**FB5.X/YB13~16**
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB21~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
RWr/w8-9	**FB5.X/YB17~20**	RWr/w8-9	-
RWr/w10-11	**FB5.X/YB21~24**	RWr/w10-11	-
RWr/w12-13	**FB5.X/YB25~28**	RWr/w12-13	-
RWr/w14-15	**FB5.X/YB29~32**	RWr/w14-15	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

3.3. Usable I/O area (CC-Link V2.0, 2 Times)

When BD570 and BD58A are used because of CC-Link V2.0 expansion by the two-time set, I/O ranges and corresponding Hi5 ranges available for use are as seen in [Table 3-5], [Table 3-6], [Table 3-7] and Table [3-8], subject to the number of stations set. Available ranges are indicated in bold in the tables.

Table 3-5 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by Two-Time Cyclic, One station)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
-	-	**RX/Y0-1F**	**FB5.X/YB1~4**
-	-	**-**	FB5.X/YB5~8
-	-	-	FB5.X/YB9~12
-	-	-	FB5.X/YB13~16
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB25~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
-	FB5.X/YB17~20	-	FB5.X/YB33~36
-	FB5.X/YB25~24	-	FB5.X/YB37~40
-	FB5.X/YB25~28	-	FB5.X/YB41~44
-	FB5.X/YB29~32	-	FB5.X/YB45~48
-	FB5.X/YB33~36	-	FB5.X/YB49~52
-	FB5.X/YB37~40	-	FB5.X/YB53~56
-	FB5.X/YB41~44	-	FB5.X/YB57~60
-	FB5.X/YB45~48	-	FB5.X/YB61~64
-	FB5.X/YB49~52	-	FB5.X/YB65~68
-	FB5.X/YB53~56	-	FB5.X/YB69~72
-	FB5.X/YB57~60	-	FB5.X/YB73~76
-	FB5.X/YB61~64	-	FB5.X/YB77~80
-	FB5.X/YB65~68	-	**-**
-	FB5.X/YB69~72	-	-
-	FB5.X/YB73~76	-	**-**
-	FB5.X/YB77~80	-	**-**

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-6 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by Two-Time Cyclic, Two stations)

RWr/RWw mode		RX/RY+RWr/RWw mode	
-	-	**RX/Y00-1F**	**FB5.X/YB1~4**
-	-	**RX/Y20-3F**	**FB5.X/YB5~8**
-	-	**RX/Y40-5F**	**FB5.X/YB9~12**
-	-	-	FB5.X/YB13~16
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB25~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
RWr/w8-9	**FB5.X/YB17~20**	**RWr/w8-9**	**FB5.X/YB33~36**
RWr/w10-11	**FB5.X/YB25~24**	**RWr/w10-11**	**FB5.X/YB37~40**
RWr/w12-13	**FB5.X/YB25~28**	**RWr/w12-13**	**FB5.X/YB41~44**
RWr/w14-15	**FB5.X/YB29~32**	**RWr/w14-15**	**FB5.X/YB45~48**
-	FB5.X/YB33~36	-	FB5.X/YB49~52
-	FB5.X/YB37~40	-	FB5.X/YB53~56
-	FB5.X/YB41~44	-	FB5.X/YB57~60
-	FB5.X/YB45~48	-	FB5.X/YB61~64
-	FB5.X/YB49~52	-	FB5.X/YB65~68
-	FB5.X/YB53~56	-	FB5.X/YB69~72
-	FB5.X/YB57~60	-	FB5.X/YB73~76
-	FB5.X/YB61~64	-	FB5.X/YB77~80
-	FB5.X/YB65~68	**-**	**-**
-	FB5.X/YB69~72	-	-
-	FB5.X/YB73~76	**-**	**-**
-	FB5.X/YB77~80	**-**	**-**

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-7 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by Two-Time Cyclic, Three stations)

RWr/RWw mode		RX/RY+RWr/RWw mode	
-	-	**RX/Y0-1F**	**FB5.X/YB1~4**
-	-	**RX/Y20-3F**	**FB5.X/YB5~8**
-	-	**RX/Y40-5F**	**FB5.X/YB9~12**
-	-	**RX/Y60-7F**	**FB5.X/YB13~16**
RWr/w0-1	**FB5.X/YB1~4**	**RWr/w0-1**	**FB5.X/YB17~20**
RWr/w2-3	**FB5.X/YB5~8**	**RWr/w2-3**	**FB5.X/YB25~24**
RWr/w4-5	**FB5.X/YB9~12**	**RWr/w4-5**	**FB5.X/YB25~28**
RWr/w6-7	**FB5.X/YB13~16**	**RWr/w6-7**	**FB5.X/YB29~32**
RWr/w8-9	**FB5.X/YB17~20**	**RWr/w8-9**	**FB5.X/YB33~36**
RWr/w10-11	**FB5.X/YB25~24**	**RWr/w10-11**	**FB5.X/YB37~40**
RWr/w12-13	**FB5.X/YB25~28**	**RWr/w12-13**	**FB5.X/YB41~44**
RWr/w14-15	**FB5.X/YB29~32**	**RWr/w14-15**	**FB5.X/YB45~48**
RWr/w16-17	**FB5.X/YB33~36**	**RWr/w16-17**	**FB5.X/YB49~52**
RWr/w18-19	**FB5.X/YB37~40**	**RWr/w18-19**	**FB5.X/YB53~56**
RWr/w20-21	**FB5.X/YB41~44**	**RWr/w20-21**	**FB5.X/YB57~60**
RWr/w22-23	**FB5.X/YB45~48**	**RWr/w22-23**	**FB5.X/YB61~64**
-	FB5.X/YB49~52	-	FB5.X/YB65~68
-	FB5.X/YB53~56	-	FB5.X/YB69~72
-	FB5.X/YB57~60	-	FB5.X/YB73~76
-	FB5.X/YB61~64	-	FB5.X/YB77~80
-	FB5.X/YB65~68	**-**	**-**
-	FB5.X/YB69~72	-	-
-	FB5.X/YB73~76	**-**	**-**
-	FB5.X/YB77~80	**-**	**-**

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-8 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by Two-Time Cyclic, Four stations)

RWr/RWw mode		RX/RY+RWr/RWw mode	
-	-	RX/Y0-1F	FB5.X/YB1~4
-	-	RX/Y20-3F	FB5.X/YB5~8
-	-	RX/Y40-5F	FB5.X/YB9~12
-	-	RX/Y60-7F	FB5.X/YB13~16
RWr/w0-1	FB5.X/YB1~4	RWr/w0-1	FB5.X/YB17~20
RWr/w2-3	FB5.X/YB5~8	RWr/w2-3	FB5.X/YB25~24
RWr/w4-5	FB5.X/YB9~12	RWr/w4-5	FB5.X/YB25~28
RWr/w6-7	FB5.X/YB13~16	RWr/w6-7	FB5.X/YB29~32
RWr/w8-9	FB5.X/YB17~20	RWr/w8-9	FB5.X/YB33~36
RWr/w10-11	FB5.X/YB25~24	RWr/w10-11	FB5.X/YB37~40
RWr/w12-13	FB5.X/YB25~28	RWr/w12-13	FB5.X/YB41~44
RWr/w14-15	FB5.X/YB29~32	RWr/w14-15	FB5.X/YB45~48
RWr/w16-17	FB5.X/YB33~36	RWr/w16-17	FB5.X/YB49~52
RWr/w18-19	FB5.X/YB37~40	RWr/w18-19	FB5.X/YB53~56
RWr/w20-21	FB5.X/YB41~44	RWr/w20-21	FB5.X/YB57~60
RWr/w22-23	FB5.X/YB45~48	RWr/w22-23	FB5.X/YB61~64
RWr/w24-25	FB5.X/YB49~52	RWr/w24-25	FB5.X/YB65~68
RWr/w26-27	FB5.X/YB53~56	RWr/w26-27	FB5.X/YB69~72
RWr/w28-29	FB5.X/YB57~60	RWr/w28-29	FB5.X/YB73~76
RWr/w30-31	FB5.X/YB61~64	RWr/w30-31	FB5.X/YB77~80
-	FB5.X/YB65~68	-	-
-	FB5.X/YB69~72	-	-
-	FB5.X/YB73~76	-	-
-	FB5.X/YB77~80	-	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

3.4. Usable I/O Area (CC-Link V2.0, 4 Times)

When BD570 and BD58A are used due to CC-Link V2.0 expansion by four-time set, I/O ranges and corresponding Hi5 ranges available for use are as seen in [Table 3-9], [Table 3-10], [Table 3-11], and Table [3-12], subject to the number of stations set. Available ranges are indicated in bold in the tables.

Table 3-9 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by four-time cyclic, one station)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y0-3F	-	**RX/Y0-3F**	**FB5.X/YB1~8**
-	-	**-**	FB5.X/YB9~16
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
RWr/w0-3	**FB5.X/YB1~8**	**RWr/w0-3**	**FB5.X/YB17~24**
RWr/w4-7	**FB5.X/YB9~16**	**RWr/w4-7**	**FB5.X/YB25~32**
RWr/w8-11	**FB5.X/YB17~24**	**RWr/w8-11**	**FB5.X/YB33~40**
RWr/w12-15	**FB5.X/YB25~32**	**RWr/w12-15**	**FB5.X/YB41~48**
-	FB5.X/YB33~40	-	FB5.X/YB49~56
-	FB5.X/YB41~48	-	FB5.X/YB57~64
-	FB5.X/YB49~56	-	FB5.X/YB65~72
-	FB5.X/YB57~64	-	FB5.X/YB73~80
-	FB5.X/YB65~72	-	FB5.X/YB81~88
-	FB5.X/YB73~80	-	FB5.X/YB89~96
-	FB5.X/YB81~88	-	FB5.X/YB97~104
-	FB5.X/YB89~96	-	FB5.X/YB105~112
-	FB5.X/YB97~104	-	FB5.X/YB113~120
-	FB5.X/YB105~112	-	-
-	FB5.X/YB113~120	-	-
-	**-**	-	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-10 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by four-time cyclic, two stations)

RWr/RWw mode		RX/RY+RWr/RWw mode	
RX/Y0-3F	-	**RX/Y0-3F**	**FB5.X/YB1~8**
RX/Y40-7F	-	**RX/Y40-7F**	**FB5.X/YB9~16**
RX/Y80-BF	-	RX/Y80-BF	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
RWr/w0-3	**FB5.X/YB1~8**	**RWr/w0-3**	**FB5.X/YB17~24**
RWr/w4-7	**FB5.X/YB9~16**	**RWr/w4-7**	**FB5.X/YB25~32**
RWr/w8-11	**FB5.X/YB17~24**	**RWr/w8-11**	**FB5.X/YB33~40**
RWr/w12-15	**FB5.X/YB25~32**	**RWr/w12-15**	**FB5.X/YB41~48**
RWr/w16-19	**FB5.X/YB33~40**	**RWr/w16-19**	**FB5.X/YB49~56**
RWr/w20-23	**FB5.X/YB41~48**	**RWr/w20-23**	**FB5.X/YB57~64**
RWr/w24-27	**FB5.X/YB49~56**	**RWr/w24-27**	**FB5.X/YB65~72**
RWr/w28-31	**FB5.X/YB57~64**	**RWr/w28-31**	**FB5.X/YB73~80**
-	FB5.X/YB65~72	-	FB5.X/YB81~88
-	FB5.X/YB73~80	-	FB5.X/YB89~96
-	FB5.X/YB81~88	-	FB5.X/YB97~104
-	FB5.X/YB89~96	-	FB5.X/YB105~112
-	FB5.X/YB97~104	-	FB5.X/YB113~120
-	FB5.X/YB105~112	-	-
-	FB5.X/YB113~120	-	-
-	**-**	-	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD

Table 3-11 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by four-time cyclic, three stations)

RWr/RWw mode		**RX/RY+RWr/RWw mode**	
RX/Y0-3F	-	**RX/Y0-3F**	**FB5.X/YB1~8**
RX/Y40-7F	-	**RX/Y40-7F**	**FB5.X/YB9~16**
RX/Y80-BF	-	RX/Y80-BF	-
RX/YC0-100	-	RX/YC0-100	-
RX/Y100-13F	-	RX/Y100-13F	-
-	-	-	-
-	-	-	-
-	-	-	-
RWr/w0-3	**FB5.X/YB1~8**	**RWr/w0-3**	**FB5.X/YB17~24**
RWr/w4-7	**FB5.X/YB9~16**	**RWr/w4-7**	**FB5.X/YB25~32**
RWr/w8-11	**FB5.X/YB17~24**	**RWr/w8-11**	**FB5.X/YB33~40**
RWr/w12-15	**FB5.X/YB25~32**	**RWr/w12-15**	**FB5.X/YB41~48**
RWr/w16-19	**FB5.X/YB33~40**	**RWr/w16-19**	**FB5.X/YB49~56**
RWr/w20-23	**FB5.X/YB41~48**	**RWr/w20-23**	**FB5.X/YB57~64**
RWr/w24-27	**FB5.X/YB49~56**	**RWr/w24-27**	**FB5.X/YB65~72**
RWr/w28-31	**FB5.X/YB57~64**	**RWr/w28-31**	**FB5.X/YB73~80**
RWr/w32-35	**FB5.X/YB65~72**	**RWr/w32-35**	**FB5.X/YB81~88**
RWr/w36-39	**FB5.X/YB73~80**	**RWr/w36-39**	**FB5.X/YB89~96**
RWr/w40-43	**FB5.X/YB81~88**	**RWr/w40-43**	**FB5.X/YB97~104**
RWr/w44-47	**FB5.X/YB89~96**	**RWr/w44-47**	**FB5.X/YB105~112**
-	FB5.X/YB97~104	-	FB5.X/YB113~120
-	FB5.X/YB105~112	-	-
-	FB5.X/YB113~120	-	-
-	**-**	-	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Table 3-12 Usable I/O area of the CC-Link (CC-Link V2.0, Expansion by four-time cyclic, four stations)

RWr/RWw mode		RX/RY+RWr/RWw mode	
RX/Y0-3F	-	**RX/Y0-3F**	**FB5.X/YB1~8**
RX/Y40-7F	-	**RX/Y40-7F**	**FB5.X/YB9~16**
RX/Y80-BF	-	RX/Y80-BF	-
RX/YC0-100	-	RX/YC0-100	-
RX/Y100-13F	-	RX/Y100-13F	-
RX/Y140-17F	-	RX/Y140-17F	-
RX/Y180-1BF	-	RX/Y180-1BF	-
-	-	-	-
RWr/w0-3	**FB5.X/YB1~8**	**RWr/w0-3**	**FB5.X/YB17~24**
RWr/w4-7	**FB5.X/YB9~16**	**RWr/w4-7**	**FB5.X/YB25~32**
RWr/w8-11	**FB5.X/YB17~24**	**RWr/w8-11**	**FB5.X/YB33~40**
RWr/w12-15	**FB5.X/YB25~32**	**RWr/w12-15**	**FB5.X/YB41~48**
RWr/w16-19	**FB5.X/YB33~40**	**RWr/w16-19**	**FB5.X/YB49~56**
RWr/w20-23	**FB5.X/YB41~48**	**RWr/w20-23**	**FB5.X/YB57~64**
RWr/w24-27	**FB5.X/YB49~56**	**RWr/w24-27**	**FB5.X/YB65~72**
RWr/w28-31	**FB5.X/YB57~64**	**RWr/w28-31**	**FB5.X/YB73~80**
RWr/w32-35	**FB5.X/YB65~72**	**RWr/w32-35**	**FB5.X/YB81~88**
RWr/w36-39	**FB5.X/YB73~80**	**RWr/w36-39**	**FB5.X/YB89~96**
RWr/w40-43	**FB5.X/YB81~88**	**RWr/w40-43**	**FB5.X/YB97~104**
RWr/w44-47	**FB5.X/YB89~96**	**RWr/w44-47**	**FB5.X/YB105~112**
RWr/w48-51	**FB5.X/YB97~104**	**RWr/w48-51**	**FB5.X/YB113~120**
RWr/w52-55	**FB5.X/YB105~112**	RWr/w52-55	-
RWr/w56-59	**FB5.X/YB113~120**	RWr/w56-59	-
RWr/w60-63	**-**	RWr/w60-63	-

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

3.5. System Area of CC-Link

When using RX/RY + RWr/RWw mode, you cannot use the last 2 bytes of the usable RX/RY area because they are the system areas.
Table3-13 shows the system area. Of the areas, “Reserved area” currently can be used but will be changed for different usage in the future version of the CC-Link protocol.
Please restrain from using the “Reserved area” as much as possible as it can cause malfunction due to lack of compatibility.

Table 3-13 System Area of CC-Link

Link input	Signal name	Link output	Signal name
RXn0	Reserved area	**RYn0**	Reserved area
RXn1		**RYn1**	
RXn2		**RYn2**	
RXn3		**RYn3**	
RXn4		**RYn4**	
RXn5		**RYn5**	
RXn6		**RYn6**	
RXn7		**RYn7**	
RXn8	Initial data processing request flag	**RYn8**	Initial processing complete flag
RXn9	Initial data setting complete flag	**RYn9**	Initial setting request flag
RXnA	Error status flag	**RYnA**	Error setting request flag
RXnB	Remote station ready	**RYnB**	Reserved area
RXnC	Reserved area	**RYnC**	
RXnD		**RYnD**	
RXnE	OS definition	**RYnE**	OS definition
RXnF		**RYnF**	

Number of stations	
1	n=1
2	n=3
3	n=5
4	n=7

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Because “RXn8~RXnB” and “RYn8~RYnA” use the self-handshake of CC-Link communication, common I/O cannot be used. If you have to use this area inevitably, you must stop the handshake operation of this area of the Hi5 Controller. For this set the system signal option as shown in [Figure 3.8].

But, please avoid this method as it does not satisfy the CC-Link standard.

If you are utilizing the handshake of RXn8~RXnB and RYn8~RYnA on the PLC side, you must set the system signal to “System”.

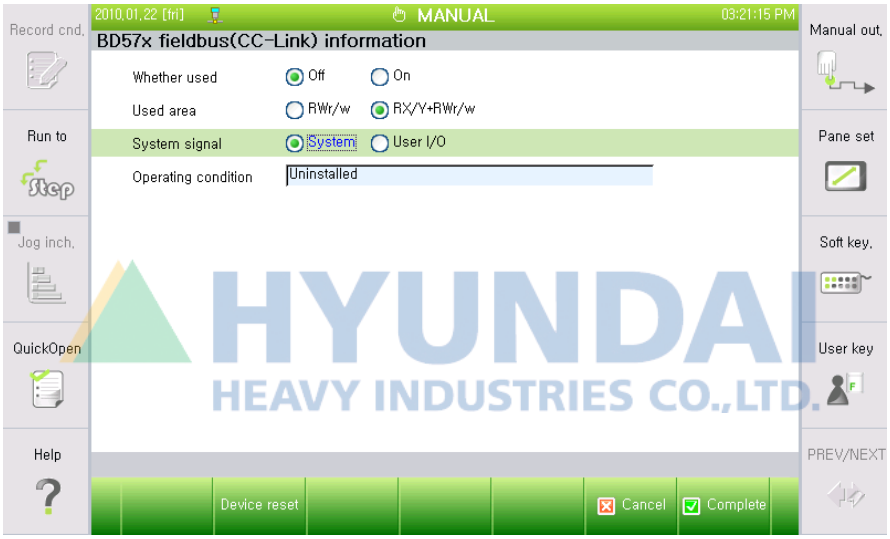


Figure 3.8 System Signal Setting

3.6. Input Signal Attribute

(1) Select 『[F2]: System』 → 『2: Control Parameter』 → 『2: Input/Output Signal Setting』 → 『1: Input Signal attribute』

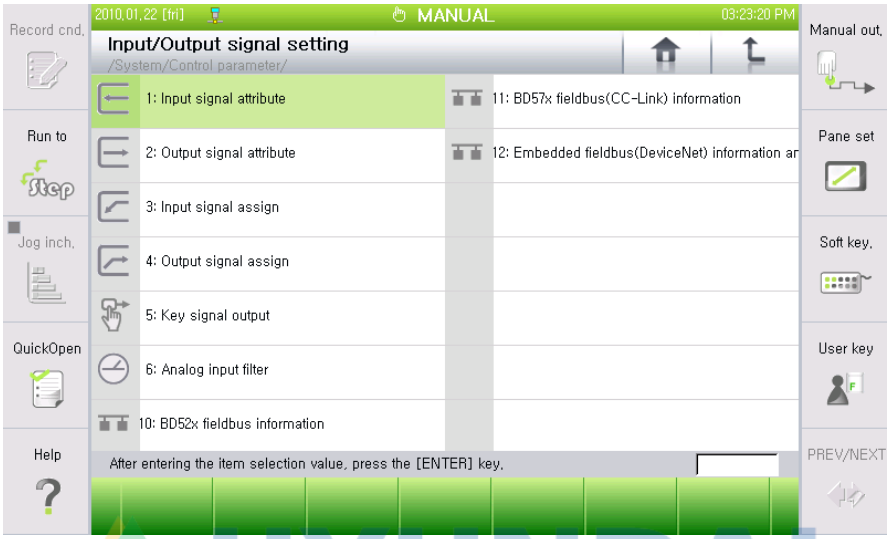


Figure 3.9 I/O Signal Setting Menu

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

(2) For example, if you want to set the negative logic for CC-Link Input #5, enter “5.12” in the empty block of the signal column. “5.12” will automatically be converted to “FB5.12”. After changing the logic of this item to Negative, click on the 『[F7]: Complete』 button to complete the setting.

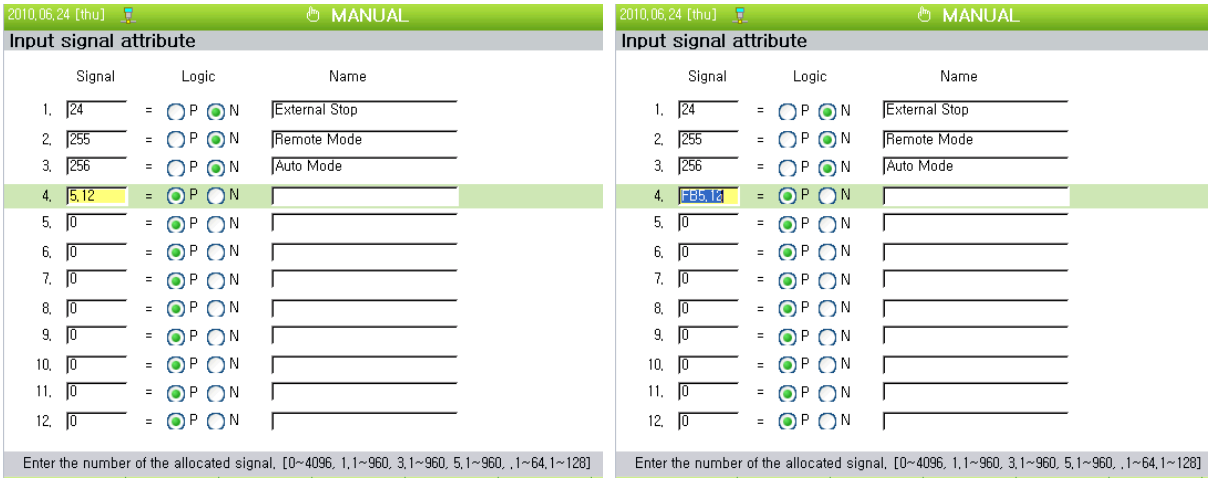


Figure 3.10 I/O Signal Attribute

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

(3) Setting of “0” refers to “Not Assigned” and “1~4096” refers to the “DI/DO (logical input/output)”. “1.n, 3.n” refers to 1 and 3 channel of BD52x Fieldbus, and “5.n” refers to BD57x CC-Link.

(4) You can set up to maximum of 24 items. To view the next page, click on the 『[F5]: Next』

3.7. Input Signal Assignment

(1) Select 『[F2]: System』 → 『2: Control Parameter』 → 『2: Input/Output Signal Setting』 → 『3: Input Signal Assign』

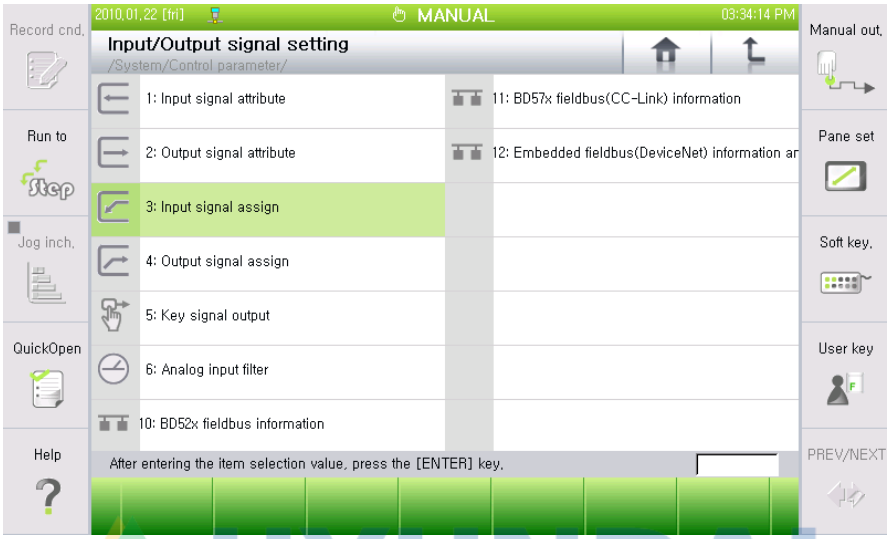


Figure 3.11 I/O Signal Setting Menu

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

(2) For example, if you want to receive the external Reset signal as #18 Input Signal of CC-Link, enter “5.18” in the edit box and press [ENTER]. “5.18”will automatically switch to “FB5.18”. Now, click on the 『[F7]: Complete』 button to complete the setting.

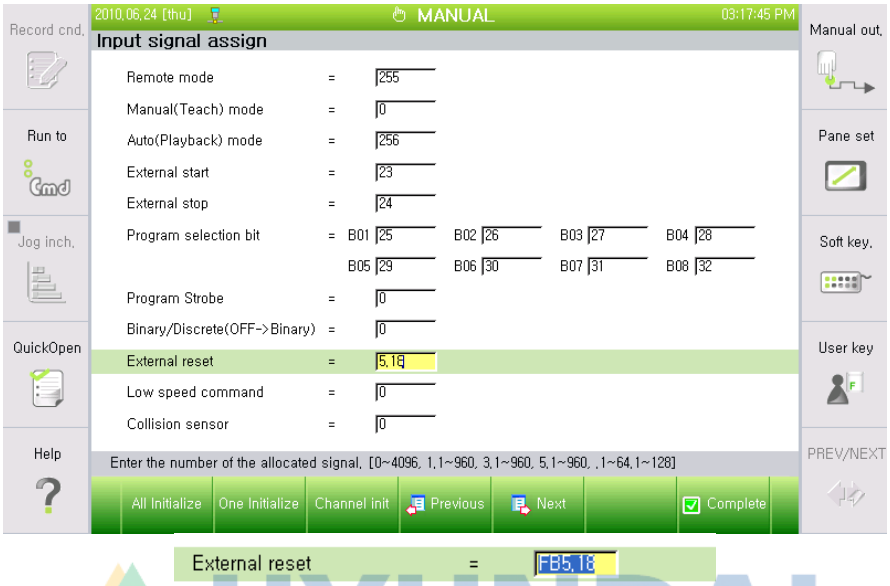


Figure 3.12 Input Signal Assignment

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

(3) Setting of “0” refers to “Not Assigned” and “1~4096” refers to the “DI/DO (logical input/output)”. “1.n, 3.n” refers to 1, 3 channel of BD52x Fieldbus and “5.n” refers to BD57x CC-Link.

(4) When you click on 『[F1]: All Initialize』 button, all the values of all the signals currently displayed on the screen, will be set to the default value (DI/DO (logical input/output)). When you click on the 『[F2]: One Initialize』 button, only one signal where the cursor is currently located will be reset to the default value (DI/DO (logical input/output)).

(5) When you click on the 『[F3]: Channel init』 button, the text message box of the selected channel number (FB1~FB5) will be displayed. Enter 5 and click on [ENTER] to automatically enter the CC-Link Input Signal for all the input signals.

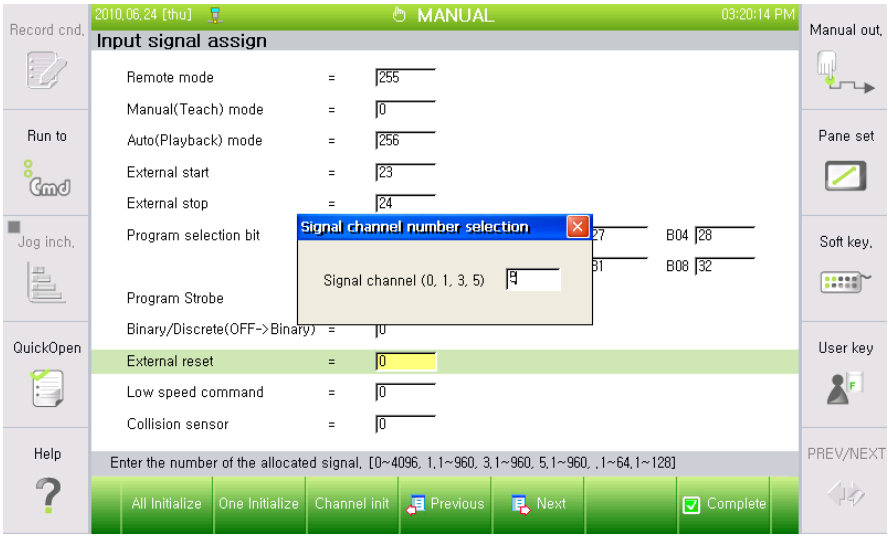


Figure 3.13 Signal Channel Number Selection

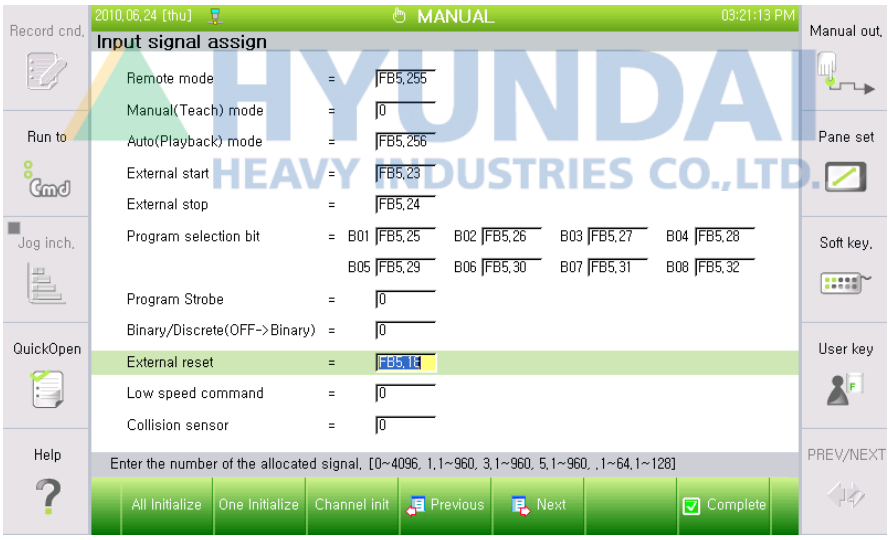


Figure 3.14 Result of Setting to Channel #5 (CC-Link)

3.8. Output Signal Attribute

(1) 『Select 『[F2]: System』 → 『2: Control Parameter』 → 『2: Input/Output Signal Setting』 → 『2: Output Signal Attribute』

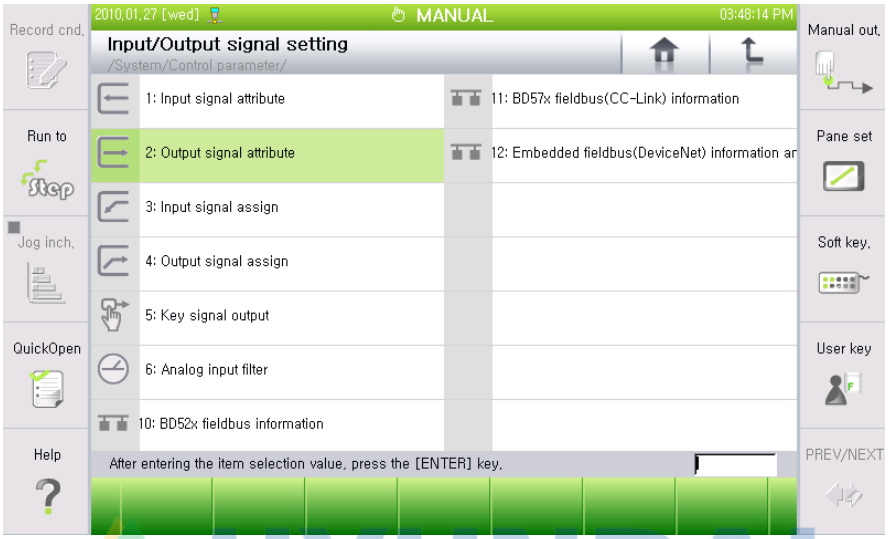


Figure 3.15 I/O Signal Setting Menu

(2) Setting method is the same as that of the Input Signal Attribute. Click on the 『[F7]: Complete』 button to complete the setting.

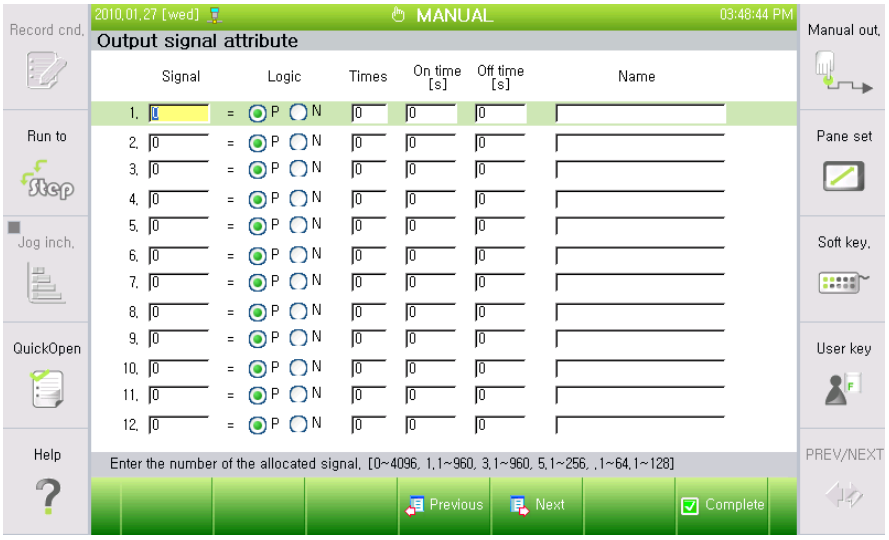


Figure 3.16 Output Signal Attribute

3.9. Output Signal Assignment

(1) Select 『[F2]: System』 → 『2: Control Parameter』 → 『2: Input/Output Signal Setting』 → 『4: Output Signal Assign』

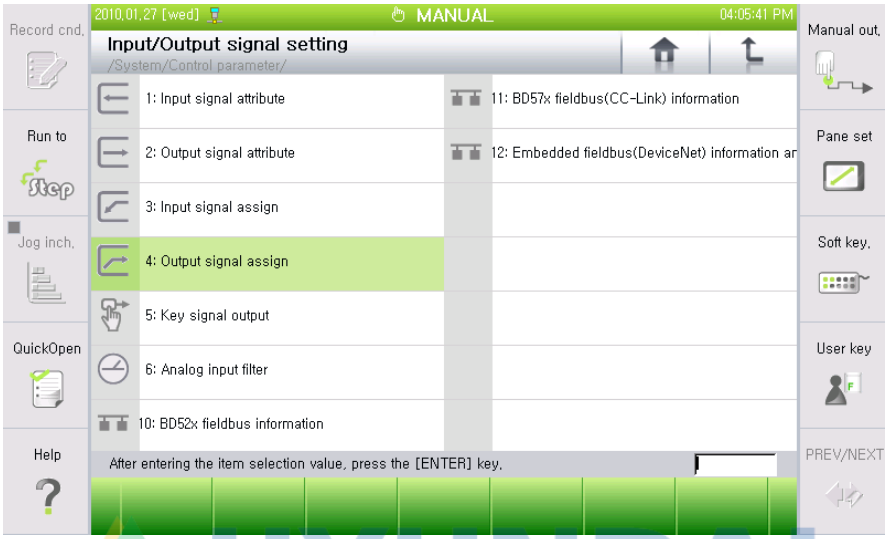


Figure 3.17 I/O Signal Setting Menu

(2) Setting method is the same as that of the Input Signal Assignment. Click on the 『[F7]: Complete』 button to complete the setting.

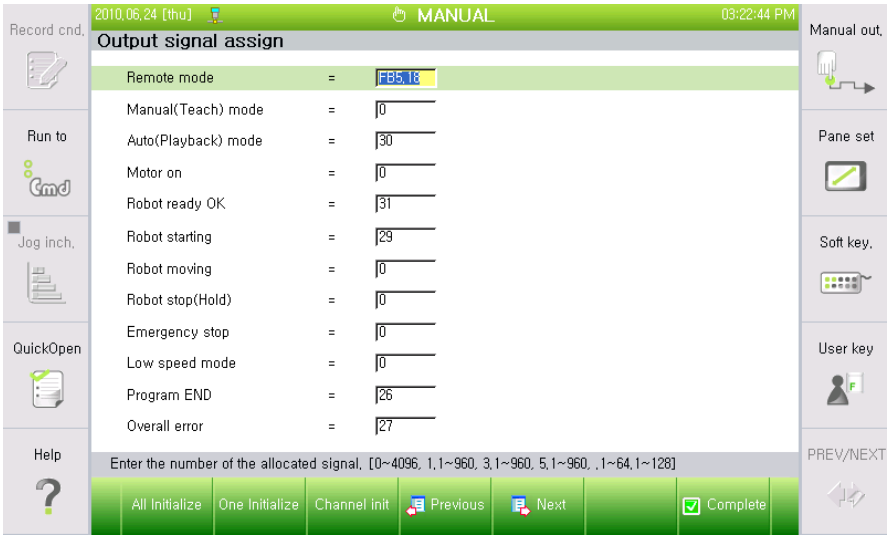


Figure 3.18 Output Signal Assignment

4

Status Check and Troubleshooting

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

4.1. Controller Side Error Message

[Table 4-1] shows the list of warning messages and troubleshooting methods that can be displayed on the teach pendant of the controller while using the Fieldbus.

Table 4-1 Warning Message and Troubleshooting Method on Controller Side

Warning message	Troubleshooting method
W0011 Fieldbus network connection error	Check whether the Fieldbus cable is correctly installed and whether there isn't any issue with the connection.
W0012 Fieldbus IDLE condition (PLC STOP)	Fieldbus function can only operate when the PLC with Fieldbus master installed is in Run Mode. Check this. Also please check if the communication speed is matched up with masters.
W0013 Fieldbus module is not detected.	Check whether the Bd57x CC-Link module is correctly connected and whether 5V of power is supplied.
W0014 Fieldbus setting error.	Check whether the dip switch of the Fieldbus module is correctly set up.
W0027 The field bus master setting is CC-Link v1.0	On CC-Link master, Hi5 Controller is incorrectly set as CC-Link v1.0 slave. Please set it as v2.0 slave.

Because the Hi5 Controller periodically retries for normal communication, the Fieldbus communication may automatically be reconnected once the issue is resolved. Turn off and on both of PLC and Controller, if the connection issue is not resolved after the change of setting.

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

4.2. CC-Link version discrepancy

The discrepancy between the version of the CC-Link supported by BD570 or BD58A of the Hi5 controller and the version of the CC-Link set for the CC-Link master of a controller of higher class, such as the process PLC or PC, means that communication will not take place normally.

Table 4-2 shows how to identify the discrepancy between the version of the CC-Link of the CC-Link master and the version of the CC-Link of the Hi5 controller.

Table 4-2 CC-Link version discrepancy

<table>
<tr><th colspan="2">CC-Link version</th><th colspan="2" rowspan="2">State</th><th rowspan="2">Remarks</th></tr>
<tr><th>Master</th><th>Hi5</th></tr>
<tr><td rowspan="3">V2.0</td><td rowspan="3">V1.0</td><td>Master</td><td>ERR LED turned on</td><td></td></tr>
<tr><td rowspan="2">Hi5</td><td>동작상태 정상
CC-Link 버전 v1.0 v2.0</td><td>Before resetting the master</td></tr>
<tr><td>동작상태 IDLE 상태 (PLC Stop)
CC-Link 버전 v1.0 v2.0</td><td>After resetting the master</td></tr>
<tr><td rowspan="2">V1.0</td><td rowspan="2">V2.0</td><td>Master</td><td>ERR LED turned off</td><td></td></tr>
<tr><td>Hi5</td><td>동작상태 비호환: 필드버스 마스터가 CC-Link v1.0
CC-Link 버전 v1.0 v2.0</td><td></td></tr>
</table>

※ The CC-Link communication state of the Hi5 controller can be checked by entering 『[F2]: System』 → 『2: Control parameter』 → 『2: Input/Output signal setting』 → 『11: BD57x fieldbus(CC-Link) information』.

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

4.3. Fieldbus Module Status Check (CC-Link)

CC-Link Fieldbus module has 4 LEDs installed

Table 4-3 Operating Status by CC-Link Fieldbus Module LED (○ : ON ● : OFF ◉ : Flash)

RUN	ERR	SD	RD	Operating status
○	◉	◉	○	Normal communication, but CRC error is frequently detected due to noise.
○	◉ 0.4s	◉	○	Station number or speed setting has changed when reset.
○	◉	●	○	No response due to CRC error in receiving data.
○	●	◉	○	Normal communication
○	●	●	○	No host data.
○	◉	◉	○	Responding to falling signal, but CRC error in refreshed reception
●	◉	●	○	CRC error in host data
●	●	◉	○	Link start not executed.
●	●	●	○	No host data or cannot be received due to noise
●	●	●	●	Cannot be received due to disconnection etc... Power turned Off or H/W setting
●	○	●	○,●	Speed or station number setting error

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

5 Network Configuration

HYUNDAI
HEAVY INDUSTRIES CO.,LTD

5.1. Introduction

This document describes an example of how to configure the CC-Link communication with the Hi5 Controller based on the Q Series PLC of Mitsubishi.
To install or make changes to the setting or monitor the CC-Link network, you must connect the PLC to the PC with the GX Developer software installed as shown in [Figure 5.1].

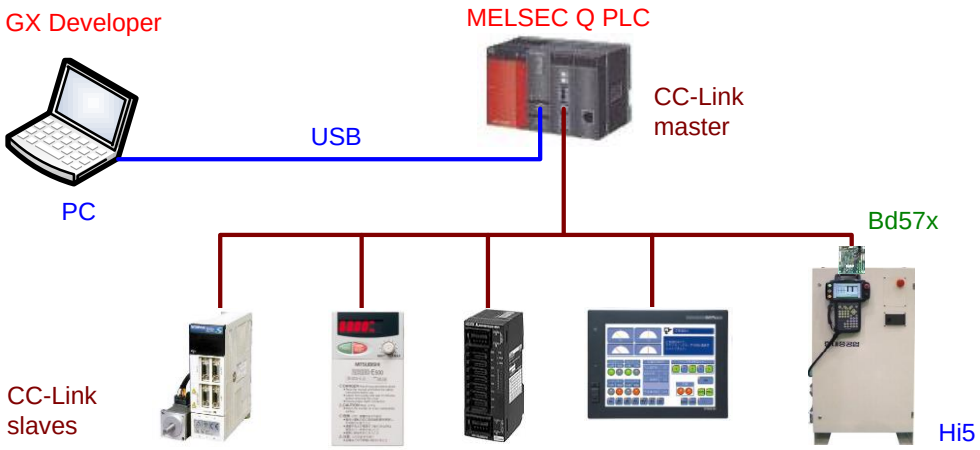


Figure 5.1 CC- Link Setting and Monitoring Configuration

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

This document only describes the overall network installation and setting procedure. For more detail on how to use the PLC device and GX Developer software, refer to the manual provided by Mitsubishi.

5.2. Examples of GX developer setting (CC-Link V2.0)

(1) When you double click on the 『Network param』 item from the GX Developer project, the 『Network parameter』 message box will be displayed. Here, click on the 『CC-Link』 button.

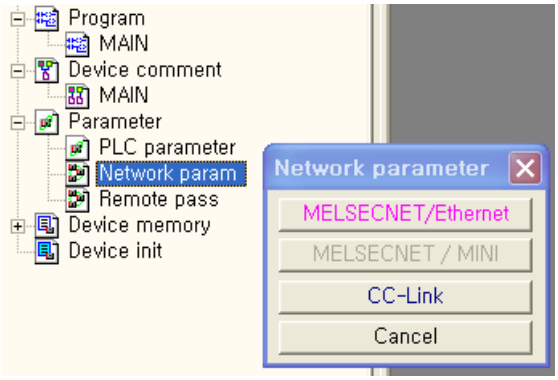


Figure 5.2 Network Parameter Message Box

(2) Example with 1 master module installation on the PLC is displayed in [Figure 5.3]. According to the Figure 5.4, please set the Mode as Remote net (Ver.2 mode) and set the number of slave for all connect count. Then set a relay start which will map RX, RY, RWr, or RWw.

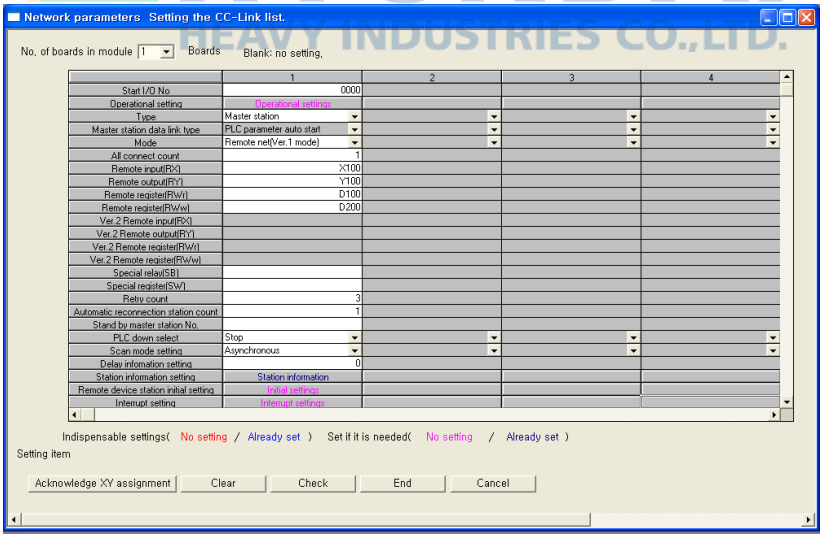


Figure 5.3 CC-Link Network Parameter Setting

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

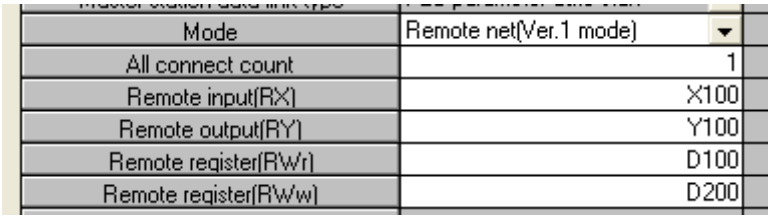


Figure 5.4 Mode and Relay Start Point Setting

(3) Click on “Station information”.

Figure 5.5 Station information

(4) For the station that corresponds to Hi5 Controller, “Station type” needs to be set to 『Ver. 2 Remote device station』and “Expanded cyclic setting” needs to be set to 『quadruple』. Also please set the 『Exclusive station count』to matches with the station quantity setting of BD57x.

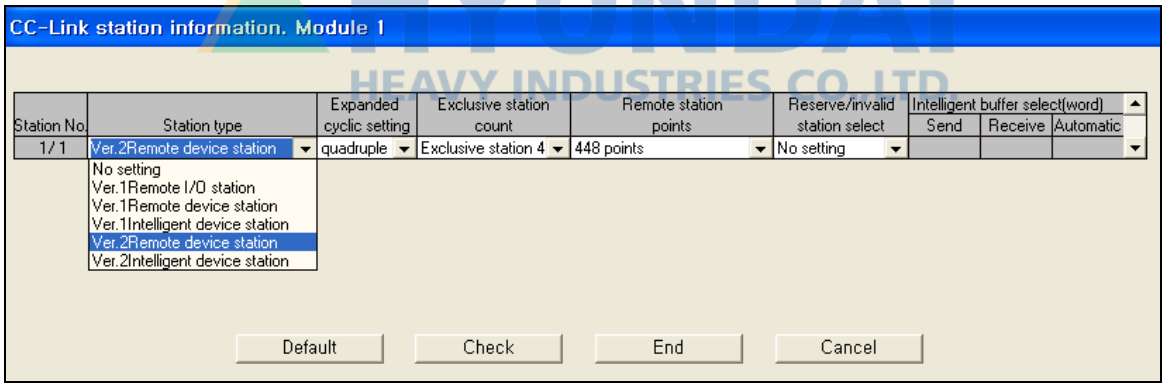


Figure 5.6 CC-Link Station information

(5) Select the menu item of 『Online - Write to PLC』. When you check the 『PLC/Network/ Remote password』 item and click on the 『Execute』 button, the setting will be saved to the PLC.

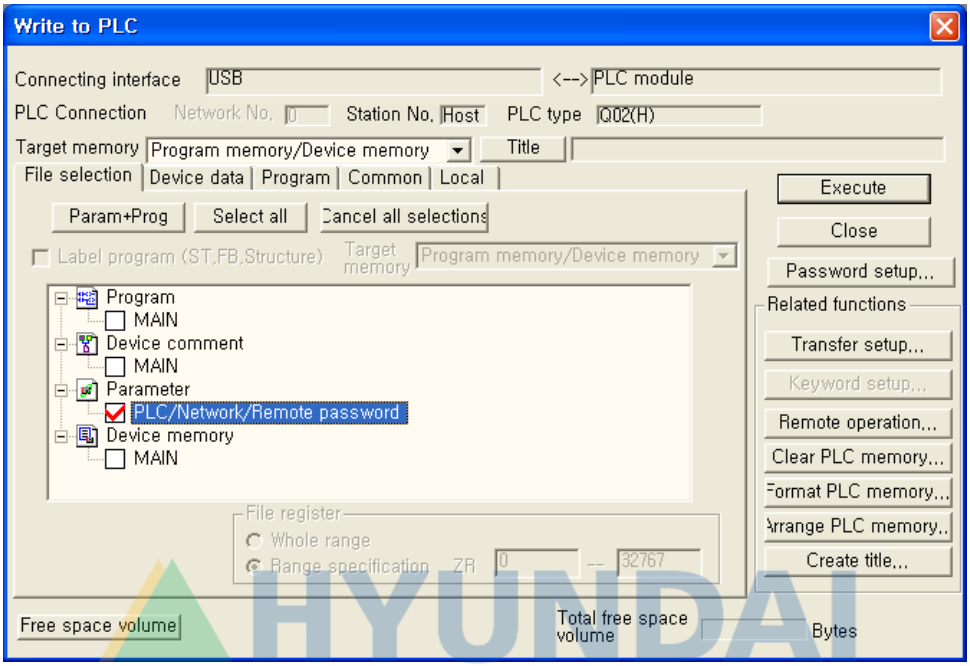


Figure 5.7 Write to PLC Message Box

5.3. Complete

This completes the preparation. CC-Link master device manages the overall CC-Link network with the power supplied and sends/receives information with the remote station devices within the network, including the Hi5 Controller.
Now, you will not need the GX Developer software unless you make changes to the network setting (Add/Remove remote station device, change data mapping). In other words, when the PLC is operated in Run Mode, the PC does not need to be connected.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

- **Head Office**
  Tel. 82-52-202-7901 / Fax. 82-52-202-7900
  1, Jeonha-dong, Dong-gu, Ulsan, Korea

- **A/S Center**
  Tel. 82-52-202-5041 / Fax. 82-52-202-7960

- **Seoul Office**
  Tel.82-2-746-4711 / Fax. 82-2-746-4720
  140-2, Gye-dong, Jongno-gu, Seoul, Korea

- **Ansan Office**
  Tel.82-31-409-4945 / Fax.82-31-409-4946
  1431-2, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, Korea

- **Cheonan Office**
  Tel.82-41-576-4294 / Fax.82-41-576-4296
  355-15, Daga-dong, Cheonan-si, Chungcheongnam-do, Korea

- **Daegu Office**
  Tel.82-53-746-6232 / Fax.82-53-746-6231
  223-5, Beomeo 2-dong, Suseong-gu, Daegu, Korea

- **Gwangju Office**
  Tel. 82-62-363-5272 / Fax. 82-62-363-5273
  415-2, Nongseong-dong, Seo-gu, Gwangju, Korea

- **본사**
  Tel. 052-202-7901 / Fax. 052-202-7900
  울산광역시 동구 전하동 1 번지

- **A/S 센터**
  Tel. 82-52-202-5041 / Fax. 82-52-202-7960

- **서울 사무소**
  Tel. 02-746-4711 / Fax. 02-746-4720
  서울특별시 종로구 계동 140-2 번지

- **안산 사무소**
  Tel. 031-409-4945 / Fax. 031-409-4946
  경기도 안산시 상록구 사동 1431-2 번지

- **천안 사무소**
  Tel. 041-576-4294 / Fax. 041-576-4296
  충남 천안시 다가동 355-15 번지

- **대구 사무소**
  Tel. 053-746-6232 / Fax. 053-746-6231
  대구광역시 수성구 범어 2 동 223-5 번지

- **광주 사무소**
  Tel. 062-363-5272 / Fax. 062-363-5273
  광주광역시 서구 농성동 415-2 번지

HYUNDAI HEAVY INDUSTRIES CO.,LTD.