Hi4aMB051001FME1

HYUNDAI ROBOT

Function Manual

MODBUS

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Printed in Korea - Oct. 2005. 1st Edition

Contents

List of Figures

List of Tables

1. Overview

1.1. Prior necessary information

Prior information as following is needed to understand this manual.

- Hi4a robot controller operation knowledge
- Hi4a embedded PLC relay knowledge
- Modbus protocol knowledge

1.2. Hi4a Robot Controller Modbus Function

Hi4a robot controller is supporting the slave function of Modbus.

- MODBUS transmission mode
  - ① ASCII mode
  - ② RTU(binary) mode

- Supported function
  - ① 01 : read coils (bits)
  - ② 02 : read discrete inputs (bits)
  - ③ 03 : read holding registers (multiple)
  - ④ 04 : read input registers (multiple)
  - ⑤ 05 : write single coil (bit)
  - ⑥ 06 : write single holding register
  - ⑦ 15 : write coils (multiple bits)
  - ⑧ 16 : write holding registers (multiple)

- Slave address setting
  - ① Slave address : 1~247
  - ② When the slave address of instruction is 0, all slave without relations with address that is setting support the Broadcasting function which operates.

- Medium of communication
  - ① CNSIO : RS232 → Support only 1:1
  - ② OPSIO : Use of RS232/RS422 selection → Support only 1:1
  - ③ RS485 is needed to support the 1:N communication, it can't be used at BD412 that is the improvement board, of current BD411.

- Use condition
  - ① To use Relay of Embedded PLC as the MODBUS function, set up the embedded PLC as valid (DIP4=ON) and it has be in Run condition.

② If embedded PLC is invalid, it doesn't support to write at Relay of embedded PLC. However, it can read entire register or coil.

- Example of MODBUS virtual use

① Control board function

This is cheap GP(Graphic Panel) supporting MODBUS, and it can be used as connecting to RS485 of muti-robot.

② PLC communication

Provide the communication between the PLC with the function of MODBUS Master with cheap solution.

③ PC robot operation system

Using serial port of PC, monitor in/out signal of robot or can build the operation system of robot.

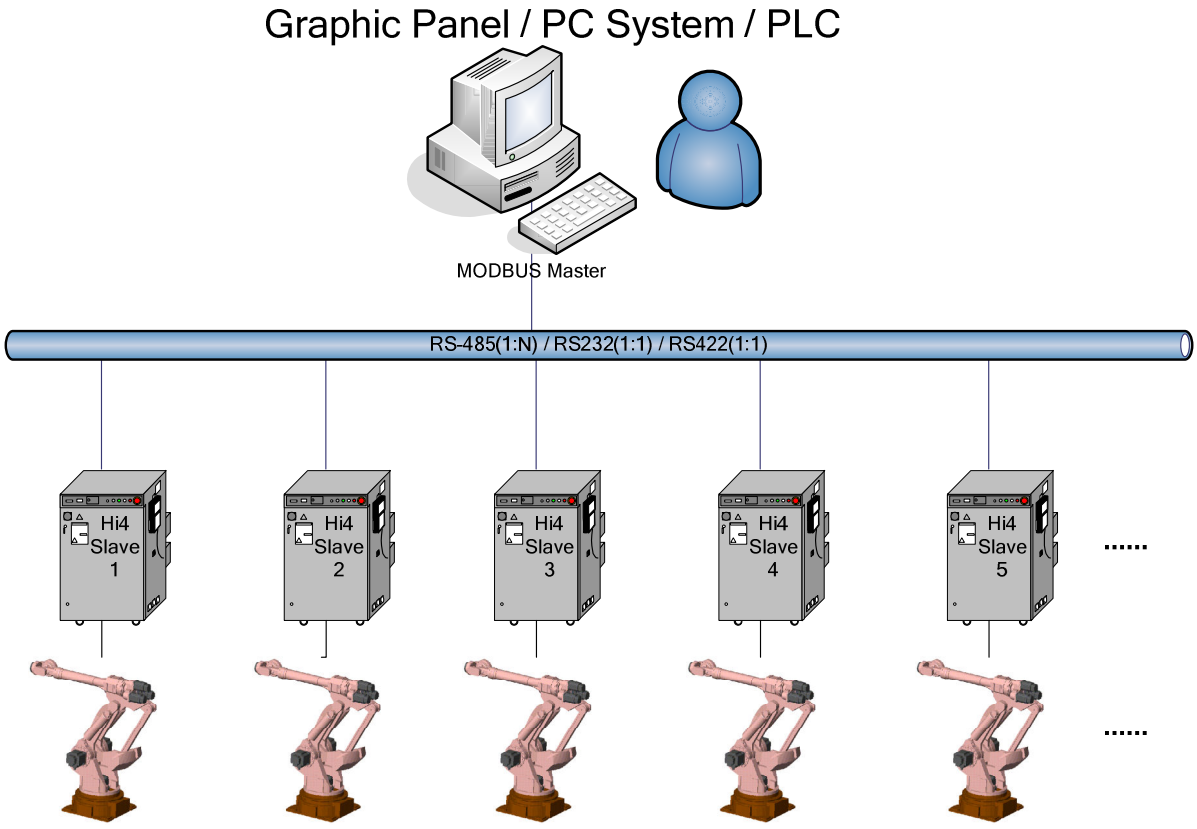


Fig. 1.1 Example of MODBUS virtual use

- Hi4a relay mapping

Table 1-1 Relay mapping

Modbus Data Model	Relay mapping : Refer to Hi4a relay configuration & I/O data flow					Fuction
	Relay name	Bits	Local Add.	Registers	Local Addr.	
Input Discrete Add: 0x0000~0xffff Quantity: 1~2000(bit) **Input Registers** Add: 0x0000~0xffff Quantity: 1~125	External Input	X1~256	0001~0256	XW1~16	001~016	Read only 02: read discrete Inputs (bits) 04: read input registers (multiple)
	PLC Input	DO1~256	1001~1256	DOW1~16	101~116	
	Fieldbus Input #1	FB1.X1~960	2001~2960	FB1.XW1~60	201~260	
	Fieldbus Input #2	FB2.X1~960	3001~3960	FB2.XW1~60	301~360	
	Fieldbus Input #3	FB3.X1~960	4001~4960	FB3.XW1~60	401~460	
	Fieldbus Input #4	FB4.X1~960	5001~5960	FB4.XW1~60	501~560	
	Timer	T1~256	6001~6256	~~TW1~256~~	~~1001~1256~~	
	Counter	C1~256	7001~7256	~~CW1~256~~	~~1501~1756~~	
Coils Add: 0x0000~0xffff Quantity: 1~2000(bit) **Holding Registers** Add: 0x0000~0xffff Quantity: 1~125	External Output	Y1~256	0001~0256	YW1~16	001~016	Read 01: read coils (bits) 03: read holding registers (multiple) Write 05: write single coil (bit) 15: write coils (multiple bits) 06: write single holding register 16: write holding registers (multiple)
	PLC Output	DI1~256	1001~1256	DIW1~16	101~116	
	Fieldbus Output #1	FB1.Y1~960	2001~2960	FB1.YW1~60	201~260	
	Fieldbus Output #2	FB2.Y1~960	3001~3960	FB2.YW1~60	301~360	
	Fieldbus Output #3	B3.Y1~960	4001~4960	FB3.YW1~60	401~460	
	Fieldbus Output #4	FB4.Y1~960	5001~5960	FB4.YW1~60	501~560	
	Special	SP1~32	6001~6032	SPW1~2	601~602	
	Auxiliary	R1~1024	6501~7524	RW1~64	701~764	
	Keep	K1~1024	8001~9024	KW1~64	801~864	
	Timer			TW1~256	1001~1256	
	Counter			CW1~256	1501~1756	
	System Memory			SW1~256	2001~2256	
Shared Registers	Data Memory			MW1~5000	3001~8000	
HRBASIC	HRBASIC V% variable			V%[1~400]	8001~8400	
	RN Register for M-code			RN1~16	8501~8516	Data range: 0~255
	HRBASIC V$ variable			V$[1~40]	9001~9720	36 bytes/V$ → 40 x 36/2 = 720

Oversized idographic number of above table is the relay group used at GP and shade control portion (gray) is reserved.

- Relay composition of Hi4a controller

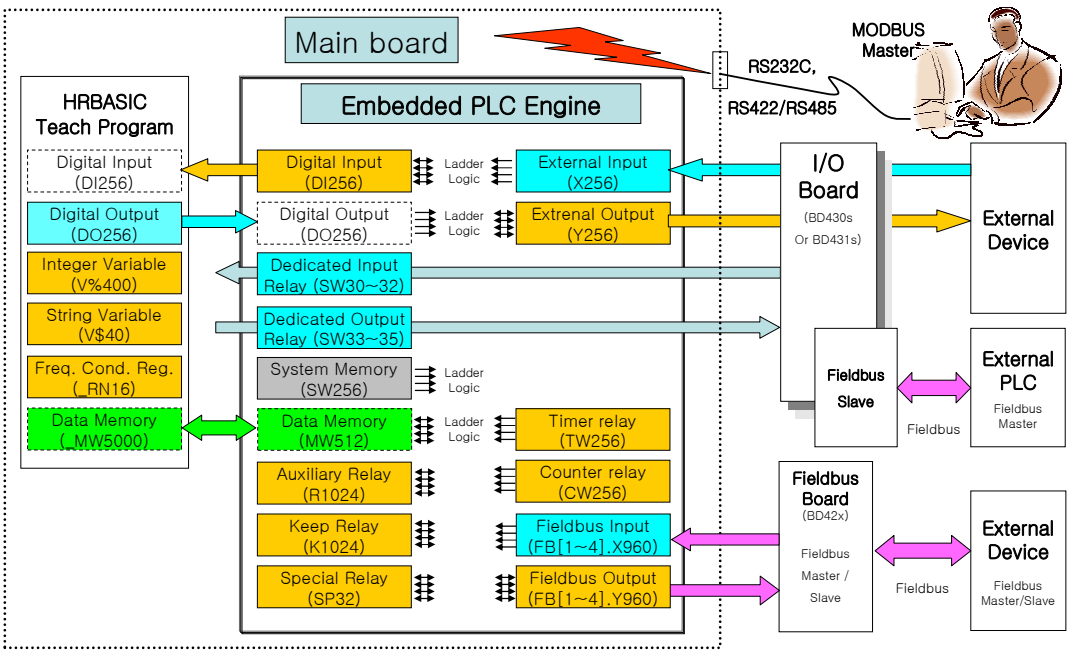


Fig. 1.2 Relay composition of Hi4a controller

- In-out data flow of Hi4a controller

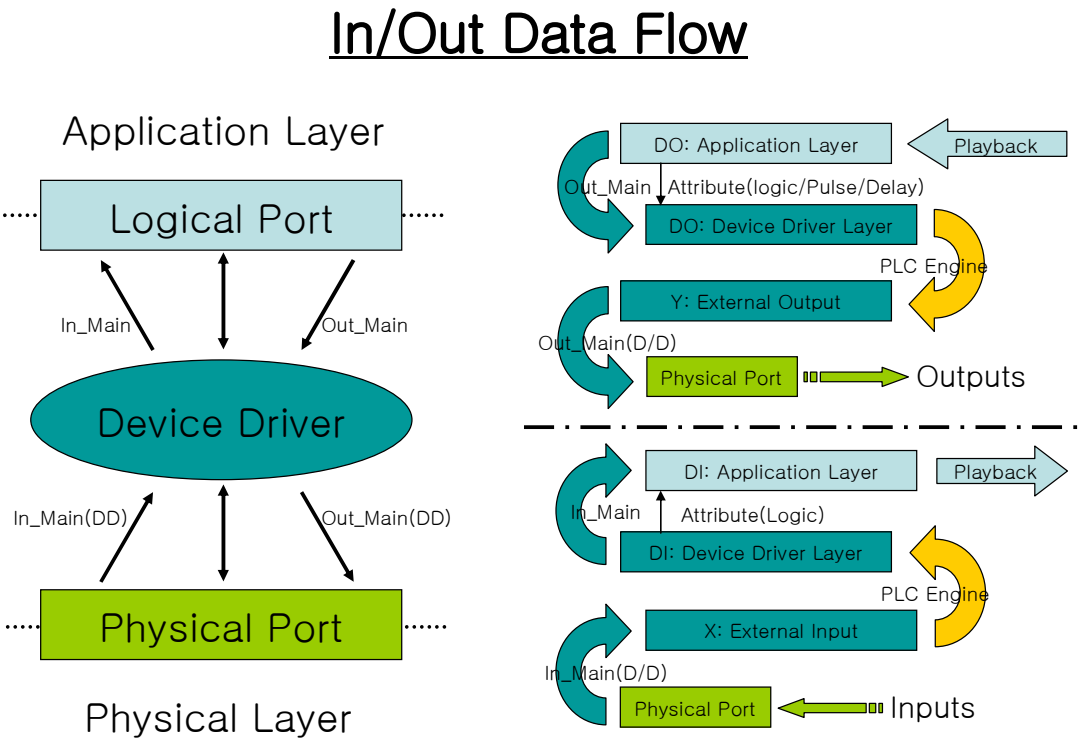


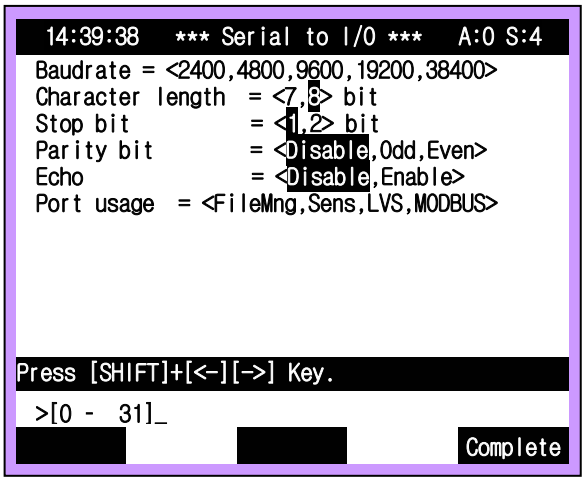
Fig. 1.3 Input/output data flow of Hi4a controller

DI/DO is entirely the application layer is refer to the input-output monitoring or the HRBASIC, and DI/DO is entirely the device layer to refer PLC and Modbus. Setting can be different in attribute (logic/pulse/delay) between two.

2. Modbus Setting of Hi4a Controller

2.1. Serial Port Useage Setting

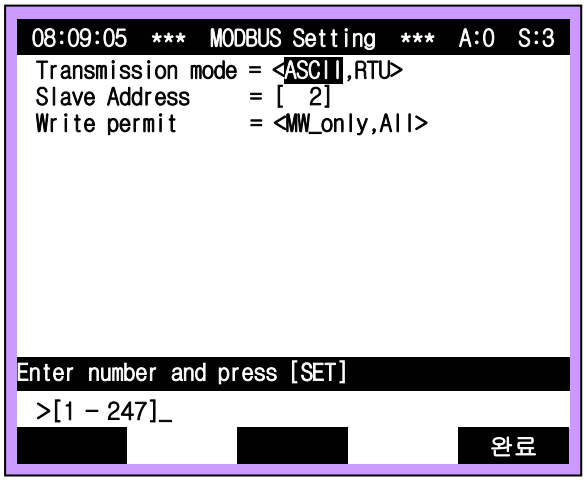
(1) Set up at『[PF2]: System』→『2: Controller parameter』→『2: Serial ports』→『3: Serial Port #1(CNSIO)』 or 『4: Serial port#2(OPSIO)』.



(2) If setting up serial port #1 and #2 as MODBUS, MODBUS slave module refers only serial #1.

2.2. MODBUS Environment Setting

(1) Choose『[PF2]: System』『2: Controller parameter』 → 『18: Modbus environment setting』.



HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

■ Head Office

1, Jeonha-Dong, Dong-Gu,
Ulsan, Korea
TEL : 82-52-230-7901 Ex 11
FAX : 82-52-230-7900

■ 본사

울산광역시 동구 전하동 1 번지

TEL: 82-052-230-7901~11
FAX: 82-052-230-7900

■ Seoul Office

140-2, Gye-Dong, Jongno-Gu,
Seoul, Korea
TEL : 82-2-746-4711 Ex 5
FAX : 82-2-746-4720

■ 서울사무소

서울특별시 종로구 계동 140-2 번지

TEL: 82-02-746-4711~5
FAX: 82-02-746-4720

■ Daegu Office

223-5, Bumeo 2-Dong, Susung-Gu
Daegu, Korea
TEL : 82-53-746-6232 Ex 3
FAX : 82-53-746-6231

■ 대구사무소

대구광역시 수성구 범어 2 동 223-5 번지

TEL : 82-053-746-6232~3
FAX: 82-053-746-6231

■ Cheonan Office

355-15,Daga-Dong,
Cheonan, Chungnam, Korea
TEL : 82-41-576-4294 Ex 5
FAX : 82-41-576-4296

■ 천안사무소

충남 천안시 다가동 355-15 번지

TEL: 82-041-576-4294~5
FAX: 82-041-576-4296

■ Gwamgju Office

415-2, Nongsung-Dong, Seo-Gu
Gwangju, Korea
TEL: 82-62-363-5272
FAX: 82-62-363-5273

■ 광주사무소

광주 서구 농성동 415-2 번지

TEL: 82-062-363-5272
FAX: 82-062-363-5273