

32

SH7285 CPU Board

M3A-HS85

User's Manual

Renesas 32-Bit RISC Microcomputers
SuperH™ RISCengine Family / SH7285 Group

User's Manual

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M3A-HS85 SCHEMATICS

1.1 Overview

The M3A-HS85 is the CPU board designed for users to evaluate the functionality and performance of the SH7285 group of Renesas Technology original microcomputer, as well as develop and evaluate the application software for this group of microcomputers. The Sh7285's data bus, address bus and various internal peripheral circuit function pins are connected to the extension connector of the M3A-HS85, allowing users to evaluate the timing relationship with peripheral devices using measurement instruments or develop extension boards tailored to suit development purposes. Furthermore, the E10A-USB or the on-chip emulator made by Renesas Technology can also be connected to the M3A-HS85.

1.2 Configuration

Figure 1.2.1 shows an example of system configuration using the M3A-HS85.

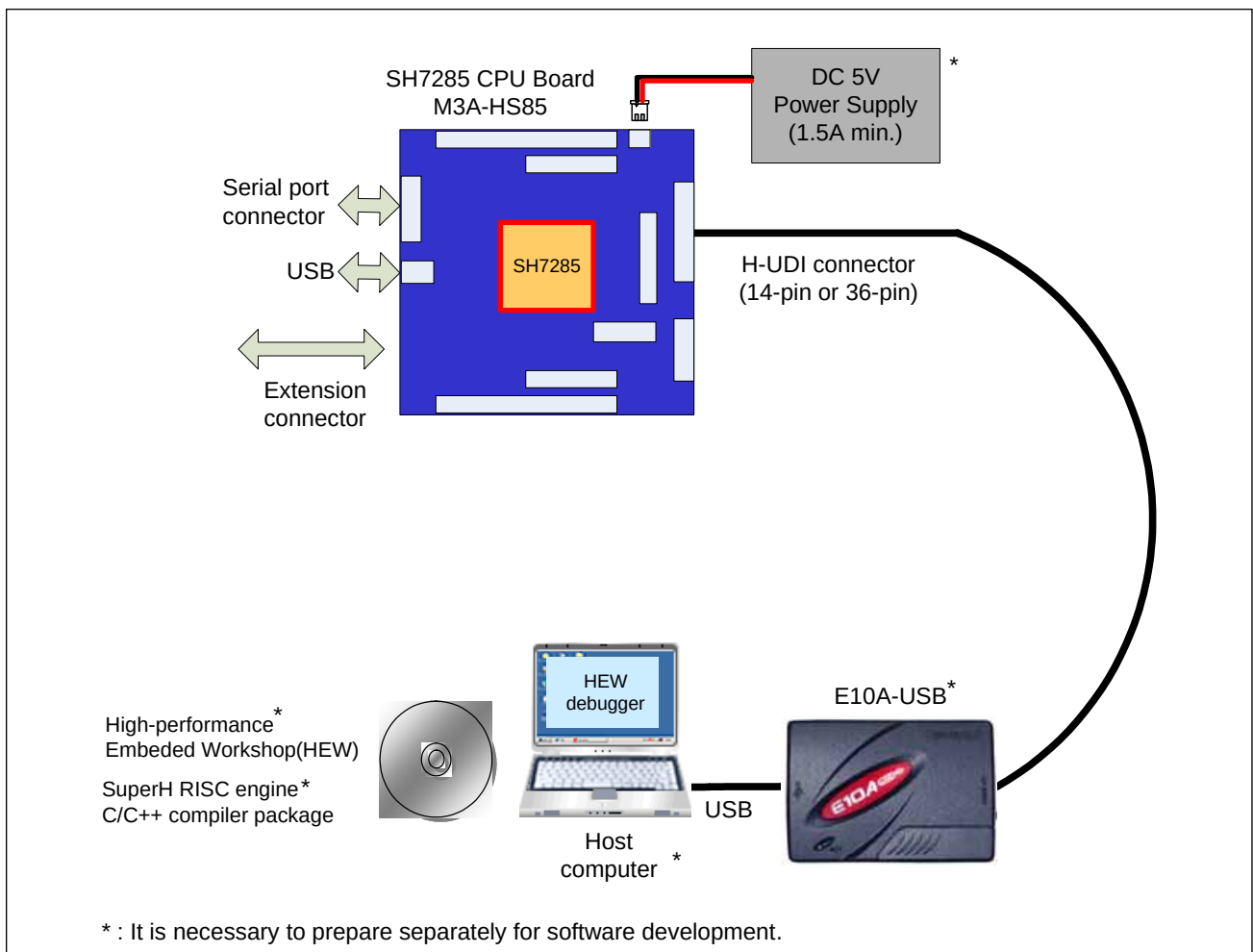


Figure 1.2.1 Example System Configuration of M3A-HS85

1.3 External Specifications

Table 1.3.1 lists the external specifications of M3A-HS85.

Table 1.3.1 External Specifications of M3A-HS85

No.	Item	Content
1	CPU	SH7285 ● Input(XIN) Clock: 12.5 MHz ● CPU Clock: Maximum 100 MHz ● Bus Clock: Maximum 50 MHz ● On-chip memory • Flash Memory: 768 KB • RAM: 32 KB
2	Memory	● SRAM: 2-Mbyte (16-bit bus width x 1 pc.) (Not mounted) *Can be mounted only when SH7285 is used in 3.3V. ● SDRAM: 16-Mbyte (16-bit bus width x 1 pc.) (Not mounted) *Can be mounted only when SH7285 is used in 3.3V. ● EEPROM: 128k-bit (Not mounted) HN58X24128FPIE x 1 pc. (I²C bus connection)
3	Connector	● Extension connector (Bus,I/O,VCC,GND) ● USB connector (Standard-B receptacle) ● Serial port connector (D-sub 9-pin) ● H-UDI connector (14-pin) ● H-UDI connector (36-pin)
4	LED	● POWER LED (1pc.) ● User LED (6pcs.)
5	Switch	● Reset switch (1pc.) ● NMI switch (1pc.) ● IRQ1 switch (1 pc.) ● DIP switch for system setting (1pc., 4 poles) ● DIP switch for user (1pc., 4 poles)
6	Package Dimension	● Dimensions : 100mm x 100mm ● Mounting form : 6-layer, double side mounted ● Board configuration : 1 board

1.4 External View

Figure 1.4.1 shows the external view of M3A-HS85.

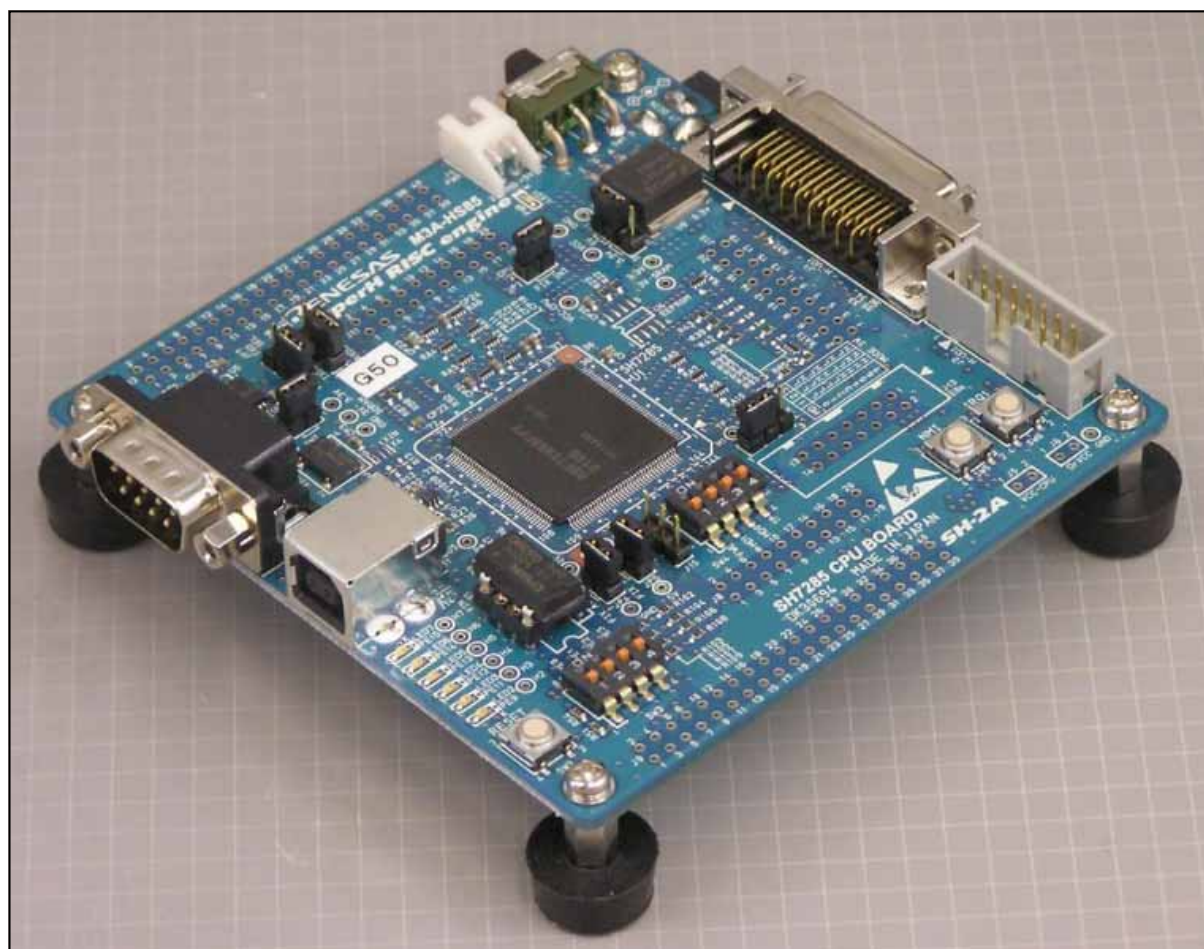


Figure 1.4.1 External View of M3A-HS85

1.5 M3A-HS85 Block Diagram

Figure 1.5.1 shows the system block diagram of M3A-HS85.

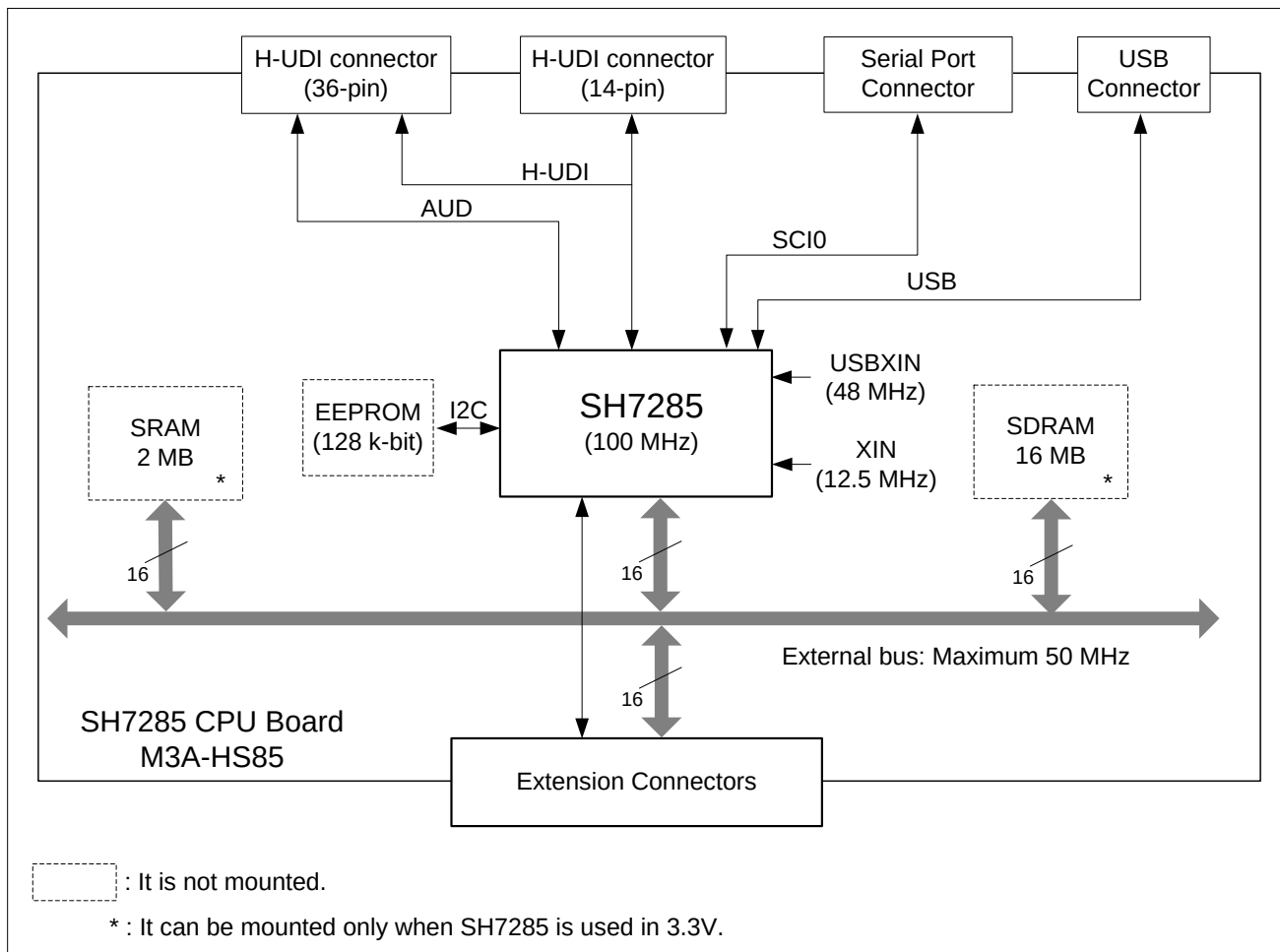
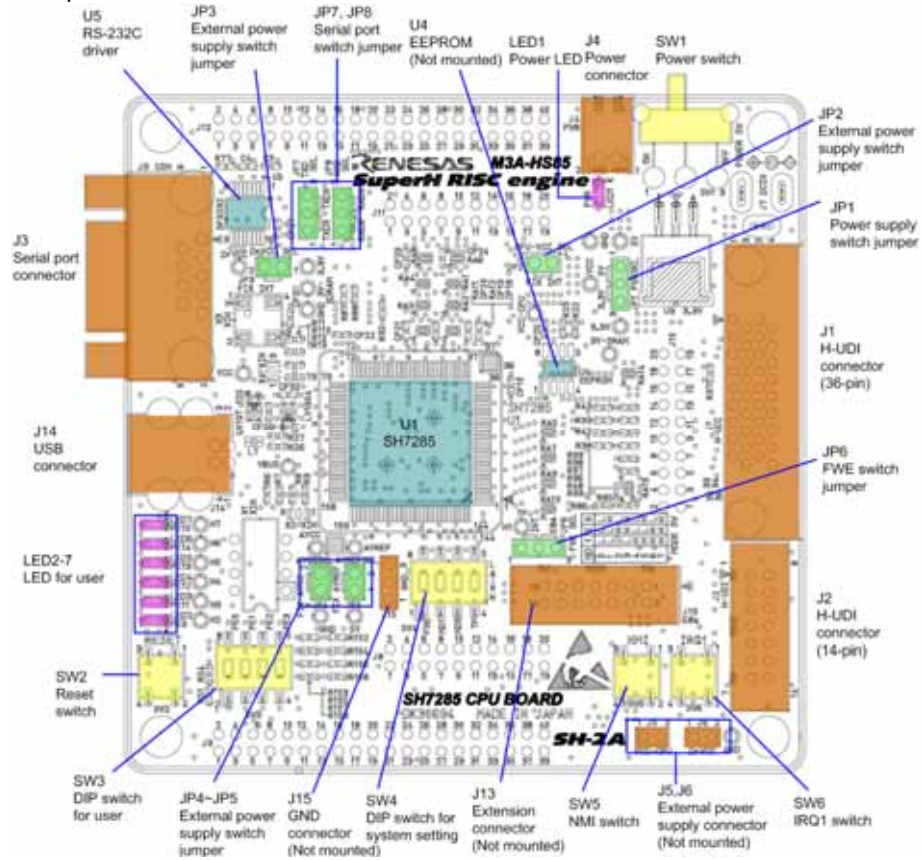


Figure 1.5.1 System Block Diagram of M3A-HS85

1.6 M3A-HS85 Board Overview

Figure 1.6.1 shows the M3A-HS85 board overview.

<Top view of the component side>



<Top view of the solder side>

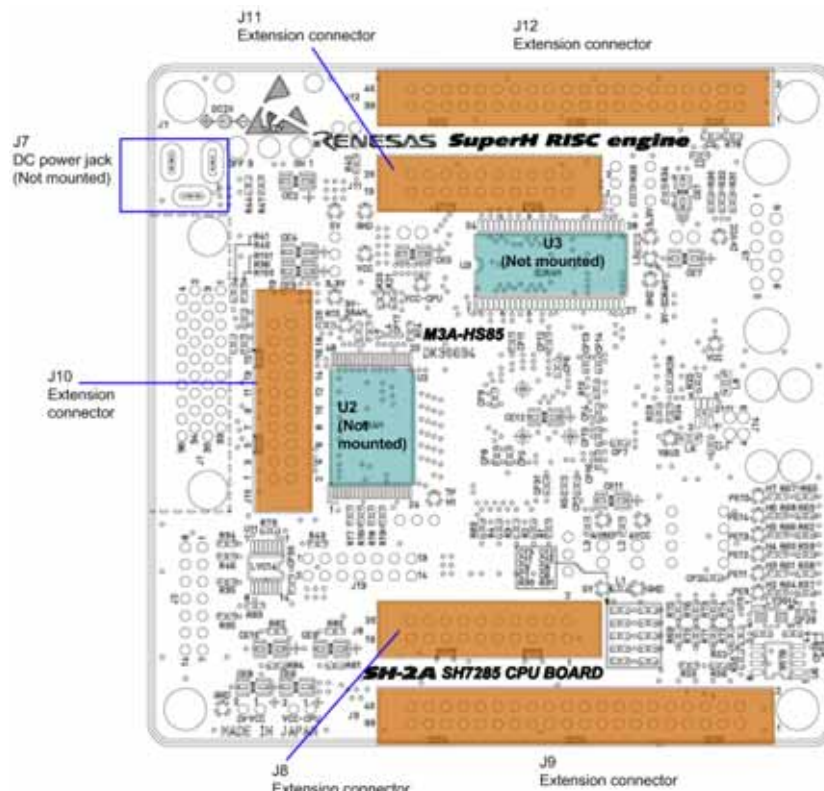


Figure 1.6.1 M3A-HS85 Board Overview

Table 1.6.1 lists the main components mounted on the M3A-HS85.

Table 1.6.1 Main Components Mounted in the M3A-HS85

Symbol	Parts Name	Remarks	Recommended components (Part number and manufacture)
U1	CPU	SH7285 (Renesas)	
U2	SRAM	Not mounted	R1LV1616RSA-7S (Renesas)
U3	SDRAM	Not mounted	EDS1216AATA-75E (Elpida)
U4	EEPROM	Not mounted	HN58X24128FPIE (Renesas)
U5	RS-232C driver	SP3232ECA(Sipex)	
U6	Reset IC	M51957BFP (Renesas)	
X1	Oscillator	SG8002DC_12.5MHz (Epson)	
X1	Oscillator socket	R110-83-308(Preci-Dip)	
X2	Resonator	Not mounted	CSTCE-G12M5 (Murata)
X3	Oscillator	SG8002JF_48MHz (Epson)	
X4	Resonator	Not mounted	CSTCZ48M0X12R (Murata)
J1	H-UDI connector (36pin)	DX10M-36SE(50) (Hirose)	
J2	H-UDI connector (14pin)	7614-6002BL(3M)	
J3	Serial port connector	XM2C-0942-132L(Omron)	
J4	Power supply connector	S2B-XH-A(JST)	
J5	External power supply connector	Not mounted	A2-2PA-2.54DSA (Hirose)
J6	External power supply connector	Not mounted	A2-2PA-2.54DSA (Hirose)
J7	DC power jack	Not mounted	HEC0470-01-630 (HOSIDEN)
J8,J10,J11	Extension connector (20pin)	Not mounted	XG4C-2031 (Omron)
J9,J12	Extension connector (40pin)	Not mounted	XG4C-4031 (Omron)
J13	Extension connector (14pin)	Not mounted	7614-6002 (Sumitomo 3M)
J14	USB connector	UBB-4R-D14T-4D(SN)(LF) (JST)	
LED1	Power LED	Blue UB1111C (Stanley)	
LED2-7	User LED	Green SML-310MT (Rohm)	
SW1	Power switch	MS-12AAH1 (Nihon Kaiheiki)	
SW2	Reset switch	Push switch B3SN-3012 (Omron)	
SW3	DIP switch for user	4 poles A6S-4104 (Omron)	
SW4	DIP switch for system setting	4 poles A6S-4104 (Omron)	
SW5	NMI switch	Push switch B3SN-3012 (Omron)	
SW6	IRQ1 switch	Push switch B3SN-3012 (Omron)	

1.7 M3A-HS85 Memory Mapping

Figure 1.7.1, Figure 1.7.2, and Figure 1.7.3 show the memory mapping examples of SH7285 in the M3A-HS85.

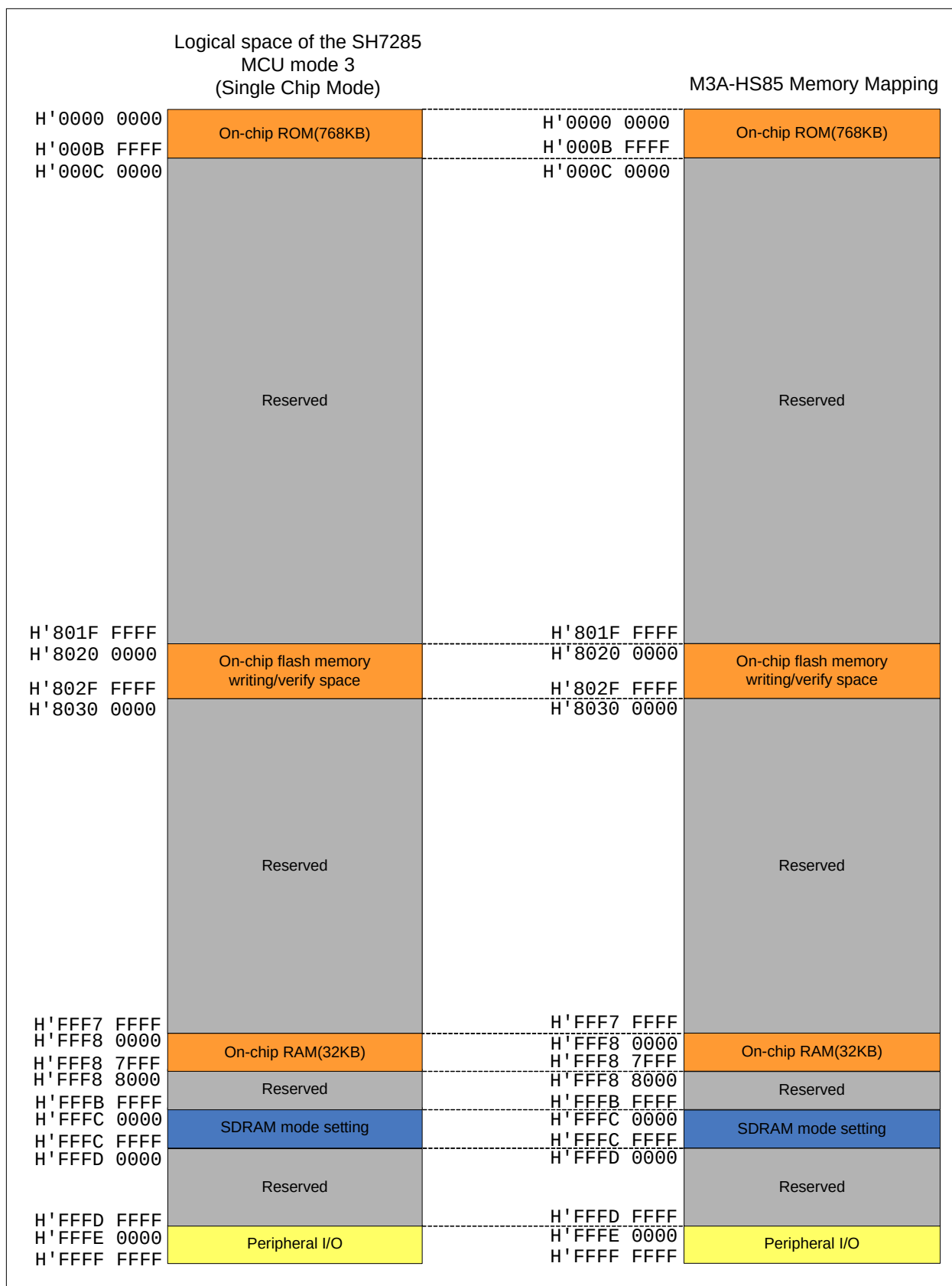


Figure 1.7.1 Memory Mapping Example of SH7285 (MCU mode 3)

H'0000 0000	CS0 space	H'0000 0000	SRAM(2MB) *1 *2 *3
			User area *3
H'03FF FFFF	CS1 space	H'03FF FFFF	User area
H'0400 0000		H'0400 0000	
H'07FF FFFF	CS2 space	H'07FF FFFF	SRAM(2MB) *1 *2
H'0800 0000		H'0800 0000	
H'0BFF FFFF	CS3 space	H'0BFF FFFF	User area
H'0C00 0000		H'0C00 0000	
H'0FFF FFFF	CS4 space	H'0CFF FFFF	User area
H'1000 0000		H'1000 0000	
H'13FF FFFF	CS5 space	H'13FF FFFF	User area
H'1400 0000		H'1400 0000	
H'17FF FFFF	CS6 space	H'17FF FFFF	SRAM(2MB) *1 *2
H'1800 0000		H'1800 0000	
H'1BFF FFFF	CS7 space	H'1BFF FFFF	User area
H'1C00 0000		H'1C00 0000	
H'1FFF FFFF	Reserved	H'1FFF FFFF	Reserved
H'2000 0000		H'2000 0000	
H'FFF7 FFFF	On-chip RAM(32KB)	H'FFF7 FFFF	On-chip RAM(32KB)
H'FFF8 0000		H'FFF8 0000	
H'FFF8 7FFF	Reserved	H'FFF8 7FFF	Reserved
H'FFF8 8000		H'FFF8 8000	
H'FFFB FFFF	SDRAM mode setting	H'FFFB FFFF	SDRAM mode setting
H'FFFC 0000		H'FFFC 0000	
H'FFFC FFFF	Reserved	H'FFFC FFFF	Reserved
H'FFFD 0000		H'FFFD 0000	
H'FFFD FFFF	Peripheral I/O	H'FFFD FFFF	Peripheral I/O
H'FFFE 0000		H'FFFE 0000	
H'FFFF FFFF		H'FFFF FFFF	

[Notes] *1: CS space to assign is selected according to software. CS space which can be selected at a time is only one.
*2: It is initially not mounted.
*3: ROM for program is necessary for CS0 space.

Figure 1.7.2 Example Memory Mapping of SH7285 (MCU mode 0,1)

Logical space of the SH7285 MCU mode 2 (On-chip ROM enabled mode)		M3A-HS85 Memory Mapping	
H'0000 0000	On-chip ROM(768KB)	H'0000 0000	On-chip ROM(768KB)
H'000B FFFF	Reserved	H'000B FFFF	Reserved
H'000C 0000	Reserved	H'000C 0000	Reserved
H'01FF FFFF	Reserved	H'01FF FFFF	Reserved
H'0200 0000	CS0 space	H'0200 0000	SRAM(2MB) *1 *2
H'03FF FFFF	Reserved	H'03FF FFFF	User area
H'0400 0000	CS1 space	H'0400 0000	User area
H'07FF FFFF	Reserved	H'07FF FFFF	Reserved
H'0800 0000	CS2 space	H'0800 0000	SRAM(2MB) *1 *2
H'0BFF FFFF	Reserved	H'0BFF FFFF	User area
H'0C00 0000	CS3 space	H'0C00 0000	SDRAM(16MB) *2
H'0FFF FFFF	Reserved	H'0FFF FFFF	User area
H'1000 0000	CS4 space	H'1000 0000	User area
H'13FF FFFF	Reserved	H'13FF FFFF	Reserved
H'1400 0000	CS5 space	H'1400 0000	User area
H'17FF FFFF	Reserved	H'17FF FFFF	Reserved
H'1800 0000	CS6 space	H'1800 0000	SRAM(2MB) *1 *2
H'1BFF FFFF	Reserved	H'1BFF FFFF	User area
H'1C00 0000	CS7 space	H'1C00 0000	User area
H'1FFF FFFF	Reserved	H'1FFF FFFF	Reserved
H'2000 0000	Reserved	H'2000 0000	Reserved
H'801F FFFF	Reserved	H'801F FFFF	Reserved
H'8020 F000	On-chip flash memory writing/verify space	H'8020 F000	On-chip flash memory writing/verify space
H'802F FFFF	Reserved	H'802F FFFF	Reserved
H'8030 0000	Reserved	H'8030 0000	Reserved
H'FFF7 FFFF	Reserved	H'FFF7 FFFF	Reserved
H'FFF8 0000	On-chip RAM(32KB)	H'FFF8 0000	On-chip RAM(32KB)
H'FFF8 7FFF	Reserved	H'FFF8 7FFF	Reserved
H'FFF8 8000	Reserved	H'FFF8 8000	Reserved
H'FFFB FFFF	Reserved	H'FFFB FFFF	Reserved
H'FFFC 0000	SDRAM mode setting	H'FFFC 0000	SDRAM mode setting
H'FFFC FFFF	Reserved	H'FFFC FFFF	Reserved
H'FFFD 0000	Reserved	H'FFFD 0000	Reserved
H'FFFD FFFF	Reserved	H'FFFD FFFF	Reserved
H'FFFE 0000	Peripheral I/O	H'FFFE 0000	Peripheral I/O
H'FFFF FFFF	Reserved	H'FFFF FFFF	Reserved

[Notes] *1: CS space to assign is selected according to software. CS space which can be selected at a time is only one.
*2: It is initially not mounted.

Figure 1.7.3 Example Memory Mapping of SH7285 (MCU mode 2)

1.8 Absolute Maximum Ratings

Table 1.8.1 lists the absolute maximum rating of M3A-HS85.

Table 1.8.1 Absolute Maximum Ratings of M3A-HS85

Symbol	Parameter	Rated Value	Remarks
5VCC	5V System Power Supply Voltage	-0.3V to 6.0V	Relative to VSS
3VCC	3.3V System Power Supply Voltage	-0.3V to 4.6V	Relative to VSS
Topr	Operating Ambient Temperature	0°C to 50°C	No dewdrops allowed. Use in corrosive gas environment prohibited.
Tstr	Storage Ambient Temperature	-10°C to 60°C	No dewdrops allowed. Use in corrosive gas environment prohibited.

Note: The ambient temperature refers to the air temperature in places closest possible to the board.

1.9 Recommended Operating Conditions

Table 1.9.1 lists the recommended operating conditions of M3A-HS85.

Table 1.9.1 Recommended Operating Conditions of M3A-HS85

Symbol	Parameter	Rated Value	Remarks
5VCC	5V System Power Supply Voltage	4.5V to 5.5V	Relative to VSS
3VCC	3V System Power Supply Voltage	3.0V to 3.6V	Relative to VSS
-	Maximum Current Consumption in the Board	Within 1A	
Topr	Operating Ambient Temperature	0°C to 50°C	No dewdrops allowed. Use in corrosive gas environment prohibited.

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Chapter2

Functional Overview

2.1 Functional Overview

The M3A-HS85 is the SH7285 CPU board that has the functions listed in Table 2.1.1.

Table 2.1.1 lists the functional modules of M3A-HS85.

Table 2.1.1 Functional Modules of M3A-HS85

Section	Function	Content
2.2	CPU	SH7285 ● Input(XIN) Clock: 12.5 MHz ● CPU Clock: Maximum 100 MHz ● Bus Clock: Maximum 50 MHz ● On-Chip Memory - Flash Memory: 768 kBytes - RAM: 32 kBytes
2.3	Memory	● SRAM : 2-Mbyte (16-bit bus width x 1pc.) (Not mounted) *Can be mounted only when SH7285 is used in 3.3V. ● SDRAM : 16-Mbyte(16-bit bus width x 1pc.) (Not mounted) *Can be mounted only when SH7285 is used in 3.3V. ● EEPROM : 128 kBits (Not mounted) HN58X24128FPIE x 1 pc. (I²C bus connection)
2.4	Serial Port Interface	Connects SCI0 or SCI3 of SH7285 to the serial port connector
2.5	I/O Ports	Connects to the input/output ports of the SH7285
2.6	Power Supply Module	Controls the system power supply of the M3A-HS85
2.7	USB Interface	Connects USB pin of SH7285 to USB connector
2.8	Clock Module	Controls the system clock
2.9	Reset Module	Controls the device reset mounted on the M3A-HS85
2.10	Interrupt Switches	Connect to the NMI pin, IRQ0 pin and test port
2.11	E10A-USB Interface	SH7285 H-UDI/AUD interface
-	Operational Specifications	Connectors, Switches and LEDs ● SH7285 extension connector ● Switches and LEDs ● H-UDI connector Detailed in Chapter 3.

2.2 CPU

The M3A-HS85 contains the 32-bit RISC microcomputer SH7285 that operates with a maximum 100MHz of CPU clock frequency. The SH7285 includes 768-Kbyte flash memory, and 32-Kbyte RAM, making it useful in a wide range of applications from data processing to equipment control.

The M3A-HS85 can be operated with a maximum 100MHz of CPU clock frequency (external bus maximum 50 MHz) using a 12.5 MHz input clock.

Figure 2.2.1 shows the SH7285 block diagram in the M3A-HS85.

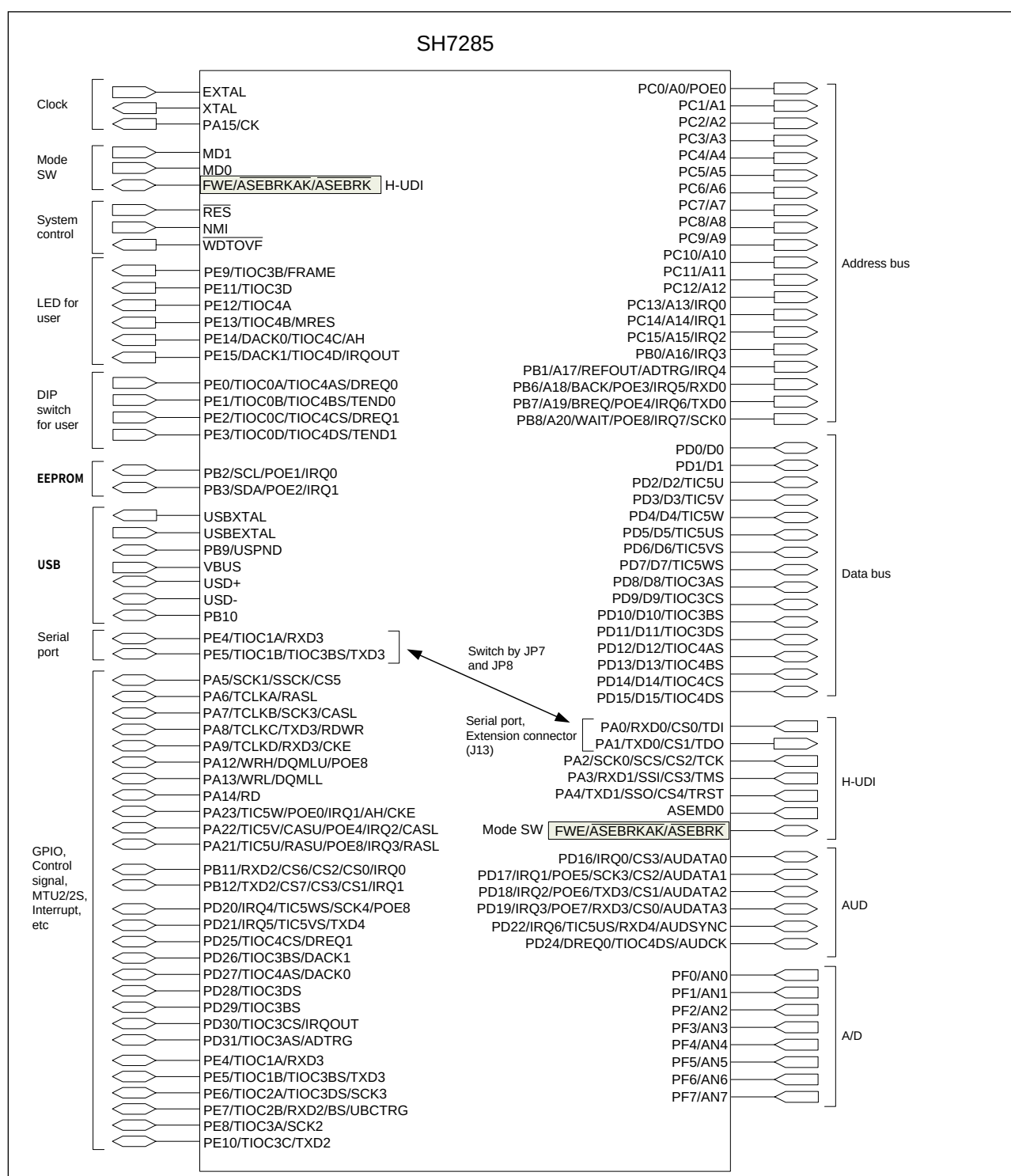


Figure 2.2.1 SH7285 Block Diagram

2.3 Memory

2.3.1 SH7285 On-Chip Memory

The SH7285 includes a 768-Kbytes flash memory and 32-Kbytes RAM.

2.3.2 SRAM

Two Mbytes of SRAM can be mounted on the M3A-HS85 (Not mounted). In the M3A-HS85 specification, 3.3V power is supplied to SRAM so that SH7285 should be used in 3.3V when SRAM is mounted (CPU power supply switch jumper (JP1) should be set to “2-3”). SRAM is controlled by the bus state controller built into SH7285. The address spaces of SRAM can be switched to CS0 space, CS2 space, and CS6 space by the pin function controller setting of SH7285.

Table 2.3.1 lists the SRAM specifications. Figure 2.3.1 shows the block diagram for the connection between SH7285 and SRAM.

Table 2.3.1 SRAM Specifications

Part Number	Bus size	Capacity	Package
R1LV1616RSA-7S	16 bit	2 Mbytes (16-bit x 1M word x 1 pc.)	48-pin TSOP (20 x 12mm)

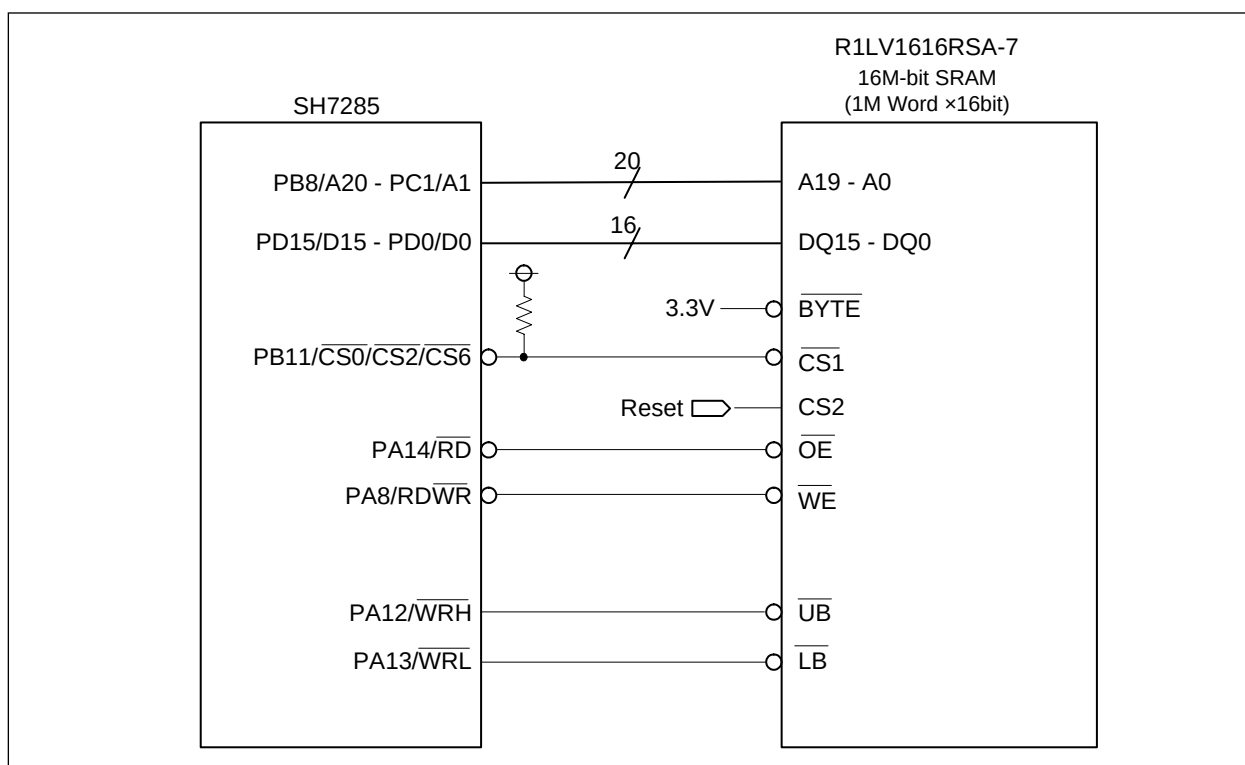


Figure 2.3.1 Block Diagram for Connection Between SH7285 and SRAM

2.3.3 SDRAM

The M3A-HS85 can mount 16Mbytes of SDRAM (Not mounted). In the M3A-HS85 specification, 3.3V power is supplied to SDRAM so that SH7285 should be used in 3.3V when SDRAM is mounted (CPU power supply switch jumper (JP1) should be set to “2-3”). The SDRAM is controlled by the bus state controller built into SH7285.

Table 2.3.2 lists the SDRAM specifications. Figure 2.3.2 shows the block diagram for the connection between SH7285 and SDRAM.

Table 2.3.2 SDRAM Specifications

Specification	Content
Configuration	2M words x 16 bits x 4 banks (1pc.)
Capacity	16 Mbytes
Access Time	5.4ns
CAS Latency	2 (at 40MHz bus clock)
Refresh Interval	4096 refresh cycle every 64ms
Low Address	A11- A0
Column Address	A8 - A0
Number of Banks	4-bank operation controlled by BA0 and BA1

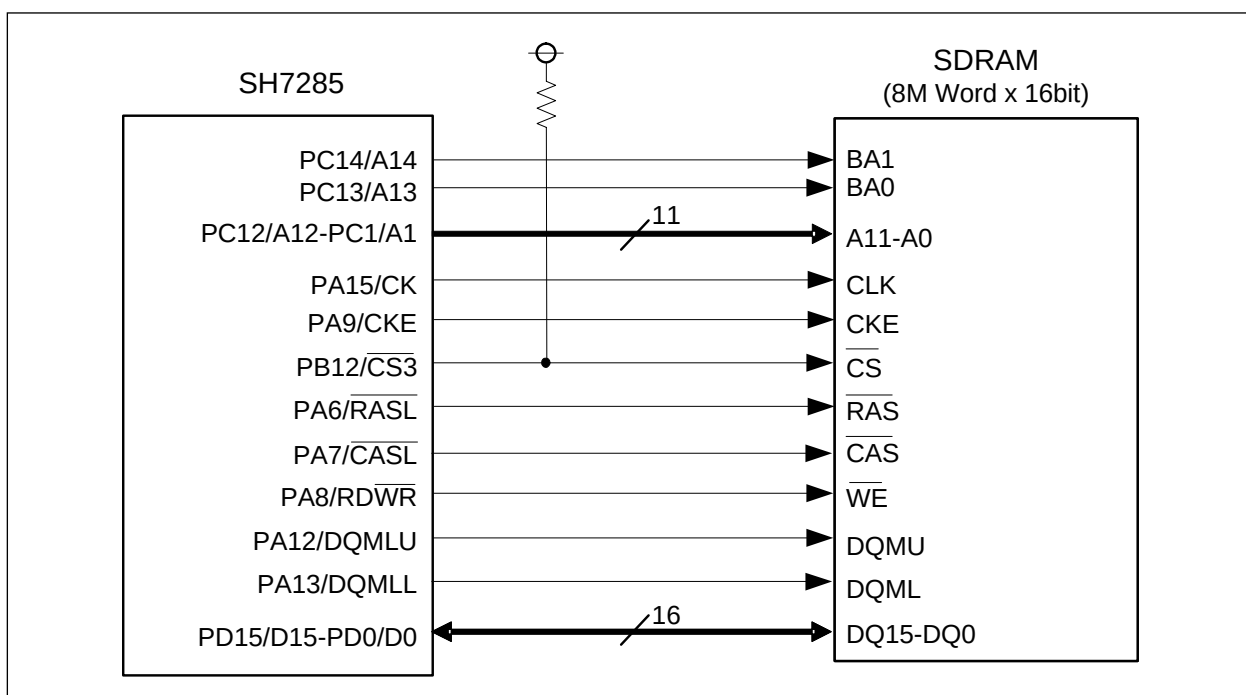


Figure 2.3.2 Block Diagram for the Connection Between SH7285 and SDRAM

2.3.4 EEPROM

The M3A-HS85 can mount the 128k-bits of EEPROM (Not mounted). The EEPROM is controlled by the I2C bus interface included in SH7285.

Table 2.3.3 lists the specification outline of EEPROM.

Figure 2.3.3 shows the connection circuit block diagram of SH7285 and EEPROM.

Table 2.3.3 EEPROM Specification Outline

Part Number	Interface	Capacity	Package
HN58X24128FPIE	2-wire system serial (I ² C bus)*	128k bit (16k-word x 8-bit)	8-pin SOP

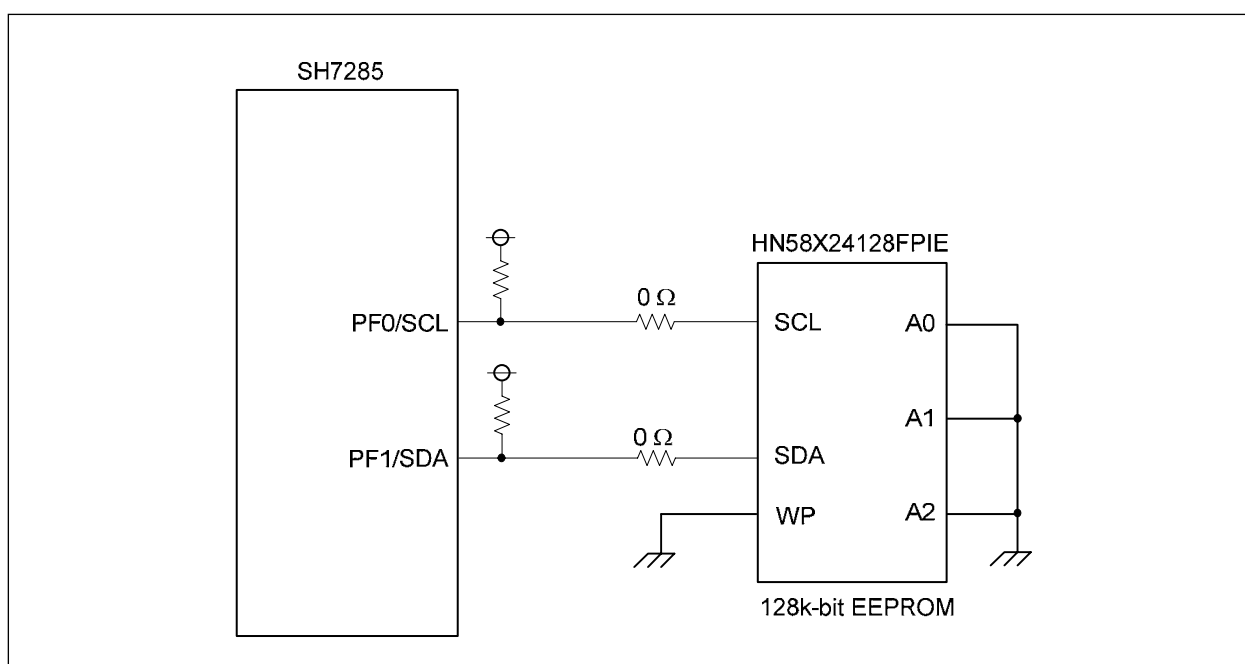


Figure 2.3.3 Block Diagram of SH7285 and EEPROM

Note*: I²C bus is a trademark of Koninklijke Philips Electronics N. V.

2.4 Serial Port Interface

SCI channel 0 or SCI channel 3 of SH7285 can be connected with the serial port connector in the M3A-HS85 (SCI channel 3 is connected to serial port connector (J3) in initial setting.). SCI channel to connect to a serial port connector is switched by the serial port switch jumper (JP7 and JP8).

SCI channel 0 of SH7285 is connected to an H-UDI connector (14-pin and 36-pin). When SCI channel 0 of SH7285 is used as a serial port connector, note that it should not be double-used on the other connectors.

Figure 2.4.1 shows the block diagram of serial port interface in the M3A-HS85.

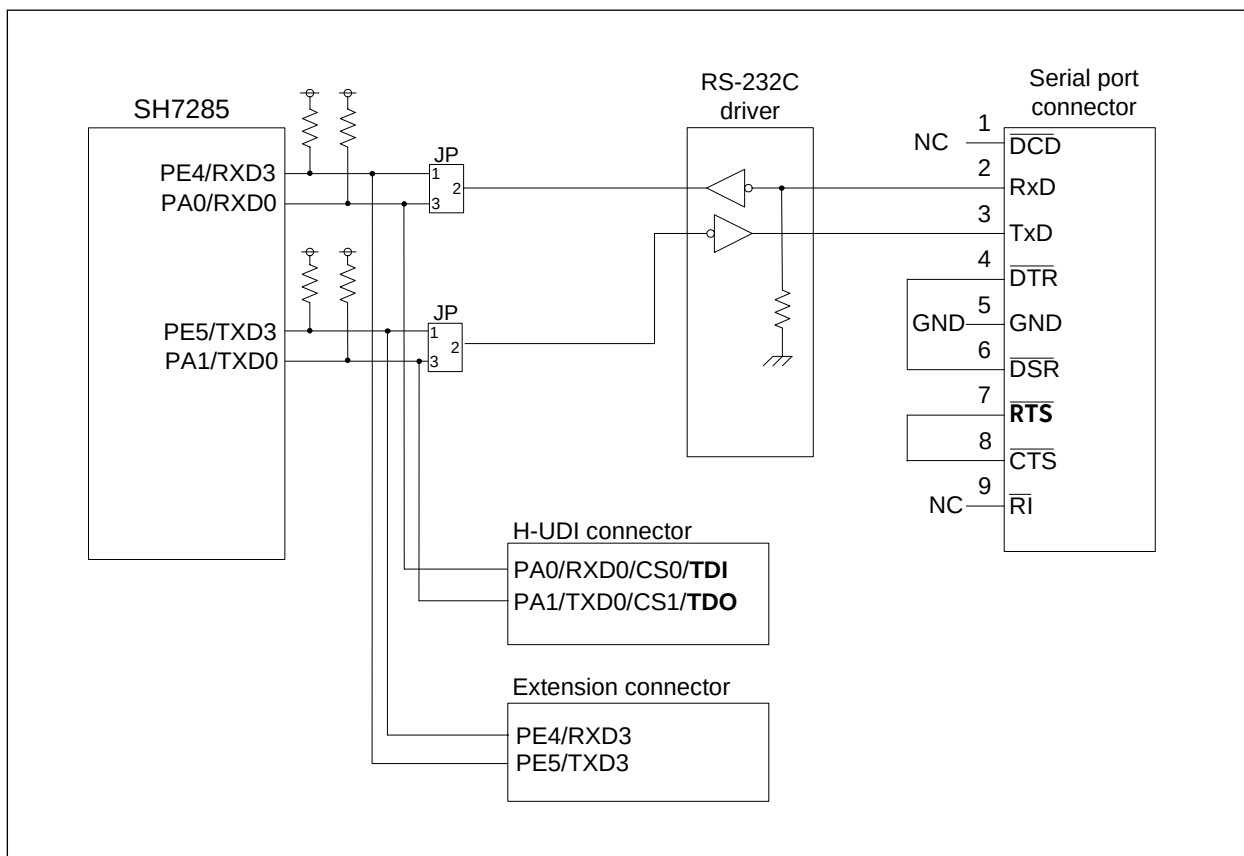


Figure 2.4.1 Block Diagram of Serial Port Interface

2.5 I/O Ports

In the M3A-HS85, all of the SH7285's I/O ports are connected to the extension bus connector.

Some I/O ports are connected to DIP switches and LEDs, and users are free to use these ports.

Figure 2.5.1 shows the block diagram of DIP Switch and LEDs.

Table 2.5.1 lists the functions of the SH7285.

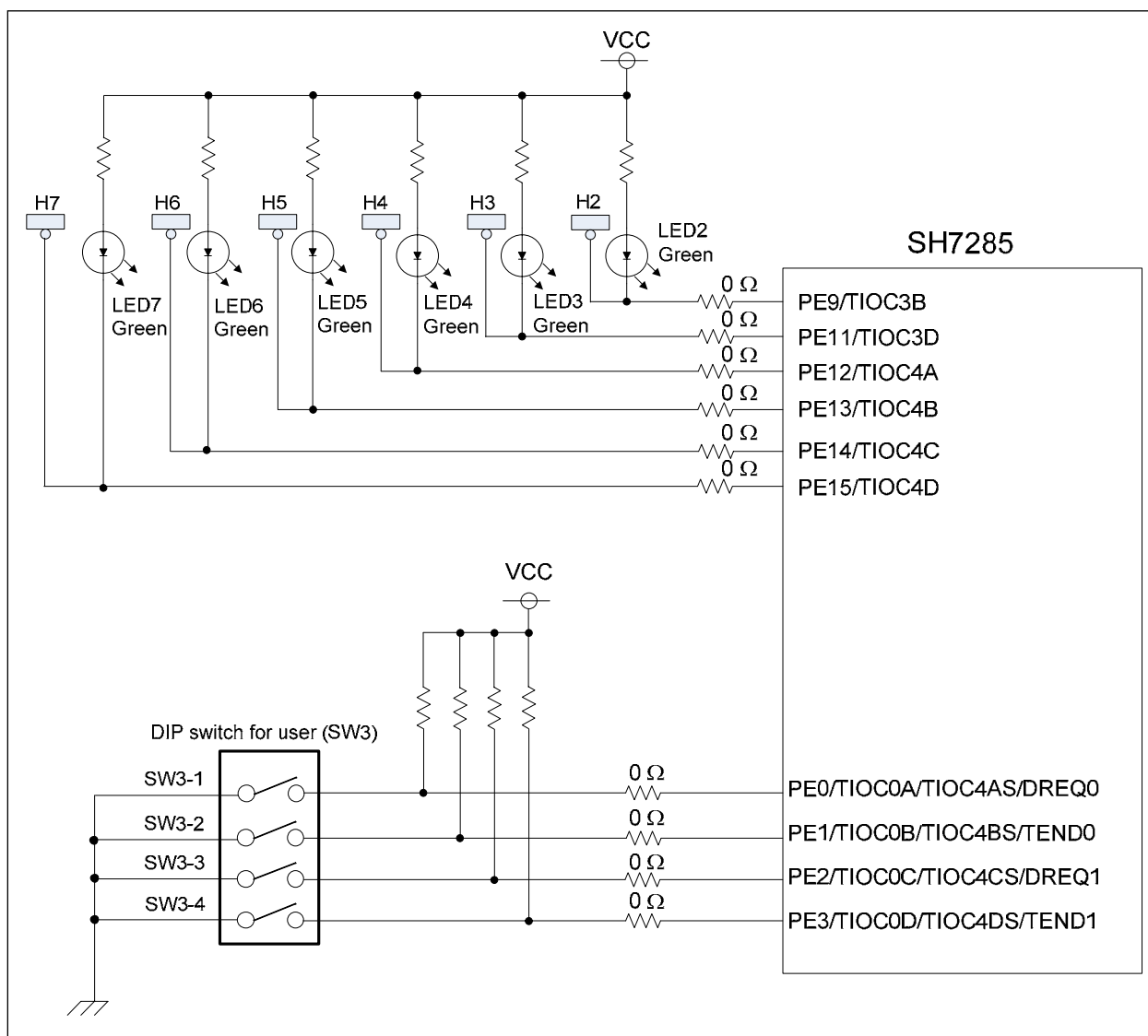


Figure 2.5.1 Block Diagram of DIP Switch and LEDs

Table 2.5.1 Functions of I/O Ports

SH7285		Extension Connector					Remarks
No	Pin Name	J8	J9	J10	J11	J12	
1	PE14/DACK0/TIOC4C/AH					●	LED
2	PE15/DACK1/TIOC4D/IRQOUT					●	LED
6	PA23/TIC5W/POE0/IRQ1/AH/CKE					●	IRQ1 SW
7	PA22/TIC5V/CASU/POE4/IRQ2/CASL					●	
8	PA21/TIC5U/RASU/POE8/IRQ3/RASL					●	
9	PC0/A0/POE0		●				
10	PC1/A1		●				
11	PC2/A2		●				
12	PC3/A3		●				
13	PC4/A4		●				
14	PC5/A5		●				
15	PC6/A6		●				
16	PC7/A7		●				
17	PC8/A8		●				
18	PC9/A9		●				
19	PC10/A10		●				
20	PC11/A11		●				
21	PC12/A12		●				
24	PC13/A13/IRQ0		●				
25	PC14/A14/IRQ1		●				
26	PC15/A15/IRQ2		●				
27	PB0/A16/IRQ3		●				
28	PB1/A17/REFOUT/ADTRG/IRQ4		●				
29	PB2/SCL/POE1/IRQ0			●			EEPROM
30	PB3/SDA/POE2/IRQ1			●			EEPROM
31	PB6/A18/BACK/POE3/IRQ5/RXD0		●				
32	PB7/A19/BREQ/POE4/IRQ6/TXD0		●				
33	PB8/A20/WAIT/POE8/IRQ7/SCK0		●				
36	PD0/D0				●	●	
37	PD1/D1				●	●	
38	PD2/D2/TIC5U				●	●	
39	PD3/D3/TIC5V				●	●	
40	PD4/D4/TIC5W				●	●	
41	PD5/D5/TIC5US				●	●	
42	PD6/D6/TIC5VS				●	●	
43	PD7/D7/TIC5WS				●	●	
46	PD8/D8/TIOC3AS				●	●	
47	PD9/D9/TIOC3CS				●	●	
48	PD10/D10/TIOC3BS				●	●	
49	PD11/D11/TIOC3DS				●	●	
50	PD12/D12/TIOC4AS				●	●	
51	PD13/D13/TIOC4BS				●	●	
52	PD14/D14/TIOC4CS				●	●	
53	PD15/D15/TIOC4DS				●	●	
57	PD16/IRQ0/CS3/AUDATA0			*			
58	PD17/IRQ1/POE5/SCK3/CS2/AUDATA1			*			
59	PD18/IRQ2/POE6/TXD3/CS1/AUDATA2			*			
60	PD19/IRQ3/POE7/RXD3/CS0/AUDATA3			*			
61	PD20/IRQ4/TIC5WS/SCK4/POE8		●				
62	PD21/IRQ5/TIC5VS/TXD4		●				
63	PD22/IRQ6/TIC5US/RXD4/AUDSYNC			*			
64	PD24/DREQ0/TIOC4DS/AUDCK			*			
67	PD25/TIOC4CS/DREQ1					●	
68	PD26/TIOC4BS/DACK1					●	
69	PD27/TIOC4AS/DACK0					●	
70	PD28/TIOC3DS				●		

SH7285		Extension Connector					Remarks
No	Pin Name	J8	J9	J10	J11	J12	
71	PD29/TIOC3BS				●		
72	PD30/TIOC3CS/IRQOUT		●				
73	PD31/TIOC3AS/ADTRG			●			
76	PA15/CK		●				
77	PA14/RD				●	●	
78	PA13/WRL/DQMLL			●			
79	PA12/WRH/DQMLU/POE8			●			
80	PA9/TCLKD/RXD3/CKE			●			
81	PA8/TCLKC/TXD3/RDWR			●			
82	PA7/TCLKB/SCK3/CASL			●			
83	PA6/TCLKA/RASL			●			
87	PB9/USPND					●	
93	PB10					●	
102	PE0/TIOC0A/TIOC4AS/DREQ0		●				DIP switch for user
103	PE1/TIOC0B/TIOC4BS/TEND0		●				DIP switch for user
104	PE2/TIOC0C/TIOC4CS/DREQ1		●				DIP switch for user
105	PE3/TIOC0D/TIOC4DS/TEND1		●				DIP switch for user
106	PE4/TIOC1A/RXD3		●				
107	PE5/TIOC1B/TIOC3BS/TXD3		●				
108	PE6/TIOC2A/TIOC3DS/SCK3	●	●				
111	PB11/RXD2/CS6/CS2/CS0/IRQ0		●				
112	PB12/TXD2/CS7/CS3/CS1/IRQ1			●			
118	PF0/AN0	●					Pin for analog input
119	PF1/AN1	●					Pin for analog input
120	PF2/AN2	●					Pin for analog input
121	PF3/AN3	●					Pin for analog input
122	PF4/AN4	●					Pin for analog input
123	PF5/AN5	●					Pin for analog input
124	PF6/AN6	●					Pin for analog input
125	PF7/AN7	●					Pin for analog input
131	PA0/RXD0/CS0/TDI						J1,J2,J3,J13
132	PA1/TXD0/CS1/TDO						J1,J2,J3,J13
133	PA2/SCK0/SCS/CS2/TCK			*			
134	PA3/RXD1/SSI/CS3/TMS			*			
135	PA4/TXD1/SSO/CS4/TRST			*			
136	PA5/SCK1/SSCK/CS5		●				
137	PE7/TIOC2B/RXD2/BS/UBCTRG					●	
139	PE8/TIOC3A/SCK2					●	
140	PE10/TIOC3C/TXD2					●	
141	PE9/TIOC3B/FRAME					●	LED
142	PE11/TIOC3D					●	LED
143	PE12/TIOC4A					●	LED
144	PE13/TIOC4B/MRES					●	LED

Note *: Connected only when the 0Ω resistance is mounted.

2.6 Power Supply Module

In M3A-HS85, 5V power is input to the board and 3.3V is generated by using a regulator. The regulator used is output voltage variable type and given voltage value can be generated by changing the resistance value.

5V power can be supplied from DC stabilized power supply (via power supply connector (J4)) and AC adapter (via DC power supply jack (J7)).

SH7285 system power supply (VCC) can be switched to 3.3V/5V by setting 3V/5V select jumper (JP1)(Initially it is set to 5V). When VCC is switched, please note the points shown as follows.

- When 5V is set in the state that SRAM or SDRAM is mounted, the voltage that exceeds the maximum rating is supplied from the address line, data line, and control line to SDRAM or SRAM, and devices could be destroyed. Thus, using like this must be avoided.

(3.3V is supplied to 3V system device such as SRAM and SDRAM even when 5V is set.)

By setting jumpers, system power (VSS), A/D power (AVCC), AVREF power, and USB power (DrVCC) of SH7285 can be individually supplied from external power supply.

Figure 2.6.1 shows the block diagram of M3A-HS85 power supply circuit.

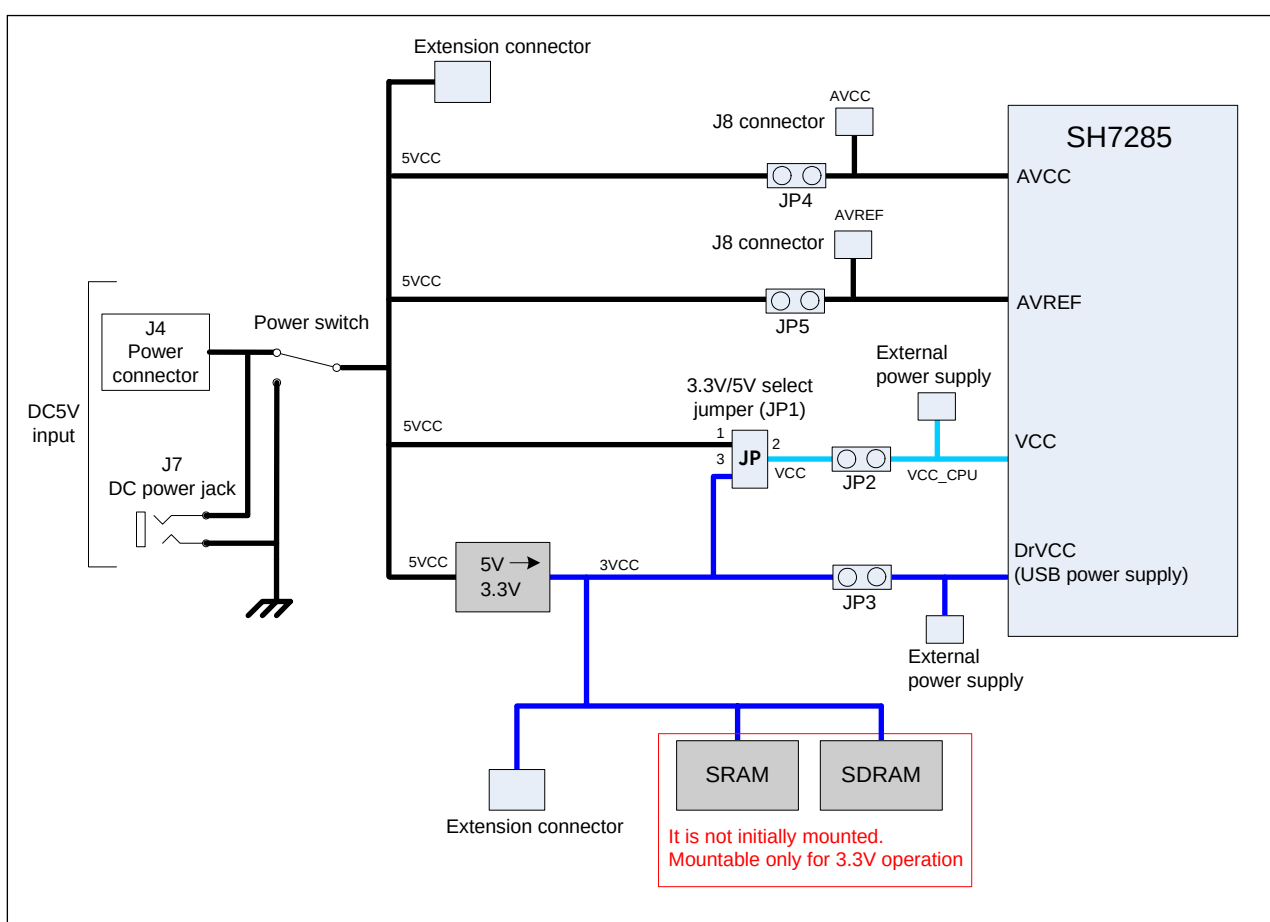


Figure 2.6.1 Block Diagram of Power Supply Circuit

2.7 USB Interface

The M3A-HS85 contains a USB connector (Standard-B receptacle).

When a cable is connected to USB host/hub in the state that this CPU board is not turned on, the voltage is impressed from USB host/hub to VBUS. Thus, the CPU board should be turned on before USB cable is connected.

When you want to delay a notification of connection to USB host/hub (the cases such as in the processing of high priority or initialization), it can be controlled by PB10. The powered state is kept regardless of the states USD+ and USD- when pin VBUS of SH7285 is set to low level.

Figure 2.7.1 shows the block diagram of M3A-HS85 USB interface.

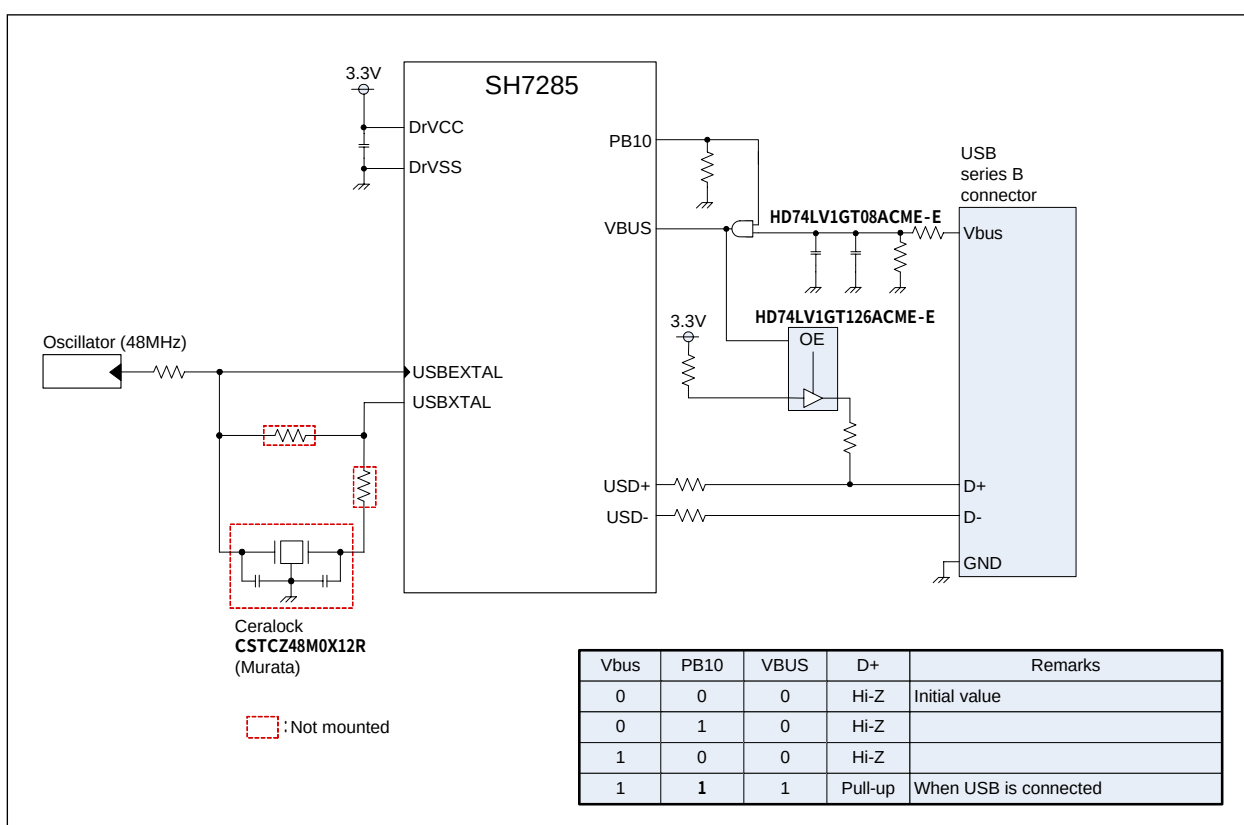


Figure 2.7.1 Block Diagram of USB Interface

2.8 Clock Module

The clock module in the M3A-HS85 consists of the following two blocks:

- Output from a oscillator connected to EXTAL of the SH7285
- Ceramic resonator connected to EXTAL and XTAL

The M3A-HS85 has a 12.5MHz ceramic oscillator connected to it as standard specification. (The oscillator is mounted via 8-pin IC socket.)

When the ceramic resonator is used, R7 should be removed.

Figure 2.8.1 shows the block diagram of clock module.

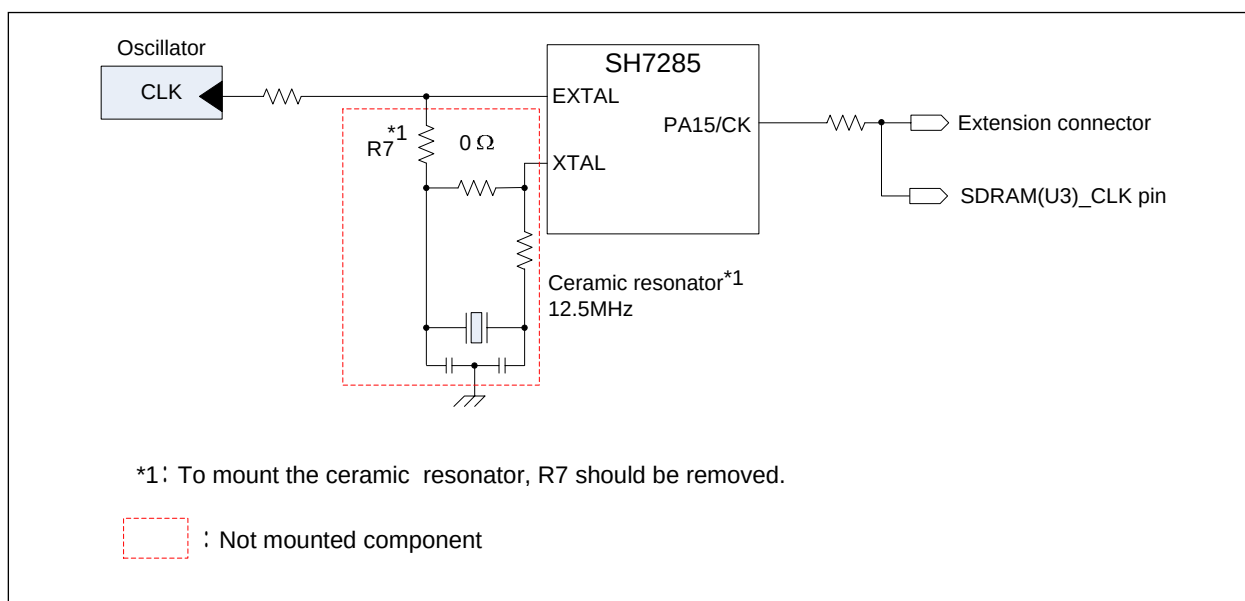


Figure 2.8.1 Block Diagram of Clock Module

2.9 Reset Module

This circuit controls the reset signal of SH7285 mounted on the M3A-HS85.

Figure 2.9.1 shows the block diagram of reset module in the M3A-HS85.

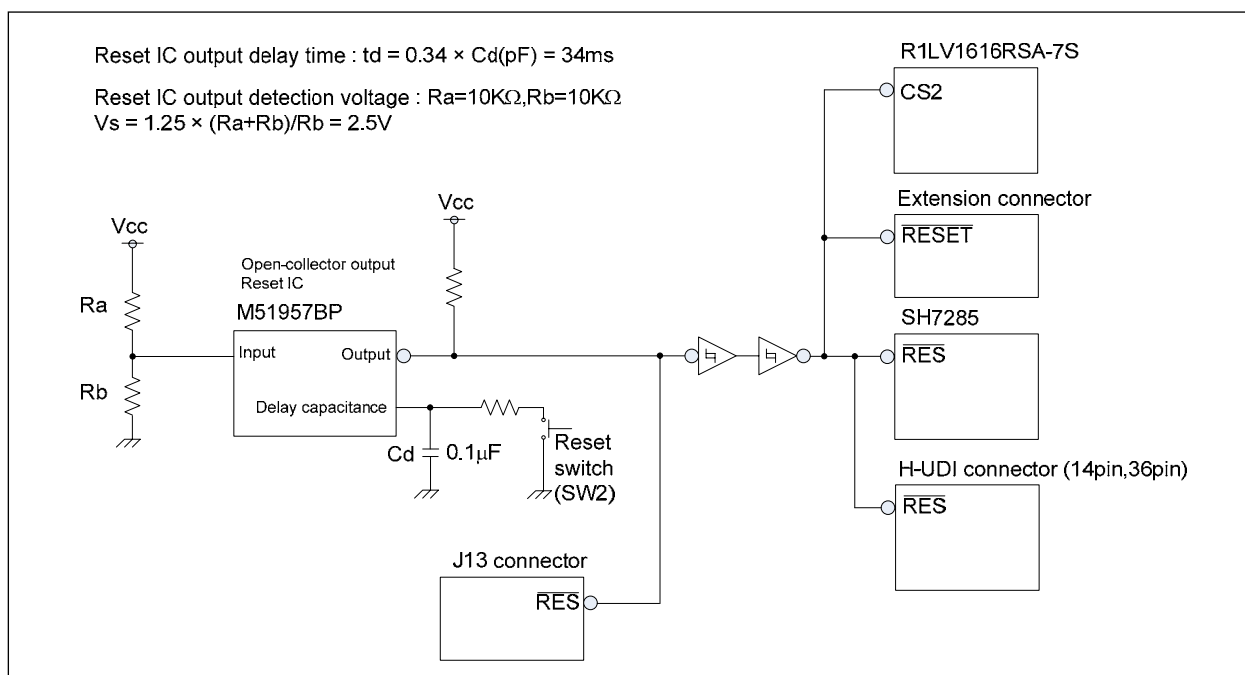


Figure 2.9.1 Block Diagram of Reset Module

2.10 Interrupt Switches

In the M3A-HS85, the push switches are connected with the pins NMI and IRQ1 of SH7285.

Figure 2.10.1 shows the block diagram of interrupt switch.

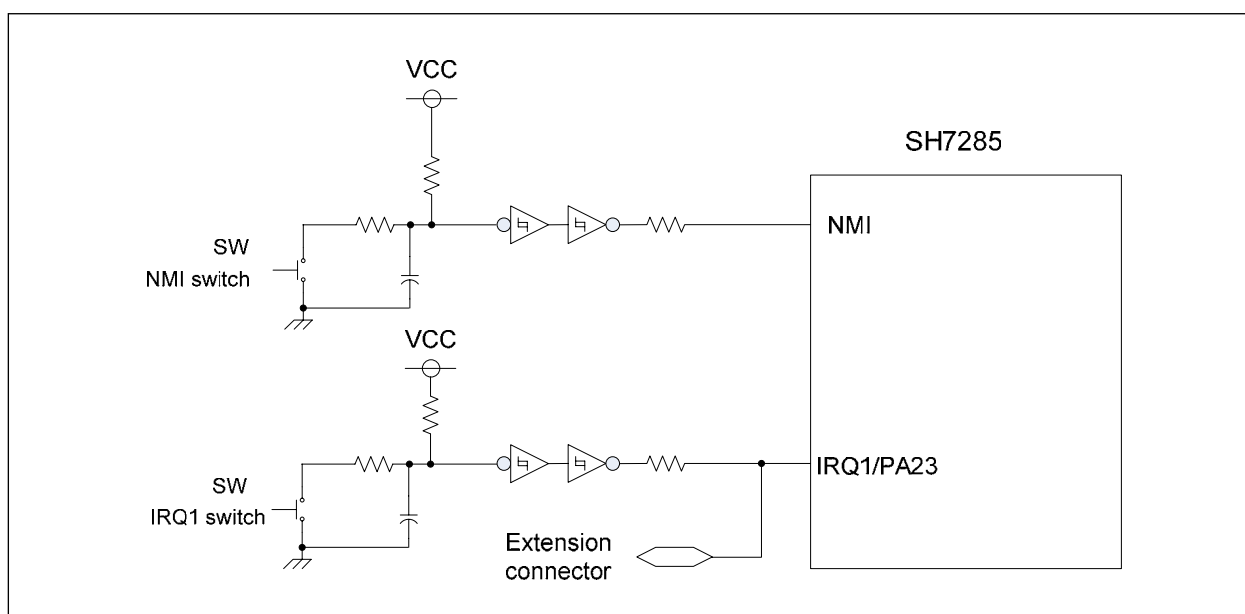


Figure 2.10.1 Block Diagram of Interrupt Switch

2.11 E10A-USB Interface

The M3A-HS85 has the H-UDI connectors (J1 and J2) to connect with E10A-USB.

ASEBRKAK/ASEBRK/FWE pin of SH7285 is connected to DIP switch for system setting (SW4-1). When the M3A-HS85 is connected to E10A-USB, SW4-1 should be set to “OFF” after FWE switch jumper (JP6) is set to “1-2”. When it is connected to E10A-USB in the state that SW4-1 is set to “ON”, it cannot be normally debugged.

Figure 2.11.1 shows the block diagram of E10A-USB interface.

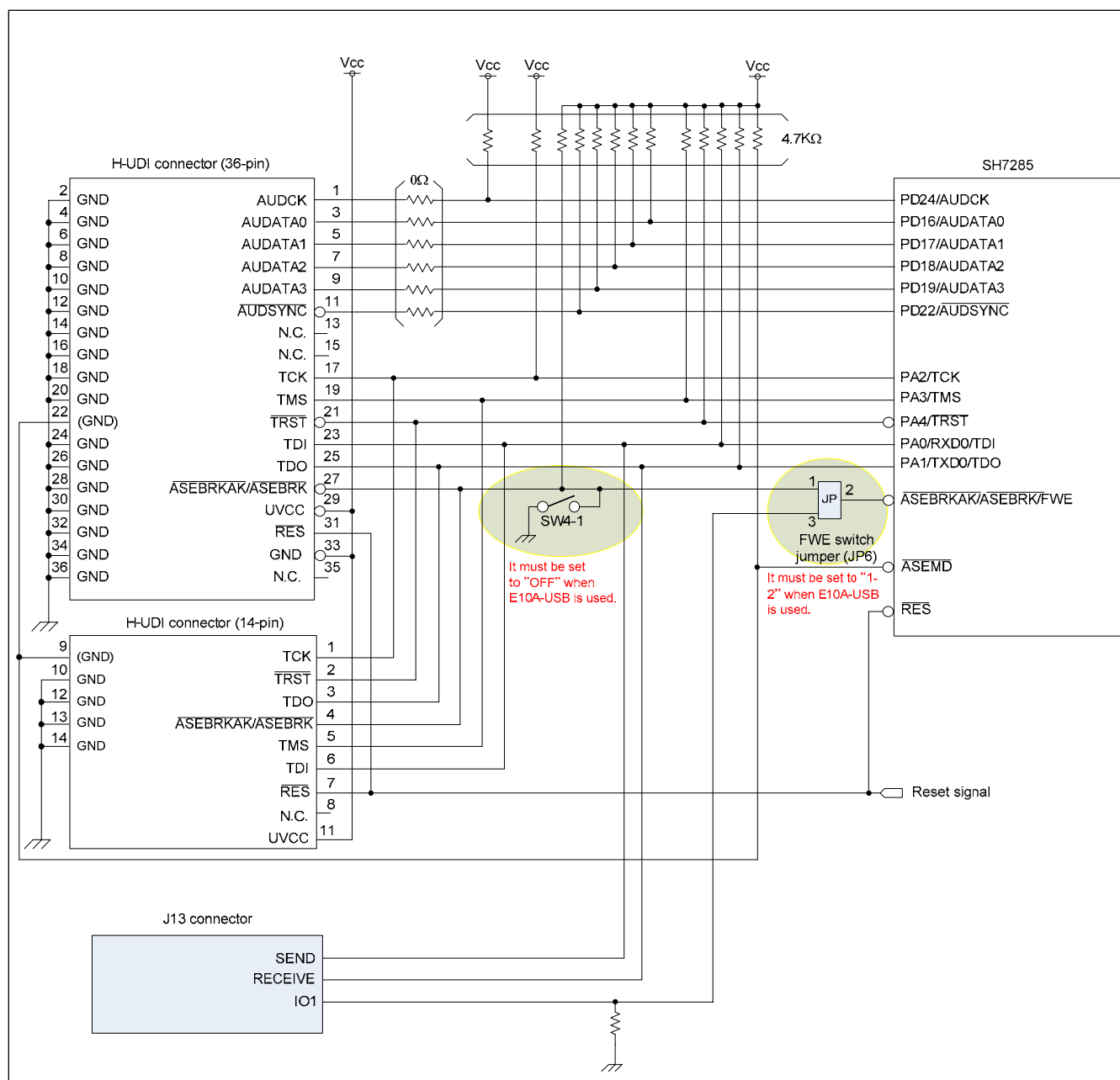


Figure 2.11.1 Block Diagram of E10A-USB Interface

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3.1 M3A-HS85 Connectors Outline

Figure 3.1.1 shows the M3A-HS85 connector assignments.

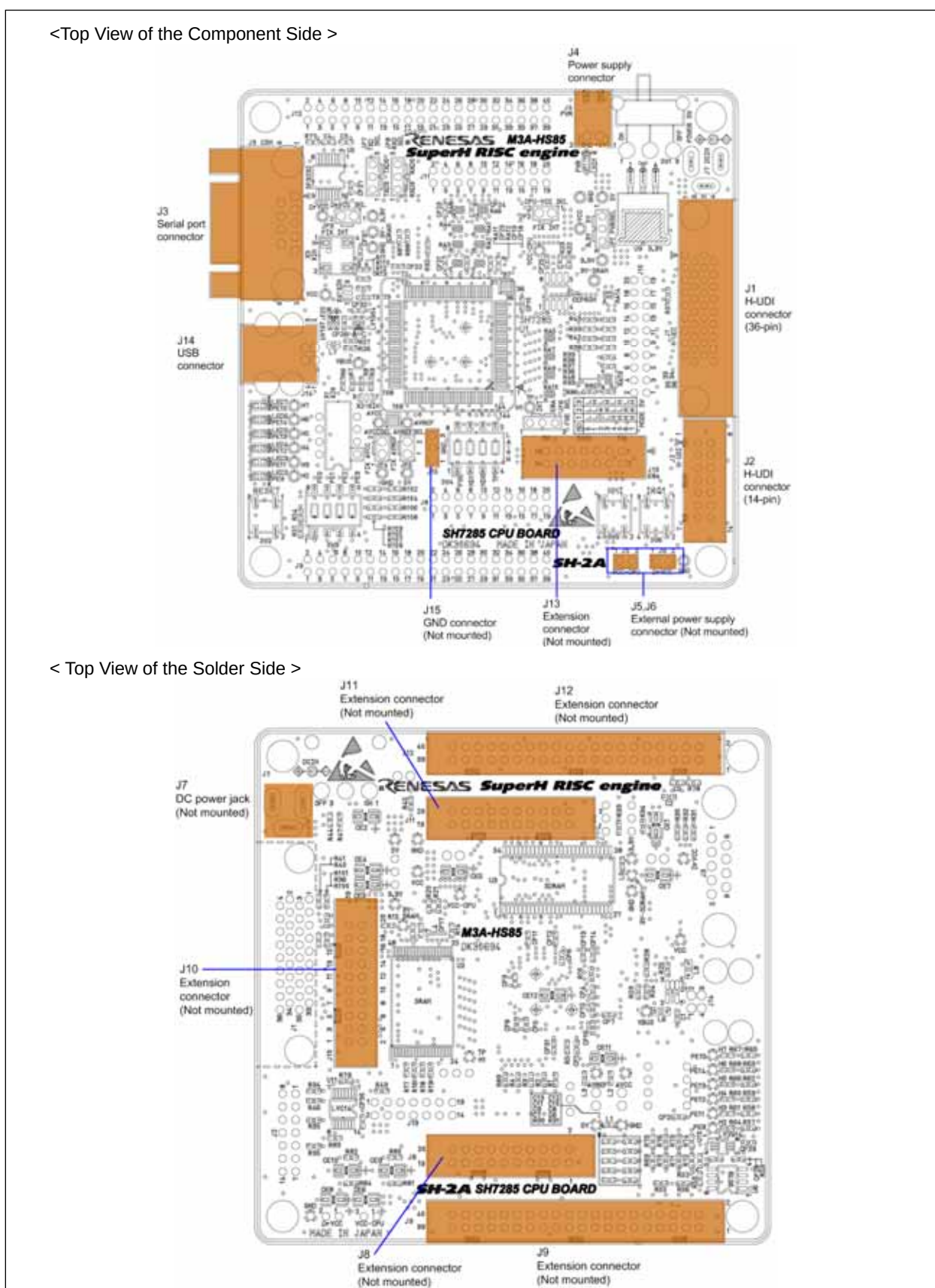


Figure 3.1.1 M3A-HS85 Connector Assignments

3.1.1 H-UDI Connector (J1, J2)

The M3A-HS85 includes a 36-pin H-UDI (J1) connector and 14-pin H-UDI (J2) connector for a connection to the E10A-USB emulator.

Figure 3.1.2 shows the pin assignments of H-UDI (J1) connector.

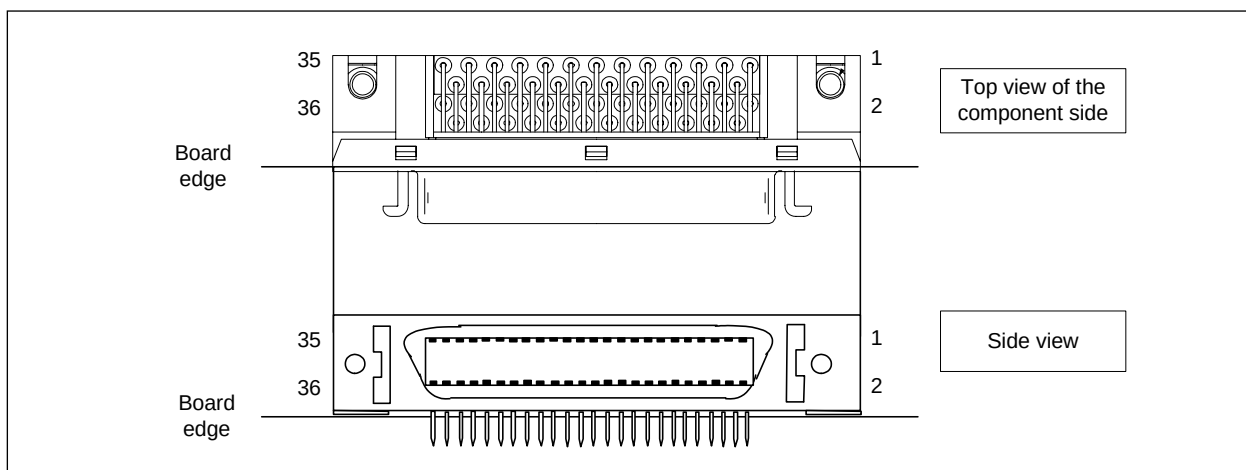


Figure 3.1.2 Pin Assignments of H-UDI (J1) Connector

Table 3.1.1 lists pin assignments of H-UDI connector (J1).

Table 3.1.1 Pin Assignments of H-UDI (J1) Connector

Pin	Signal Name	Pin	Signal Name
1	AUDCK	19	TMS
2	GND	20	GND
3	AUDATA0	21	$\overline{\text{TRST}}$
4	GND	22	(GND)
5	AUDATA1	23	TDI
6	GND	24	GND
7	AUDATA2	25	TDO
8	GND	26	GND
9	AUDATA3	27	$\overline{\text{ASEBRKAK/ASEBRK}}$
10	GND	28	GND
11	$\overline{\text{AUDSYNC}}$	29	UVCC
12	GND	30	GND
13	NC	31	RES
14	GND	32	GND
15	NC	33	GND
16	GND	34	GND
17	TCK	35	NC
18	GND	36	GND

Figure 3.1.3 shows the pin assignments of H-UDI (J2) connector.

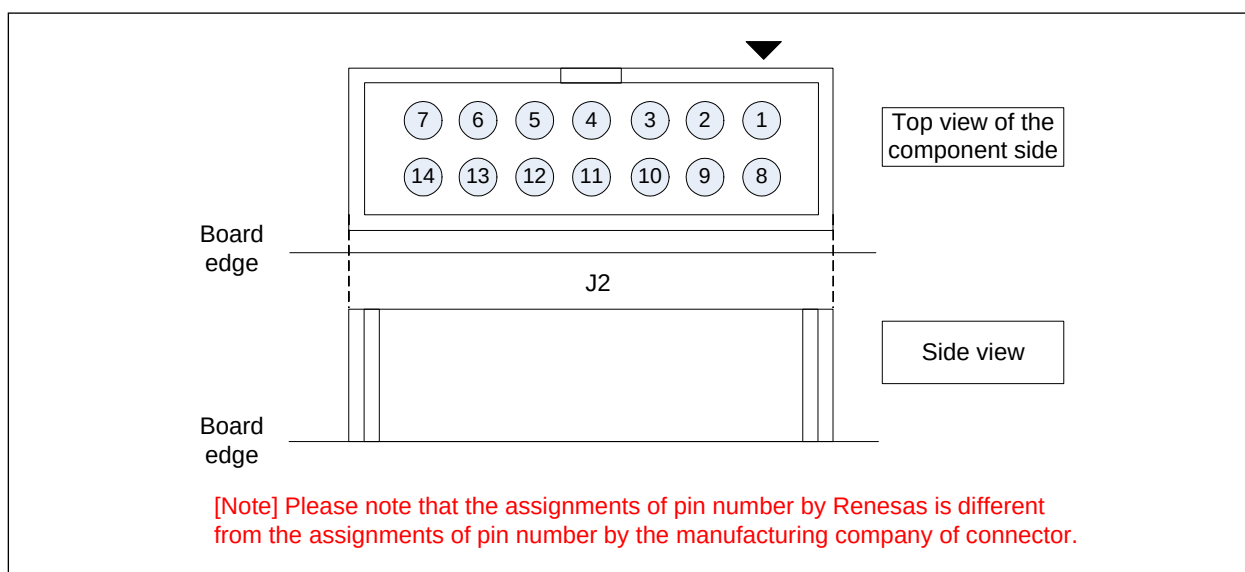


Figure 3.1.3 Pin Assignments of H-UDI (J2) Connector

Table 3.1.2 lists the pin assignments of H-UDI (J2) connector.

Table 3.1.2 Pin Assignments of H-UDI (J2) Connector

Pin	Signal Name	Pin	Signal Name
1	TCK	8	NC
2	$\overline{\text{TRST}}$	9	(GND)
3	TDO	10	GND
4	$\overline{\text{ASEBRKAK/ASEBRK}}$	11	UVCC
5	TMS	12	GND
6	TDI	13	GND
7	$\overline{\text{RES}}$	14	GND

3.1.2 Serial Port Connector (J3)

The M3A-HS85 contains a serial port connector (J3).

Figure 3.1.4 shows the pin assignments of serial port connector.

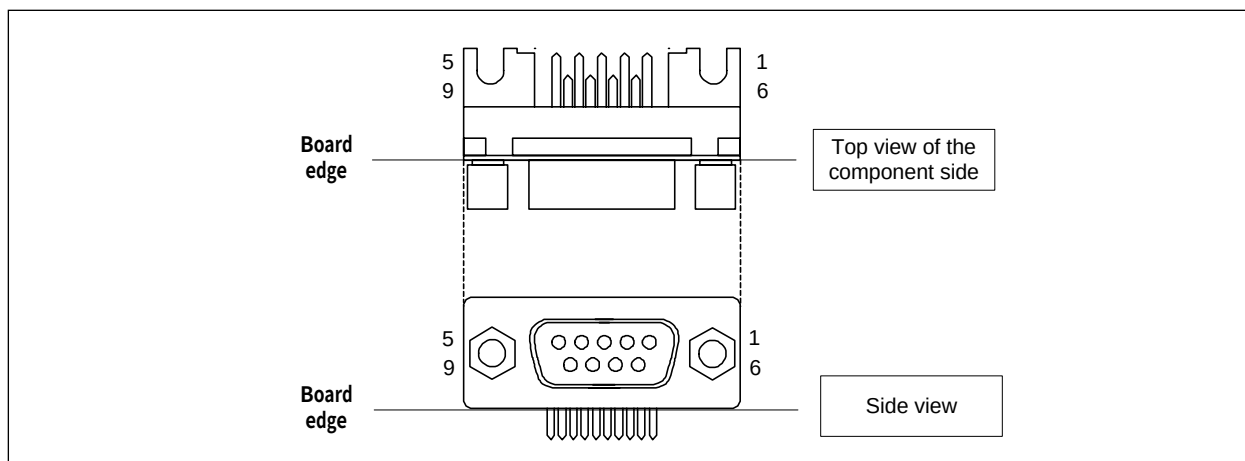


Figure 3.1.4 Pin Assignments of Serial Port Connector (J3)

Table 3.1.3 lists the pin assignments of serial port connector.

Table 3.1.3 Pin Assignments of Serial Port Connector (J3)

Pin	Signal Name	Pin	Signal Name
1	NC	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	$\overline{\text{DTR}}$	9	NC
5	GND		

Pins 4-6 and Pins 7-8 are loop back connected.

3.1.3 Power Supply Connector (J4)

The M3A-HS85 includes a connector for power supply.

Figure 3.1.5 shows the pin assignments of power supply connector.

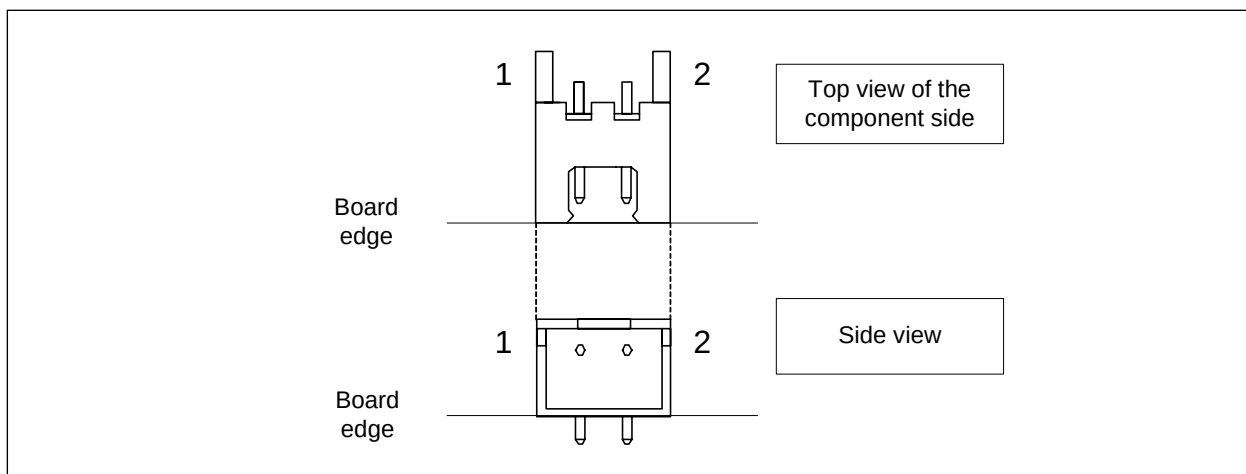


Figure 3.1.5 Pin Assignments of Power Supply Connector (J4)

Table 3.1.4 lists the pin assignments of power supply connector for M3A-HS85.

Table 3.1.4 Pin Assignments of Power Supply Connector (J4)

Pin	Signal Name	Pin	Signal Name
1	+5V	2	GND

3.1.4 External Power Supply Connector for SH7285 (J5, J6)

The M3A-HS85 contains a connector pin for external power supply to be supplied to the power for CPU and USB.

When the power is supplied by using this connector, remove the post heads of the external power switch jumpers (JP2 and JP3) to be in the released state.

Figure 3.1.6 shows the pin assignments of power supply connector.

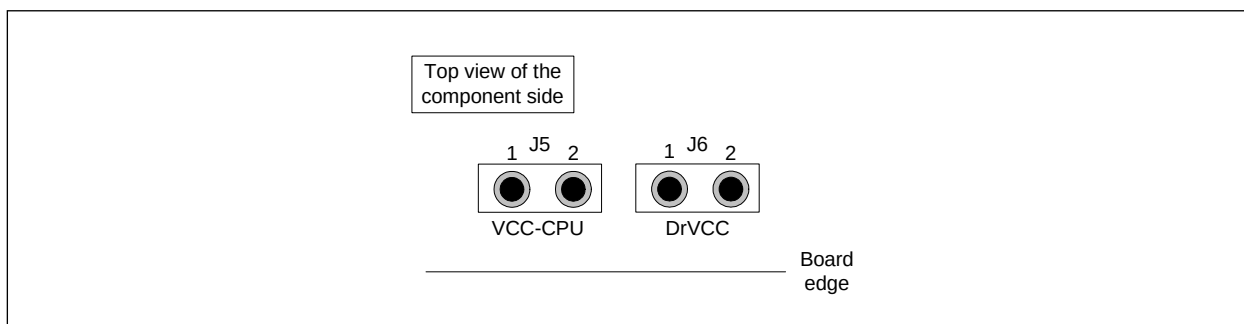


Figure 3.1.6 Pin Assignments of Power Supply Connector (J5, J6)

Table 3.1.5 lists the pin assignment of power supply connector (J5) for SH7285.

Table 3.1.5 Pin Assignments of Power Supply Connector for SH7285 (J5)

Pin	Signal Name	Pin	Signal Name
1	VCC-CPU	2	GND

Table 3.1.6 lists the pin assignments of power supply connector (J6) for SH7285.

Table 3.1.6 Pin Assignments of Power Supply Connector for SH7285 (J6)

Pin	Signal Name	Pin	Signal Name
1	DrVCC	2	GND

3.1.5 DC Power Jack (J7)

A DC power jack can be mounted on the M3A-HS85. Figure 3.1.7 shows the pin assignments of DC power jack, and Table 3.1.7 lists the pin assignments of DC power jack (J7).

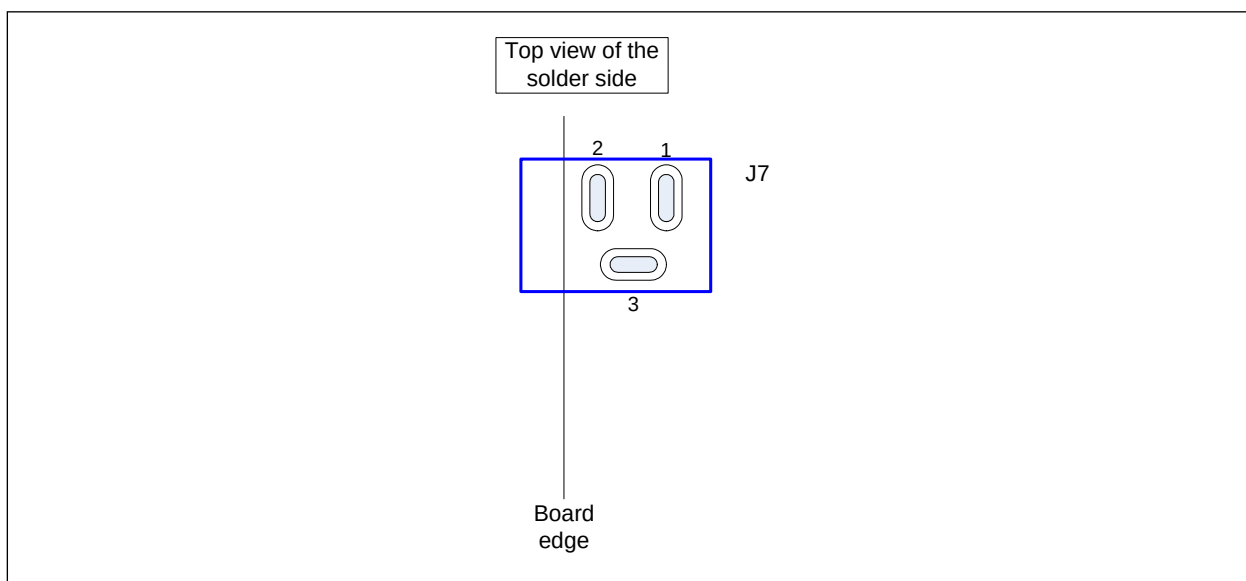


Figure 3.1.7 Pin Assignments of DC Power Jack (J7)

Table 3.1.7 Pin Assignments of DC Power Jack (J7)

Pin	Signal Name
1	+5V
2	GND
3	GND

3.1.6 Extension Connectors (J8-J12)

The M3A-HS85 includes the through-hole for mounting extension connectors to which the I/O pins of the SH7285 are connected.

MIL standard connectors can be connected to J8-J12, allowing users to connect with extension boards or monitor the SH7285 bus signals.

Figure 3.1.8 shows the pin assignments of extension connector.

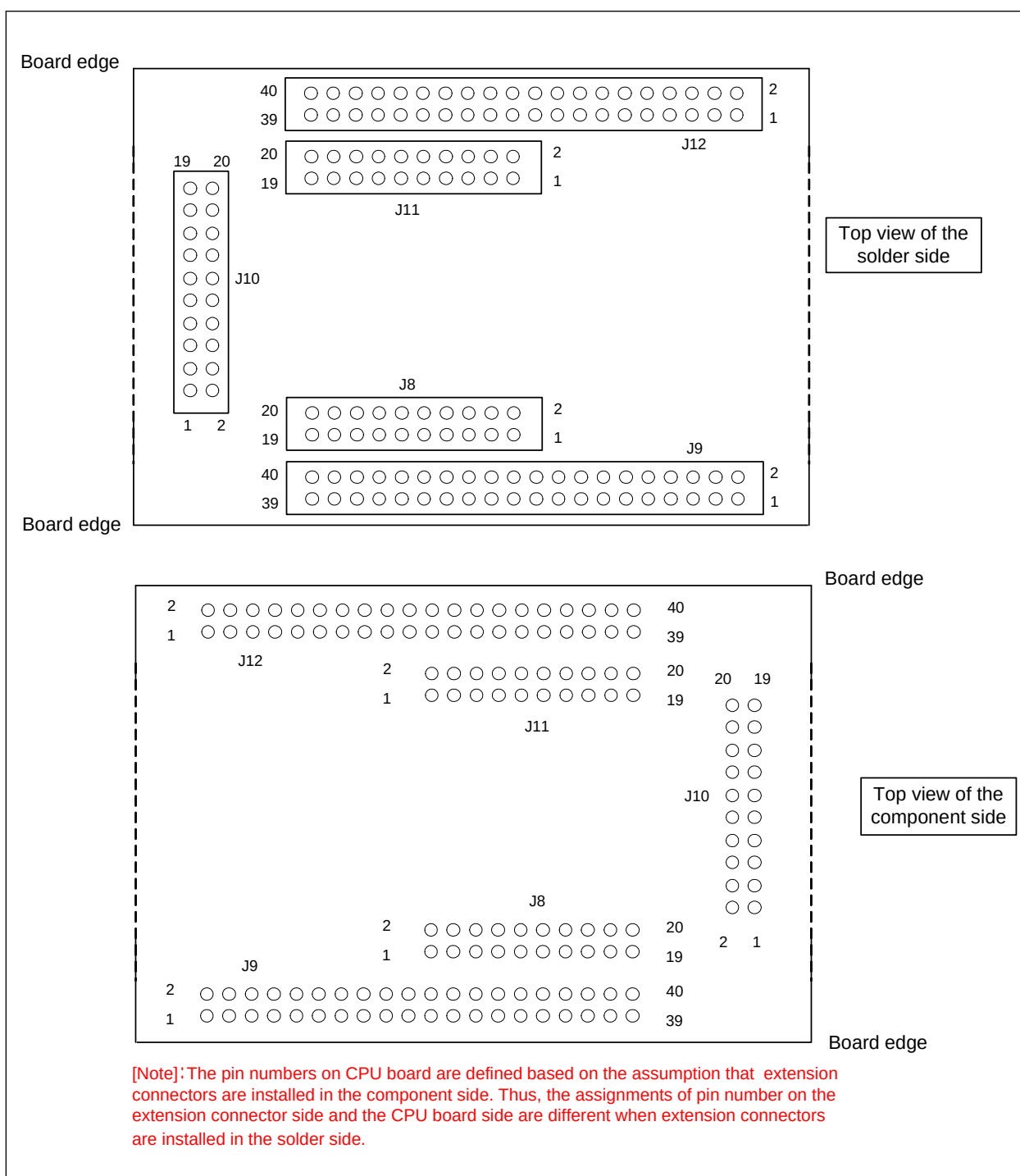


Figure 3.1.8 Pin Assignments of Extension Connectors

Table 3.1.8 lists the pin assignments of extension connector (J8).

Table 3.1.8 Pin Assignments of Extension Connectors (J8)

Pin	Signal Name	Other Connections
1	AVCC	-
2	AVCC	-
3	AVREF	-
4	PF0/AN0	-
5	PF1/AN1	-
6	PF2/AN2	-
7	PF3/AN3	-
8	PF4/AN4	-
9	PF5/AN5	-
10	PF6/AN6	-
11	PF7/AN7	-
12	AVREFVSS	-
13	PE6/TIOC2A/TIOC3DS/SCK3	Extension Connector (J9)
14	AVSS	-
15	AVSS	-
16	NC	-
17	NC	-
18	NC	-
19	NC	-
20	GND	-

Table 3.1.9 lists the pin assignments of extension connectors (J9).

Table 3.1.9 Pin Assignments of Extension Connectors (J9)

Pin	Signal Name	Other Connections
1	5VCC	-
2	5VCC	-
3	WDTOVF#	-
4	PE6/TIOC2A/TIOC3DS/SCK3	Extension Connector (J8)
5	PE5/TIOC1B/TIOC3BS/TXD3	Serial Port Connector (J3) *When JP7 is "2-3"
6	PE4/TIOC1A/RXD3	Serial Port Connector (J3) *When JP8 is "2-3"
7	PE3/TIOC0D/TIOC4DS/TEND1	DIP Switch for User (SW3)
8	PE2/TIOC0C/TIOC4CS/DREQ1	DIP Switch for User (SW3)
9	PB8/A20/WAIT/POE8/IRQ7/SCK0	SRAM (U2) *
10	PB7/A19/BREQ/POE4/IRQ6/TXD0	SRAM (U2) *
11	PB6/A18/BACK/POE3/IRQ5/RXD0	SRAM (U2) *
12	PB1/A17/REFOUT/ADTRG/IRQ4	SRAM (U2) *
13	PB0/A16/IRQ3	SRAM (U2) *
14	PC15/A15/IRQ2	SRAM (U2) *
15	PC14/A14/IRQ1	SRAM (U2) * SDRAM (U3) *
16	PC13/A13/IRQ0	SRAM (U2) * SDRAM (U3) *
17	PC12/A12	SRAM (U2) * SDRAM (U3) *
18	PC11/A11	SRAM (U2) * SDRAM (U3) *
19	PC10/A10	SRAM (U2) * SDRAM (U3) *
20	GND	-
21	PE1/TIOC0B/TIOC4BS/TEND0	DIP Switch for User (SW3)
22	PE0/TIOC0A/TIOC4AS/DREQ0	DIP Switch for User (SW3)
23	PA15/CK	SDRAM (U3) *
24	PC9/A9	SRAM (U2) * SDRAM (U3) *
25	PC8/A8	SRAM (U2) * SDRAM (U3) *
26	PC7/A7	SRAM (U2) * SDRAM (U3) *
27	PC6/A6	SRAM (U2) * SDRAM (U3) *
28	PC5/A5	SRAM (U2) * SDRAM (U3) *
29	PC4/A4	SRAM (U2) * SDRAM (U3) *
30	PC3/A3	SRAM (U2) * SDRAM (U3) *
31	PC2/A2	SRAM (U2) * SDRAM (U3) *
32	PC1/A1	SRAM (U2) * SDRAM (U3) *
33	PC0/A0/POE0	-
34	PB11/RXD2/CS6#/CS2#/CS0#/IRQ0	SRAM (U2) *
35	PA5/SCK1/SSCK/CS5#	-
36	PD20/IRQ4/TIC5WS/SCK4/POE8	-
37	PD21/IRQ5/TIC5VS/TXD4	-
38	PD30/TIOC3CS/IRQOUT	-
39	RESET#	Reset Module
40	GND	-

Note *: Only when SRAM and SDRAM are mounted.

Table 3.1.10 lists the pin assignments of extension connectors(J10).

Table 3.1.10 Pin Assignments of Extension Connectors (J10)

Pi	Signal Name	Other Connections
1	PB3/SDA/POE2/IRQ1	EEPROM (U4)
2	PB2/SCL/POE1/IRQ0	EEPROM (U4)
3	PB12/TXD2/CS7#/CS3#/CS1#/IRQ1	SDRAM (U3) *
4	PA8/TCLKC/TXD3/RDWR#	SRAM (U2) *, SDRAM (U3) *
5	PA13/WRL/DQMLL	SRAM (U2) *, SDRAM (U3) *
6	PA12/WRH/DQMLU/POE8	SRAM (U2) *, SDRAM (U3) *
7	PD31/TIOC3AS/ADTRG	-
8	NC (PA4/TXD1/SSO/CS4#/TRST when R93 is mounted)	- (H-UDI connector (J1,J2) when R93 is mounted)
9	PA9/TCLKD/RXD3/CKE	SDRAM (U3) *
10	PA6/TCLKA/RASL#	SDRAM (U3) *
11	PA7/TCLKB/SCK3/CASL#	SDRAM (U3) *
12	NC (PA2/SCK0/SCS/CS2#/TCK when R94 is mounted)	- (H-UDI connector (J1,J2) when R94 is mounted)
13	NC (PA3/RXD1/SSI/CS3#/TMS when R95 is mounted)	- (H-UDI connector (J1,J2) when R95 is mounted)
14	NC (PD16/IRQ0/CS3#/AUDATA0 when R96 is mounted)	- (H-UDI connector (J1) when R96 is mounted)
15	NC (PD17/IRQ1/POE5/SCK3/CS2#/AUDATA1 when R97 is mounted)	- (H-UDI connector (J1) when R97 is mounted)
16	NC (PD18/IRQ2/POE6/TXD3/CS1#/AUDATA2 when R98 is mounted)	- (H-UDI connector (J1) when R98 is mounted)
17	NC (PD19/IRQ3/POE7/RXD3/CS0#/AUDATA3 when R99 is mounted)	- (H-UDI connector (J1) when R99 is mounted)
18	NC (PD22/IRQ6/TIC5US/RXD4/AUDSYNC when R100 is mounted)	- (H-UDI connector (J1) when R100 is mounted)
19	NC (PD24/DREQ0/TIOC4DS/AUDCK when R101 is mounted)	- (H-UDI connector (J1) when R101 is mounted)
20	GND	

Note *: Only when SRAM and SDRAM are mounted.

Table 3.1.11 lists the pin assignments of extension connectors (J11).

Table 3.1.11 Pin Assignments of Extension Connectors (J11)

Pin	Signal Name	Other Connections
1	PD28/TIOC3DS	-
2	PD29/TIOC3BS	-
3	PA14/RD#	SRAM (U2) *, Extension Connector (J12)
4	PD15/D15/TIOC4DS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
5	PD14/D14/TIOC4CS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
6	PD13/D13/TIOC4BS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
7	PD12/D12/TIOC4AS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
8	PD11/D11/TIOC3DS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
9	PD10/D10/TIOC3BS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
10	PD9/D9/TIOC3CS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
11	PD8/D8/TIOC3AS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
12	PD7/D7/TIC5WS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
13	PD6/D6/TIC5VS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
14	PD5/D5/TIC5US	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
15	PD4/D4/TIC5W	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
16	PD3/D3/TIC5V	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
17	PD2/D2/TIC5U	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
18	PD1/D1	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
19	PD0/D0	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J12)
20	GND	-

Note *: Only when SRAM and SDRAM are mounted.

Table 3.1.12 lists the pin assignments of the extension connectors (J12).

Table 3.1.12 Pin Assignments of the Extension Connectors (J12)

Pin	Signal Name	Other Connections
1	3VCC	-
2	3VCC	-
3	PA21/TIC5U/RASU/POE8/IRQ3/RASL	-
4	PA22/TIC5V/CASU/POE4/IRQ2/CASL	-
5	PA23/TIC5W/POE0/IRQ1/AH/CKE	IRQ1 SW (SW6)
6	PB9/USPND	-
7	PB10	USB module
8	PD25/TIOC4CS/DREQ1	-
9	PD26/TIOC4BS/DACK1	-
10	PD27/TIOC4AS/DACK0	-
11	PE7/TIOC2B/RXD2/BS/UBCTRG	-
12	PE8/TIOC3A/SCK2	-
13	PE9/TIOC3B/FRAME	User LED
14	PE10/TIOC3C/TXD2	-
15	PE11/TIOC3D	User LED
16	PE12/TIOC4A	User LED
17	PE13/TIOC4B/MRES#	User LED
18	PE14/DACK0/TIOC4C/AH	User LED
19	PE15/DACK1/TIOC4D/IRQOUT	User LED
20	GND	-
21	NC	-
22	NC	-
23	PA14/RD#	SRAM (U2) *, Extension Connector (J11)
24	PD15/D15/TIOC4DS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
25	PD14/D14/TIOC4CS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
26	PD13/D13/TIOC4BS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
27	PD12/D12/TIOC4AS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
28	PD11/D11/TIOC3DS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
29	PD10/D10/TIOC3BS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
30	PD9/D9/TIOC3CS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
31	PD8/D8/TIOC3AS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
32	PD7/D7/TIC5WS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
33	PD6/D6/TIC5VS	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
34	PD5/D5/TIC5US	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
35	PD4/D4/TIC5W	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
36	PD3/D3/TIC5V	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
37	PD2/D2/TIC5U	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
38	PD1/D1	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
39	PD0/D0	SRAM (U2) *, SDRAM (U3) *, Extension Connector (J11)
40	GND	-

Note *: Only when SRAM and SDRAM are mounted.

3.1.7 Extension Connector (J13)

J13 is the one having installed it for the examination when this board is developed. Please do not use it.

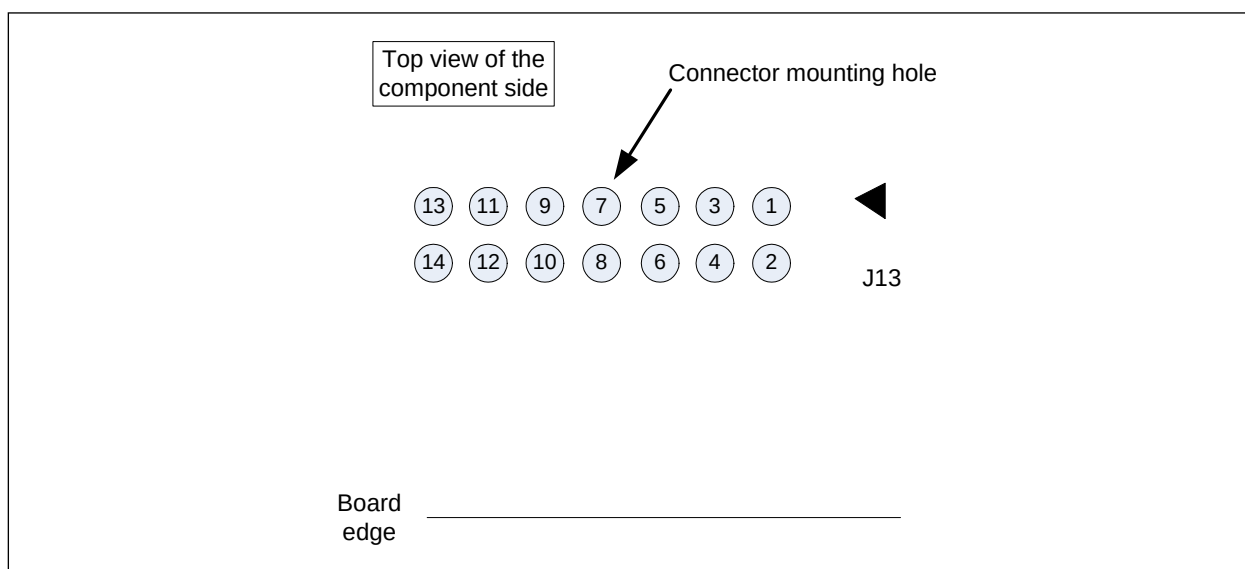


Figure 3.1.9 Pin Assignments of the Extension Connectors (J13)

3.1.8 USB Connector (J14)

The M3A-HS85 has a connector for USB (series B plug).

Figure 3.1.10 shows the pin assignments of USB connector (J14), and Table 3.1.13 lists the pin assignments of USB connector (J14).

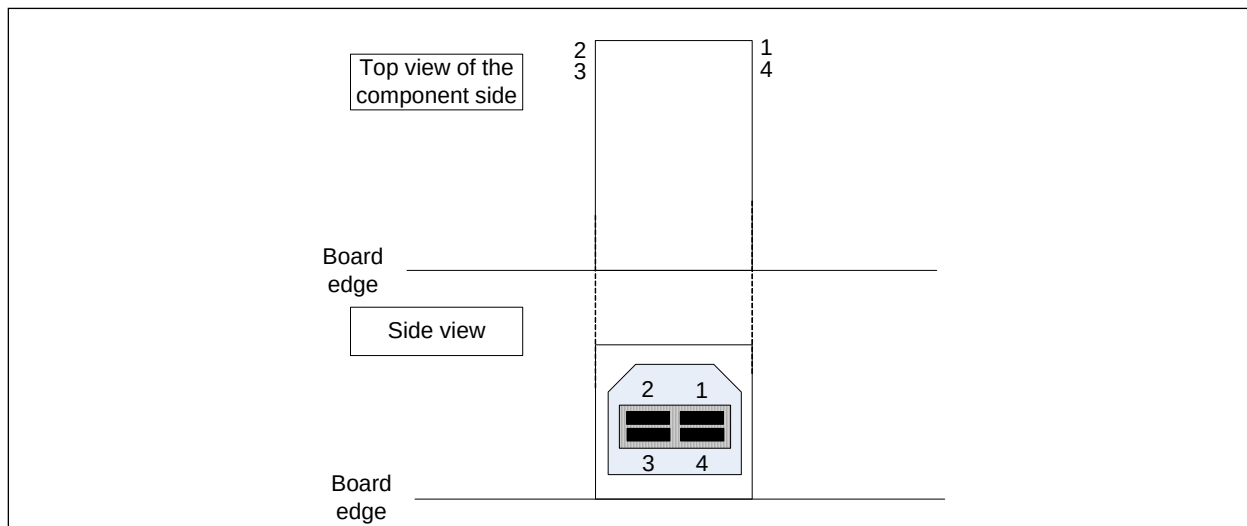


Figure 3.1.10 Pin Assignments of USB Connector (J14)

Table 3.1.13 Pin Assignments of USB Connector (J14)

Pin	Signal Name
1	Vbus
2	D-
3	D+
4	GND

3.1.9 GND Connector (J15)

The M3A-HS85 has a connector for GND. This is because GND such as measuring instruments can be easily connected when debugging.

Figure 3.1.11 shows the pin assignments of GND connector (J15). Table 3.1.14 lists the pin assignments of GND connector (J15).

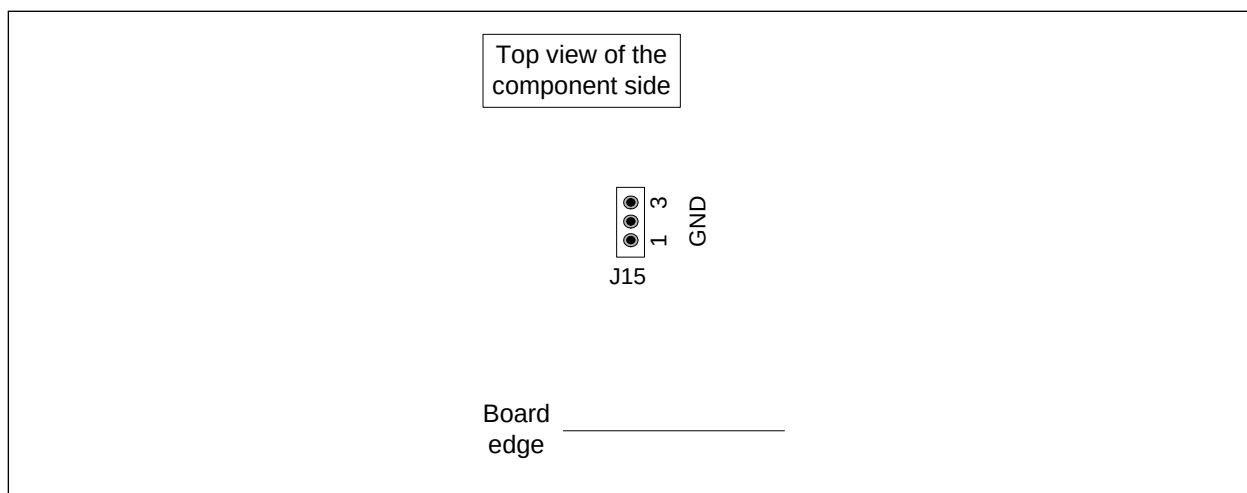


Figure 3.1.11 Pin Assignments of GND Connector (J15)

Table 3.1.14 Pin Assignments of GND Connector (J15)

Pin	Signal Name
1	GND
2	GND
3	GND

3.2 Outline of Switches and LEDs

The M3A-HS85 includes switches and LEDs as its operational components.

Figure 3.2.1 shows the M3A-HS85 operational component assignment.

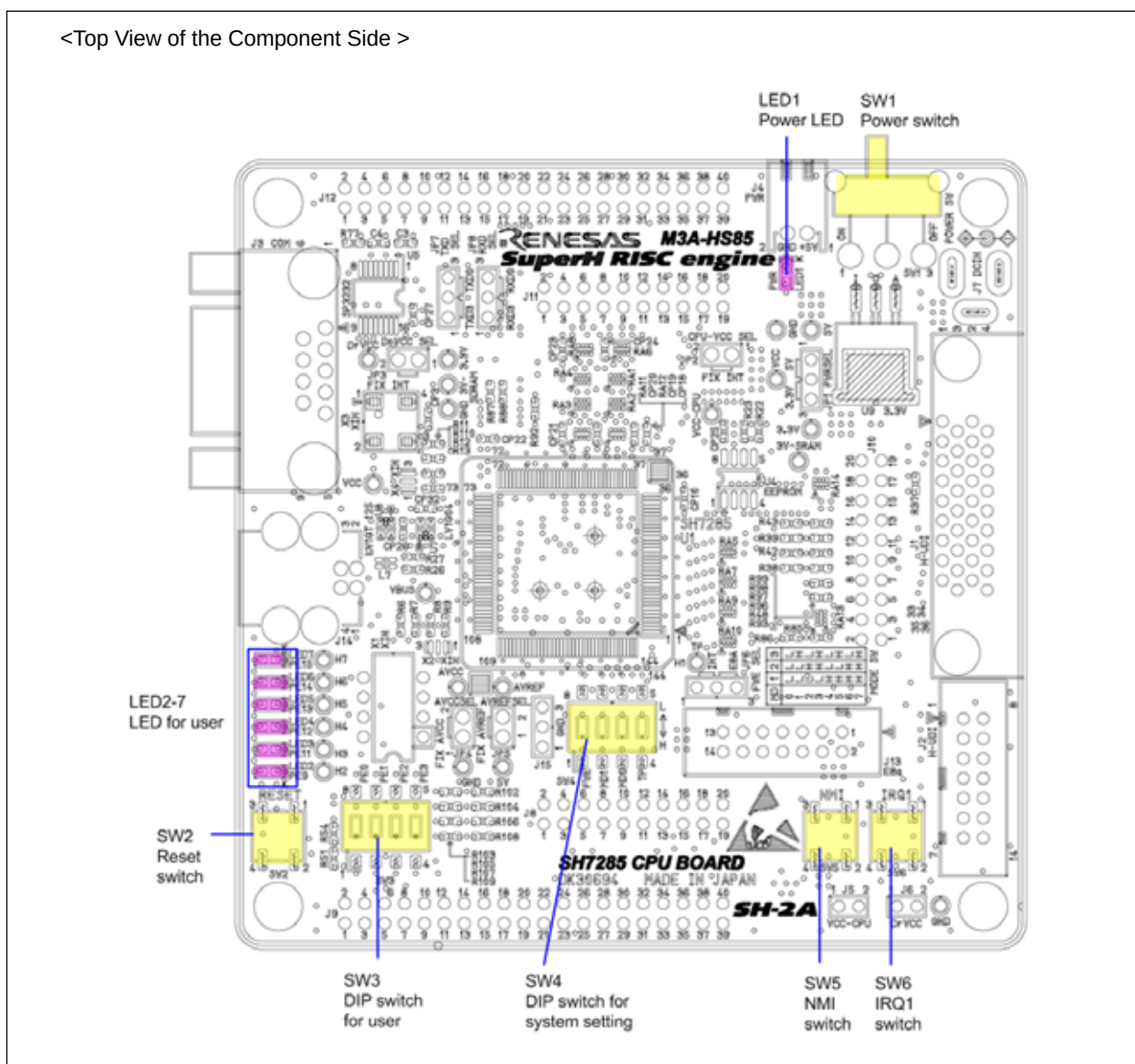


Figure 3.2.1 M3A-H85 Operational Component Assignment

3.2.1 CPU Power Supply Select Jumpers (JP1)

The power voltage supplied to SH7285 can be switched to 3.3V supply or 5V supply by setting JP1.

The power voltage which can be switched in this jumper is only SH7285 (U1). The supply voltages for the components such as external memories are not changed.

Figure 3.2.2 shows the pin assignments of select jumper for CPU power supply. Table 3.2.1 lists the pin assignments of jumper for CPU power supply select jumper for CPU power supply.

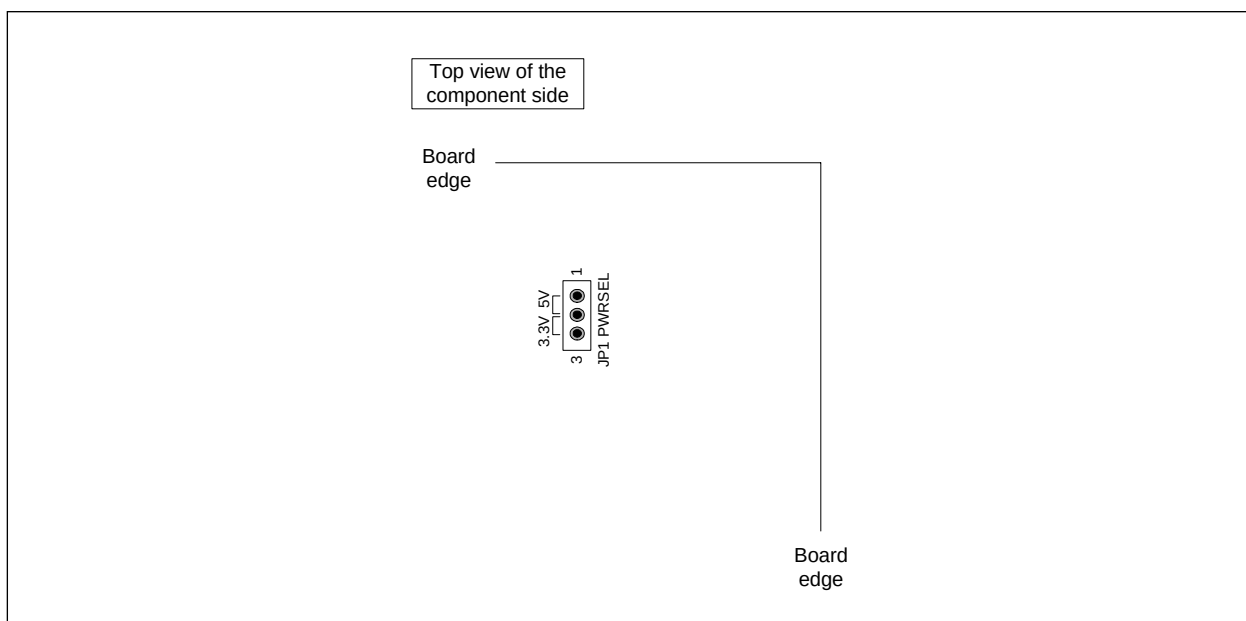


Figure 3.2.2 Pin Assignments of Select Jumper for CPU Power Supply (JP1)

Table 3.2.1 Pin Assignments of Select Jumper for CPU Power Supply (JP1)

Jumper	Setting	Function
JP1	1-2	5V voltage is supplied to CPU
PWRSEL	2-3	3.3V voltage is supplied to CPU

■ : Initial Setting

Note: Do not change jumper settings during the operation of M3A-HS85. Ensure to turn off the power for the M3A-HS85 before changing jumper settings.

3.2.2 External Power Supply Select Jumper (JP2, JP3, JP4, JP5)

By setting JP2 to JP5, the source of power voltage supplying to A/D reference power supply (AVREF), analog power supply (AVCC), USB power supply (DrVCC), and system power supply of SH7285 can be switched.

Figure 3.2.3 shows the external power supply select jumper assignments. Table 3.2.2 lists the external power supply select jumper setting.

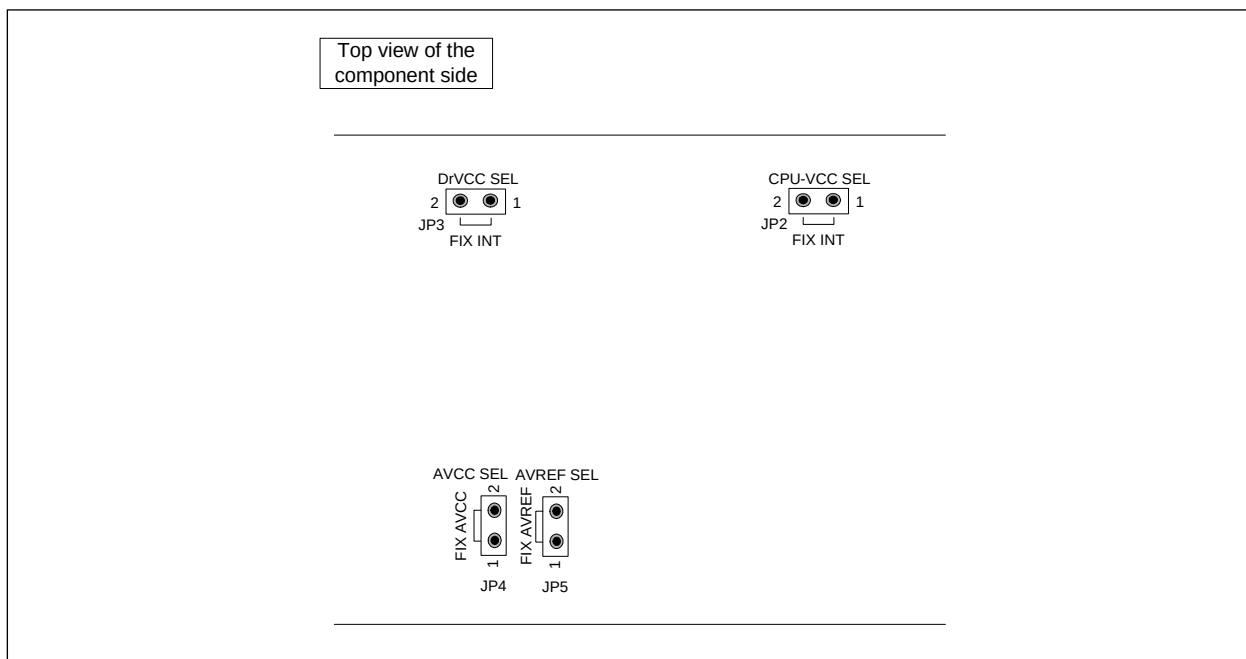


Figure 3.2.3 External Power Supply Select Jumper Assignments (JP2,JP3,JP4,JP5)

Table 3.2.2 External Power Supply Select Jumper Setting (JP2,JP3,JP4,JP5)

Jumper	Setting	Function
JP2 CPU-VCC SEL	1-2	SH7285 power supply voltage (VCC) is supplied from J4 or J7
	Open	External power supply voltage (supplied from J5 or H13)
JP3 DrVCC SEL	1-2	SH7285 USB power supply (DrVCC) is supplied from J4 or J7 (via regulator)
	Open	External power supply voltage (supplied from J6 or H14)
JP4 AVCCSEL	1-2	SH7285 AVCC is connected to 5V fixed power supply voltage.
	Open	External power supply voltage (supplied from J8 or H8)
JP5 AVREFSEL	1-2	SH7285 AVREF is connected to 5V fixed power supply voltage.
	Open	External power supply voltage (supplied from J8 or H9)

■ : Initial Setting

Note: Do not change jumper settings during the operation of M3A-HS85.

Ensure to turn off the power for the M3A-HS85 before changing jumper settings.

3.2.3 FWE Pin Select Jumper (JP6)

By setting JP6, pin FWE/ASEBRKAK/ASEBRK of SH7285 can be switched if it is connected to SW4-3 and H-UDI connector, or the extension connector (J13). This jumper should be set only when you want the pin FWE/ASEBRKAK/ASEBRK to be controlled via the extension (J13).

Figure 3.2.4 shows FWE pin select jumper assignment. Table 3.2.3 lists jumper setting for selecting FWE pin.

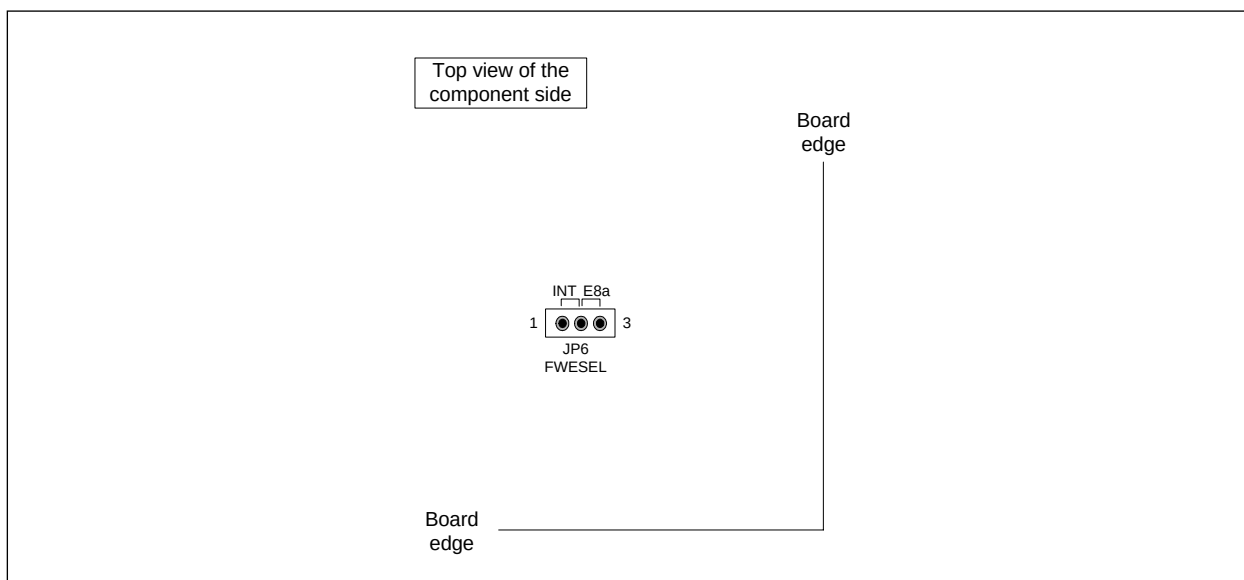


Figure 3.2.4 FWE Pin Select Jumper (JP6) Assignment

Table 3.2.3 FWE Select Jumper Setting (JP6)

Jumper	Setting	Function
JP6 FWESEL	1-2	Pin FWE/ASEBRKAK/ASEBRK of SH7285 is connected to SW4-3 and the H-UDI connector (J1 and J2).
	2-3	Pin FWE/ASEBRKAK/ASEBRK of SH7285 is connected to the extension connector (J13).

■ : Initial Setting

Note: Do not change jumper settings during the operation of M3A-HS85.

Ensure to turn off the power for the M3A-HS85 before changing jumper settings.

3.2.4 Serial Port Select Jumper (JP7, JP8)

SCI channel of SH7285 connecting to the serial port connector (J3) is changed by the setting of JP7 and JP8.

SCIF channel 3 is connected to the serial port connector (J3) as the initial setting. When SCI channel 0 is connected to the serial port connector (J3), note that H-UDI connectors (J1 and J2) and the extension connector (J13) cannot be used.

Figure 3.2.5 shows the serial port select jumper assignments. Table 3.2.4 lists the serial port select jumper setting.

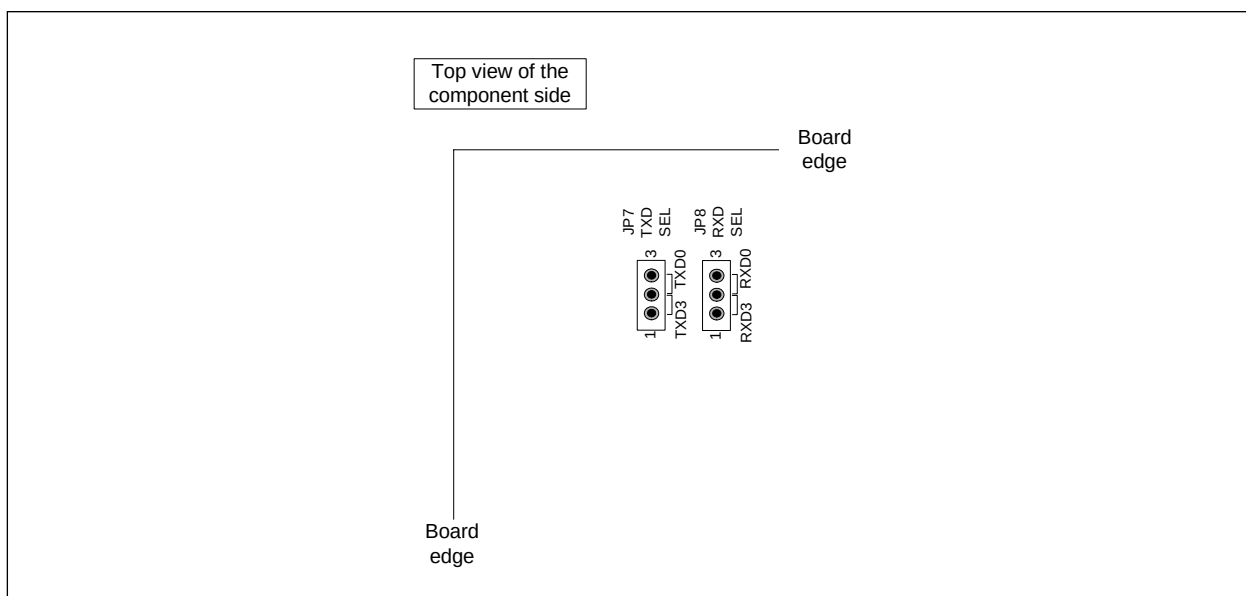


Figure 3.2.5 Serial Port Select Jumper Assignments (JP7, JP8)

Table 3.2.4 Serial Port Select Jumper Setting (JP7, JP8)

Jumper	Setting	Function
JP7 TXDSEL	1-2	Pin PE5/TXD3 of SH7285 is connected to the serial port connector (J3).
	2-3	Pin PA1/TXD0 of SH7285 is connected to the serial port connector (J3).
JP8 RXDSEL	1-2	Pin PE4/RXD3 of SH7285 is connected to the serial port connector (J3).
	2-3	Pin PA0/RXD0 of SH7285 is connected to the serial port connector (J3).

■ : Initial Setting

Note: Do not change jumper settings during the operation of M3A-HS85.

Ensure to turn off the power for the M3A-HS85 before changing jumper settings.

3.2.5 Switch and LED Functions

The M3A-HS85 includes six switches and seven LEDs.

Table 3.2.5 lists switches mounted on M3A-HS85.

Table 3.2.5 Switches Mounted on M3A-HS85

No.	Function	Remarks
SW1	System power on/off switch	-
SW2	System reset input switch	See section 2.9 for details.
SW3	DIP switch for user (4-pole) SW3-1 OFF : PE0="H" ON : PE0="L" SW3-2 OFF : PE1="H" ON : PE1="L" SW3-3 OFF : PE2="H" ON : PE2="L" SW3-4 OFF : PE3="H" ON : PE3="L"	PE0, PE1, PE2, and PE3 are pulled up. See section 2.5 on chapter 2 for details.
SW4	System setup DIP switch (4-pole)	See Table 3.2.6 for the functions
SW5	NMI input switch	See section 2.10 for details.
SW6	IRQ1 input switch	See section 2.10 for details.

Table 3.2.6 lists the functions of switch SW4. The operation mode of SH7285 is set by the combination of the pins FWE, MD0, and MD1. Table 3.2.7 lists the SH7285 operating mode setting.

FWE pin is multiplexed with the $\overline{\text{ASEBRK}}/\overline{\text{ASEBRKAK}}$ signal. When E10A-USB is used, SW4-1(FWE) must be set to "OFF".

Table 3.2.6 Functions of Switch SW4

No.	Setting	Function	
SW4-1 FWE	OFF	FWE="H" (Releasing the writing/erasing protects of on-chip flash memory)	Operating mode setting (See Table 3.2.7)
	ON	FWE="L" (Setting the writing erasing protects of on-chip flash memory)	
SW4-2 MD1	OFF	MD1 pin state "H"	
	ON	MD1 pin state "L"	
SW4-3 MD0	OFF	MD0 pin state "H"	
	ON	MD0 pin state "L"	
SW4-4 TP	OFF	H1="H"	It is connected to a test hole (H1). You can use it freely like connecting it to the input pin of SH7285 via H1.
	ON	H1="L"	

: Initial Setting

Table 3.2.7 SH7285 Operating Mode Setting

SW4-1 (FWE)	SW4-2 (MD1)	SW4-3 (MD0)	SH7285 Operating Mode	
			Operating Mode	Mode Name
ON	ON	ON	Mode 0	MCU extension mode 0 (On-chip ROM disabled, CS0 space :16bit bus)
ON	ON	OFF	Mode 1	MCU extension mode 1 (On-chip ROM disabled, CS0 space:8bit bus)
ON	OFF	ON	Mode 2	MCU extension mode 2 (On-chip ROM enabled)
ON	OFF	OFF	Mode 3	Single chip mode (On-chip ROM enabled)
OFF	ON	ON	Mode 4 *	Boot mode (On-chip ROM enabled)
OFF	ON	OFF	Mode 5 *	User boot mode (On-chip ROM enabled)
OFF	OFF	ON	Mode 6 *	User program mode (On-chip ROM enabled)
OFF	OFF	OFF	Mode 7 *	USB boot mode (On-chip ROM enabled)

■: Initial Setting

Note: * It is the programming mode of flash memory.

Table 3.2.8 lists the functions of LEDs mounted on M3A-HS85.

Table 3.2.8 Functions of LEDs mounted on M3A-HS85

No.	Color	Functions/Remarks
LED1	Blue	Power-on LED (LED1 lights when power is supplied)
LED2	Green	Open to user (LED2 lights on when PE9 outputs "L")
LED3	Green	Open to user (LED3 lights on when PE11 outputs "L")
LED4	Green	Open to user (LED4 lights on when PE12 outputs "L")
LED5	Green	Open to user (LED5 lights on when PE13 outputs "L")
LED6	Green	Open to user (LED6 lights on when PE14 outputs "L")
LED7	Green	Open to user (LED7 lights on when PE15 outputs "L")

3.2.6 Jumper Switch Setting when Using Development Tool

SH7285's emulator related signals (FWE/ASEBRKAK/ASEBRK, TDI, and TDO) are multiplexed with on-chip flash writing control pin. Thus, when development tools such as E10A-USB and Flash Development Toolkit (FDT) are used, the jumper switch should be set as shown in Table 3.2.9.

Table 3.2.9 Setting when Using Connectors

Tool	Connector	Setting				Remarks
		JP6	JP7,8	SW4-1	SW4-2,3	
E10A-USB	H-UDI connector (J1 or J2)	"1-2"	"1-2"	OFF	-	
FDT	Serial port connector (J3)	-	"2-3"	OFF ^{*1}	-	
	USB connector (J14)	-	"2-3"	OFF ^{*1}	OFF OFF	Mode 7 USB boot mode
Flash programmer	Extension connector (J13)	"2-3"	"1-2"	-	-	

Note:*1: When JP6 is set to "1-2", it must be set to "OFF".

3.3 Board Dimensions of M3A-HS85

Figure 3.3.1 shows board dimensions of M3A-HS85.

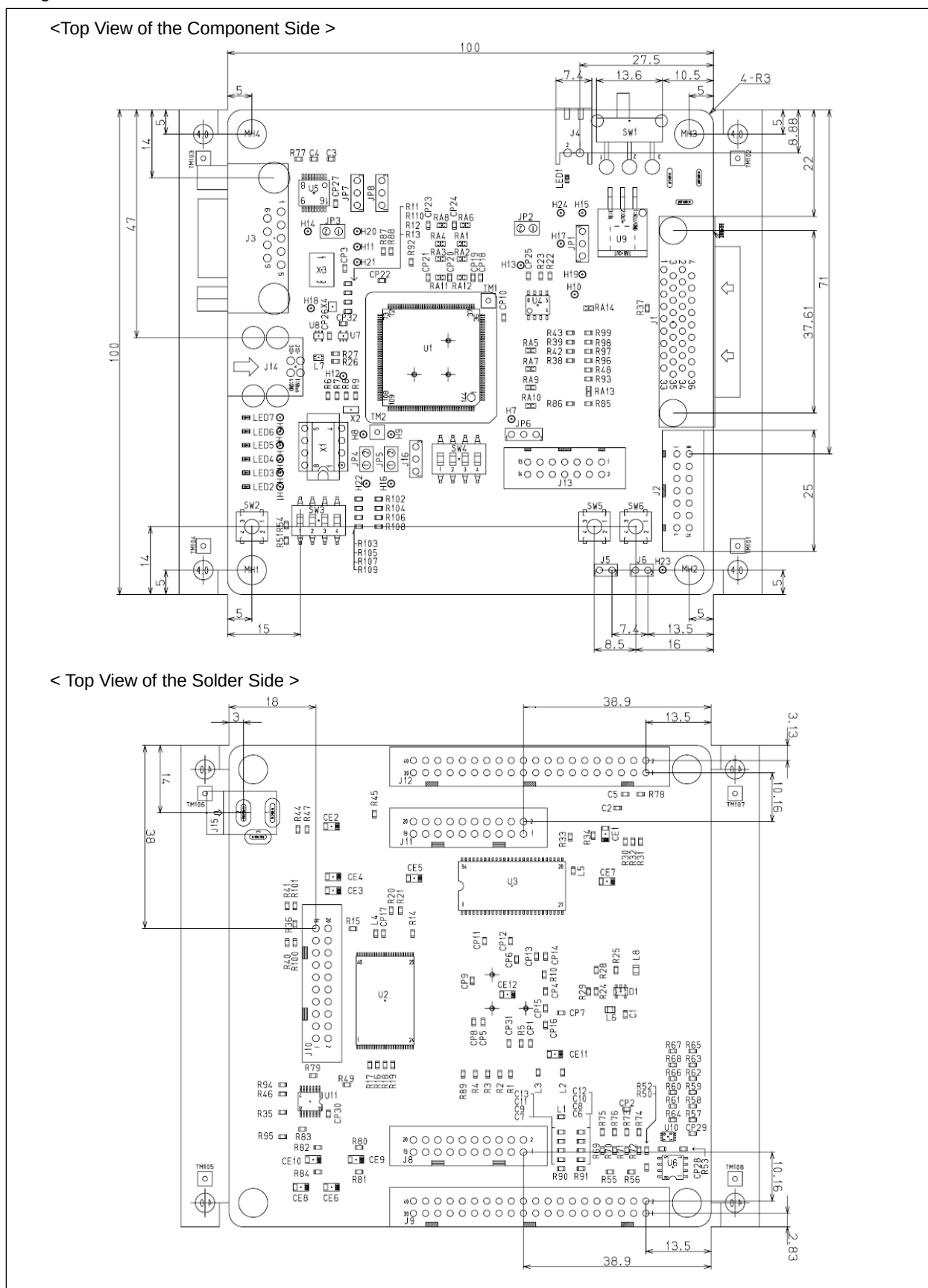


Figure 3.3.1 Board Dimensions of M3A-HS85

Appendix
M3A-HS85 SCHEMATICS

This is a blank page

SH7285 CPU Board M3A-HS85 SCHEMATICS

TITLE

INDEX
SH7285
EPROM/SRAM/SDRAM
Serial Interface/USB
H-UDI, Reset, Power
Other Connectors, PUSH_SW, LED

PAGE

1
2
3
4
5
6

Note:

5VCC = Digital 5V
3VCC = 3.3V
VCC = ETC 5V/3.3V
VCC_CPU = CPU 5V/3.3V
AVCC = CPU Analog 5V
DrVCC = USB 3.3V
3VCC_SRAM = SRAM 3.3V
3VCC_SDRAM = SDRAM 3.3V

R = Fixed Resistors
RA = Resister Array
VR = Resistor Potentiometers
C = Ceramic Caps
CE = Electrolytic Caps
CP = Decoupling Caps

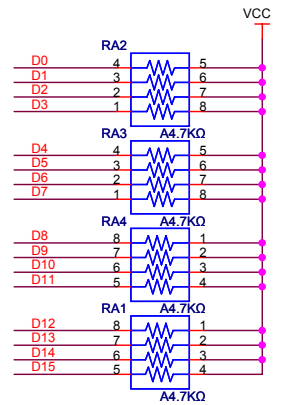
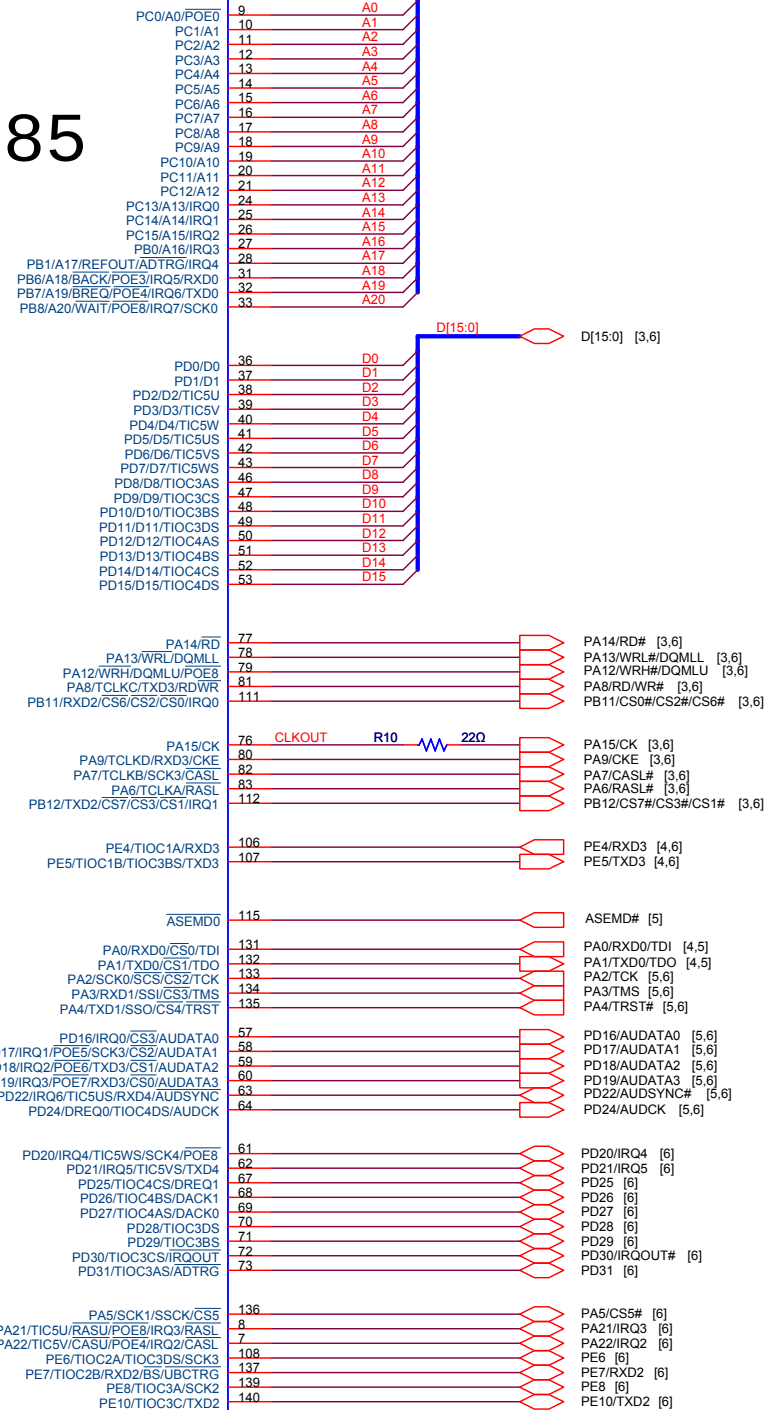
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			SCALE		DRAWN	CHECKED	DESIGNED	APPROVED	INDEX	(1 / 6)
			DATE	08-07-14					DK30694-C	

MODE	FWE	MD1	MD0
0	L	L	L
1	L	L	H
2	L	H	L
3	L	H	H
4	H	L	L
5	H	L	H
6	H	H	L
7	H	H	H



SH7285



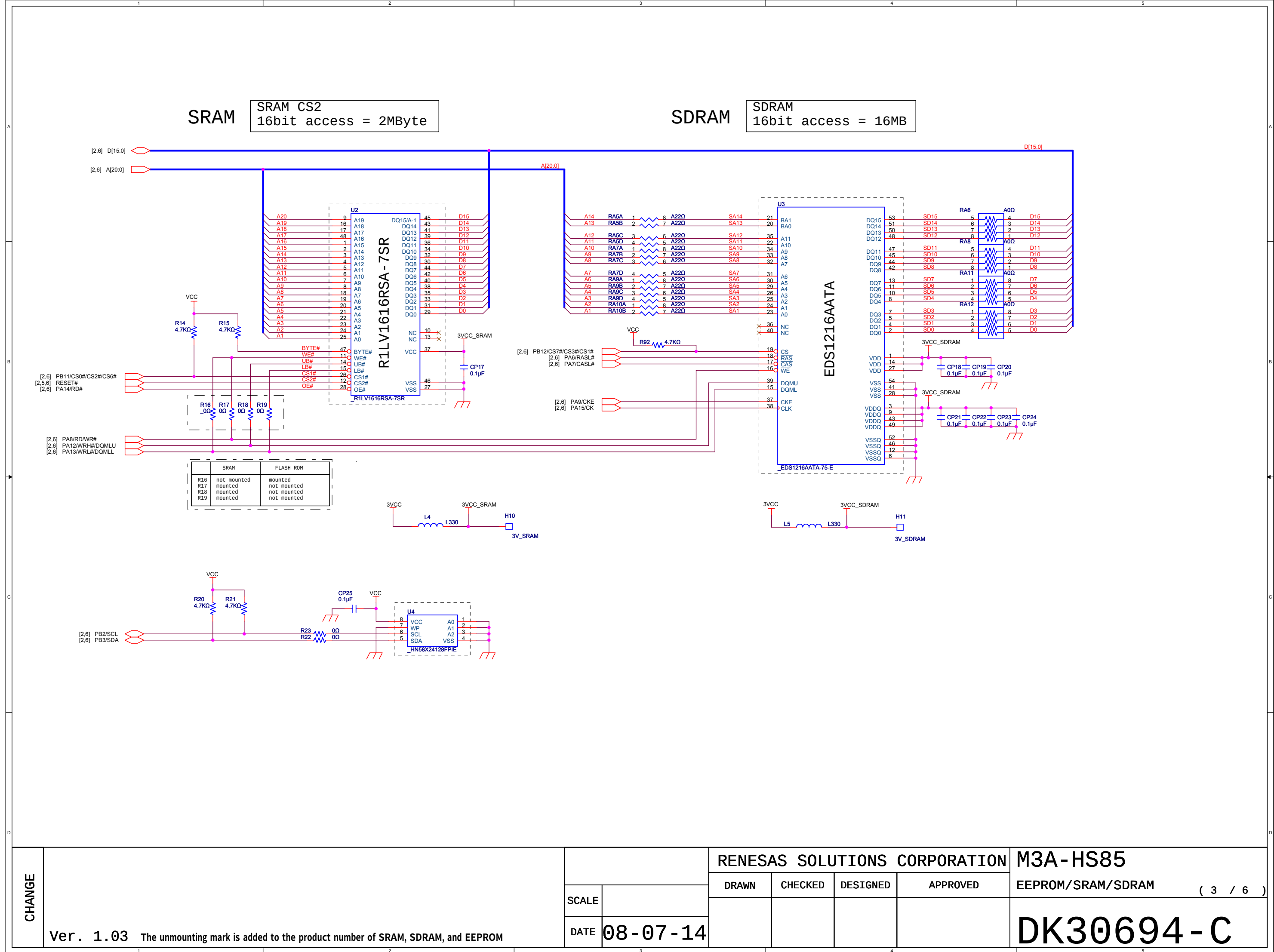
Ver. 1.03 As for CP33, even not mounting is possible.

DATE 08-07-14

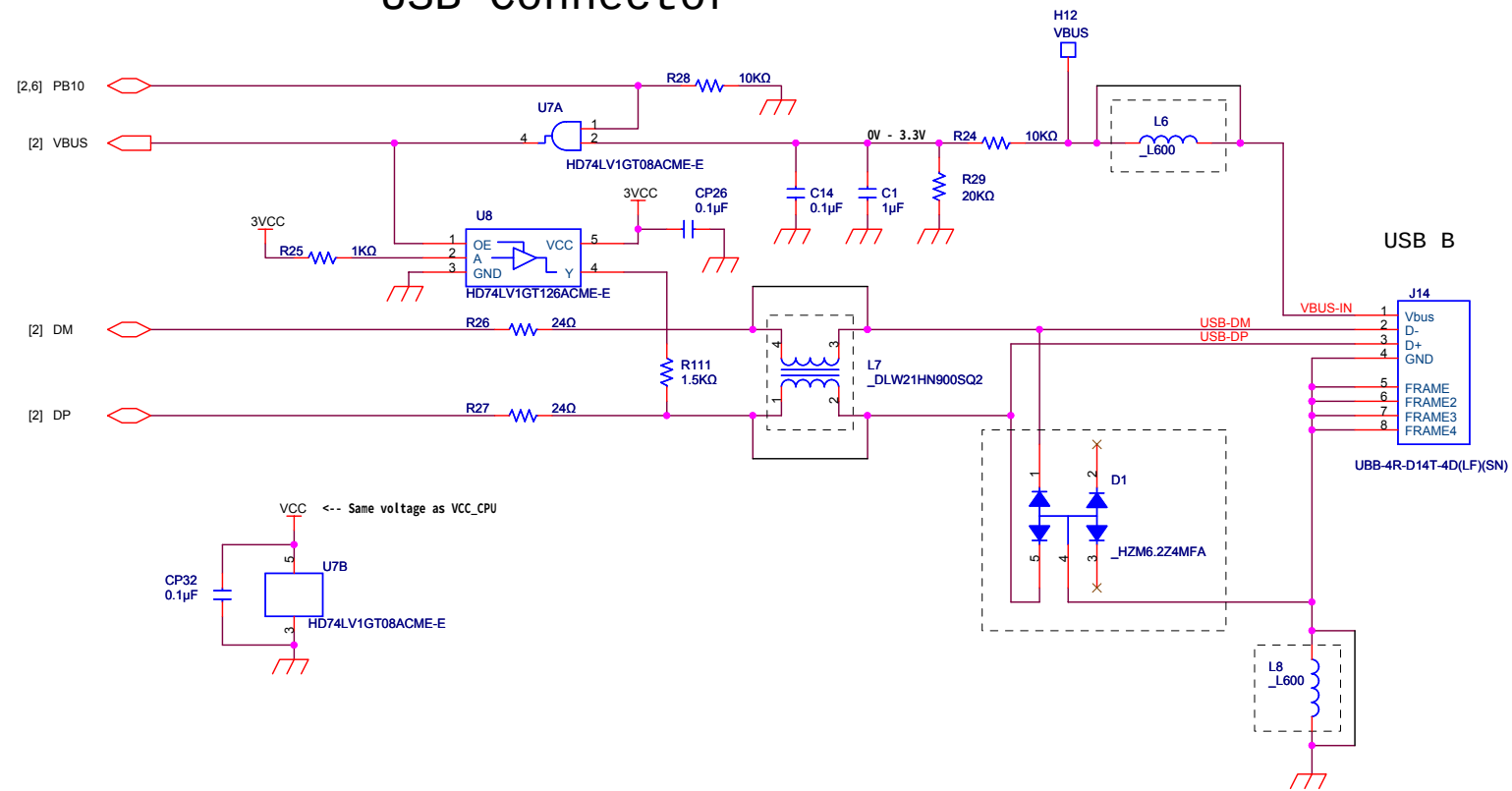
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(2 / 6)

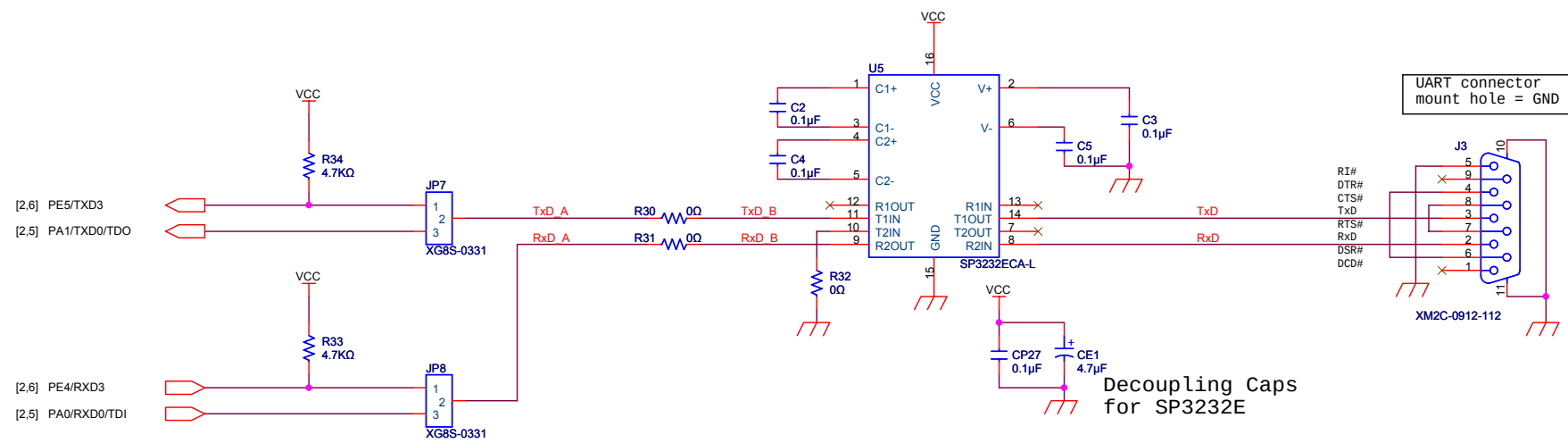
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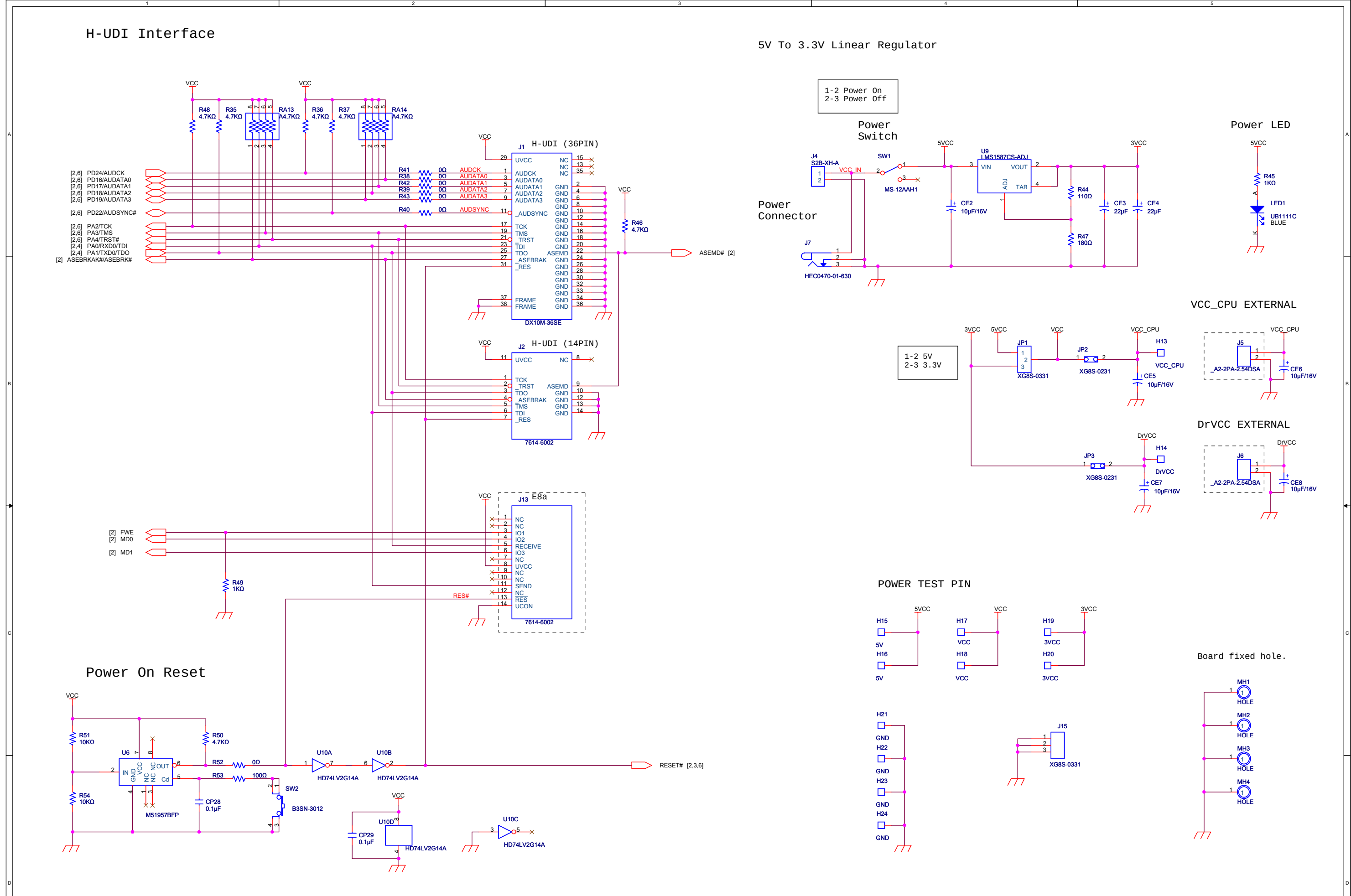
USB Connector



Serial Port Connector(COM)

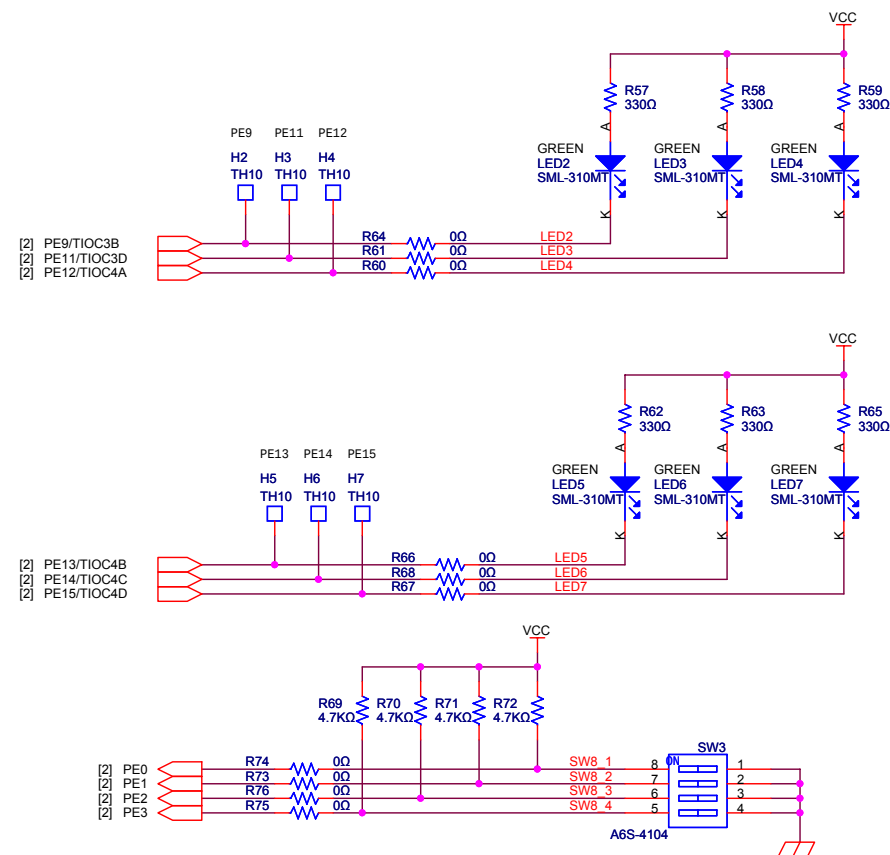


CHANGE	Ver. 1.03 USB surroundings, IC, and connected power supply change			RENESAS SOLUTIONS CORPORATION				M3A-HS85
		SCALE		DRAWN	CHECKED	DESIGNED	APPROVED	USB/SERIAL Interface (4 / 6)
		DATE	08-07-14					DK30694-C

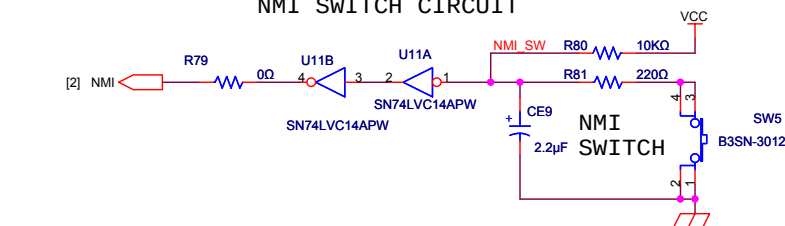


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				SCALE		DRAWN	CHECKED	DESIGNED	APPROVED	H-UDI, Power, Reset (5 / 6)	
				DATE	08-07-14					DK30694-C	
1		2			3		4		5		

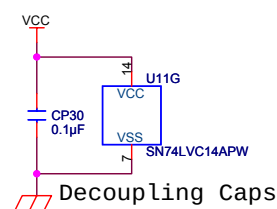
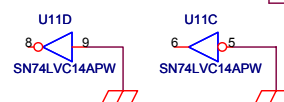
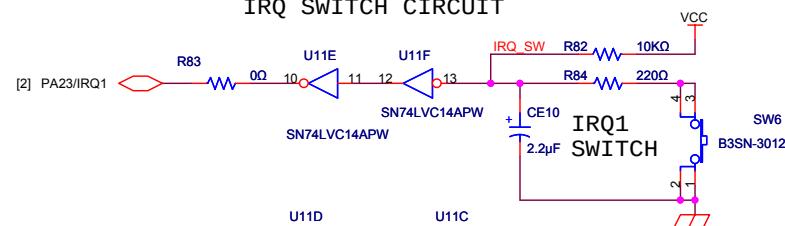
LED&SW



NMI SWITCH CIRCUIT

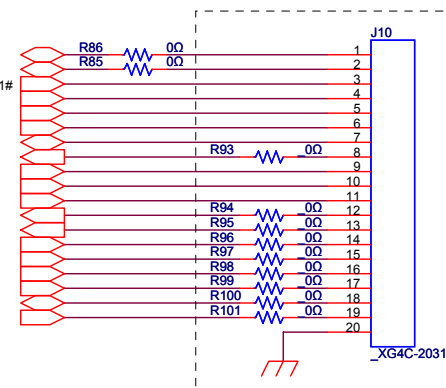


IRQ SWITCH CIRCUIT

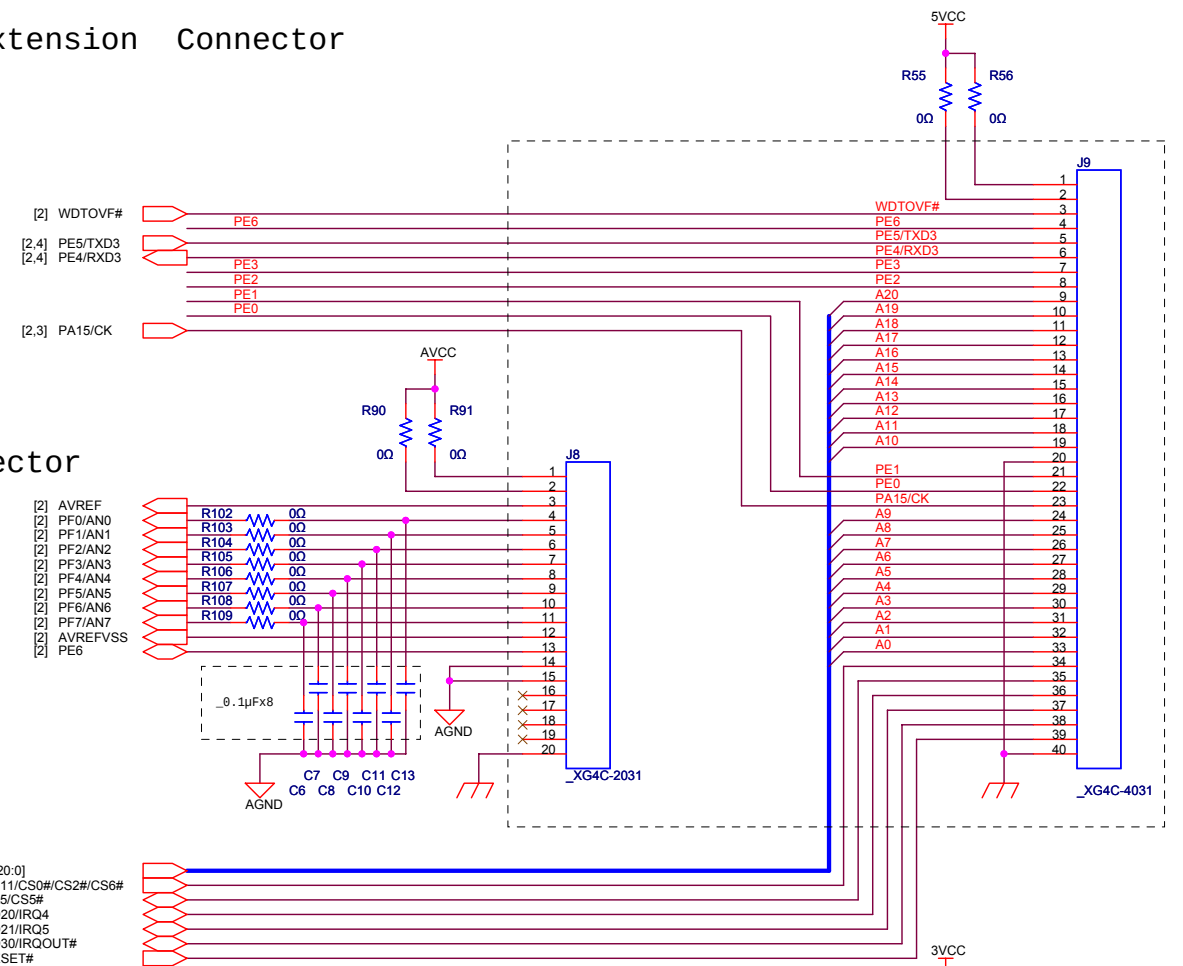


Decoupling Caps

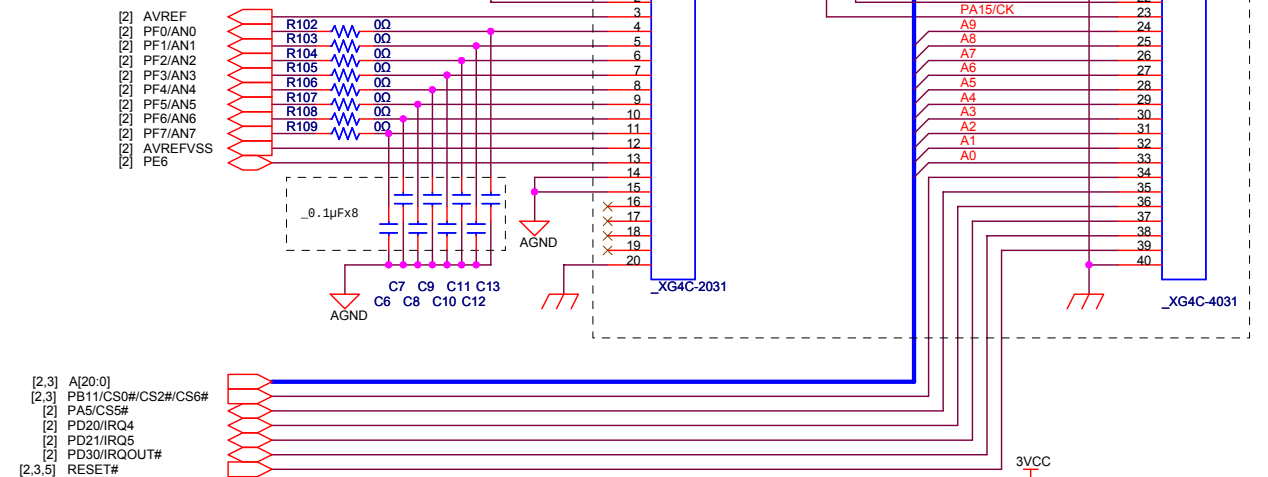
- [2,3] PB3/SDA
- [2,3] PB2/SCL
- [2,3] PB12/CS7#/CS3#/CS1#
- [2,3] PA8/RD#/WR#
- [2,3] PA13/WRH#/DQMLL
- [2,3] PA12/WRH#/DQMLL
- [2] PD31
- [2,5] PA4/TRST#
- [2,3] PA9/CKE
- [2,3] PA6/RASL#
- [2,3] PA7/CASL#
- [2,5] PA2/TCK
- [2,5] PA3/TMS
- [2,5] PD16/AUDATA0
- [2,5] PD17/AUDATA1
- [2,5] PD18/AUDATA2
- [2,5] PD19/AUDATA3
- [2,5] PD22/AUDSYNCH#
- [2,5] PD24/AUDCK



SH7285 Extension Connector



A/D Connector



CHANGE

Ver. 1.03

SCALE

DATE

08-07-14

RENESAS SOLUTIONS CORPORATION

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CHECKED

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APPROVED

M3A-HS85

Connectors

(6 / 6)

DK30694-C

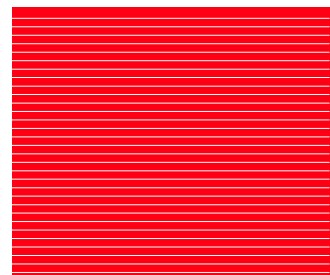
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SH7285 CPU Board
M3A-HS85
User's Manual

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M3A-HS85 User's Manual



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