REJ10J0917-0100

PRELIMINARY

Notice This is not a final specification.

Some parametric limits are subject to change.

32

SH7149 CPU Board

M3A-HS49

User's Manual

Renesas 32-Bit RISC Microcomputers
SuperH™ RISC engine Family / SH7149 Group

User's Manual

Rev. 1.0
Issued : Dec 15, 2006

Renesas Technology
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Revision History	SH7149 CPU Board M3A-HS49User's Manual

Rev.	Date of Issue	Content of Revision	
		Page	Page
1.0	Dec 15, 2006	-	First edition issued

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Chapter 1
Overview

1.1 Overview

The M3A-HS49 is the CPU board designed for users to evaluate the functionality and performance of the SH7149 group of Renesas Technology original microcomputers, as well as develop and evaluate the application software for this group of microcomputers. The SH7149's data bus, address bus and various internal peripheral circuit function pins are connected to the extension connector of the M3A-HS49, 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-HS49.

1.2 Configuration

Figure1.2.1 shows an example of system configuration using the M3A-HS49.

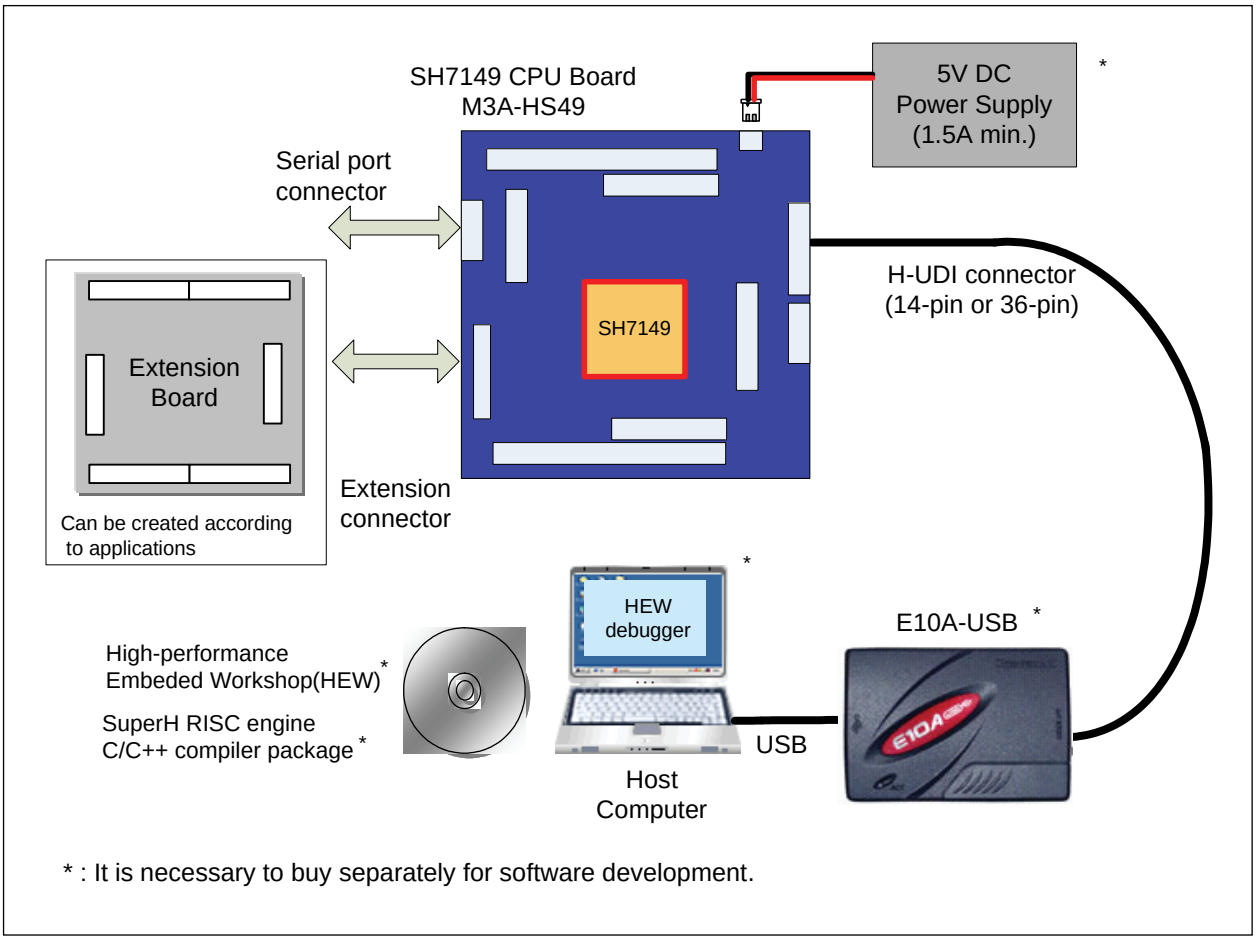


Figure1.2.1 Example System Configuration of the M3A-HS49

1.3 External Specifications

Table1.3.1 lists external specifications of M3A-HS49.

Table1.3.1 External Specifications of M3A-HS49

No.	Item	Content
1	CPU	SH7149 ● Input(XIN) clock : 10MHz ● Bus clock : 40MHz, max ● CPU clock : 80MHz, max ● On-chip memory Flash memory : 256KB RAM : 8KB
2	Connectors	● Extension connector (Bus, I/O, VCC, GND) ● User I/O connector (SH7149's MTU2, A/D function pins) ● Serial Port connector (D-sub 9pins) ● H-UDI connector (36pins) ● H-UDI connector (14pins)
3	LED	● POWER LED (1pc.) ● LED for Interrupt confirmation (1pc.) ● User LED (6pcs.)
4	Switches	● Reset switch (1pc.) ● NMI switch (1pc.) ● MRES switch (1pc.) ● IRQ0 switch (1pc.) ● DIP switch for System setting (1pc.,3 poles) ● DIP switch for users (1pc.,4 poles)
5	External dimensions	● Dimensions : 100mm x 100mm ● Mounting form : 4-layer, double-side mounted ● Board configuration : 1 board

1.4 External View

Figure1.4.1 shows the external view of M3A-HS49.

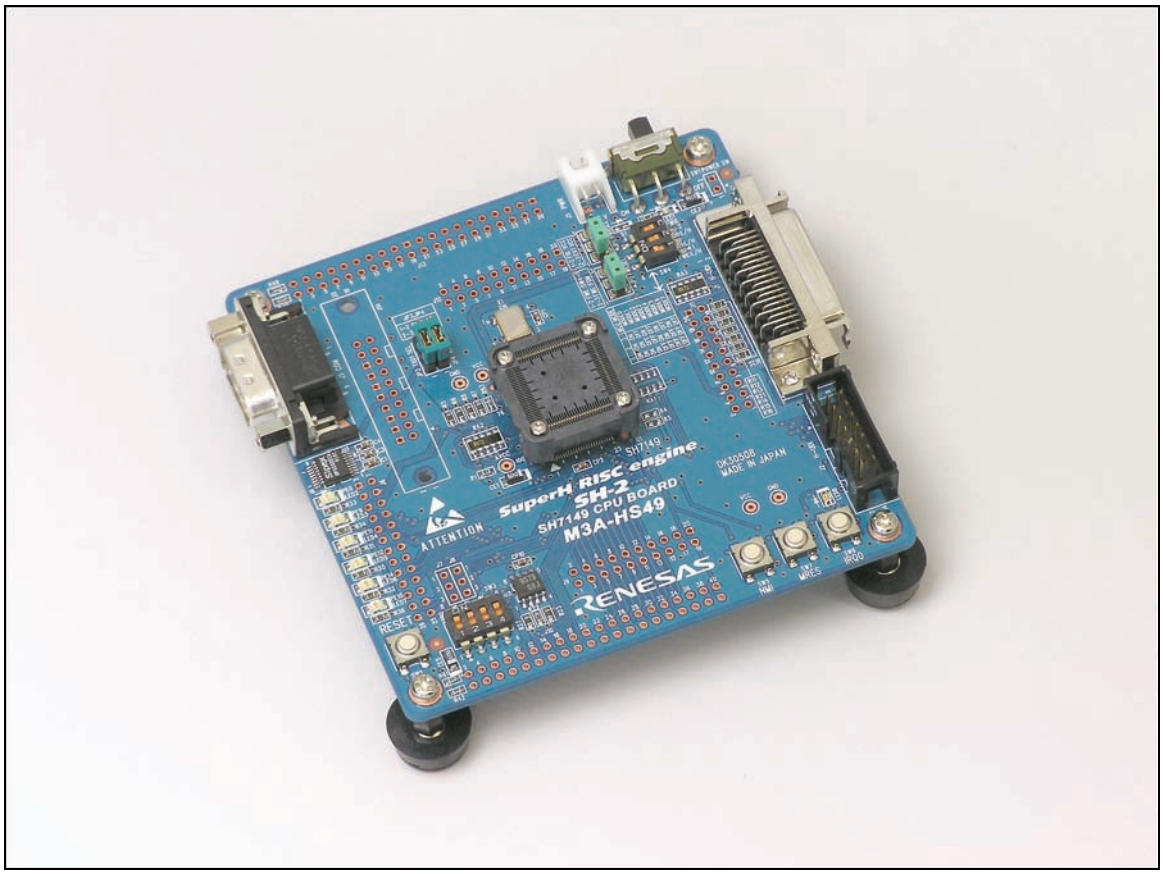


Figure1.4.1 External View of M3A-HS49

1.5 M3A-HS49 Block Diagram

Figure1.5.1 shows the system block diagram of M3A-HS49.

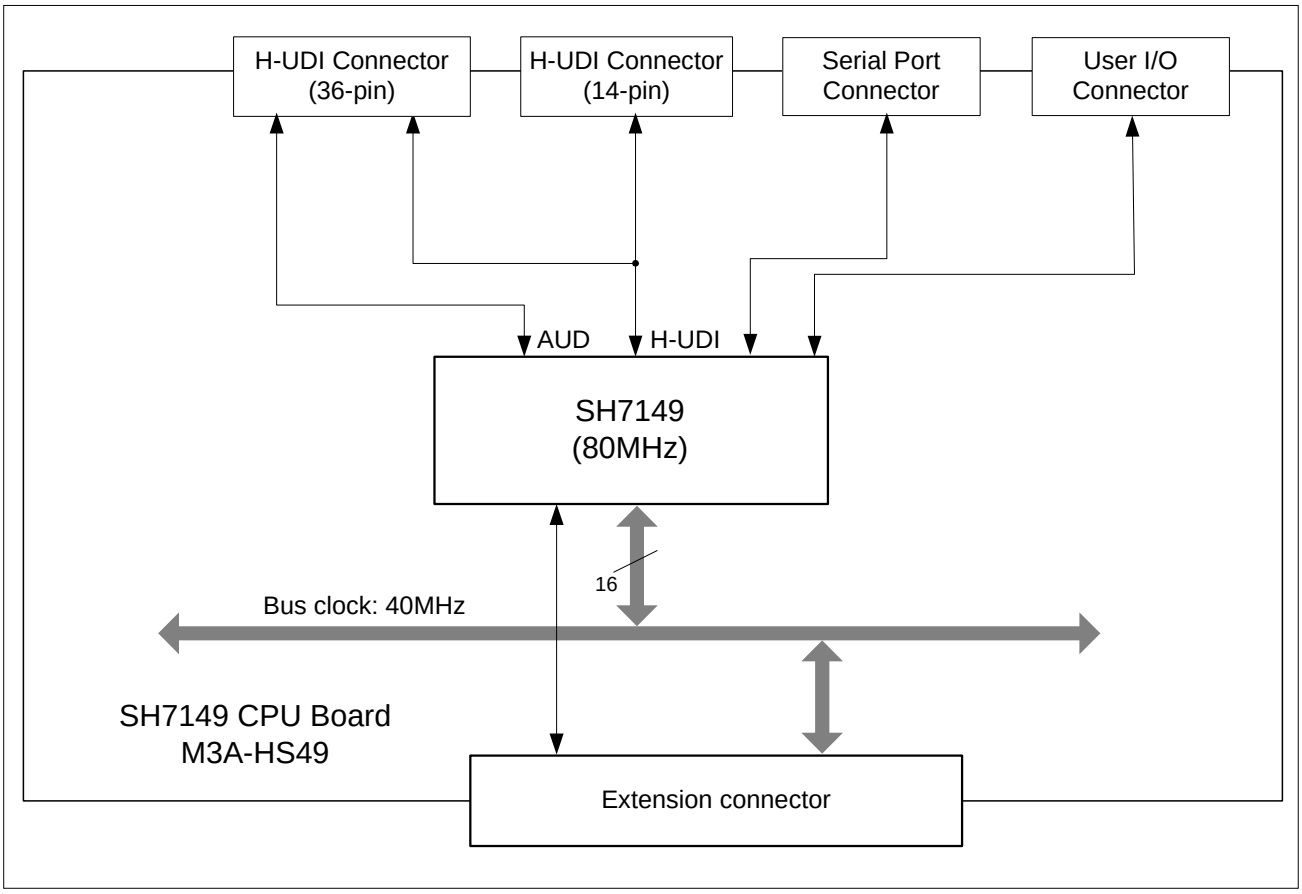
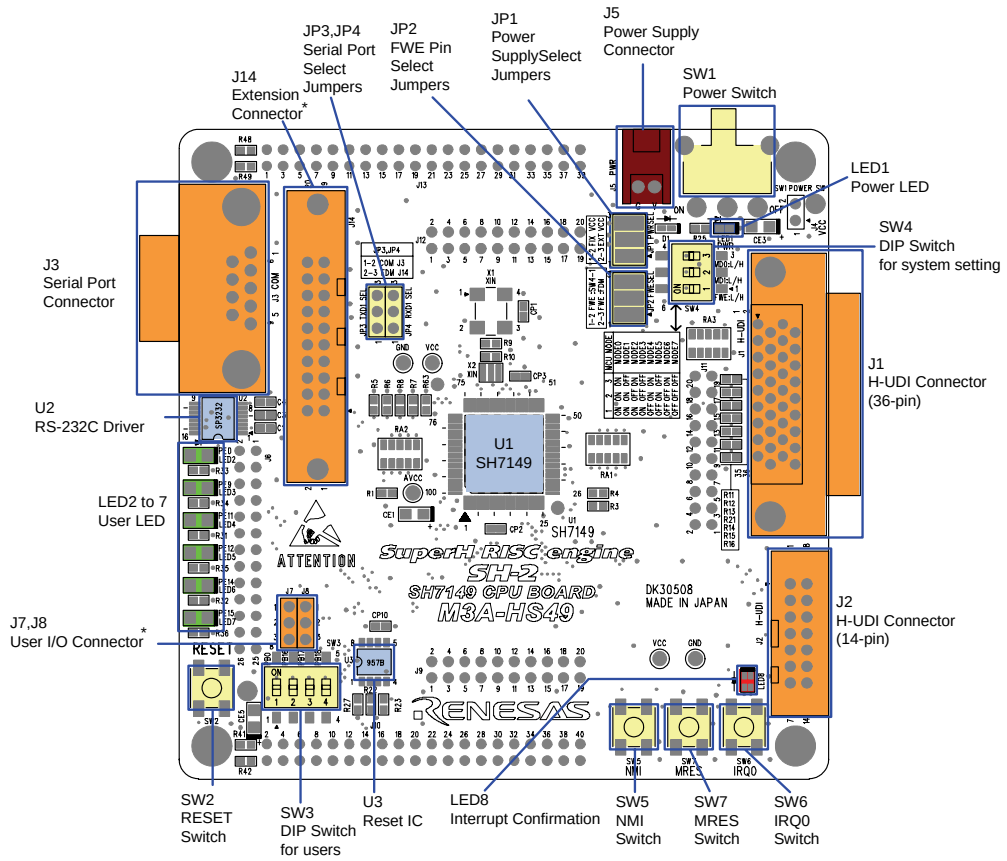


Figure1.5.1 System Block Diagram of M3A-HS49

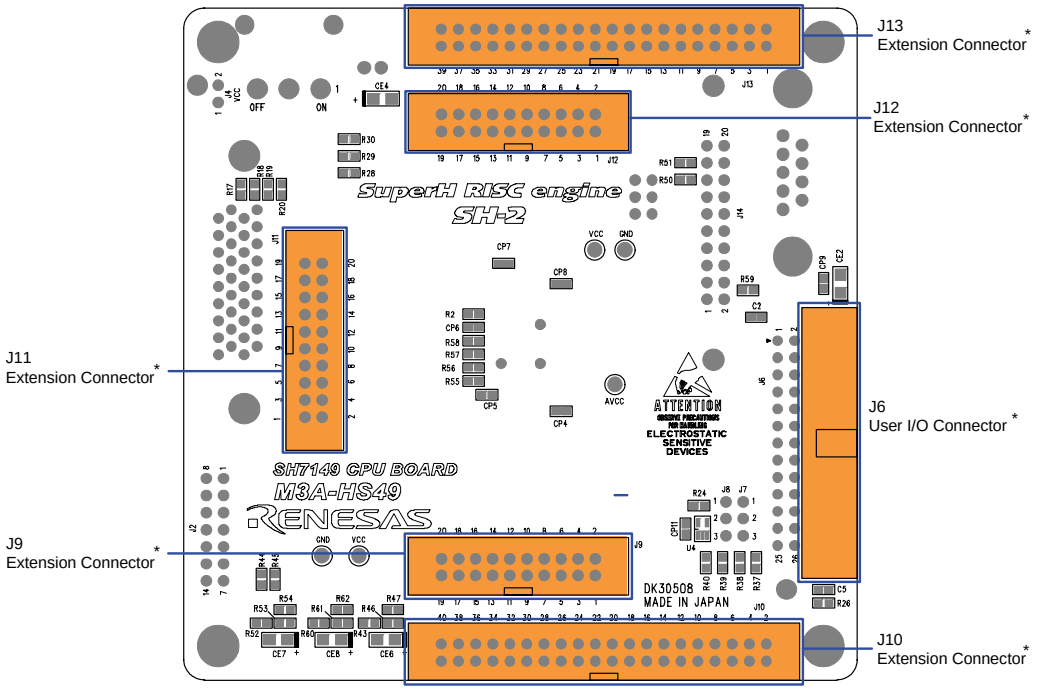
1.6 M3A-HS49 Board Overview

Figure1.6.1 shows the M3A-HS49 board overview.

<Top view of the component side >



<Top view of the solder side >



Note *: Not mounted

Figure1.6.1 M3A-HS49 Board Overview

Table1.6.1 lists main components mounted in M3A-HS49.

Table1.6.1 Main Components Mounted in M3A-HS49

Symbol	Parts Name	Remarks	Parts number for recommended components that are not mounted
U1	CPU	SH7149 (Renesas)	
U1	CPU Socket		
U2	RS-232C Driver		
U3	Reset IC	M51957BFP (Renesas)	
U4	Logic IC		
X1	Oscillator	10.00MHz	
J1	H-UDI Connector	36-pin type	
J2	H-UDI Connector	14-pin type	
J3	Serial Port Connector		
J4	External Power Supply Connector	Not mounted	A2-2PA-2.54DSA (Hirose)
J5	Power Supply Connector		
J6	User I/O Connector	Not mounted	XG4C-2634 (Omron)
J7,J8	User I/O Connector	Not mounted	A2-3PA-2.54DSA (Hirose)
J9,J11,J12	Extension Connector	Not mounted	XG4C-2031 (Omron)
J10,J13	Extension Connector	Not mounted	XG4C-4031 (Omron)
J14	Extension Connector	Not mounted	3428-6002LCSC (Sumitomo 3M)
LED1	Power LED	Blue	
LED2 to 7	User LED	Green	
LED8	LED for Interrupt confirmation	Red/Yellowgreen (Two colors)	
SW1	Power Switch		
SW2	Reset Switch		
SW3	DIP Switch for users		
SW4	DIP Switch for system setting		
SW5	NMI Switch		
SW6	IRQ0 Switch		
SW7	MRES Switch		

1.7 M3A-HS49 Memory Mapping

Figure1.7.1, Figure1.7.2 and Figure1.7.3 show a memory mapping example of SH7149 in the M3A-HS49.

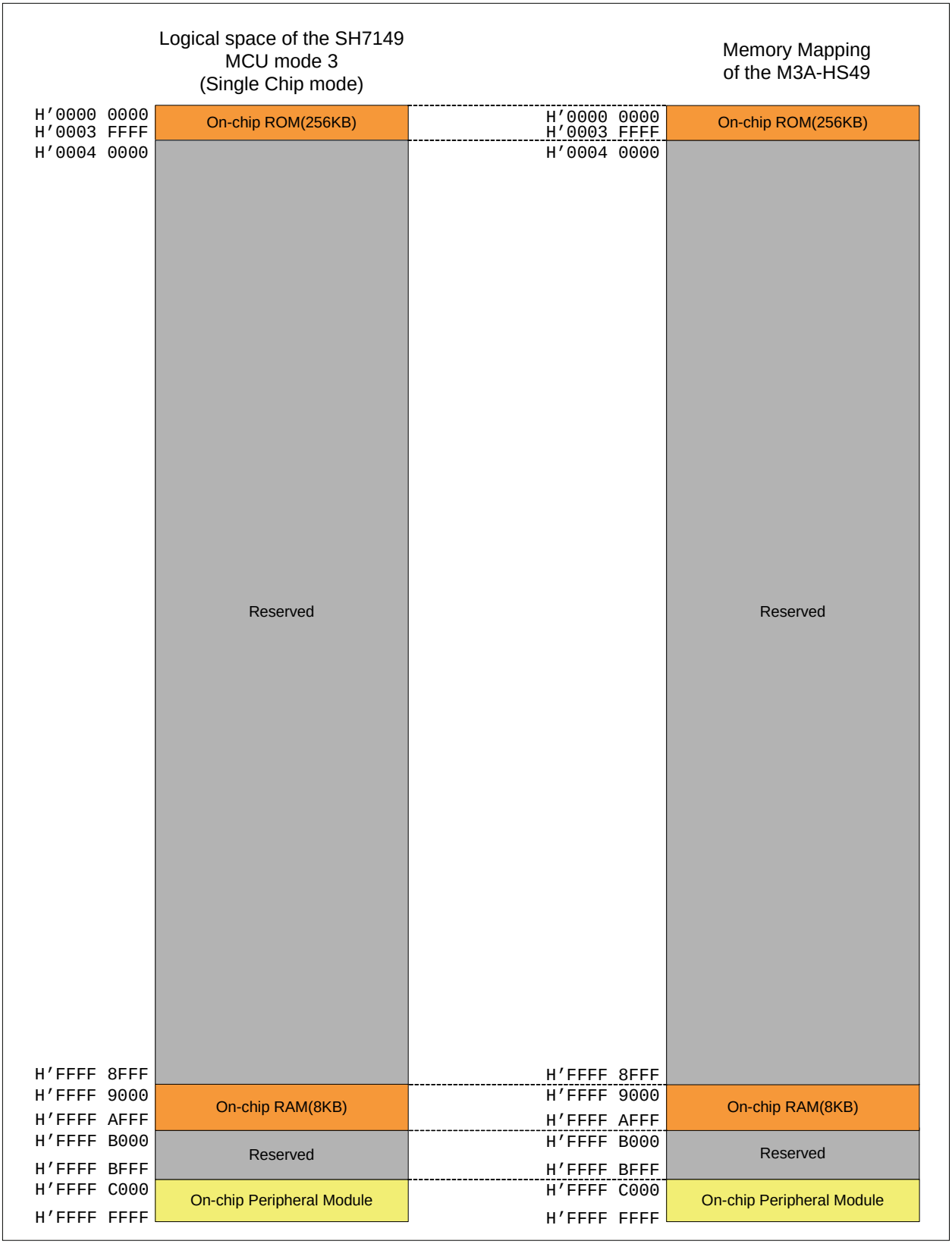
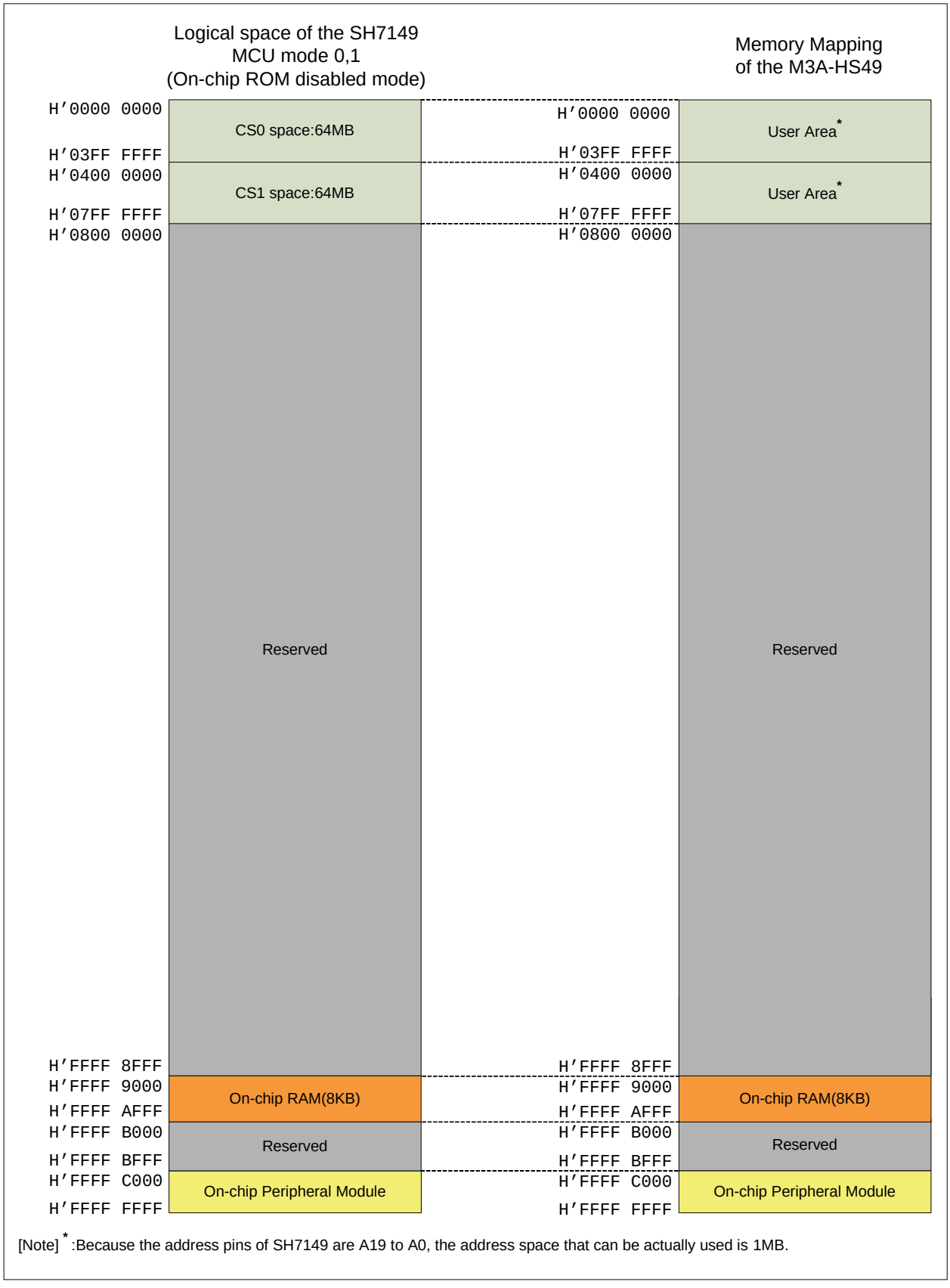
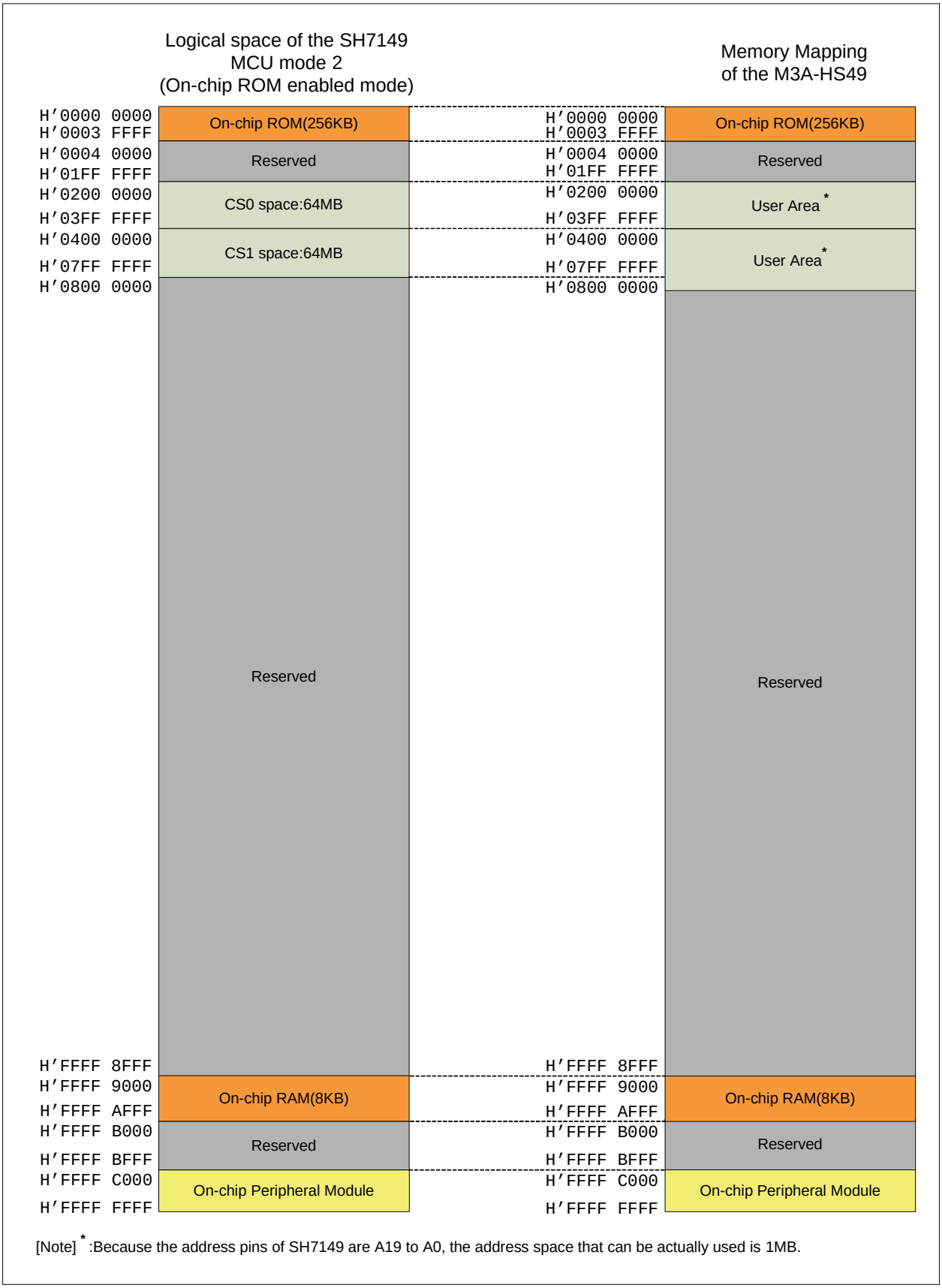


Figure1.7.1 Memory Mapping Example of SH7149 (MCU mode 3)



[Note] * :Because the address pins of SH7149 are A19 to A0, the address space that can be actually used is 1MB.

Figure1.7.2 Memory Mapping Example of SH7149 (MCU mode 0,1)



[Note] * :Because the address pins of SH7149 are A19 to A0, the address space that can be actually used is 1MB.

Figure1.7.3 Memory Mapping Example of SH7149 (MCU mode 2)

1.8 Absolute Maximum Ratings

Table1.8.1 lists the absolute maximum ratings of M3A-HS49.

Table1.8.1 Absolute Maximum Ratings of M3A-HS49

Symbol	Parameter	Rated Value	Remarks
VCC	5V System Power Supply Voltage	-0.3V to 6.0V	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

Table1.9.1 lists recommended operating conditions of M3A-HS49.

Table1.9.1 Recommended Operating Conditions of M3A-HS49

Symbol	Parameter	Rated Value	Remarks
VCC	5V System Power Supply Voltage	4.75V to 5.25V	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-HS49 is the SH7149 CPU board that has functions listed in Table2.1.1.

Table2.1.1 lists functional modules of M3A-HS49.

Table2.1.1 Functional Modules of M3A-HS49

Section	Function	Content
2.2	CPU	SH7149 ● Input(XIN) clock : 10MHz ● Bus clock : 40MHz, max ● CPU clock : 80MHz, max ● On-chip Memory - Flash memory : 256KB - RAM : 8KB
2.3	Serial Port Interface	Connects SCI1 of the SH7149 to the Serial Port connector
2.4	Input/Output Ports	Connects to the I/O ports of the SH7149
2.5	Clock Module	Controls the system clock
2.6	Reset Module	Controls device reset accommodated by the M3A-HS49
2.7	Interrupt Switches	Controls interrupt (NMI,IRQ0,MRES)
2.8	E10A-USB Interface	SH7149 H-UDI/AUD interface
-	Operational specifications	Connectors, switches and LEDs ● SH7149 extension connector ● Switches and LEDs ● H-UDI connector Detailed in Chapter 3.

2.2 CPU

The M3A-HS49 contains the 32-bit RISC microcomputer SH7149 that operates with a maximum 80MHz of CPU clock frequency. The SH7149 includes 256-Kbyte flash memory, and 8-Kbyte SRAM, making it useful in a wide range of applications from data processing to equipment control.

The M3A-HS49 can be operated with a maximum 80MHz of CPU clock frequency (external bus 40MHz, max) using a 10MHz input clock.

Figure2.2.1 shows the block diagram of SH7149 in the M3A-HS49.

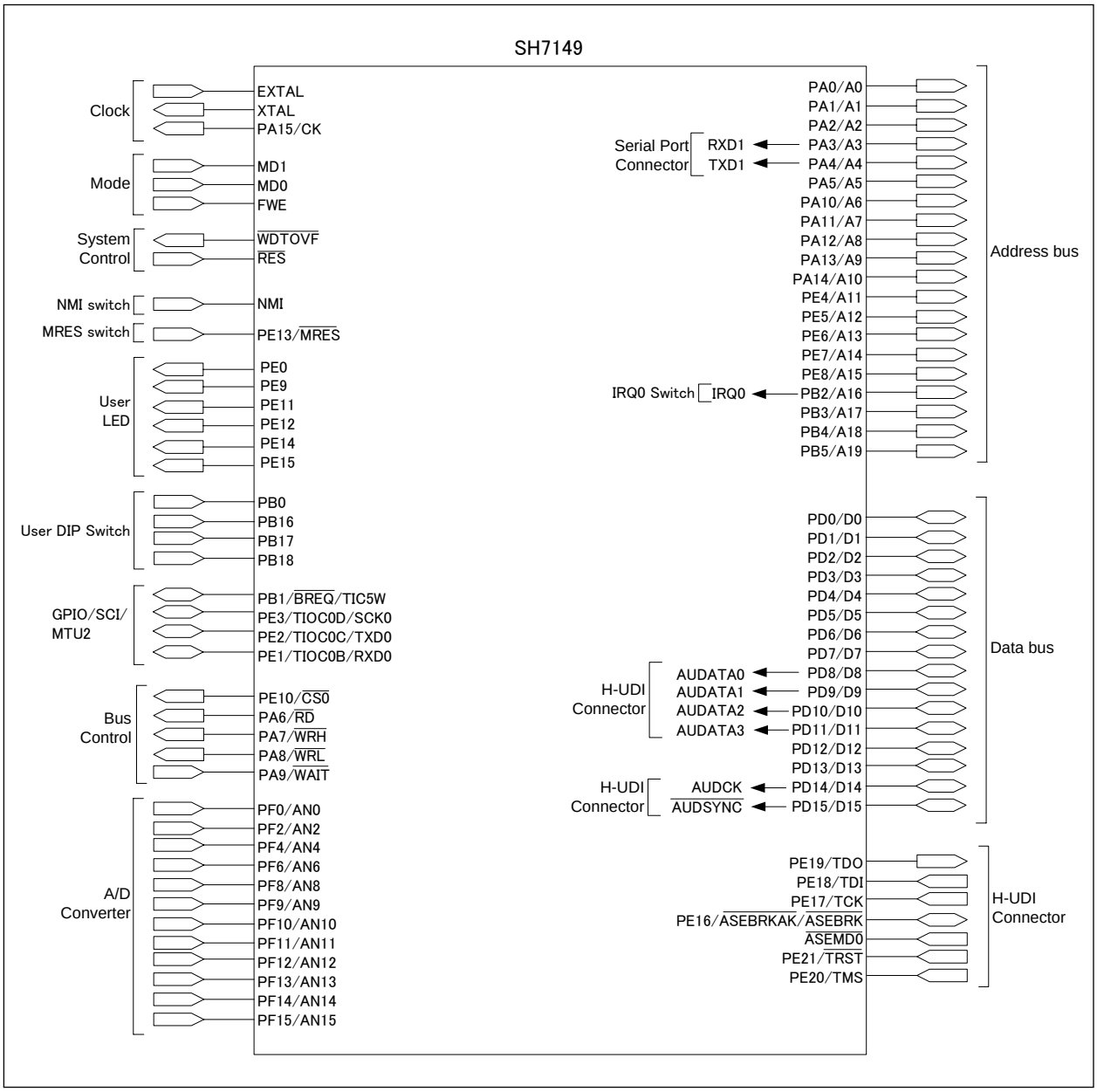


Figure2.2.1 Block Diagram of SH7149

2.3 Serial Port Interface

The SH7149 included in the M3A-HS49 contains a UART module. In the M3A-HS49, SCI channel 1 is connected to J3 (Serial Port connector). Switch the connection of the J3 connector and J14 connector by the jumper (JP3, JP4) setting.

Figure2.3.1 shows the block diagram of serial port interface in the M3A-HS49.

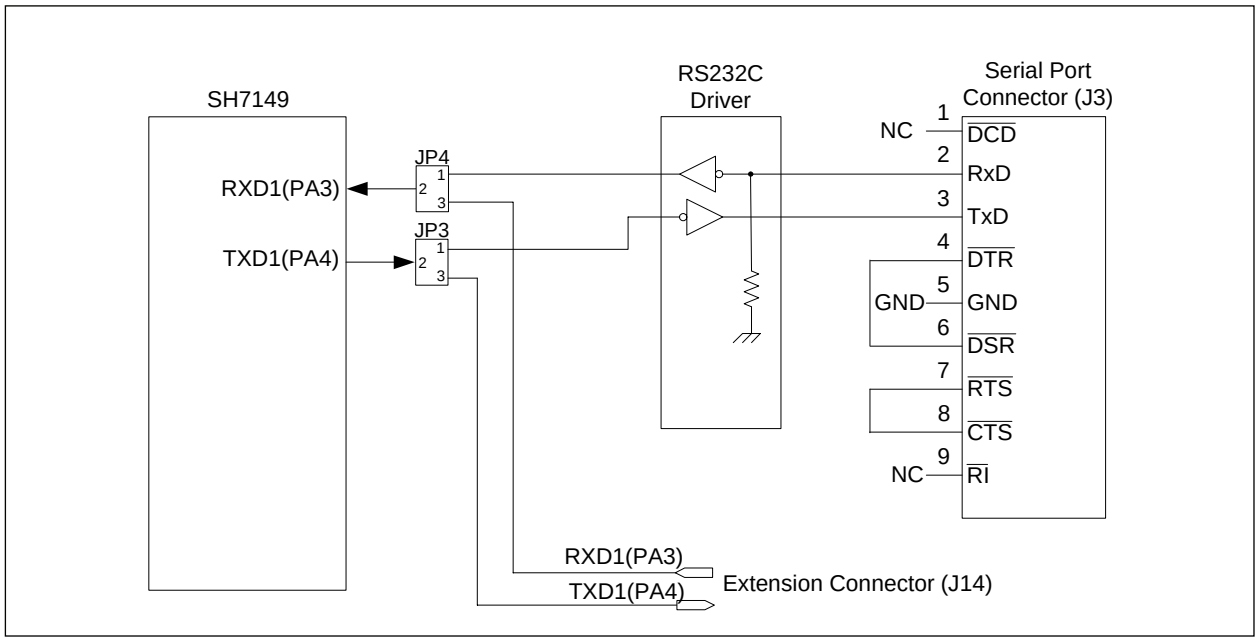


Figure2.3.1 Block Diagram of Serial Port Interface

2.4 I/O Ports

In the M3A-HS49, all of the SH7149's I/O ports are connected to the extension connector. Some I/O ports are connected to DIP switches and LEDs of the M3A-HS49 board. Users are free to use these ports.

Figure2.4.1 shows the block diagram of DIP switch and LEDs in the M3A-H49.

Table2.4.1 shows functions of SH7149 I/O ports in the M3A-HS49.

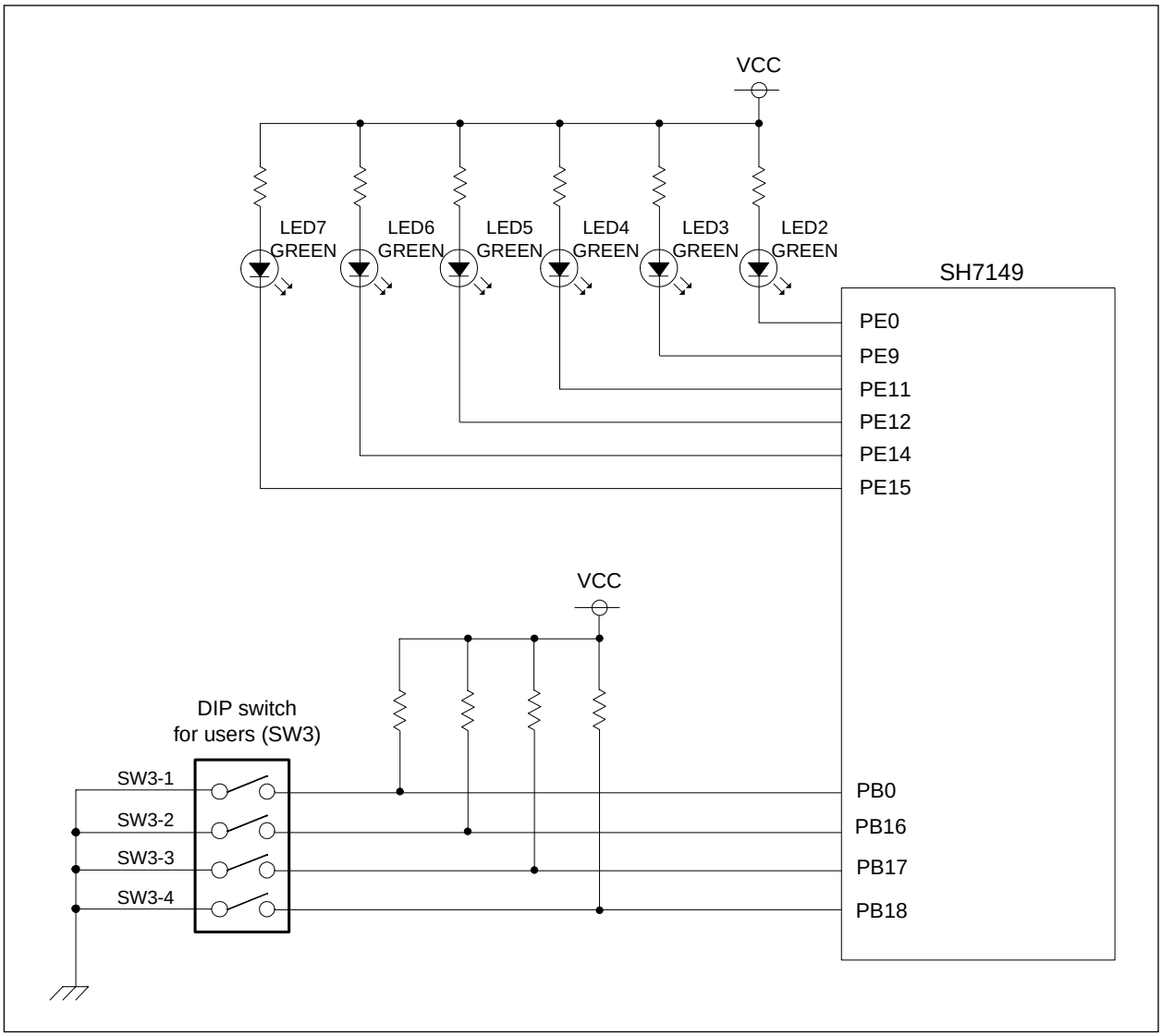


Figure2.4.1 Block Diagram of DIP Switch and LEDs

Table2.4.1 Functions of SH7149 I/O Ports

SH7149 Port Name	Connection in the M3A-HS49
PA0 - PA2	Extension Connector
PA3,PA4	Serial Port Connector(via JP3 and JP4), Extension Connector
PA5 - PA15	Extension Connector
PB0	DIP Switch(SW3), Extension Connector
PB1	Extension Connector
PB2	IRQ0 Switch(SW6), LED8, Extension Connector
PB3 - PB5	Extension Connector
PB16 - PB18	DIP Switch(SW3), Extension Connector
PD0 - PD7	Extension Connector
PD8 - PD11	H-UDI Connector(J1) (When R55-R58 are mounted, connects to the extension connector)
PD12,PD13	Extension Connector
PD14,PD15	H-UDI Connector(J1), Extension Connector
PE0	LED2, Extension Connector
PE1 - PE8	Extension Connector
PE9	LED3, Extension Connector
PE10	Extension Connector
PE11	LED4, Extension Connector
PE12	LED5, Extension Connector
PE13	MRES Switch(SW7), Extension Connector
PE14	LED6, Extension Connector
PE15	LED7, Extension Connector
PE16 - PE21	H-UDI Connector(J1/J2), Extension Connector
PF0, PF2, PF4, PF6, PF8 - PF15	Extension Connector

2.5 Clock Module

The clock module in the M3A-HS49 consists of the following two blocks:

- Output from a oscillator connected to EXTAL of the SH7149
- Ceramic resonator connected to EXTAL and XTAL

The M3A-HS49 has a 10MHz oscillator connected to it as standard specification.

To connect an extension board to the extension connector, we recommend including a clock buffer that contains a PLL to ensure that the board will be supplied with a stable clock signal.

Figure2.5.1 shows the block diagram of clock module.

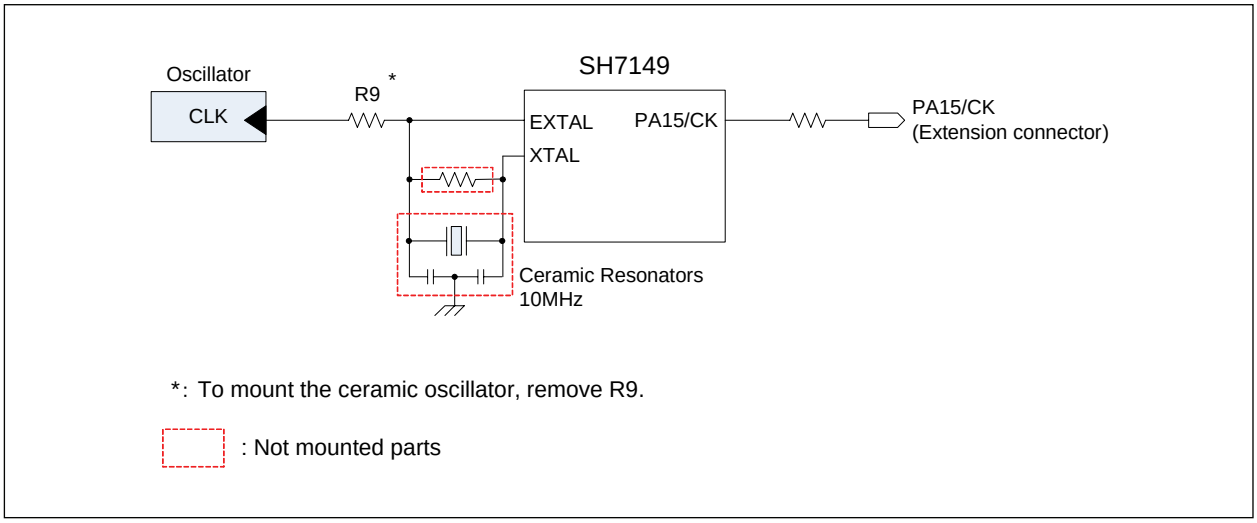


Figure2.5.1 Block Diagram of Clock Module

2.6 Reset Module

This module controls the reset signal connected to the SH7149 mounted on the M3A-HS49.

Figure2.6.1 shows the block diagram of reset module in the M3A-HS49.

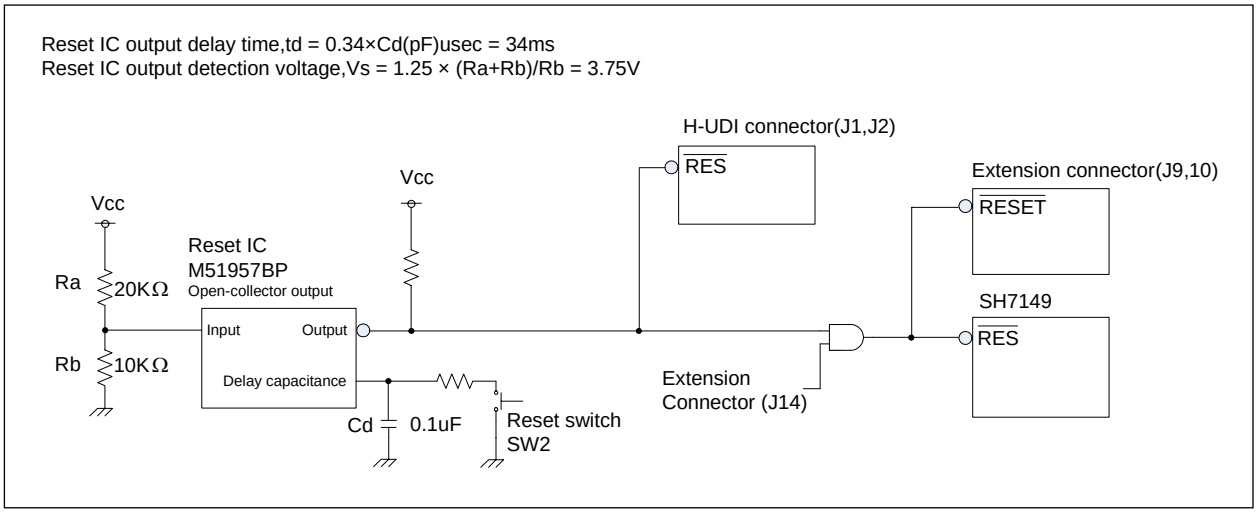


Figure2.6.1 Block Diagram of Reset Module

2.7 Interrupt Switches

In the M3A-HS49, the switch is connected with the IRQ0 (PB2) pin, MRES pin and NMI pin of the SH7149. LED to confirm that the switch has been pushed is connected to the NMI switch and IRQ0 switch. Figure2.7.1 shows the interrupt block diagram in the M3A-HS49.

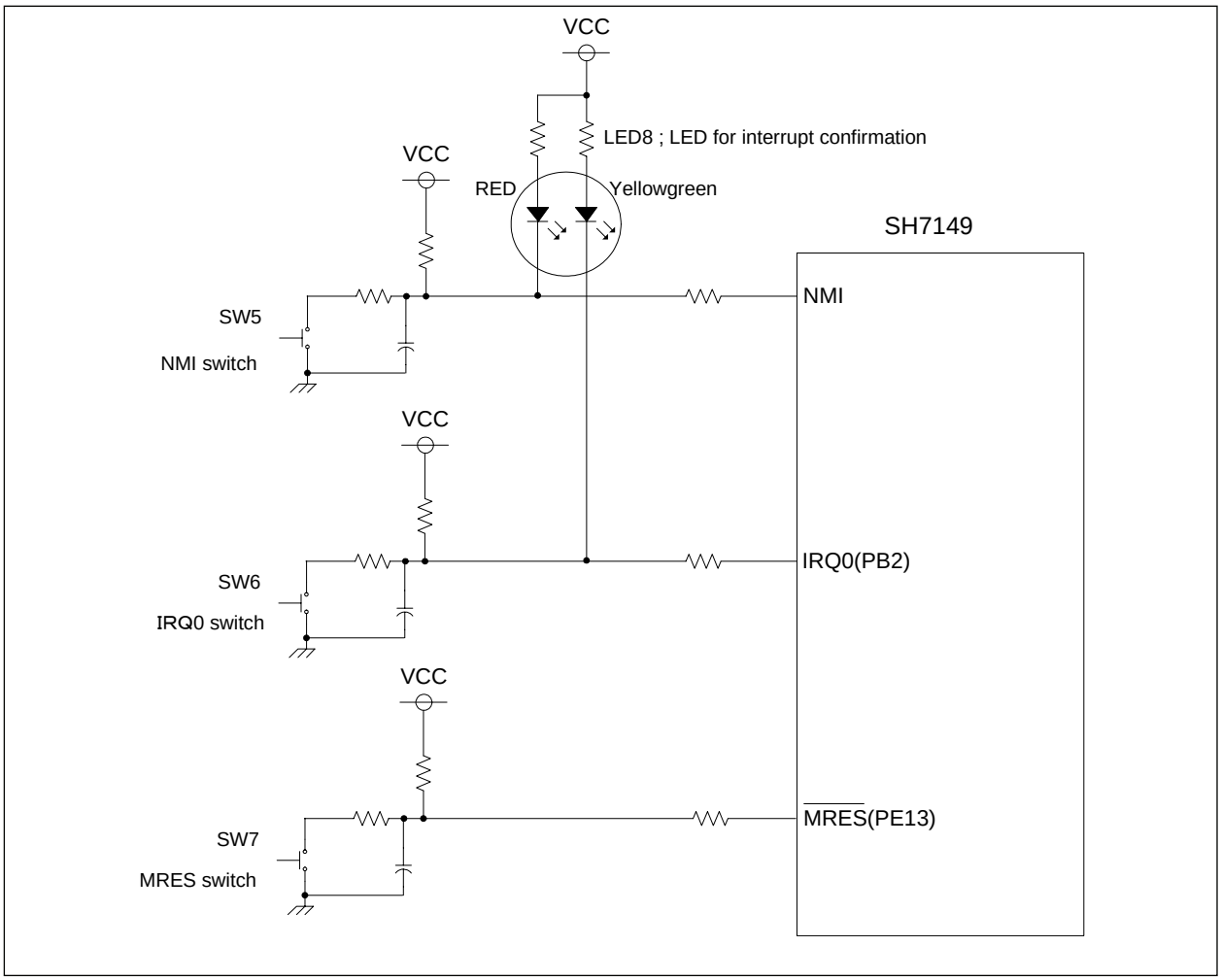


Figure2.7.1 Interrupt Block Diagram

2.8 E10A-USB Interface

The M3A-HS49 has a 36-pin H-UDI connector and 14-pin H-UDI connector included in it for connection to the E10A-USB.

Because the SH7149's H-UDI pins and AUD pins are being output to the extension connector, do not use the applicable pins of the extension connector when debugging with the H-UDI connector.

Figure2.8.1 shows the block diagram of E10A-USB interface.

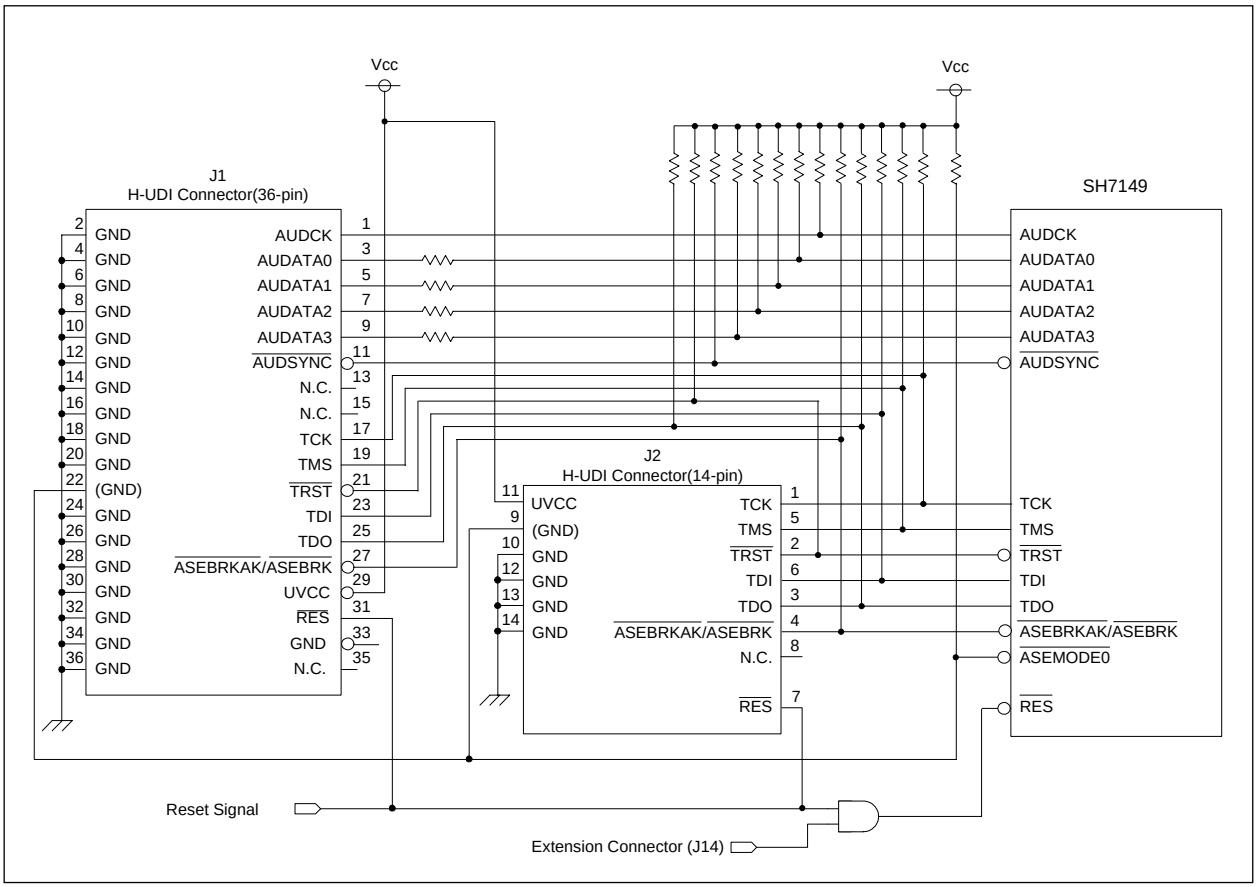


Figure2.8.1 Block Diagram of E10A-USB Interface

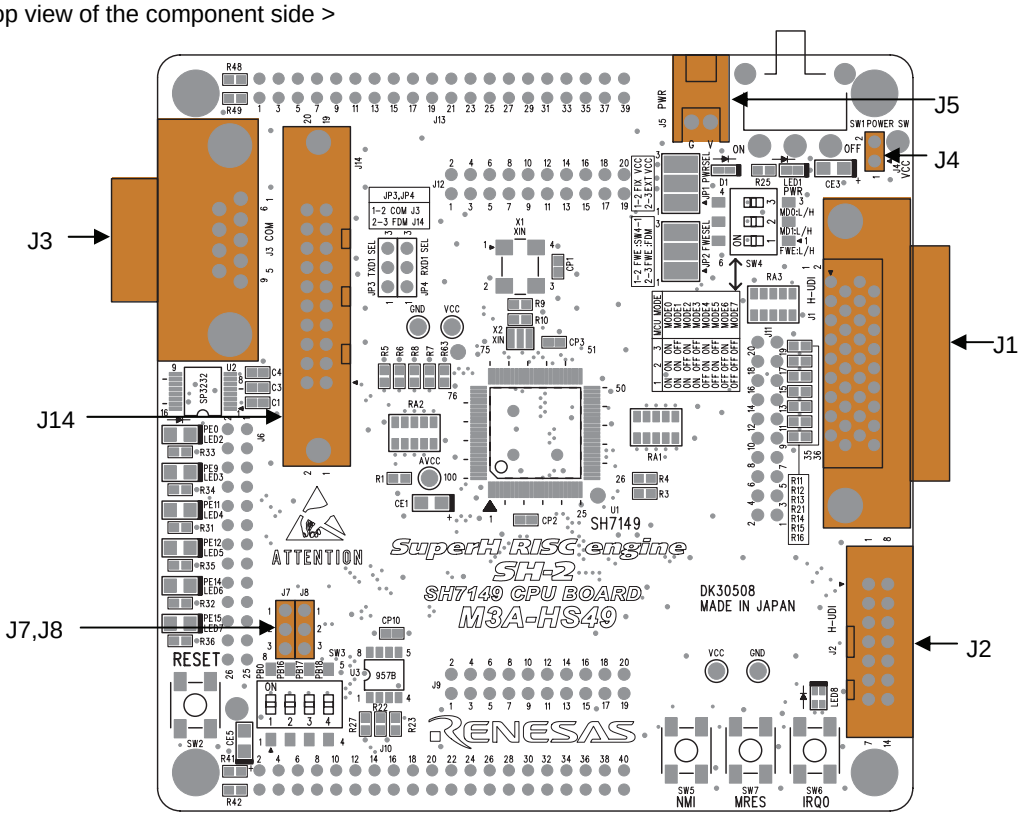
Note : 36 pin type and 14 pin type of the H-UDI connector cannot be used at the same time.

Chapter3
Operational Specifications

3.1 M3A-HS49 Connectors Outline

Figure3.1.1 shows the M3A-HS49 Connector assignments.

<Top view of the component side >



< Top view of the solder side >

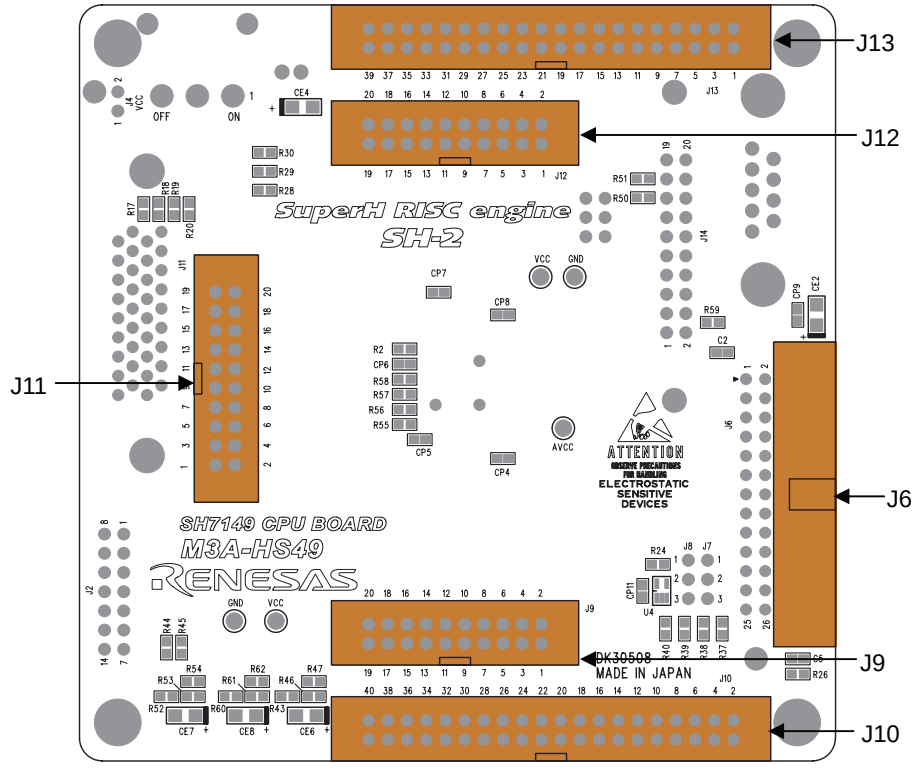


Figure3.1.1 M3A-HS49 Connector Assignments

3.1.1 H-UDI Connector (J1, J2)

M3A-HS49 has the H-UDI (J1) connector and H-UDI (J2) connector included in it for connection to the E10A-USB emulator.

Figure3.1.2 shows a pin assignment of H-UDI (J1) connector.

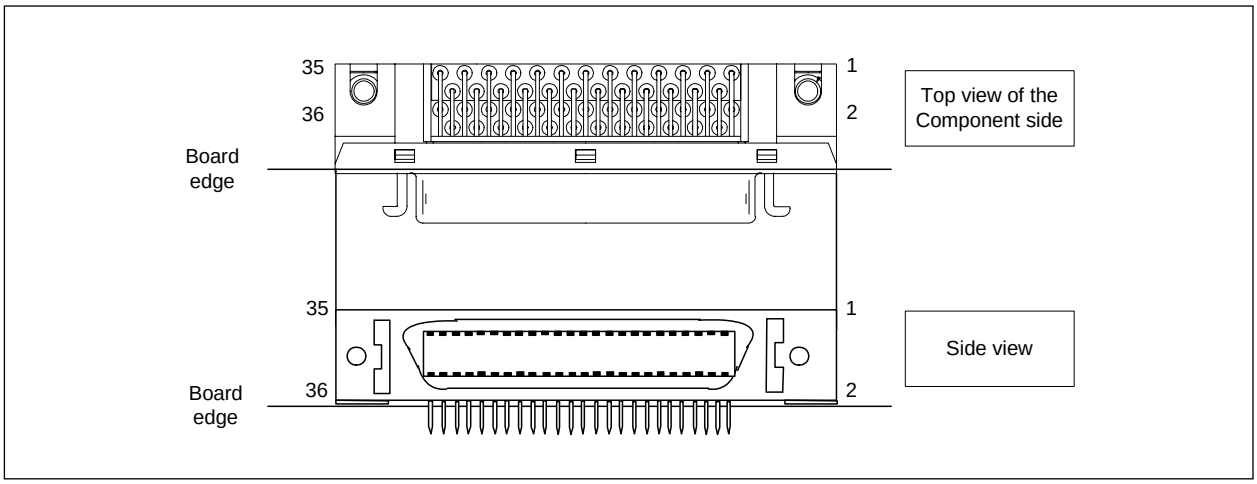


Figure3.1.2 Pin Assignment of H-UDI (J1) Connector

Table3.1.1 lists pin assignments of H-UDI connector.

Table3.1.1 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	$\overline{\text{ASEBRKAK}}$/$\overline{\text{ASEBRK}}$
10	GND	28	GND
11	$\overline{\text{AUDSYNC}}$	29	UVCC
12	GND	30	GND
13	NC	31	$\overline{\text{RES}}$
14	GND	32	GND
15	NC	33	GND
16	GND	34	GND
17	TCK	35	NC
18	GND	36	GND

Figure3.1.3 shows a pin assignment of H-UDI (J2) connector.

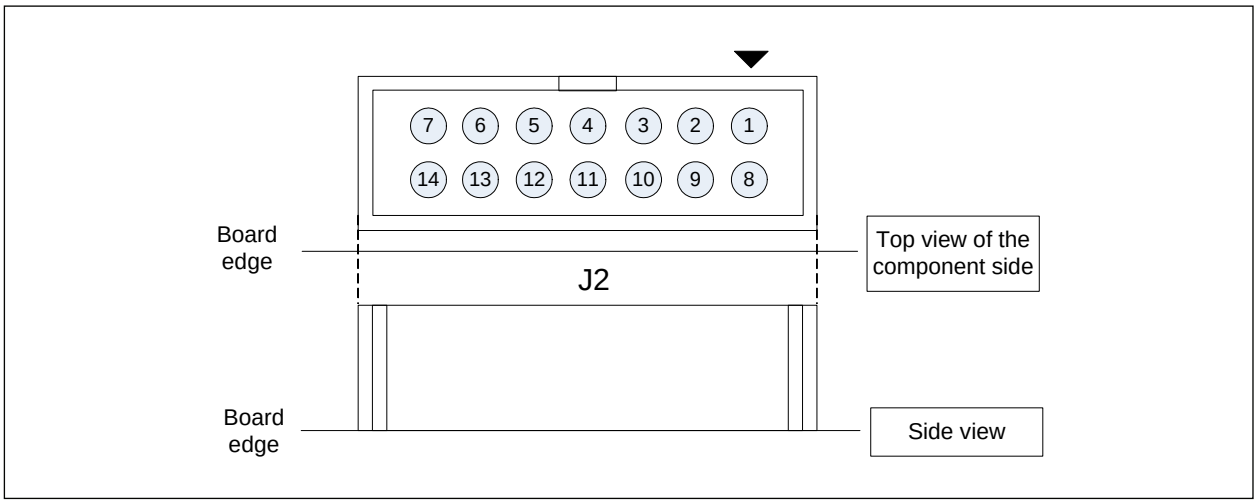


Figure3.1.3 Pin Assignment of H-UDI (J2) Connector

Table3.1.2 lists pin assignments of H-UDI (J2) connector.

Table3.1.2 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	$\overline{\text{ASEBRKAK}}$/$\overline{\text{ASEBRK}}$	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-HS49 includes a serial port connector (J3) for serial communication.

Figure3.1.4 shows a pin assignment of serial port connector.

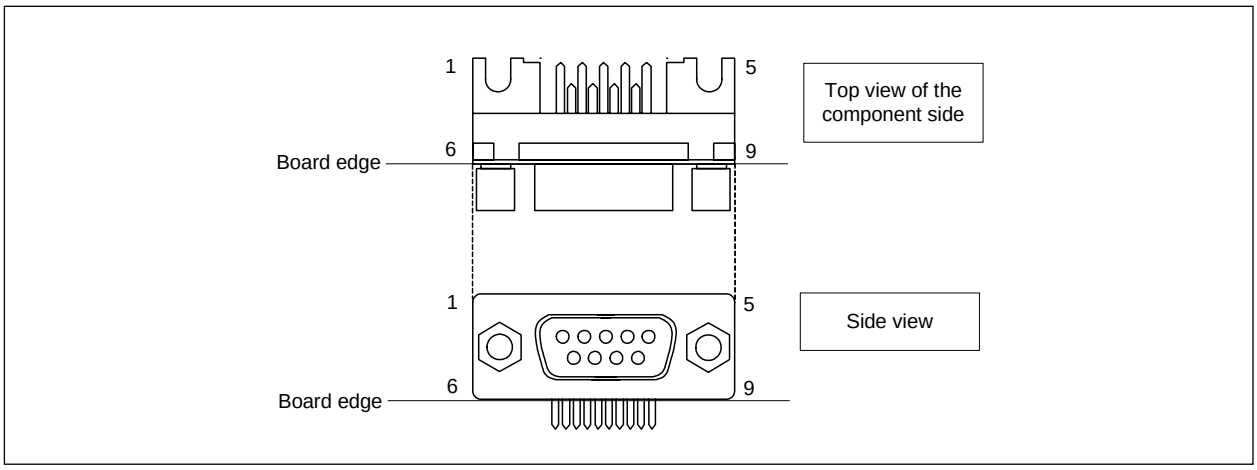


Figure3.1.4 Pin Assignment of Serial Port Connector (J3)

Table3.1.3 lists pin assignments of serial port connector.

Table3.1.3 Pin Assignments of Serial Port Connector (J3)

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

Pins 4-6 are loopback-connected. Pins 7-8 are loopback-connected.

3.1.3 External Power Supply Connectors (J4)

The M3A-HS49 includes external power supply connectors for the SH7149.

Figure3.1.5 shows a pin assignment of power supply connector.

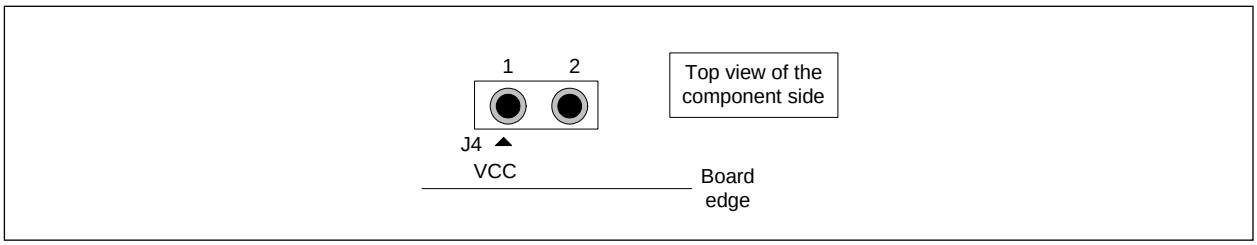


Figure3.1.5 Pin Assignment of Power Supply Connector (J4)

Table3.1.4 lists pin assignments of power supply connector for the SH7149.

Table3.1.4 Pin Assignment of Power Supply Connector (J4)

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

3.1.4 Power Supply Connector (J5)

The M3A-HS49 includes a power supply connector for the board itself.

Figure3.1.6 shows a pin assignment of power supply connector.

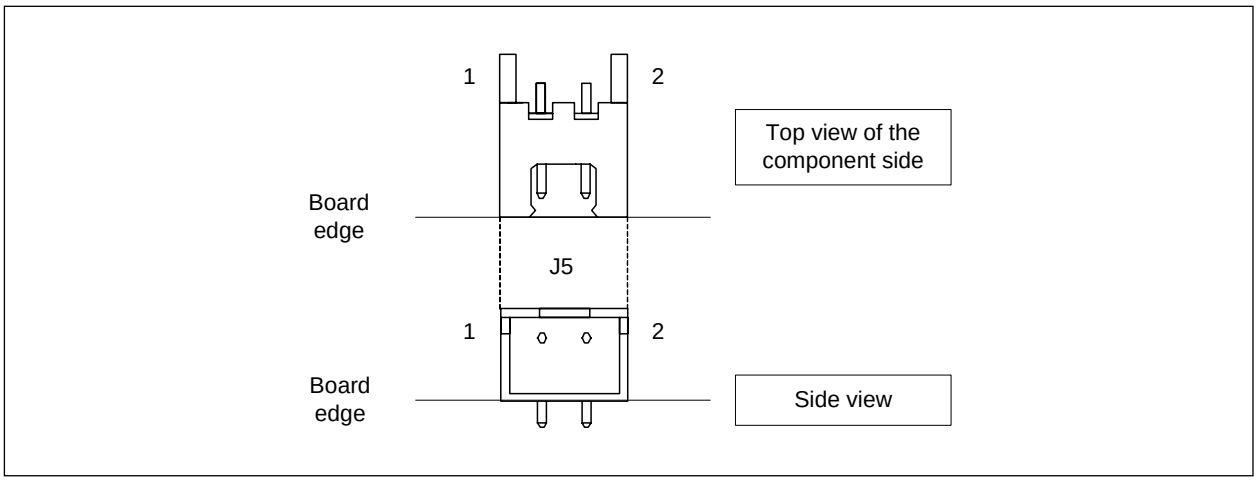


Figure3.1.6 Pin Assignment of Power Supply Connector (J5)

Table3.1.5 lists a pin assignment of power supply connector for the M3A-HS49.

Table3.1.5 Pin Assignment of Power Supply Connector (J5)

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

3.1.5 User I/O Connector (J6-J8)

The M3A-HS49 includes user I/O connectors to which the on-chip peripheral function pins of the SH7149 applicable for motor control (e.g.,MTU2 and AD functions) are connected. Figure3.1.7 shows a pin assignment of each user I/O connector. Table3.1.6 lists pin assignments of user I/O connector (J6).

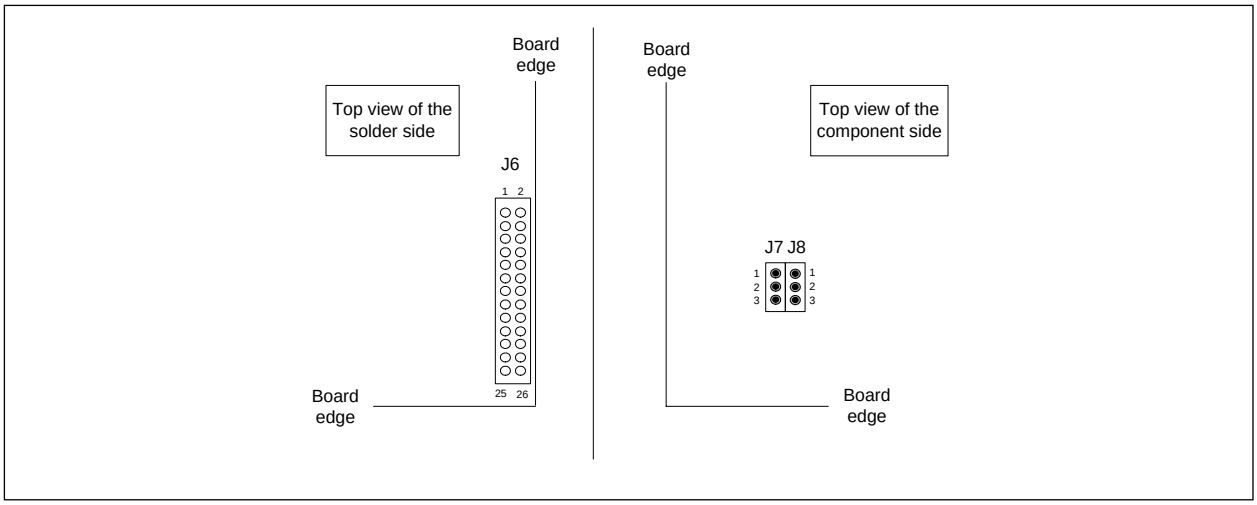


Figure3.1.7 Pin Assignment of User I/O Connectors (J6-J8)

Table3.1.6 Pin Assignments of User I/O Connector (J6)

Pin	Signal Name	Other connection
1	+5V	-
2	GND	-
3	PF8/AN8	-
4	PB5/A19/IRQ3/$\overline{\text{POE5}}$/TIC5U	Extension Connector(J10)
5	PB3/A17/IRQ1/$\overline{\text{POE1}}$/TIC5V	Extension Connector(J10)
6	PB1/$\overline{\text{BREQ}}$/TIC5W	Extension Connector(J11)
7	PE9/TIOC3B	LED3
8	PE12/TIOC4A	LED5
9	PE13/$\overline{\text{MRES}}$/TIOC4B	MRES Switch(SW7)
10	PE11/TIOC3D	LED4
11	PE14/TIOC4C	LED6
12	PE15/$\overline{\text{IRQOUT}}$/TIOC4D	LED7
13	PE0/TIOC0A	LED2
14	PE1/TIOC0B/RXD0	-
15	PE2/TIOC0C/TXD0	-
16	PE3/TIOC0D/SCK0	-
17	PF2/AN2	-
18	PF10/AN10	-
19	PF4/AN4	-
20	PF9/AN9	-
21	PB16/$\overline{\text{POE3}}$	DIP Switch(SW3)
22	PB17/$\overline{\text{POE7}}$	DIP Switch(SW3)
23	PF12/AN12	-
24	PF13/AN13	-
25	PF14/AN14	-
26	PF15/AN15	-

Table3.1.7 lists pin assignments of User I/O Connector (J7).

Table3.1.7 Pin Assignments of User I/O Connector (J7)

Pin	Signal Name	Other connection
1	PD5/D5/IRQ1/SCK1	Extension Connector(J12, J13)
2	PD6/D6/IRQ2/RXD2	Extension Connector(J12, J13)
3	PD7/D7/IRQ3/TXD2	Extension Connector(J12, J13)

Table3.1.8 lists pin assignments of User I/O Connector (J8).

Table3.1.8 Pin Assignments of User I/O Connector (J8)

Pin	Signal Name	Other connection
1	PF0/AN0	-
2	PF6/AN6	-
3	PF11/AN11	-

3.1.6 Extension Connectors (J9-J13)

The M3A-HS49 includes extension connectors to which the I/O pins of the SH7149 are connected.

MIL Standard connectors can be connected to J9-J13, allowing the user to create extension board or monitor the SH7149 bus signals.

The bus signals of SH7149 are connected to the terminal connector J10 (J13) through J9 (J12). There are J9 and J12 for measuring the signals by measuring instrument. When an extension board is made, J10 and J13 of the terminal connector are recommended to be used to prevent the waveform being distorted because of the reflection of the signal.

Figure3.1.8 shows a pin assignment of extension connector.

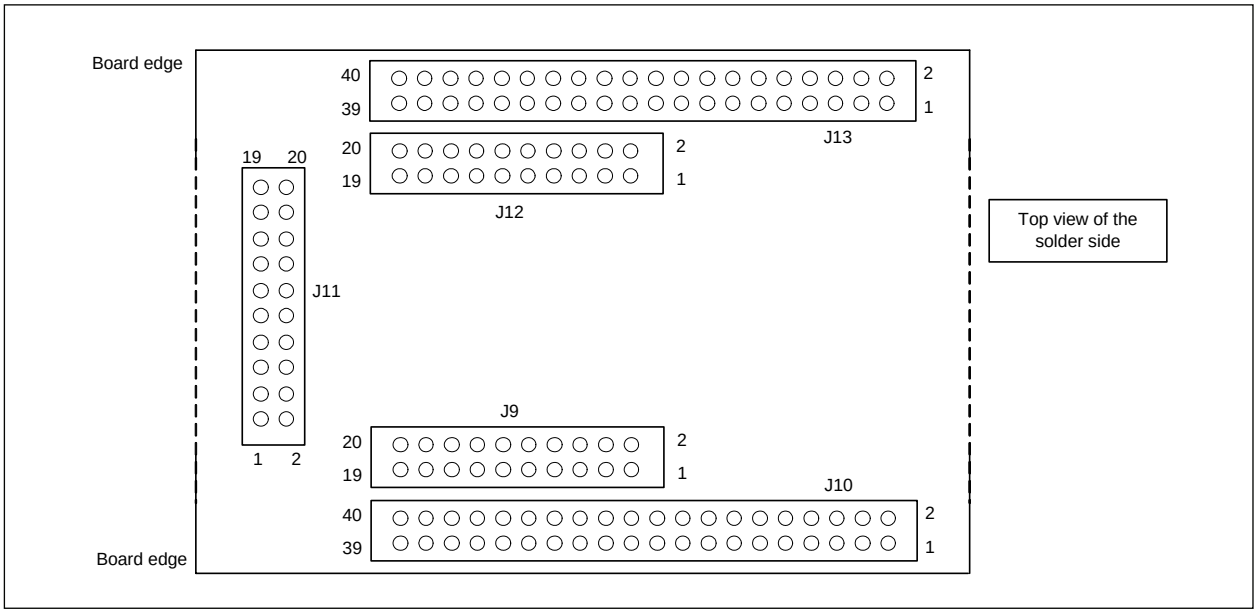


Figure3.1.8 Pin Assignment of Extension Connectors (J9-J13)

Table3.1.9 lists pin assignments of extension connectors (J9,J10).

Table3.1.9 Pin Assignments of Extension Connectors (J9, J10)

Pin J10	Pin J9	Signal Name	Other connection
1	-	+5V	-
2	-	+5V	-
3	-	$\overline{\text{WDTOVF}}$	-
4	-	NC	-
5	-	NC	-
6	-	NC	-
7	-	NC	-
8	-	NC	-
9	-	NC	-
10	-	PB5/A19/IRQ3/$\overline{\text{POE5}}$/TIC5U	User I/O Connector(J6)
11	-	PB4/A18/IRQ2/$\overline{\text{POE4}}$/TIC5US	-
12	-	PB3/A17/IRQ1/$\overline{\text{POE1}}$/TIC5V	User I/O Connector(J6)
13	-	PB2/A16/IRQ0/$\overline{\text{POE0}}$/TIC5VS	IRQ0 switch(SW6), LED8
14	-	PE8/A15/TIOC3A	-
15	-	PE7/A14/TIOC2B	-
16	-	PE6/A13/TIOC2A/SCK1	-
17	-	PE5/A12/TIOC1B/TXD1	-
18	-	PE4/A11/TIOC1A/RXD1	-
19	-	PA14/A10/RXD1	-
20	-	GND	-
21	1	NC	-
22	2	NC	-
23	3	PA15/CK/TXD1	-
24	4	PA13/A9/SCK1	-
25	5	PA12/A8/SCK0	-
26	6	PA11/A7/TXD0/$\overline{\text{ADTRG}}$	-
27	7	PA10/A6/RXD0	-
28	8	PA5/A5/IRQ3/SCK1	-
29	9	PA4/A4/IRQ2/TXD1	Serial port select Jumper(JP3)
30	10	PA3/A3/IRQ1/RXD1	Serial port select Jumper(JP4)
31	11	PA2/A2/IRQ0/$\overline{\text{POE2}}$/SCK0	-
32	12	PA1/A1/$\overline{\text{POE1}}$/TXD0	-
33	13	PA0/A0/$\overline{\text{POE0}}$/RXD0	-
34	14	PE10/$\overline{\text{CS0}}$/TIOC3C	-
35	15	NC	-
36	16	NC	-
37	17	NC	-
38	18	NC	-
39	19	$\overline{\text{RES}}$	Reset Module
40	20	GND	-

Table3.1.10 lists pin assignments of extension connectors (J11).

Table3.1.10 Pin Assignments of Extension Connectors (J11)

Pin	Signal Name	Other connection
1	NC	-
2	NC	-
3	NC	-
4	NC	-
5	PA8/$\overline{\text{WRL}}$/TCLKC/$\overline{\text{POE6}}$/RXD2	-
6	PA7/$\overline{\text{WRH}}$/TCLKB/$\overline{\text{POE5}}$/SCK2	-
7	PE19/$\overline{\text{RD}}$/TIOC4BS/TDO	H-UDI Connector(J1,J2)
8	PE18/$\overline{\text{CS1}}$/TIOC4AS/TDI	H-UDI Connector(J1,J2)
9	PE17/$\overline{\text{CS0}}$/TIOC3DS/TCK	H-UDI Connector(J1,J2)
10	PE16/$\overline{\text{WAIT}}$/TIOC3BS/$\overline{\text{ASEBRKAK}}$/$\overline{\text{ASEBRK}}$	H-UDI Connector(J1,J2)
11	PE21/$\overline{\text{WRL}}$/TIOC4DS/$\overline{\text{TRST}}$	H-UDI Connector(J1,J2)
12	PE20/$\overline{\text{WRH}}$/TIOC4CS/TMS	H-UDI Connector(J1,J2)
13	NC	-
14	NC	-
15	NC	-
16	NC	-
17	PB18/$\overline{\text{POE8}}$	DIP Switch(SW3)
18	PB1/$\overline{\text{BREQ}}$/TIC5W	User I/O Connector(J6)
19	PB0/$\overline{\text{BACK}}$/TIC5WS	DIP Switch(SW3)
20	GND	-

Table3.1.11 lists pin assignments of extension connectors (J12, J13).

Table3.1.11 Pin Assignments of Extension Connectors (J12, J13)

Pin J13	Pin J12	Signal Name	Other connection
1	-	+5V	-
2	-	+5V	-
3	-	PA9/$\overline{\text{WAIT}}$/TCLKD/TXD2	-
4	-	NC	-
5	-	NC	-
6	-	NC	-
7	-	NC	-
8	-	NC	-
9	-	NC	-
10	-	NC	-
11	-	NC	-
12	-	NC	-
13	-	NC	-
14	-	NC	-
15	-	NC	-
16	-	NC	-
17	-	NC	-
18	-	NC	-
19	-	NC	-
20	-	GND	-
21	1	NC	-
22	2	NC	-
23	3	PA6/$\overline{\text{RD}}$/$\overline{\text{UBCTRG}}$/TCLKA/$\overline{\text{POE4}}$	-
24	4	PD15/D15/$\overline{\text{AUDSYNC}}$	H-UDI Connector(J1)
25	5	PD14/D14/AUDCK	H-UDI Connector(J1)
26	6	PD13/D13/AUDMD	-
27	7	PD12/D12/$\overline{\text{AUDRST}}$	-
28	8	NC (PD11/D11/AUDATA3 when R55 mounted)	H-UDI Connector(J1) when R55 mounted
29	9	NC (PD10/D10/AUDATA2 when R56 mounted)	H-UDI Connector(J1) when R56 mounted
30	10	NC (PD9/D9/AUDATA1 when R57 mounted)	H-UDI Connector(J1) when R57 mounted
31	11	NC (PD8/D8/SCK2/AUDATA0 when R58 mounted)	H-UDI Connector(J1) when R58 mounted
32	12	PD7/D7/IRQ3/TXD2	User I/O Connector(J7)
33	13	PD6/D6/IRQ2/RXD2	User I/O Connector(J7)
34	14	PD5/D5/IRQ1/SCK1	User I/O Connector(J7)
35	15	PD4/D4/IRQ0/TXD1	-
36	16	PD3/D3/RXD1	-
37	17	PD2/D2/SCK0	-
38	18	PD1/D1/TXD0	-
39	19	PD0/D0/RXD0	-
40	20	GND	-

3.1.7 Extension Connector (J14)

Extension connector(J14) connects the pins necessary for writing a on-chip flash memory of SH7149.

Figure 3.1.9 lists pin assignments of the extension connectors.

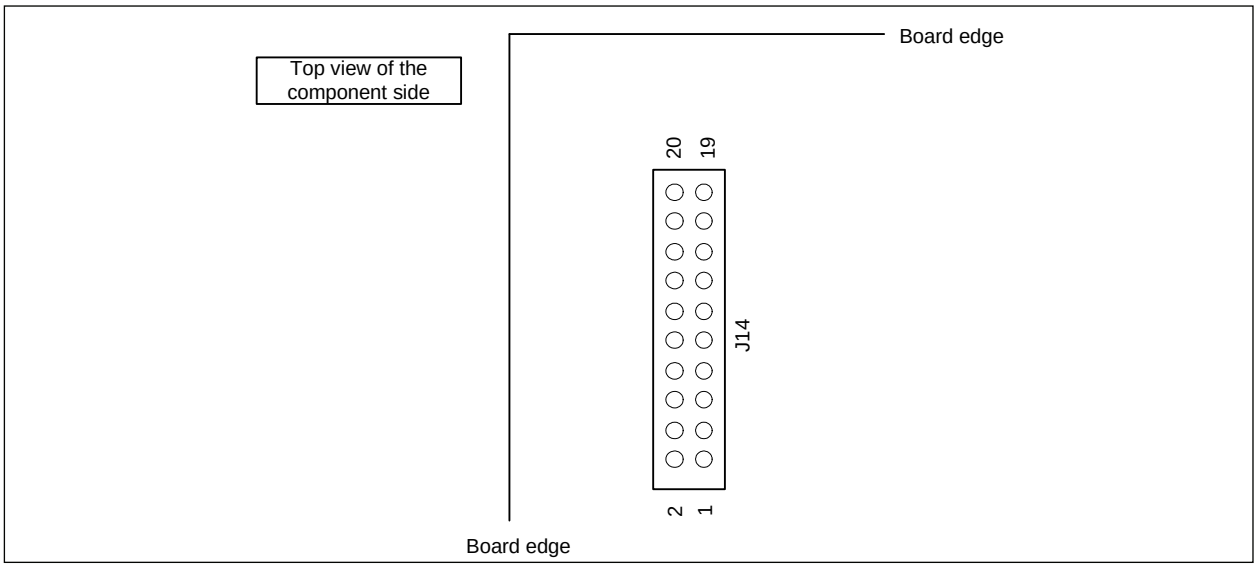


Figure 3.1.9 Pin assignments of the Extension Connector (J14)

Table 3.1.12 lists pin assignments of the extension connector(J14).

Table 3.1.12 Pin assignments of the extension connector (J14)

Pin	Signal name	Other connection
1	RES	-
2	GND	-
3	FWE	FWE pin Select Jumper (JP2)
4	GND	-
5	MD0	DIP switch for system setting (SW4-3)
6	GND	-
7	MD1	DIP switch for system setting (SW4-2)
8	GND	-
9	NC	-
10	GND	-
11	NC	-
12	GND	-
13	NC	-
14	GND	-
15	FTXD1(PA4/TXD1)*1	Serial port Select Jumper (JP3), Extension connector(J9, J10)
16	GND	-
17	FRXD1(PA3/RXD1)*2	Serial port Select Jumper (JP4), Extension connector(J9, J10)
18	VCC	-
19	NC	-
20	VCC	-

Note *1: When serial port select jumper (JP3) is set to “2-3”, it is activated.

*2: When serial port select jumper (JP4) is set to “2-3”, it is activated.

3.2 Outline of Switches and LEDs

The M3A-HS49 includes switches and LEDs as its operational components.

Figure3.2.1 shows the M3A-H49 operational component assignment.

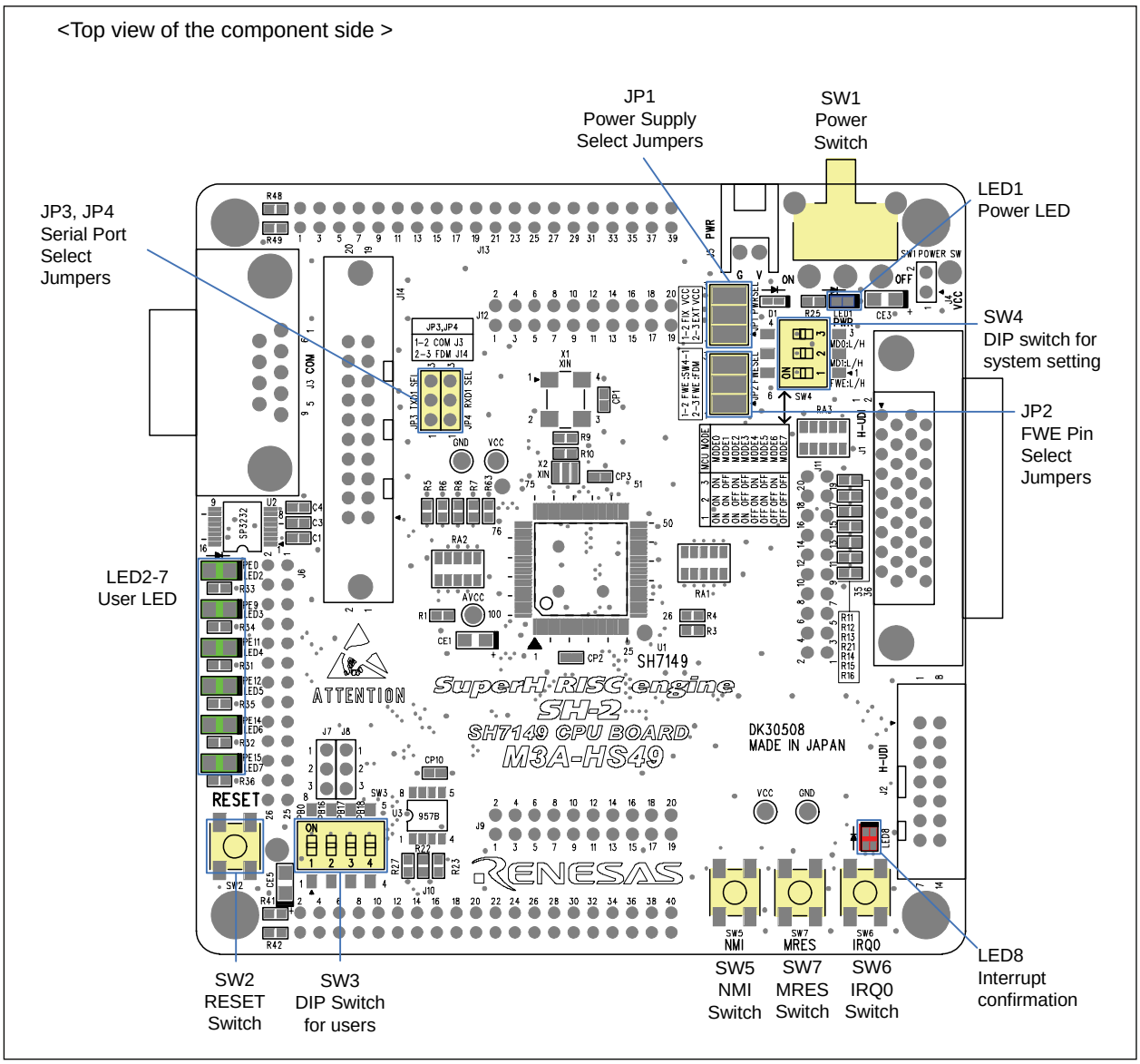


Figure3.2.1 M3A-H49 Operational Component Assignment

3.2.1 SH7149 Power Supply Select Jumper (JP1)

The JP1 allows the sources for the SH7149 power supply voltages to be selected.

Figure3.2.2 shows the SH7149 power supply voltage select jumper (JP1) assignment.

Table3.2.1 lists jumper setting for selecting SH7149 power supply voltage (JP1).

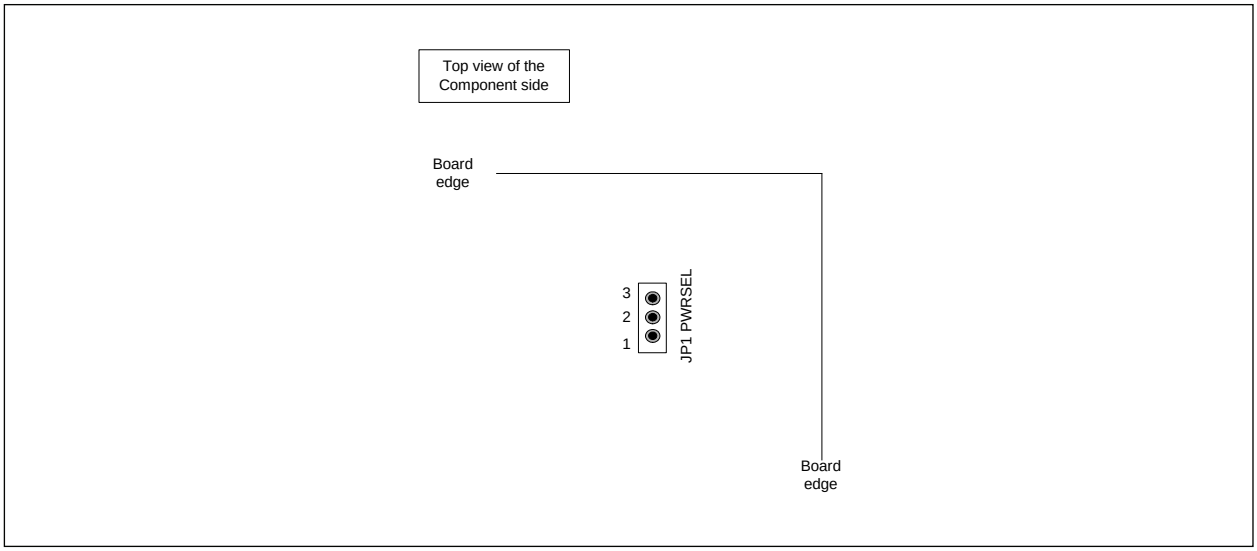


Figure3.2.2 SH7149 Power Supply Voltage Select Jumper (JP1) Assignment

Table3.2.1 Jumper Setting for Selecting SH7149 Power Supply Voltage (JP1)

Jumper	Setting	Function
JP1 PWRSEL	1 - 2	5V fixed power supply voltage
	2 - 3	External power supply voltage (supplied from J4)

: Initial Setting

Note : Do not change jumper settings while the operation of M3A-HS49. Ensure to turn off the power for the M3A-HS49 before changing jumper settings.

3.2.2 FWE Pin Select Jumper (JP2)

The JP2 allows the connection for the FWE pin to be selected.

Figure3.2.2 shows the FWE pin select jumper (JP2) assignment.

Table3.2.1 lists the jumper setting for selecting FWE pin (JP2).

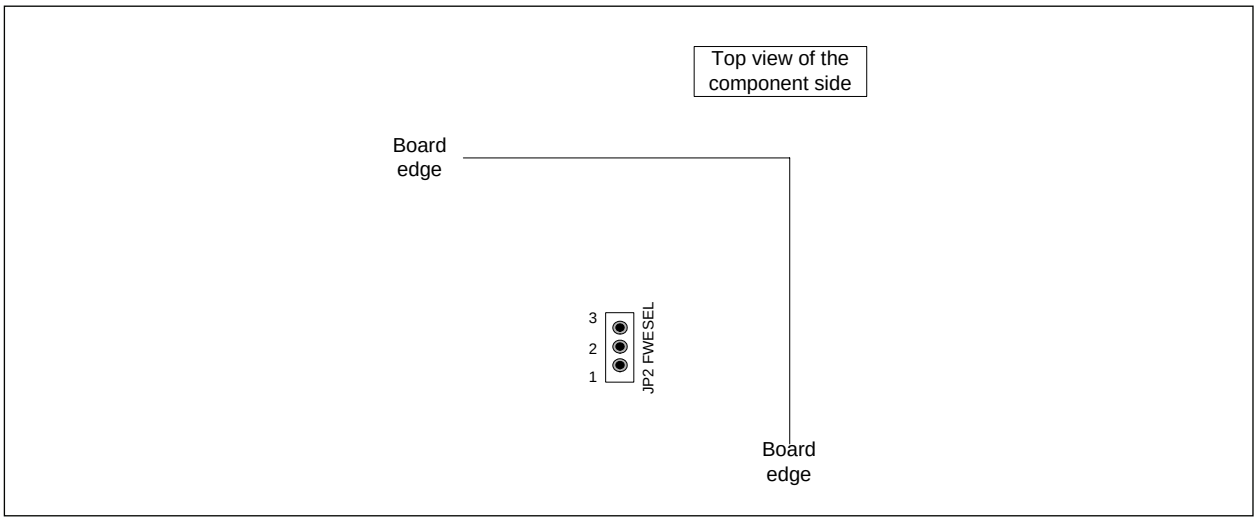


Figure3.2.3 FWE Pin Select Jumper (JP2) Assignment

Table3.2.2 Jumper Setting for Selecting FWE pin (JP2)

Jumper	Setting	Function
JP2 FWESEL	1 - 2	The FWE pin of SH7149 is connected with DIP Switch (SW4-1).
	2 - 3	The FWE pin of SH7149 is connected with Extension Connector (J14).

: Initial Setting

Note : Do not change jumper settings while the operation of M3A-HS49. Ensure to turn off the power for the M3A-HS49 before changing jumper settings.

3.2.3 Serial Port Select Jumpers (JP3,JP4)

The JP3 and JP4 allow the connection for the Serial port (TXD1 and RXD1) in the SH7149 to be selected.

Figure 3.2.4 shows the Serial port select jumper (JP3, JP4) assignment.

Table 3.2.3 and Table 3.2.4 list the jumper setting for selecting Serial port (JP3, JP4).

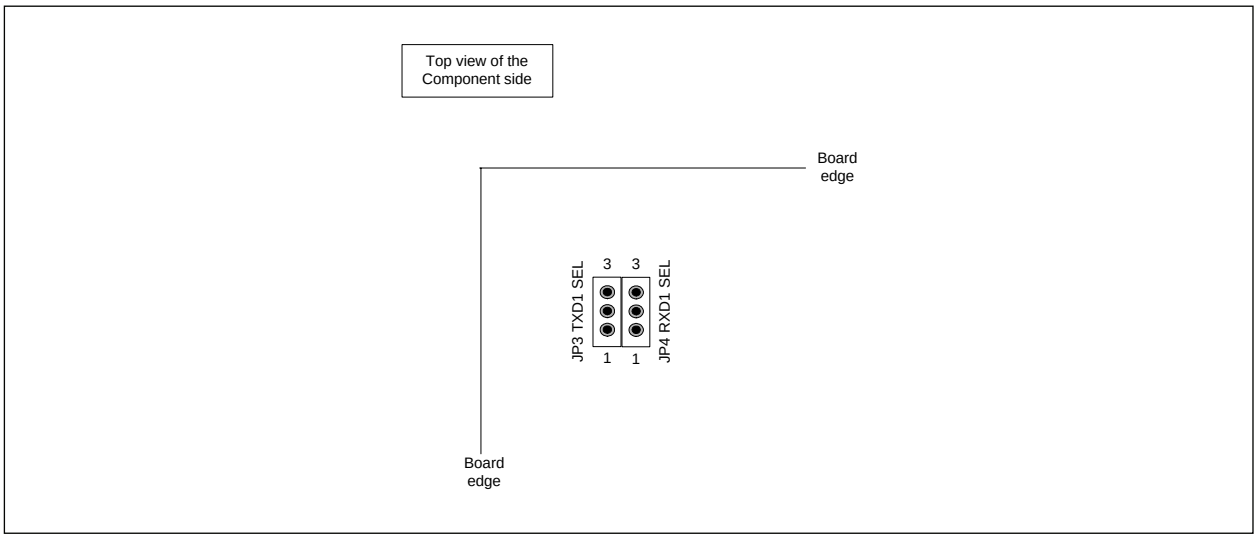


Figure 3.2.4 Serial Port Select Jumper (JP3, JP4) Assignment

Table 3.2.3 Jumper Setting for Selecting Serial Port (JP3)

Jumper	Setting	Function
JP3 TXD1 SEL	1 - 2	The TXD1 pin of SH7149 is connected with Serial port connector (J3).
	2 - 3	The TXD1 pin of SH7149 is connected with extension connector (J14).

: Initial Setting

Table 3.2.4 Jumper Setting for Selecting Serial Port (JP4)

Jumper	Setting	Function
JP4 RXD1 SEL	1 - 2	The RXD1 pin of SH7149 is connected with Serial port connector (J3).
	2 - 3	The RXD1 pin of SH7149 is connected with extension connector (J14).

: Initial Setting

Note : Do not change jumper settings while the operation of M3A-HS49. Ensure to turn off the power for the M3A-HS49 before changing jumper settings.

3.2.4 Switch and LED Functions

The M3A-HS49 includes seven switches and eight LEDs.

Figure3.2.5 shows the switch and LED pin assignment. Table3.2.5 lists switches mounted on M3A-HS49.

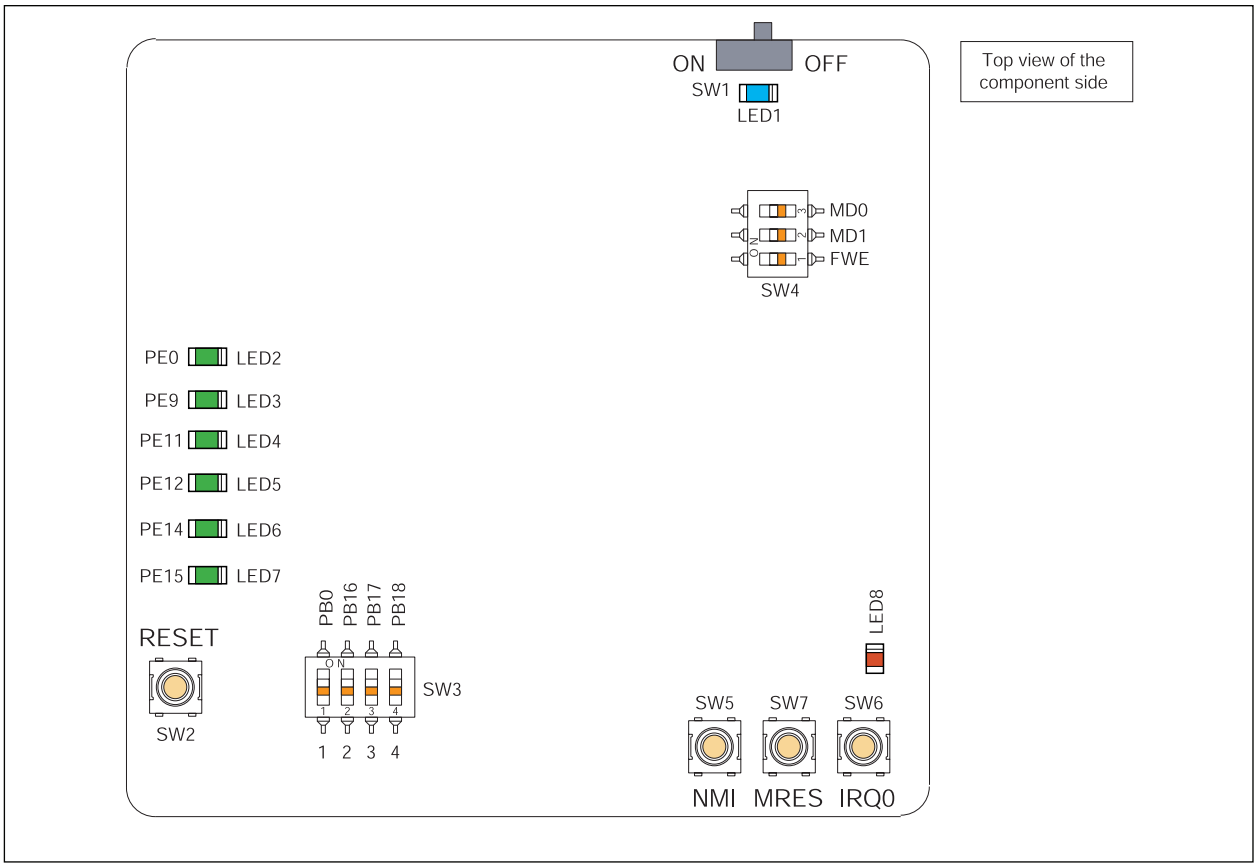


Figure3.2.5 Switch and LED Pin Assignment

Table3.2.5 Switches Mounted on M3A-HS49

No.	Function	Remarks
SW1	System power on/off switch	-
SW2	System reset input switch	ref. section 2.6
SW3	DIP switch for users SW3-1 OFF : PB0=H, ON : PB0=L SW3-2 OFF : PB16=H, ON : PB16=L SW3-3 OFF : PB17=H, ON : PB17=L SW3-4 OFF : PB18=H, ON : PB18=L	PB0, PB16, PB17 and PB18 are pulled up. ref. section 2.4
SW4	DIP switch for CPU mode setting	ref. Table3.2.6
SW5	NMI input switch	ref. section 2.7
SW6	IRQ0 input switch	ref. section 2.7
SW7	MRES* input switch	ref. section 2.7

*: By MRES (manual reset), each register of the on-chip peripheral module is not initialized though an internal state of CPU is initialized.

Table3.2.6 lists functions of switch SW4. SH7149 operating mode is determined by the setting of the MD0, MD1 and FWE pins. Table3.2.7 lists the selection of SH7149 operating modes.

Table3.2.6 Functions of Switch SW4

No.	Setting	Function	
SW4-1 FWE	OFF	FWE=H (Releasing the writing/erasing protects of on-chip flash memory)	CPU mode setting (ref. Table3.2.7)
	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”	

: Initial Setting

Table3.2.7 Selection of SH7149 operating modes

SW4-1 (FWE)	SW4-2 (MD1)	SW4-3 (MD0)	SH7149 Operating mode	
			Operating mode	Mode name
ON	ON	ON	Mode0	MCU extension mode0 (On-chip ROM not active, CSO space: 8-bit bus width)
ON	ON	OFF	Mode1	MCU extension mode1 (On-chip ROM not active, CSO space: 8-bit bus width))
ON	OFF	ON	Mode2	MCU extension mode2 (On-chip ROM active)
ON	OFF	OFF	Mode3	Single chip mode (On-chip ROM active)
OFF	ON	ON	Mode4	Boot mode (On-chip ROM active)
OFF	ON	OFF	Mode5	User Boot mode (On-chip ROM active)
OFF	OFF	ON	Mode6	User Programming mode (On-chip ROM active)
OFF	OFF	OFF	Mode7	User Programming mode (On-chip ROM active)

: Initial Setting

Table3.2.8 lists functions of LEDs mounted in M3A-HS49.

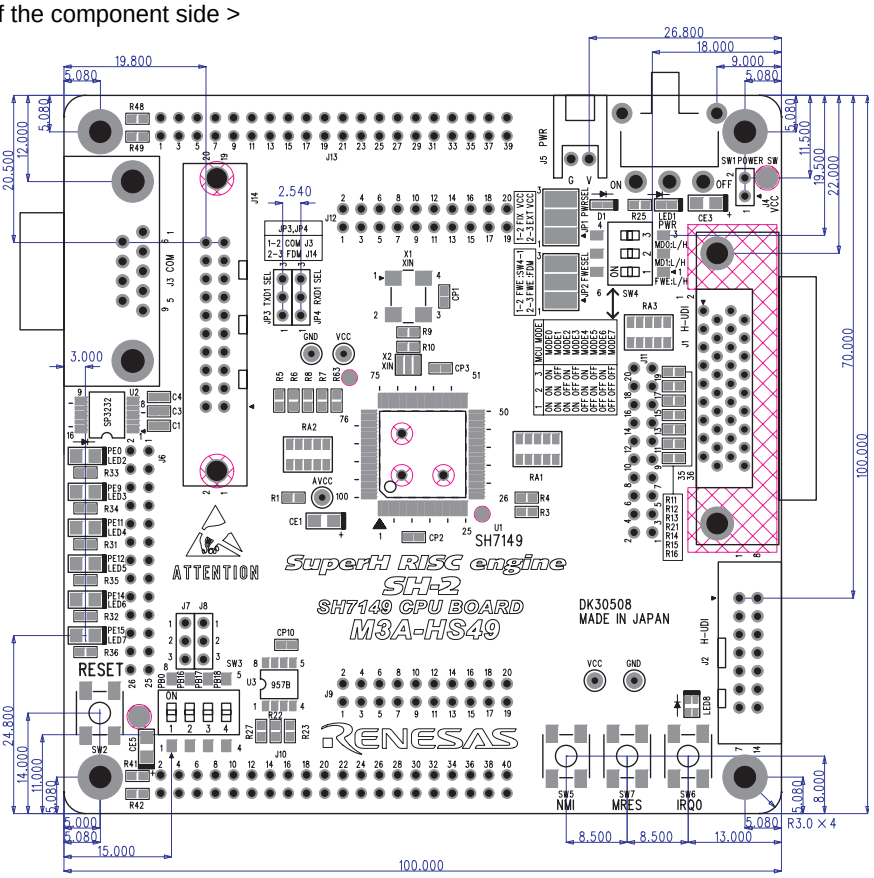
Table3.2.8 Functions of LEDs Mounted in M3A-HS49

No.	Color	Functions/Remarks
LED1	Blue	Power-on LED (LED1 lights when power is supplied)
LED2	Green	Open to the user (LED2 lights when PE0 outputs “L”)
LED3	Green	Open to the user (LED3 lights when PE9 outputs “L”)
LED4	Green	Open to the user (LED4 lights when PE11 outputs “L”)
LED5	Green	Open to the user (LED5 lights when PE12 outputs “L”)
LED6	Green	Open to the user (LED6 lights when PE14 outputs “L”)
LED7	Green	Open to the user (LED7 lights when PE15 outputs “L”)
LED8	Red	Interrupt confirmation (LED8 lights red when pushing at NMI switch (SW5).
	Yellowgreen	Interrupt confirmation (LED8 lights yellowgreen when pushing IRQ0 switch (SW6).

3.3 Package Dimensions of M3A-HS49

Figure3.3.1 shows package dimensions of M3A-HS49.

<Top view of the component side >



< Top view of the solder side >

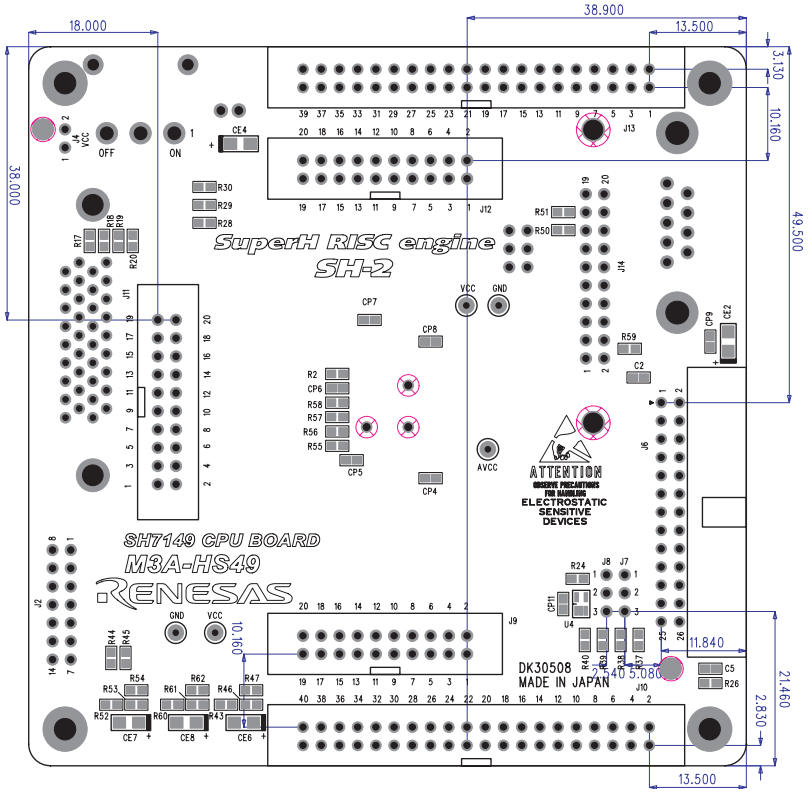


Figure3.3.1 Package Dimensions of M3A-HS49

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Appendix

M3A-HS49 SCHEMATICS

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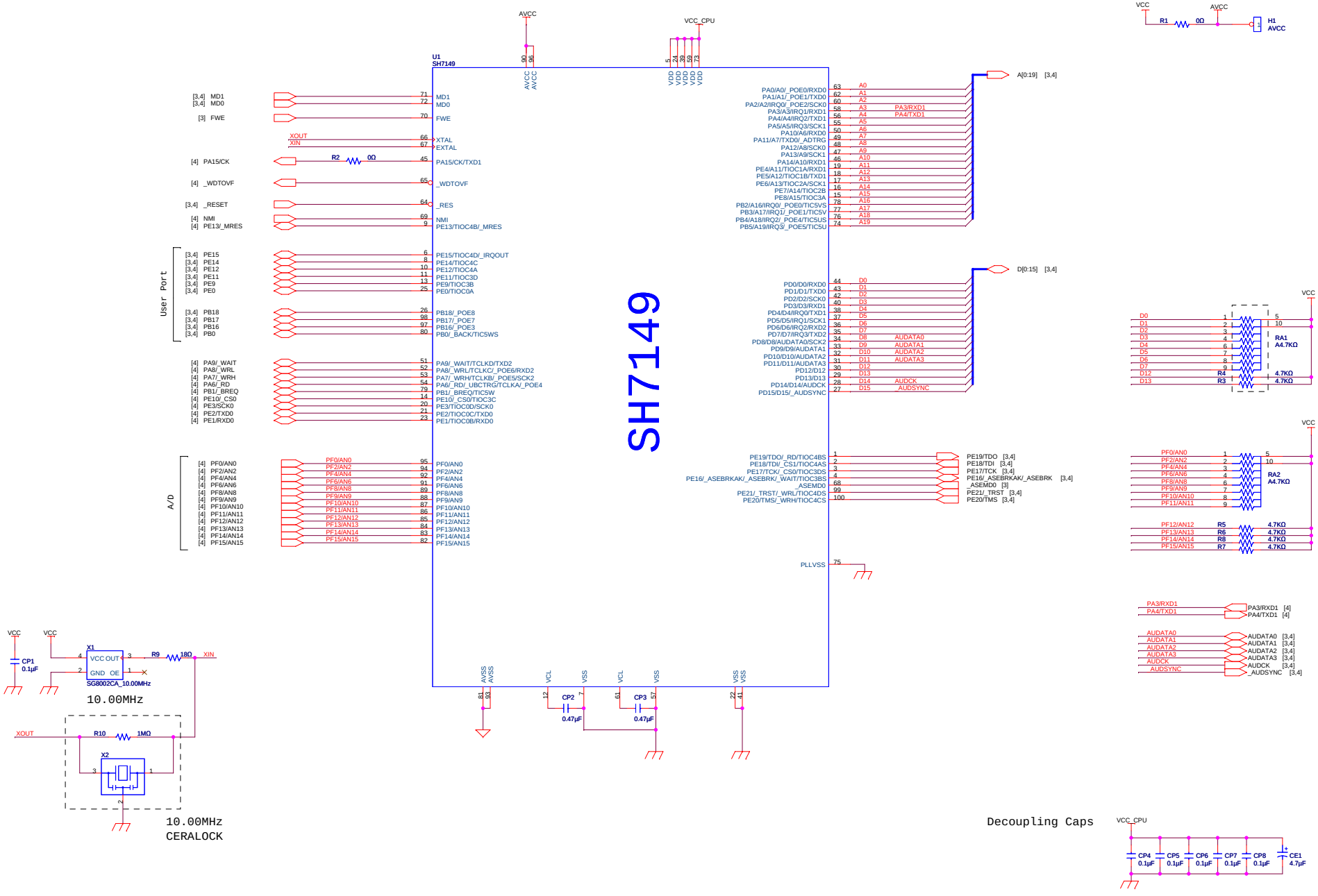
SH7149 CPU BOARD M3A-HS49 SCHEMATICS

Note:
VCC = 5V

R = Fixed Resistors
RA = Resistor Array
C = Ceramic Caps
CE = Tantalum Electrolytic Caps
CP = Decoupling Caps

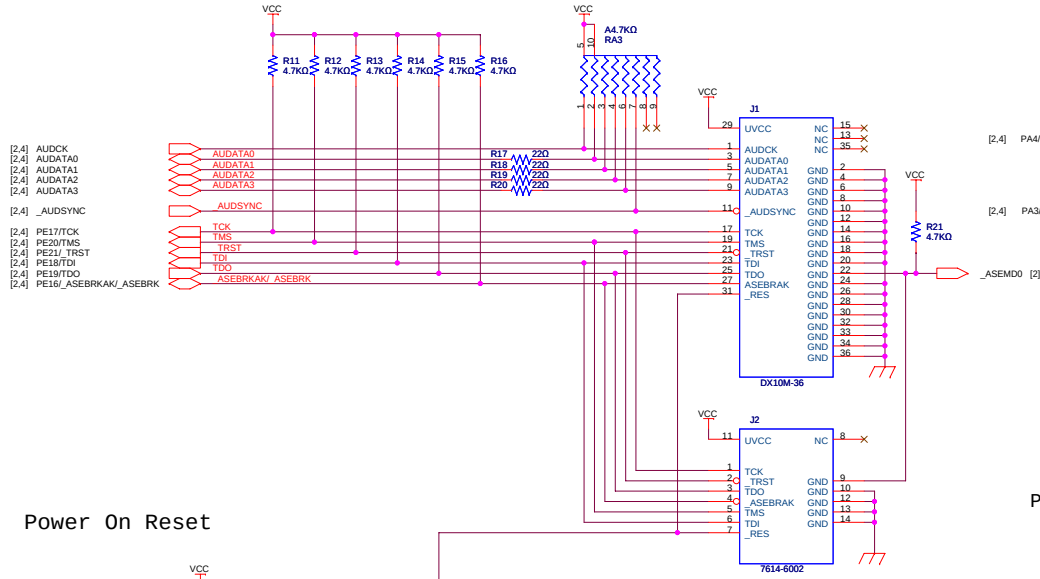
[Note] ⬚ : not mounted

CHANGE			RENESAS SOLUTIONS CORPORATION				M3A-HS49
		SCALE	DRAWN	CHECKED	DESIGNED	APPROVED	INDEX (1 / 5)
Ver. 1.0		DATE 06-12-08					DK30508

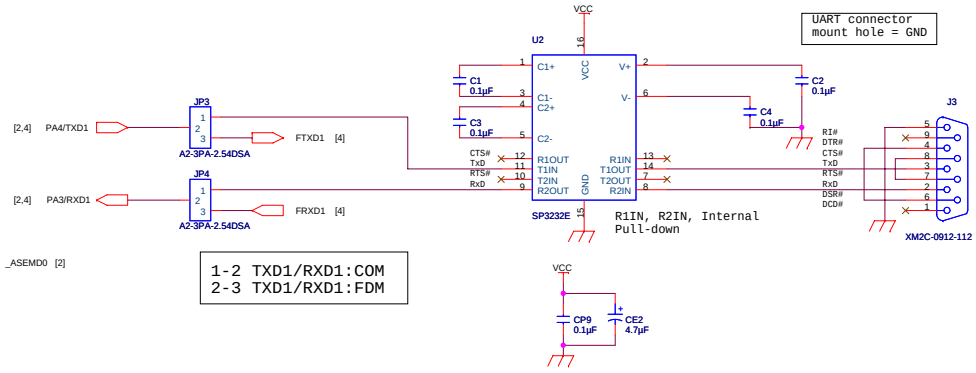


CHANGE		RENESAS SOLUTIONS CORPORATION			M3A-HS49
		DRAWN	CHECKED	DESIGNED	APPROVED	CPU SH7149 (2 / 5)
Ver. 1.0	SCALE					DK30508
	DATE	06-12-08			

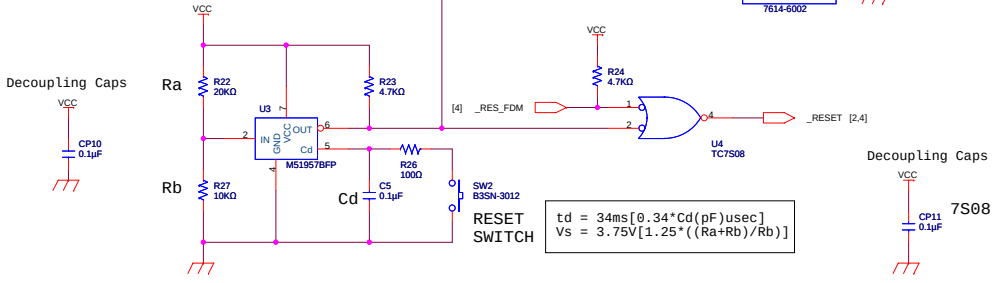
H-UDI INTERFACE



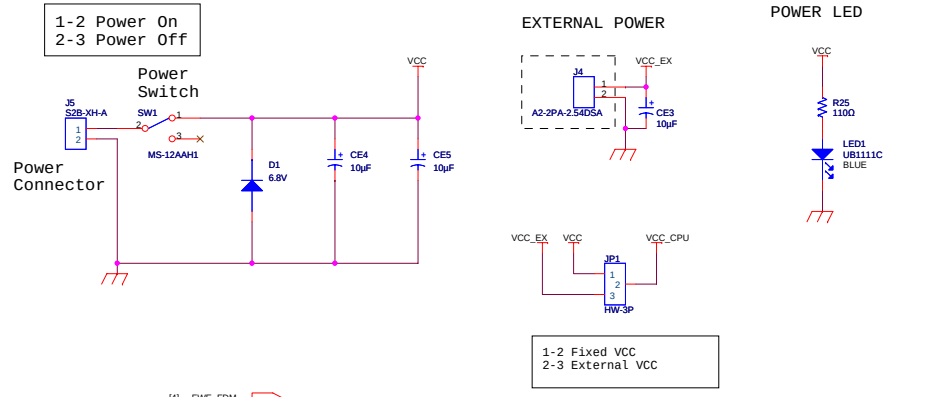
SERIAL CONNECTOR(COM)



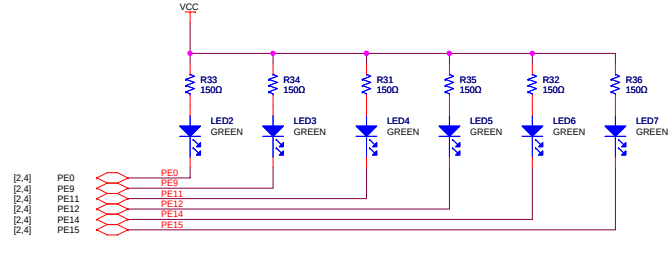
Power On Reset

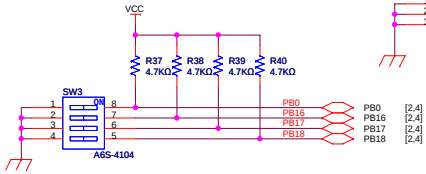


POWER SUPPLY

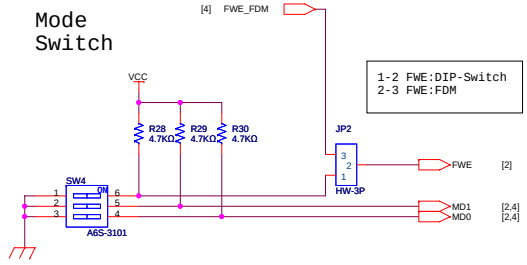


User Port





Mode Switch



1	2	3	Mode
ON	ON	ON	MCU extension mode 0
		OFF	MCU extension mode 1
	OFF	ON	MCU extension mode 2
		OFF	Single chip mode
OFF	ON	ON	Boot mode
		OFF	User Boot mode
	OFF	ON	User Programming mode
		OFF	

CHANGE

Ver. 1.0

SCALE

DATE 06-12-08

RENESAS SOLUTIONS CORPORATION

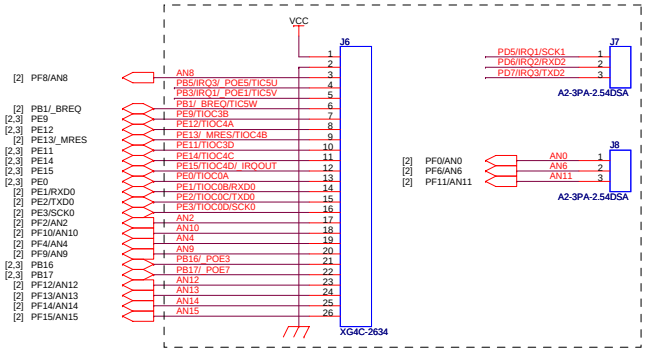
DRAWN	CHECKED	DESIGNED	APPROVED

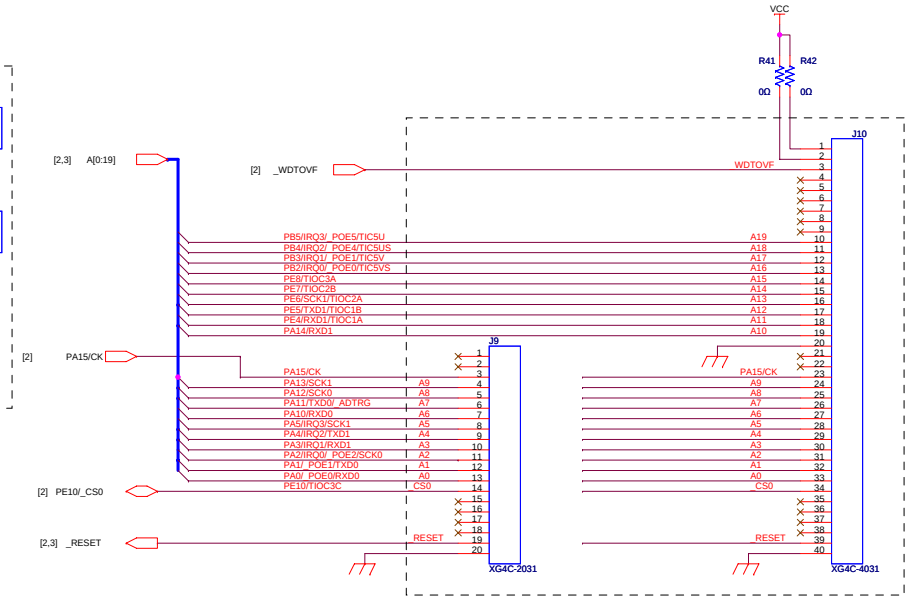
M3A-HS49

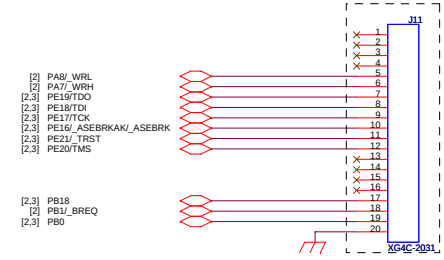
H-UDI/RESET/UART/POWER (3 / 5)

DK30508

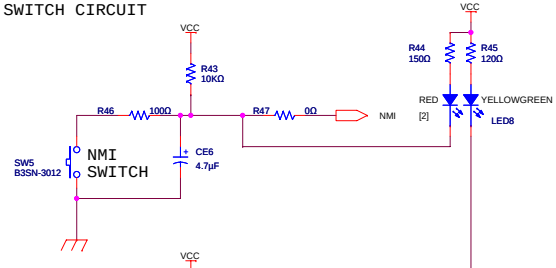
Extension Connector



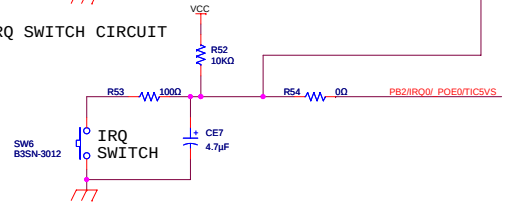




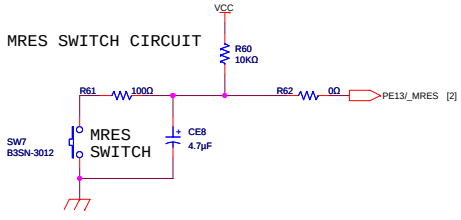
NMI SWITCH CIRCUIT

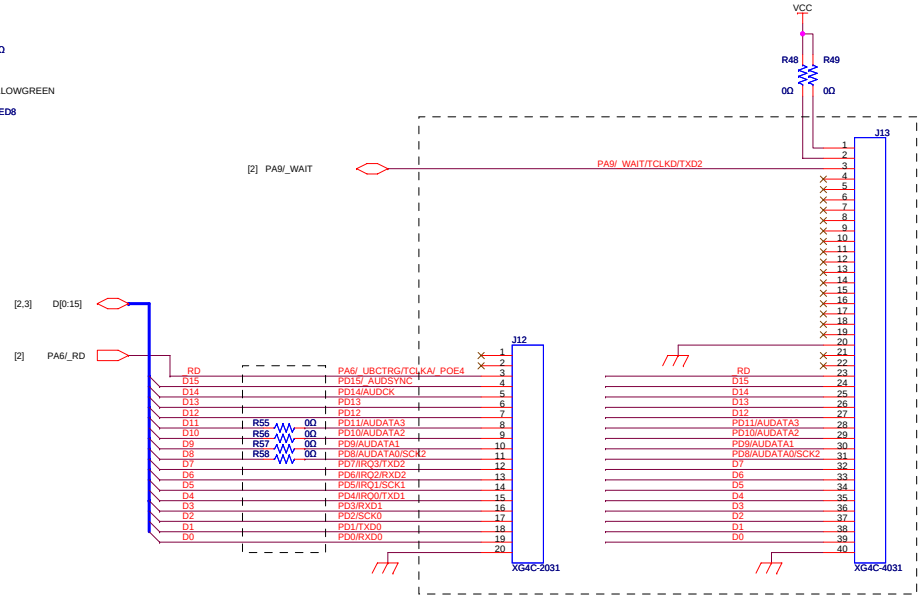


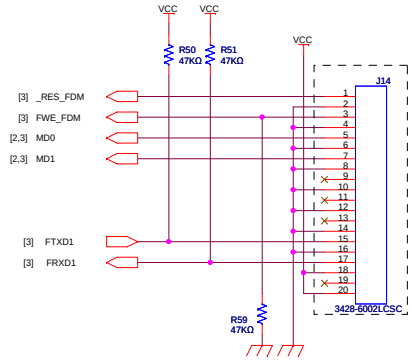
IRQ SWITCH CIRCUIT



MRES SWITCH CIRCUIT

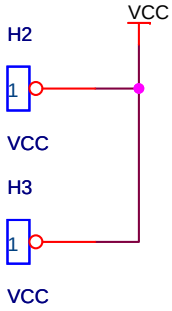


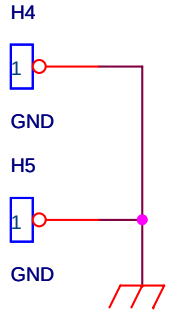


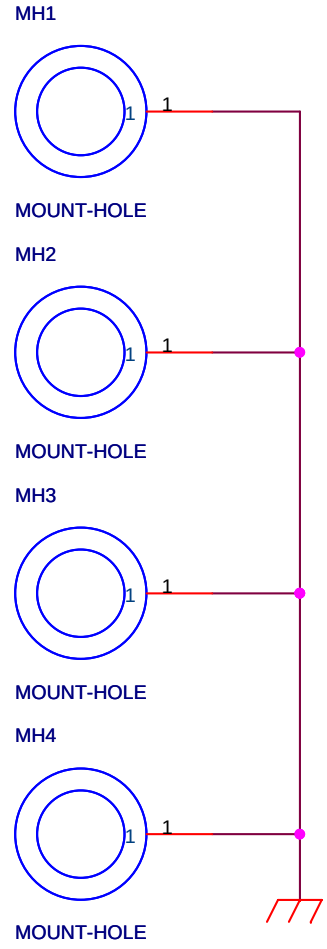


CHANGE			RENESAS SOLUTIONS CORPORATION		M3A-HS49
Ver. 1.0	SCALE		DRAWN / CHECKED / DESIGNED / APPROVED		BUS CONNECTORS/PUSH SW (4 / 5)
	DATE	06-12-08			DK30508

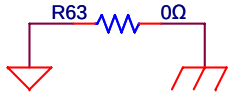
TEST PIN







AGND-GND



CHANGE	Ver. 1.0		RENESAS SOLUTIONS CORPORATION			M3A-HS49
		SCALE	DRAWN	CHECKED	DESIGNED	APPROVED	OTHERS (5 / 5)
		DATE 06-12-08				DK30508

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M3A-HS49
User's Manual

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User's Manual

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