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April 1st, 2010
Renesas Electronics Corporation

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

Connection of SH7705 E10A Emulator

HS7705KCM01H HS7705KCM02H HS7705KCI01H
HS7705KCI02H with User System

1. Connecting the E10A Emulator with the User System

To connect the E10A emulator (hereinafter referred to as the emulator), the H-UDI port connector must be installed on the user system to connect the user system interface cable. When designing the user system, refer to the recommended circuit between the H-UDI port connector and the MCU. In addition, read the E10A emulator user's manual and hardware manual for the related device.

Table 1.1 shows the type number of the E10A emulator, the corresponding connector type, and the use of AUD function.

Table 1.1 Type Number, AUD Function, and Connector Type

Type Number	Connector	AUD Function
HS7705KCM02H, HS7705KCI02H	36-pin connector	Available
HS7705KCM01H, HS7705KCI01H	14-pin connector	Not available

The H-UDI port connector has the 36-pin and 14-pin types as described below. Use them according to the purpose of the usage.

1. 36-pin type (with AUD function)
The AUD trace function is supported. A large amount of trace information can be acquired in realtime. The E10A emulator supports the window trace function that memory access (memory access address or memory access data) in the specified range can be acquired by tracing.
2. 14-pin type (without AUD function)
The AUD trace function cannot be used because only the H-UDI function is supported. For tracing, only the internal trace function is supported. Since the 14-pin type connector is smaller than the 36-pin type (1/2.5), the area where the connector is installed on the user system can be reduced.

2. Installing the H-UDI Port Connector on the User System

Table 2.1 shows the recommended H-UDI port connectors for the emulator.

Table 2.1 Recommended H-UDI Port Connectors

Connector	Type Number	Manufacturer	Specifications
36-pin connector	DX10M-36S	Hirose Electric Co., Ltd.	Screw type
	DX10M-36SE, DX10G1M-36SE		Lock-pin type
14-pin connector	2514-6002	Sumitomo 3M Limited	14-pin straight type

Note: When the 36-pin connector is used, do not connect any components under the H-UDI connector. When the 14-pin connector is used, do not install any components within 3 mm of the H-UDI port connector.

3. Pin Arrangement of the H-UDI Port Connector

Figures 3.1 and 3.2 show the pin arrangement of the 36-pin and 14-pin H-UDI port connectors, respectively.

Note: Note that the pin number assignment of the H-UDI port connector shown below differs from that of the connector manufacturer.

Pin No.	Signal	Input/ Output*1	MCU Pin No.	Note	Pin No.	Signal	Input/ Output*1	MCU Pin No.	Note
1	AUDCK	Output	191		19	TMS	Input	141	
2	GND	—			20	GND	—		
3	AUDATA0	Output	118		21*2	/TRST	Input	142	
4	GND	—			22	GND	—		
5	AUDATA1	Output	119		23	TDI	Input	139	
6	GND	—			24	GND	—		
7	AUDATA2	Output	120		25	TDO	Output	143	
8	GND	—			26	GND	—		
9	AUDATA3	Output	121		27*2	/ASEBRKAK	Output	144	
10	GND	—			28	GND	—		
11*2	/AUDSYNC	Output	117		29	NC	—		
12	GND	—			30	GND	—		
13	NC	—			31*2	/RESETP	Output	195	User reset
14	GND	—			32	GND	—		
15	NC	—			33*3	GND	Output		
16	GND	—			34	GND	—		
17	TCK	Input	140		35	NC	—		
18	GND	—			36	GND	—		

- Notes: 1. Input to or output from the user system.
2. The slash (/) means that the signal is active-low.
3. The emulator monitors the GND signal of the user system and detects whether or not the user system is connected.

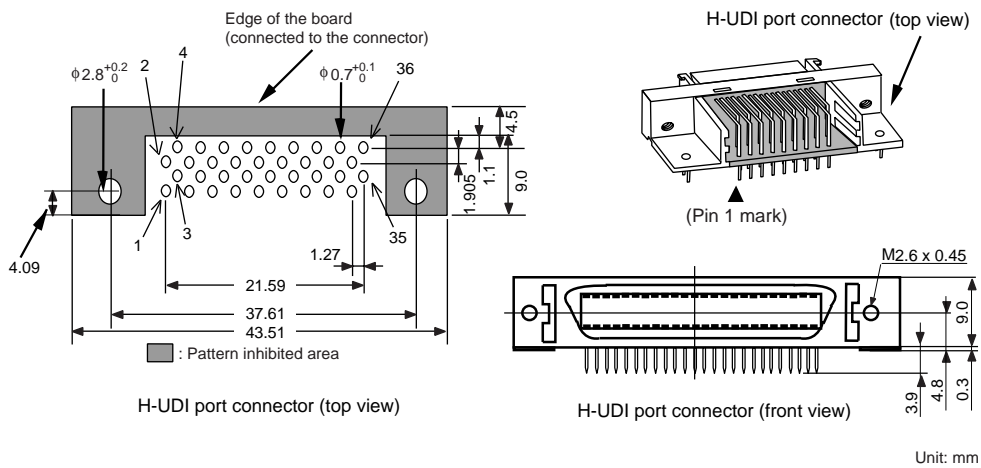


Figure 3.1 Pin Arrangement of the H-UDI Port Connector (36 Pins)

Pin No.	Signal	Input/ Output* ¹	MCU Pin No.
1	TCK	Input	140
2* ²	/TRST	Input	142
3	TDO	Output	143
4* ²	/ASEBRKAK	Output	144
5	TMS	Input	141
6	TDI	Input	139
7* ²	/RESETP	Output	195
11	Not connected	—	—
8 to 10	GND	—	—
12 to 13			
14* ³	GND	Output	—

- Notes: 1. Input to or output from the user system.
2. The slash (/) means that the signal is active-low.
3. The emulator monitors the GND signal of the user system and detects whether or not the user system is connected.

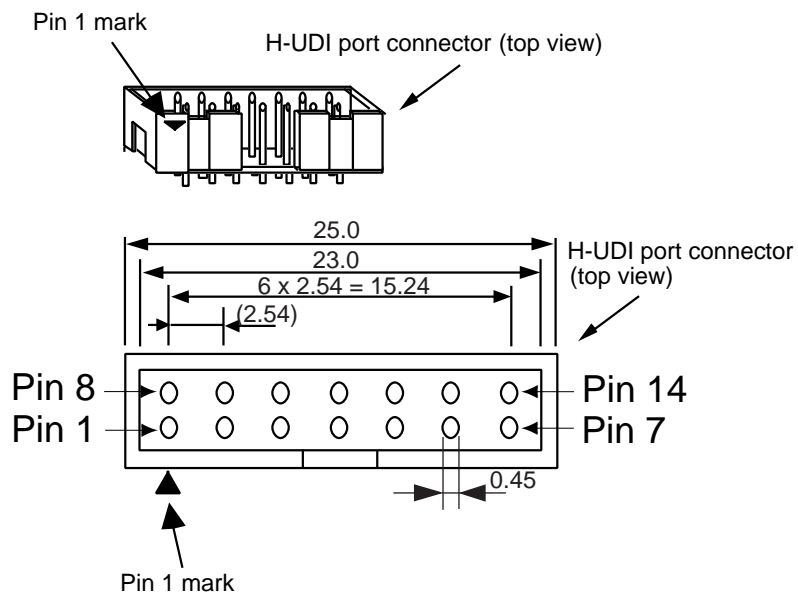


Figure 3.2 Pin Arrangement of the H-UDI Port Connector (14 Pins)

4. Recommended Circuit between the H-UDI Port Connector and MCU

4.1 Recommended Circuit (36-Pin Type)

Figure 4.1 shows a recommended circuit between the H-UDI port connector (36 pins) and the MCU.

- Notes:
1. Do not connect anything to the N.C. pin of the H-UDI port connector.
 2. The processing of the /ASEMD0 pin differs depending on whether the emulator is used or not. As the emulator does not control this pin, it must be controlled by a switch on the board.
 - (1) When the emulator is used: /ASEMD0 = low (ASE mode)
 - (2) When the emulator is not used: /ASEMD0 = high (normal mode)
 3. The reset signal in the user system is input to the /RESETP pin (pin 195) of the MCU. Connect this signal to the H-UDI port connector as the output from the user system.
 4. When a joined resistance is used for pull-up, it may be affected by a noise. Separate TCK from other resistances.
 5. The pattern between the H-UDI port connector and the MCU must be as short as possible. Do not connect the signal lines to other components on the board.
 6. The resistance values shown in figure 4.1 are recommended.
 7. For the pin processing in cases where the emulator is not used, refer to the hardware manual of the related device.

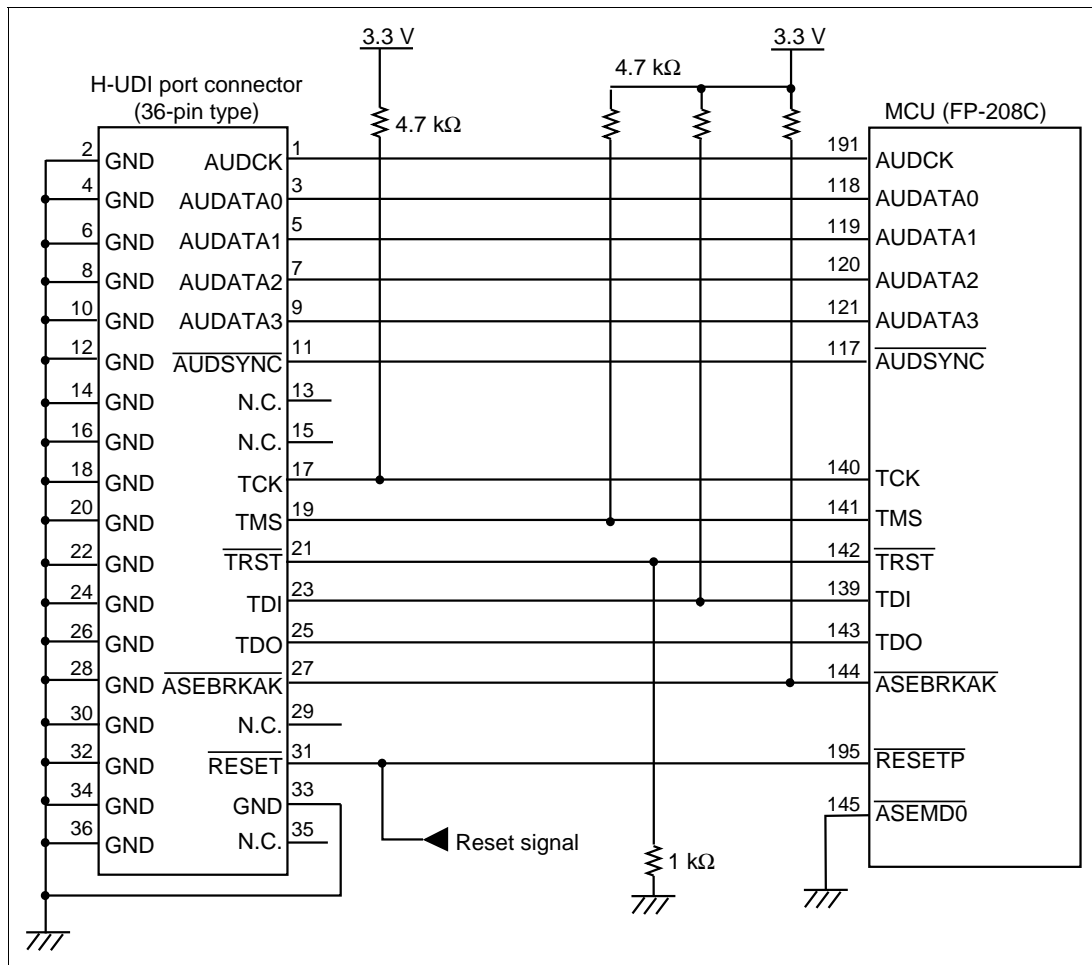


Figure 4.1 Recommended Circuit for Connection between the H-UDI Port Connector and MCU (36-Pin Type)

4.2 Recommended Circuit (14-Pin Type)

Figure 4.2 shows a recommended circuit between the H-UDI port connector and the MCU.

- Notes:
1. Do not connect anything to the N.C. pin of the H-UDI port connector.
 2. The processing of the /ASEMD0 pin differs depending on whether the emulator is used or not. As the emulator does not control this pin, it must be controlled by a switch on the board.
 - (1) When the emulator is used: /ASEMD0 = low (ASE mode)
 - (2) When the emulator is not used: /ASEMD0 = high (normal mode)
 3. The reset signal in the user system is input to the /RESETP pin (pin 195) of the MCU. Connect this signal to the H-UDI port connector as the output from the user system.
 4. When a joined resistance is used for pull-up, it may be affected by a noise. Separate TCK from other resistances.
 5. The pattern between the H-UDI port connector and the MCU must be as short as possible. Do not connect the signal lines to other components on the board.
 6. The resistance values shown in figure 4.2 are recommended.
 7. For the pin processing in cases where the emulator is not used, refer to the hardware manual of the related device.

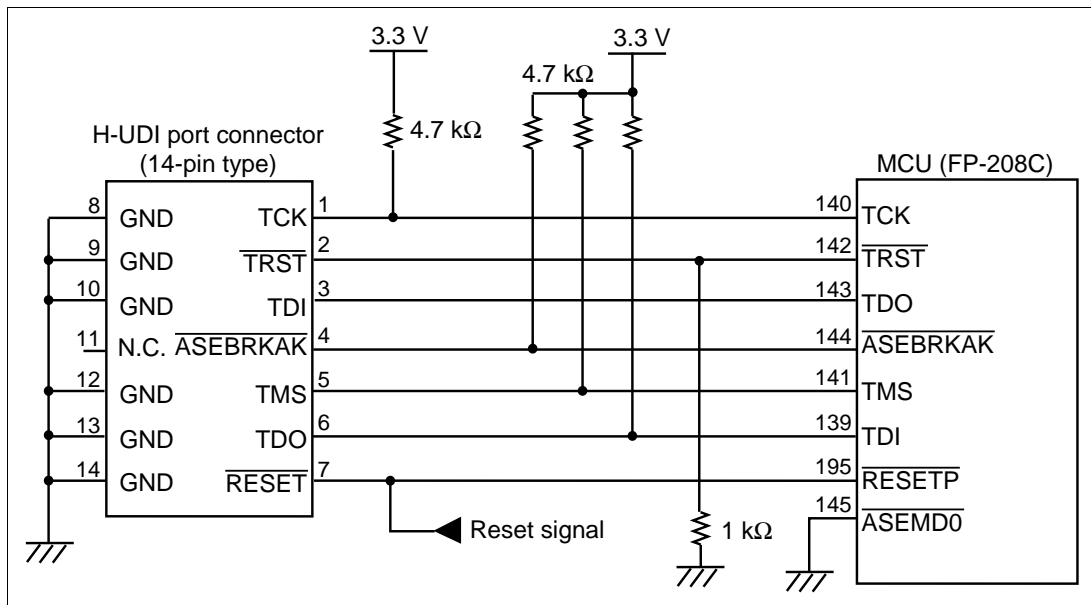


Figure 4.2 Recommended Circuit for Connection between the H-UDI Port Connector and MCU (14-Pin Type)

5. Restriction

The AUD and H-UDI pins are multiplexed as shown below. When the emulator is used, function 1 in table 5.1 is not available.

Table 5.1 Multiplex Functions

Port	Function 1	Function 2
F	PTF0 input/output (port)/TO0 output*	AUDATA0 (AUD)
F	PTF1 input/output (port)/TO1 output*	AUDATA1 (AUD)
F	PTF2 input/output (port)/TO2 output*	AUDATA2 (AUD)
F	PTF3 input/output (port)/TO3 output*	AUDATA3 (AUD)
F	PTF4 input/output (port)*	/AUDSYNC (AUD)
F	PTF5 input/output (port)	TDO (H-UDI)
F	PTF6 input/output (port)	/ASEBRKAK (H-UDI)
F	PTF7 input/output (port)	/ASEMD0 (AUD, H-UDI)
G	PTG0 input/output (port)	TDI (H-UDI)
G	PTG1 input/output (port)	TCK (H-UDI)
G	PTG2 input/output (port)	TMS (H-UDI)
G	PTG3 input/output (port)	/TRST (AUD, H-UDI)
G	PTG4 input/output (port)*	AUDCK (AUD)

Note: Function 1 is available only when the AUD pins of the MCU are not connected to the emulator.