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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 SH7641 E10A Emulator

HS7641KCM01H HS7641KCM02H HS7641KCI01H
HS7641KCI02H 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
HS7641KCM02H, HS7641KCI02H	36-pin connector	Available
HS7641KCM01H, HS7641KCI01H	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	N1		19	TMS	Input	R4	
2	GND	—			20	GND	—		
3	AUDATA0	Output	N4		21*2	/TRST	Input	P2	
4	GND	—			22	GND	—		
5	AUDATA1	Output	P1		23	TDI	Input	P3	
6	GND	—			24	GND	—		
7	AUDATA2	Output	N3		25	TDO	Output	T1	
8	GND	—			26	GND	—		
9	AUDATA3	Output	N2		27*2	/ASEBRKAK	Output	N17	
10	GND	—			28	GND	—		
11*2	/AUDSYNC	Output	P4		29	NC	—		
12	GND	—			30	GND	—		
13	NC	—			31*2	/RESETP	Output	N20	User reset
14	GND	—			32	GND	—		
15	NC	—			33*3	GND	Output		
16	GND	—			34	GND	—		
17	TCK	Input	R1		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.

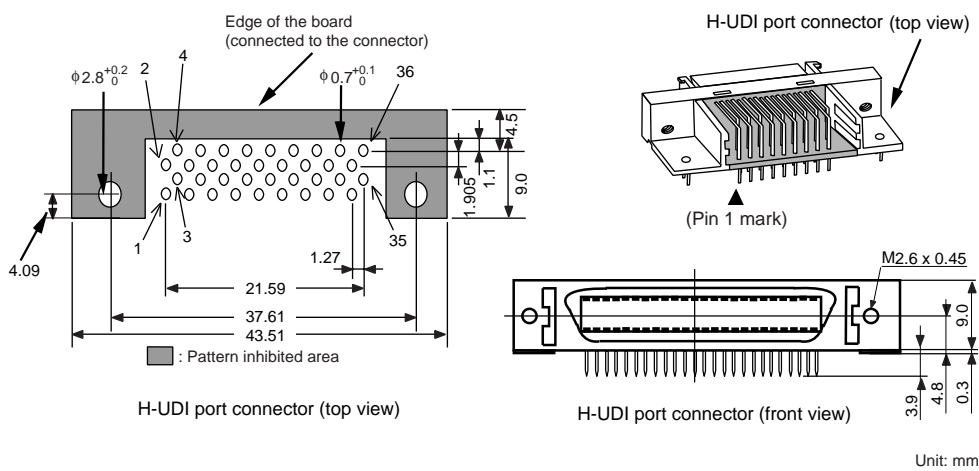


Figure 3.1 Pin Arrangement of the H-UDI Port Connector (36 Pins)

Pin No.	Signal	Input/ Output* ¹	MCU Pin No.
1	TCK	Input	R1
2* ²	/TRST	Input	P2
3	TDO	Output	T1
4* ²	/ASEBRKAK	Output	N17
5	TMS	Input	R4
6	TDI	Input	P3
7* ²	/RESETP	Output	N20
11	Not connected	—	—
8 to 10 12 to 13	GND	—	—
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.

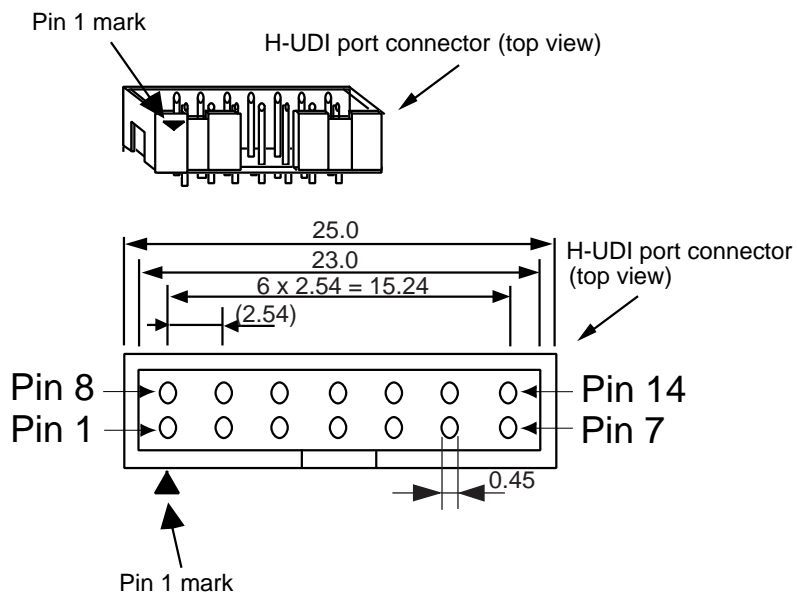


Figure 3.2 Pin Arrangement of the H-UDI Port Connector (14 Pins)

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 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.

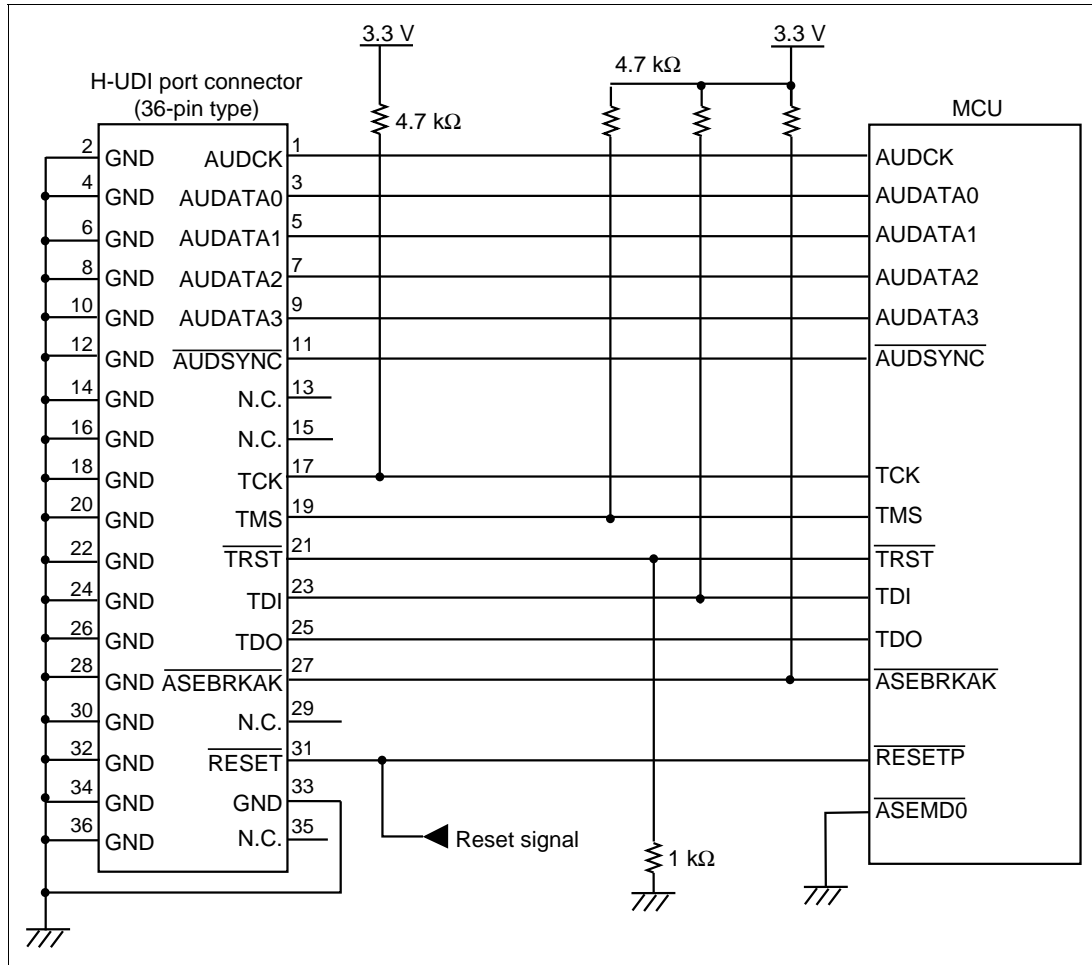


Figure 4.1 Recommended Circuit for Connection between the H-UDI Port Connector and MCU (36-Pin Type)

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 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.

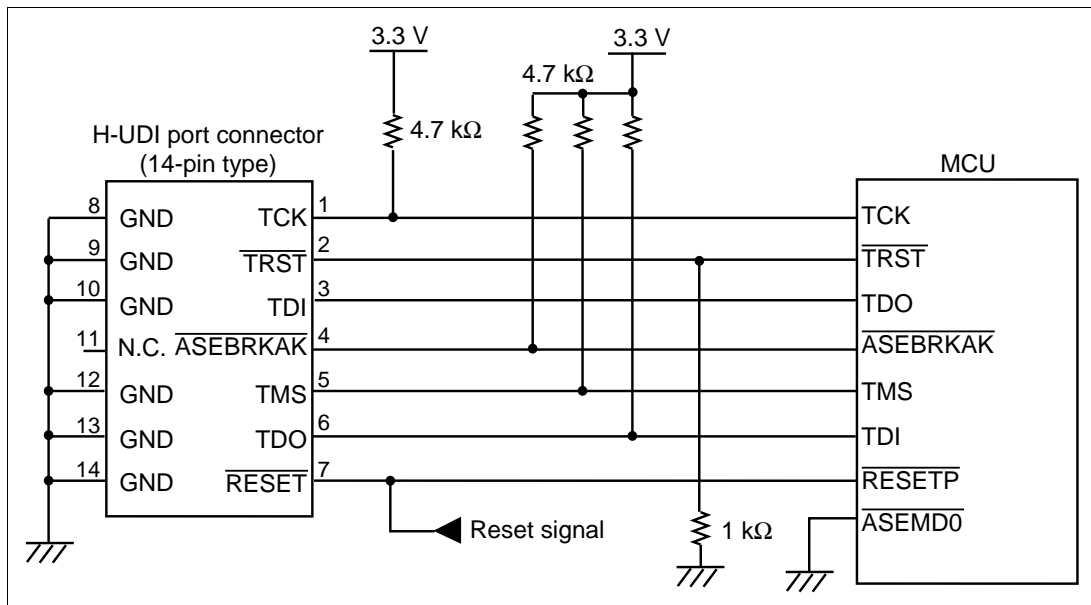


Figure 4.2 Recommended Circuit for Connection between the H-UDI Port Connector and MCU (14-Pin Type)

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
J	PTJ8 input/output (port) *	AUDATA0 (AUD)
J	PTJ9 input/output (port) *	AUDATA1 (AUD)
J	PTJ10 input/output (port)*	AUDATA2 (AUD)
J	PTJ11 input/output (port)*	AUDATA3 (AUD)
J	PTJ12 input/output (port)*	/AUDSYNC (AUD)
C	PTC13 input/output (port)	/ASEBRKAK (H-UDI)

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