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Renesas Electronics Corporation

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

Connection of SH7760 E10A Emulator

HS7760KCM01H HS7760KCM02H HS7760KCI01H
HS7760KCI02H with User System

1. Connecting the E10A Emulator with the User System

To connect the E10A emulator (hereafter 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 MCU.

Table 1.1 shows the type numbers of the emulator, the corresponding connector types, and the use of AUD function.

Table 1.1 Type Number, AUD Function, and Connector Type

Type Number	Connector	AUD Function
HS7760KCM02H, HS7760KCI02H	36-pin connector	Available
HS7760KCM01H, HS7760KCI01H	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.

- 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.
- 14-pin type (without AUD function)
The user cannot use the AUD trace function 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 connector for the emulator.

Table 2.1 Recommended H-UDI Port Connector

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	Note	Pin No.	Signal	Input/ Output*1	Note
1	AUDCK	Output		19	TMS	Input	
2	GND	—		20	GND	—	
3	AUDATA0	Output		21*2	/TRST	Input	
4	GND	—		22	GND	—	
5	AUDATA1	Output		23	TDI	Input	
6	GND	—		24	GND	—	
7	AUDATA2	Output		25	TDO	Output	
8	GND	—		26	GND	—	
9	AUDATA3	Output		27*2	/ASEBRK BRKACK	I/O	
10	GND	—		28	GND	—	
11*2	/AUDSYNC	Output		29	NC	—	
12	GND	—		30	GND	—	
13	NC	—		31*2	/RESET	Output	User reset
14	GND	—		32	GND	—	
15	NC	—		33*3	GND	Output	
16	GND	—		34	GND	—	
17	TCK	Input		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.

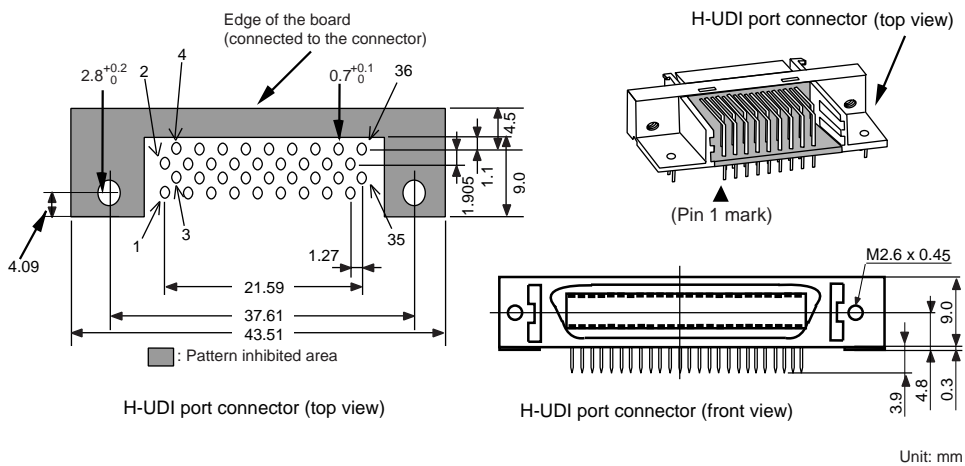


Figure 3.1 Pin Arrangement of the H-UDI Port Connector (36 Pins)

Pin No.	Signal	Input/ Output* ¹	Note
1	TCK	Input	
2* ²	/TRST	Input	
3	TDO	Output	
4* ²	/ASEBRK BRKACK	I/O	
5	TMS	Input	
6	TDI	Input	
7* ²	/RESET	Output	User reset
11	N.C.		
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.

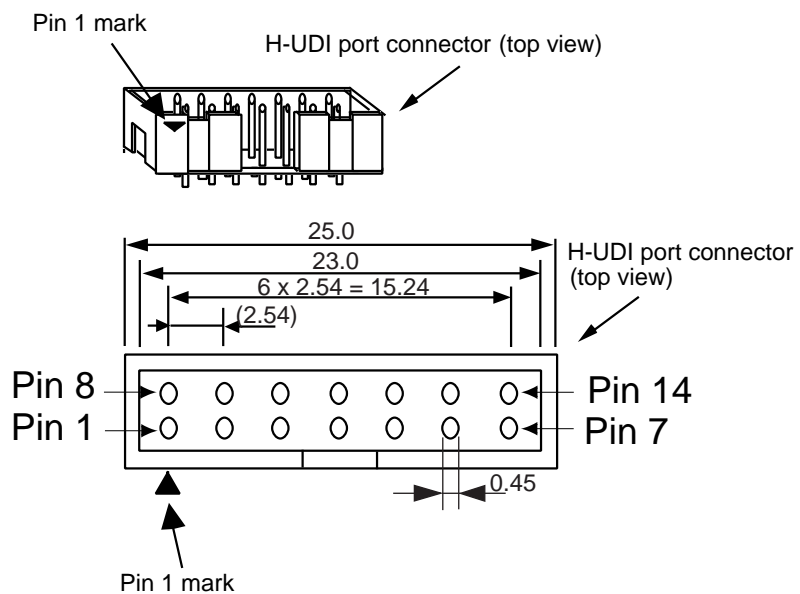


Figure 3.2 Pin Arrangement of the H-UDI Port Connector (14 Pins)

4. Recommended Circuit between the H-UDI Port Connector and the 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. When a joined resistance is used for pull-up, it may be affected by a noise. Separate TCK from other resistances.
 3. The reset signal in the user system is input to the /RESET pin of the MCU. Connect this signal to the H-UDI port connector as the output from the user system.
 4. The resistance values shown in figure 4.1 are recommended.
 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. For processing of pins in cases where the emulator is not used, refer to the hardware manual for the related MCU.

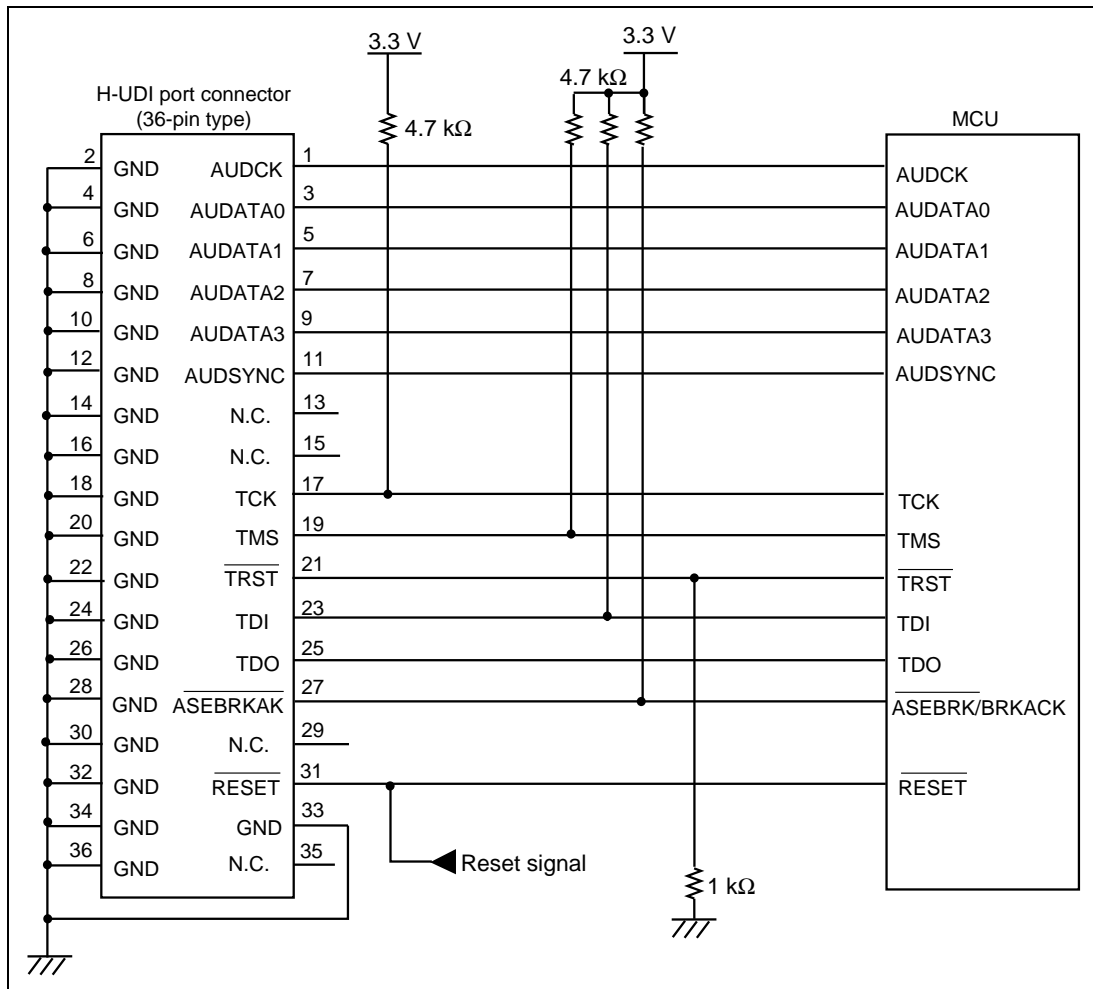


Figure 4.1 Recommended Circuit for Connection between the H-UDI Port Connector and the MCU when Using the Emulator (36-Pin Type)

4.2 Recommended Circuit (14-Pin Type)

Figure 4.2 shows a recommended circuit between the H-UDI port connector (14 pins) and the MCU.

- Notes:
1. Do not connect anything to the N.C. pin of the H-UDI port connector.
 2. When a joined resistance is used for pull-up, it may be affected by a noise. Separate TCK from other resistances.
 3. The reset signal in the user system is input to the /RESET pin of the MCU. Connect this signal to the H-UDI port connector as the output from the user system.
 4. The resistance values shown in figure 4.2 are recommended.
 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. For processing of pins in cases where the emulator is not used, refer to the hardware manual for the related MCU.

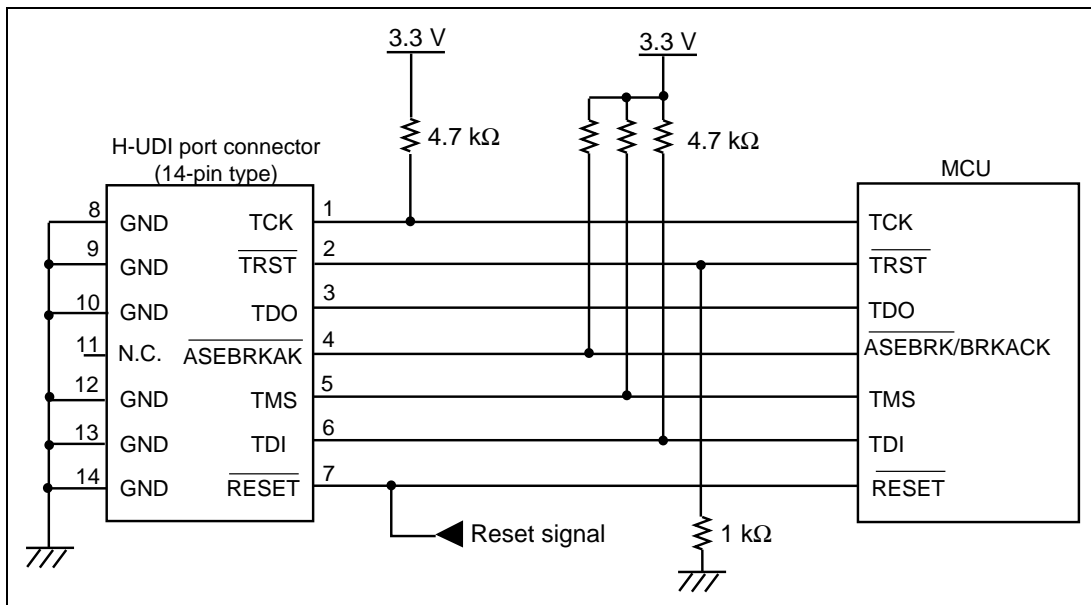


Figure 4.2 Recommended Circuit for Connection between the H-UDI Port Connector and the MCU when Using the Emulator (14-Pin Type)

5. Limitations

5.1 Limitations on the SH7760 E10A Emulator

The AUD pins are multiplexed as shown below. When the AUD function of the emulator is in use, either function 1 or function 2 in table 5.1 is available.

Table 5.1 Multiplex Functions

Function 1	Function 2	Function 3
CAN0_TX *	ADTRG *	AUDATA0
CAN1_TX *	FWE *	AUDATA1
CAN0_RX *	FCDE *	AUDATA2
CAN1_RX *	FCE *	AUDATA3
CAN0_NERR *	FOE *	AUDCK
CAN1_NERR *	FSC *	AUDSYNC

Note: Function 1 and function 2 are available only when the AUD pins of the MCU are not connected to the emulator. Otherwise, either function 1 or function 2 is available. When function 1 is not in use: Setting bit 13 of the IPSELR register in GPIO to 1 enables the AUD function. When function 2 is not in use: Setting bit 12 of the IPSELR register in GPIO to 1 enables the AUD function.