

To our customers,

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Renesas Electronics Corporation

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

Connection of SH4-R ASIC E10A Emulator

HS0775KCM01H HS0775KCM02H HS0775KCI01H
HS0775KCI02H 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 of 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 |
|----------------------------|------------------|---------------|
| HS0775KCM02H, HS0775KCI02H | 36-pin connector | Available |
| HS0775KCM01H, HS0775KCI01H | 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 | /ASEBRKAK 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.

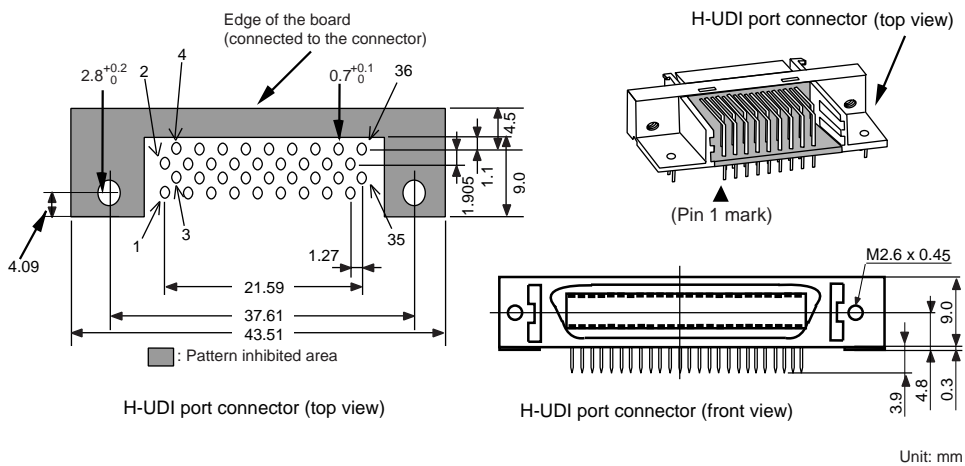


Figure 3.1 Pin Arrangement of the H-UDI Port Connector (36 Pins)

| Pin No. | Signal | Input/ Output* ¹ | Note |
|---------------------|---------------------|--------------------------------|------|
| 1 | TCK | Input | |
| 2* ² | /TRST | Input | |
| 3 | TDO | Output | |
| 4* ² | /ASEBRKAK BRKACK | I/O | |
| 5 | TMS | Input | |
| 6 | TDI | Input | |
| 7* ² | /RESET | Output | |
| 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.

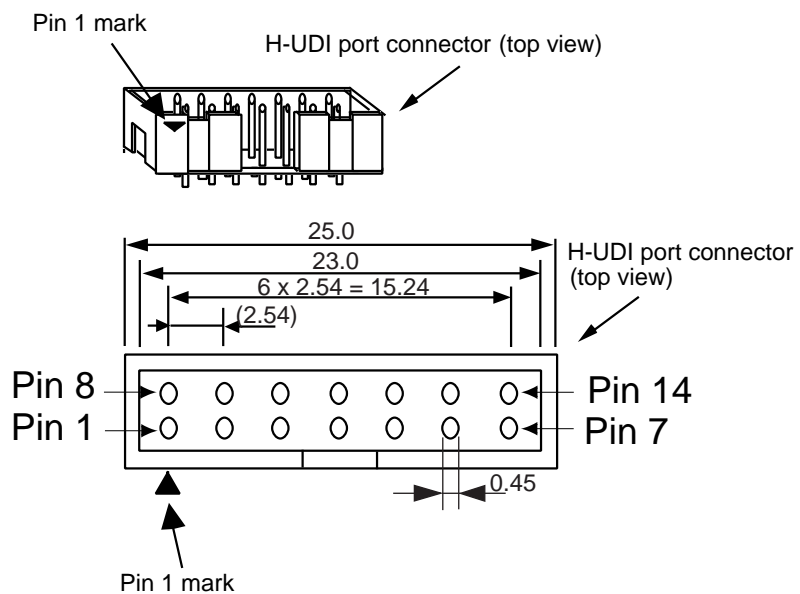


Figure 3.2 Pin Arrangement of the H-UDI Port Connector (14 Pins)

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 the pin processing in cases where the emulator is not used, refer to the hardware manual of the related MCU.

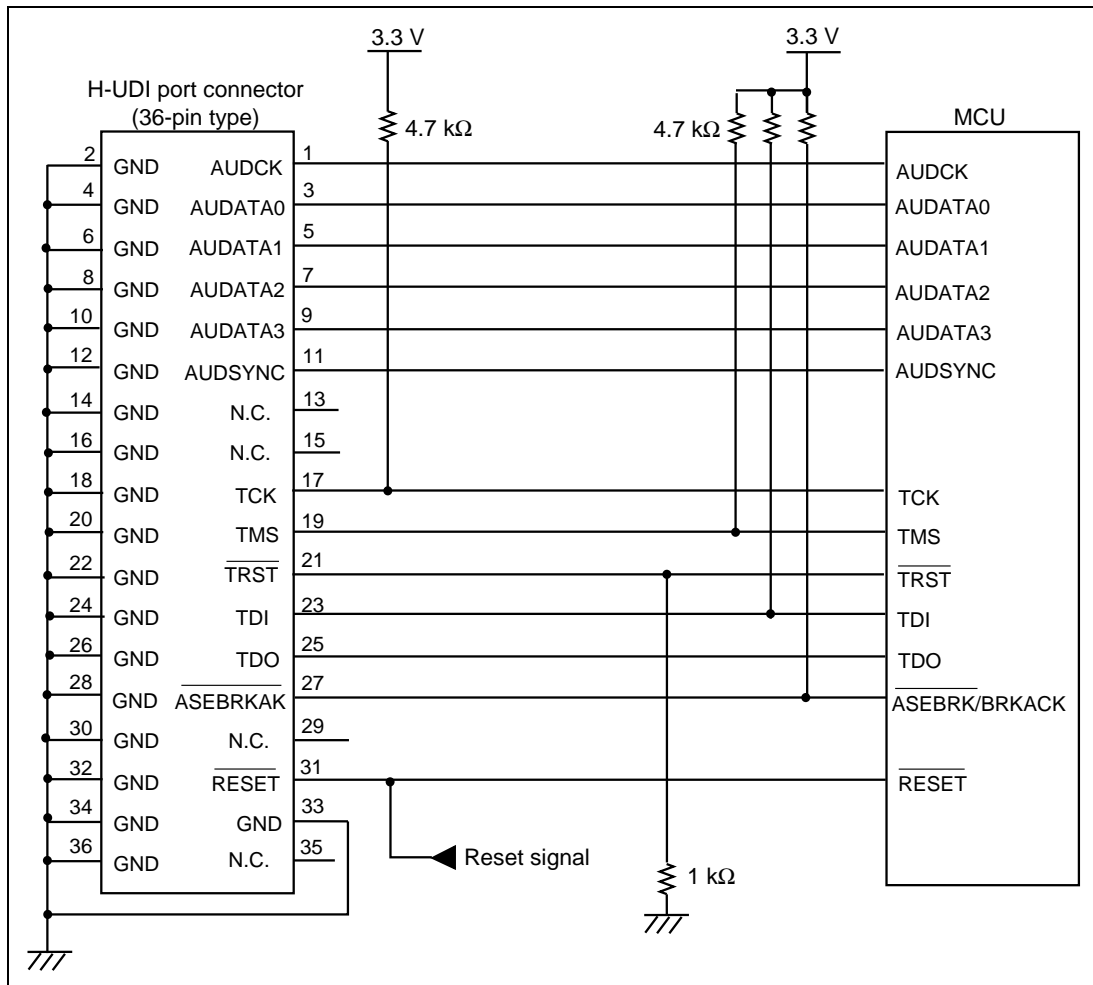


Figure 4.1 Recommended Circuit for Connection between the H-UDI Port Connector and the MCU when Using the Emulator (36-Pin Type)

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 the pin processing in cases where the emulator is not used, refer to the hardware manual of the related MCU.

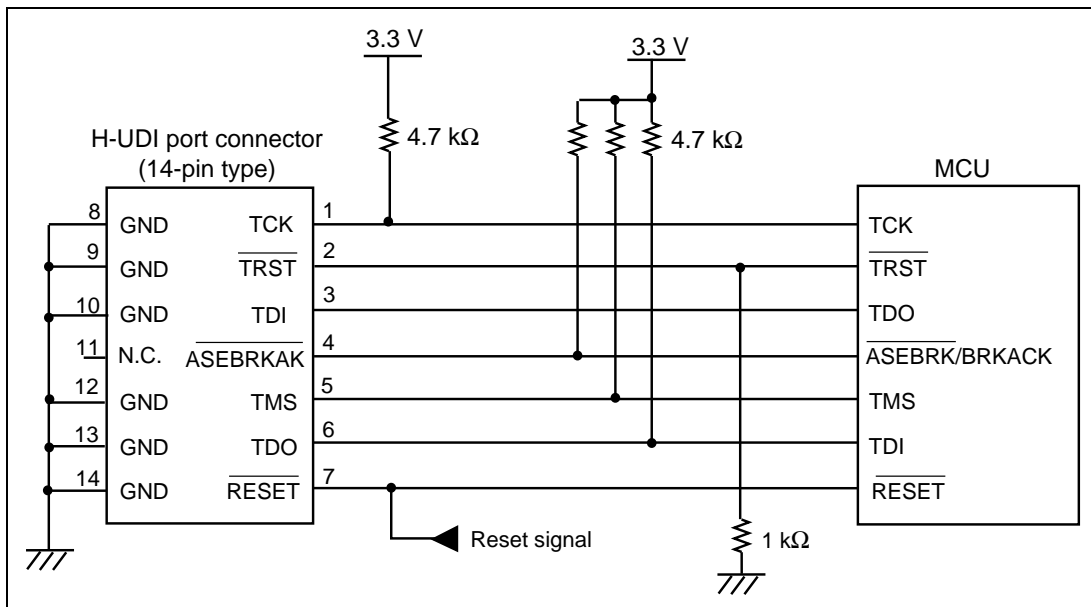


Figure 4.2 Recommended Circuit for Connection between the H-UDI Port Connector and the MCU when Using the Emulator (14-Pin Type)