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**Be Sure to Read This First.**

# SDI Emulator System for the M32R Family MCUs
# M32100T3-SDI-E
# Release Notes

Renesas Solutions Corp.

September 1, 2003

**Outline**

These release notes explain the specifications, cautions and restrictions dependent on MCU models which are not covered by the M32100T3-SDI-E user's manual. When referring to a required section in the user's manual, read the release notes together with the user's manual.

## Contents



## 1. MCU Model List

These release notes cover the MCU models listed in Table 1.

*Table 1 MCU model list*

| | |
|---|---|
| 32102 Group | M32102S6FP |
| 32104 Group | M32104S6FP |
| 32121 Group | M32121xCWG |
| 32170 Group | M32170FxVFP |
| 32171 Group | M32171FxVFP |
| 32172 Group | M32172FxVFP, M32172FxVWG |
| 32173 Group | M32173FxVFP, M32173FxVWG |
| 32174 Group | M32174FxVFP |
| 32180 Group | M32180FxxFP |
| 32182 Group | M32182FxxFP |

## 2. Specifications, Cautions and Restrictions Dependent on the MCU Model

The following explains the emulator specifications, cautions and restrictions dependent on the MCU model.

### 2.1 32102 Group

(1) Differences between the emulator and MCUs

## IMPORTANT

- The emulator initializes the MCU internal register to the following values. Initialization starts when the power switch is turned ON or MCU is reset.

R0 = 00000000 R1 = 00000000 R2 = 00000000 R3 = 00000000 R4 = 00000000
R5 = 00000000 R6 = 00000000 R7 = 00000000 R8 = 00000000 R9 = 00000000
R10 = 00000000 R11 = 00000000 R12 = 00000000 R13 = 00000000 R14 = 00000000
R15 = 00000100 SPI = 00000100 SPU = 00000100 BPC = 00000000 PC = 00000000
ACCH = xxxxxxxx ACCL = xxxxxxxx
PSW = 00000000

(2) MCU signals connected to the SDI MCU control interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TCLK | Emulator to target | TCK of MCU | Clock frequency: 5 MHz |
| 2 | Vss | - | GND (0 V) | |
| 3 | TDI | Emulator to target | TDI of MCU | |
| 4 | TDO | Target to emulator | TDO of MCU | |
| 5 | TMS | Emulator to target | TMS of MCU | |
| 6 | TRST | Emulator to target | TRST# of MCU | Totem pole output on the emulator |
| 7 | DBI | Emulator to target | DBI# of MCU | |
| 8 | N.C. | - | Not used | |
| 9 | Vcc | Target to emulator | VCCX of MCU | |
| 10 | RST | Emulator to target | System reset | Open corrector output on the emulator |

(3) MCU signals connected to the SDI trace interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TRCLK | Target to emulator | TRCLK of MCU | |
| 2 | Vss | | GND (0 V) | |
| 3 | TRSYNC | Target to emulator | TRSYNC# of MCU | |
| 4 | TRDATA(0) | Target to emulator | TRDATA0 of MCU | |
| 5 | TRDATA(1) | Target to emulator | TRDATA1 of MCU | |
| 6 | Vss | | GND (0 V) | |
| 7 | TRDATA(2) | Target to emulator | TRDATA2 of MCU | |
| 8 | TRDATA(3) | Target to emulator | TRDATA3 of MCU | |
| 9 | Vss | | GND (0 V) | |
| 10 | TRDATA(4) | Target to emulator | TRDATA4 of MCU | |
| 11 | TRDATA(5) | Target to emulator | TRDATA5 of MCU | |
| 12 | Vss | | GND (0 V) | |
| 13 | TRDATA(6) | Target to emulator | TRDATA6 of MCU | |
| 14 | TRDATA(7) | Target to emulator | TRDATA7 of MCU | |
| 15 | Vcc | Target to emulator | VCCX of MCU | |
| 16 | EVENT0 | Target to emulator | EVENT0 of MCU | |
| 17 | EVENT1 | Target to emulator | EVENT1 of MCU | |
| 18 | NC | | Not used | |
| 19 | NC | | Not used | |
| 20 | NC | | Not used | |

(4) Debug specifications dependent on MCU model (Section 5.1)

| | | |
|---|---|---|
| Emulation memory | | • No built-in emulation memory provided in the emulator<br>• Function to download the data to an external flash ROM supported |
| Software break | | RAM area: Implemented by instruction replacement<br>ROM area: Implemented by preexecution PC breakpoints of MCU (4 points) |
| Hardware break | Forcible break | Implemented by MCU's internal resources |
| | Data access break | Implemented by MCU's internal resources (2 data access break points) |
| Trace clock frequency | | TRCLK frequency = CPU operation frequency/2 |

(5) Other cautions and restrictions dependent on MCU model

# IMPORTANT

## Note on Using the MVTC Instruction (1):

- When the user program is stopped by the MVTC instruction at the address of the instruction which operates BPC, a BPC value may be changed even if the MVTC instruction has not been executed. Occurrence of this phenomenon depends on the MCU status and the instruction sequence. After this phenomenon occurs, the program is normally re-executed starting with the PC value of the MVTC instruction.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
            .
            .
```

  When a break occurs at PC = H'104 in the above program fragment, BPC = H'100 may be enabled even before the MVTC instruction is executed.

## Note on Using the MVTC Instruction (2):

- In cases when instructions used to operate on the BPC with the MVTC instruction are followed by an RTE instruction, do not set a preexecution PC breakpoint for the RTE instruction. This is because the BPC value becomes illegal and the program cannot be run normally after a break.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
            .
            .
H'110     RTE
```

  If in the above program fragment a preexecution PC breakpoint is set at PC = H'110 to cause a break, the BPC value becomes illegal.

## Note on WDT:

- If a user program is stopped during operation of WDT built in the MCU, the WDT count halts meanwhile. This prevents SBI interruption by WDT while the user program is stopped. However, WDT is normally initialized then.

### 2.2 32104 Group

(1) Differences between the emulator and MCUs

**IMPORTANT**

- The emulator initializes the MCU internal register to the following values. Initialization starts when the power switch is turned ON or MCU is reset.

R0 = 00000000 R1 = 00000000 R2 = 00000000 R3 = 00000000 R4 = 00000000
R5 = 00000000 R6 = 00000000 R7 = 00000000 R8 = 00000000 R9 = 00000000
R10 = 00000000 R11 = 00000000 R12 = 00000000 R13 = 00000000 R14 = 00000000
R15 = 00000100 SPI = 00000100 SPU = 00000100 BPC = 00000000 PC = 00000000
ACCH = xxxxxxxx ACCL = xxxxxxxx
PSW = 00000000

(2) MCU signals connected to the SDI MCU control interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TCLK | Emulator to target | TCK of MCU | Clock frequency: 5 MHz |
| 2 | Vss | - | GND (0 V) | |
| 3 | TDI | Emulator to target | TDI of MCU | |
| 4 | TDO | Target to emulator | TDO of MCU | |
| 5 | TMS | Emulator to target | TMS of MCU | |
| 6 | TRST | Emulator to target | TRST# of MCU | Totem pole output on the emulator |
| 7 | DBI | Emulator to target | DBI# of MCU | Not used when using M32104S6FP |
| 8 | N.C. | - | Not used | |
| 9 | Vcc | Target to emulator | VCCX of MCU | |
| 10 | RST | Emulator to target | System reset | Open corrector output on the emulator |

(3) MCU signals connected to the SDI trace interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TRCLK | Target to emulator | TRCLK of MCU | |
| 2 | Vss | | GND (0 V) | |
| 3 | TRSYNC | Target to emulator | TRSYNC# of MCU | |
| 4 | TRDATA(0) | Target to emulator | TRDATA0 of MCU | |
| 5 | TRDATA(1) | Target to emulator | TRDATA1 of MCU | |
| 6 | Vss | | GND (0 V) | |
| 7 | TRDATA(2) | Target to emulator | TRDATA2 of MCU | |
| 8 | TRDATA(3) | Target to emulator | TRDATA3 of MCU | |
| 9 | Vss | | GND (0 V) | |
| 10 | TRDATA(4) | Target to emulator | TRDATA4 of MCU | |
| 11 | TRDATA(5) | Target to emulator | TRDATA5 of MCU | |
| 12 | Vss | | GND (0 V) | |
| 13 | TRDATA(6) | Target to emulator | TRDATA6 of MCU | |
| 14 | TRDATA(7) | Target to emulator | TRDATA7 of MCU | |
| 15 | Vcc | Target to emulator | VCCX of MCU | |
| 16 | EVENT0 | Target to emulator | EVENT0 of MCU | |
| 17 | EVENT1 | Target to emulator | EVENT1 of MCU | |
| 18 | NC | | Not used | |
| 19 | NC | | Not used | |
| 20 | NC | | Not used | |

(4) Debug specifications dependent on MCU model (Section 5.1)

| | | |
|---|---|---|
| Emulation memory | | • No built-in emulation memory provided in the emulator<br>• Function to download the data to an external flash ROM supported |
| Software break | | RAM area: Implemented by instruction replacement<br>ROM area: Implemented by preexecution PC breakpoints of MCU (4 points) |
| Hardware break | Forcible break | Implemented by MCU's internal resources |
| | Data access break | Implemented by MCU's internal resources (2 data access break points) |
| Trace clock frequency | | Varies depending on MCU's operating frequency and type of connection. For details, see the M3T-PD32RM release notes. |

(5) Other cautions and restrictions dependent on MCU model

# IMPORTANT

## Note on Using the MVTC Instruction (1):

- When the user program is stopped by the MVTC instruction at the address of the instruction which operates BPC, a BPC value may be changed even if the MVTC instruction has not been executed. Occurrence of this phenomenon depends on the MCU status and the instruction sequence. After this phenomenon occurs, the program is normally re-executed starting with the PC value of the MVTC instruction.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
  .
  .
```

  When a break occurs at PC = H'104 in the above program fragment, BPC = H'100 may be enabled even before the MVTC instruction is executed.

## Note on Using the MVTC Instruction (2):

- In cases when instructions used to operate on the BPC with the MVTC instruction are followed by an RTE instruction, do not set a preexecution PC breakpoint for the RTE instruction. This is because the BPC value becomes illegal and the program cannot be run normally after a break.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
  .
  .
H'110     RTE
```

  If in the above program fragment a preexecution PC breakpoint is set at PC = H'110 to cause a break, the BPC value becomes illegal.

### 2.3 32121 Group

(1) Differences between the emulator and MCUs

## IMPORTANT

- The emulator initializes the MCU internal register to the following values. Initialization starts when the power switch is turned ON or MCU is reset.

  R0 = 00000000 R1 = 00000000 R2 = 00000000 R3 = 00000000 R4 = 00000000
  R5 = 00000000 R6 = 00000000 R7 = 00000000 R8 = 00000000 R9 = 00000000
  R10 = 00000000 R11 = 00000000 R12 = 00000000 R13 = 00000000 R14 = 00000000
  R15 = 00000100 SPI = 00000100 SPU = 00000100 BPC = 00000000 PC = 00000000
  ACCH = xxxxxxxx ACCL = xxxxxxxx
  PSW = 00000000

- To execute a target program which transfers to the sleep mode or to the stop mode, you must observe the following restrictions because of the MCU specifications:

  (1) Add the instructions given below after the store instruction which transfers the target program to the sleep/stop mode.
  (2) Do not set a break point between the STB instruction and the last NOP instruction added.

```
    Target program
                .
                .
                Store instruction   <--Instruction to transfer to the sleep/stop mode
LOOP:           BRA    LOOP
                NOP
                NOP
                .                   Insert 16 NOP instructions after the address branch command.
                .
                NOP
```

- When a break is forced while the target MCU is set in the sleep/stop mode, the target MCU may return to the normal mode. Also when memory is referenced or set while the target MCU is set in the sleep/stop mode, the target MCU may return to the normal mode from the sleep/stop mode.
- Do not change the target MCU to the sleep/stop mode using the memory rewrite function of the emulator debugger.

(2) MCU signals connected to the SDI MCU control interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TCLK | Emulator to target | TCK of MCU | Clock frequency: 5 MHz |
| 2 | Vss | - | GND (0 V) | |
| 3 | TDI | Emulator to target | TDI of MCU | |
| 4 | TDO | Target to emulator | TDO of MCU | |
| 5 | TMS | Emulator to target | TMS of MCU | |
| 6 | TRST | Emulator to target | TRST# of MCU | Totem pole output on the emulator |
| 7 | DBI | Emulator to target | DBI# of MCU | |
| 8 | FVCC | Emulator to target | FVCC of MCU | Voltage is set to 2.5 V. Turned ON/OFF according to the setting of the FVCC switch. |
| 9 | Vcc | Target to emulator | VCCJ of MCU | |
| 10 | RST | Emulator to target | System reset | Open corrector output on the emulator |

(3) MCU signals connected to the SDI trace interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TRCLK | Target to emulator | TRCLK of MCU | |
| 2 | Vss | | GND (0 V) | |
| 3 | TRSYNC | Target to emulator | TRSYNC of MCU | |
| 4 | TRDATA(0) | Target to emulator | TRDATA0 of MCU | |
| 5 | TRDATA(1) | Target to emulator | TRDATA1 of MCU | |
| 6 | Vss | | GND (0 V) | |
| 7 | TRDATA(2) | Target to emulator | TRDATA2 of MCU | |
| 8 | TRDATA(3) | Target to emulator | TRDATA3 of MCU | |
| 9 | Vss | | GND (0 V) | |
| 10 | TRDATA(4) | Target to emulator | TRDATA4 of MCU | |
| 11 | TRDATA(5) | Target to emulator | TRDATA5 of MCU | |
| 12 | Vss | | GND (0 V) | |
| 13 | TRDATA(6) | Target to emulator | TRDATA6 of MCU | |
| 14 | TRDATA(7) | Target to emulator | TRDATA7 of MCU | |
| 15 | Vcc | Target to emulator | VCCJ of MCU | |
| 16 | EVENT0 | Target to emulator | EVENT0 of MCU | |
| 17 | EVENT1 | Target to emulator | EVENT1 of MCU | |
| 18 | NC | | Not used | |
| 19 | NC | | Not used | |
| 20 | NC | | Not used | |

(4) Debug specifications dependent on MCU model (Section 5.1)

| | | |
|---|---|---|
| Emulation memory | | Flash ROM built in MCU used as emulation memory |
| Software break | | RAM area: Implemented by instruction replacement<br>ROM area: Implemented by preexecution PC breakpoints of MCU (4 points) |
| Hardware break | Forcible break | Implemented by MCU's internal resources |
| | Data access break | Implemented by MCU's internal resources (2 data access break points) |
| Trace clock frequency | | TRCLK frequency = CPU operation frequency |

(5) Other cautions and restrictions dependent on MCU model

# IMPORTANT

## Note on Using the MVTC Instruction (1):

- When the user program is stopped by the MVTC instruction at the address of the instruction which operates BPC, a BPC value may be changed even if the MVTC instruction has not been executed. Occurrence of this phenomenon depends on the MCU status and the instruction sequence. After this phenomenon occurs, the program is normally re-executed starting with the PC value of the MVTC instruction.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
            .
            .
            .
```

  When a break occurs at PC = H'104 in the above program fragment, BPC = H'100 may be enabled even before the MVTC instruction is executed.

## Note on Using the MVTC Instruction (2):

- In cases when instructions used to operate on the BPC with the MVTC instruction are followed by an RTE instruction, do not set a preexecution PC breakpoint for the RTE instruction. This is because the BPC value becomes illegal and the program cannot be run normally after a break.
  The following shows sample data when the phenomenon occurs.

  Example:

```
Address              Instruction
H'100     LD24       R0,#H'100
H'104     MVTC       R0,BPC
H'106     NOP
            .
            .
            .
H'110     RTE
```

  If in the above program fragment a preexecution PC breakpoint is set at PC = H'110 to cause a break, the BPC value becomes illegal.

## Note on WDT:

- If a user program is stopped during operation of WDT built in the MCU, the WDT count halts meanwhile. This prevents SBI interruption by WDT while the user program is stopped. However, WDT is normally initialized then.

### 2.4 32170, 32171, 32172, 32173 and 32174 Groups

(1) Differences between the emulator and MCUs

**IMPORTANT**

- The emulator initializes the MCU internal register to the following values. Initialization starts when the power switch is turned ON or MCU is reset.

R0 = 00000000 R1 = 00000000 R2 = 00000000 R3 = 00000000 R4 = 00000000
R5 = 00000000 R6 = 00000000 R7 = 00000000 R8 = 00000000 R9 = 00000000
R10 = 00000000 R11 = 00000000 R12 = 00000000 R13 = 00000000 R14 = 00000000
R15 = 00000100 SPI = 00000100 SPU = 00000100 BPC = 00000000 PC = 00000000
ACCH = xxxxxxxx ACCL = xxxxxxxx
PSW = 00000000

(2) MCU signals connected to the SDI MCU control interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TCLK | Emulator to target | JTCK of MCU | Clock frequency: 4 MHz |
| 2 | Vss | - | GND (0 V) | |
| 3 | TDI | Emulator to target | JTDI of MCU | |
| 4 | TDO | Target to emulator | JTDO of MCU | |
| 5 | TMS | Emulator to target | JTMS of MCU | |
| 6 | TRST | Emulator to target | JTRST of MCU | Totem pole output on the emulator |
| 7 | DBI | Emulator to target | JDBI of MCU | Not used when using M3217xFxxFP |
| 8 | N.C. | - | Not used | |
| 9 | Vcc | Target to emulator | VCCE of MCU | |
| 10 | RST | Emulator to target | System reset | Open corrector output on the emulator |

(3) MCU signals connected to the SDI trace interface connector (Section 3.3)

This connector is not necessary because the M32170FxVFP and M32171FxVFP do not have a signal to be connect to the SDI trace interface connector. If you need debug functions such as real-time trace, use the converter for in-circuit connection (optional).

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TRCLK | Target to emulator | TRCLK of MCU | |
| 2 | Vss | | GND (0 V) | |
| 3 | TRSYNC | Target to emulator | TRSYNC of MCU | |
| 4 | TRDATA(0) | Target to emulator | TRDATA0 of MCU | |
| 5 | TRDATA(1) | Target to emulator | TRDATA1 of MCU | |
| 6 | Vss | | GND (0 V) | |
| 7 | TRDATA(2) | Target to emulator | TRDATA2 of MCU | |
| 8 | TRDATA(3) | Target to emulator | TRDATA3 of MCU | |
| 9 | Vss | | GND (0 V) | |
| 10 | TRDATA(4) | Target to emulator | TRDATA4 of MCU | |
| 11 | TRDATA(5) | Target to emulator | TRDATA5 of MCU | |
| 12 | Vss | | GND (0 V) | |
| 13 | TRDATA(6) | Target to emulator | TRDATA6 of MCU | |
| 14 | TRDATA(7) | Target to emulator | TRDATA7 of MCU | |
| 15 | Vcc | Target to emulator | VCCE of MCU | |
| 16 | EVENT0 | Target to emulator | JEVENT0 of MCU | |
| 17 | EVENT1 | Target to emulator | JEVENT1 of MCU | |
| 18 | NC | | Not used | |
| 19 | NC | | Not used | |
| 20 | NC | | Not used | |

(4) Debug specifications dependent on MCU model (Section 5.1)

| | | |
|---|---|---|
| Emulation memory | | Flash ROM built in MCU used as emulation memory |
| Software break | | RAM area: Implemented by instruction replacement<br>ROM area: Implemented by preexecution PC breakpoints of MCU (4 points) |
| Hardware break | Forcible break | Implemented by MCU's internal resources |
| | Data access break | Implemented by MCU's internal resources (2 data access break points) |
| Trace clock frequency | | TRCLK frequency = CPU operation frequency |

(5) Other cautions and restrictions dependent on MCU model

# IMPORTANT

## Note on CLOCK LED:

- When using M3217xFxVWG or connecting M3217xFxVFP to the converter for in-circuit connection (optional), CLOCK LED may light regardless of oscillation on the MCU target board. Thus, you cannot use CLOCK LED to judge presence/ absence of oscillation of vibrators on the target board.

## Note on Access Prohibited Areas:

- The emulator uses the system space from H'C000 0000 to H'FFFF FFFF stipulated in the MCU user's manual as an emulator-only area. If the system space is accessed by the target program, operation of the emulator cannot be guaranteed. Therefore, do not access the area H'C000 0000 through H'FFFF FFFF from the target program.

### 2.5 32180 and 32182 Groups

(1) Differences between the emulator and MCUs

**IMPORTANT**

- The emulator initializes the MCU internal register to the following values. Initialization starts when the power switch is turned ON or MCU is reset.

  R0 = 00000000 R1 = 00000000 R2 = 00000000 R3 = 00000000 R4 = 00000000
  R5 = 00000000 R6 = 00000000 R7 = 00000000 R8 = 00000000 R9 = 00000000
  R10 = 00000000 R11 = 00000000 R12 = 00000000 R13 = 00000000 R14 = 00000000
  R15 = 00000100 SPI = 00000100 SPU = 00000100 BPC = 00000000 PC = 00000000
  ACCH = xxxxxxxx ACCL = xxxxxxxx
  PSW = 00000000

(2) MCU signals connected to the SDI MCU control interface connector (Section 3.3)

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TCLK | Emulator to target | JTCK of MCU | Clock frequency: 5 MHz |
| 2 | Vss | - | GND (0 V) | |
| 3 | TDI | Emulator to target | JTDI of MCU | |
| 4 | TDO | Target to emulator | JTDO of MCU | |
| 5 | TMS | Emulator to target | JTMS of MCU | |
| 6 | TRST | Emulator to target | JTRST of MCU | Totem pole output on the emulator |
| 7 | DBI | Emulator to target | JDBI of MCU | Not used when using M3218xFxxFP |
| 8 | FVCC | Emulator to target | SDIVCC of MCU | Not used when using M3218xFxxFP |
| 9 | Vcc | Target to emulator | VCCE of MCU | |
| 10 | RST | Emulator to target | System reset | Open corrector output on the emulator |

(3) MCU signals connected to the SDI trace interface connector (Section 3.3)
This connector is not necessary because the M32180FxxFP and M32182FxxFP do not have a signal to be connect to the SDI trace interface connector. If you need debug functions such as real-time trace, prepare a target board for debugging using M32180F8VWG or use the converter for in-circuit connection (optional).

| Pin No. | Pin | Direction | Connected to | Remarks |
|---|---|---|---|---|
| 1 | TRCLK | Target to emulator | JTRCLK of MCU | |
| 2 | Vss | | GND (0 V) | |
| 3 | TRSYNC | Target to emulator | JTRSYNC of MCU | |
| 4 | TRDATA(0) | Target to emulator | JTRDATA0 of MCU | |
| 5 | TRDATA(1) | Target to emulator | JTRDATA1 of MCU | |
| 6 | Vss | | GND (0 V) | |
| 7 | TRDATA(2) | Target to emulator | JTRDATA2 of MCU | |
| 8 | TRDATA(3) | Target to emulator | JTRDATA3 of MCU | |
| 9 | Vss | | GND (0 V) | |
| 10 | TRDATA(4) | Target to emulator | JTRDATA4 of MCU | |
| 11 | TRDATA(5) | Target to emulator | JTRDATA5 of MCU | |
| 12 | Vss | | GND (0 V) | |
| 13 | TRDATA(6) | Target to emulator | JTRDATA6 of MCU | |
| 14 | TRDATA(7) | Target to emulator | JTRDATA7 of MCU | |
| 15 | Vcc | Target to emulator | VCCE of MCU | |
| 16 | EVENT0 | Target to emulator | JEVENT0 of MCU | |
| 17 | EVENT1 | Target to emulator | JEVENT1 of MCU | |
| 18 | NC | | Not used | |
| 19 | NC | | Not used | |
| 20 | NC | | Not used | |

(4) Debug specifications dependent on MCU model (Section 5.1)

| | | |
|---|---|---|
| Emulation memory | | Flash ROM built in MCU used as emulation memory |
| Software break | | RAM area: Implemented by instruction replacement<br>ROM area: Implemented by preexecution PC breakpoints of MCU (4 points) |
| Hardware break | Forcible break | Implemented by MCU's internal resources |
| | Data access break | Implemented by MCU's internal resources (2 data access break points) |
| Trace clock frequency | | Varies depending on MCU's operating frequency and type of connection. For details, see the M3T-PD32RM release notes. |

(5) Other cautions and restrictions dependent on MCU model

# IMPORTANT

## Note on CLOCK LED:

- When using M3218xFxxWG or connecting M3218xFxxFP to the converter for in-circuit connection (optional), CLOCK LED may light regardless of oscillation on the MCU target board. Thus, you cannot use CLOCK LED to judge presence/ absence of oscillation of vibrators on the target board.

## Note on Access Prohibited Areas:

- The emulator uses the system space from H'C000 0000 to H'FFFF FFFF stipulated in the MCU user's manual as an emulator-only area. If the system space is accessed by the target program, operation of the emulator cannot be guaranteed. Therefore, do not access the area H'C000 0000 through H'FFFF FFFF from the target program.

## Note on the FVCC Switch:

- Always set the FVCC switch on the M32RT2-CNV to "ON". If the switch is set to "OFF", the trace function and time measurement function do not work.