To our customers,

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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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April 1, 2003

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User's Manual

ADE-502-xxx

H8/3052, H8/3048 Series, H8/3042 Series, H8/3039 Series, H8/3035 Series, H8/3032 Series, H8/3022 Series, H8/3005, H8/3004, H8/3002, H8/3001 E6000 Emulator HS3052EPI61H

Supplementary Information

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READ FIRST

• READ this user's manual before using this emulator product.
• KEEP the user's manual handy for future reference.

Do not attempt to use the emulator product until you fully understand its mechanism.

Emulator Product:

Throughout this document, the term "emulator product" shall be defined as the following products produced only by Hitachi, Ltd. excluding all subsidiary products.

- Emulator station
- User system interface cables
- PC interface board
- Optional SIMM memory module

The user system or a host computer is not included in this definition.

Purpose of the Emulator Product:

This emulator product is a software and hardware development tool for systems employing the Hitachi microcomputer H8/3052, H8/3048, H8/3042, H8/3039, H8/3035, H8/3032, H8/3022, H8/3005, H8/3004, H8/3002 series (hereafter referred to as the MCU). This emulator product must only be used for the above purpose.

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Target User of the Emulator Product:

This emulator product should only be used by those who have carefully read and thoroughly understood the information and restrictions contained in the user's manual. Do not attempt to use the emulator product until you fully understand its mechanism.

It is highly recommended that first-time users be instructed by users that are well versed in the operation of the emulator product.

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Figures:

Some figures in this user's manual may show items different from your actual system.

Limited Anticipation of Danger:

Hitachi cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this user's manual and on the emulator product are therefore not all inclusive. Therefore, you must use the emulator product safely at your own risk.

SAFETY PAGE

READ FIRST

• READ this user's manual before using this emulator product.

• KEEP the user's manual handy for future reference.

Do not attempt to use the emulator product until you fully understand its mechanism.

DEFINITION OF SIGNAL WORDS

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION **CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE emphasizes essential information.

⚠ WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

1. **Do not repair or remodel the emulator product by yourself for electric shock prevention and quality assurance.**
2. **Always switch OFF the E6000 emulator and user system before connecting or disconnecting any CABLES or PARTS.**
3. **Always before connecting any CABLES, make sure that pin 1 on both sides are correctly aligned.**
4. **Supply power according to the power specifications and do not apply an incorrect power voltage. Use only the provided power cable.**

Preface

Thank you for purchasing the H8/3052, H8/3048, H8/3042, H8/3039, H8/3035, H8/3032, H8/3022, H8/3005, H8/3004, H8/3002, H8/3001 series E6000 emulator.

The H8/3052, H8/3048, H8/3042, H8/3039, H8/3035, H8/3032, H8/3022, H8/3005, H8/3004, H8/3002, H8/3001 series E6000 emulator (hereafter referred to as the E6000) was designed as a software and hardware development tool for systems based on Hitachi's original microcomputers HD64F3052, HD64F3048, HD6473042, HD6473032, HD64F3022 series.

The E6000 provides a CD-R that contains the Hitachi Debugging Interface (HDI) system program, test program, and the user's manual.

There are three manuals for the E6000: the H8/300H series E6000 Emulator User's Manual, this Supplementary Information, and the Hitachi Debugging Interface User's Manual. The E6000 Emulator User's Manual describes E6000 functions common to all H8/300H series microcomputers. This Supplementary Information describes the functions specialized for each microcomputer supported by the H8/3052, H8/3048, H8/3042, H8/3039, H8/3035, H8/3032, H8/3022, H8/3005, H8/3004, H8/3002, H8/3001 series E6000 emulator. Please read this manual before using the E6000.

To connect the E6000 to the user system, a user system interface cable for each package type is available. For details on the user system interface cable, refer to the User System Interface Cable User's Manual.

The following shows the related manuals:

- E6000 H8/300H Series Emulator User's Manual (HS300HEPI61HE)
- Hitachi Debugging Interface User's Manual (HS6400DIIW5SE)
- User System Interface Cable User's Manual (HS3048ECH61HE, etc)
- The PC interface board user's manual which will be the following manuals:
  ISA Bus Interface Board User's Manual (HS6000EII01HE)
  PCI Bus Interface Board User's Manual (HS6000EIC01HE, HS6000EIC02HE)
  PCMCIA Interface Card User's Manual (HS6000EIP01HE)
- Description Notes on Using LAN Adapter for E6000/E8000 Emulator (HS6000ELN01HE)
- Option Memory Board User's Manual
  1M SIMM Memory Board User's Manual (HS6000EMS11HE)
  4M SIMM Memory Board User's Manual (HS6000EMS12HE)

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Contents

Figures

Tables

Section 1 Overview

The H8/3052, H8/3048 Series, H8/3042 Series, H8/3039 Series, H8/3035 Series, H8/3032 Series, H8/3022 Series, H8/3005, H8/3004, H8/3002, H8/3001 E6000 emulator (hereafter referred to as the E6000) is an efficient software and hardware development support tool for application systems using Hitachi's original microcomputers H8/3052, H8/3048, H8/3042, H8/3032, H8/3022 series.

1.1 Environment Conditions

Table 1.1 Environment Conditions

Item	Specifications
Temperature	Operating: +10 to +35°C
	Storage: –10 to +50°C
Humidity	Operating: 35 to 80% RH; no condensation
	Storage: 35 to 80% RH; no condensation
Ambient gases	No corrosive gases
AC Power supply voltage	100 V to 240 V AC 50/60 Hz 0.6 A max.
User system voltage (UVcc)	Depends on the target MCU within the range 2.7 V to 5.5 V

1.2 Supported MCUs and User System Interface Cables

Tables 1.2 to 1.5 show the correspondence between the MCUs and the user system interface cables supported by the E6000.

H8/3052F, H8/3048F, H8/3048 Series, H8/3042 Series, and H8/3002:

Table 1.2 H8/3052F, H8/3048F, H8/3048 Series, H8/3042 Series, and H8/3002 MCUs and User System Interface Cable

No.	MCU Type Number	Package	E6000 User System Interface Cable
1	HD64F3052	100-pin QFP/TQFP	HS3048ECH61H
	HD64F3048	FP-100B/TFP-100B	
	HD6473048		
	HD6433048		
	HD6433047		
	HD6433045		
	HD6433044		
	HD6473042		
	HD6433042		
	HD6433041		
	HD6433040		
	HD6413002		

H8/3039F, H8/3039 Series, H8/3022F, and H8/3022 Series:

Table 1.3 H8/3039F, H8/3039 Series, H8/3022F, and H8/3022 Series MCUs and User System Interface Cables

No.	MCU Type Number	Package	E6000 User System Interface Cables
1	HD64F3039	80-pin QFP	HS3039ECH61H
	HD6433039	FP-80A	
	HD6433038	80-pin TQFP	HS3039ECN61H
	HD6433037	TFP-80C	
	HD6433036		
	HD64F3022		
	HD6433022		
	HD6433021		
	HD6433020		

H8/3035 Series, H8/3032 Series, H8/3005, and H8/3004:

Table 1.4 H8/3035 Series, H8/3032 Series, H8/3005, and H8/3004 MCUs and User System Interface Cables

No.	MCU Type Number	Package	E6000 User System Interface Cables
1	HD6473035	80-pin QFP	HS3032ECH61H
	HD6433035	FP-80A	
	HD6433034	80-pin TQFP	HS3032ECN61H
	HD6433033	TFP-80C	
	HD6473032		
	HD6433032		
	HD6433031		
	HD6433030		
	HD6413005		
	HD6413004		

H8/3001:

Table 1.5 H8/3001 MCU and User System Interface Cable

No.	MCU Type Number	Package	E6000 User System Interface Cable
1	HD6413001	80-pin QFP FP-80A	HS3001ECH61H
		80-pin TQFP TFP-80C	HS3001ECN61H

1.3 Operating Voltage and Frequency Specifications

Table 1.5 shows examples of the MCU operating voltage and frequency specifications supported by the E6000. If the E6000 is used in an environment that exceeds the operating voltage range and operating frequency range guaranteed for the MCU operation, normal emulator operation is not guaranteed.

Table 1.6 Operating Voltage and Frequency Specifications

No.	MCU Types	Operating Voltage (V)	Operating Frequency (ϕ) (MHz)
1	H8/3052F	4.5-5.5	1-18
2	H8/3048 series	2.7-5.5	1-8
		3.0-5.5	1-13
		4.5-5.5	1-18
3	H8/3042 series	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
4	H8/3039 series	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-18
5	H8/3035 series	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
6	H8/3032 series	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
7	H8/3022 series	3.0-3.6	2-18
8	H8/3005	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
9	H8/3004	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
10	H8/3002	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16
11	H8/3001	2.7-5.5	2-8
		3.0-5.5	2-10
		4.5-5.5	2-16

NOTE

For details on the operating voltage and frequency specifications, refer to the MCU hardware manual.

In the E6000, the clock can be selected by using the Configuration window or the Clock command.

Table 1.7 Clock Selections

Clock Command Parameter	Configuration Window Setting	Notes
2	2 MHz internal clock	
4	4 MHz internal clock	
6	6 MHz internal clock	
8	8 MHz internal clock	Default
10	10 MHz internal clock	
12	12 MHz internal clock	
14	14 MHz internal clock	
16	16 MHz internal clock	
18	18 MHz internal clock	
t	Target	
t2	Target/2	Not supported by the actual MCU. Use this clock only when the required clock duty cannot be obtained.

NOTE

The system clock (ϕ) frequency is the same clock frequency input to the XTAL and EXTAL when external clock t is specified. For example, when a 18-MHz crystal oscillator is connected to the XTAL and EXTAL of the user system, the system clock (ϕ) frequency is 18 MHz. When external clock t2 is specified, the system clock (ϕ) frequency is 1/2 of the clock frequency input to the XTAL and EXTAL.

The frequency of the E6000 internal clock specified with the HDI CLOCK command is applied to the system clock (ϕ).

Section 2 User System Interface

All user system interface signals are directly connected to the MCU in the E6000 with no buffering except for those listed below which are connected to the MCU through control circuits:

- NMI
- /RES
- MD2, MD1, MD0
- XTAL
- EXTAL
- /WAIT
- /RES0

2.1 Signal Protection

All user system interface signals are protected from over- or under-voltage by use of diode arrays except for the AVcc and Vref.

Pull-up resistors are connected to the port signals except for the analog port signals.

The Vcc pins (except for the AVcc pin) at the head of the user system interface cable are connected together. The E6000 monitors the voltage level of the Vcc pins and displays the power-supply status in the Platform sheet in the System Status Window.

If the user system interface cable is not connected to the user system, the Vcc pin of the user system is 3.3V.

2.2 User System Interface Circuits

The interface circuit between the MCU in the E6000 emulator and the user system has a signal delay of about 8 ns due to the user system interface cable and it includes pull-up resistors. Therefore, high-impedance signals will be pulled up to the high level. When connecting the E6000 emulator to a user system, adjust the user system hardware to compensate for propagation delays.

The following diagrams show the interface signal circuits.

Default:

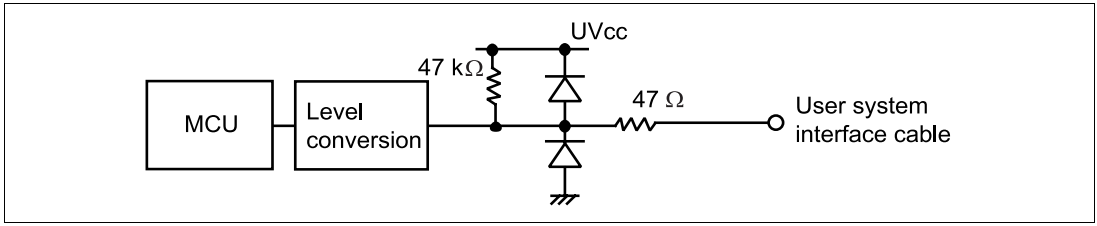

Figure 2.1 Default User System Interface Circuit

Mode Pins (MD2):

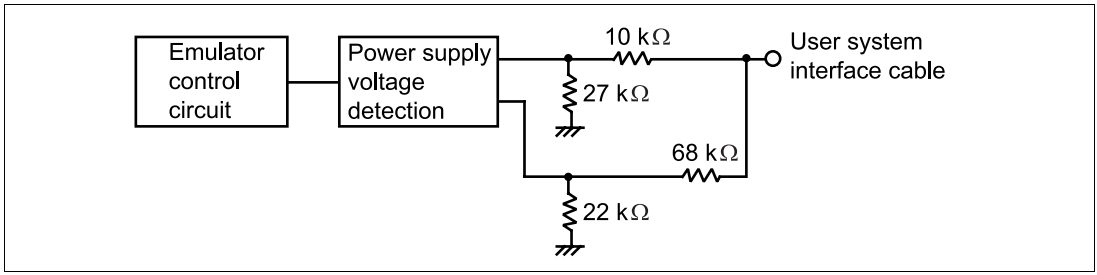

Figure 2.2 User System Interface Circuit for MD2

Mode Pins (MD1, MD0):

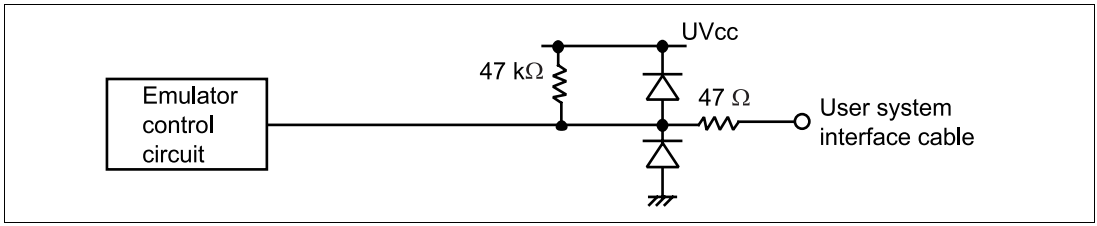

Figure 2.3 User System Interface Circuit for MD1, MD0

RES and NMI: The NMI signal is input to the MCU through the emulator control circuit. The rising/falling time of the signal must be 8 ns/V or less. The mode pins are only monitored. The CPU mode depends on the HDI Configuration settings.

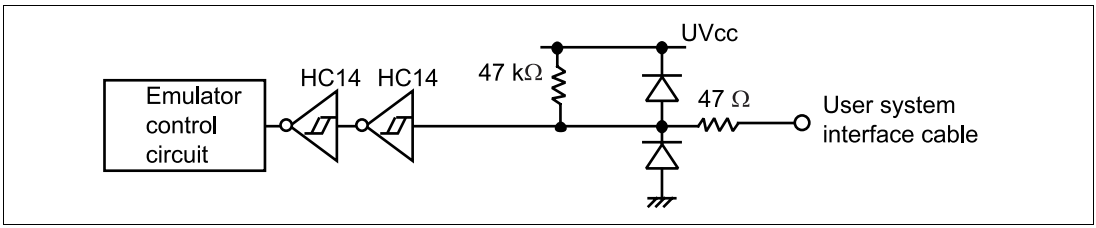

Figure 2.4 User System Interface Circuit for RES and NMI

RES0:

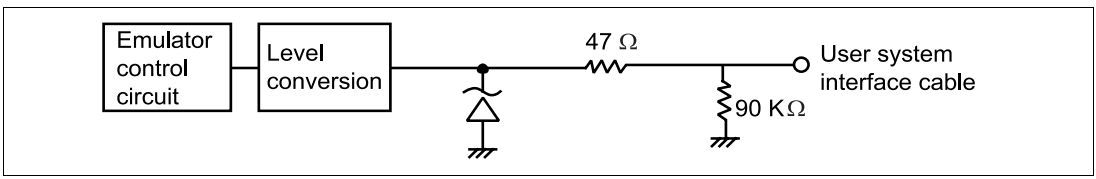

Figure 2.5 User System Interface Circuit for RES0

P70 to P77 (pins used for AN0 to AN7 and DA0 to DA1), AVcc, AVss and Vref:

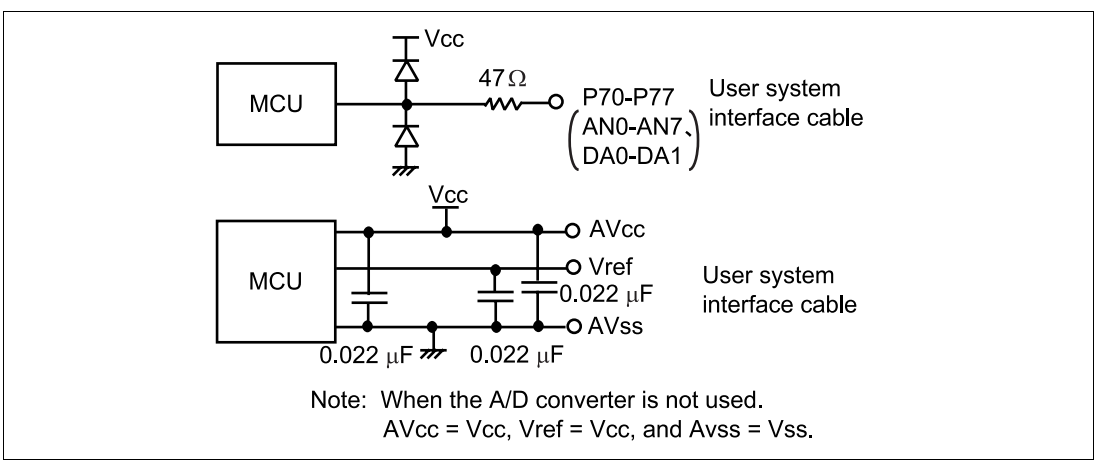

Figure 2.6 User System Interface Circuit for P70 to P77, AVcc, AVss and Vref Signals

/IRQ0–/IRQ5 and /WAIT: The /IRQ0 to /IRQ7 and /WAIT signals are input to the MCU and also to the trace acquiring circuit. Therefore, the rising and falling time of these signals must be within 8 ns/V or shorter.

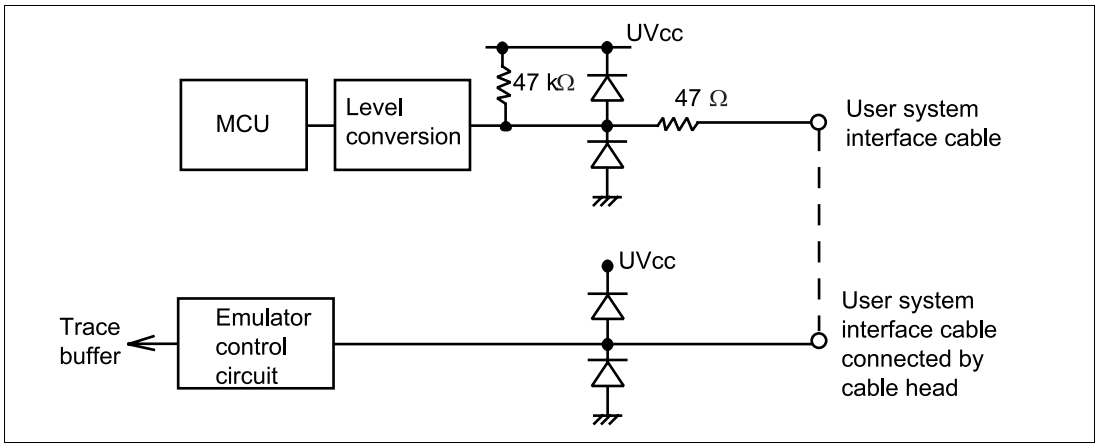

Figure 2.7 IRQ0–IRQ5 and WAIT User System Interface Circuit

Section 3 Notes on Use

3.1 I/O Register Differences between Actual MCU and E6000

In the E6000, one evaluation chip emulates several types of MCU. Therefore, there are some differences in I/O registers between an actual MCU and the E6000. Note these differences when accessing the I/O registers.

I/O port is in the input state at default. The I/O register contents indicate the emulator port status. When the user system interface cable is not connected, the read value is 1 due to the emulator's pull-up resistors.

In E6000, accesses to the following registers for controlling the flash memory are invalid.

- RAM control register (RAMCR: H'FF48)
- Flash memory control register (FLMCR: H'FF40)
- Erase block register 1 (EBR1: H'FF41)
- Erase block register 2 (EBR2: H'FF43)

3.2 Limitations for Each Device

The limitations for each device are shown below. Read the description for the device used.

Table 3.1 Limitations for Each Device (1)

				H8/3022 Series			H8/3032 Series		
Description	**3001**	**3002**	**3004 and 3005**	**3022 and 3021**	**3020**	**3022F**	**3032**	**3031**	**3030**
Port 4 access			O	O	O	O	O	O	O
ABWCR write-disabled			O	O	O	O	O	O	O
Oscillation stabilization standby time specifications	O	O	O				O	O	O
Inhibiting access to inoperative modules	O	O	O	O	O	O	O	O	O
CS0 to CS3 output specifications	O		O	O	O	O	O	O	O
SCI0 specifications	O	O	O				O	O	O
Output specifications at bus release		O							
Access to on-chip ROM area									O
Access to on-chip RAM area	O	O							O
Support of flash memory						O			
Access to the Reserved Area					O			O	O
Number of on-chip ROM/RAM access states				O		O			

Notes: When emulating the H8/3022F, select H8/3022.
O: The specifications are included.

Table 3.1 Limitations for Each Device (2)

	H8/3035 Series			H8/3039 Series			
Description	**3035**	**3034**	**3033**	**3039**	**3038 and 3037**	**3036**	**3039F**
Port 4 access	O	O	O	O	O	O	O
ABWCR write-disabled	O	O	O	O	O	O	O
Oscillation stabilization standby time specifications	O	O	O				
Inhibiting access to inoperative modules	O	O	O	O	O	O	O
CS0 to CS3 output specifications	O	O	O	O	O	O	O
SCI0 specifications	O	O	O				
Output specifications at bus release							
Access to on-chip ROM area						O	
Access to on-chip RAM area						O	O
Support of flash memory							O
Access to the Reserved Area		O	O		O	O	O
Number of on-chip ROM/RAM access states	O	O					

Notes: When emulating H8/3039F, select H8/3039.
O: The specifications are included.

Table 3.1 Limitations for Each Device (3)

	H8/3042 Series			H8/3048 Series			
Description	**3042**	**3041**	**3040**	**3048**	**3047, 3045 and 3044**	**3048F**	**3052F**
Port 4 access							
ABWCR write-disabled							
Oscillation stabilization standby time specifications	O	O	O				
Inhibiting access to inoperative modules	O	O	O				
CS0 to CS3 output specifications	O	O	O				
SCI0 specifications	O	O	O				
Output specifications at bus release	O	O	O				
Access to on-chip ROM area		O					
Access to on-chip RAM area							
Support of flash memory						O	O
Access to the Reserved Area					O		
Number of on-chip ROM/RAM access states		O	O				O

Notes: When emulating H8/3048F, select H8/3048.
O: The specifications are included.

3.2.1 Port 4 Access

In the E6000, port 4 can be used to access registers. However, in the actual devices (hereafter referred to as the actual MCUs), port 4 does not exist. Therefore, the operation of the actual MCU will differ from that of the E6000. In an actual MCU, registers P4DR (lower address: H'FFC7) and P4PCR (lower address: H'FFDA), which are related to port 4, cannot be written to. In the case of a read operation, H'FF is read.

3.2.2 ABWCR Write-Disabled (Lower Address: H'FFEC)

The external bus width is fixed to 8 bits because port 4 does not exist in the actual MCUs. Therefore, the ABWCR value must not be modified. The E6000 will operate according to the value set in ABWCR. Therefore, if ABWCR is modified to a value other than H'FF, the external bus width will become 16 bits, and the external address area will become access-disabled.

3.2.3 Specifications of Oscillation Stabilization Standby Time after Clearing Software Standby Mode

Bits STS2 to STS0 in the system control register (SYSCR) can specify the oscillation stabilization standby time. However, the oscillation stabilization standby time may differ between the E6000 and the actual MCU as shown in table 3.2.

Table 3.2 Difference of Oscillation Stabilization Standby Time

STS2	STS1	STS0	E6000	Actual MCU
0	0	0	8192 states	8192 states
0	0	1	16384 states	16384 states
0	1	0	32768 states	32768 states
0	1	1	65536 states	65536 states
1	0	0	131072 states	131072 states
1	0	1	1024 states	131072 states
1	1	-	Cannot be used.	Cannot be used.

Note: The oscillation stabilization standby time differs between the E6000 and the actual MCU in the shaded part.

3.2.4 Inhibiting Access to Inoperative Modules

In the E6000, all internal modules can operate. However, in the actual MCU, some modules cannot operate. These modules must not be accessed.

3.2.5 CS0 to CS3 Output Specifications

The actual MCU does not have CS output; however, in the E6000, CS output is enabled by setting H'FF to P8DDR in port 8. Therefore, H'FF must not be set to P8DDR.

3.2.6 SCI0 Specifications

The SCI1 installed in the E6000 is the same as the one installed in the actual MCU. However, in the E6000, smart card interface specifications is added as SCI0. The SCMR (lower address: H'FFB6) must not be accessed in MCUs other than H8/3048 series, H8/3022 series, and H8/3052F.

3.2.7 CS0 to CS3, and A20 to A23 Output Specifications at Bus Release

In the actual MCU, if bus is released after areas 0 to 3 have been accessed, the CS pin that corresponds to the area accessed immediately before the bus release is driven low during release; however, in the E6000, the CS pin is driven high. If address output pins A20 to A23 are selected and ITU pin function is output enabled, A20 to A23 will not be high impedance and will be ITU output during bus release. However, if the E6000 is using A20 to A23, A20 to A23 will be high impedance regardless of the ITU setting during bus release.

3.2.8 Access On-Chip ROM Area

The internal ROM size of the actual H8/3041 is 48 KB and the E6000 is 64 kbyte. In the E6000, the remaining 16 kbytes become the reserved area.

3.2.9 Access to On-Chip RAM Area

The internal RAM size of the actual MCUs is 512 bytes. However, in the E6000, the internal RAM size is 1 kbyte and the remaining 512 bytes are reserved. Therefore, in the E6000, lower addresses H'FD10 to H'FF0F are the internal RAM areas and lower addresses H'FB10 to H'FD0F are the reserved area. Therefore, H'FB10 to H'FD0F cannot be used as external address areas. However, by using the RAME bit in SYSCR, RAM area can be used as external address area. Note that only User (user memory) can be accessed as external address and not Emulator (option memory). In this case, internal RAM is set in the Memory Mapping.

3.2.10 Support of Flash Memory

The E6000 does not emulate the flash memory control operation in the MCU.

3.2.11 Access to the Reserved Area

When accessing the reserved area, note the following:

If the reserved area is used, the operation in the actual MCU cannot be guaranteed. If the user program extends to the reserved area during debugging, select the MCU having the largest ROM capacity (for example, debug the program for H8/3044 with the H8/3048 memory mapping).

3.2.12 Number of Internal ROM/RAM Access States when Selecting H8/3052 or H8/3022

When H8/3052 or H8/3022 is selected, the default number of access states is six when the internal ROM size is 128 kbytes or more. The default number of states is four when the internal RAM size is 4 kbytes or more. Therefore, it is recommended to set the bus state controller (BSC) to a 2-state 16-bit access area.

3.3 Hardware Standby

This emulator does not have a hardware standby mode.

3.4 DC Characteristics when the User Vcc Is Other Than 5 V

Since the MCU operates at 5 V in the emulator, the emulator must access the user system through a level conversion circuit.
Therefore, the DC characteristics of each port in an MCU may differ.

Section 4 HDI Parameters

4.1 Address Areas

Table 4.1 lists the parameters for address areas (Area) that can be specified with HDI command line interface or displayed as trace results.

Table 4.1 Address Area Parameters

HDI Parameter (Trace Display)	Address Area	Description
rom	On-chip ROM	MCU's on-chip ROM, which can be read but cannot be written to.
ram	On-chip RAM	MCU's on-chip RAM (except for DTC RAM), which can be read and written to.
IO16 (I/O-16)	Internal I/O registers (16-bit bus)	MCU's internal I/O registers for the 16-bit bus.
IO8 (I/O-8)	Internal I/O registers (8-bit bus)	MCU's internal I/O registers for the 8-bit bus.
ext16 (EXT-16)	External area (16-bit bus)	External area for the 16-bit bus, which can be allocated to the user system memory or the optional SIMM memory module in the E6000.
ext8 (EXT-8)	External area (8-bit bus)	External area for the 8-bit bus, which can be allocated to the user system memory or the optional SIMM memory module in the E6000.

4.2 Access Status

Table 4.2 lists the parameters for access status (Status) that can be specified with HDI command line interface or displayed as trace results.

Table 4.2 Access Status Parameters

HDI Parameter (Trace Display)	Access Status	Description
dmac (DMAC)	On-chip DMAC	Access by the MCU's DMAC
refresh (REFRESH)	Refresh	Refresh cycle by the MCU's refresh controller
prefetch (PROG)	CPU prefetch	Instruction prefetch cycle by the CPU
Other	Other	Status other than above

Section 5 Diagnostic Test Procedure

This section describes the diagnostic test procedure using the E6000 test program.

5.1 System Set-Up for Test Program Execution

To execute the test program, use the following hardware; do not connect the user system interface cable and user system.

- E6000 (HS3052EPI61H)
- Host computer
- The E6000 PC interface board which will be one of the following boards or card:
  Select one interface board from the following depending on the PC interface specifications.
  ISA bus interface board (HS6000EII01H)
  PCI bus interface board (HS6000EIC01H, HS6000EIC02H)
  PCMCIA interface card (HS6000EIP01H)

1. Install the E6000 PC interface board in the host computer and connect the supplied PC interface cable to the board.
2. Connect the PC interface cable to the E6000.
3. Connect the supplied AC adapter to the E6000.
4. Initiate the host computer to make it enter DOS prompt command input wait state.
5. Turn on the E6000 switch.

5.2 Diagnostic Test Procedure Using the Test Program

Insert the CD-R (HS3052EPI61SR supplied with the E6000) into theCD-ROM drive of host computer by pressing the Shift key, move the current directory to <Drive>:\Diag with a command prompt, and enter one of the following commands according to the PC interface board used to initiate the test program:

1. ISA bus interface board (HS6000EII01H)
   >TM3052 –ISA (RET)

2. PCI bus interface bad (HS6000EIC01H, HS6000EIC02H)
   >TM3052 –PCI (RET)

3. PCMCIA interface card (HS6000EIP01H)
   >TM3052 –PCCD (RET)

The HDI must be installed before the test program is executed.

Be sure to initiate the test program from <Drive>:\Diag. Do not initiate it from a directory other than <Drive>:\Diag, such as > <Drive>:\Diag\TM3052 –ISA (RET). If the test program is initiated when the current directory is not <Drive>:\Diag, the test program will not operate correctly.

When –S is added to the command line such as > TM3052 –ISA –S (RET), steps 1 to 18 will be repeatedly executed. To stop the execution, enter Q.

Notes: 1. When the CD-R is inserted into the CD-ROM drive without pressing the Shift key, the HDI installation wizard is automatically started.
   In such a case, exit the HDI installation wizard.

2. <Drive> is a drive name for the CD-ROM drive.

3. Do not remove the CD-R from the CD-ROM drive during test program execution.

It will take about 11 minutes to execute the test program when the host computer using Windows® 95 runs at 166 MHz and the PCMCIA interface card is used. The following messages are displayed during the test.

Message	Description
E6000 H8/3052 EMULATION BOARD Tests Vx.x Hitachi Ltd (1999)	Test program start message. Vx.x shows the version number.
SIMM module fitted? (1.None 2.1MB 3. 4MB) 1	Enter 1 because the SIMM memory module is not installed in this example.
Searching for interface card .....OK, card at H'd0000	Shows that the PC interface board is correctly installed in the host computer, and displays the address when the ISA bus interface is installed. The displayed address depends on the settings. When the PCI interface board or PCMCIA interface card is installed, the address is not displayed.
Checking emulator is connected ......OK	Shows that the E6000 is correctly connected to the host computer.
Emulator Board Information: Main Board ID H'5	Shows the ID number of the lower board of the E6000 (always 5).
Emulation Board ID H'e	Shows the ID number of the upper board of the E6000 (always e).
Revision H'x	Shows the revision number of the upper board of the E6000.

```
       SIMM             No SIMM module inserted
```
Shows whether the SIMM memory board is installed.

```
  Downloading firmware .....
```
Loading the test program.

```
  01) Testing Main Board Register :
    IDR0 Register.....................OK
    PAGE Register.....................OK
    TRACE G/A Register................OK
    PERFM G/A Register................OK
    CES GA register ..................OK
    IDR1 Register.....................OK
```
Shows the check results for the registers in the E6000 (normal completion).

```
02) Testing Dual-Port RAM :
   Decode Test ......................OK
   Marching Test ....................OK
```
Shows the results of decoding test and step test for the dual-port RAM in the E6000 (normal completion).

```
  03) Testing Firmware RAM :
   Decode Test. page range H'700 - H'71f ..........OK
```
Shows the results of decoding test for the firmware RAM in the E6000 (normal completion).

```
   Marching Test. page range H'700 - H'71f .........OK
```
Shows the results of step for the firmware RAM in the E6000 (normal completion).

```
Downloading firmware .....
```
Loading the test program.

```
  04) Testing Trace RAM :
   Decode Test. page range H'000 - H'04f ..........OK
```
Shows the results of decoding test for the trace RAM (first half) in the E6000 (normal completion).

```
   Marching Test. page range H'000 - H'04f .........OK
```
Shows the results of step test for the trace RAM (first half) in the E6000 (normal completion).

```
   Decode Test. page range H'000 - H'04f ..........OK
```
Shows the results of

decoding test for the trace RAM (last half) in the E6000 (normal completion).

```
 Marching Test. page range H'000 - H'04f .........OK
```
Shows the results of step test for the trace RAM (last half) in the E6000 (normal completion).

```
05) Testing Mapping RAM :
 Decode Test. page range H'200 - H'27f ........OK
```
Shows the results of decoding test for the mapping RAM in the E6000 (normal completion).

```
 Marching Test. page range H'200 - H'27f .........OK
```
Shows the results of step test for the mapping RAM in the E6000 (normal completion).

```
06) Testing Internal ROM and RAM :
    Setting up, please wait..
    Decode Test .......................OK
    Marching Test .....................OK
```
Shows the results of decoding test and step test for internal ROM and RAM in the E6000 (normal completion).

```
07) Testing Option RAM :
    Setting up, please wait..
    No SIMM fitted - test skipped
```
Shows the check results for the optional SIMM memory module in the E6000 (not installed).

```
08) Testing STEP Operation :
    Setting up, please wait..
    Step Operation .....................OK
```
Shows the check results for the step execution controlling circuits in the E6000 (normal completion).

```
09) Testing Key Break :
    Setting up, please wait..
    Key Break ..........................OK
```
Shows the check results for the forced break controlling circuits in the E6000 (normal completion).

```
10) Testing Emulation RAM Hardware Break :
```
Shows the check results

```
    Setting up, please wait..
    GRD Break ..........................OK
    Setting up, please wait..
    WPT Break ..........................OK

11) Testing Internal ROM Write-Protect :
    Setting up, please wait..
    Write-Protect ......................OK

12) Testing Hardware Break :
    Setting up, please wait..
    A)Break Point Intialised ............OK
    B)Event Detectors CES channel 1-12 ...OK
    C)Test Sequencing 1 .................OK
    D)Check Range Break .................OK
    E)Check Range Break for Data .........OK
    F)Check Compare Either ..............OK

13) Testing Emulation RAM Trace :
    Setting up, please wait..
    A)Free Trace Test ...................OK
    B)Range Trace Test ...................OK
    C)Point to Point Trace Test ..........OK
    D)Start and Stop Event Trace Test ....OK
    F)Time STAMP Trace Test ..............OK
      Time STAMP Trace Test 1 ............OK
      Time STAMP Trace Test 2 ............OK
      Time STAMP Trace Test 3 ............OK

14) Testing Runtime counter :
    Setting up, please wait..
    Testing Internal Clock = 18.0 MHz ....OK
    Testing CLK Generate   = 16.92 MHz ....OK
    Testing CLK Generate   = 16.18 MHz ....OK
    Testing CLK Generate   = 13.12 MHz ....OK
    Testing Internal Clock = 16.00 MHz ....OK
    Testing Internal Clock =  8.00 MHz ....OK
```

for the illegal access break controlling circuits in the E6000 (normal completion).

Shows the check results for the internal ROM write-protection controlling circuits in the E6000 (normal completion).

Shows the check results for the hardware break control circuits in the E6000 (normal completion).

Shows the check results for the trace controlling circuits in the E6000 (normal completion).

Shows the check results for the run-time counter in the E6000 (normal completion).

```
15) Testing Emulation Monitor :
    Setting up, please wait..
    A)EMA23-EMA0(MONIT00:D7-D0,MONIT10,E:D7-D0)TEST..OK
    B)ACST2-ACST0(MONIT0E:D2-D0)TEST.................OK
    C)ST3-ST0(MONIT2E:D3-D0)TEST.....................OK
    D)BRKACK(MONIT0E:D7)TEST.........................OK
    E)CNN(MONIT3E:D1)TEST............................OK
    F)NOCLK(MONIT3E:D2)TEST..........................OK
```

Shows the check results for the emulation monitor controlling circuits in the E6000 (normal completion).

```
16) Testing PERM_GA :
    Setting up, please wait..
    A)Time Measure Test .........................OK
    B)PERM_POINT TO POINT Time Measure Test .....OK
    C)PERM_SUBROUTINE Time Measure Test .........OK
    D)PERM Time Out Bit Test
      Time Out Test 1............................OK
      Time Out Test 2............................OK
```

Shows the check results for the performance analysis controlling circuits in the E6000 (normal completion).

```
17) Testing Bus Monitor :
    Setting up, please wait..
    A) Register test.............................OK
    B) Parallel RAM test.........................OK
    C) SPRSEL2 test..............................OK
    Setting up, please wait..
    D) RAM monitor test..........................OK
```

Shows the check results for the bus monitor controlling circuits in the E6000 (normal completion).

```
18) Testing Paralell Access :
    A)IN ROM Paralell Read Access(WORD) .........OK
    B)IN ROM Paralell Write Access(WORD) ........OK
    C)IN ROM Paralell Write Access(High Byte) ...OK
    D)IN ROM Paralell Write Access(Low Byte) ....OK
    E)IN RAM Paralell Read Access(WORD) .........OK
    F)IN RAM Paralell Write Access(WORD) ........OK
    G)IN RAM Paralell Write Access(High Byte) ...OK
    H)IN RAM Paralell Write Access(Low Byte) ....OK
     I)SIMM Paralell Read Access(WORD) ...........SKIP
     J)SIMM Paralell Write Access(WORD) ..........SKIP
     K)SIMM Paralell Write Access(High Byte) .....SKIP
     L)SIMM Paralell Write Access(Low Byte) ......SKIP
```

Shows the check results for the parallel access controlling circuits in the E6000 (normal completion).

```
0 total errors
```

Total number of errors.

```
Tests passed, emulator functioning correctly
```

Shows that the E6000 is correctly operating.