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2010年4月1日
瑞萨电子公司

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E8 仿真器

用户手册 另册

E8 R0E000080KCE00

瑞萨单片机开发环境系统

H8族 / H8/300L Super Low Power 系列

H8/38024F、H8/38004F 连接时的注意事项

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第1章 E8 仿真器和用户系统的连接

为了连接 E8 仿真器，需要在用户系统上安装连接用户接口电缆的连接器。在用户系统设计时，请参考本手册记载的连接器和芯片之间的推荐电路。

另外，在用户系统设计时，请务必阅读 E8 仿真器用户手册和有关器件的硬件手册。

E8 仿真器推荐的 E8 连接器如表 1.1 所示。

表 1.1 推荐连接器

	型号	厂家	规格
14 管脚连接器	2514-6002	3M Limited	14 管脚直插型

- 请在PCB上将用户系统连接器的2、4、6、10、12、14管脚连接到GND。除了用作电气GND以外，还用于E8仿真器监视用户系统连接器的连接。请注意用户系统连接器的管脚配置。

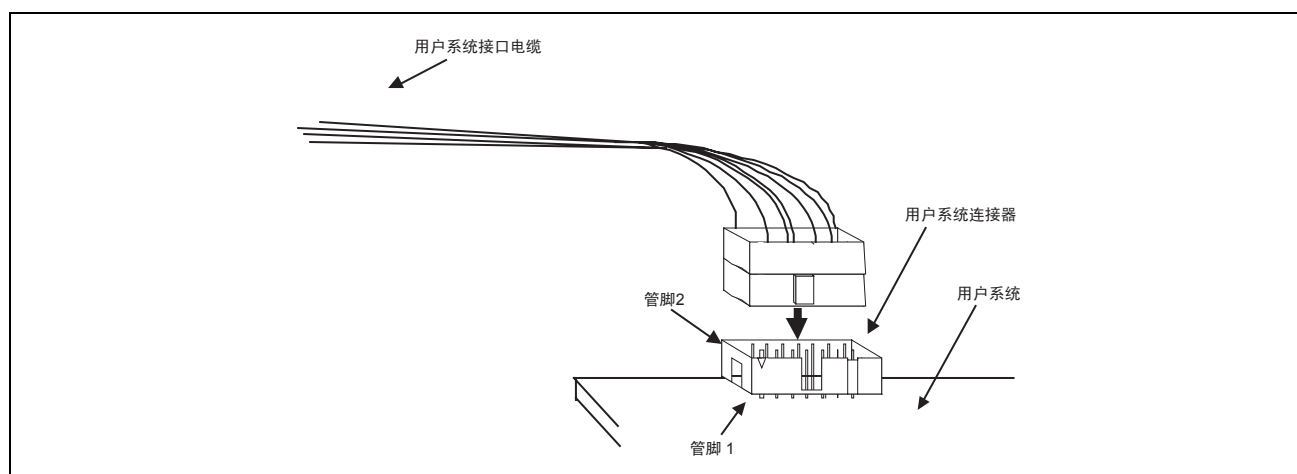


图 1.1 使用 14 管脚直插型连接器时的用户系统侧的用户接口电缆连接方法

【注】 14 管脚型连接器的管脚序号的排列和 E10A-USB 仿真器的情况不同。

【注意事项】

1. 请不要在 E8 连接器的 3mm 四周安装其它部件。
2. 在 E8 用作编程器时，连接方法也相同。

第2章 E8 连接器的管脚配置

E8 连接器的管脚配置如图 2.1 所示。

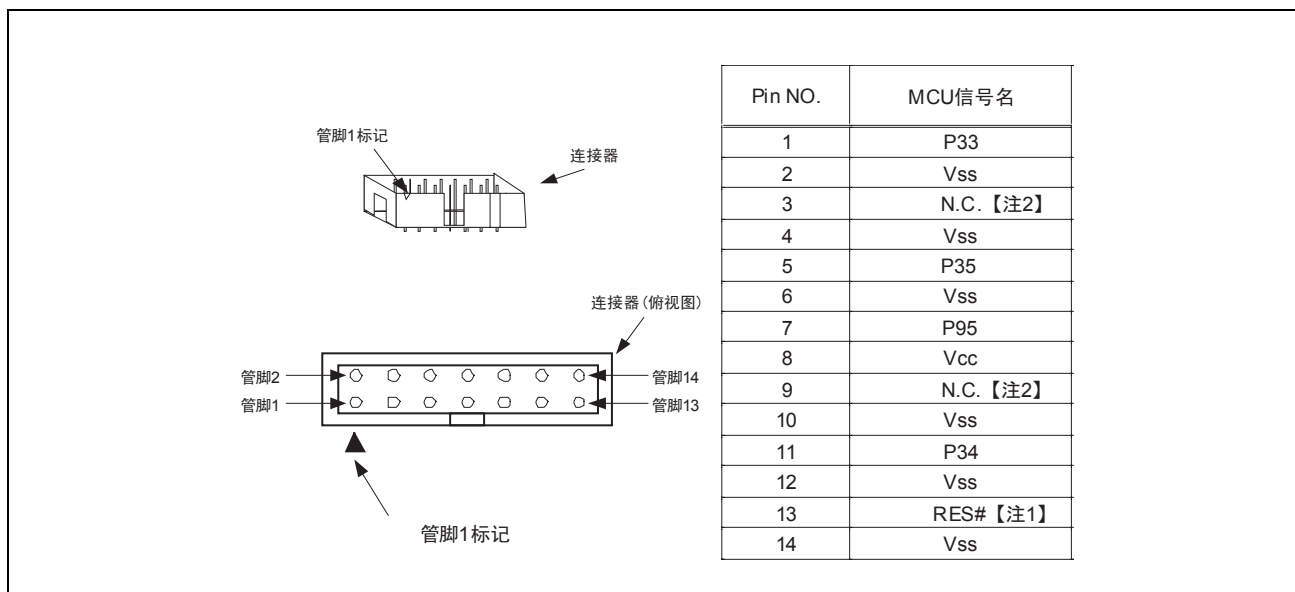


图 2.1 E8 连接器的管脚配置

- 【注】 1. 信号名#: Low 电平有效的信号
2. 在 H8/300L SLP 系列中不使用, 必须为 N.C. (Non Connect)。

第3章 E8 的连接例

连接例如下所示。

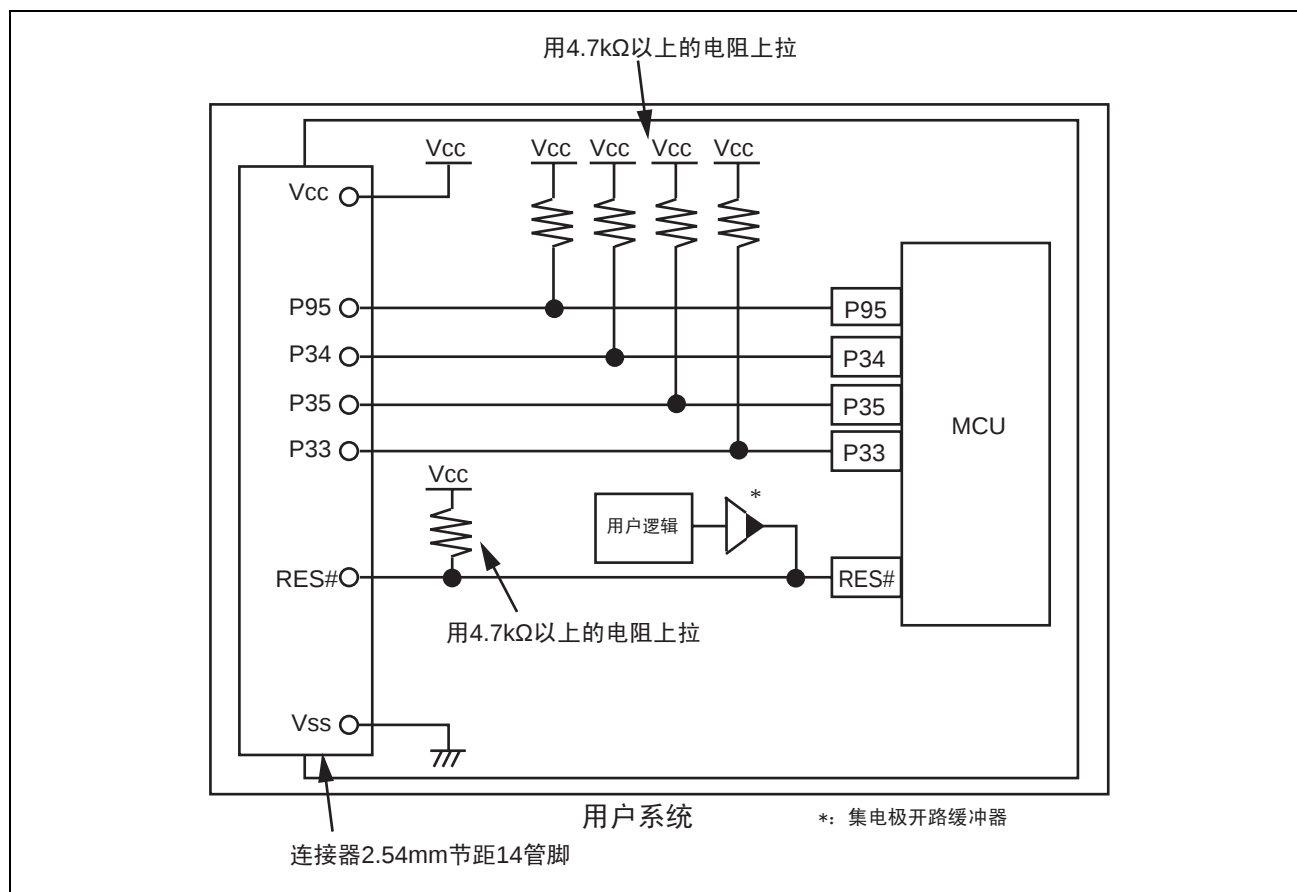


图 3.1 E8 的连接例

【注意事项】

1. P33~P35管脚由E8仿真器占用。请将MCU管脚上拉后和E8仿真器连接。

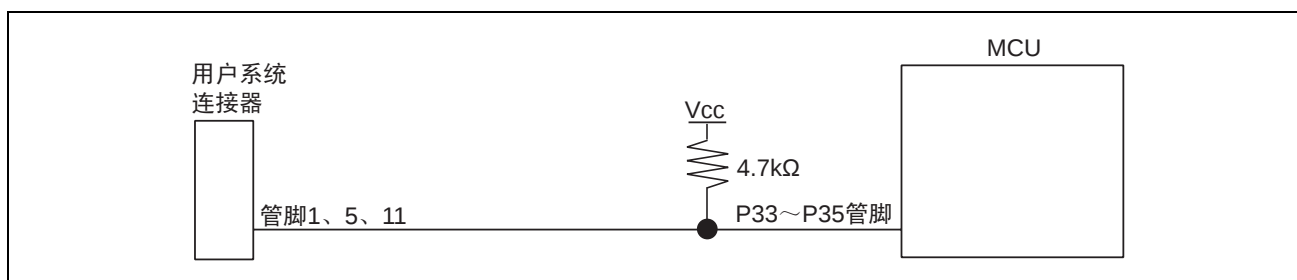


图 3.2 E8 仿真器和 P33~P35 管脚的连接

2. E8仿真器将P95管脚用于强制暂停控制。请将E8仿真器和MCU管脚连接。

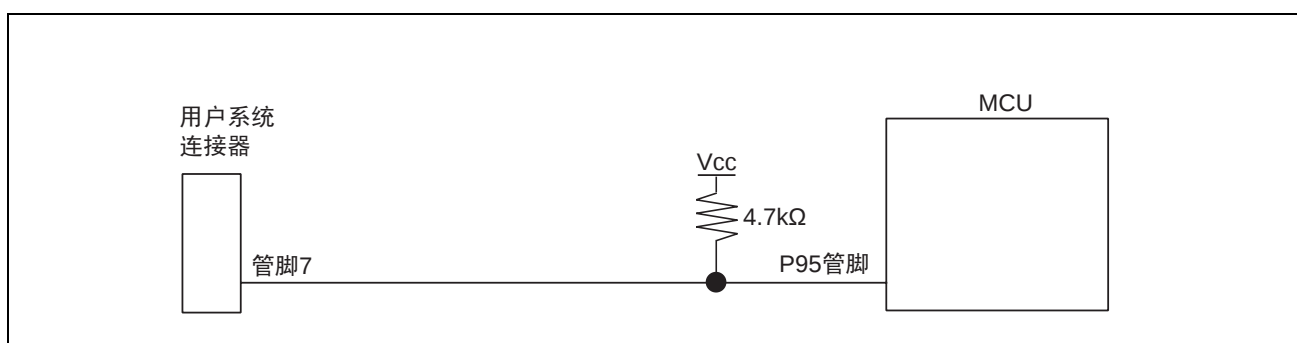


图 3.3 E8 仿真器和 P95 管脚的连接

3. E8仿真器使用RES#管脚。因此，用集电极开路缓冲器连接E8仿真器的复位输入，使用户系统能进行复位控制，请设计如下的电路。

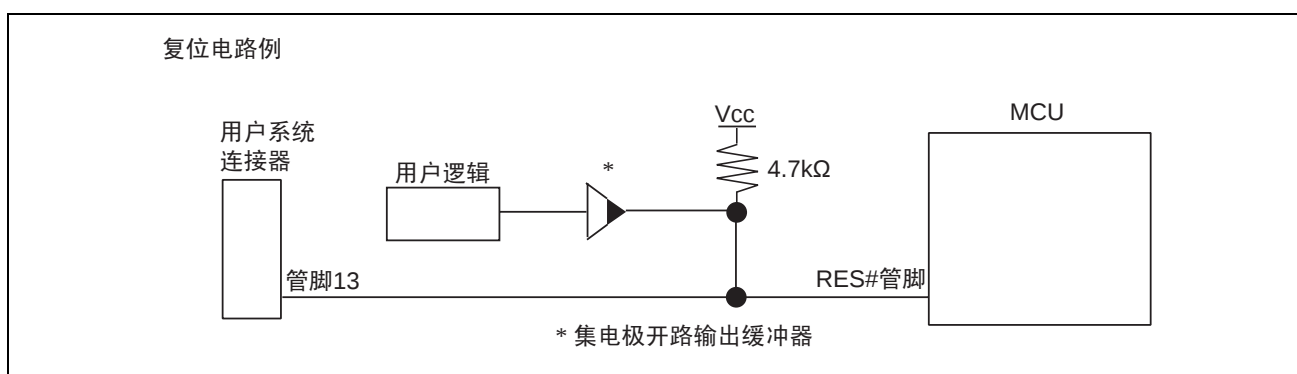


图 3.4 复位电路例

4. 必须将Vss连接MCU的Vss管脚，Vcc连接MCU的Vcc管脚（在单片机的工作保证范围内）。另外，在使用电源供给模式时，给用户系统提供电源，必须确认用户系统的功耗和电压在E8的可供给范围内以及用户系统中没有电源电路的短路等问题。
5. N.C.什么都不能连接。



在电源供给模式时，必须在确认用户系统的电源电路无短路和用户系统连接器的管脚排列后连接E8仿真器。如果误接，主机（PC）、E8仿真器和用户系统有可能冒烟起火。

6. 仿真器内的接口电路如图3.5所示。在决定上拉电阻值等时，请参考。

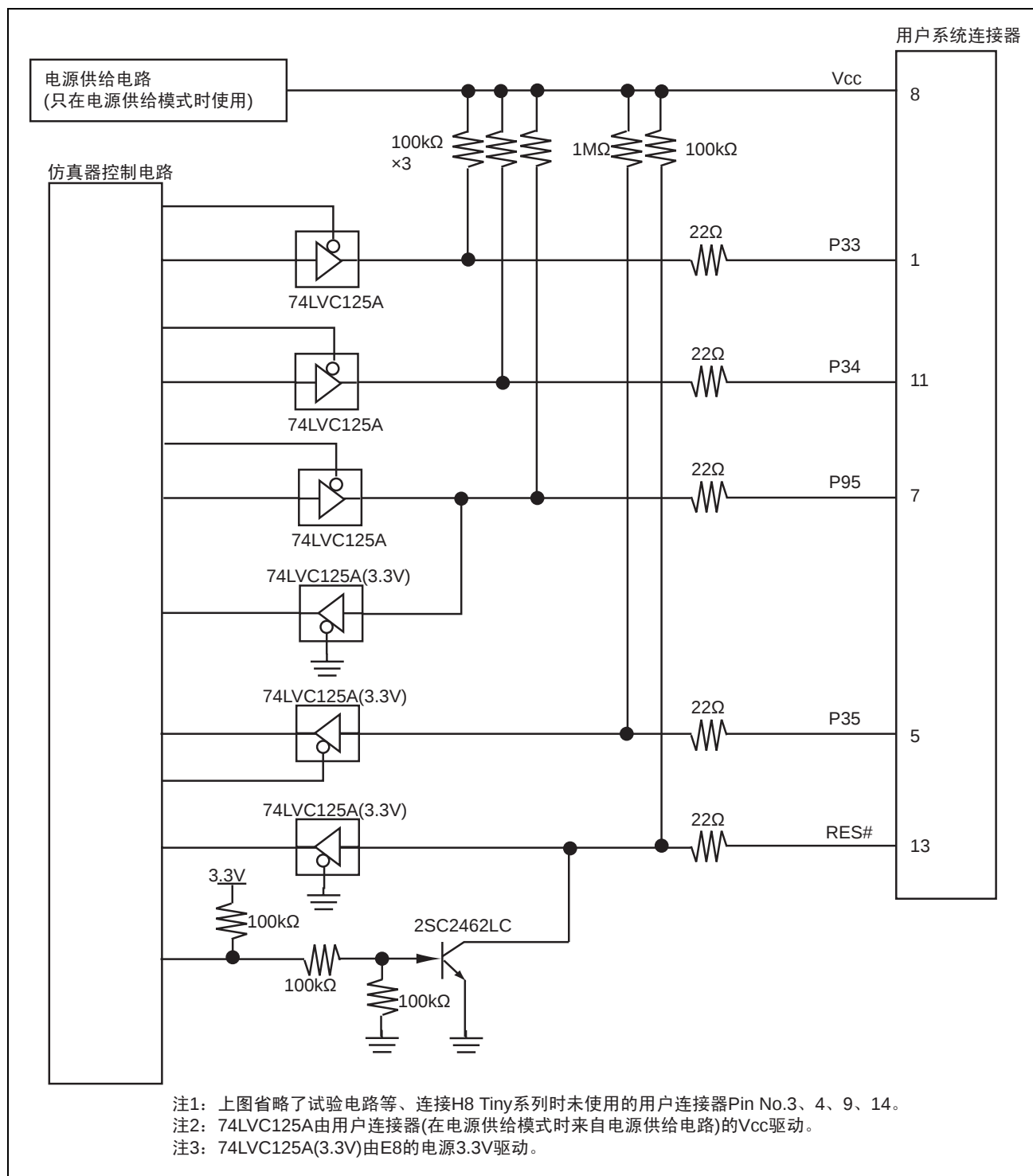


图 3.5 仿真器内的接口电路（参考）

第4章 E8 仿真器和各 MCU（H8/38024F、H8/38004F）的不同点

本章说明仿真器功能以及仿真器和 MCU 在运行时的不同点。

（1）仿真器启动模式的说明

- Download emulator firmware

在对象器件的快速擦写存储器内不存在E8仿真器程序时使用本模式。在第一次启动E8仿真器、或者E8仿真器软件版本升级，或者要更改ID码时，请选择本模式。

- Does not download emulator firmware

在对象器件的快速擦写存储器内已经存在E8仿真器程序时使用本模式。必须输入上述设定的ID码。如果输入错误代码，就会擦除快速擦写存储器上的全部程序。

- Writing Flash memory

在E8仿真器用作快速擦写存储器的编程器时使用本模式。
不能调试程序。
请将下载的装入模块注册到工作空间，并进行下载。

【注】 H8/Tiny、H8/SLP 器件没有 Writing Flash memory 中的 ID 码输入设定。

(2) 有关仿真器的启动方法和ID码

对于H8/Tiny、H8/SLP系列芯片，在启动时设定[System Clock]对话框和[ID Code]对话框。

• 系统时钟的设定

请输入所使用电路板的系统时钟值。初始值根据每种器件而不同。

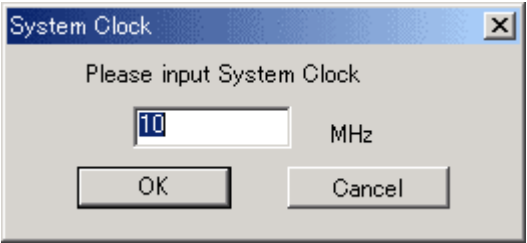


图 4.1 [System Clock]对话框

• ID码的设定

如果用Download emulator firmware模式启动，就请用任意的4位16进制数的值（H'FFFF除外）输入要设定的ID码。初始值为H'00E8。

如果用Does not download emulator firmware模式启动，就请输入正确的ID码。当ID码不一致时，快速擦写存储器的全部内容将被擦除。

请用Download emulator firmware模式重新启动。

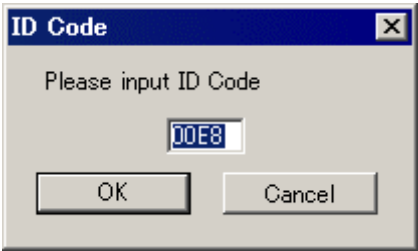


图 4.2 [ID Code]对话框

(3) 必须注意：E8仿真器在系统启动时初始化一部分通用寄存器和控制寄存器（表4.1）。

表 4.1 E8 仿真器中的寄存器初始值

状态	寄存器名	初始值
E8 仿真器启动时 (POWER ON)	PC	向量地址表中的复位向量值
	R0~R6	H'0000
	R7	H'FF80
	CCR	H'80

(4) 低功耗模式

在用户程序暂停中，为了高速运行，将CPU运行频率强制设定为系统时钟（ Φ ）。

(5) RES#信号

各MCU的RES#信号在单击GO按钮和STEP系按钮的仿真中有效。在用户程序暂停中，RES#信号不输入到各MCU。

【注意事项】

当用于控制的输入信号（RES#）为“Low”电平时，由于会发生TIMEOUT错误，所以不能执行用户程序或者存取存储器。

(6) 系统控制寄存器

E8仿真器能通过[IO]窗口存取内部I/O寄存器，在写系统控制寄存器时必须注意。E8仿真器在暂停时保存系统控制寄存器的值，在执行用户程序时恢复被保存的系统控制寄存器值。因此，暂停中不能在[IO]窗口改写系统控制寄存器。

(7) 仿真执行中的存储器存取

当在仿真执行中参照或者更改存储器的内容时，由于用户程序暂时停止，因此失去其实时性。

(8) E8仿真器使用RES#管脚、P33~P35管脚、P95管脚与MCU进行通信。除了RES#管脚以外，P33~P35管脚、P95管脚不能使用。

(9) 有关Writing Flash memory中的Sum data

在“Writing Flash memory”模式中显示的Sum data是以字节将全部ROM区的数据相加的值。

(10) 执行用户程序时的注意事项

E8仿真器在写快速擦写存储器时（Go、Step In、Step Out、Step Over）使用快速擦写存储器的寄存器和监视定时器的寄存器，所以设定值被改写。

(11) MCU的功耗增加几mA，这是为了使通信信号的电平符合用户系统电源电压而使用用户电源驱动IC。但是，因为在执行用户程序中E8仿真器不进行通信，所以功耗几乎不增加而在暂停中增加。

(12) 仿真器程序的占有区

E8仿真器程序使用快速擦写存储器和内部RAM的一部分区域，所以不能存取。
如果更改仿真器程序占有区的内容，仿真器就无法正常运行，必须用Download emulator firmware模式重新启动。

表 4.2 E8 仿真器程序的占有区

器件名	程序占有区
H8/38024F	快速擦写存储器 H'7000~H'7FFF
H8/38004F	内部 RAM H'F780~H'FB7F 向量等 H'0002~H'0007、H'0014~H'0015、 H'7FF8~H'7FF9

(13) E8仿真器在用户程序暂停时使用2个字的堆栈指针。因此，必须在堆栈区确保2个字的空间。

(14) 不能将调试中使用的MCU用于产品。

如果改写快速擦写存储器的次数增多，就会出现保持问题，在数据放置几天后可能丢失。
如果改写快速擦写存储器的次数增多，数据就不能擦除。如果显示错误信息，就必须交换新的MCU。

(15) 有关E8仿真器的Configuration设定项目

能在[Configuration]对话框的设定画面进行E8仿真器的基本设定。

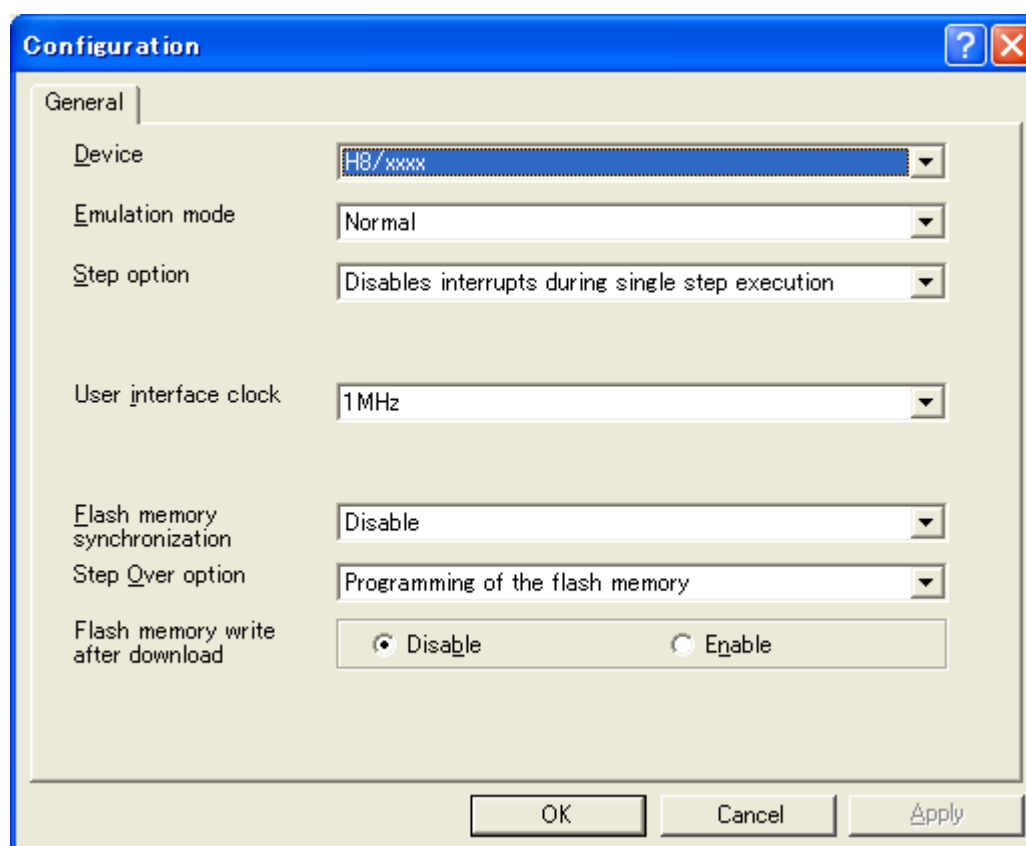


图 4.3 [Configuration]对话框 (General 页)

能设定的项目如下：

[Device]组合框	显示 MCU 器件名。
[Emulation mode]组合框	选择在执行用户程序时的仿真模式。 Normal 通常的执行。 No break 在将 PC 断点和硬件断点暂时设定为无效后执行用户程序。
[Step option]组合框	设定逐步执行中的中断的开放/屏蔽。 Disable interrupts during single step execution 在开始逐步执行时，不接受中断[注 1]。 Enable interrupts during single step execution 在开始逐步执行时，接受中断[注 1]。
[User interface clock]组合框	显示用户接口的传送时钟。

[Flash memory synchronization]组合框

选择在停止用户程序时是否通过仿真器读取快速擦写存储器的内容，以及是否将 PC 断点的设定位置恢复到源代码。

如果用户程序不改写快速擦写存储器，就不需要通过仿真器读取快速擦写存储器内容。

另外，如果快速擦写存储器中的程序在被替换为 PC 断点码的状态下没有问题，就不需要恢复到源代码。

Disable

除了在启动 E8 仿真器、更改快速擦写存储器区或者更改对快速擦写存储器区的 PC 断点设定时以外，不对快速擦写存储器进行读写操作。

PC to flash memory

在停止用户程序时，将设定的 PC 断点码替换为源指令。如果快速擦写存储器中的程序在被替换为 PC 断点码的状态下有问题，就请选择本选项。

Flash memory to PC

在停止用户程序时，通过仿真器读取快速擦写存储器的内容。如果用户程序改写快速擦写存储器，就请选择本选项。

PC to flash memory, Flash memory to PC

在停止用户程序时，通过仿真器读取快速擦写存储器的内容。另外，将设定的 PC 断点码替换为源指令。

如果用户程序改写快速擦写存储器，并且快速擦写存储器中的程序在被替换为 PC 断点码的状态下有问题，就请选择本选项。

[Step Over option]组合框

设定在 Step 时是否进行快速擦写存储器的写处理。

Programming of the flash memory

使用软件断点，执行 StepOver 等（进行快速擦写存储器的写处理）。

No Programming of the flash memory

使用 BreakCondition，执行 StepOver 等（不进行快速擦写存储器的写处理）。[注 2]

[Flash memory write after download]组合框

在程序下载结束时，写快速擦写存储器。

Disable

在下载后，不写到快速擦写存储器。

Enable

在下载后，写到快速擦写存储器。

【注】1. 也包含暂停中发生的中断。

2. 如果在[Step Over option]中选择[No Programming of the flash memory]后执行[Step Over]，就在执行 JSR、BSR、TRAPA 指令过程中也执行 JSR、BSR、TRAPA 指令的下一条指令。另外，如果 JSR、BSR、TRAPA 指令连续时，就连续执行到 JSR、BSR、TRAPA 指令以外的指令。（如果在 C 语言中连续存在函数调用时，就对此全部函数一次性地进行逐步执行）

(16) E8仿真器可使用的器件

E8仿真器还可使用H8/38002F。

在启动时，请按表4.3的设定使用所选的器件。

但是必须注意：即使下载超过实际内部ROM容量的程序，也不显示错误等。

表 4.3 器件一览表

使用的器件名	选择的器件名
H8/38002F	H8/38004F

修订记录	E8 仿真器用户手册 另册
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Rev.	发行日	修订内容	
		页	修订要点
1.00	2006.02.24	—	初版发行

E8 仿真器用户手册 另册
H8/38024F、H8/38004F连接时的注意事项

Publication Date: 1st Edition, February, 2006
Rev.1.00, February 24, 2006
Published by: Sales Strategic Planning Div.
Renesas Technology Corp.
Edited by: Customer Support Department
Global Strategic Communication Div.
Renesas Solutions Corp.

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan



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RCJ10J0019-0100