Microcomputer Technical Information

IE-789234-NS-EM1 In-Circuit Emulator for 78K0S/KY1+, 78K0S/KA1+, 78K0S/KB1+ Upgrade		Document No.	ZBG-CD-05-0059	1/1
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		Issued by	Development Tool Group Multipurpose Microcomputer Systems Division 4th Systems Operations Unit NEC Electronics Corporation	
Related documents IE-789234-NS-EM1 User's Manual: ZUD-CD-05-0037 IE-789234-NS-EM1 In-Circuit Emulator for 78K0S/KY1+, 78K0S/KA1+, 78K0S/KB1+ Usage Restrictions: ZBG-CD-05-0022		Notification classification		Usage restriction
			√	Upgrade
				Document modification
				Other notification

1. Target product and version

Product	Outline	Control Code[Note]
IE-789234-NS-EM1	In-circuit emulator for 78K0S/KY1+, 78K0S/KA1+, 78K0S/KB1+	A, B

It is not necessary to upgrade control code C.

2. Details of upgrade

The bugs (No. 3 to No. 5) described in "IE-789234-NS-EM1 In-Circuit Emulator for 78K0S/KY1+, 78K0S/KA1+, 78K0S/KB1+ Usage Restrictions" (ZBG-CD-05-0025) will be corrected.

After upgrading, the control code will be C. See the document for details.

3. Upgrade start date

Upgrade by sending the product to NEC Electronics is available. Consult an NEC Electronics sales representative or distributor.

The upgrade described herein will be provided for free for a period of one year from the above date. After the free upgrade period expires, an upgrade will be available for a fee. We therefore recommend that you take advantage of the free upgrade offer during the free upgrade period.

Upgrading by submitting the product will be available from July 11, 2005.

Note The "control code" is the second digit from the left in the 10-digit serial number.
 If the product has been upgraded, a label indicating the new version is attached to the product and the x in V-UP LEVEL x on this label indicates the control code.

Notes on Using IE-789234-NS-EM1

This document describes restrictions applicable only to the emulator and restrictions that are planned for correction in the emulator.

Refer to the following documents for the restrictions in the target device.

- User's manual of target device
- Restrictions notification document for target device

Also refer to the user's manual of the emulator for cautions on using the emulator.

1. Product Version

Part number: IE-789234-NS-EM1

Control Code[Note]	Remark
A	Dedicated to 78K0S/KA1+
B	Addition of target devices (78K0S/KY1+ and 78K0S/KB1+)
C	Correction of bugs No. 3 to No. 5

Note The "control code" is the second digit from the left in the 10-digit serial number.

If the product has been upgraded, a label indicating the new version is attached to the product and the x in V-UP LEVEL x on this label indicates the control code.

2. Product History

No.	Bugs and Changes/Additions to Specifications	Control Code[Note]		
		A	B	C
1	Restriction on oscillation stabilization time	Permanent restriction		
2	Addition of target devices	−	√	√
3	Bug in A/D function	×	×	√
4	Bug in P121/X1 pin	×	×	√
5	Debugger hangs up after execution of STOP instruction	×	×	√

×: Applicable, √: Not applicable (specifications added), −: Specification change not implemented

3. Details of Bugs and Added Specifications

No. 1　Restriction on oscillation stabilization time

[Description]

When the IE-789234-NS-EM1 is used in combination with the IE-78K0S-NS, the emulator may not be activated depending on the combination of the oscillation stabilization time and the frequency of the clock supplied to X1 set by the option byte, as shown below.

This restriction does not apply when the IE-789234-NS-EM1 is used in combination with IE-78K0S-NS-A.

Option Byte Setting		Oscillation Stabilization Time	Frequency of Clock Supplied to X1	Result
SW3-7	SW3-6			
DEFOSTS1	DEFOSTS0			
0	0	$2^{10}/fx$	500 kHz to 10 MHz	OK
0	1	$2^{12}/fx$	500 kHz to 10 MHz	OK
1	0	$2^{15}/fx$	500 kHz to 10 MHz	May not be activated when the frequency is lower than 1 MHz.
1	1	$2^{17}/fx$	500 kHz to 10 MHz	May not be activated when the frequency is lower than 2 MHz.

[Workaround]

Regard this item as a permanent restriction.

Use the IE-789234-NS-EM1 as shown below when it is used in combination with the IE-78K0S-NS.

- Supply a 1 MHz or higher clock to X1 when the oscillation stabilization time is set to $2^{15}/fx$ (DEFOSTS1: 1 and DEFOSTS0: 0).
- Supply a 2 MHz or higher clock to X1 when the oscillation stabilization time is set to $2^{17}/fx$ (DEFOSTS1: 1 and DEFOSTS0: 1).

No. 2　Addition of target devices

[Description]

The target devices shown below are now supported in IE-789234-NS-EM1 control code B. (IE-789234-NS-EM1 control code A only supports 78K0S/KA1+: μPD78F9221, μPD78F9222)

- 78K0S/KY1+: μPD78F9210, μPD78F9211, μPD78F9212
- 78K0S/KB1+: μPD78F9232, μPD78F9234

No. 3　Bug in A/D function

[Description]

The A/D function may not operate if any of the following operations is performed while the use environment temperature is low.

- Changing the settings of analog input channel specification register (ADS) during A/D conversion
- Changing the settings of A/D converter mode register (ADM) during A/D conversion

[Workaround]

Stop the A/D converter operation (ADCS = 0) then change the settings of ADS or ADM.

This bug has been corrected in IE-789234-NS-EM1 with control code C.

No. 4 Bug in P121/X1 pin (target devices: 78K0S/KA1+, 78K0S/KB1+)

[Description]

When the P121/X1 pin is used as an external clock input pin, the P121/X1 pin does not function as the I/O port. However, it functions as an output port if bit 1 of port mode register 12 (PM12) is set to select output mode.

[Workaround]

When using the P121/X1 pin as an external clock input pin, do not set bit 1 of PM12 to select output mode. This bug has been corrected in IE-789234-NS-EM1 with control code C.

No. 5 Debugger hangs up after execution of STOP instruction

[Description]

Regarding the standby release conditions after a STOP instruction is executed, if an arbitrary interrupt mask flag is cleared to 0 while an interrupt enable flag is 0 (by executing the DI instruction), an interrupt is generated (interrupt request flag = 1), then the STOP instruction is executed, the standby state is not released and the debugger hangs up. Moreover, the standby state is not released even if a standby release signal is generated due to another interrupt request, and the debugger hangs up.

Example 1 A standby release signal is generated due to INTP0 immediately before executing a STOP instruction while interrupts are disabled

```
DI              ; Disables interrupts
SET1  PIF0      ; Sets INTP0 interrupt request flag
CLR1  PMK0      ; Clears masking of INTP0 interrupt
SET1  P2.0      ; Sets port 20 to "1"
STOP            ; Enters STOP mode
CLR1  P2.0      ; Clears port 20 to "0" (not executed)
```

The same situation occurs when a standby release signal is generated while interrupts are enabled and an instruction that holds interrupt requests pending is executed immediately before a STOP instruction.

Example 2 A standby release signal is generated due to INTP0 immediately before executing a STOP instruction while interrupts are enabled

```
EI              ; Enables interrupts
SET1  P2.0      ; Sets port 20 to "1"
SET1  PIF0      ; Sets interrupt request flag
CLR1  PMK0      ; Executes an instruction that holds interrupt requests pending
                ; immediately before executing a STOP instruction
STOP            ; Enters STOP mode
CLR1  P2.0      ; Clears port 20 to "0" (not executed)
```


Remark Instructions that hold interrupt requests pending
- Instructions that perform writing to the interrupt request flag register (IF0 or IF1)
- Instructions that perform writing to the interrupt mask flag register (MK0 or MK1)

[Workaround]

Be sure to set the interrupt enable flag to 1 (EI instruction) before executing a STOP instruction. Moreover, do not execute an instruction that holds interrupt requests pending immediately before executing the STOP instruction.

Example Execute an EI instruction immediately before executing the STOP instruction

```
DI                ; Disables interrupts
SET1  PIF0        ; Sets INTP0 interrupt request flag
CLR1  PMK0        ; Clears masking of INTP0 interrupt
SET1  P2.0        ; Sets port 20 to "1"
EI                ; Enables interrupts
STOP              ; Enters STOP mode
CLR1  P2.0        ; Clears port 20 to "0"  (executed)
```

Remark In the case that an interrupt occurs immediately before a STOP instruction, the interrupt request flag is cleared before executing the STOP instruction. To release the STOP mode, therefore, another interrupt must be generated.

This bug has been corrected in IE-789234-NS-EM1 with control code C.

4. Cautions

(1) Since the IE-789234-NS-EM1 sets the option byte using SW3, the value set to address 80H is not reflected.

(2) Some bits of the port register are fixed to 0 in the target device, but some of them can be overwritten by program. However, writing is not possible on the SFR window.

(3) A/D conversion can be started without waiting for 1 μs or longer even if bit 0 (ADCE) of the A/D converter mode register (ADM) is set to 1.

(4) Bit 4 (WDTRF) and bit 0 (LVIRF) of the reset control flag register (RESF) cannot be initialized by the reset button of the debugger or reset button (SW2) of the IE-78K0S-NS and IE-78K0S-NS-A. Input a reset from the target side, re-apply power to the emulator, or press SW4 on the IE-789234-NS-EM1.

(5) The IE-789234-NS-EM1 does not support the self-programming function of the flash memory.

(6) When HALT mode is released by an interrupt, the program is restored two or three clocks earlier than the target device.

(7) Low-voltage detection level
An error of several mV occurs in the IE-789234-NS-EM1 compared to the target device.

(8) A/D converter characteristics
The characteristics of the A/D converter of the IE-789234-NS-EM1 differ from those of the target device because a probe is connected between the IE-789234-NS-EM1 and the target system.

(9) 8-bit timer H1
When the low-speed internal oscillation clock is selected as the 8-bit timer count clock, the timer does not stop while the program is stopped even if "Break" is selected for "Peripheral Break" in the Configuration dialog box of the debugger.

(10) $\overline{\text{RESET}}$ pin
Since the $\overline{\text{RESET}}$ pin alternately functions as P34, it is connected to a protective resistor (pull-down resistor) inside the emulator. Consequently, the $\overline{\text{RESET}}$ pin is always at low level.
Normally a reset does not occur because "Mask: RESET" is set in the Configuration dialog box, but if the "Mask: RESET" setting is cancelled, a reset is always applied, which causes the debugger to hang up.
When inputting an external reset from the $\overline{\text{RESET}}$ pin, first pull the $\overline{\text{RESET}}$ pin up and cancel the "Mask: RESET" setting in the Configuration dialog box.

(11) General cautions on handling this product

(11)-1. Circumstances not covered by product guarantee
- If the product was disassembled, altered, or repaired by the customer
- If it was dropped, broken, or given another strong shock
- Use at overvoltage, use outside guaranteed temperature range, storing outside guaranteed temperature range
- If power was turned on while the power supply unit, PC interface cable, or target system connection was in an unsatisfactory state
- If the power supply cable, PC interface cable, emulation probe, or the like was bent or pulled excessively
- If a power supply unit other than the one supplied with the product is used
- If the product got wet
- If the product and target system were connected while a potential difference existed between the GND of the product and the GND of the target system
- If a connector or cable was removed while the power was being supplied to the product
- If an excessive load was placed on a connector or socket

(11)-2. Safety precautions
- If used for a long time, the product may become hot (50°C to 60°C). Be careful of low temperature burns and other dangers due to the product becoming hot.
- Be careful of electrical shock. There is a danger of electrical shock if the product is used as described above in (**11)-1 Circumstances not covered by product guarantee**.

(12) Caution on connecting emulation probe

When using IE-789234-NS-EM1 control code B or later, do not connect the emulation probe directly to probe connector CN5. Refer to the user's manual included with a control code B or later product or the latest user's manual for the probe interface conversion board corresponding to the target device and connect the emulation probe via this board.

Target Device	Probe Interface Conversion Board	Emulation Probe
78K0S/KA1+: μPD78F9221, μPD78F9222	789222 PROBE Board	NP-30MC
78K0S/KB1+: μPD78F9232, μPD78F9234	789234 PROBE Board	

(13) Caution on device file version

When using IE-789234-NS-EM1 control code B or later, do not use device file DF789222 V1.10, which is designed for IE-789234-NS-EM1 control code A.

The device file can be downloaded from the NEC Electronics website.

(URL: http://www.necel.com/micro/)

Target Device	Control Code	Usable Device File
78K0S/KA1+: μPD78F9221, μPD78F9222	A	DF789222 V1.10
	B	DF789222 V2.00