

Microcontroller Technical Information

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QB-MINI2 On-Chip Debug Emulator with Programming Function Usage Restrictions		Document No.	ZBG-CD-07-0013	1/1
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Related documents	QB-MINI2 User's Manual: U18371EJ1V0UM00 QB-MINI2 Operating Precautions: ZUD-CD-07-0007	Notification classification	<input checked="" type="checkbox"/> Usage restriction <input type="checkbox"/> Upgrade <input type="checkbox"/> Document modification <input type="checkbox"/> Other notification	

1. Affected product

Product	Generic Name	Control Code ^{Note}	Firmware Version ^{Note}	Remark
QB-MINI2	MINICUBE2	A	V4.01 or earlier	–

Note See the attachment for the identification method for the control code and firmware version.

2. New restrictions

Restrictions and specification changes No. 14 to No. 18 have been added. See the attachment for details.

No. 14: Restriction on using QB-MINI2 with USB 1.1 (When using a 78K0R device)

No. 15: Restriction on operation at 20 MHz or higher frequency (When using a 78K0R device)

No. 16: Restriction on general-purpose registers after reset (When using a 78K0R device)

No. 17: Specifications changed/added in conjunction with firmware optimization (When using a 78K0R device)

No. 18: Restriction on hardware breaks (When using a 78K0R device)

3. Workarounds

See the attachment.

4. Modification schedule

Restrictions No. 14, No. 15 and No. 17 have been corrected or implemented in MINICUBE2 firmware V4.03, which was released on January 29, 2007. Restrictions No. 16 and No. 18 are not planned for correction.

5. List of restrictions

For the product history and the details of the list of restrictions are described in the attachment.

Notes on Using QB-MINI2

This document describes the following items. Refer to the user's manual of the QB-MINI2 (hereafter referred to as MINICUBE2) for cautions on using MINICUBE2.

- Restrictions not applicable to the target device but applicable to MINICUBE2
- Restrictions applicable to both the target device and MINICUBE2 but correction is planned only for MINICUBE2
- Devices supported by MINICUBE2

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

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

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(Note)

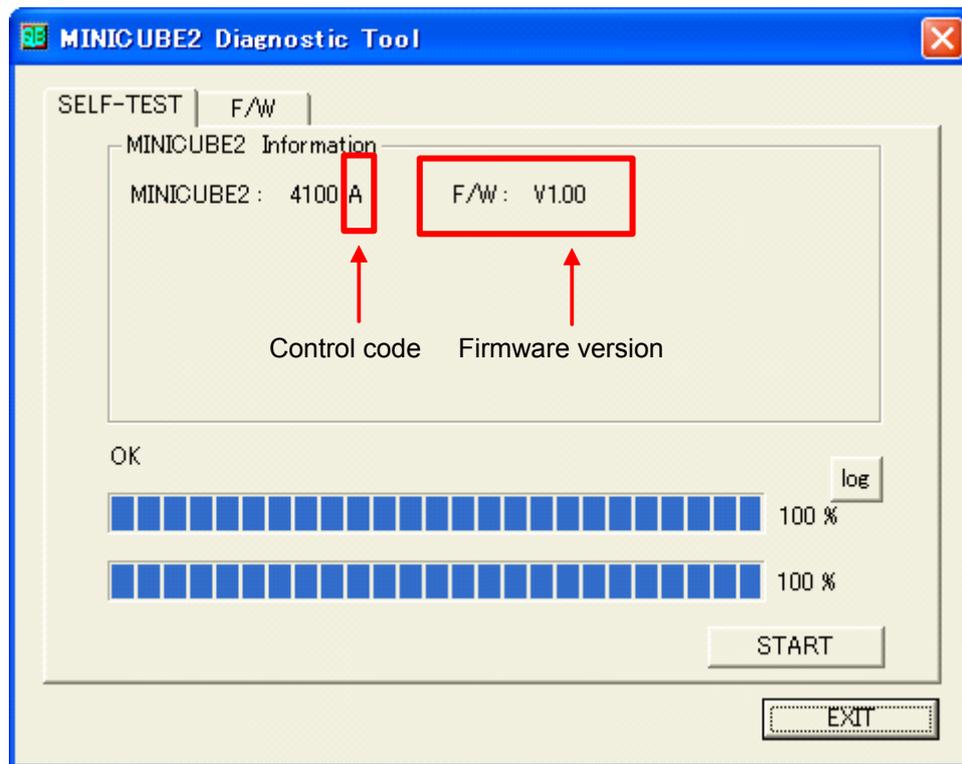
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Product Version

Control Code ^{Note 1}	Firmware ^{Note 2}	Remark
A	V1.00	Newly released
	V2.00	Supports V850 microcontrollers
	V3.00	Supports 78K0S microcontrollers
	V4.00	Supports 78K0R microcontrollers
	V4.01	
	V4.03	

- Notes**
- The “control code” is an alphabetic code used to identify the hardware of MINICUBE2. It is the second digit from the left in the 10-digit serial number printed on the sticker attached to the bottom side of MINICUBE2 (if it has not been upgraded).
If the product has been upgraded, the control code can be checked with the MINICUBE2 diagnostic tool (see Figure 1 below).
 - Firmware (F/W) is a program embedded in the device in MINICUBE2 for control. The F/W version is shown as Vx.xx (x is an arbitrary number). The version can be checked with the MINICUBE2 diagnostic tool (see Figure 1 below).

Figure 1. Checking Control Code and Firmware Version



Product History

Table 1 is a list of restrictions and changed/added specifications of MINICUBE2.

Table 1. List of Restrictions and Changed/Added Specifications

No.	Target Device	Note D/P	Changed/Added Specifications and Restrictions	Control Code					
				A					
				F/W Version					
				V1.00	V2.00	V3.00	V4.00	V4.01	V4.03
1	78K0	D	Internal high-speed RAM values become invalid after reset	×	×	×	×	×	×
2	V850	D	Restriction regarding watchdog timer	–	×	×	×	×	×
3	V850	D	Restriction on break during subclock operation	–	×	×	×	×	×
4	V850	D	Restriction regarding break during flash macro servicing	–	×	×	×	×	×
5	V850	D	Restriction regarding reset vector handling function	–	×	×	×	×	×
6	V850	D	Restriction on rewriting registers that require a specific sequence	–	×	×	×	×	×
7	V850	D	Restriction when a reset is generated	–	×	×	×	×	×
8	78K0S	D	Restriction on debugging with operating clock of 6 MHz or lower	–	–	×	○	○	○
9	78K0S	D	Restriction on downloading when operating clock is 10 MHz	–	–	×	×	○	○
10	78K0S	D	Restriction on display of register values	–	–	×	○	○	○
11	78K0R	D	Restriction on breakpoint for a CPU clock lower than 2 MHz	–	–	–	×	×	△
12	78K0R	D	Restriction on debugging of time measurement function in 1-wire mode	–	–	–	×	×	○
13	78K0R	D	Restriction regarding invalid operation after program download	–	–	–	×	×	○
14	78K0R	D	Restriction on using QB-MINI2 with USB 1.1	–	–	–	×	×	○
15	78K0	D	Restriction on operation at 20 MHz or higher frequency	×	×	×	×	×	○
16	78K0R	D	Restriction on general-purpose registers after reset	–	–	–	×	×	×
17	78K0R	D	Specifications changed/added in conjunction with firmware optimization	–	–	–	×	×	○
18	78K0R	D	Restriction on hardware breaks	–	–	–	×	×	×

○: Restrictions are not applicable or already corrected. Changes or additions of specifications are applied.

△: Restrictions are partially corrected.

×: Restrictions are applicable. Changes or additions of specifications are not applied.

–: Not relevant or the target device is not supported

Note D: Applicable during debugging, P: Applicable during programming.

Remark The permanent restriction means a restriction that is not planned for correction.

Details of Bugs and Added Specifications

No. 1 Internal high-speed RAM values become invalid after reset

[Target device] 78K0

[Description]

If a reset is input via the RESET pin during program execution, portions in the internal high-speed RAM areas shown below become invalid. This bug does not apply to reset sources such as the watchdog timer, LVI, etc.

- 5 bytes from FECBh to FECFh

(When Permit is selected in Target Power OFF field in Configuration dialog box)

- 10 bytes from FEC9h to FECFh and FEDDh to FEDFh

(When Not Permit is selected in Target Power OFF field in Configuration dialog box)

[Workaround]

There is no workaround.

No. 2 Restriction regarding watchdog timer

[Target device] V850

[Description]

The watchdog timer is forcibly stopped by the debug monitor program. Therefore, do not set the option byte so as to disable stoppage of the watchdog timer. For the option byte setting, see the user's manual of the target device.

[Workaround]

There is no workaround.

No. 3 Restriction on break during subclock operation

[Target device] V850

[Description]

When the mode for communication between MINICUBE2 and the target device is UART, and if a break occurs during subclock operation while the main clock has been stopped, the debug monitor program forcibly switches the operating clock to the main clock. The device continues its operation with the main clock, even after execution is resumed. Whether the operating clock during a break is switched from the subclock to main clock depends on the Main Clock area setting in the Configuration dialog box of the debugger.

[Workaround]

There is no workaround.

No. 4 Restriction regarding break during flash macro servicing

[Target device] V850

[Description]

If a break occurs during flash macro servicing, it occurs at an unexpected address. This also applies to the case where a break occurs in the debugger, such as when using the pseudo RRM function.

[Workaround]

There is no workaround. Reset the device and reexecute the program.

No. 5 Restriction regarding reset vector handling function

[Target device] V850

[Description]

The reset vector handling function is not supported.

[Workaround]

There is no workaround.

No. 6 Restriction on rewriting registers that require a specific sequence

[Target device] V850

[Description]

Peripheral I/O registers (other than PCC and CKC) that require a specific sequence cannot be rewritten in the I/O register window or the like in the debugger.

[Workaround]

There is no workaround.

No. 7 Restriction when a reset is generated

[Target device] V850

[Description]

A break occurs when an external reset (when reset is not masked) or an internal reset is generated.

[Workaround]

There is no workaround.

No. 8 Restriction on debugging with operating clock of 6 MHz or lower

[Target device] 78K0S

[Description]

The debugger does not start when the target device operating frequency is 6 MHz or lower.

[Workaround]

There is no workaround. This item has been corrected in firmware V4.00.

No. 9 Restriction on downloading when operating clock is 10 MHz

[Target device] 78K0S

[Description]

When the target device operating frequency is 10 MHz, an error will occur during download of a program and the downloading cannot be completed.

[Workaround]

There is no workaround.

This item has been corrected in firmware V4.01. If you are using the NEC Electronics debugger

ID78K0S-QB, please switch to ID78K0S-QB V2.90 or later.

No. 10 Restriction on display of register values

[Target device] 78K0S

[Description]

The register values may be displayed incorrectly in the debugger during a break.

[Workaround]

There is no workaround. This item has been corrected in firmware V4.00.

No. 11 Restriction on breakpoint for a CPU clock lower than 2 MHz

[Target device] 78K0R

[Description]

If a break occurs during operation at a CPU clock (f_{CLK}) lower than 2 MHz while the PER0 and PER1 registers are set to 0, the internal flash memory can no longer be rewritten. Consequently, the following operations cannot be performed.

- <1> Writing to internal flash memory
- <2> Setting or canceling of software breakpoint
- <3> Starting execution at the set software breakpoint position
- <4> Step-wise execution at the set software breakpoint position
- <5> Step-wise execution, Return Out execution
- <6> Come Here
- <7> If Permit is selected in the Flash Programming area in the Configuration dialog box, the following operations cannot be performed.
 - (a) Setting, changing, or canceling of hardware breaks
 - (b) Masking/unmasking of internal reset
 - (c) Switching of peripheral breaks

[Workaround]

There is no workaround. To set a breakpoint for operation performed at a CPU clock lower than 2 MHz, use a hardware break, not a software break.

With firmware V4.03, this restriction is corrected partially, as shown below. To apply this correction, please use the NEC Electronics debugger ID78K0R-QB V3.30 or later.

[Correction]

For clock frequencies with which flash memory cannot be written, specifications will be changed so that the frequency that enables flash memory rewriting is selected automatically, and the register settings are restored after flash memory rewriting is completed. To prevent the frequency from being switched automatically, select "User" in the Monitor Clock area and "Not Permit" in the Flash Programming area in the ID78K0R-QB Configuration dialog box. However, operations <1> to <7> shown above can no longer be performed.

No. 12 Restriction on debugging of time measurement function in 1-wire mode

[Target device] 78K0R

[Description]

When debugging is performed in 1-wire mode (selected by choosing TOOL0 in the Target Device Connection area in the Configuration dialog box of the debugger), the Run-Break execution time is measured with the accuracy of roughly 10 ms order. The prescribed accuracy is 100 μ s.

[Workaround]

Perform debugging in 2-wire mode (TOOL0 + TOOL1).

This item has been corrected in firmware V4.03. If you are using the NEC Electronics debugger ID78K0R-QB, please switch to ID78K0R-QB V3.30 or later.

No. 13 Restriction regarding invalid operation after program download

[Target device] 78K0R

[Description]

When the reset vector (addresses 0 and 1) is assigned to an address lower than 0x0100, the debugger operation becomes invalid after a program is downloaded. Specifically, illegal breaks occur immediately after execution, the Source window cannot be opened, and so on.

[Workaround]

Assign the reset vector for the user program to addresses of 0x0100 or higher.

This item has been corrected in firmware V4.03. If you are using the NEC Electronics debugger ID78K0R-QB, please switch to ID78K0R-QB V3.30 or later.

No. 14 Restriction on using QB-MINI2 with USB 1.1

[Target device] 78K0R

[Description]

The debugger operation may become invalid if it is connected via USB 1.1.

[Workaround]

There is no workaround. This item has been corrected in firmware V4.03.

No. 15 Restriction on operation at 20 MHz or higher frequency

[Target device] 78K0R

[Description]

When the QB-MINI2 operates at a frequency of 20 MHz or higher, downloading or manipulation to change the memory contents may fail.

[Workaround]

Perform downloading or manipulation to change the memory contents at a frequency lower than 20 MHz.

This item has been corrected in firmware V4.03.

No. 16 Restriction on general-purpose registers after reset

[Target device] 78K0R

[Description]

After reset in standby mode, the general register contents are not retained.

[Workaround]

There is no workaround.

No. 17 Specifications changed/added in conjunction with firmware optimization

[Target device] 78K0R

[Description]

The specifications shown below have been changed or added in conjunction with firmware optimization. See *QB-MINI2 Operating Precautions* (ZUD-CD-07-0007) for information on changes in the MINICUBE2 user's manual in conjunction with this modification.

This item has been implemented in firmware V4.03. To apply this correction, use the NEC Electronics debugger ID78K0R-QB V3.30 or later.

- <1> The debugger operation speed has been improved by improving the MINICUBE2 firmware processing.
- <2> The operation speed in 1-wire mode has been improved to be equalized with that in 2-wire mode.
- <3> For a case when the pseudo real-time monitor function (RRM function) is not used during debugging in 2-wire mode, the occupied size of the debug monitor program allocated to the last block in the internal ROM has been reduced from 1 KB to 88 bytes.
- <4> Instructions that perform two instructions during step-wise execution have been modified so as to perform only one instruction.
- <5> The option byte setting (C1H) for the LVI default start function is now the same regardless of whether MINICUBE2 is connected.
- <6> Debugger operations for rewriting the flash memory (download, software break setting, etc.), which were not possible when the target microcontroller cannot rewrite the flash memory due to the CPU clock or the regulator mode, are now available by changing the specification so that the debugger automatically changes the SFR contents so as to enable rewriting of the flash memory to enable such operations. (Correction of restriction No. 11 is also included in this change). After rewriting the flash memory is completed, the SFR contents will be restored. The debugger will output the following errors if the operation voltage is lower than the voltage with which flash memory rewriting is possible (1), or if the flash memory rewriting is prohibited by the debugger configuration (2). (When using the ID78K0R-QB)
 - In case of (1): "F0C37: The voltage is too low to operate flash programming."
 - In case of (2): "F0C48: Flash programming is disabled in the debugger."
 - In case of (1) or (2) and when setting or cancelling software breaks:
"W401C: Software break can not be set on this area."
- <7> A break, which was generated if STOP mode is entered when the pseudo RRM function is used, is now prevented by releasing the STOP mode.

No. 18 Restriction on hardware breaks

[Target device] 78K0R

[Description]

A hardware break occurs at an address several instructions after the specified point. This applies to both instruction fetch and data access. If any of the following debugger operations <1> to <3> is performed while the flash memory cannot be rewritten, a hardware break occurs at an address several instructions after the specified point.

<1> Step-wise execution

<2> Return Out execution

<3> Come Here

[Workaround]

There is no workaround.