Customer Notification

# QB-MINI2-EE

## Universal Flash Memory Programmer and Serial On-chip Debugger

## Operating Precautions

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# Table of Contents

## A) Table of Operating Precautions

**Table A-1 Table of Operating Precautions**

| No. | Target Device | Debug/ Progr. | Outline | Control Code: Firmware: | QB-MINI2-EE A V4.00 | A V4.01 | A V4.02 | A V4.03 | A V4.04 | A V4.05 | A V4.07 | A V5.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 78K0 | Debug | Invalid internal high-speed RAM area after RESET | | × | × | × | × | × | × | × | × |
| 2 | V850 | Debug | Use of watchdog timer | | × | × | × | × | × | × | × | × |
| 3 | V850 | Debug | Break during sub-clock operation | | × | × | × | × | ✓ | ✓ | ✓ | ✓ |
| 4 | V850 | Debug | Break during flash memory modifications | | × | × | × | × | × | × | × | × |
| 5 | V850 | Debug | Reset vector handling | | × | × | × | × | × | × | × | × |
| 6 | V850 | Debug | Modifying specific registers | | × | × | × | × | × | × | × | × |
| 7 | V850 | Debug | Reset generation | | × | × | × | × | × | × | × | × |
| 8 | 78K0S | Debug | Debugging with operation clock of 6MHz or lower | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 9 | 78K0S | Debug | Downloading when operation clock is 10MHz | | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 10 | 78K0S | Debug | Display of register values | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 11 | 78K0R | Debug | Breakpoint for a CPU lower than 2MHz | | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 12 | 78K0R | Debug | Debugging of time measurement function in 1-wire mode | | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 13 | 78K0R | Debug | Invalid operation after program download | | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 14 | 78K0R | Debug | Using QB-MINI2-EE with USB1.1 | | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ |
| 15 | 78K0R | Debug | Operation at frequencies at 20MHz | | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ |
| 16 | 78K0R | Debug | General purpose registers after reset | | × | × | × | × | × | × | × | × |
| 17 | 78K0R | Debug | Specification changes in conjunction with firmware optimization | | - | - | - | ✓ | ✓ | ✓ | ✓ | ✓ |
| 18 | 78K0R | Debug | Hardware breakpoints | | × | × | × | × | × | × | × | × |
| 19 | V850 | Debug | Download speed via CSI | | - | - | - | - | ✓ | ✓ | ✓ | ✓ |
| 20 | V850 | Debug | Reserved area changed for CSI | | - | - | - | - | ✓ | ✓ | ✓ | ✓ |
| 21 | V850 | Debug | Operation in low voltage | | - | - | - | - | × | × | × | × |
| 22 | 78K0R | Debug | Addition of specification of RRM and DDM functions | | - | - | - | - | - | ✓ | ✓ | ✓ |
| 23 | 78K0 | Debug Progr. | Devices with TOOLCx and TOOLDx pins | | - | - | - | - | - | - | ✓ | ✓ |
| 24 | All | Debug Progr. | Addition of specification for support of MINICUBE2 wireless unit (QB-MINI2-RF) | | - | - | - | - | - | - | - | ✓ |

- : Not relevant or the target device is not supported
- ✓ : Not applicable or new/changed specification applies
- × : Applicable

## B) Description of Operating Precautions

**Table B-1 Invalid internal high-speed RAM area after RESET**

*Details*
If a RESET signal is generated at the RESET-pin or a RESET occurs due to POC during program execution, below showed internal high-speed RAM areas become invalid:

- 5 bytes from FECBh to FECFh (When ***Permit*** is selected in ***Target Power OFF*** field in the configuration dialog box)
- 10 bytes from FEC9h to FECFh and FEDDh to FEDFh (When ***Not Permit*** is selected in ***Target Power OFF*** field in the configuration dialog box)

*Workaround*
No workaround available

**Table B-2 Use of watchdog timer**

*Details*
The watchdog timer cannot be used, because it's forcibly stopped by the debug monitor program. Don't set the option byte to disable watchdog timer stop.

*Workaround*
No workaround available

**Table B-3 Break during sub-clock operation**

*Details*
In the configuration dialog box of the debugger it's possible to define, if the operating clock during a break is switched from sub-clock to main clock. But if UART is the communication channel between QB-MINI2-EE and target device, an occurring break during sub-clock operation (while the main clock has been stopped) will forcibly switch the operation clock to main clock. The device continues its operation with the main clock after monitor program execution.

*Workaround*
No workaround available

**Table B-4 Break during flash memory modifications**

*Details*
A break may occurs at an unexpected address during flash memory modifications (for example usage of flash self-programming libraries).

*Workaround*
No workaround available

**Table B-5 Reset vector handling**

| |
|---|
| *Details*<br>The reset vector cannot be used.<br><br>*Workaround*<br>No workaround available |

**Table B-6 Modifying specific registers**

| |
|---|
| *Details*<br>Peripheral I/O registers (except PCC and CKC), that require a specific program sequence for access, cannot be modified in the I/O register of the debugger.<br><br>*Workaround*<br>No workaround available |

**Table B-7 Reset generation**

| |
|---|
| *Details*<br>A break occurs, when an external reset (which isn't masked in the debugger GUI) or an internal reset is generated.<br><br>*Workaround*<br>No workaround available |

**Table B-8 Debugging with operation clock of 6MHz or lower**

| |
|---|
| *Target Device*<br>78K0S<br><br>*Details*<br>The debugger does not start when the target device operating frequency is 6MHz or lower<br><br>*Workaround*<br>No workaround available This item is corrected from firmware version V4.00 onwards |

**Table B-9 Downloading when operation clock is 10MHz**

*Target Device*
78K0S

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

*Workaround*
No workaround available

**Table B-10 Display of register values**

*Target Device*
78K0S

*Details*
Register values may be displayed incorrectly in the debugger during a break.

*Workaround*
No workaround available. This item is corrected in firmware version V4.00

**Table B-11 Table description**

*Target Device*
78K0R

*Details*
If a break occurs, during CPU operational clock lower than 2MHz, the internal flash memory can no longer be rewritten. The following operations cannot be performed any longer.

1. Writing to internal Flash memory
2. Setting or canceling of software breakpoints
3. Starting execution at the set software breakpoint position
4. Step execution at the set software breakpoint position
5. Step-over execution, Return Out execution
6. Run to Cursor
7. If Permit of 'Flash memory access in the Flash Programming area', is selected 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*
To set a breakpoint, for operation performed at a CPU clock lower than 2MHz, use a hardware break and not a software breakpoint

**Table B-12 Debugging of time measurement function in 1-wire mode**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>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 about 10ms.<br><br>*Workaround*<br>Perform debugging in 2-wire mode (TOOL0 + TOOL1) |

**Table B-13 Invalid operation after program download**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>When the reset vector (address 0 and 1) points 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 the application cannot be debugged.<br><br>*Workaround*<br>*Assign the reset vector for the user program to addresses of 0x0100 or higher.* |

**Table B-14 Using QB-MINI2-EE with USB1.1**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>The debugger operation may become invalid if it is connected via USB 1.1.<br><br>*Workaround*<br>*This item has been corrected in firmware V4.03.* |

**Table B-15 Operation on frequencies ≥20MHz**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>When the QB-MINI2 operates at a frequency of 20 MHz or higher, downloading or manipulation to change the memory contents may fail.<br><br>*Workaround*<br>Perform downloading or manipulation to change the memory contents at a frequency lower than 20MHz.<br>This item has been corrected in firmware V4.03. |

**Table B-16 General purpose registers after reset**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>After reset in standby mode, the general register contents are not retained.<br><br>*Workaround*<br>No workaround available |

**Table B-17 Specification changes in conjunction with firmware optimization**

*Target Device*
78K0R

*Details*
The specifications shown below have been changed or added in conjunction with firmware optimization.
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.

*Workaround*
No workaround available

**Table B-18 Hardware breakpoints**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>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.<br>1. Step-wise execution<br>2. Return Out execution<br>3. Come Here.<br><br>*Workaround*<br>No workaround available |

**Table B-19 Download speed via CSI**

| |
|---|
| *Target Device*<br>V850<br><br>*Details*<br>The downloading speed via the CSI interface with the target system has been approximately doubled. This specification change is applicable for firmware V4.04 or later.<br>- Using the GHS Multi debugger, use the 850eserv V12.0 or later<br>- Using the IAR debugger, use the IAR workbench V3.40 or later<br><br>*Workaround*<br>No workaround available |

**Table B-20 Reserved area changed for CSI**

| |
|---|
| *Target Device*<br>V850ES/IE2<br><br>*Details*<br>The reception error interrupt can now be used with Minicube2 when connected to the target system via CSI interface. The change has been implemented for the purpose of preventing debugger hang-up when a reception error occurs.<br>This specification change is applicable for firmware V4.04 or later.<br>- Using the GHS Multi debugger, use the 850eserv V12.0 or later<br>- Using the IAR debugger, use the IAR workbench V3.40 or later<br><br>When using the latest V850eserv and IAR version, it does not start with the firmware V4.03 or earlier. Also be sure to upgrade the firmware to V4.04 or later, if the V850eserv and IAR version 3.40 is used and Minicube2 is connected to the target system with UART.<br><br>*Workaround*<br>No workaround available |

**Table B-21 Operation at low voltage**

| |
|---|
| *Target Device*<br>V850ES/JX3-L<br><br>*Details*<br>When the operation voltage of less 2.7V, communication between Minicube2 and the target device cannot be performed correctly, and a malfunction occurs. Be sure to perform debugging at a voltage of at least 2,7V.<br><br>*Workaround*<br>No workaround available |

**Table B-22 Specification on RRM and DDM functions**

| |
|---|
| *Target Device*<br>78K0R<br><br>*Details*<br>The following specifications <1> to <3> have been added. These specifications are added to firmware V4.05 and later.<br><br><1> The pseudo RRM function is now supported in 1-wire mode (supported only in 2-wire mode in older version)<br><2> The entire memory space can now be monitored when using the pseudo RRM function. If the targets to be monitored are too numerous, the operability of the debugger may be affected because the monitoring speed is slow when using the pseudo RRM function in 1-wire mode. Therefore monitoring the by Watch window, rather than the memory window, is recommended.<br><3> The direct memory modification (DDM) function is now supported. Along with this support, the contents in the RAM can now be changed during program execution. When changing the memory contents by using the DDM function, program execution is stopped. This means, that the memory contents are not changed in real time. |

**Table B-23 Devices with TOOLCx and TOOLDx pins**

| |
|---|
| *Target Device*<br>78K0<br><br>*Details*<br>On-chip debugging and flash programming of devices that have the TOOLCx and TOOLDx pins can now be executed. This specification is added in firmware V4.07 and later. If you are using the NEC Electronics debugger ID78K0-QB, please switch to ID78K0-QB V3.10 or later.<br><br>*Workaround*<br>When the ID78K0-QB is upgraded to V3.10, be sure to upgrade the firmware of the MINICUBE2 to V4.07 or later. |

**Table B-24 Addition of specification for support of MINICUBE2 wireless unit (QB-MINI2-RF)**

| |
|---|
| *Details*<br>The wireless extension unit QB-MINI2-RF for MINICUBE2 is now supported. This specification is added to firmware V5.00 or later.<br><br>*Caution*<br>This unit can be used for all 78K0S, 78K0, 78K0R, and V850 microcontrollers, but whether a microcontroller is supported varies depending on the version of the debugger used. |

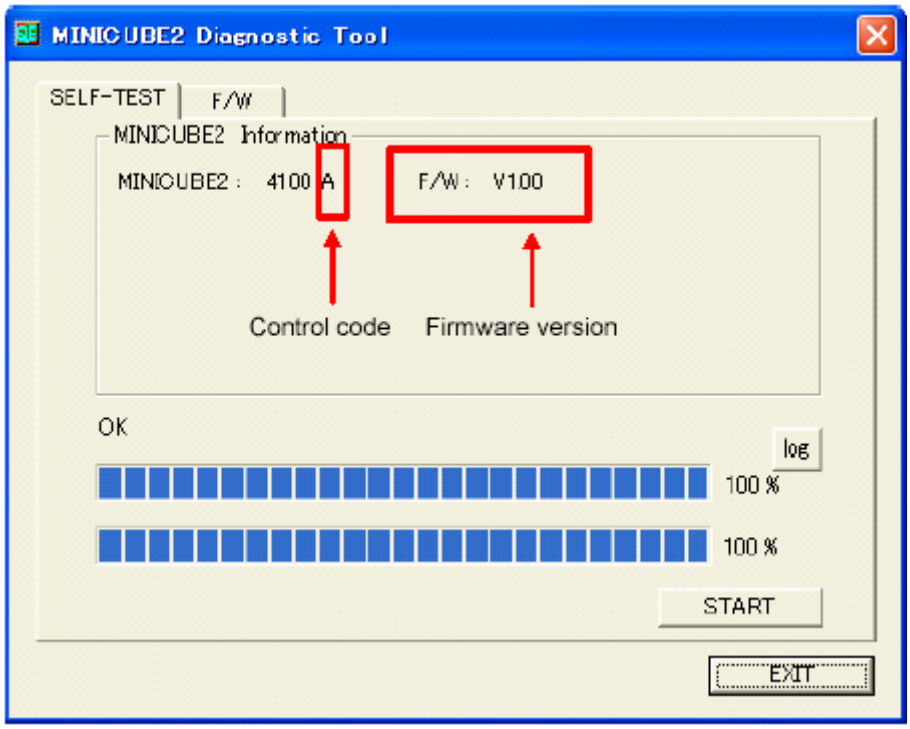
## C) Product Version

The **“Control Code”** is an alphabetic code used to identify the hardware of QB-MINI2-EE. It is the second digit from the left in the 10-digit serial number printed on the sticker attached to the bottom side of QB-MINI2-EE (if it has not been upgraded).

The **“Firmware”** (F/W) is a program embedded in the controller device of the QB-MINI2-EE. The F/W version is shown as Vx.xx.

The control code and firmware version can be checked with the QB-MINI2-EE diagnostic tool:

Figure 1



# D) Supported Devices

The devices that are supported by QB-MINI2 are listed in the following tables.

## a) 78K0 microcontrollers

The following table lists the support status for 78K0 microcontrollers. Support for the target device also differs depending on the version of the development tools.

**Table D-1 Table of supported 78K0 devices**

| Supported Devices | On-chip Debugging | | | | | | Flash Memory Programming | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Firmware Version | ID78K0-QB Version | Device File Package | | Debug Monitor Area Size | | Firmware Version | QBP Version | Parameter File Package | |
| | | | | Version | w/o RRM | w RRM | | | | Version |
| 78K0/Lx2 | ≥V1.00 | ≥V2.94 | DF780397 | ≥V1.03 | 256 bytes | 256 bytes | ≥V1.00 | ≥V1.00 | PRM78F0397 | ≥V1.02 |
| 78K0/Kx2 | ≥V1.00 | ≥V2.94 | DF780547 | ≥V2.21 | 256 bytes | 256 bytes | ≥V1.00 | ≥V1.00 | PRM78F0547 | ≥V1.07 |
| 78K0/Kx2-L | ≥V4.07 | ≥V3.10 | DF780588 | ≥V2.00 | 256 bytes | 384 bytes | ≥V4.07 | ≥V2.24 | PRM78F0588 | ≥V1.01 |
| 78K0/Ix2 | ≥V4.07 | ≥V3.10 | DF780756 | ≥V1.00 | 256 bytes | 384 bytes | ≥V4.07 | ≥V2.24 | PRM78F0756 | ≥V1.00 |
| 78K0/Kx1+ | ≥V4.01 | ≥V2.94 | DF78F0148H | ≥V3.00 | 256 bytes | 256 bytes | ≥V1.00 | ≥V1.00 | PRM78F0148 | ≥V1.12 |
| UPD78(F)0822B | Not supported | | | | | | ≥V1.00 | ≥V1.00 | PRM78F0822 | ≥V1.00 |
| 78K0/Fx2 | ≥V4.01 | ≥V2.94 | DF78F0893 | ≥V1.01 | 384 bytes | 512 bytes | ≥V1.00 | ≥V1.00 | PRM78F0893 | ≥V1.04 |
| 78K0/Fx1+ | ≥V4.01 | ≥V2.94 | DF78F0876 | ≥V1.10 | 256 bytes | 384 bytes | ≥V1.00 | ≥V1.00 | PRM78F0876 | ≥V1.11 |
| UPD78F0822B | Not supported | | | | | | ≥V1.00 | ≥V1.00 | PRM78F0822 | ≥V1.00 |
| UPD78F0711<br>UPD78F0712<br>UPD78F0714 | ≥V4.01 | ≥V2.94 | DF78F0714 | ≥V1.10 | 256 bytes | 384 bytes | ≥V1.00 | ≥V1.00 | PRM78F0714 | ≥V1.12 |
| UPD78F0730 | ≥V4.01 | ≥V2.94 | DF780731 | ≥V1.20 | 256 bytes | 256 bytes | ≥V1.00 | ≥V1.00 | PRM78F0731 | ≥V1.03 |
| UPD78F0862x | Not supported | | | | | | ≥V1.00 | ≥V1.00 | PRM78F0862 | ≥V1.11 |
| UPD179F11x<br>UPD179F12x | ≥V4.04 | ≥V2.94 | DF179124 | ≥V1.00 | 256 bytes | 256 bytes | ≥V4.03 | ≥V2.22 | PRM179F124 | ≥V1.00 |
| 78K0/Lx3 | ≥V4.01 | ≥V2.94 | DF780495 | ≥V1.00 | 256 bytes | 256 bytes | ≥V4.03 | ≥V2.21 | PRM78F0495 | ≥V1.01 |
| 78K/Kxx with LIN | Not supported | | | | | | ≥V1.00 | ≥V1.00 | PRM78F8006H | ≥V1.00 |
| | | | | | | | ≥V1.00 | ≥V1.00 | PRM78F8016 | ≥V1.01 |
| | | | | | | | ≥V1.00 | ≥V1.00 | PRM78F8020 | ≥V1.01 |
| UPD78F8024<br>UPD78F8025 | Not supported | | | | | | ≥V1.00 | ≥V1.00 | PRM78F8025 | ≥V1.00 |

### b) 78K0S microcontrollers

The following table lists the support status for 78K0S microcontrollers. Support for the target device also differs depending on the version of the development tools. Check the external interrupt pins that can be used as a communication interface between Minicube2 and the target device.

**Table D-2 Table of supported 78K0S devices**

| Supported Devices | On-chip Debugging | | | | | Flash Memory Programming | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Supported Serial Interface | Firmware Version | ID78K0-QB Version | Device File Package | Version | Firmware Version | QBP Version | Parameter File Package | Version |
| 78K0S/KU1+ | INTP1 | ≥V4.01 | ≥V2.90 | DF789234 | ≥V3.20 | ≥V3.00 | ≥V1.00 | PRM78F9234 | ≥V1.08 |
| 78K0S/KY1+ | | | | | | | | | |
| 78K0S/KA1+ | INTP3 | | | | | | | | |
| 78K0S/KB1+ | | | | | | | | | |
| UPD78F9334 | Not supported | | | | | ≥V3.00 | ≥V1.00 | PRM78F9334 | ≥V1.00 |

### c) 78K0R microcontrollers

The following table lists the support status for 78K0R microcontrollers. Support for the target device also differs depending on the version of the development tools.

**Table D-3 Table of supported 78K0R devices**

| Supported Devices | On-chip Debugging | | | | Flash Memory Programming | | | |
|---|---|---|---|---|---|---|---|---|
| | Firmware Version | ID78K0-QB Version | Device File Package | Version | Firmware Version | QBP Version | Parameter File Package | Version |
| 78K0R/Kx3 | ≥V4.03 | ≥V3.30 | DF781188 | ≥V3.00 | ≥V4.00 | ≥V2.00 | PRM-78F1188 | ≥V1.01 |
| 78K0R/KC3-L<br>78K0R/KD3-L<br>78K0R/KE3-L | ≥V4.05 | ≥V3.50 | DF781014 | ≥V2.00 | ≥V4.03 | ≥V2.24 | PRM78F1014 | ≥V1.01 |
| 78K0R/KF3-L<br>78K0R/KG3-L | ≥V5.00 | ≥V3.60 | DF781014 | ≥V2.00 | ≥V4.03 | ≥V2.24 | PRM78F1014 | ≥V1.01 |
| 78K0R/Ix3 | ≥V5.00 | ≥V3.60 | DF781235 | ≥V2.00 | ≥V4.03 | ≥V2.24 | PRM78F1235 | ≥V1.00 |
| 78K0R/Lx3 | ≥V5.00 | ≥V3.60 | DF781508 | ≥V1.00 | ≥V4.03 | ≥V2.24 | PRM78F1508 | ≥V1.00 |
| 78K0R/Fx3 | ≥V5.00 | ≥V3.60 | DF781845 | ≥V1.00 | ≥V4.03 | ≥V2.24 | PRM78F1845 | ≥V1.00 |
| 78K0R/Kx3-C | ≥V5.00 | ≥V3.60 | DF781849 | ≥V1.00 | ≥V4.03 | ≥V2.24 | PRM78F1849 | ≥V1.00 |

### d) V850 microcontrollers

The following table lists the support status for V850 microcontrollers. Support for the target device also differs depending on the version of the development tools. Check the serial interface that can be used as a communication interface between Mini2 and the target device.

### Table D-4 Table of supported V850 devices

| Supported Devices | On-chip Debugging | | | | | Flash Memory Programming | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Supported Interfaces | Firmware Version* | GHS eserv / IAR* | Device File Package | | Firmware Version * | QBP Version* | Parameter File Package | |
| | | | | | Version* | | | | Version* |
| V850ES/Hx2 | UART0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703712 | V1.10 | V2.00 | V1.00 | PRM70F3712 | V1.00 |
| V850ES/Hx3 | UART0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703757 | V1.01 | V4.04 | V2.21 | PRM70F3757 | V1.00 |
| V850ES/IE2 | UART0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703714 | V1.00 | V2.00 | V1.00 | PRM70F3714 | V1.00 |
| V850ES/Jx2 | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703724 | V1.00 | V2.00 | V1.00 | PRM70F3724 | V1.00 |
| V850ES/Jx3 | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703746 | V1.00 | V2.00 | V1.00 | PRM70F3746 | V1.02 |
| V850ES/Jx3-L | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703738 | V1.10 | V2.00 | V1.00 | PRM70F3738 | V1.00 |
| V850ES/Jx3-H | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703771 | V1.00 | V2.00 | V1.00 | PRM70F3771 | V1.00 |
| V850ES/Jx3-U | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703771 | V1.00 | V2.00 | V1.00 | PRM70F3771 | V1.00 |
| V850ES/Jx3-E | UART0 CSIF0/CSIF3 | V5.00 | Vx.245/ V3.60 | DF703786 | V1.00 | Not supported | | | |
| V850ES/Kx2 | UART0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703734 | V1.00 | V2.00 | V1.00 | PRM70F3734 | V1.01 |
| V850ES/Kx1 | Not supported | | | | | not supported | | | |
| V850ES/Kx1H | UART0 CSIB0 | V4.04 | Vx.245/ V3.40 | DF703218 | V2.01 | V2.00 | V1.00 | PRM70F3218H | V1.11 |
| V850ES/Kx1+ | UART0 CSIB0 | V4.04 | Vx.245/ V3.40 | DF703318 | V1.01 | V2.00 | V1.00 | PRM70F3318 | V1.11 |
| V850ES/Fx2 | UARTA0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703239 | V2.13 | V2.00 | V1.00 | PRM70F3239 | V1.12 |
| V850ES/Fx3 | UARTD0/ CSIB0[Note1] | V4.04 | Vx.245/ V3.40 | DF703385 | V1.20 | V4.00 | V2.00 | PRM70F3385 | V1.02 |
| V850ES/Fx3-L | UARTD0/ CSIB0[Note1] | V4.04 | Vx.245/ V3.40 | DF703622 | V1.00 | V4.00 | V2.00 | PRM70F3622 | V1.00 |
| V850ES/Sx2 | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703288 | V2.11 | V2.00 | V1.00 | PRM70F3288 | V1.11 |
| V850ES/Sx3 | UART0 CSIB0/CSIB3 | V4.04 | Vx.245/ V3.40 | DF703368 | V1.01 | V2.00 | V1.00 | PRM70F3368 | V1.02 |
| V850ES/SJ3-H V850ES/SK3-H | UART0 CSIB0/CSIB3 | V5.00 | Vx.245/ V3.60 | DF703482 | V1.00 | V4.03 | V2.24 | PRM70F3482 | V1.00 |
| V850E/IA3 V850E/IA4 | UARTA0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703186 | V3.00 | V2.00 | V1.00 | PRM70F3184 PRM70F3186 | V2.10 |
| V850E/IF3 V850E/IG3 | UARTA0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703454 | V1.00 | V4.03 | V2.21 | PRM70F3454 | V1.02 |
| V850ES/IK1 | UARTA0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703329 | V2.00 | V2.00 | V1.00 | PRM70F3329 | V1.20 |
| V850ES/Dx2 | Not supported | | | | | V2.00 | V1.00 | PRM70F3325 | V1.10 |
| V850ES/DG3 V850ES/DJ3 | UARTA0/CSIB0 | V5.00 | Vx.245/ V3.60 | DF703426 | E2.00a | V2.01 | V2.21 | PRM70F3427 | V1.00 |
| V850E/MA3 | UARTA0/CSIB0 | V4.04 | Vx.245/ V3.40 | DF703134 | V2.00 | V2.00 | V1.00 | PRM70F3134 | V1.21 |
| V850E/SV2 | Not supported | | | | | V2.00 | V1.00 | PRM70F3166 | V1.10 |
| V850E/PG2 | Not supported | | | | | V2.00 | V1.00 | PRM70F3414 | V1.00 |
| V850E/PHO3 | Not supported | | | | | V4.03 | V2.21 | PRM70F3441 | V1.00 |

[Note1] When using UARTD0, $f_{RH}$ cannot be used as the CPU clock

* or higher version

## E) Valid Specification

| Item | Date published | Document No. | Document Title |
|---|---|---|---|
| 1 | June 2006 or later | U17966E | QB-MINI2-EE Setup Manual |
| 2 | March 2008 or later | U18371E | QB-MINI2-EE User's Manual |
| | | | |
| | | | |

## F) Revision History

| Item | Date published | Document No. | Comment |
|---|---|---|---|
| 1 | June 2006 | TPS-LE-OP-TMINI2-1 | Release |
| 2 | August 2006 | TPS-LE-OP-TMINI2-2 | 1st Update: 78K0S restrictions added |
| 3 | October 2006 | TPS-LE-OP-TMINI2-3 | 2nd Update: 78K0R restrictions added |
| 4 | October 2006 | TPS-LE-OP-TMINI2-4 | 3rd Update: Revision of items 11, 12 and 13 |
| 5 | March 2007 | U18674EE1V0IF00 | 4th Update:<br>New Doc.-No.<br>This document is a replacement of document TPS-LE-OP-TMINI2-4<br>Items 14 to 18 added<br>Tables in Chapter (D) Supported Devices revised |
| 6 | April 2007 | U18674EE2V0IF00 | Items 19 and 20 added<br>Tables in Chapter (D) supported devices revised |
| 7 | July 2008 | U18674EE3V0IF00 | Items 21 and 22 added<br>Tables in Chapter (D) supported devices revised |
| 8 | May 2009 | U18674EE4V0IF00 | Item 23 added<br>Tables in Chapter (D) supported devices revised |
| 9 | February 2010 | U18674EE5V0IF00 | Item 24 added<br>Tables in Chapter (D) supported devices revised |
| 10 | October 2010 | U18674EE6V0IF00 | Table of supported V850 devices updated |
| 11 | Mai 2011 | R01TU0019ED0100 | Update of document number |

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