To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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

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78K0S/KA1+
Flash Programming Manual (Basic)
MINICUBE2 version

STEP 1 Check the Programming Environment

- ❑ **78K0S/KA1+ microcontroller with on-chip flash memory (µPD78F922x)**
- ❑ **Programming code (Intel or Motorola hexadecimal format)**
- ❑ **QB-Programmer**
- ❑ **Parameter file (78F922x.PRM (included in PRM78F9234))**
- ❑ **PC (Windows 98/Me/2000/XP, compliant with USB V1.1 or V2.0)**
- ❑ **USB driver**

Off-board programming: Programming environment using adapter board plugged into socket

On-board programming: Programming environment on user board

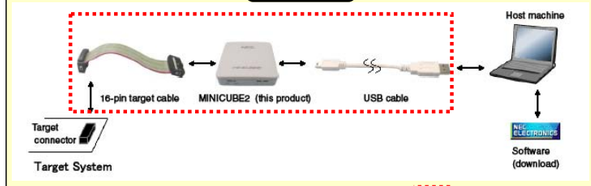
* For off-board programming, be sure to use an FA adapter (manufactured by NAITO DENSEI MACHIDA MFG. CO., LTD.).

If software has not been installed,

Go to STEP 2 .

If software is installed and hardware is ready,

Go to STEP 4 .



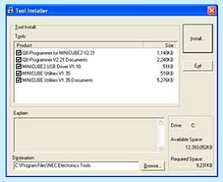
MINICUBE2 system configuration **MINICUBE2 package**

(Mountain fold)

STEP 2 MINICUBE2 Setup 1

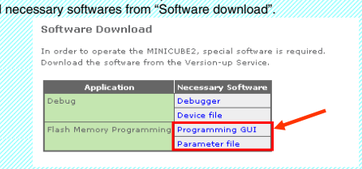
<1> Set up the MINICUBE2 software

To install QB-Programmer (GUI), execute "qpb_v221_e.exe" downloaded from following NEC Electronics Microcontrollers and Microprocessors Websites.

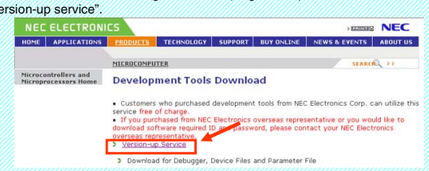


NEC Electronics Microcontrollers and Microprocessors Website

- **MINICUBE2**
  http://www.necel.com/micro/en/development/asia/minicube2/minicube2.html (English site)
  Download necessary softwares from "Software download".



- **Development Tools Download**
  http://www.necel.com/micro/ods/eng/index.html (English site)
  Click "Version-up service".

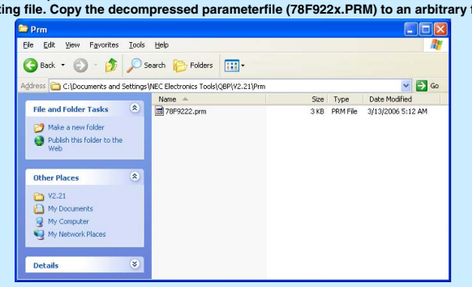


(Valley fold)

STEP 2 MINICUBE2 Setup 2

<2> Set up the parameter file

Download the parameter file from either websites as shown <1>. Run the downloaded self-extracting file. Copy the decompressed parameterfile (78F922x.PRM) to an arbitrary folder.



<3> Connect your PC

Connect your PC to the MINICUBE2 via a USB interface.

The USB driver is loaded by the Plug & Play operation.

*** Select the "Install the software automatically [recommended]" wizard.**

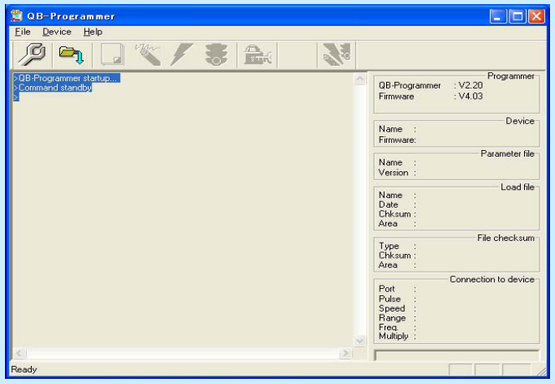
(Valley fold)

STEP 2 MINICUBE2 Setup 3

<4> Confirm startup of MINICUBE2

After a normal startup according to the settings in step <3>, the following window is opened.

MINICUBE2 normal startup screen



If a normal startup is confirmed, the software setup is finished.

Select [File] → [Quit] to terminate the software, then disconnect the USB cable from the MINICUBE2.

If a normal startup isn't confirmed,

see the **Troubleshooting** section.

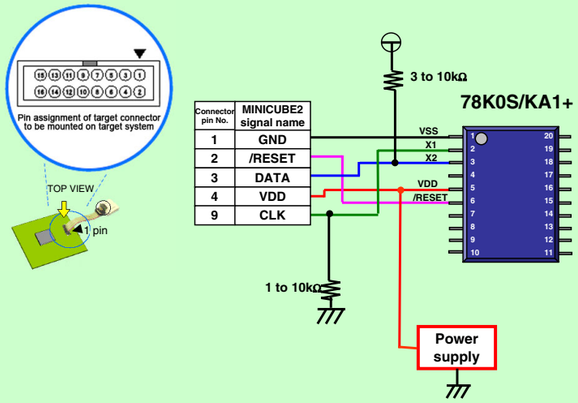
Go to STEP 3

(Mountain fold)

STEP 3 On-board Programming (via UART Communication)

Be sure to note the following caution points regarding board design for on-board programming.

- ☐ With the MINICUBE2, perform the pin connection on the target board as below figure.
- ☐ Even when VDD is being supplied from the target board, the VDD pin should be connected to the MINICUBE2.
- ☐ If the signals used during on-board programming are also used during device communication in normal mode, be sure to check whether any circuits need to be isolated.



Remarks 1. The clock must be supplied from MINICUBE2 (8MHz).
If the oscillator is connected to the target board, disconnect it for now before writing.

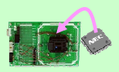
2. In case of on-board programming, set the power select switch to "T".
(Power supply of the target system is used.)
When VDD is supplied from the MINICUBE2, do not exceed the maximum supply current of 100 mA.

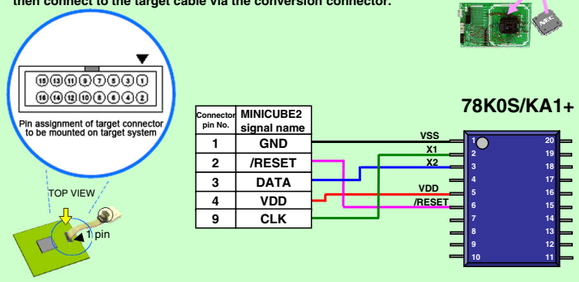
Go to STEP 4

(Mountain fold)

STEP 3 Off-board Programming (via UART Communication)

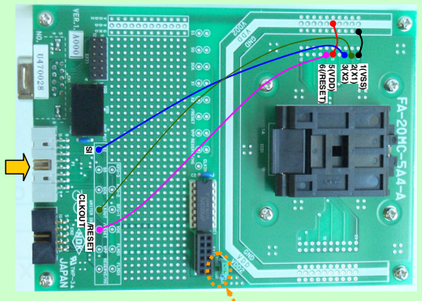
Wire as follows for off-board programming, then connect to the target cable via the conversion connector.





Remark The clock must be supplied from the MINICUBE2 (8MHz).
The power can be supplied from it, too. In this case, set Power select switch to "3" or "5".
For details, refer to **STEP 4** .

Wiring when using FA-20MC-5A4-A



Set J1 switch to VDD side

[Remark]

When using FA-78F9222 MC-5A4-RX, it have been wired already. So it is not necessary to wire.

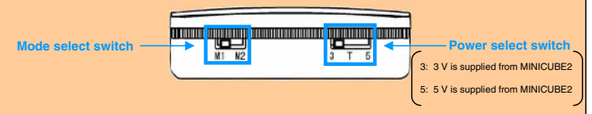
Go to STEP 4

(Mountain fold)

STEP 4 Hardware connection (power supply from MINICUBE2)

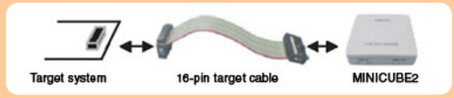
<1> Set the Mode select switch to "M1".

<2> In case of power supply from the MINICUBE2, set the Power select switch to "3" or "5".

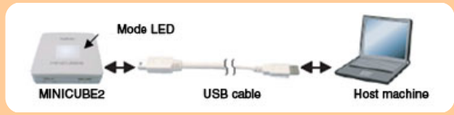


Caution Do not change the switch settings while the USB cable is connected.

<3> Confirm that the target system is not turned on, and then connect the MINICUBE2 to the target system via a target cable.



<4> Connect the MINICUBE2 with the host machine, via a USB cable.
(The mode LED glows white after connection.)



The power is always supplied after the MINICUBE2 is connected to the host machine.

Caution Be sure to connect according to steps <1> to <4>, in that order. Otherwise, the MINICUBE2 or the target system may be damaged.

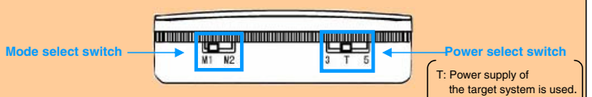
Go to STEP 5

(Valley fold)

STEP 4 Hardware connection (power supply on a target system)

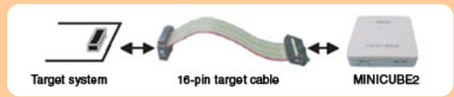
<1> Set the mode select switch to "M1".

<2> In case of power supply from the MINICUBE2, set the Power select switch to "T".

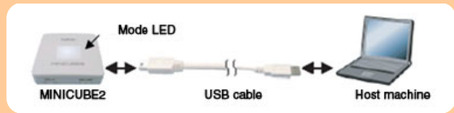


Caution Do not change the switch setting while the USB cable is connected.

<3> Confirm that the target system is not turned on, and then connect the MINICUBE2 to the target system via a target cable.



<4> Connect the MINICUBE2 with the host machine, via a USB cable.
(The mode LED flashes white after connection.)



<5> Turn on power to the target system.
(The mode LED glows white after connection.)

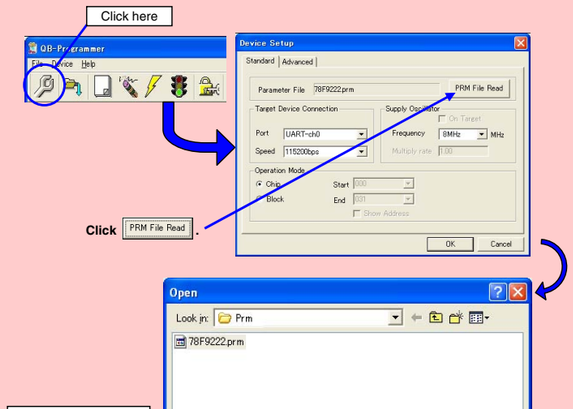
Caution Be sure to connect according to steps <1> to <5>, in that order. Otherwise, the MINICUBE2 or the target system may be damaged.

Go to STEP 5

STEP 5 Software setting 1

<1> Startup MINICUBE2 software "QB-Programmer" (GUI).

<2> Click the icon (or select [Device] → [Setup] menu), then select a parameter file.

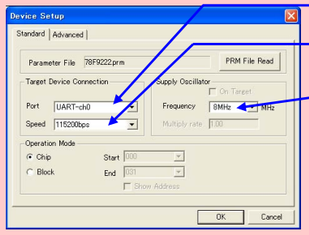


STEP 5 Software setting 2

<3> Check the communication conditions and command options to be used.

Click the Standard and Advance tabs to confirm these setting.

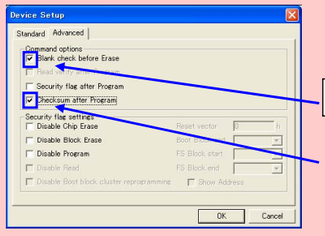
< Standard menu >



Set the communication conditions as shown below.

Communication port: UART-ch0 (single-wire UART)
Maximum communication rate: 115200bps
Supplied clock: 8 MHz

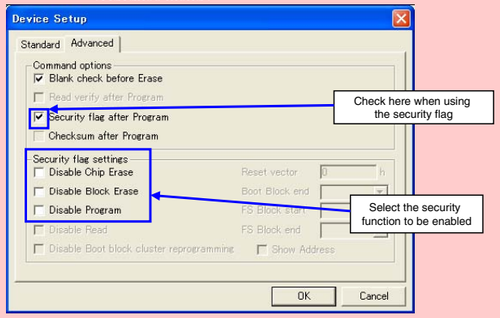
< Advance menu >



STEP 5 Software setting 3

<4> Specify the following security flag settings when using the security flag.

< Advance menu >



☐ Description of security flag

Disable Chip Erase: This disables deletion of the entire flash memory area.
Disable Block Erase: This disables deletion of blocks in the flash memory area.
Disable Program: This disables the flash memory write operation as well as deletion of blocks in the flash memory area.

The relationship between the security flag enable/disable settings and the corresponding commands is shown below.

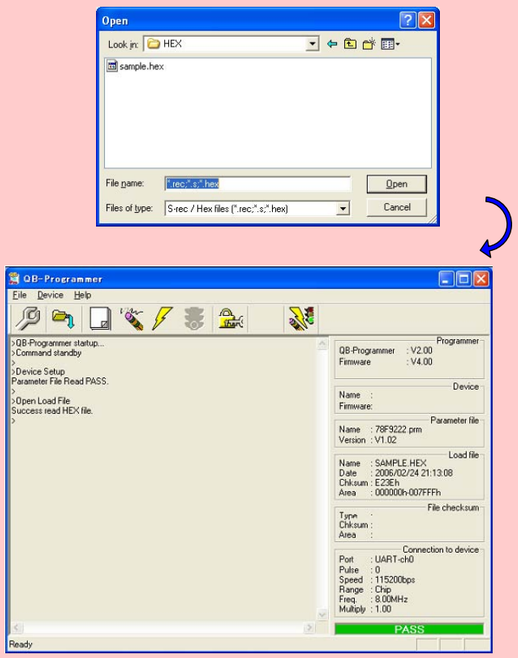
	Chip Erase Command	Block Erase Command	Program Command
Disable Chip Erase	Disable	Disable	Enable Note
Disable Block Erase	Enable	Disable	Enable
Disable Program	Enable	Disable	Disable

Note Since the Erase command is disabled, previously written data cannot be overwritten.

Remark [Disable Chip Erase] security function can not be cleard.
[Disable Program] or [Disable Block Erase] security function can be cleared if the Chip Erase command is executed.

STEP 5 Software setting 4

<5> Click the icon, then select a writing code (HEX file) to download to the MINICUBE2.



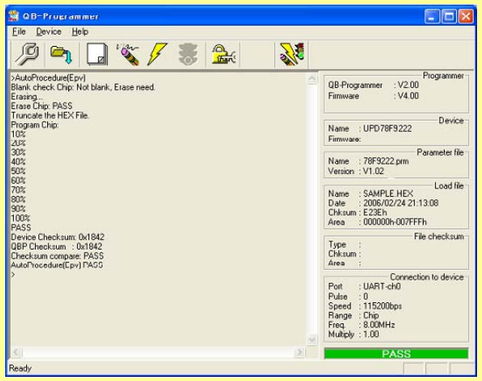
Go to STEP 6

STEP 6 Ready for Programming!

<6> Click the icon to run Autoprocedure (EPV).

If "Blank check before Erase" is checked during <3> in STEP5, the writing will be executed after automatic blank check.

The mode LED on the MINICUBE2 flashes yellow during execution. When the command execution is completed normally, the mode LED glows green and the following window appears.



Programming is completed!

If an error occurs, communication with the target device may have failed.

See **Troubleshooting** .

☐ Trouble During Operation

● Communication with the target device is not possible.

Cause 1: The driver may not be correctly installed.

Action 1: Check the following in the Device Manager of the "System Properties" window.
- "NEC Electronics IE-PC Interface [MINICUBE2 USB]" is displayed.
- Alternatively, the "!" or "x" is not prefixed.

If not, see the ☐ Trouble During Setup.

Cause 2: There may be an incorrect connection between the target cable and target system.

Action 2: Check if the connections are correct.
- DATA pin of the MINICUBE2 → X2 pin of the target device.
- CLK pin of the MINICUBE2 → X1 pin of the target device.

Cause 3: The power may not be correctly supplied to the target device.

Action 3: Check that the power is supplied in the target system.
If the power is supplied from the MINICUBE2, check if the setting of the Mode select switch and Power select switch are correct.

Cause 4: The PRM file selected in the "Device Setup" window may be incorrect.

Action 4: Download the latest PRM file (78F922x.prm) from the following site.
Next, select it by clicking on PRM File Read in the "Device Setup" window.

NEC Electronics Microcontrollers and Microprocessors Website
- MINICUBE2
  http://www.necel.com/micro/en/development/asia/minicube2/minicube2.html
- "Development Tools Download" Version-up service
  http://www.necel.com/micro/ods/eng/index.html

Cause 5: A security setting may have been made for the programming device.

Action 5: A security setting may have been made for the programming device.
For details, refer to ☐ Description of security flag in STEP5.

Cause 6: The power supply capacity of the USB port of the PC may be low (when the Power select switch is set to "3" or "5").

Action 6: If the power select switch is set to "3" or "5", the power supply is 100 mA max., so a power shortage may occur. In such a case, set the power select switch to "T" and then supply power from the target system.

If problems are not solved by any of the above, the flash memory unit itself or the MINICUBE2 may be damaged.

Troubleshooting

☐ Trouble During Setup

● When the MINICUBE2 is connected to the host machine via a USB interface, the driver is not recognized by Plug and Play.

Cause: The USB connector may not be inserted properly into the USB port of the host machine.

Action: Check that the USB connector is fully inserted into the USB port of the PC.
Alternatively, disconnect the USB connector, then insert the USB connector again later.

● The USB driver file cannot be found at a specified location.

Cause: The USB driver may not have been installed normally.

Action: Refer to CHAPTER 2 SOFTWARE INSTALLATION in QB-Programmer Operation User's Manual (U18527E) and reinstall the USB driver.
If the file is requested by Plug and Play, specify the following path for the USB driver.

C:\Program Files\NEC Electronics Tools\MQB2ALL

● The MINICUBE2 is connected to the host machine but the Power LED on the MINICUBE2 is not turned on.

Cause: The USB port of the MINICUBE2 or the host machine may have a defect.

Action: Check a defect of the MINICUBE2 using the MINICUBE2 diagnostic tool. If a defect is found, consider repair. If there is no defect, try connecting the MINICUBE2 to another machine.

● The "Add New Hardware Wizard" screen is displayed when the MINICUBE2 is connected to a PC.

Cause: If the USB connector of the MINICUBE2 is not inserted into the USB port during installation but into another USB port, the MINICUBE2 may be recognized as a new hardware item.

Action: Select "Install the software automatically [recommended]" and install the USB driver.

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