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Development Tools | http://www.renesas.com/tools
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User's Manual

MINICUBE2 Diagnostic Tool

MINICUBE® Utility

Target Devlopment Tool
QB-MINI2

Document No. U18588EJ2V0UM00 (2nd edition)
Date Published October 2008 NS

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INTRODUCTION

Target Readers

This manual is intended for users who use the MINICUBE2 diagnostic tool when designing and developing a system using an NEC Electronics on-chip flash memory microcontroller.

Purpose

This manual is intended to give users an understanding of the basic specifications and correct use of the MINICUBE2 diagnostic tool.

Organization

This manual includes the following sections.

- Overview
- Installation and startup
- Self-testing function
- Firmware download function
- Version indication
- Uninstallation

How to Read This Manual

It is assumed that the readers of this manual have general knowledge of electricity, logic circuits, and microcontrollers. In the explanations of the operation of the applications, it is also assumed that the readers have sufficient knowledge of Windows™. For the usage and terminology of Windows 98, Windows Me, Windows 2000, and Windows XP, refer to each Windows manual.

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

To understand the overall operation of the MINICUBE2 diagnostic tool
→ Read this manual according to the **CONTENTS**.

Conventions

Note:	Footnote for item marked with **Note** in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Binary ... xxxx or xxxxB
	Decimal ... xxxx
	Hexadecimal ... xxxxH
“ ”:	Indicates an arbitrary message or item on the screen.
[ ]:	indicates the name of a button, command, dailog box, or area.

Terminology

The meanings of the terms used in this manual are as follows.

Term	Meaning
MINICUBE2	Indicates QB-MINI2, an on-chip debug emulator with programming function
Debugger	Indicates NEC Electronics integrated debugger ID850QB, ID78K0-QB, ID78K0S-QB or ID78K0R-QB.
QBP	Indicates the QB-Programmer, GUI software used for flash programming.

Related Documents

Please use the following documents in combination with this manual.
The related documents listed below may include preliminary versions. However, preliminary versions are not marked as such.

○ Documents Related to Development Tools (User's Manuals)

Document Name	Document Number
MINICUBE2 Diagnostic Tool	This manual
QB-MINI2 On-Chip Debug Emulator with Programming Function	U18371E
ID850QB Ver. 3.40 Integrated Debugger Operation	U18604E
ID78K0-QB Ver. 2.90 Integrated Debugger Operation	U17272E
ID78K0S-QB Ver. 2.90 Integrated Debugger Operation	U18247E
ID78K0R-QB Ver. 3.20 Integrated Debugger Operation	U17839E
QB-Programmer Programming GUI Operation	U18527E
MINICUBE OCD Checker	U18591E

Caution The related documents listed above are subject to change without notice. Be sure to use the latest version of each document for designing, etc.

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CHAPTER 1 OVERVIEW

1.1 MINICUBE2 Diagnostic Tool

The MINICUBE2 diagnostic tool is software used to perform self-testing of the QB-MINI2, an on-chip debug emulator with programming function (MINICUBE2), and update MINICUBE2 firmware.

Use the MINICUBE2 diagnostic tool mainly for MINICUBE2 self-testing. Note that MINICUBE2 may not operate normally if the firmware download function is used during ordinary operation.

1.1.1 Self-testing function

The MINICUBE2 diagnostic tool tests the following items for abnormality in MINICUBE2.

- F/W version indication
- Voltage supplied via USB
- Internal V_{DD}
- LED
- Power select switch
- Mode select switch
- Connection status of 78K0-OCD board
- Oscillator (only when 78K0-OCD board is connected)
- I/O ports

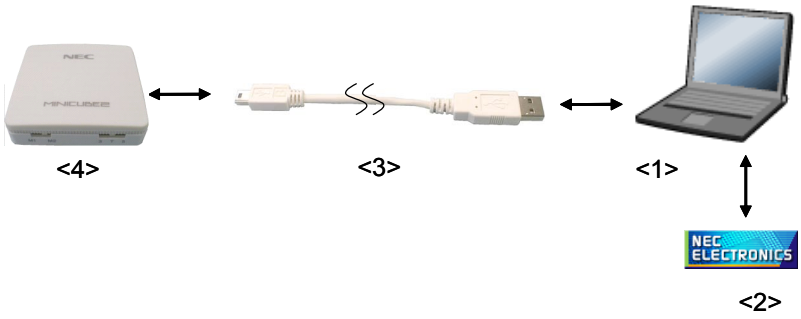
1.1.2 Firmware download function

This function is used to update the firmware program (MINICUBE2 firmware) embedded into the on-chip flash memory of the control CPU in MINICUBE2.

Caution Do not use this function for any purpose other than updating firmware; otherwise, MINICUBE2 may be damaged.

1.2 System Configuration

The following figure illustrates the system configuration that includes MINICUBE2, for using the MINICUBE2 diagnostic tool.



<1> Host machine
Products with USB ports, which are compatible with the debugger and QBP

<2> Software
Includes the MINICUBE2 diagnostic tool, MINICUBE OCD Checker, debugger, and QBP.

<3> USB cable (accessory of MINICUBE2)

<4> MINICUBE2 (connection of the 78K0-OCD board can be checked by self-testing)

CHAPTER 2 INSTALLATION AND STARTUP

This section explains how to install and start the MINICUBE2 diagnostic tool. Note that the procedure differs depending on the development tool used (Refer to **2.1 When NEC Electronics Tool Is Used** and **2.2 When Tools Manufactured by Partner Companies (GHS and IAR) are Used**).

2.1 When NEC Electronics Tool Is Used

2.1.1 Installation

<R>
- Select the “Emulator Utilities” check box when installing CubeSuite V1.00 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

- Select the “MINICUBE Utilities Vx.xx” check box when installing ID850QB V3.20 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

- Select the “MINICUBE Utilities Vx.xx” check box when installing ID78K0-QB V2.93 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

- Select the “MINICUBE Utilities Vx.xx” check box when installing ID78K0S-QB V2.82 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

- Select the “MINICUBE Utilities Vx.xx” check box when installing ID78K0R-QB V3.20 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

- Select the “MINICUBE Utilities Vx.xx” check box when installing QB-Programmer V1.00 or later; the MINICUBE2 diagnostic tool will then be installed automatically.

Caution If multiple debuggers are installed, “MINICUBE Utilities Vx.xx MINICUBE2 Diagnostic Tool” in the [Latest Version] folder is overwritten.

Remark The MINICUBE OCD Checker is installed when the MINICUBE2 diagnostic tool is installed.

<R> **2.1.2 Startup**

Start the MINICUBE2 diagnostic tool using either of the following procedure.

- When using CubeSuite
  Click the Start menu of Windows, point to “Programs”, “NEC Electronics CubeSuite”, “Emulator Utilities”, “<Target Device>and then click “MINICUBE2 Diagnostic Tool”.

- When using the ID850QB, ID78K0-QB, ID78K0S-QB, ID78K0R-QB, or QB-Programmer
  Click the Start menu of Windows, point to “Programs”, “NEC Electronics Tools”, “Latest Version”, and then click “MINICUBE Utilities Vx.xx MINICUBE2 Diagnostic Tool”.

Caution If the debugger, QBP, or MINICUBE OCD Checker is running, terminate it before starting the MINICUBE2 diagnostic tool.

2.2 When Tools Manufactured by Partner Companies (GHS and IAR) are Used

2.2.1 Installation

- Download MINICUBE Utilites (*MINICUBE_Utilities_Vxxx.lzh*) from one of the following websites.

  http://www.necel.com/micro/ghs/jpn/exec/execindex.html (Japanese version)
  http://www.necel.com/micro/ghs/eng/exec/ (English version)

<1> Download *MINICUBE_Utilities_Vxxx*.lzh into an arbitrary folder from the website.
<2> Execute *MINICUBE_Utilities_Vxxx*.lzh in the arbitrary folder.
<3> The following folders and files will be created in the arbitrary folder.

```
MINICUBE_Utilities_Vxxx ─┬─ MINICUBE_Utilities_Vxxx
                         ├─ MINICUBE_Utilities_Document_Vxxx
                         ├─ readme_j.txt
                         └─ readme_e.txt
```

<4> Install MINICUBE_Utilities_Vxxx main unit as follows.
- If the OS is Japanese Windows, execute *setup.exe* in the *MINICUBE_Utilities_Vxxx\Japanese\DISK1* folder and install the software according to the installer instructions.
- If the OS is not Japanese Windows, execute *setup.exe* in the *MINICUBE_Utilities_Vxxx\English\DISK1* folder and install the software according to the installer instructions.

Caution Specify *C:\Program Files\NEC Electronics Tools* as an installation destination folder.

Remarks 1. The MINICUBE2 diagnostic tool and MINICUBE OCD Checker can be installed by installing *MINICUBE Utilities Vxxx*.

2. GHS: Green Hills Software, Inc
IAR: IAR Systems AB

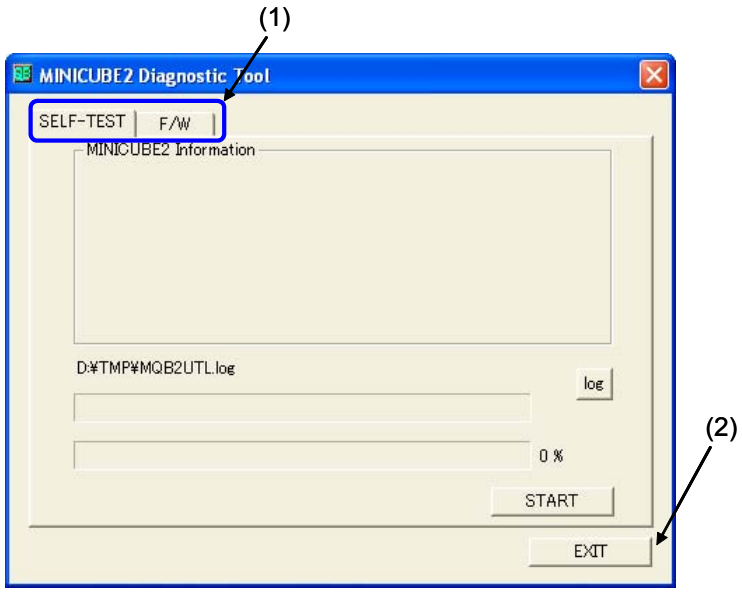
2.2.2 Startup

- Click the Start menu of Windows, point to “Programs”, “NEC Electronics Tools”, “Latest Version”, and then click “MINICUBE2 Utilities Vx.xx MINICUBE2 Diagnostic Tool”.

Caution If the debugger, QBP, or MINICUBE OCD Checker is running, terminate it before starting the MINICUBE2 diagnostic tool.

2.3 Explanation of Each Area

When the MINICUBE2 diagnostic tool is started, a window with two tabs for switching two functions is displayed.



(1) [SELF-TEST] and [F/W] tabs

The self-testing and firmware download functions can be switched.

(2) [EXIT] button

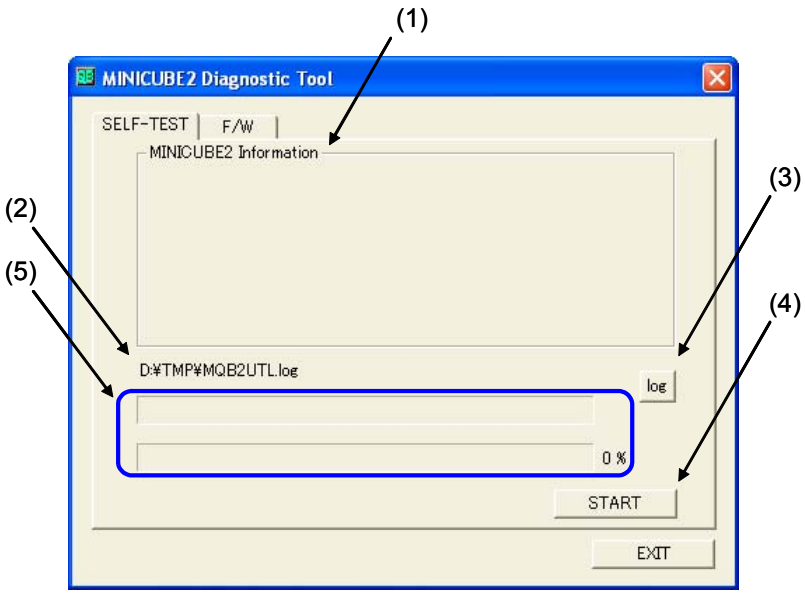
Terminates the MINICUBE2 diagnostic tool.

CHAPTER 3 SELF-TESTING FUNCTION

This section explains how to perform self-testing of MINICUBE2.

3.1 Explanation of Each Area

The following window is displayed by clicking the [SELF-TEST] tab. Explanation of each area is described below.



(1) MINICUBE2 Information window

Displays MINICUBE2 hardware information and the firmware version.

(2) Test status

Displays the log file name until the path is changed or self-testing is performed. Displays the test items during self-testing. Displays the test result after self-testing is completed.

(3) [log] button

When this button is clicked, the path for the log file can be changed.

(4) [START] button

When this button is clicked, a confirmation dialog box appears and self-testing is started by clicking the [OK] button.

(5) Progress bar

The upper progress bar indicates the progress status of the test currently being performed. The lower progress bar indicates the status of progress for overall self-testing.

3.2 Cautions on Self-Testing

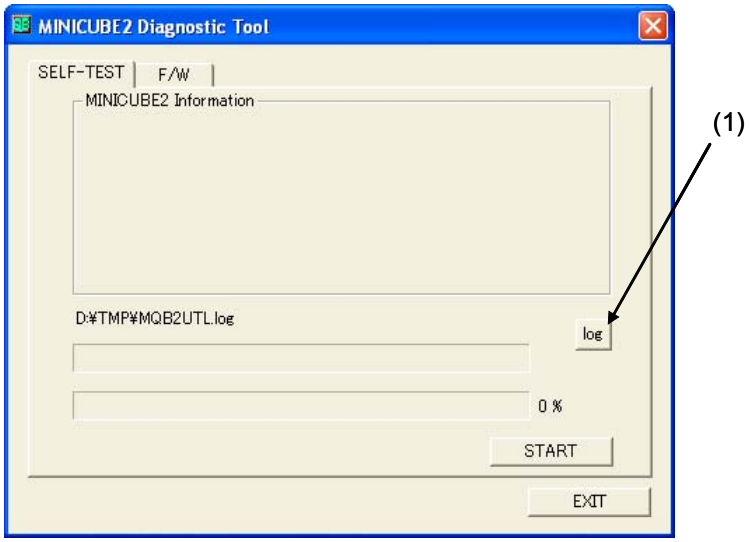
Note the following points when executing the self-testing function.

- Do not connect MINICUBE2 to the target system.
- Finish the MINICUBE2 switch setting before connecting MINICUBE2 to the host machine (power on).
  - Power select switch: This switch is set to “3” by default. Set this switch to “3” or “5”. Self-testing is aborted if this switch is set to “T”.
  - Mode select switch: This switch is set to “M2” by default. Self-testing is aborted if this switch is set to “M1” while the 78K0-OCD board is connected.
- Connection between MINICUBE2 and 78K0-OCD board
  - Set the mode select switch to “M2” if the 78K0-OCD board is connected. Self-testing is aborted if this switch is set to “M1”.
- Terminate the debugger, QBP and OCD Checker.

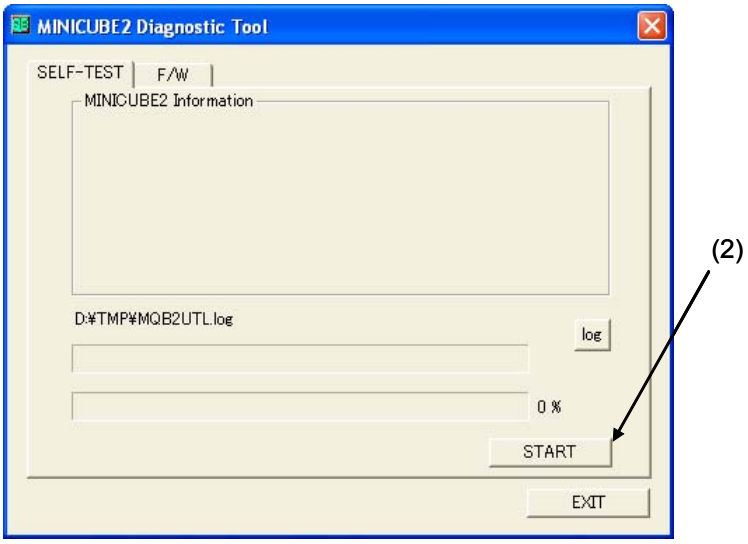
3.3 Execution of Self-Testing

Perform self-testing according to the following steps (1) to (9).

(1) Specify the location in which the log file will be saved by clicking the [log] button. The self-testing result will be output to this log file. Refer to **3.4 Log File for descriptions on the log file**.

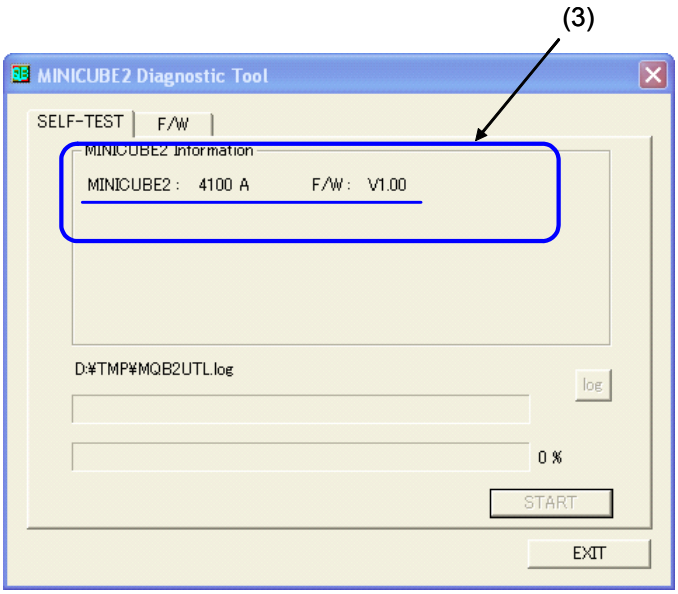


(2) Click the [START] button.

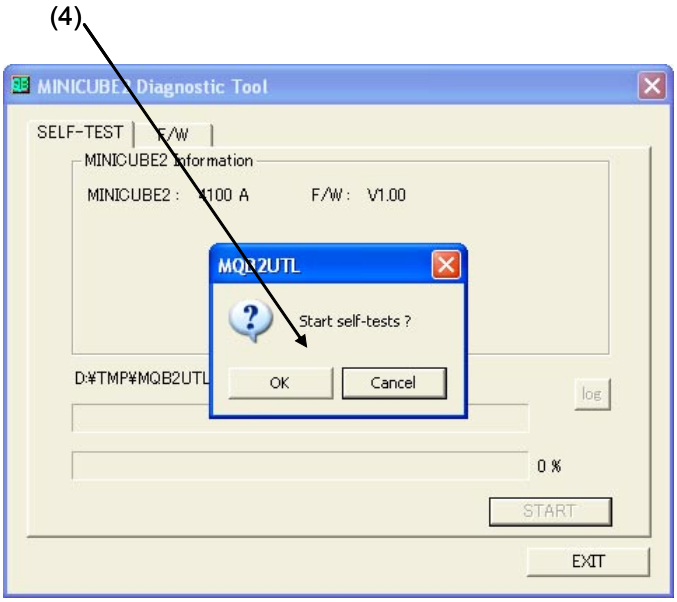


(3) The MINICUBE2 connection status is checked and the hardware information is displayed in the MINICUBE2 Information window.

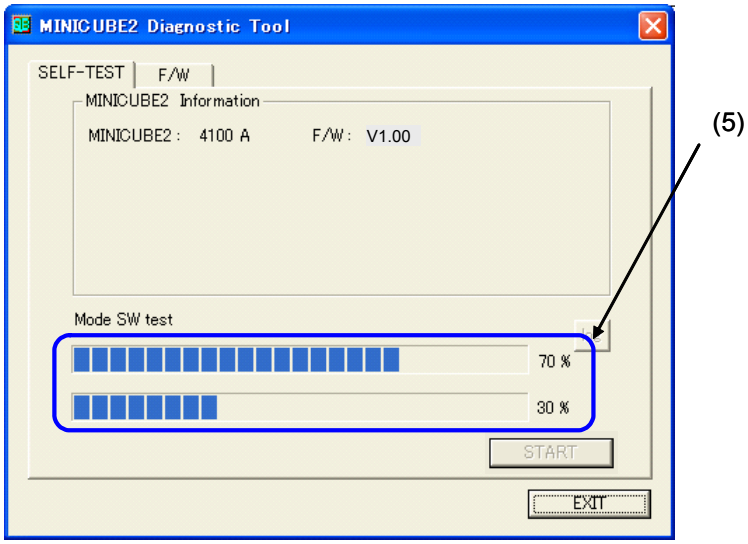
In the figure below, V1.00 described for “MINICUBE2 4100 A F/W” is the firmware version.



(4) A dialog box to confirm whether to start self-testing appears. Self-testing is started by clicking the [OK] button. The log file is created (overwritten if the self-testing was performed before).

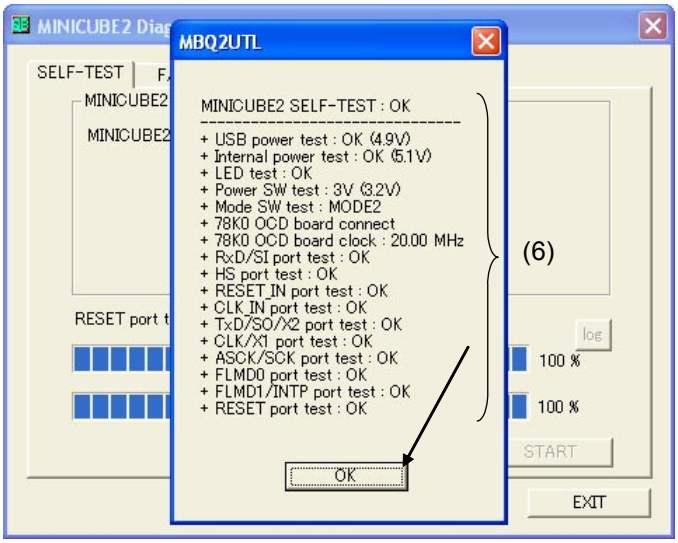


(5) The upper progress bar indicates the progress status of the test currently being performed. The lower progress bar indicates the status of progress for overall self-testing.

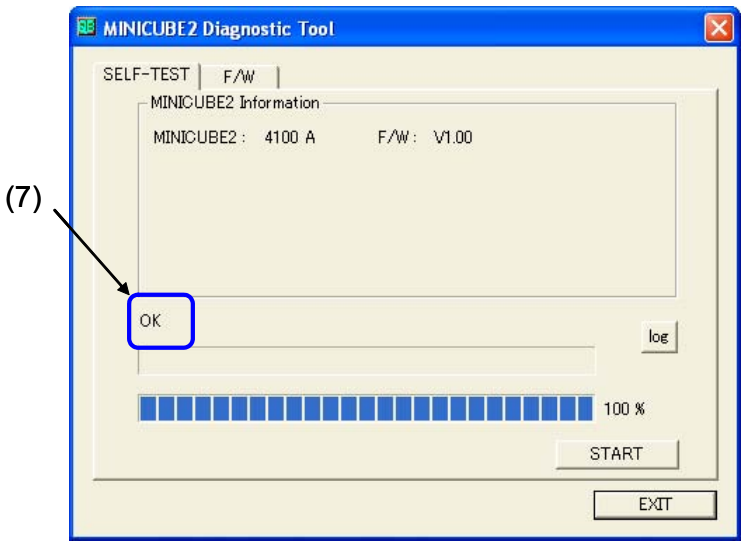


(6) When all of the tests are complete, the final result dialog box is displayed as shown below. The contents displayed in the dialog box are saved in the log file. If an error occurs during self-testing, refer to **3.5 Action When NG Is Displayed.**

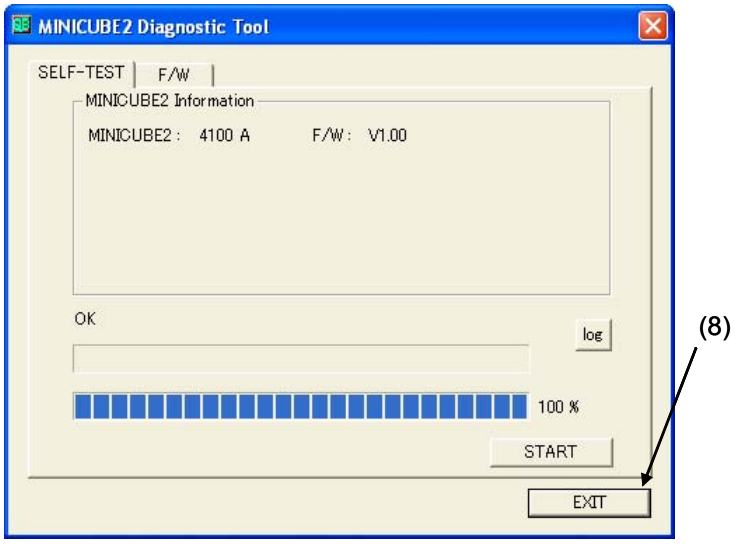
Click the [OK] button.



(7) "OK" is output as a final result.



(8) Click the [EXIT] button.



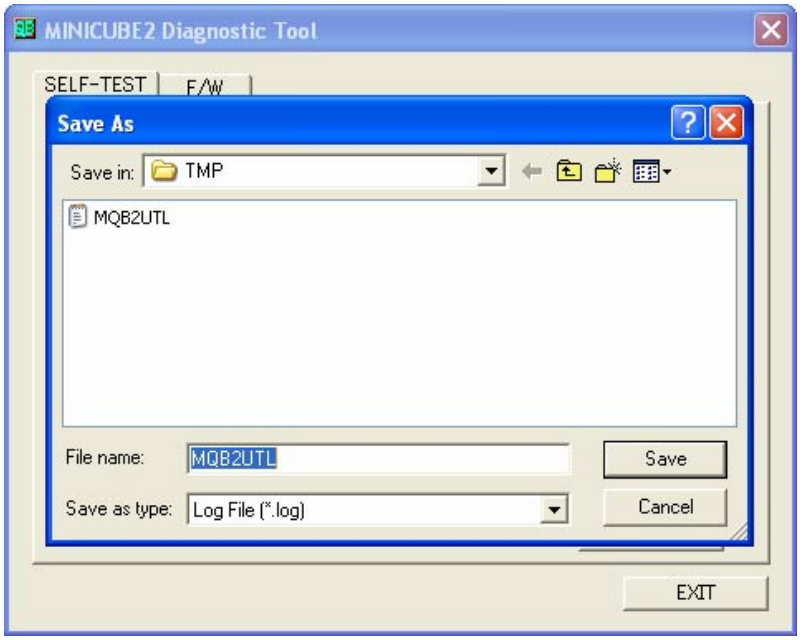
(9) Remove MINICUBE2 from the host machine.

3.4 Log File

After self-testing is performed, a log file is created to hold the result. The log file is overwritten each time the [OK] button is clicked in step (4) in **3.3 Execution of Self-Testing**.

3.4.1 Specification of location for saving log file

The location for saving the log file can be changed by clicking the [log] button in step (1) in **3.3 Execution of Self-Testing**. The log file is created as “MQB2UTL.log” in a temporary directory by default. Normally, the temporary directory is specified in the tmp or temp environmental variable.



3.4.2 Format of log file

The following shows an example of the log file when the check results show “OK” statuses.

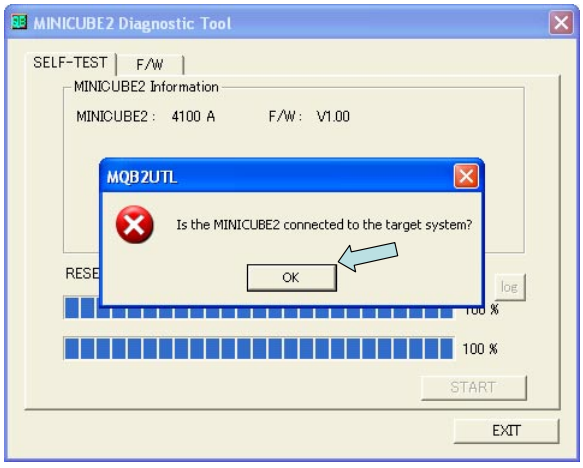
```
== mm/dd/yyyy tt:mm:ss Test start. ==

MINICUBE2 :      4100 A   F/W :     V1.00

MINICUBE2 SELF-TEST : OK
-------------------------------
+ USB power test : OK (4.8V)
+ Internal power test : OK (5.0V)
+ LED test : OK
+ Power SW test : 3V (3.2V)
+ Mode SW test : MODE2
+ 78K0S OCD board connect                    } These items are tested only when
+ 78K0S OCD board clock : 20.00 MHz          } the 78K0-OCD board is connected.
+ RxD/SI port : OK
+ HS port : OK
+ RESET_IN port : OK
+ CLK_IN port : OK
+ TxD / SO / X2 port : OK
+ CLK / X1 port : OK
+ ASCK / SCK port : OK
+ FLMD0 port : OK
+ FLMD1 / INTP port : OK
+ RESET_OUT port : OK
OK
```

3.5 Action When NG Is Displayed

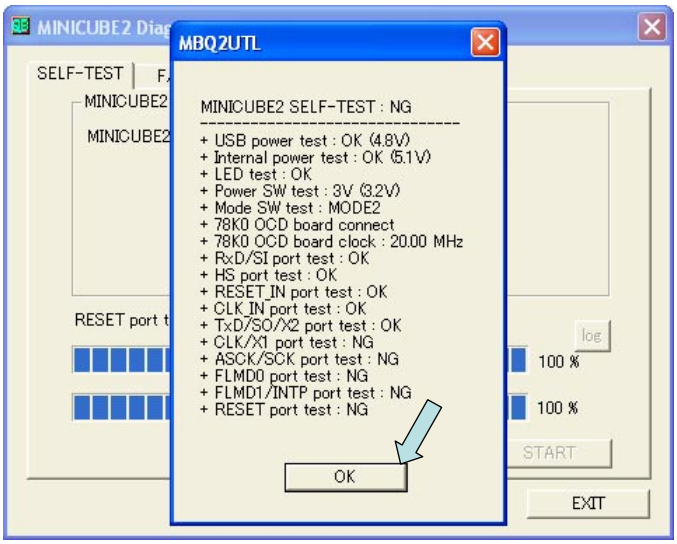
Operation when NG is displayed during self-testing (refer to **3.3 Execution of Self-Testing**) and relevant actions for coping with the errors (such as setting errors) are listed below.

3.5.1 Operation when NG is displayed

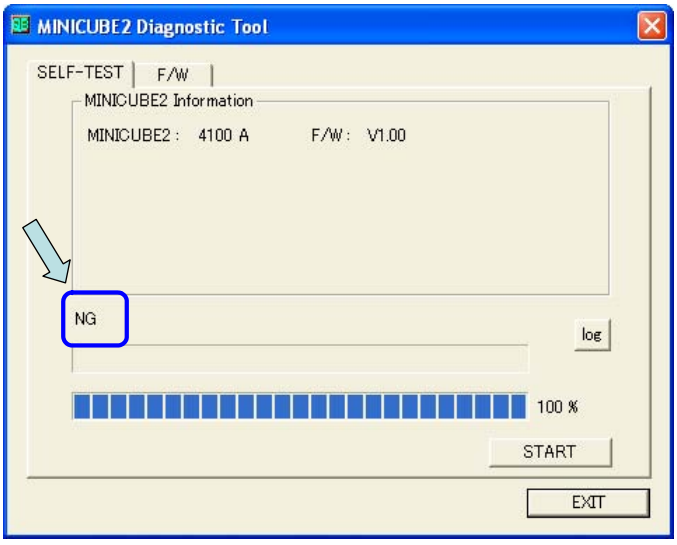
This message is displayed when an NG is displayed by the MINICUBE2 diagnostic tool for the first time. The result is not written to the log file at this stage. Click the [OK] button.



When self-testing for the second or later time, “NG” is displayed for items with which NG is detected, in the result dialog box of (6) in **3.3 Execution of Self-Testing**. Click the [OK] button.



“NG” is output as a final result.



The result of “NG” is also written to the log file.

```
== mm/dd/yyyy tt:mm:ss Test start. ==

MINICUBE2 :      4100 A   F/W :     V1.00

MINICUBE2 SELF-TEST : NG
--------------------------------
+ USB power test : OK (4.8V)
+ Internal power test : OK (5.0V)
+ LED test : OK
+ Power SW test : 3V (3.2V)
+ Mode SW test : MODE2
+ 78K0S OCD board connect
+ 78K0S OCD board clock : 20.00 MHz
+ RxD/SI port test : OK
+ HS port test : OK
+ RESET_IN port test : OK
+ CLK_IN port test : OK
+ TxD/SO/X2 port test : OK
+ CLK/X1 port test : NG
+ ASCK/SCK port test : NG
+ FLMD0 port test : NG
+ FLMD1/INTP port test : NG
+ RESET_OUT port test : NG
NG
```

If the test result includes “NG” as shown above, the cause may be a defect in MINICUBE2. Refer to **3.2 Cautions on Self-Testing** and **3.5.2 Action for error**, and retry self-testing. If the same items resulted in “NG” even after the relevant action is implemented, the cause may be a defect in MINICUBE2. In such a case, consult an NEC Electronics sales representative or distributor.

3.5.2 Action for error

The errors that may occur during self-testing (such as setting error) and relevant actions for coping with the errors are listed below.

(1/2)

No.	Error message and action
1	Is the MINICUBE2 connected to the target system?
	MINICUBE2 may be connected to the target system. This message is displayed when an NG is displayed by the MINICUBE2 diagnostic tool for the first time. If MINICUBE2 is not connected to the target system, click the [START] button again to reexecute self-testing. If NG items are detected, the result is displayed in the result dialog box and written to the log file.
2	Self-checking is aborted. Please power-off the MINICUBE2, select either "3" or "5" of the power supply selection switch. then restart self-checking.
	This message is displayed when the power select switch is set to “T”. Turn off the power to MINICUBE2, and then set the power select switch to “3” or “5”.

(2/2)

No.	Error message and action
3	Self-checking is aborted. Please power-off the MINICUBE2, either remove the 78K0-OCD Board or select "M2" of the mode selection switch. then restart self-checking.
	This message is displayed when the 78K0-OCD board is connected while the mode select switch is set to “M1”. Turn off the power to MINICUBE2, and then set the switch to “M2” or remove the 78K0-OCD board.
4	Communication Error. Self-checking is aborted.
	This message is displayed when a communication error occurs between the host machine and MINICUBE2 during self-testing. Check if the USB cable is disconnected.
5	MINICUBE2(USB) connect error.
	This message is displayed immediately after MINICUBE2 is connected to the host machine (before the LED glows). Possible causes are: MINICUBE2 is not connected to the host machine, the USB cable is disconnected, or the MINICUBE2 USB driver has an error. Check if the USB cable is disconnected.
6	Debugger already running. Self-checking is aborted.
	This message is displayed when the MINICUBE2 diagnostic tool and the debugger are running at the same time. Terminate the debugger.

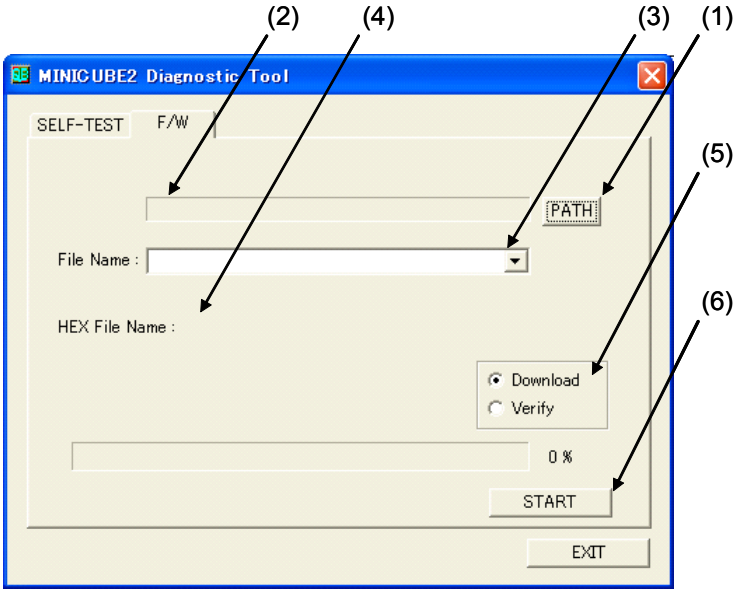
If an error message other than above is displayed, the cause may be a defect in MINICUBE2. If the same error message is displayed even after the above action is implemented, the cause may be a defect in MINICUBE2. In such a case, consult an NEC Electronics sales representative or distributor.

CHAPTER 4 FIRMWARE DOWNLOAD FUNCTION

This section describes how to update (download) MINICUBE2 firmware embedded into the on-chip flash memory of the control CPU in MINICUBE2, and explains the window operation for verifying the downloaded firmware.

4.1 Explanation of Each Area

The following window is displayed by clicking the [F/W] tab. Explanation of each area is described below.



(1) [PATH] button

The file select dialog box is opened by clicking this button. Specify the path to the folder in which the MINICUBE2 firmware file to be downloaded is placed. The specified path is displayed in the text box.

(2) Path indication

The path specified by clicking the [PATH] button is displayed in this text box.

(3) File Name drop-down list

MINICUBE2 firmware to be downloaded is displayed. If MINICUBE2 firmware is stored where MQB2UTL.exe is stored, the file can be selected from the drop-down list.

(4) HEX File Name

The file name of MINICUBE2 firmware to be downloaded is displayed.

(5) [Download] and [Verify] radio buttons

Whether to download or verify MINICUBE2 firmware can be selected.

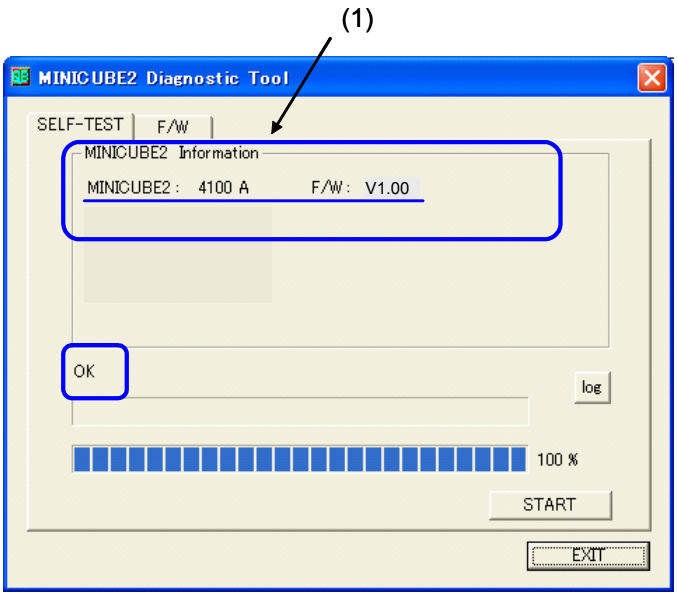
(6) [START] button

When this button is clicked, a confirmation dialog box appears and the downloading or verifying is started by clicking the [OK] button.

4.2 Version Check Before Downloading Firmware

Check the MINICUBE2 firmware version before downloading new firmware, according to the following steps (1) to (3).

(1) Perform steps in **3.3 Execution of Self-Testing** and confirm that “OK” is displayed in step (7).
Check the MINICUBE2 firmware version in the MINICUBE2 Information window. In the figure below, V1.00 described for “MINICUBE2 4100 A F/W” is the firmware version.



(2) Access the following NEC Electronics websites for checking the latest version of MINICUBE2 firmware.
Japanese version
http://www.necel.com/micro/ods/jpn/index.html
English version
http://www.necel.com/micro/ods/eng/index.html
See Version-up service → MINICUBE2_Software.

(3) Make sure that the version checked in step (1) differs from the version posted on the websites.
If the version checked in step (1) is the latest version, do not execute this function.

4.3 Preparation of Download File

Download MINICUBE2 firmware (MINICUBE2_Firmware_Vxxx.hex) from the above website and save it in an arbitrary folder.

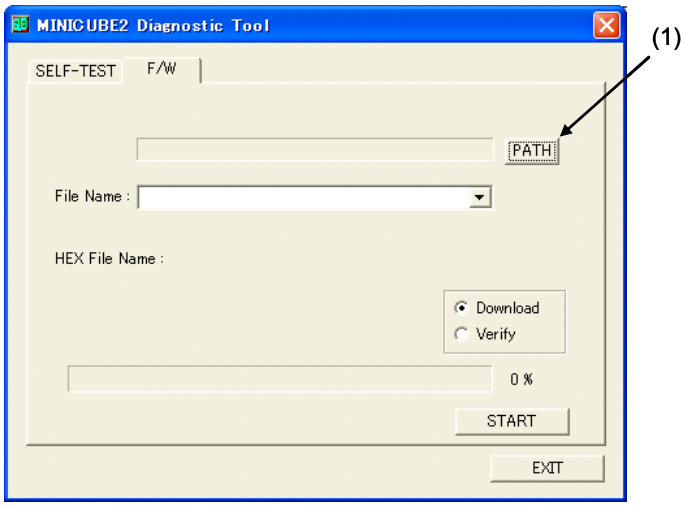
4.4 Downloading Firmware

Note the following points when updating MINICUBE2 firmware using the firmware download function.

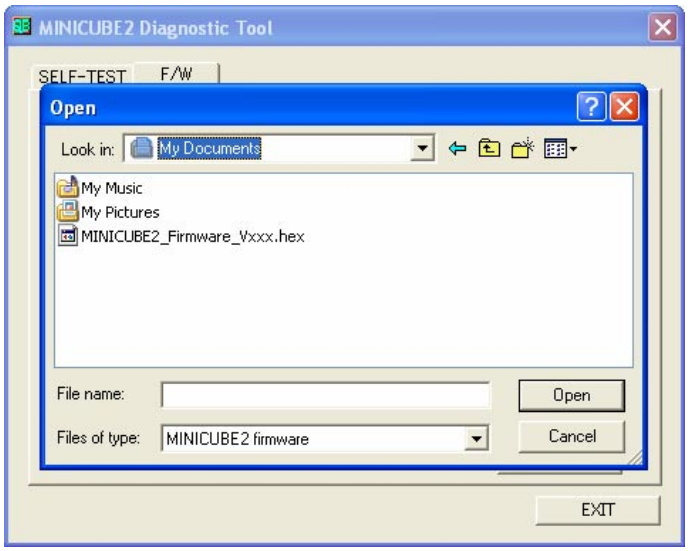
- Do not connect MINICUBE2 to the target system.
- Finish the MINICUBE2 switch setting before connecting MINICUBE2 to the host machine (power on).
  - Power select switch: Set this switch to “3” or “5”.
  - Mode select switch: Set this switch to “M1” or “M2”.
- Connection between MINICUBE2 and 78K0-OCD board
  - Whether the 78K0-OCD board is connected does not affect the operation.
- Terminate the debugger, QBP and MINICUBE OCD Checker.
- Be sure to remove MINICUBE2 from the host machine (power off) after firmware is updated.

Execute the firmware download function according to the following steps (1) to (12).

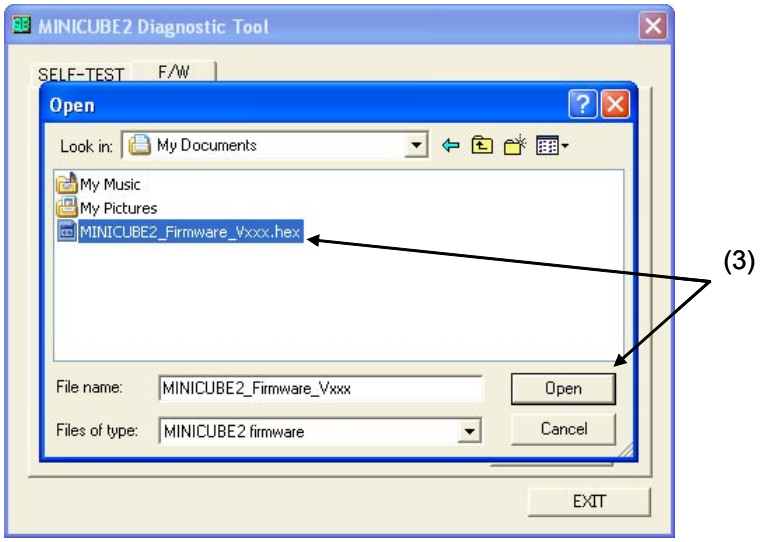
(1) Click the [PATH] button.



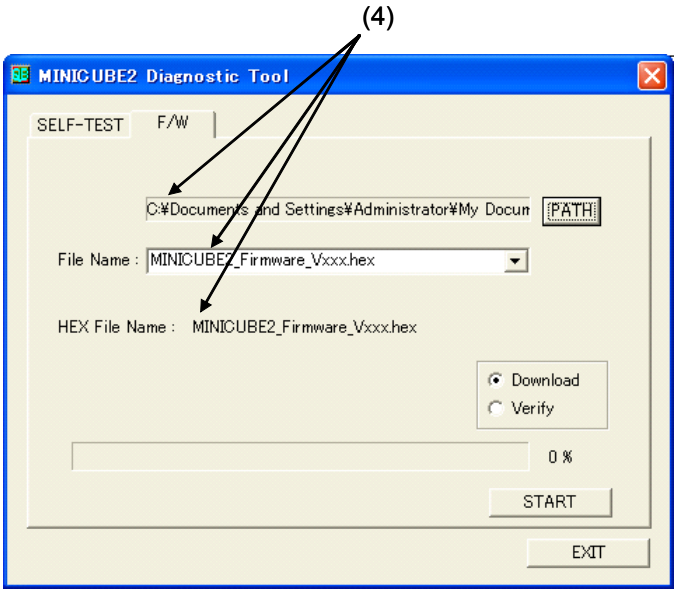
(2) Specify the folder where MINICUBE2 firmware (MINICUBE2_Firmware_Vxxx.hex), which was prepared in **4.3 Preparation of Download File**, is stored.



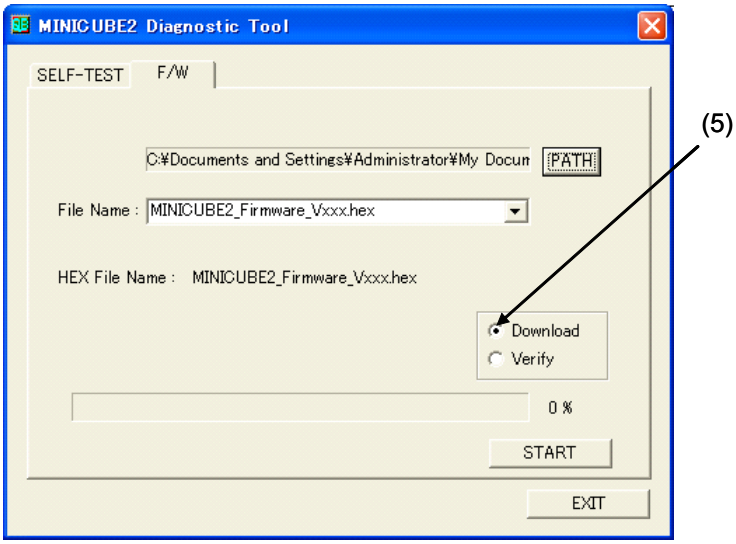
(3) Specify MINICUBE2 firmware (MINICUBE2_Firmware_Vxxx.hex) from the folder, and then click the [Open] button.



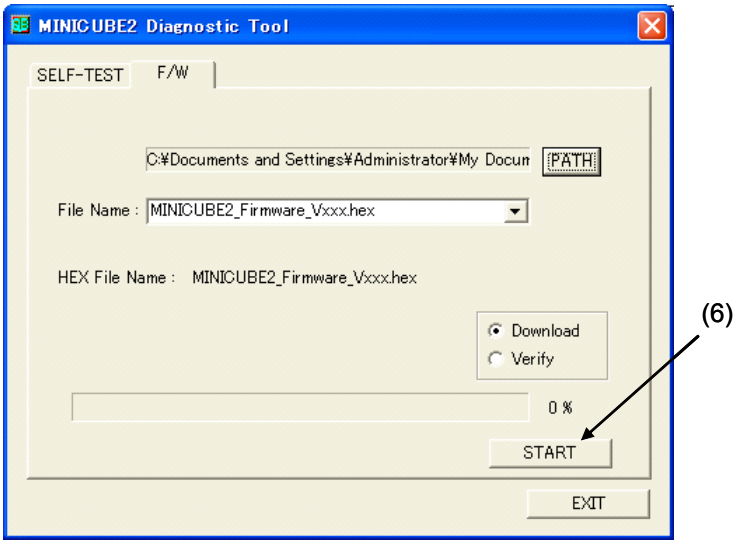
(4) Confirm that the path to the folder where MINICUBE2 firmware is stored is displayed in the path indication area, and the specified MINICUBE2 firmware is displayed in [File Name] .



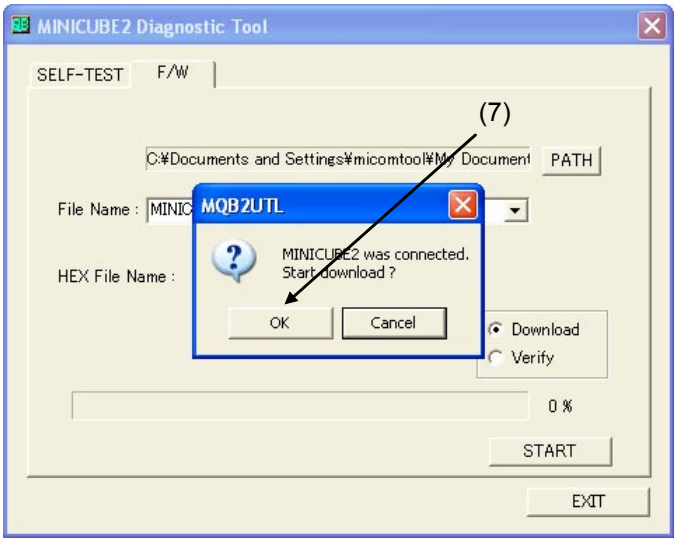
(5) Select the [Download] radio button. [Download] is selected by default.



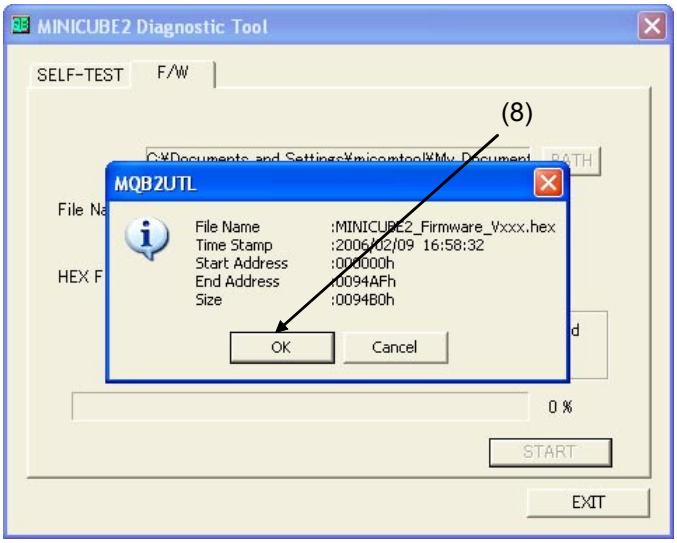
(6) Click the [START] button.



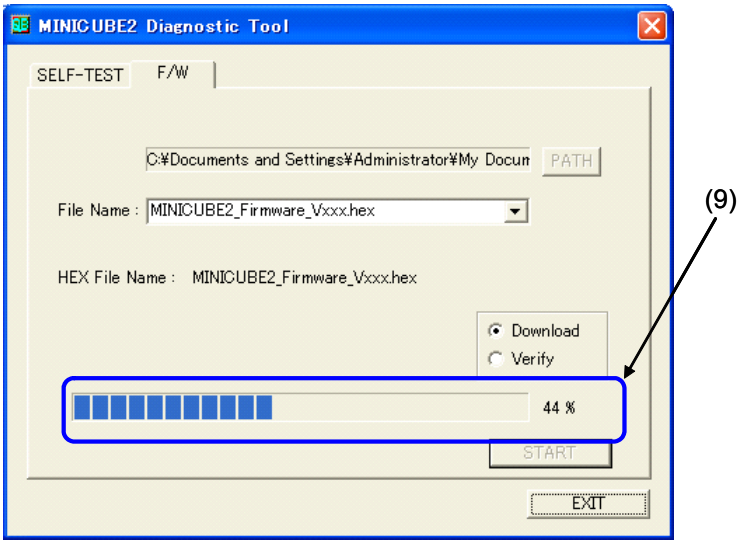
(7) A dialog box indicating that MINICUBE2 connection was established appears and prompts the user to confirm the start of downloading. Click the [OK] button.



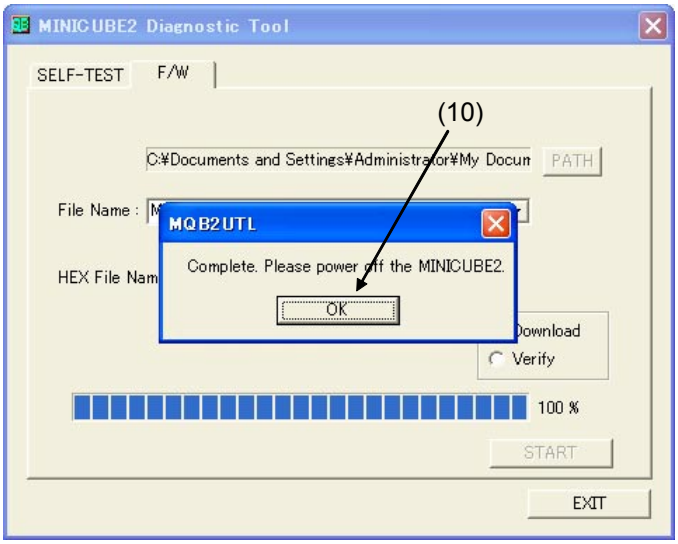
(8) A dialog box for confirming the MINICUBE2 firmware file to be downloaded appears. Click the [OK] button.



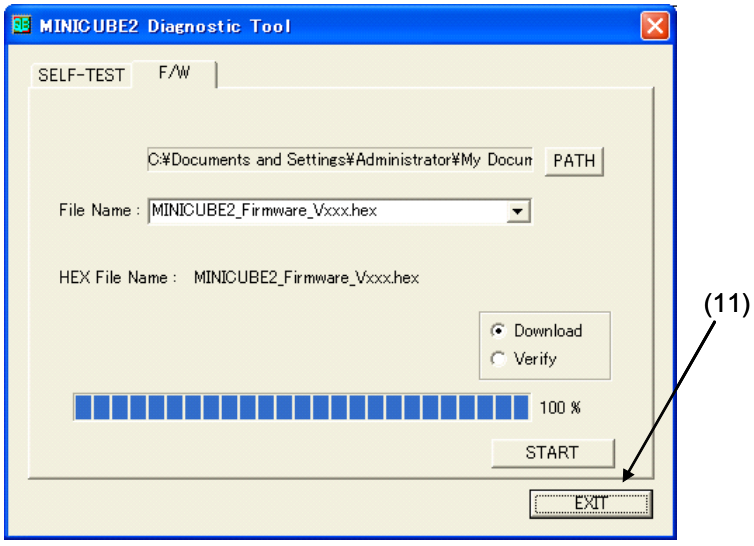
(9) The progress bar shows the status of downloading.



(10) A dialog box that informs the end of download appears. Click the [OK] button.



(11) Click the [EXIT] button.



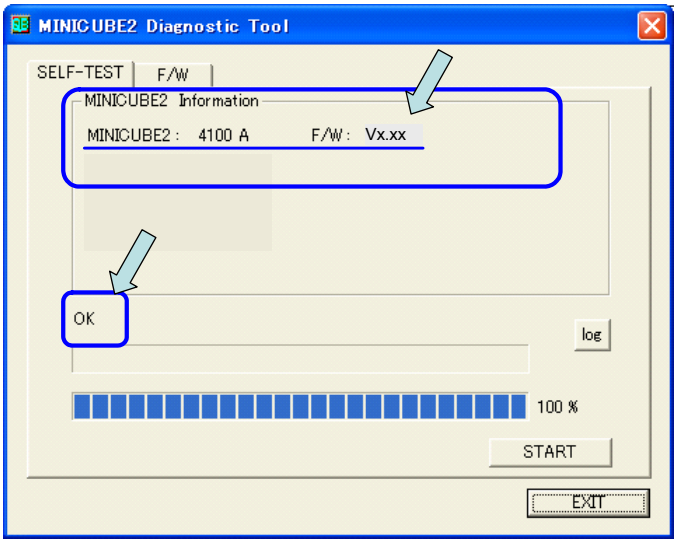
(12) Remove MINICUBE2 from the host machine.

Caution Be sure to remove MINICUBE2 from the host machine (power off) after the MINICUBE2 firmware update. If MINICUBE2 is run (executing the MINICUBE2 diagnostic tool, debugger, QBP or MINICUBE OCD Checker) after updating firmware, MINICUBE2 firmware is not updated completely and MINICUBE2 does not operate normally.

4.5 Version Check After Downloading Firmware

Perform the steps in **3.3 Execution of Self-Testing** and check the version of MINICUBE2 firmware. Perform the steps in **3.3 Execution of Self-Testing** and confirm that “OK” is displayed in step (7).

Confirm that the MINICUBE2 firmware version is updated in the MINICUBE2 Information window.



4.6 Failure in Firmware Download

If an attempt is made to update firmware according to the descriptions in **4.4 Downloading Firmware** but the operation results in any of the following, consult an NEC Electronics sales representative or distributor.

- Firmware could not be downloaded normally.

  Example Downloading of MINICUBE2 firmware is stopped during a step in **4.4 Downloading Firmware**, and no matter how many times the step is repeated from (1), the result is the same.

- After downloading firmware, the version could not be checked normally.

  Examples 1. 3.3 Execution of Self-Testing results in “NG”

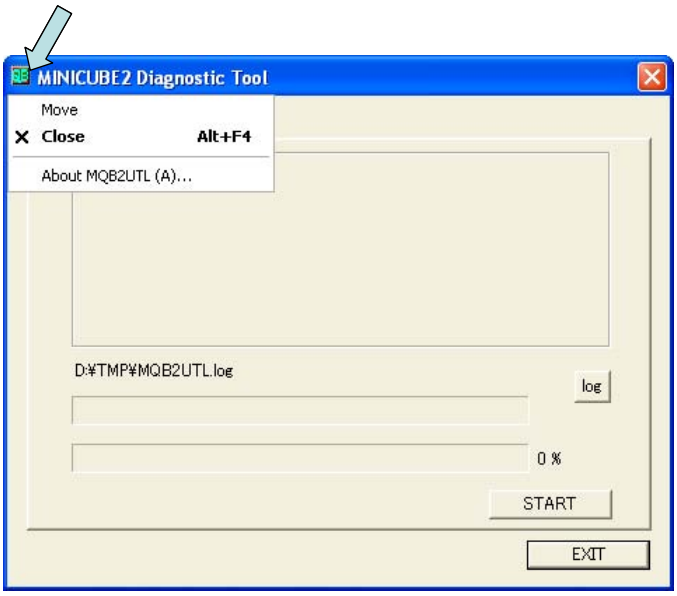
  2. Version information displayed in **3.3 Execution of Self-Testing** differs from the one expected

- The debugger or QBP does not start normally.

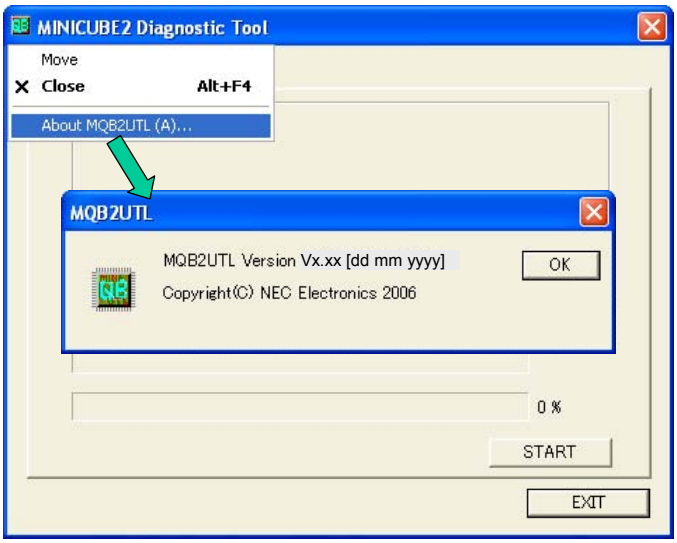
CHAPTER 5 VERSION INDICATION

This section describes the method to check the version.

Click the icon on the title bar or right-click the title bar; the system menu is then displayed.



Click “About MQB2UTL(A)…” on the system menu; the version information window then appears.



CHAPTER 6 UNINSTALLATION

This section explains how to uninstall the MINICUBE2 diagnostic tool.

Note the following points when uninstalling the MINICUBE2 diagnostic tool.

- The MINICUBE OCD Checker is uninstalled at the same time.
- The log files are not deleted by uninstalling the MINICUBE2 diagnostic tool.

Perform uninstallation according to the following steps (1) to (5).

(1) Turn on power to the host machine and start Windows.

(2) Start "Add/Remove Programs" or “Add or Remove Programs” in the Control Panel.

(3) Select the relevant item from the list displayed on the Install/Uninstall tab, and then click the [Add/Remove...] or [Change/Remove] button.
- To uninstall the MINICUBE2 diagnostic tool: “NEC EL MINICUBE Utilities Vx.xx”
- To uninstall this document: “NEC EL MINICUBE Utilities Vx.xx Documents”

(4) A dialog box for confirming deletion of files will be displayed. Click the [Yes] button, deleting the files will then be started.

(5) When the completion message is displayed, click the [OK] button. This completes uninstalling the MINICUBE2 diagnostic tool.

<R>

APPENDIX A REVISION HISTORY

A.1 Major Revisions in This Edition

Page	Description
CHAPTER 2 INSTALLATION AND STARTUP	
p.8	Addition of description in **2.1.1 Installation**
	Addition of description in **2.1.2 Startup**
APPENDIX A REVISION HISTORY	
p.32	Addition of **APPENDIX A REVISION HISTORY**

[MEMO]

[MEMO]

[MEMO]

For further information, please contact:

NEC Electronics Corporation
1753, Shimonumabe, Nakahara-ku,
Kawasaki, Kanagawa 211-8668,
Japan
Tel: 044-435-5111
http://www.necel.com/

[America]

NEC Electronics America, Inc.
2880 Scott Blvd.
Santa Clara, CA 95050-2554, U.S.A.
Tel: 408-588-6000
800-366-9782
http://www.am.necel.com/

[Europe]

NEC Electronics (Europe) GmbH
Arcadiastrasse 10
40472 Düsseldorf, Germany
Tel: 0211-65030
http://www.eu.necel.com/

Hanover Office
Podbielskistrasse 166 B
30177 Hannover
Tel: 0 511 33 40 2-0

Munich Office
Werner-Eckert-Strasse 9
81829 München
Tel: 0 89 92 10 03-0

Stuttgart Office
Industriestrasse 3
70565 Stuttgart
Tel: 0 711 99 01 0-0

United Kingdom Branch
Cygnus House, Sunrise Parkway
Linford Wood, Milton Keynes
MK14 6NP, U.K.
Tel: 01908-691-133

Succursale Française
9, rue Paul Dautier, B.P. 52
78142 Velizy-Villacoublay Cédex
France
Tel: 01-3067-5800

Sucursal en España
Juan Esplandiu, 15
28007 Madrid, Spain
Tel: 091-504-2787

Tyskland Filial
Täby Centrum
Entrance S (7th floor)
18322 Täby, Sweden
Tel: 08 638 72 00

Filiale Italiana
Via Fabio Filzi, 25/A
20124 Milano, Italy
Tel: 02-667541

Branch The Netherlands
Steijgerweg 6
5616 HS Eindhoven
The Netherlands
Tel: 040 265 40 10

[Asia & Oceania]

NEC Electronics (China) Co., Ltd
7th Floor, Quantum Plaza, No. 27 ZhiChunLu Haidian
District, Beijing 100083, P.R.China
Tel: 010-8235-1155
http://www.cn.necel.com/

Shanghai Branch
Room 2509-2510, Bank of China Tower,
200 Yincheng Road Central,
Pudong New Area, Shanghai, P.R.China P.C:200120
Tel:021-5888-5400
http://www.cn.necel.com/

Shenzhen Branch
Unit 01, 39/F, Excellence Times Square Building,
No. 4068 Yi Tian Road, Futian District, Shenzhen,
P.R.China P.C:518048
Tel:0755-8282-9800
http://www.cn.necel.com/

NEC Electronics Hong Kong Ltd.
Unit 1601-1613, 16/F., Tower 2, Grand Century Place,
193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: 2886-9318
http://www.hk.necel.com/

NEC Electronics Taiwan Ltd.
7F, No. 363 Fu Shing North Road
Taipei, Taiwan, R. O. C.
Tel: 02-8175-9600
http://www.tw.necel.com/

NEC Electronics Singapore Pte. Ltd.
238A Thomson Road,
#12-08 Novena Square,
Singapore 307684
Tel: 6253-8311
http://www.sg.necel.com/

NEC Electronics Korea Ltd.
11F., Samik Lavied'or Bldg., 720-2,
Yeoksam-Dong, Kangnam-Ku,
Seoul, 135-080, Korea
Tel: 02-558-3737
http://www.kr.necel.com/

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