CUSTOMER NOTIFICATION

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FL-PR5

User’s Manual (Provisional)

Naito Densei Machida Mfg. Co., Ltd.
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URL: http://www.ndk-m.co.jp/asmis/

[MEMO]

PREFACE

Target Readers

This manual is intended for users who use the FL-PR5 (hereinafter referred to as FP5) when designing and developing a system using an NEC Electronics on-chip flash memory micro controller.

Purpose

This manual is intended to give users an understanding of the basic specifications and correct use of the FP5.

Organization

This manual includes the following sections.

- Overview
- Hardware installation
- Software installation
- Programming GUI usage
- Example of operation using programming GUI
- FL-PR5 operation in standalone mode
- Connectors and cables
- Notes on target system designs
- Target interface specifications
- Troubleshooting
- Error messages
- Supplementary information

How to Read This Manual

It is assumed that the readers of this manual have general knowledge of electricity, logic circuits, and micro controllers. 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®, refer to each Windows manual.

To understand the overall operation

→ Read this manual according to the **CONTENTS**.

To know the cautions of target system

→ See the **CHAPTER 7 CONNECTORS AND CABLES**, **CHAPTER 8 NOTES ON TARGET SYSTEM DESIGNS**, and **CHAPTER 9 SPECIFICATION OF TARGET INTERFACE CIRCUITS**. Also see the user's manual for each target device.

Conventions

Note: Footnote for item marked with **Note** in the text.

Caution: Information requiring particular attention

Remark: Supplementary information

Numeral representation: Binary ... ×××× or ××××B

Decimal ... ××××

Hexadecimal ... 0××××H or ××××H

" ": Any character or item on screen

[ ]: Name of commands, dialog boxes or area

Terminology

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

Term	Meaning
FP5	Abbreviation of the flash memory programmer FL-PR5
Programming GUI	Windows application to operate FP5 using programming GUI
Target device	NEC Electronics on-chip flash memory micro controller
Target system	User-designed board on which target device is mounted
Program adapter [Note]	Conversion adapter to write programs to target device
PR5 file	Text file containing programming information specific to the target device (Parameter file (*.pr5) for PG-FP5, a product of NEC Electronics)
ESF file	Text file containing programming environment settings specified with programming GUI (Customized setup file (*.esf) for FP5)
Program file	HEX file of Intel HEX format type or Motorola HEX format type

Note The program adapter (FA-xxxx) is a product of Naito Densei Machida Mfg. Co., Ltd.

General Precautions on Handling This Product

1. Circumstances not covered by product guarantee
   - If the product was disassembled, altered, or repaired by the customer
   - If it was dropped, broken, or given another strong shock
   - Use at overvoltage, use outside guaranteed temperature range, storing outside guaranteed temperature range
   - If power was turned on while the AC adapter, interface cable, or connection to the target system was in an unsatisfactory state
   - If the cable of the AC adapter, the interface cable, the target cable, or the like was bent or pulled excessively
   - If an AC adapter other than the supplied product was used
   - If the product got wet
   - If the product and target system were connected while a potential difference existed between the GND of the product and the GND of the target system
   - If a connector or cable was connected or disconnected while power was being supplied to the product
   - If an excessive load was applied to a connector or cable
   - If the product is used or stored in an environment where an electrostatic or electrical noise is likely to occur

2. Safety precautions
   - If used for a long time, the product may become hot (50 to 60°C). Be careful of low temperature burns and other dangers due to the product becoming hot.
   - Be careful of electrical shock. There is a danger of electrical shock if the product is used as described above in 1 Circumstances not covered by product guarantee.
   - The AC adapter supplied with the product is exclusively for this product, so do not use it with other products.

CONTENTS

CHAPTER 1 OVERVIEW 9
1.1 Features 9
1.2 Writing Quality 9
1.3 Supported Devices 9
1.4 FP5 System Overview 10
1.5 Operating Environment 11
1.6 Hardware Specifications 13

CHAPTER 2 HARDWARE CONFIGURATION 14
2.1 Package Contents 14
2.2 System Configuration 14
2.3 Names and Functions on Main Unit 16

CHAPTER 3 SOFTWARE INSTALLATION 19
3.1 Obtaining Software 19
3.2 Installation 19
3.3 Uninstallation 24
3.4 Updating Programming GUI, Firmware and FPGA 25

CHAPTER 4 PROGRAMMING GUI USAGE 35
4.1 Introduction 35
4.2 Startup of Programming GUI 35
4.3 Menu Bar 38
4.4 Toolbar 85
4.5 Action Log Window 86
4.6 Programming Parameter Window 87
4.7 Status Bar 88
4.8 Hint Bar 89

CHAPTER 5 EXAMPLE OF OPERATION USING PROGRAMMING GUI 90

CHAPTER 6 USAGE IN STANDALONE MODE 103
6.1 Before Starting Standalone Operation 103
6.2 Description of Buttons, Message Display and Status LEDs 103
6.3 Standalone Operation Menu 105

CHAPTER 7 CONNECTORS AND CABLES 110
7.1 Power Supply Connector 110
7.2 Serial Connector 111
7.3 USB Connector 112
7.4 Target Connector 113
7.5 GND Connector 115

CHAPTER 8 NOTES ON TARGET SYSTEM DESIGN 116

CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS 120
9.1 SO/TxD, RESET and SCK 120
9.2 SI/RxD and H/S 120
9.3 CLK 121
9.4 FLMD0 and FLMD1 121
9.5 VDD and VDD2 122
9.6 VPP 122

CHAPTER 10 TROUBLESHOOTING 123
10.1 Problems During Startup 123
10.2 Problems During Operation 124

APPENDIX A MESSAGES 127

A.1 Message Format 127
A.2 Error/Warning Dialog Boxes for Programming GUI Operation 128
A.3 Information Dialog Boxes for Programming GUI Operation 131
A.4 Error Messages Displayed in FP5 Message Display 133

APPENDIX B SUPPLEMENTARY INFORMATION 135

APPENDIX C REVISION HISTORY 138

CHAPTER 1 OVERVIEW

The FP5 is a tool that erases, writes and verifies programs on an NEC Electronics on-chip flash memory micro controller on the target system or program adapter.

1.1 Features

- Supports on-chip 2-power-supply flash memory micro controllers and single-power-supply on-chip flash memory micro controllers
- Supports flash memory programming through the programming GUI using the host machine (programming GUI operation) and operation in standalone (standalone operation)
- Supports on-board programming through which programs are written with the target device mounted on the target system, and off-board programming through which programs are written via a program adapter without the target device mounted on the target system
- Program files can be saved in the 16 MB flash memory in the FP5 (divided by 4, in 4 MB units or divided by 8, in 2 MB units)
- Device-specific parameters required for programming can be saved in the FP5 internal flash memory by using the parameter file (PR5 file) for PG-FP5, a product of NEC Electronics, together with programming settings (ESF file).
- Multiple program files, PR5 files and ESF files can be saved
- Supports CSI, CSI + HS, UART, I^2C and PORT as target device interfaces
- Can supply V_{DD} and clocks to the target device
- Supports USB interface and serial interface (RS-232C) as a host interface
- Supports self-testing function
- Can update firmware and FPGA
- Compact and lightweight
- Compatible with PG-FP5, a product of NEC Electronics

1.2 Writing Quality

Thoroughly confirm, verify and evaluate the following points before using the FP5, in order to improve the writing quality.

- Design circuits as described in the user's manual for the target device and the FP5.
- Use the device and the FP5 as described in the user's manual for each product.
- The power supplied to the target device is stable.

1.3 Supported Devices

The FP5 supports on-chip 2-power-supply flash memory micro controllers and on-chip single-power-supply flash memory micro controllers.

FP5 parameter files (PR5 files) corresponding to the supported devices are posted on the following website of NEC Electronics.

URLs Japanese version: http://www.necel.com/micro/ods/jpn/

English version: http://www.necel.com/micro/ods/eng/ → Click "Version-up Service".

Select the micro controller to be used in the Each Device Series column and select the device name in the Device Name column; the FP5 parameter file can then be found.

1.4 FP5 System Overview

The FP5 system overview is shown in the following diagrams.

Figure 1-1. FP5 Connection Image

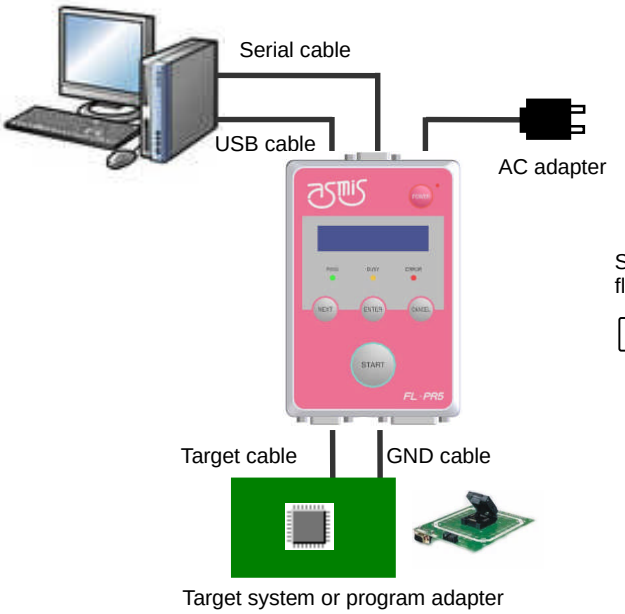
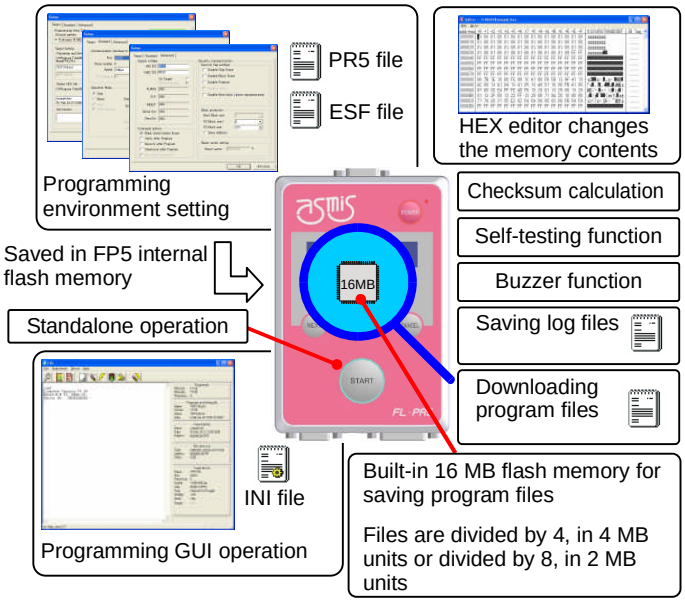


Figure 1-2. FP5 Function Overview



<Programming GUI operation>

The following operations can be performed with the programming GUI. The settings on the host machine are saved in an INI file.

- ESF file creation
- Downloading program files, PR5 files and ESF files (saved into FP5 internal flash memory)
- Saving log files
- Editing program files (by using HEX editor)
- Checksum calculation
- Programming command execution (for Autoprocedure (E.P.), whether execution is completed normally is indicated by beeps.)
- Execution of self-testing function

<Standalone operation>

The FP5 can operate in standalone mode, whereby commands such as [Erase], [Program] and [Autoprocedure(E.P.)] can be executed without using the host machine. It is suitable for use in production lines during mass production or upgrading programs in the field.

The following can be performed in standalone operation.

- Execute programming command
- Confirm contents of each downloaded file

<Program files>

Intel HEX format or Motorola HEX format files can be used.

<PR5 files>

PR5 files (parameter file) contain parameter information required for writing programs to the flash memory in the target device. Do not change the PR5 file data because it affects assurance of written data; otherwise, the programming GUI will not recognize the PR5 file.

<ESF files>

ESF files (customized setup file) contain the programming environment settings specific to the user environment and PR5 file names. If the file contains invalid contents, the programming GUI will not recognize the ESF file.

<FP5 internal flash memory>

The FP5 has a 16 MB flash memory area for saving program files. This memory area can be used as four 4 MB programming areas (Area 0 to Area 3) or eight independent 2 MB programming areas (Area 0 to Area 7). Program files can be downloaded to each programming area, and which file, PR5 or ESF, is to be saved is selectable in programming area units. That is, files can be individually downloaded in each programming area, and the area used can also be selected individually. Program files, PR5 files and ESF files are retained even if the FP5 power is turned off.

<Notification function>

When Autoprocedure (E.P.) is executed, whether execution is completed normally is indicated by beeps.

<Checksum calculation>

Checksum calculation for the download program files is possible.

1.5 Operating Environment

This section explains the following items with respect to the operating environment.

- Hardware environment
- Software environment

1.5.1 Hardware environment

(1) Host machines

- PC98-NX series, IBM PC/AT™ compatible
- Equipped with USB 2.0 ports (compatible with 1.1)
- Equipped with RS-232C serial ports

(2) Hardware option tools that support FP5

- Target board QB-xxxx-TB (a product of NEC Electronics, sold separately)
- Program adapter FA-xxxx (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)
- IC clip type target cable FA-CLIP (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)
- Switch jig FL-SW/FP5 (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)
- Buffer board FL-BUF (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)
- Long target cable (name undetermined, a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)

1.5.2 Software environment

(1) OS (either of the following)

- Windows 2000
- Windows XP

Caution Installation of the latest Service Pack for the OS used is recommended.

(2) PG-FP5 parameter file (PR5 file)

- Parameter file for the target device used (*.pr5)

Reference Download the parameter file from the following NEC Electronics website.

URLs Japanese version: http://www.necel.com/micro/ods/jpn/

English version: http://www.necel.com/micro/ods/eng/ → Click "Version-up Service".

Select the micro controller to be used in the Each Device Series column and select the device name in the Device Name column; the FP5 parameter file can then be found.

(3) Customized setup file (ESF file)

- File (*.esf) in which programming environment settings set with the programming GUI is saved

(4) Program files

- Intel HEX format
- Motorola HEX format

(5) Software option tools that support FP5

- Simplified control software for production line (FPterm) (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)[Note]
- Gang-supported software for production line (FW-GFP) (a product of Naito Densei Machida Mfg. Co., Ltd., sold separately)[Note]

Note Under development

1.6 Hardware Specifications

Table 1-1. Hardware Specifications

Hardware	Items	Specifications
FP5 main unit	Operating power supply	Supplied via AC adapter
	Operating environment ccondition	Temperature: ±0 to +40°C Humidity: 10% to 80% RH (no condensation)
	Storage environment ccondition	Temperature: −15 to +60°C Humidity: 10% to 80% RH (no condensation)
	Package size	140 × 90 × 30 mm (not including projections)
	Weight	Approximately 230 g
	Internal flash memory	Program file save area (16 MB) Other (PR5 file save area, ESF file save area, firmware area, and FPGA area)
	Operation mode	Programming GUI operation, standalone operation, remote operation, terminal operation
AC adapter	Specifications	AC input range: 100 to 240 V, 50/60 Hz DC output: 15 V Current consumption: 1 A (max.)
Host machine interface	Target host machine	PC98-NX series, IBM PC/AT compatible
	Target OS	Windows 2000, Windows XP
	USB connector	Type A, USB 2.0 (compatible with 1.1)
	USB cable	Approximately 2 m
	Serial connector	9-pin D-SUB male connector for RS-232C @ 9600, 19200, 38400, 57600, 115200 bps
	Serial cable	Approximately 3 m (cross cable)
Target interface[Note 1]	Target connector	Connector: 15-pin HD-SUB female connector Protected function: Internal overvoltage input protection circuit Supported communication mode and rate: 3-wire serial I/O (CSI) (5.0 MHz max.) 3-wire serial I/O with handshake (CSI + HS) (5.0 MHz max.) Pseudo 3-wire I/O (2.0 kHz max.) UART (1 Mbps max.) I^2C (100 kHz max.)
	Target cable	Cable length: Approximately 42 cm FP5 side: 15-pin HD-SUB male connector Target system side: 16-pin 2.54 mm pitch multipurpose female connector
	Power supply[Note 2]	Target VDD power supply: 1.5 to 6.0 V, max. 200 mA Internal overcurrent detection circuit
	Power supply detection	Available. Current consumption: 1 mA or less
	CPU clock supply	1 MHz, 2 MHz, 4 MHz, 5 MHz, 6 MHz, 8 MHz, 9 MHz, 10 MHz, 12 MHz, 16 MHz, 20 MHz
	GND cable	Approximately 1 m

Notes 1. The maximum communication speed in the interface may vary depending on the device and environment used.

2. V_{DD} for the target system is supplied for the purpose of supplying power to the target device through which writing is performed, so the specification cannot secure sufficient capacity to operate the target system. Use the power source on the target system when performing on-board programming.

CHAPTER 2 HARDWARE CONFIGURATION

This chapter explains the following items for hardware configuration.

- Package contents
- System configuration

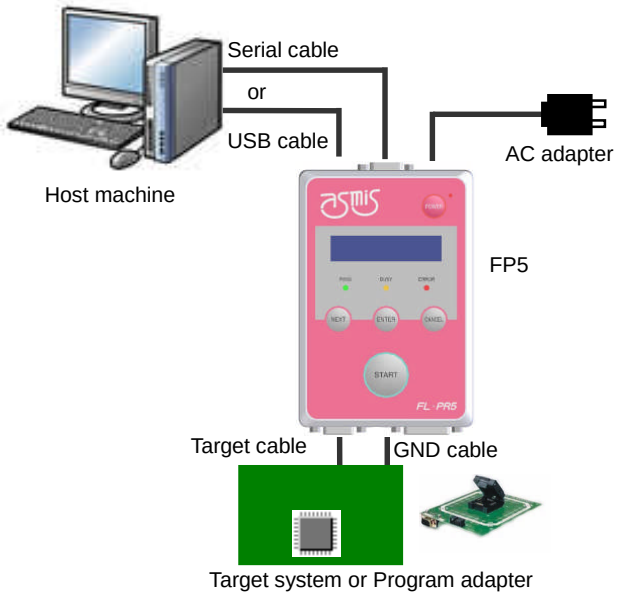
2.1 Package Contents

Please verify that you have received all the parts listed in the package contents list included with the FP5 package. If any part is missing or seems to be damaged, please contact an NEC Electronics sales representative or distributor.

2.2 System Configuration

The FP5 system configuration is as shown in the diagram below.

Figure 2-1. FP5 System Configuration



Notes 1. The target system and program adapter are not included in the FP5 package.

2. The program adapter is a product of Naito Densei Machida Mfg. Co., Ltd.

The FP5 is connected to the host system via an RS-232C serial cable or a USB cable. The FP5 is connected to the target system via a target cable. For details on the target cable specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

2.2.1 Host machine

A host machine is used to communicate with the FP5. Windows 2000 or Windows XP is required for using the programming GUI. The host machine must also be equipped with a serial port or a USB port.

2.2.2 Serial cable

Communication is established by using a serial cable to connect the host machine serial port and FP5 serial connector (RS-232C cross cable) connection. For details on the serial cable specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

2.2.3 USB cable

Communication is established by connecting the host machine USB port and the FP5 USB connector (mini-B type) using a USB cable. For details on the USB cable specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

2.2.4 AC adapter

Connect the FP5 power supply connector to the AC adapter included with the FP5. For details on the AC adapter specifications, refer to **1.6 Hardware Specifications**.

Caution The AC adapter is exclusively for the FP5, so do not use it for other products.

2.2.5 Target cable

A 16-pin connector is equipped on the tip of the target cable, which is connected to the target system or the program adapter. For details on the target cable specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

2.2.6 GND cable

To reinforce the GND, use a GND cable to connect the FP5 GND connector and the signal GND of the target system or program adapter. For details on the GND cable specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

Caution The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

2.2.7 Target system

The target system must be equipped with a device interface that complies with the target cable specifications. For details on the specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**, **CHAPTER 8 NOTES ON TARGET SYSTEM DESIGN**, and **CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS**.

2.2.8 Program adapter

The FP5 supports off-board programming through which programs are written via a program adapter (FA series) without mounting the target device onto the target system. Program adapters corresponding to each type of the target device package are available.

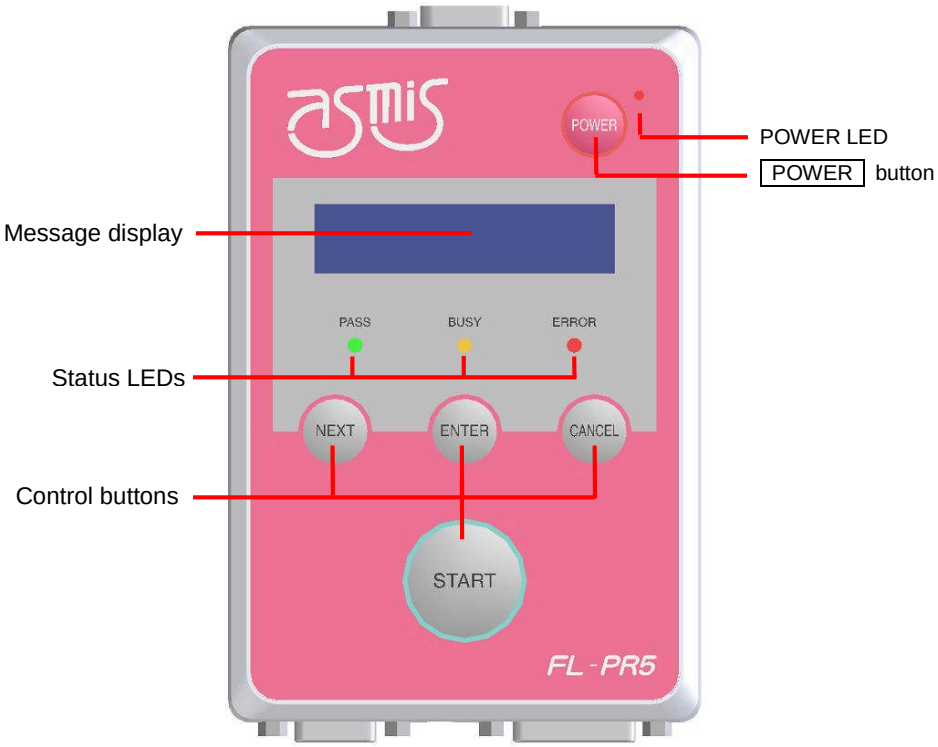
2.3 Names and Functions on Main Unit

This section describes the names and functions on the FP5 main unit.

2.3.1 FP5 control panel

Indicators and buttons are laid out on the FP5 top.

Figure 2-2. FP5 Top View <Control Panel>



(1) Indicators

- POWER LED — LED that displays the FP5 power status.
  A red LED is turned on when the FP5 is ON, and is turned off when the FP5 is OFF.
- Message display — An LCD display of 16 × 2-characters that indicates the operating mode or menus.
  It is mainly used when the FP5 operates in standalone mode.
- Status LEDs — LEDs that show the FP5 operating status.
  PASS (green LED turned on) indicates normal completion, BUSY (orange LED flashes) indicates processing in progress, and ERROR (red LED turned on) indicates errors.

(2) Buttons

- [POWER] button — Used to turn on/off the power to the FP5. Press this button longer (for about 1 minute) when turning off.
- [NEXT] button — Proceeds to the next menu item at the same level in sequence.
- [ENTER] button — Selects the item shown in the message display.
- [CANCEL] button — Cancels the current selection and returns to the previous menu item. The command currently running cannot be stopped, except for the [Read] command.
- [START] button — Executes the [Autoprocedure(E.P.)] command.

Remark The [NEXT], [ENTER], [CANCEL] and [START] buttons are mainly used in standalone mode.

2.3.2 FP5 connectors

The power supply connector, serial connector and USB connector are laid out on the host interface side.

The target connector, GND connector and remote connector are laid out on the target connector side.

Figure 2-3. FP5 Top View <Connector>

Figure 2-4. FP5 Host Interface Side

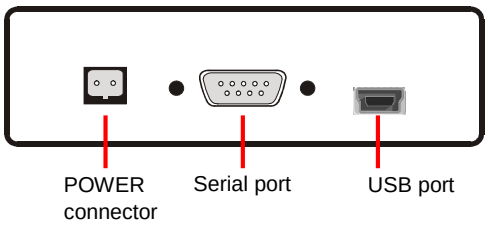
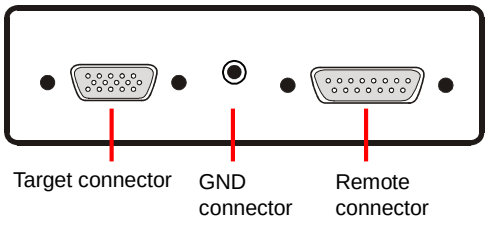


Figure 2-5. FP5 Target Connector Side



(1) Power supply connector

Connect the power supply connector to the AC adapter included with the FP5. For details on the power supply connector specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

Caution Do not use an AC adapter other than that included with the FP5.

(2) Serial connector

Communication is established by using a serial cable (RS-232C cross cable) connection to connect the host machine serial port and FP5 serial connector. The data transfer conditions are as follows.

- Data transfer speed: 9,600 bps, 19,200 bps, 38,400 bps, 57,600 bps, or 115,200 bps
- Data bit: 8 bits
- Parity: none
- Stop bit: 1 bit
- Flow control: hardware

The transfer speed is set to 115,200 bps by default, but it can be changed. For details on the serial connector specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

(3) USB connector

Communication is established by using a USB cable to connect the host machine USB port and the FP5 USB connector (mini-B type). This connector conforms with USB 2.0 standards. For details on the USB connector specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

(4) Target connector

Connect the target connector to the target system using the target cable for on-board programming. Connect the target connector to the program adapter using the target cable for off-board programming. For details on the target connector specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

(5) GND connector

To reinforce the GND, connect the FP5 GND connector and the signal GND of the target system or program adapter using a GND cable. For details on the GND connector specifications, refer to **CHAPTER 7 CONNECTORS AND CABLES**.

Caution The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

CHAPTER 3 SOFTWARE INSTALLATION

This chapter explains the following items related to installation.

- Obtaining software
- Installation
- Uninstallation
- Updating programming GUI, firmware and FPGA

3.1 Obtaining Software

Download the programming GUI, USB driver, and PG-FP5 parameter file (PR5 file) from the following website.

<Programming GUI (including USB driver)>

URL: http://www.ndk-m.cp.jp/asmis/ → Click "FL-PR5".

<PR5 file>

URLs Japanese version: http://www.necel.com/micro/ods/jpn/

English version: http://www.necel.com/micro/ods/eng/ → Click "Version-up Service".

Select the micro controller to be used in the Each Device Series column and select the device name in the Device Name column; the parameter file for PG-FP5 can then be found.

Caution Use of the latest version of software is recommended to assure the FP5 operation.

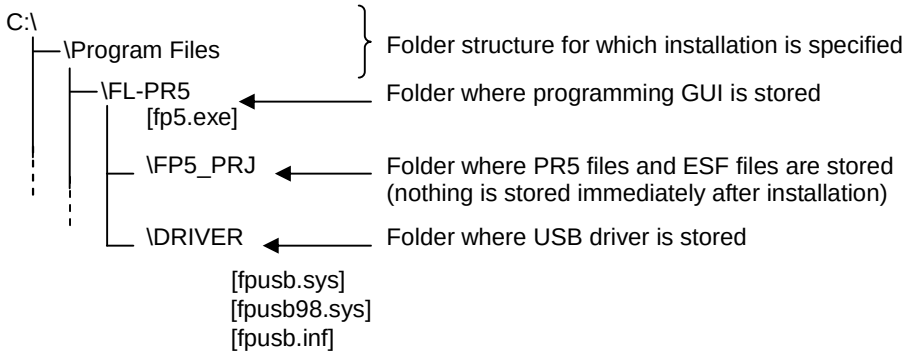
3.2 Installation

This section explains the installation procedure for the programming GUI, USB driver and parameter file (PR5 file).

Table 3-1. Installation

Installation Order	Item	Method
1	Programming GUI	Run the downloaded self-extracting file (fp5guixxx.exe). An executable file (setup.exe) is decompressed into the folder, so run it. And perform installation, following the directions on the installer screen.
2	PR5 file	Run the downloaded self-extracting file (pr5xxxxxxx_vxxx.exe). A *.pr5 file is decompressed into the folder, so copy it to the FP5_PRJ folder where the programming GUI is installed.
3	USB driver	The USB driver must be installed when connecting the FP5 and the host machine via the USB interface. The USB driver is stored into the *driver* folder in the folder where the programming GUI is installed. The USB driver is installed by Plug and Play. For details, refer to **3.2.1 Installation of USB driver**.

The folder configuration after programming GUI installation is as follows.



3.2.1 Installation of USB driver

The USB driver must be installed after installation of the programming GUI when connecting the FP5 and the host machine via the USB interface. When the FP5 is connected to the USB port on the host machine for the first time, the operating system automatically detects the FP5 by Plug and Play and the Welcome to the "Found New Hardware Wizard" will start.

In this section, displays of Windows XP are used for explanation. Displays are different when using Windows 2000, but installation can be performed in the same manner.

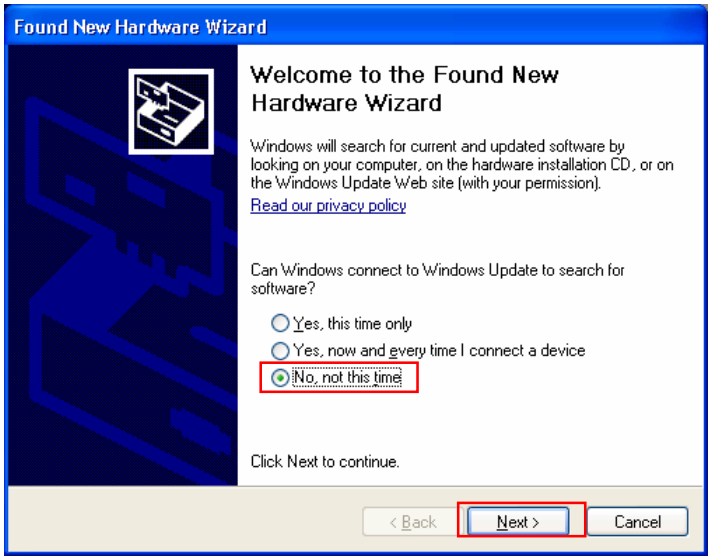
(1) Start up the host machine.

(2) Use a USB cable to connect the FP5 to the host machine, plug in the AC adapter and the AC adapter to the FP5 power supply connector.

(3) Press the POWER button on the FP5; the POWER LED will then turn on and "Command >" is displayed in the message display.

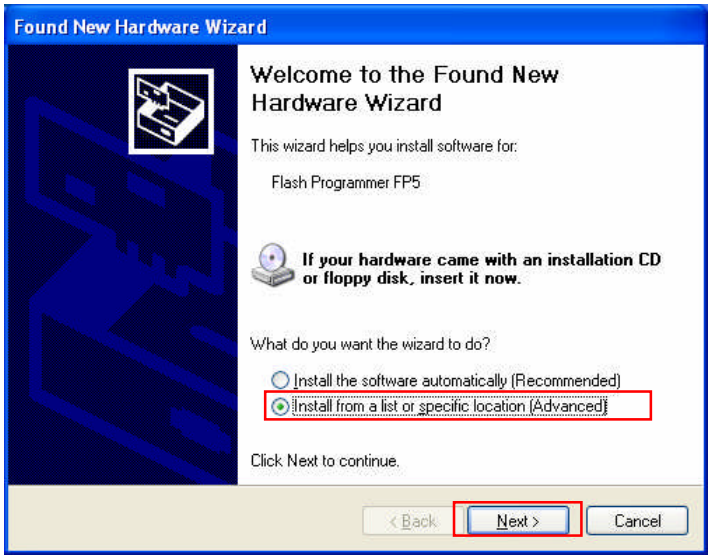
(4) The following window appears. Select "No, not this time" and click the Next > button.

Figure 3-1. Found New Hardware Wizard Window <1>



(5) The following window appears. Select "Install from a list of specific location (Advanced)" and click the Next > button.

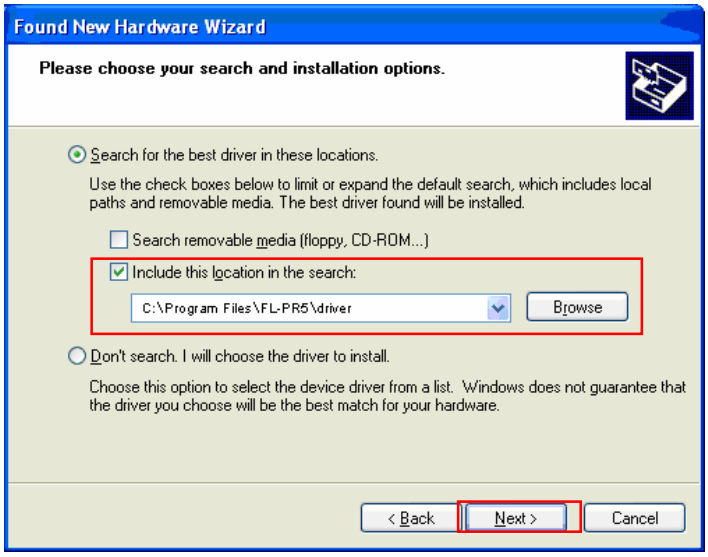
Figure 3-2. Found New Hardware Wizard Window <2>



(6) The following window appears. Select "Search for the best driver in these locations", "Include this location in the search", specify the folder where the USB driver is stored, and then click the Next > button.

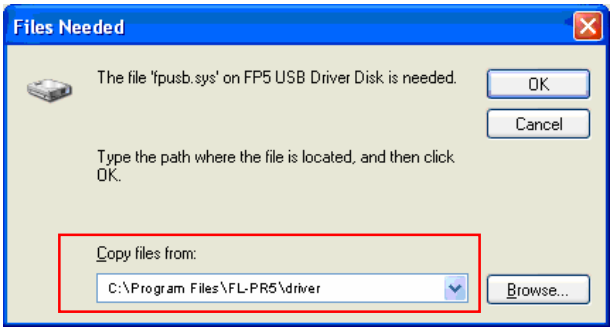
Remark When the Programming GUI is installed, the USB driver is installed into the *driver* folder in the Programming GUI installation folder. "C:\Program Files\FL-PR5\driver" should usually be specified. The *version* indicates the version of the programming GUI. Specify the *driver* folder for the latest programming GUI.

Figure 3-3. Found New Hardware Wizard Window <3>



(7) If the following window appears, specify the same folder as specified in (6) for "Copy files from" and then click the OK button.

Figure 3-4. Files Needed



(8) If the message "Software has not passed Windows Logo testing" or "Windows can't verify the publisher of this driver software" is displayed, select "Continue Anyway" or "Install this driver software anyway".

(9) The USB driver will then be installed, the FP5 is ready to communicate via the USB port.
Click the Finish button to complete the installation.

Figure 3-5. Found New Hardware Wizard Window <4>

3.3 Uninstallation

This section explains how to uninstall the programming GUI, USB driver, parameter file (PR5 file), customized setup file (ESF file) and setting information file (INI file). The uninstallation order is prescribed.

Table 3-2. Uninstallation

Item	Method
Programming GUI	Open [Add or Remove Programs] (or [Add/ Remove Programs]) on the Control Panel and uninstall this program. Parameter files (*.pr5), customized setup files (*.esf), files that contains programming GUI settings contents (FP5.ini) are not deleted.
PR5 file	Delete PR5 files (*.pr5) stored in the FP5_PRJ folder in the programming GUI installation folder.
USB driver	Uninstall the USB driver using the device manager in the [System] menu on Control Panel. For details, refer to **3.3.1 Uninstallation of USB driver**.
ESF file	Delete ESF files (*.esf) stored in the FP5_PRJ folder in the programming GUI installation folder, or other folder.
INI file	Delete INI files (FP5.ini) stored in the WINDOWS folder.

3.3.1 Uninstallation of USB driver

Uninstall the USB driver, using the following procedure.

(1) Start up the host machine.

(2) Use a USB cable to connect the FP5 to the host machine, plug in the AC adapter and the AC adapter to the FP5 power supply connector.

(3) Press the POWER button on the FP5; the POWER LED will then turn on and "Command >" is displayed in the message display.

(4) Open the Control Panel, double-click [System], click the [Hardware] tab, and the [Device Manager] button, select [Flash Programmer FP5] under [NECPCIF] and then click the [Delete] icon on the toolbar.

(5) Press the POWER button on the FP5 to turn power off; the POWER LED will then turn off. With this method, device information in the registry is deleted but the copied files remain. To completely delete all of this information, perform the above step (4), refer to the list of files copied during installation and delete the files. This method requires special attention because it directly deletes files manage by Windows.

C:\WINDOWS\System32\Drivers\ fpusb.sys: USB driver entity
C:\WINDOWS\inf\OemX.inf: fpusb.inf

Caution The C:\WINDOWS\inf folder can be seen only when "Display all file and folder" is selected on the [Display detail setting] tab in the folder option. "X" in OemX.inf indicates a numeric value starting from 0, which is assigned by the system. The detailed contents of the OemX.inf file must be checked. The relevant file includes the following notation.

```
; Installation inf for the NEC Electronics Flash Programmer
;
; Copyright(C) NEC Electronics Corporation 2005
```

3.4 Updating Programming GUI, Firmware and FPGA

The firmware and FPGA are programs embedded in the device for controlling the FP5. Updating the programming GUI, firmware and FPGA enables the following.

- Addition of newly supported functions or devices
- Correction of restrictions

Use of the latest versions of the programming GUI, firmware and FPGA are recommended to assure the FP5 operation.

The latest versions are available on the following website.

Website

http://www.ndk-m.co.jp/asmis/

Caution If update of firmware and FPGA is improperly performed, FP5 may no longer operate. Refer to the following procedure or method for updating.

Remark PR5 files, ESF files and program files are not changed, even if firmware and FPGA are updated.

Be sure to follow the procedure below when updating the firmware and FPGA.

Step 1. Check the current version. (Refer to **3.4.1 Checking the current version**.)

Step 2. If not the latest version, update the programming GUI. (Refer to **3.4.2 Installation of programming GUI**.)

Step 3. Update the firmware using the latest programming GUI. (Refer to **3.4.3 Installation of firmware update**.)

Step 4. Update the FPGA using the programming GUI. (Refer to **3.4.4 Installation of FPGA update**.)

3.4.1 Checking the current version

(1) Open the main window of the programming GUI. (Refer to **4.1 Introduction**.)

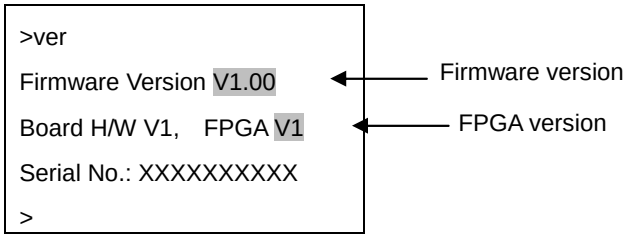
(2) Check the versions of the programming GUI, firmware and FPGA, as shown below.

Programming GUI: [Help] menu → [About]

Firmware: [Programmer] menu → [Reset] command[Note]

FPGA: [Programmer] menu → [Reset] command[Note]

Note Display example of [Reset] command



(3) The latest versions are available on the following websites.

Website

http://www.ndk-m.co.jp/asmis/

3.4.2 Installation of programming GUI

Run the downloaded self-extracting file (fp5guixxx.exe). An executable file (setup.exe) is decompressed into the folder, so run it. And perform installation, following the directions on the installer screen.

3.4.3 Installation of firmware update

Install the latest firmware by using the latest programming GUI. Run the downloaded self-extracting file (fp5_fw_vxxx.exe). Firmware file "fp5_fw_vxxx.rec" will then be decompressed into the folder, so copy it to any folder. ("*xxx*" indicates the firmware version.)

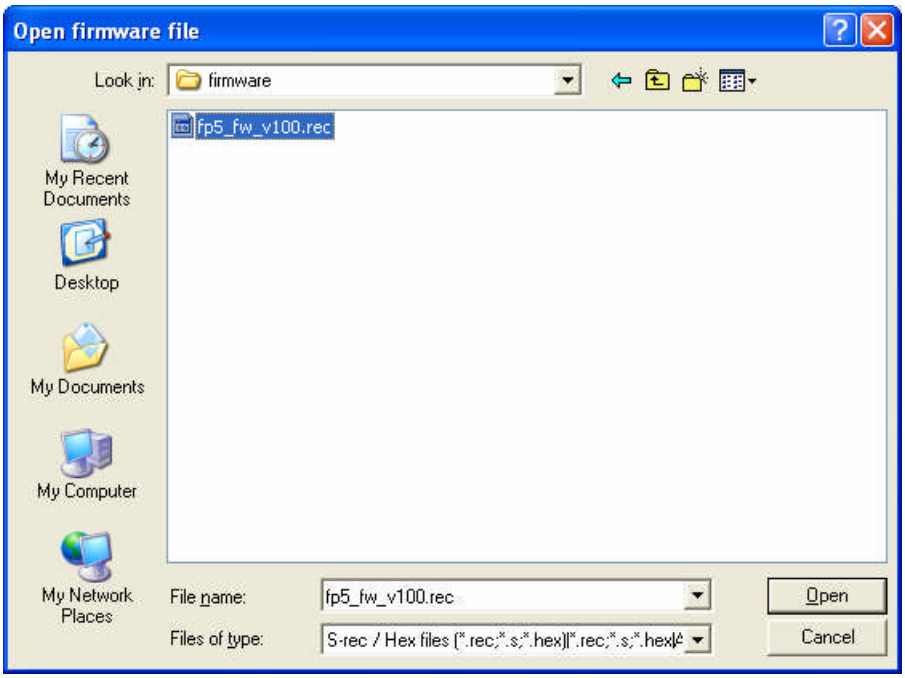
(1) Click the [Programmer] menu on the menu bar and select [Update Firmware]; the [Update Firmware] dialog box will then be opened.

Figure 3-6. [Update Firmware] Command

Figure 3-7. [Update Firmware] Dialog Box

(2) Click the OK button to continue firmware update. The [Open firmware file] dialog box is opened.

Figure 3-8. [Open firmware file] Dialog Box



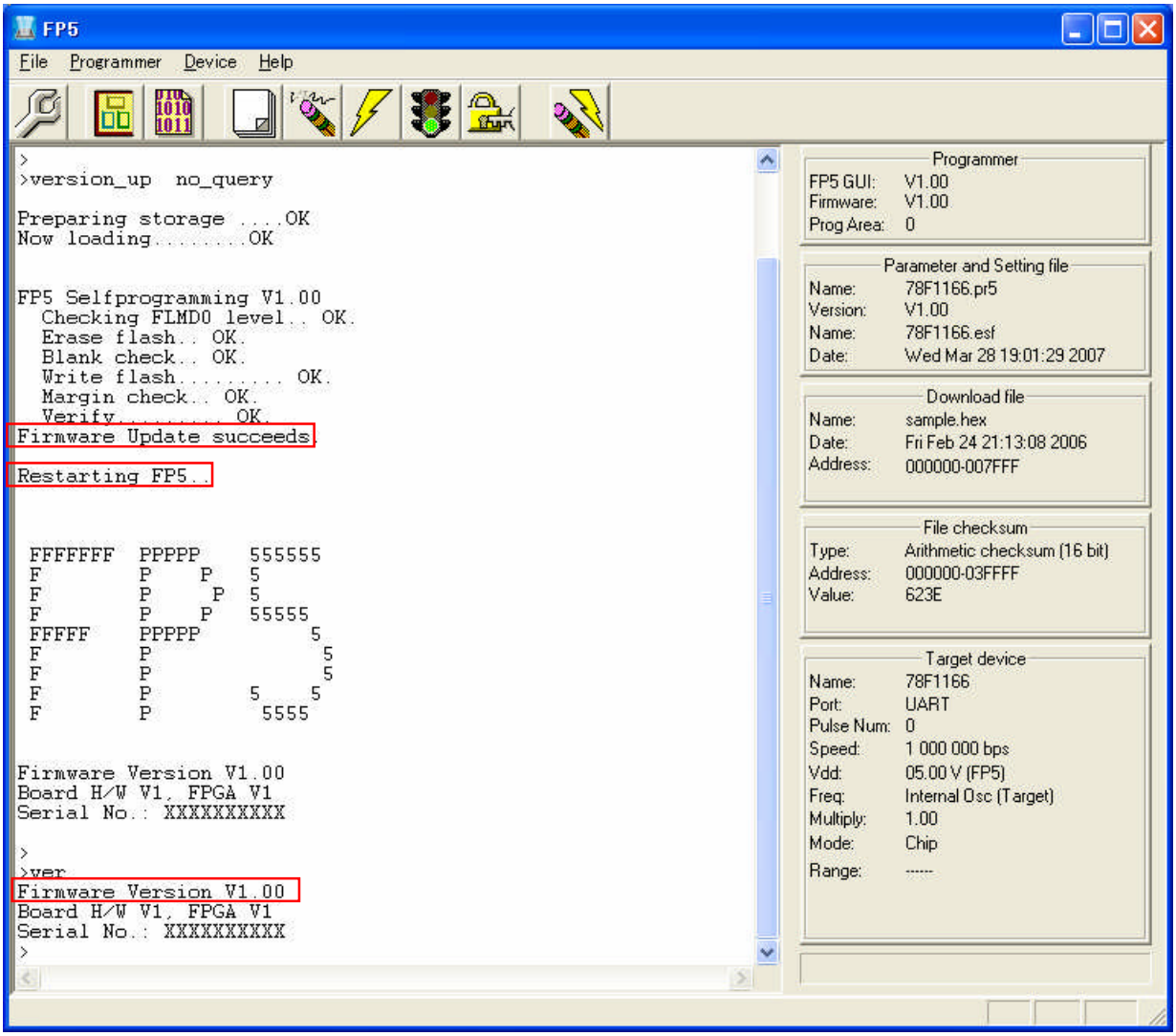
Select the firmware file "fp5_fw_vxxx.rec" and then click the Open button.

Caution Do not use FP5 firmware other than the one posted on the website; otherwise, a defect may occur.

(3) Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message "Firmware Update succeeds", which indicates normal completion of firmware update, and "Restarting FP5..", which is equivalent to [RESET] command processing, is automatically performed. The new version can then be checked as "Firmware Version Vx.xx". The update takes about 10 seconds.

Remark The action log window is a part of the main window of the programming GUI, which shows the operation progress status.

Figure 3-9. Action Log Window When Firmware Update Is Finished



3.4.4 Installation of FPGA update

Install the latest FPGA by using the latest programming GUI. Run the downloaded self-extracting file (fp5_fpga_vxxx.exe). The FPGA file "fp5_fpga_vxxx.rec" will then be decompressed into the folder, so copy it to any folder. ("*xxx*" indicates the FPGA version.)

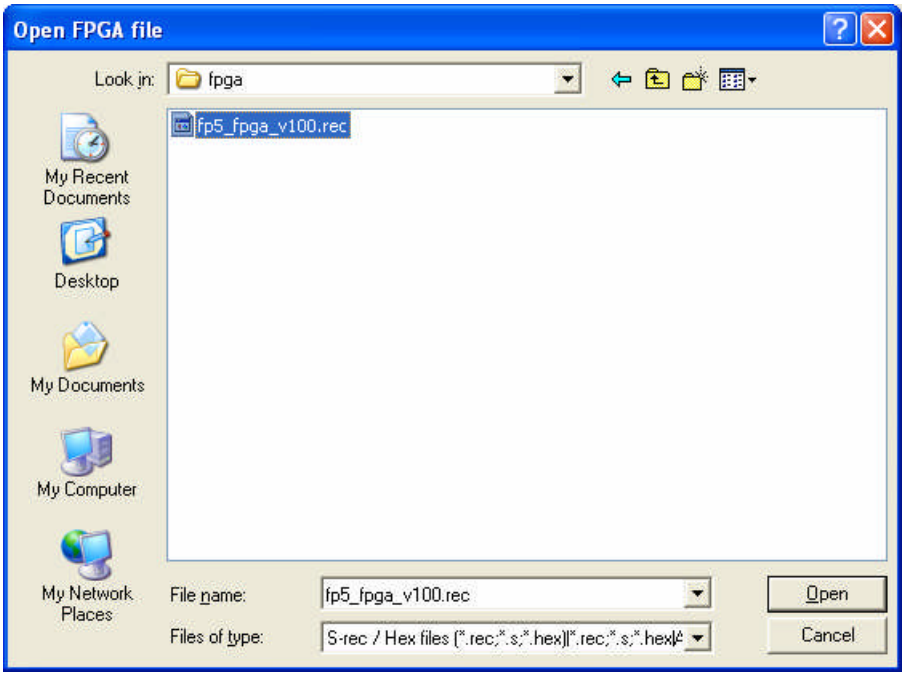
(1) Click the [Programmer] menu on the menu bar and select [Update FPGA]; the [Update FPGA] dialog box will then be opened.

Figure 3-10. [Update FPGA] Command

Figure 3-11. [Update FPGA] Dialog Box

(2) Click the OK button to continue FPGA update. The [Open FPGA file] dialog box is opened.

Figure 3-12. [Open FPGA file] Dialog Box

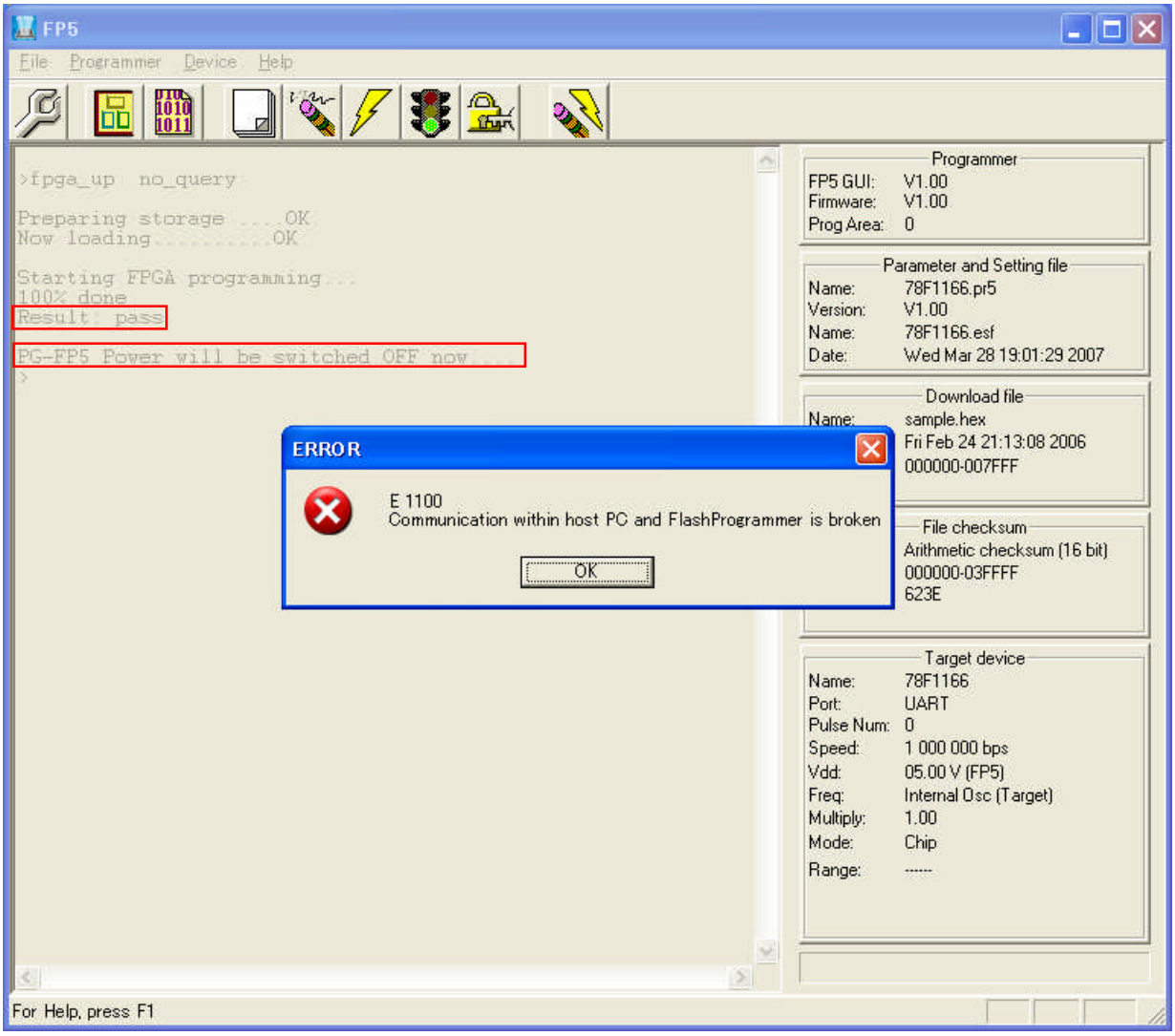


Select the FPGA file "fp5_fpga_vxxx.rec" and then click the Open button.

Caution Do not use an FP5 FPGA other than the one posted on the website; otherwise, a defect may occur.

(3) Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message "Result pass" , which indicates normal completion of firmware update, and "FP5 Power will be switched OFF now.....", which is equivalent to processing when the POWER button is turned off, is automatically executed. The update takes about 30 seconds.

Figure 3-13. Action Log Window When FPGA Update Is Finished

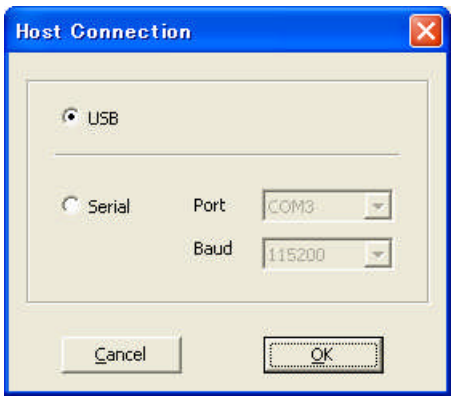


(4) Click the OK button in the error message dialog box and then press the POWER button on the FP5 to turn on power.

(5) Click the [Programmer] menu on the menu bar and select [Setup host connection...]; the [Host Connection] dialog box will then be opened. Select the communication mode used and then click the OK button.

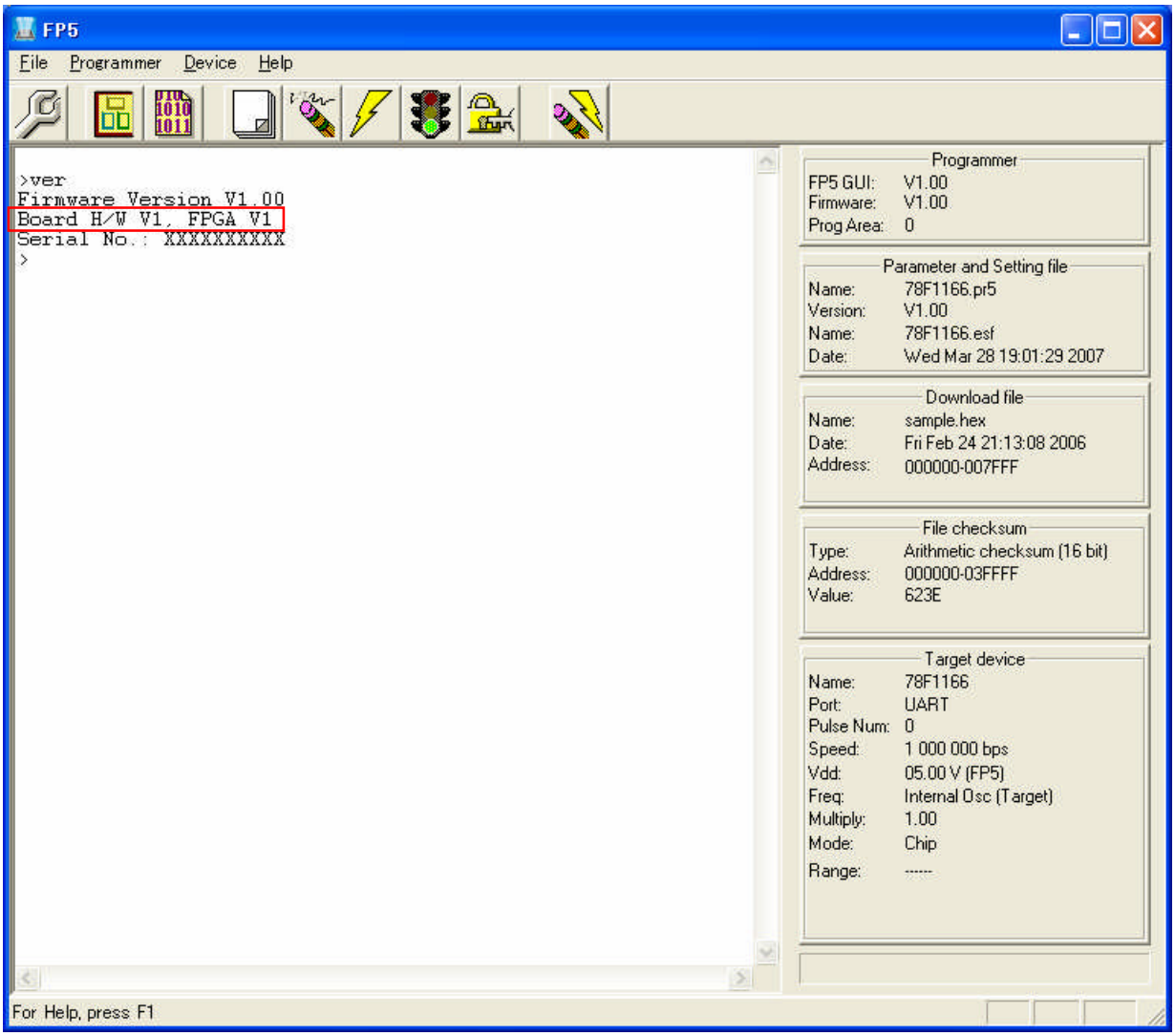
Figure 3-14. [Setup host connection] Command

Figure 3-15. [Host Connection] Dialog Box



(6) Communication with the host machine is established. "Board H/W V1, FPGA V1" is displayed in the action log window; thus, the version can be checked.

Figure 3-16. Version Confirmation After FPGA Update Is Finished



CHAPTER 4 PROGRAMMING GUI USAGE

This chapter explains functional details on windows and dialog boxes of the programming GUI.

4.1 Introduction

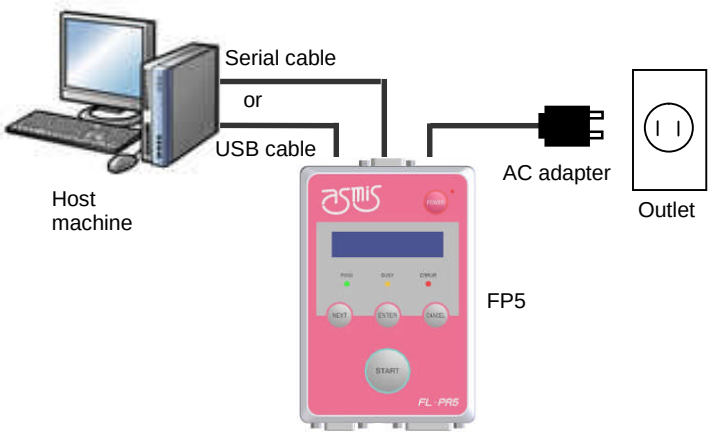
Make sure that the programming GUI, USB driver, and the FP5 parameter file (PR5 file) for the target device are installed. For the installation method, refer to **CHAPTER 3 SOFTWARE INSTALLATION**.

4.2 Startup of Programming GUI

(1) System connection

Connect a USB cable (or serial cable) to the USB port (or serial port) on the host machine, and the other side of the cable to the USB connector (or serial connector) on the FP5. Plug in the AC adapter and then connect to the FP5 power supply connector.

Figure 4-1. System Connection



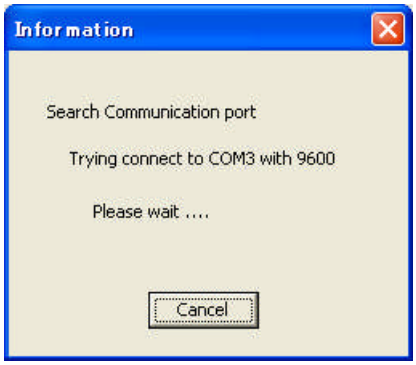
(2) FP5 startup

After the cables are connected, press the POWER button on the FP5. When the FP5 is correctly started, the POWER LED is turned on and "Commands >" is displayed in the message display. If not, the cause may be a defect in the FP5, so consult an our sales representative or distributor.

(3) Startup of programming GUI

Click the Start menu, "All Programs", point to "FL-PR5" and then select "FL-PR5" to start the Programming GUI. The valid communication mode is automatically detected in the order of the USB, and then the serial interface.

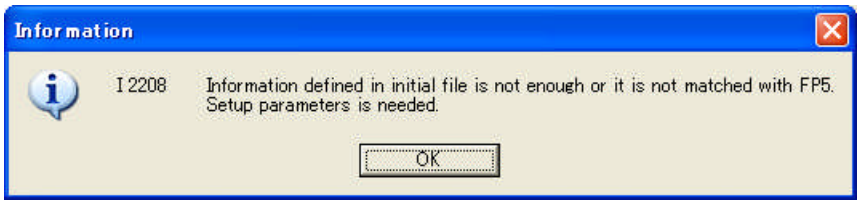
Figure 4-2. Port Scanning at Startup of Programming GUI



The communication mode can also be selected by cancelling this operation by clicking the Cancel button and selecting the [Setup host connection...] command in the [Programmer] menu.

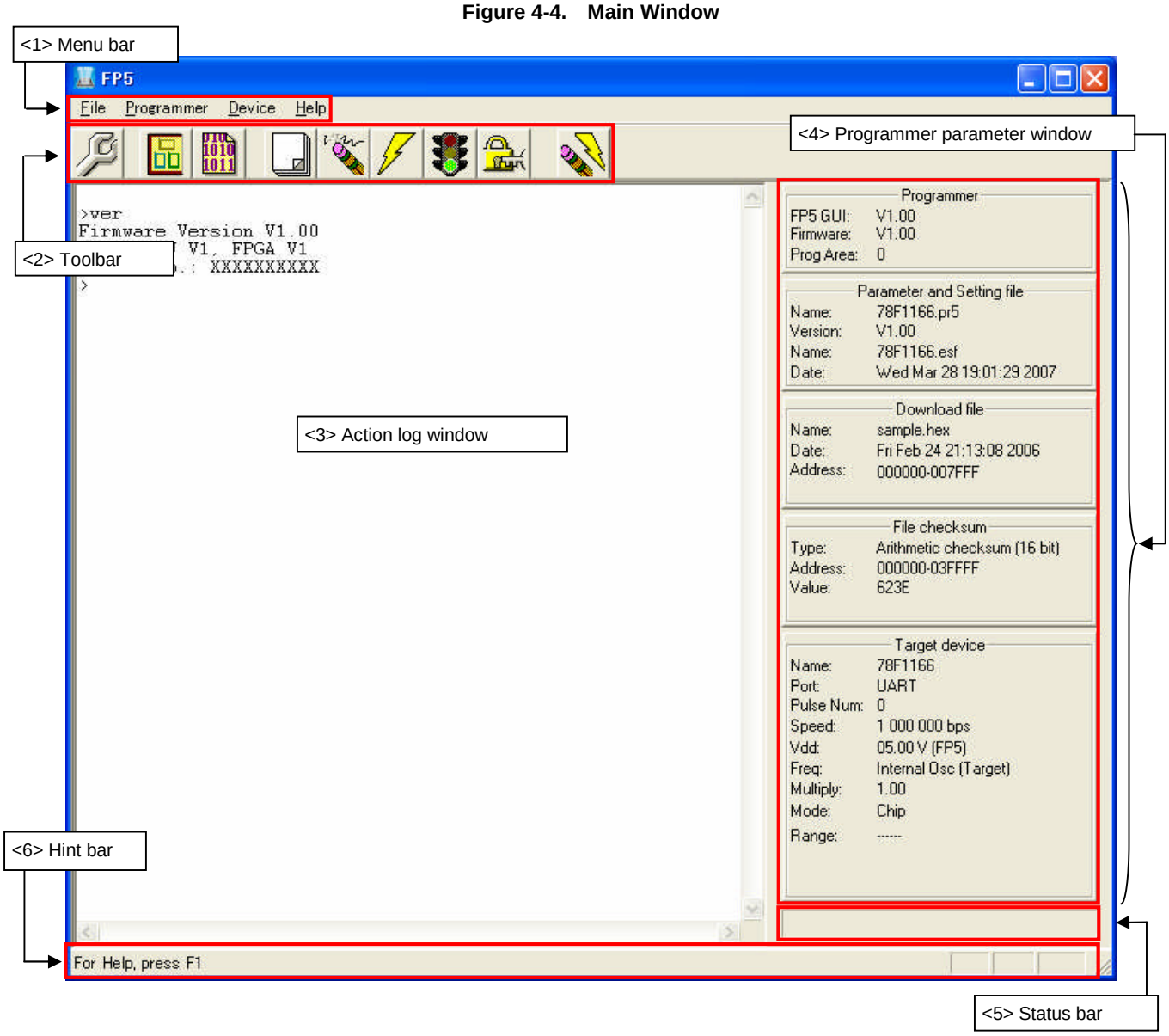
When communication is established and the programming GUI is correctly started, the main window will be opened. The following message will be displayed if the programming GUI is started for the first time or valid programming areas have been cleared, so click the OK button.

Figure 4-3. Message Displayed at the First Startup of Programming GUI



The Device Setup dialog box, which is usually opened by executing the [Setup...] command in the [Device] menu, will open. Perform settings in this dialog box. For the setting method, refer to **4.3.3 (12) [Setup...] command**.

Figure 4-4. Main Window



The main window consists of the following areas.

Name		Displayed Items	Refer to:
<1>	Menu bar	Menu items executable by the programming GUI	4.3
<2>	Toolbar	Frequently used commands, as buttons	4.4
<3>	Action log window	A programming GUI action log	4.5
<4>	Programming parameter window	Programming parameter settings	4.6
<5>	Status bar	Command progress shown as a color or with a message	4.7
<6>	Hint bar	Hints for commands and toolbar	4.8

4.3 Menu Bar

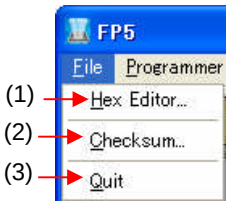
The menu bar displays the commands that are available for the programming GUI. Some commands may be unavailable when the programming GUI is started for the first time, or depending on the parameter file (PR5 file) selected.

Caution During command execution, do not execute other commands or terminate the programming GUI.

4.3.1 [File] menu

The following pull-down menu appears by clicking the [File] menu.
This menu includes commands related to program file operation.

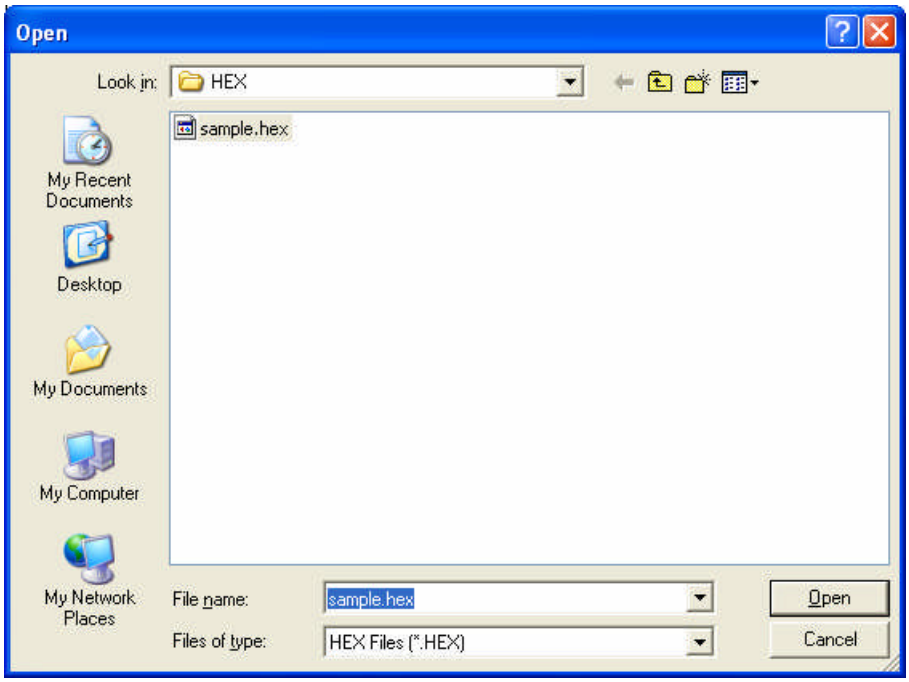
Figure 4-5. [File] Menu



(1) [Hex Editor...] command

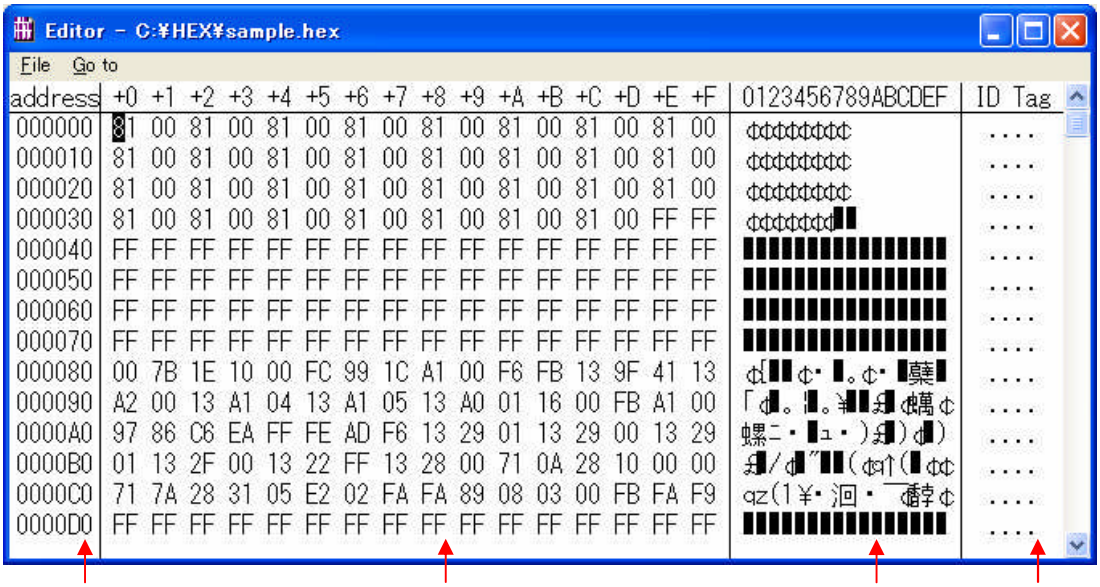
The [Hex Editor] menu allows you to edit a program file in Intel HEX format or Motorola HEX format. When this command is executed, a HEX Editor select dialog box is opened and the file to be edited can be specified.

Figure 4-6. HEX Editor Select Dialog Box



HEX Files (*.HEX), SREC Files (*.REC) or All files (*.*) may be selected from the Files of types list box.
After selecting a file to be opened, the file selected in the HEX Editor main window is loaded. At this time, whether the file is of the Intel HEX format or Motorola HEX format is automatically recognized. When loading is finished, the HEX Editor main window is opened.

Figure 4-7. HEX Editor Main Window



The displayed file contents can be modified by placing the pointer in the data display area in the HEX Editor main window. Data input via the keyboard is accepted for all shown memory locations.

The ID Tag area is the area used with the target device supporting data flash. Only address 400000h and later can be edited in this area. For details on data flash and ID tags, refer to the user's manual of the target device.

The HEX Editor only accepts hexadecimal data, i.e., numbers 0 to 9 and letters A to F. All other data will be rejected.

The ASCII representation, if any, is shown in the ASCII display area. This area is for reference only, so no data can be input.

Use the scroll bar to move another address range into the visible area of the HEX Editor.

The address space that can be viewed in the HEX Editor window is up to 4 MB + 64 KB (data flash space).

The following keys can be input using the keyboard.

Table 4-1. Key Functions That Can Be Input in HEX Editor Window

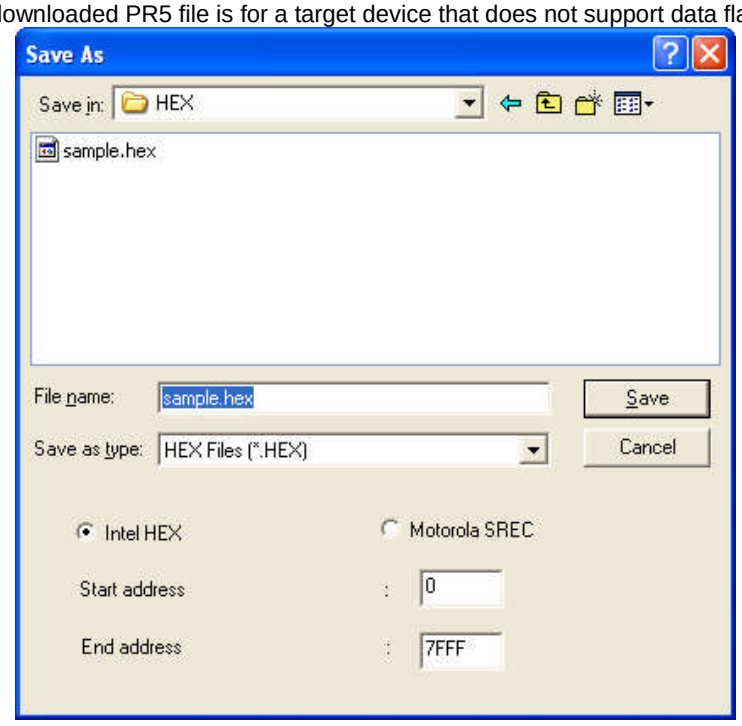
Key	Function
0-9, A-F	Data input (data display area)
→	Move cursor in right direction
←	Move cursor in left direction
↑	Move cursor in up direction
↓	Move cursor in down direction
Tab	Tab Move cursor to next input field (address + 1)

If any change has been made to the file, [Save] and [Save As] in the [File] menu in the HEX Editor main window become available for saving the modified data.

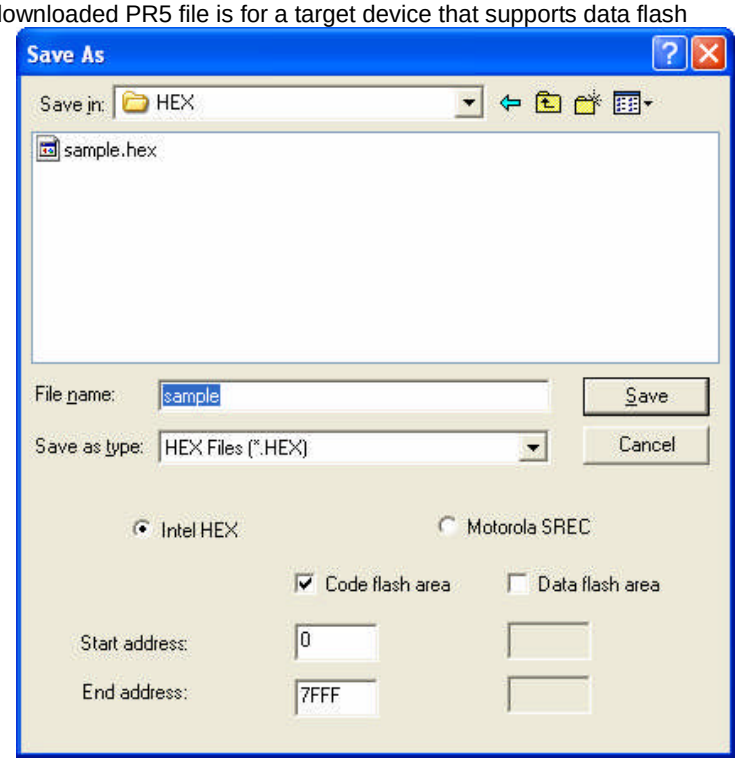
The [Save As] display varies whether or not the downloaded PR5 file is for the target device that supports data flash.

Figure 4-8. [Save As] Dialog Box of HEX Editor

The downloaded PR5 file is for a target device that does not support data flash



The downloaded PR5 file is for a target device that supports data flash



Besides the file name and folder location, a start address and an end address for the new file can be selected in the [Save As] dialog box. The original start address and end address are displayed by default. Select the file radio button for the format in which to save the data. Select the same format as that of the loaded file. Use of the saved file with other tool products is not supported.

Remark For the saved program file contents of the data flash area, refer to **Figure B-1 Relationship Between HEX Editor and Saved Program File**.

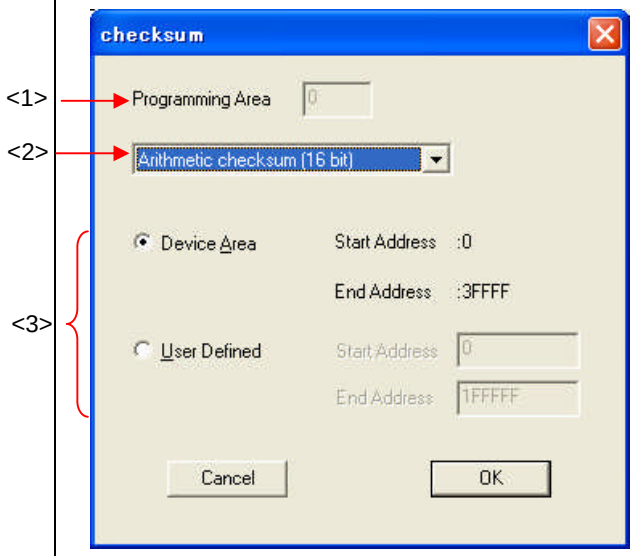
(2) [Checksum] command

The [Checksum] command calculates the checksum of the selected program file and displays the result. When this command is executed, the Checksum dialog box appears. Select the optional calculation method and the target address range, and click the OK button. The result will then be displayed in the [File Checksum] area in the action log window and programmer parameter window. This command can be executed after the [Setup] command is executed. If the [Setup] command is executed again after the [Checksum] command is executed, the result displayed in the [File Checksum] area in the programmer parameter window will be cleared.

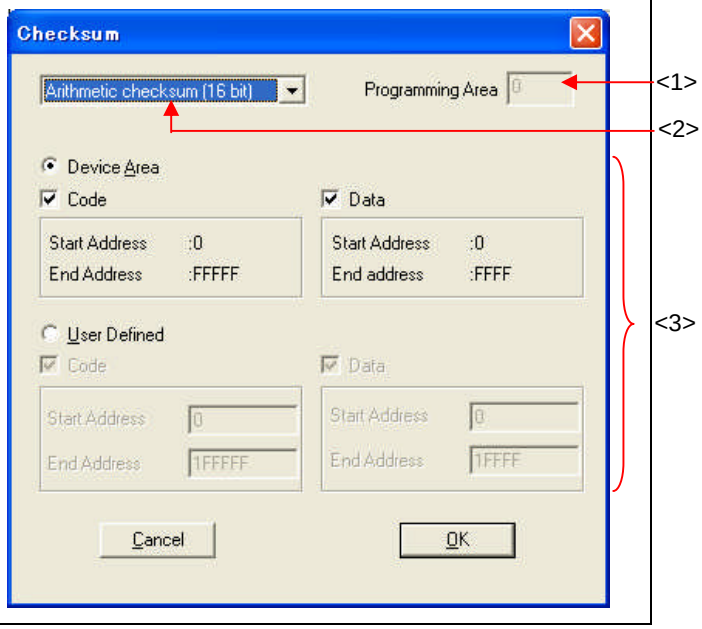
The [Checksum...] dialog box display varies whether or not the downloaded PR5 file is for a target device that supports data flash.

Figure 4-9. Checksum Dialog Box

The downloaded PR5 file is for a target device that does not support data flash



The downloaded PR5 file is for a target device that supports data flash



<1> Programming area

The valid programming area is displayed.

<2> Checksum calculation mode selection

Select the mode for calculating checksum of the selected program file.

Arithmetic checksum (16bit): 16-bit arithmetic (subtraction)

CRC sum (32bit): 32-bit CRC

Remark With the 16-bit arithmetic (subtraction) mode, the lower 4 digits of the result from which a value is subtracted from 00h in 1-byte units are displayed. With 32-bit mode, the 8-digit result of CRC32 function calculation is displayed. For details on arithmetic specifications, refer to **Figure B-2 32-bit CRC Calculation Specifications**.

<3> Address range selection

Select the range for calculating checksum of the selected program file. If there is no program file data in the specified range, the specified range is filled with FFh for calculation.

Device Area: From the start to end addresses of the device, which are contained in the selected PR5 file

User Defined: Any range can be specified by inputting the addresses to the [Start Address] and [End Address] text boxes.

Clicking the [OK] button displays the calculation result in the [File Checksum] area in the action log window and programmer parameter window.

Clicking the [Cancel] button closes the dialog box without saving the settings made in the Checksum dialog box.

Remark When the valid programming area is changed or a program file is downloaded, the checksum result will be cleared.

Figure 4-10. Checksum Result <If Downloaded PR5 File Is for Target Device That Does Not Support Data Flash>

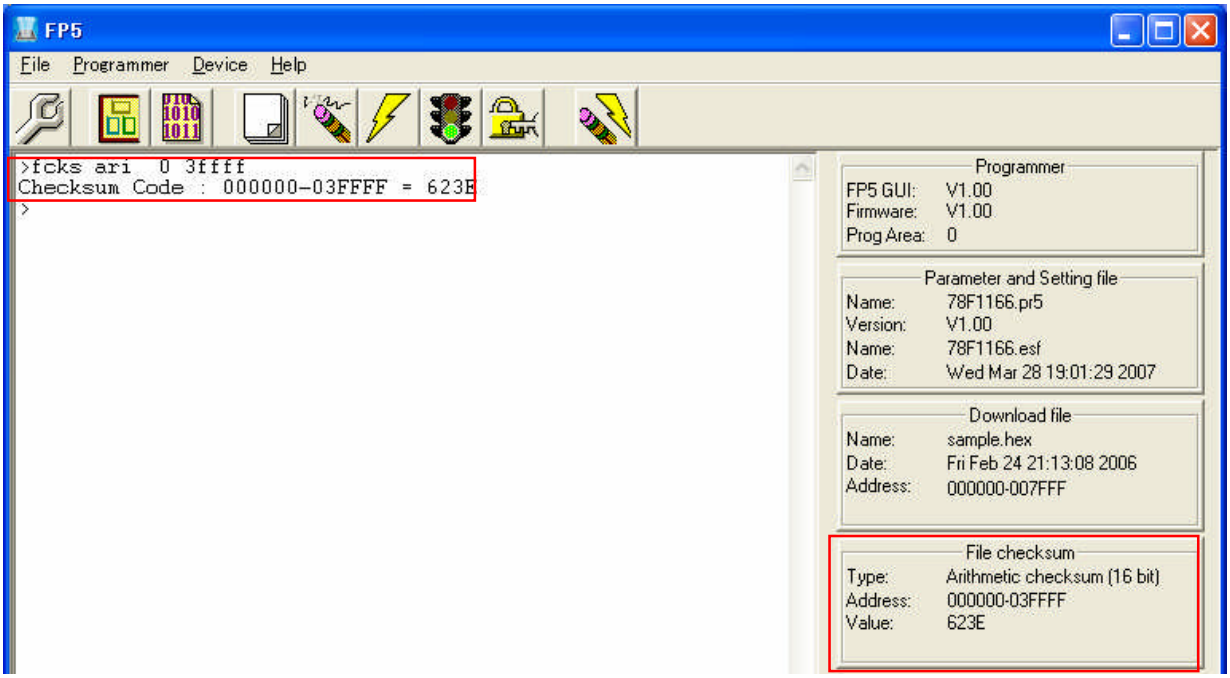
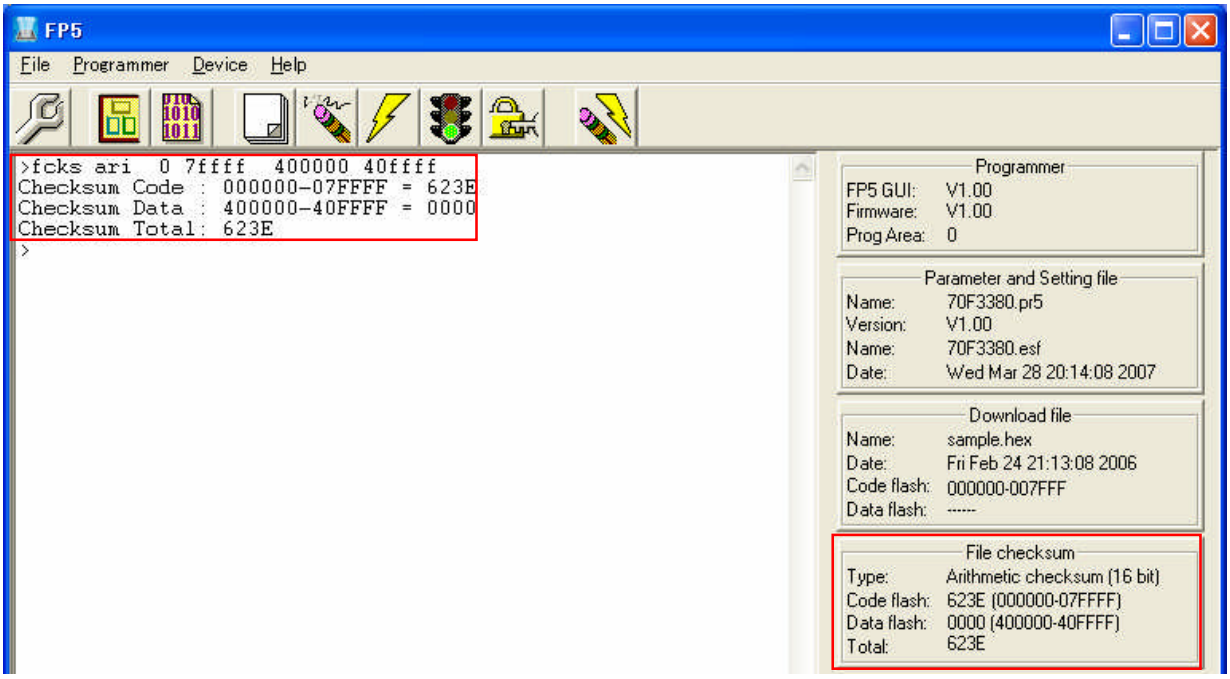


Figure 4-11. Checksum Result <If Downloaded PR5 File Is for Target Device That Supports Data Flash>



(3) [Quit] command

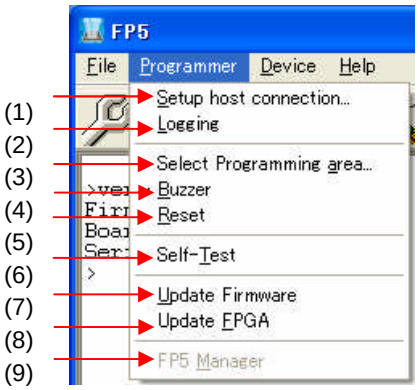
The [Quit] command terminates the programming GUI. The programming GUI can also be terminated by clicking the [×] button on the right end of the title bar in the main window. When the programming GUI is terminated, various settings are saved in the INI file (FP5.ini), and these settings are loaded when the programming GUI is started the next time. The INI file is created in the WINDOWS folder.

4.3.2 [Programmer] menu

Clicking the [Programmer] menu displays the following pull-down menu.

This menu includes commands related to FP5 settings.

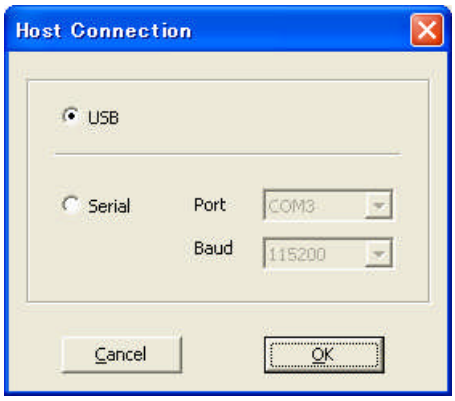
Figure 4-12. [Programmer] Menu



(1) [Setup host connection] command

Running the [Setup host connection] command opens the [Host Connection] dialog box. The channel for communication between the FP5 and the host machine can be selected and configured in this dialog box.

Figure 4-13. [Host Connection] Dialog Box



"USB" can be selected as the communication channel if the USB interface is supported in the PC used.

When selecting "Serial", select the COM port and baud rate from the drop-down list boxes. COM ports that are recognized by the host machine are displayed in the Port list. Up to 256 ports can be recognized.

When the OK button is clicked, software tries to establish a connection between the FP5 and the host machine using the selected communication channels.

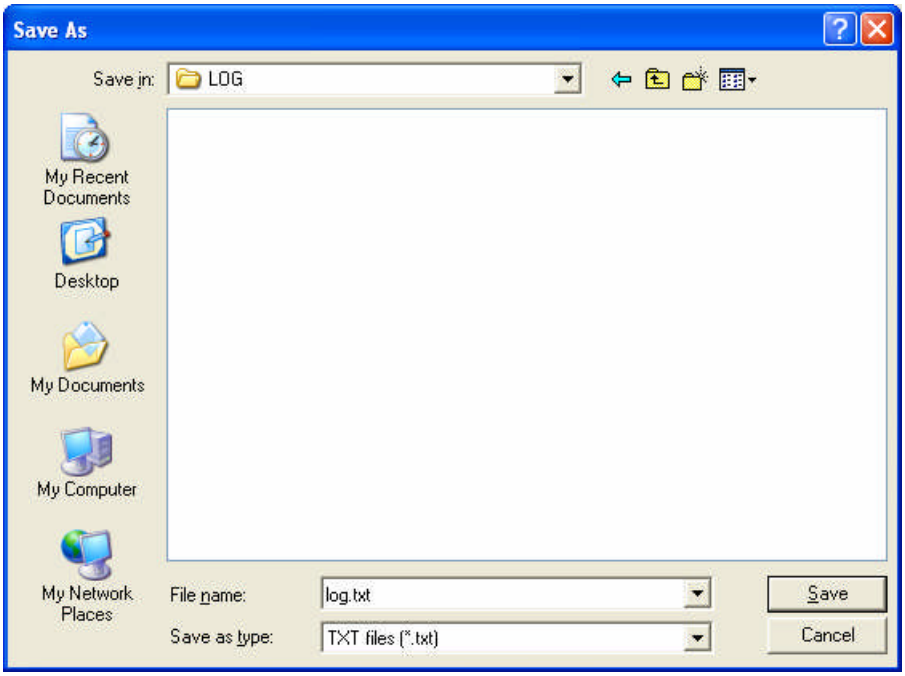
Clicking the Cancel button closes the window without making any changes.

(2) [Logging] command

The [Logging] command saves information displayed in the action log window in the log file. When this command is executed, the log file save dialog box appears. Move to an arbitrary folder, select the log file in the [File name] drop-down list, and click the [Save] button; the log file will then be saved. The [Logging] command on the menu bar will be checked. The check mark will be cleared by clicking the [Logging] command again and saving of the log file will be stopped. Enabling/disabling the [Logging] command is added to the time stamp. For a log file example, refer to **Figure B-3 Log File Example**.

Remark The log file that was saved the last time is displayed in the log file save dialog box.

Figure 4-14. Log File Save Dialog Box



Clicking the [Save] button saves the specified log file.

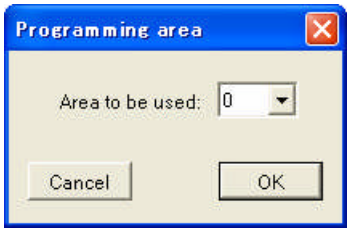
Clicking the [Cancel] button closes the dialog box without saving the log file.

(3) [Select Programming area] command

The FP5 has a 16 MB flash memory area for saving program files. This memory area can be used as four 4 MB programming areas (Area 0 to Area 3) or eight independent 2 MB programming areas (Area 0 to Area 7). Program files can be downloaded to each programming area, and which file, PR5 or ESF, is to be saved is selectable in programming area units. That is, files can be individually downloaded in each programming area, and the area used can also be selected individually.

This command is used to select a valid programming area from the FP5's four (or eight) programming areas (4 MB in case of four areas, or 2 MB in case of eight areas). When this command is executed, the programming area select dialog box is opened, and the desired programming area can be selected. The number of programming areas that can be selected with this command is the value defined in the [Programming Area Setting] area on the [Target] tab of the Device Setup dialog box, which is opened by the [Setup...] command in the [Device] menu.

Figure 4-15. Programming Area Select Dialog Box



The currently selected programming area is displayed in the programming area selection dialog box. To change the area, select the relevant number from the list box and click the OK button. To check the contents set to each area or to change the division factor, see the [Target] tab of the Device Setup dialog box.

Clicking the OK button selects the programming area selected in the programming area select dialog box.
Clicking the Cancel button closes the dialog box without changing the programming area.

(4) [Buzzer] command

The [Buzzer] command is used to enable or disable the setting to output the buzzer sound from the FP5 main unit. When this command is executed, the [Buzzer] command on the menu bar is checked and becomes valid. When this command is executed again, the check mark is cleared and the command becomes invalid. The FP5 makes a double-beep sound when the Autoprocedure(E.P.) command is completed normally, or makes a buzzer sound when the command results in an error.

(5) [Reset] command

When the [Reset] command is executed, a software reset can be applied to the FP5. After reset, the current versions of the firmware and FPGA, and the FP5 serial number will be displayed in the action log window.

(6) [Self-Test] command

The [Self-Test] command executes the FP5 self-testing program. The following four items are subject to self-testing. The self-testing program does not affect the PR5 files, ESF files and program files saved in the FP5.

<1> FPGA test

<2> Power generation block test

<3> Target interface I/O test

<4> Remote interface I/O test

Since execution of the [Self-Test] command involves I/O testing, a message that prompts the user to disconnect hardware connected the target connector or remote connector is displayed. Remove hardware (including target system and program adapter), connected to the target connector or remote connector, if any. Make sure that no hardware is connected and click the OK button; self-testing will then be executed.

If the Cancel button is clicked, self-testing will not be executed.

Figure 4-16. Confirmation Before Starting Self-Testing

Self-testing takes about three seconds, and the result will be displayed in the action log window and a result dialog box. If the message "Selftest FAILED." is displayed, the cause may be a defect in the FP5, so consult an NEC Electronics sales representative or distributor.

Figure 4-17. When Self-Testing Result Is "PASSES" <Action Log Window>

```
>selftest

***** CAUTION *****
Remove any plugs from Target- and Remote-Connector before starting.
Any hardware attached to those connectors may be damaged by this test !
***** CAUTION *****

Target- and Remote-connector unplugged ?
If yes, press 's' to start the test: s

FPGA Test: PASS
Power Supply Test: PASS
Target- and Remote-Interface Test: PASS
Selftest PASSED.
>
```

Figure 4-18. When Self-Testing Result Is "PASSES" <Result Dialog Box>

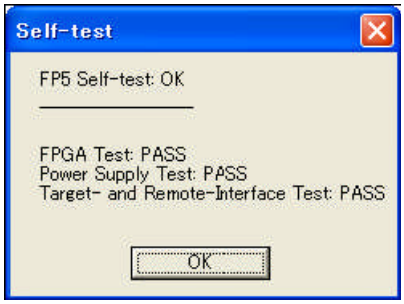
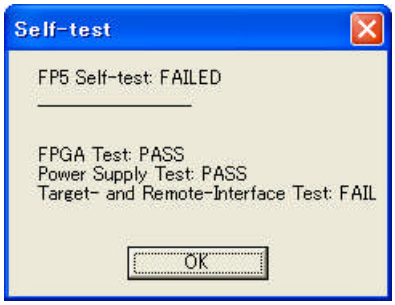


Figure 4-19. Example for When Self-Testing Result Is "FAILED" <Action Log Window>

```
>selftest

***** CAUTION *****
Remove any plugs from Target- and Remote-Connector before starting.
Any hardware attached to those connectors may be damaged by this test !
***** CAUTION *****

Target- and Remote-connector unplugged ?
If yes, press 's' to start the test: s

FPGA Test: PASS
Power Supply Test: PASS
Target- and Remote-Interface Test: FAIL

Selftest FAILED.
>
```

Figure 4-20. Example for When Self-Testing Result Is "FAILED" <Result Dialog Box>



(7) [Update Firmware] command

The [Update Firmware] command updates the firmware. Refer to **3.4 Updating Programming GUI, Firmware and FPGA** and download the relevant update file before starting update.

Executing of this command displays the following dialog box.

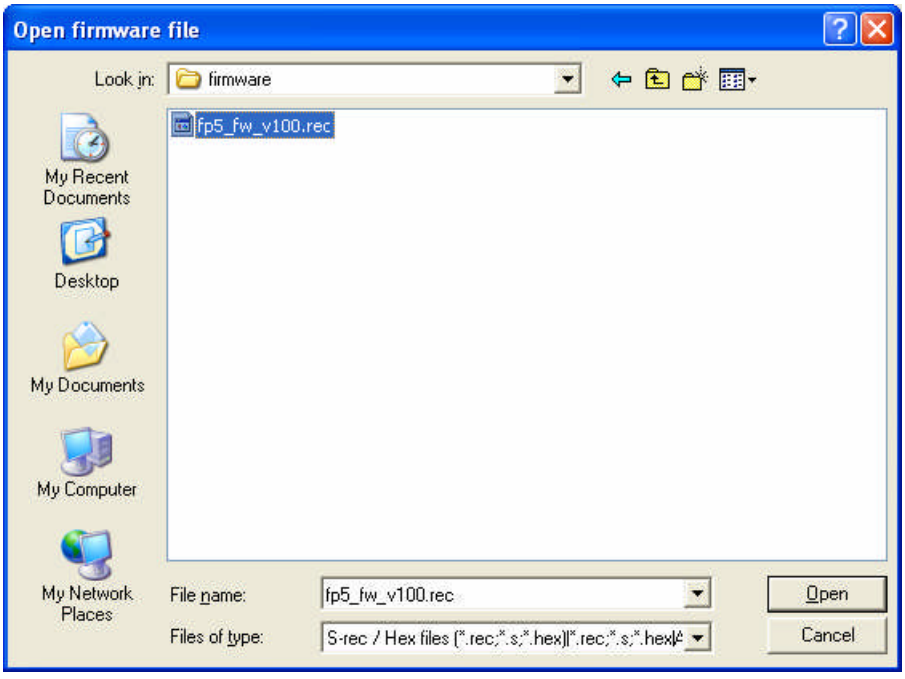
Figure 4-21. [Update Firmware] Dialog Box

To continue the firmware update, click the OK button.

Clicking the Cancel button cancels the firmware update.

Clicking the OK button opens the [Open firmware file] dialog box.

Figure 4-22. [Open firmware file] Dialog Box

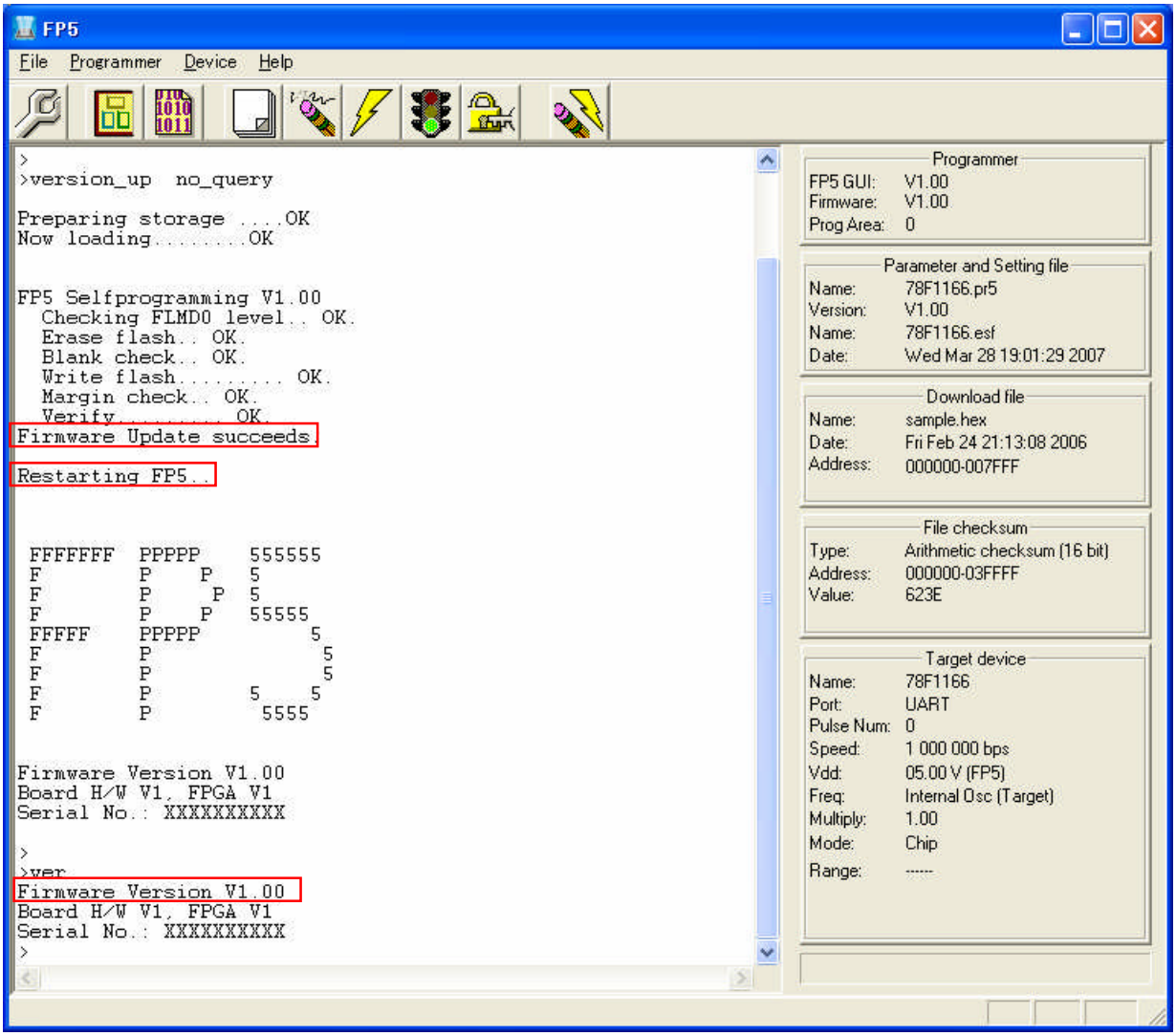


Select the firmware file "fp5_fw_vxxx.rec" and then click the Open button.

Caution Do not use FP5 firmware other than the one posted on the website; otherwise, a defect may occur.

Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message "Firmware Update succeeds", which indicates normal completion of firmware update, and "Restarting FP5..", which is equivalent to [RESET] command processing, is automatically performed. The new version can then be checked as "Firmware Version Vx.xx". The update takes about 10 seconds.

Figure 4-23. Action Log Window When Firmware Update Is Finished



(8) [Update FPGA] command

The [Update FPGA] command updates the FPGA. Refer to **3.4 Updating Programming GUI, Firmware and FPGA** and download the relevant update file before starting update.

Executing of this command displays the following dialog box.

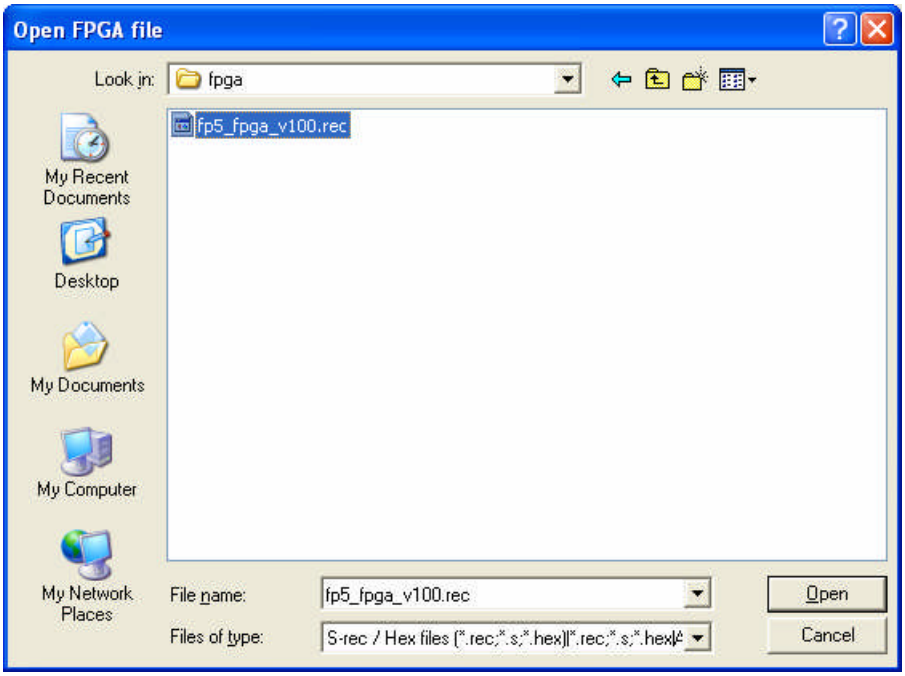
Figure 4-24. [Update FPGA] Dialog Box

To continue the FPGA update, click the OK button.

Clicking the Cancel button cancels the FPGA update.

Clicking the OK button opens the [Open FPGA file] dialog box.

Figure 4-25. [Open FPGA file] Dialog Box

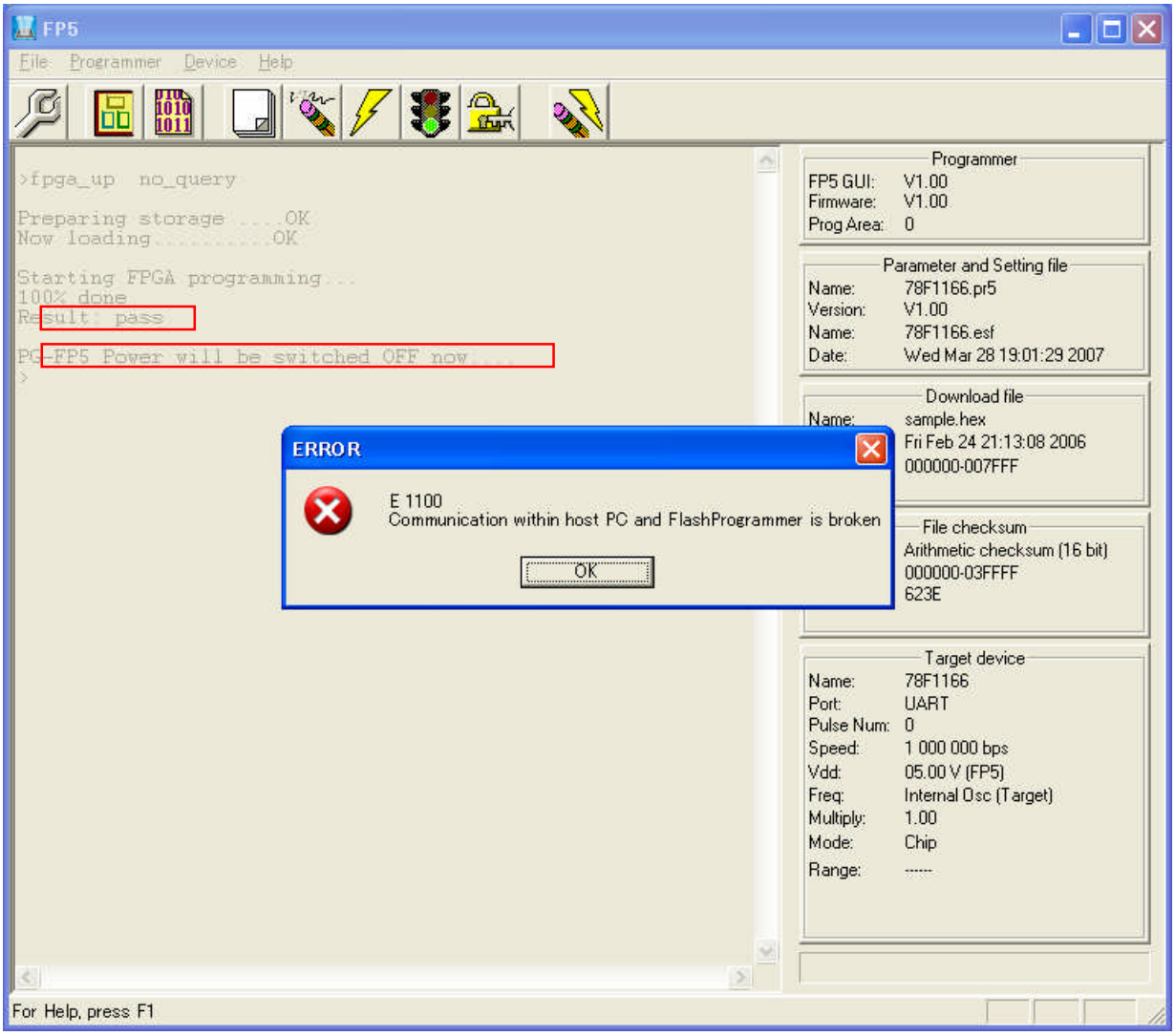


Select the FPGA file "fp5_fpga_vxxx.rec" and then click the Open button.

Caution Do not use FP5 FPGA other than the one posted on the website; otherwise, a defect may occur.

Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message "Result pass" , which indicates normal completion of firmware update, and "FP5 Power will be switched OFF now.....", which is equivalent to processing when the POWER button is turned off, is automatically executed. The update takes about 30 seconds.

Figure 4-26. Action Log Window When FPGA Update Is Finished

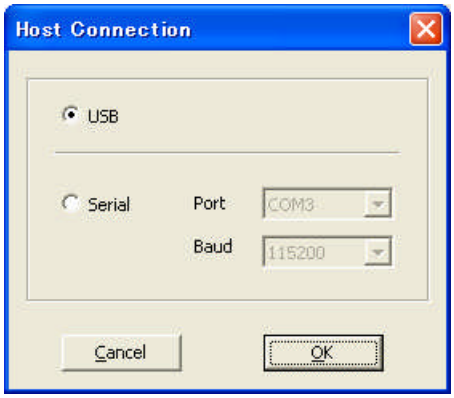


Click the OK button in the error message dialog box and then press the POWER button on the FP5 to turn on power.

Execution of the [Setup host connection...] command opens the [Host Connection] dialog box. Select the communication mode used and then click the OK button.

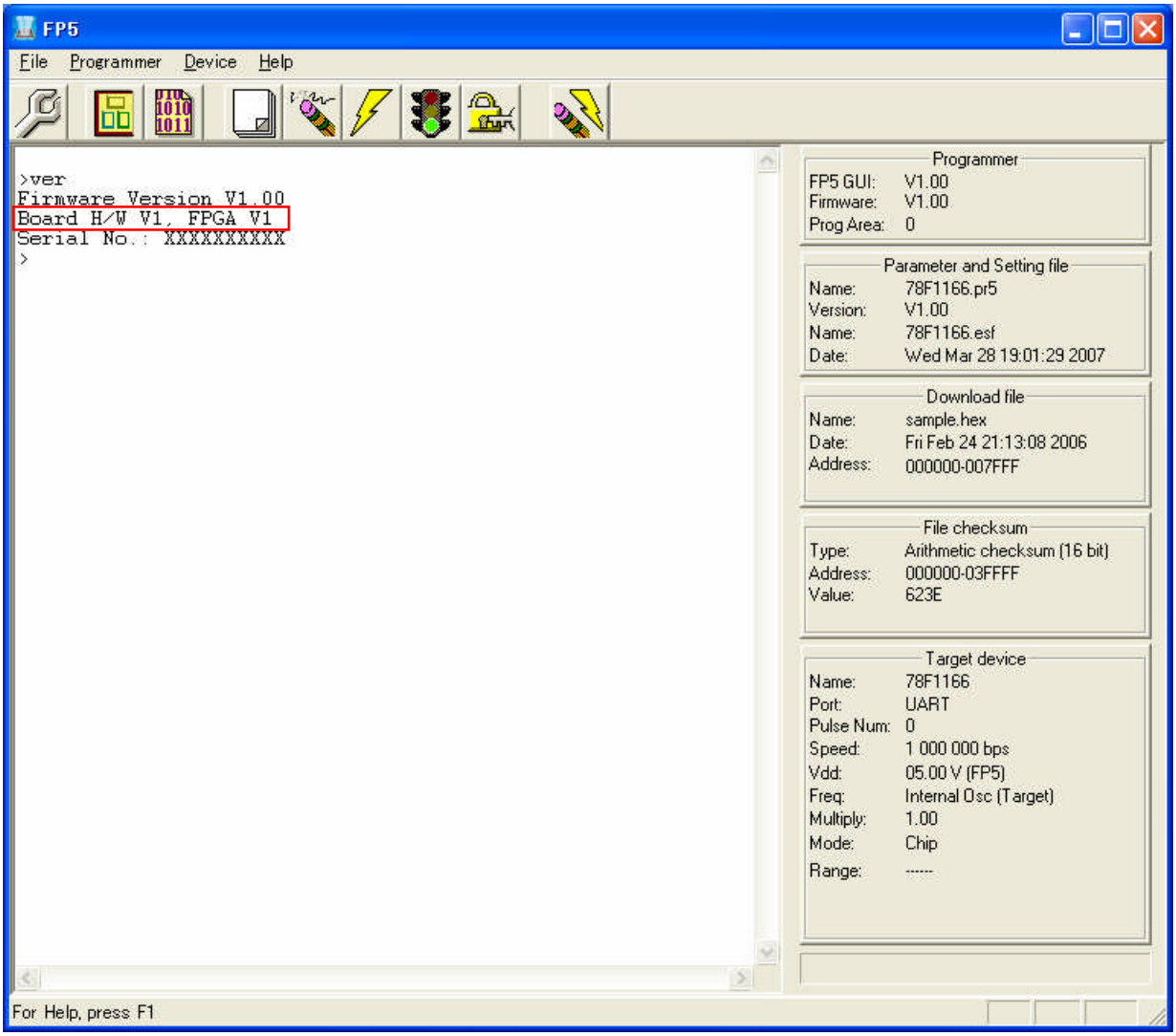
Figure 4-27. [Setup host connection] Command

Figure 4-28. [Host Connection] Dialog Box



The main window is opened. "Board H/W V1, FPGA V1" is displayed in the action log window; thus, the version can be checked.

Figure 4-29. Version Confirmation After FPGA Update Is Finished



(9) [FP5 Manager] command

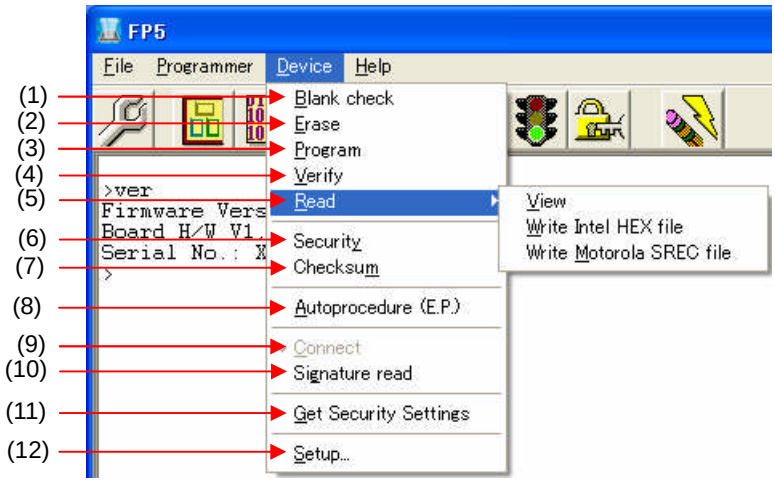
This command is not available.

4.3.3 [Device] menu

The following pull-down menu appears by clicking the [Device] menu.

This menu includes commands mainly related to programming to the target device, such as erase, write and verify.

Figure 4-30. [Device] Menu



(1) [Blank check] command

The [Blank Check] command performs blank check for the flash memory in the target device. The target area can be set in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. If the flash memory has already been erased, "Blank check OK" is displayed. If the flash memory has not yet been erased, "ERROR" is displayed. If this error is displayed, erase the entire area of the flash memory before starting programming.

(2) [Erase] command

The [Erase] command erases the flash memory in the target device. The target area can be set in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. If this command is executed with [Chip] selected, security command options are initialized at the same time. While erasing the flash memory is in progress, the progress status is displayed in the action log window. When execution of this command is completed, the result of command execution in the target device is displayed. Whether to perform the [Blank Check] command before executing this command depends on the [Blank check before Erase] check box setting in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. If this command is executed for the target device that has already been erased with the [Blank check before Erase] check box selected, "OK, Erase skipped." is displayed and erasure is not performed.

(3) [Program] command

The [Program] command transmits the memory contents (program files) in the FP5 valid programming area to the target device and writes the programs to the flash memory. The target area can be set in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. The progress status of this command is displayed as a percentage in the action log window. When execution of this command is completed, the programming GUI displays the result of command execution in the target device. Command options after execution of this command depend on the settings of the [Verify after Program], [Security after Program] and [Checksum after Program] check boxes in the [Command options] area on the

[Advanced] tab in the Device Setup dialog box. For details on these check boxes, refer to **4.3.3 (12) (c) <2> [Command options] area**.

(4) [Verify] command

The [Verify] command transmits the memory contents (program files) in the FP5 valid programming area to the target device, verifies the data written to the flash memory in the target device, and receives the result. The target area can be set in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. The progress status of this command is displayed as a percentage in the action log window. When execution of this command is completed, the programming GUI displays the result of command execution in the target device.

(5) [Read] command

The [Read] command loads data on the flash memory in the target device and saves it as a file. When the [View] command is executed following this command, 4 KB read data is displayed in the log window each time the ENTER key is pressed. When the [Write Intel HEX file] or [Write Motorola SREC file] command is executed following this command, the read data can be saved in the Intel HEX format or Motorola HEX format. Use of the saved file with other tool products is not supported.

Remark The folder in which program data was saved the last time is displayed in the program data save dialog box.

Caution The [Read] command is available only when using a single-power-supply flash memory microcontroller that supports the [Read] command.

Figure 4-31. Program Data Saved Dialog <When *Write Intel HEX file* Command Is Executed>

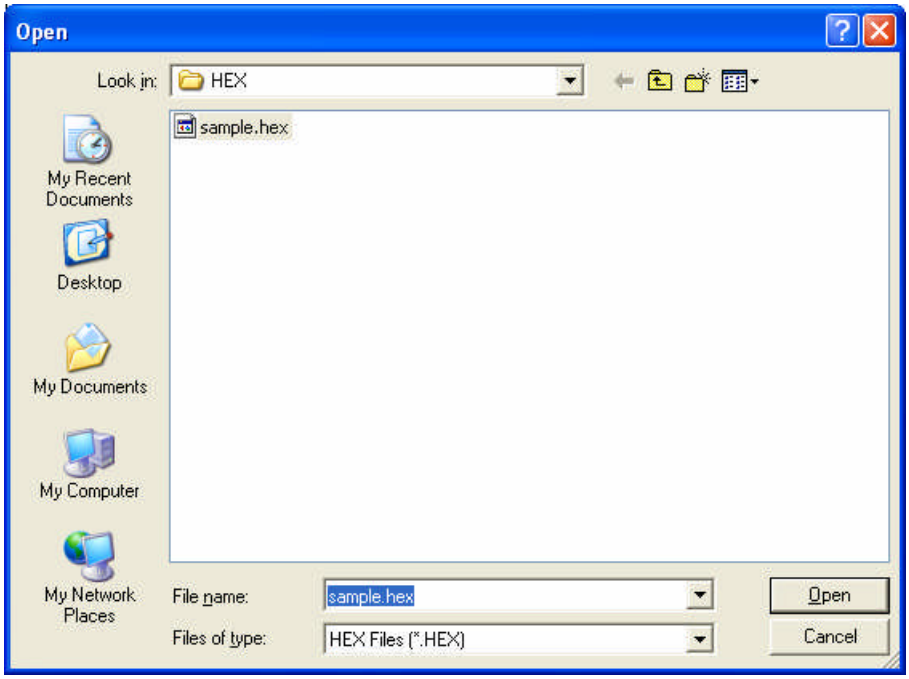
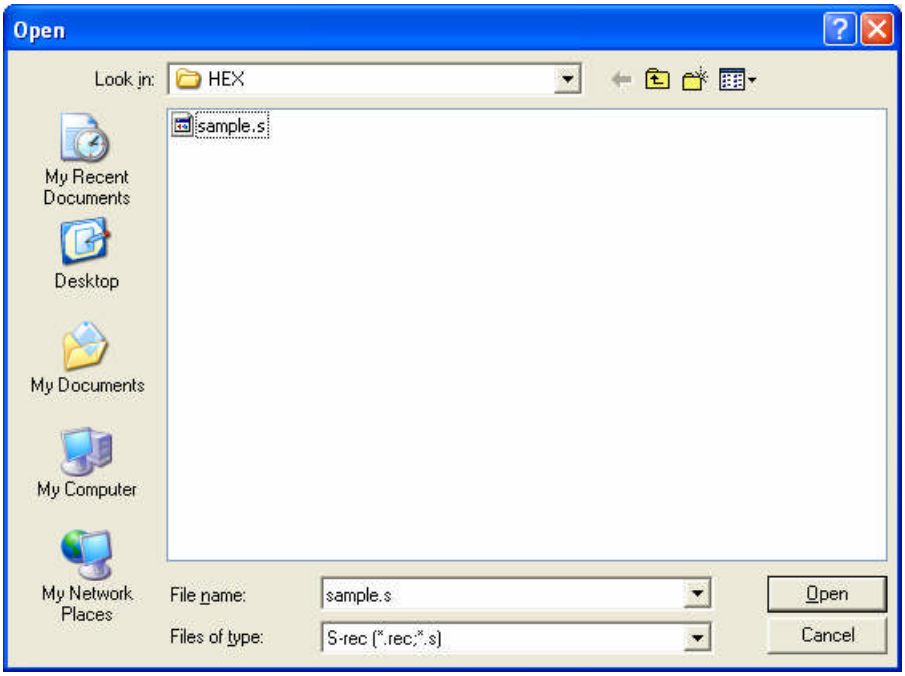


Figure 4-32. Program Data Save Dialog Box <When *Write Motorola SREC file* Command Is Executed>



Clicking the Open button saves the program data into a file and closes the dialog box.

Clicking the Cancel button closes the program data save dialog box without saving the program data into a file.

(6) [Security] command

The [Security] command sets the security functions for the target device. When this command is executed, the settings made in the [Security command option] area on the [Advanced] tab in the Device Setup dialog box will be reflected in the target device. For details on the security functions, refer to **4.3.3 (12) (c) <3> [Security command option] area**.

(7) [Checksum] command

The [Checksum] command reads the checksum calculated in the target device and displays it in the action log window. When using a 78K0S/Kx1+ microcontroller or the μPD78F9334, this command also displays the checksum of the program file and compares both.

Remark The checksum read by this command differs from the one displayed in the [File checksum] area in the programmer parameter window. For details on the [File checksum] area, refer to **4.3.1 (2) [Checksum...] command**.

The checksum is calculated as follows.

<When using 78K0, 78K0S (other than 78K0S/Kx1+ microcontrollers and μPD78F9334), 78K0R, or V850>

Method: Subtraction (16-bit arithmetic)

Range: Area set in the [Operation Mode] area on the [Advanced] tab in the Device Setup dialog box

Figure 4-33. Action Log Window After [Checksum] Command Execution

<When using 78K0, 78K0S (other than 78K0S/Kx1+ microcontrollers and μPD78F9334), 78K0R, or V850>

```
>sum
0x623E
OK
>
```

Remark With the 16-bit arithmetic (subtraction) mode, the lower 4 digits of the result from which a value is subtracted from 00h in 1-byte units are displayed.

<When using a 78K0S/Kx1+ microcontroller or μPD78F9334>

Method: Division (original)

Range: Area set in the [Operation Mode] area on the [Advanced] tab in the Device Setup dialog box

Figure 4-34. Action Log Window After [Checksum] Command Execution

<When using 78K0S/Kx1+ microcontroller or μPD78F9334>

```
>sum
Device Checksum: 0x1842
FP5 Checksum:    0x1842
Checksum compare: OK
>
```

Remark For details on the arithmetic specifications, refer to **Figure B-4 Division (Original) Calculation Specifications**.

(8) [Autoprocedure(E.P.)] command

The [Autoprocedure(E.P.)] command executes the [Erase] and [Program] commands in succession. Exiting from the flash memory programming mode is not possible between the [Erase] and [Program] commands. The target area can be set in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. The progress status of this command is displayed in the action log window. When execution of this command is completed, the programming GUI displays the result of command execution in the target device. Command options after execution of this command depend on the settings of the [Blank check before Erase], [Verify after Program], [Security after Program], and [Checksum after Program] check boxes in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. For details on these check boxes, refer to **4.3.3 (12) (c) <2> [Command options] area**.

Figure 4-35. Action Log Window After [Autoprocedure(E.P.)] Command Execution

```
>ep
Blank check Chip: OK
OK, Erase skipped.
Erase OK
Write Chip:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
OK
Write OK
Erase, Program OK
>
```

(9) [Connect] command

This command is not available.

(10) [Signature read] command

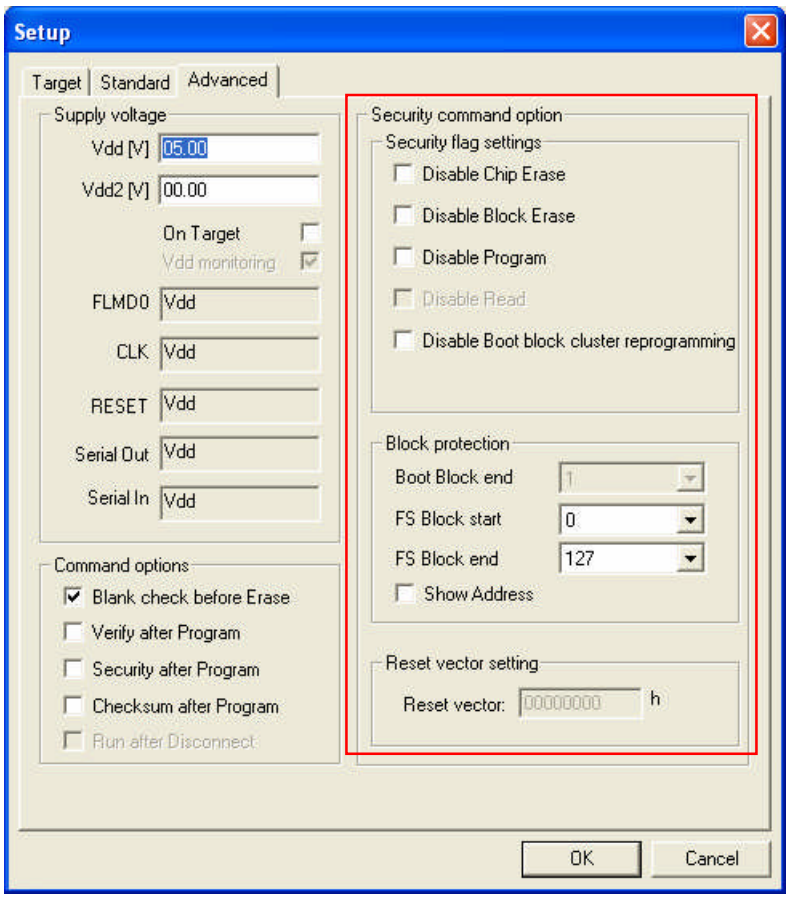
The [Signature read] command reads target device product information, such as the device name and flash memory information.

The read result is displayed in the action log window.

(11) [Get Security Settings] command

The [Get Security Settings] command reads the settings for the security functions for the target device and displays the result in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. When execution of this command is enabled, execute this command before the [Security] command; the settings for the security functions or the boot area can thus be checked. For details on the security functions, refer to **4.3.3 (12) (c) <3> [Security command option] area**.

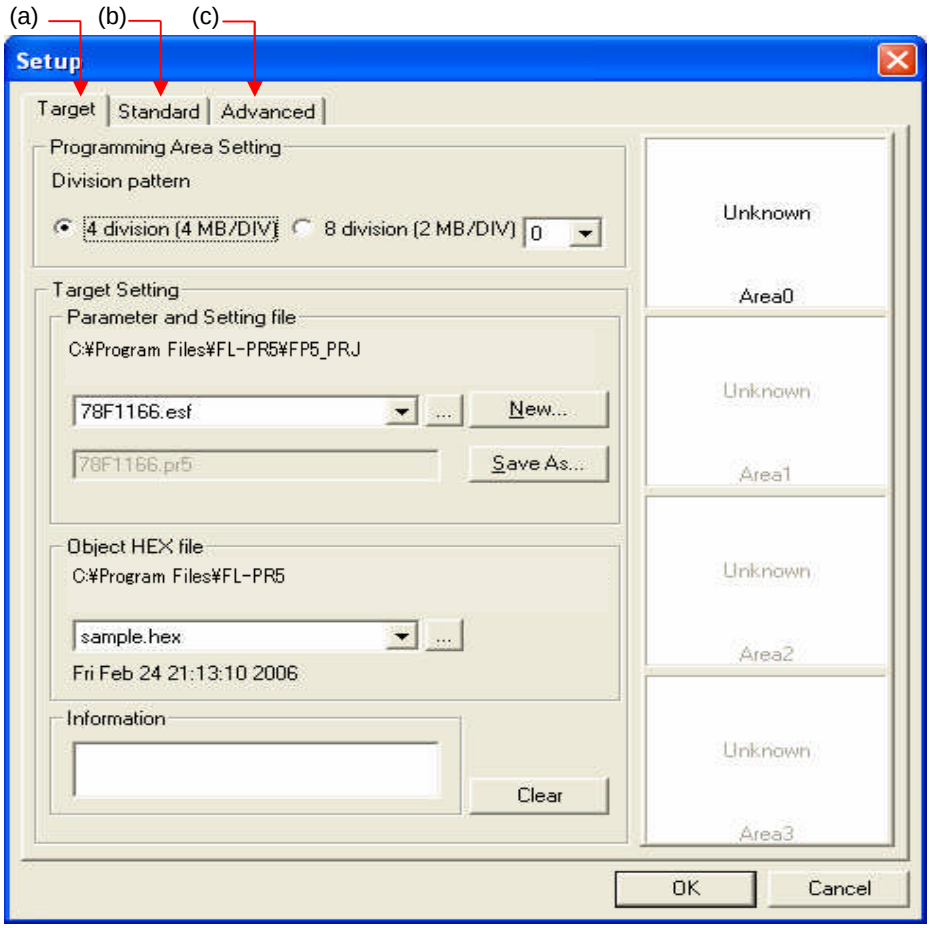
Figure 4-36. [Get Security Settings] Command



(12) [Setup] command

When the [Setup...] command is executed, the Device Setup dialog box is opened. In this dialog box, select a program file, perform settings in accordance with the user environment for flash memory programming, set command options, and perform security settings. Each time the programming GUI is started, the programming GUI loads the PR5 file, ESF file and program file that were used last and displays the settings. Settings for the items not dimmed can be changed in accordance with the user environment. Switch the [Target], [Standard] and [Advanced] tabs for setting.

Figure 4-37. Device Setup Dialog Box



Remark • PR5 file (parameter file)

PR5 files (parameter files) contain parameter information required for writing programs to the flash memory in the target device. Do not change the PR5 file data because it affects assurance of written data; otherwise, the programming GUI will not recognize the PR5 file.

• ESF file (customized setup file)

ESF files (customized setup files) contain the programming environment settings specific to the user environment and PR5 file names. If the file contains invalid contents, the programming GUI will not recognize the ESF file.

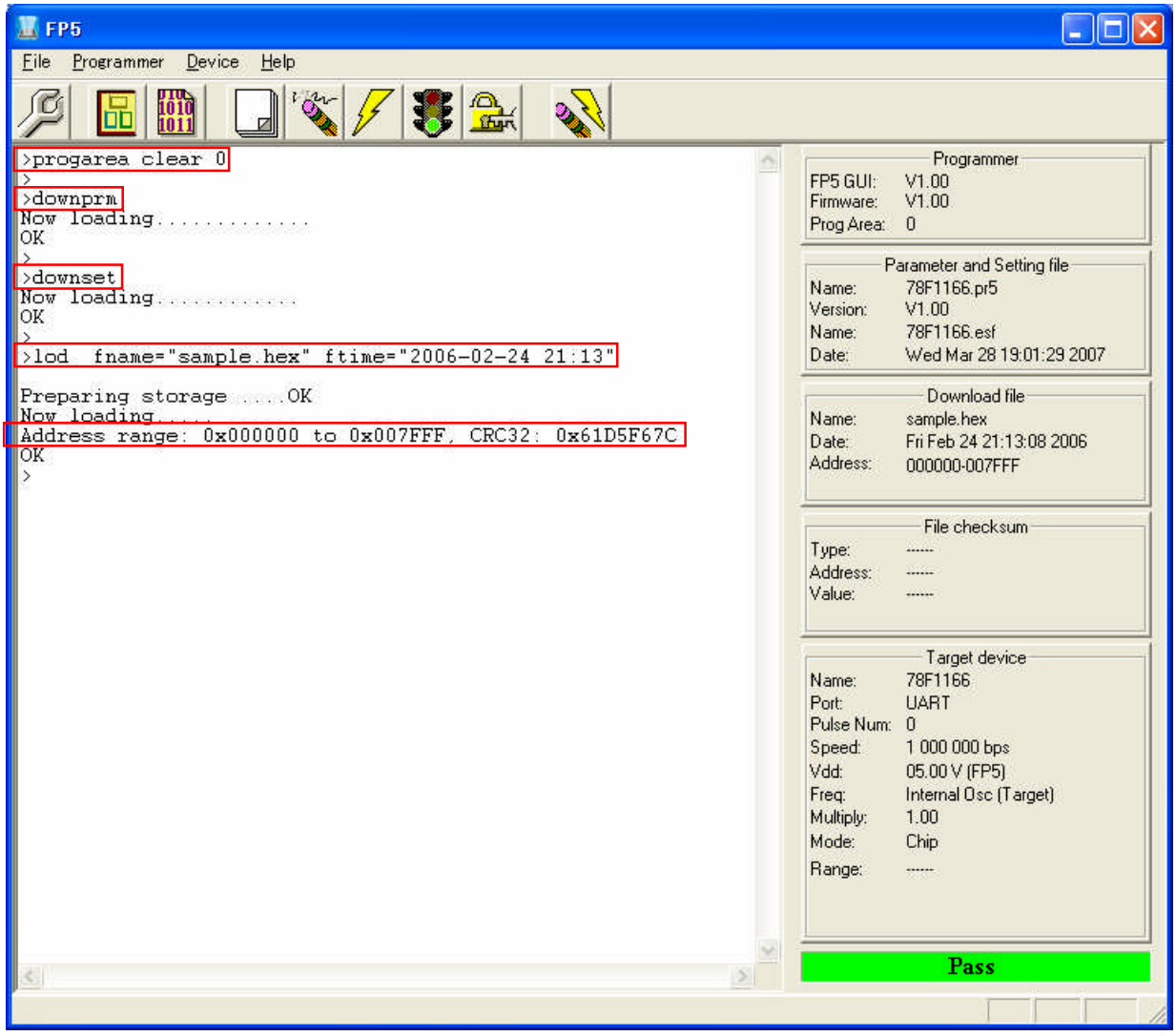
When the OK button (button common to [Target], [Standard] and [Advanced] tabs) is clicked, program areas are cleared and PR5 files, ESF files and program files are downloaded for the FP5. After that, the settings made on the [Target], [Standard] and [Advanced] tabs are saved into an ESF file. These settings are reflected to the programming parameter window. If there are settings which have not been updated, the files related to the settings are not downloaded. When a program file is downloaded, the date and checksum of that file are displayed in the action log window. The checksum is calculated as shown below. For details of the arithmetic specifications, refer to **Figure B-2 32-bit CRC Calculation Specifications**.

Method: 32-bit CRC

Range: From the start to end addresses in the program file

When the Cancel button (button common to [Target], [Standard] and [Advanced] tabs) is clicked, the dialog box is closed without saving changed settings on the [Target], [Standard] and [Advanced] tabs into an ESF file.

Figure 4-38. Clearing of Programming Area, PR5 Files and ESF Files, and Download of Program File



(a) [Target] tab in Device Setup dialog box

Settings related to programming areas, PR5 files, ESF files and program files can be performed on the [Target] tab in the Device Setup dialog box. This tab consists of the following items.

<1> [Programming Area Setting] area

<2> [Target Setting] area

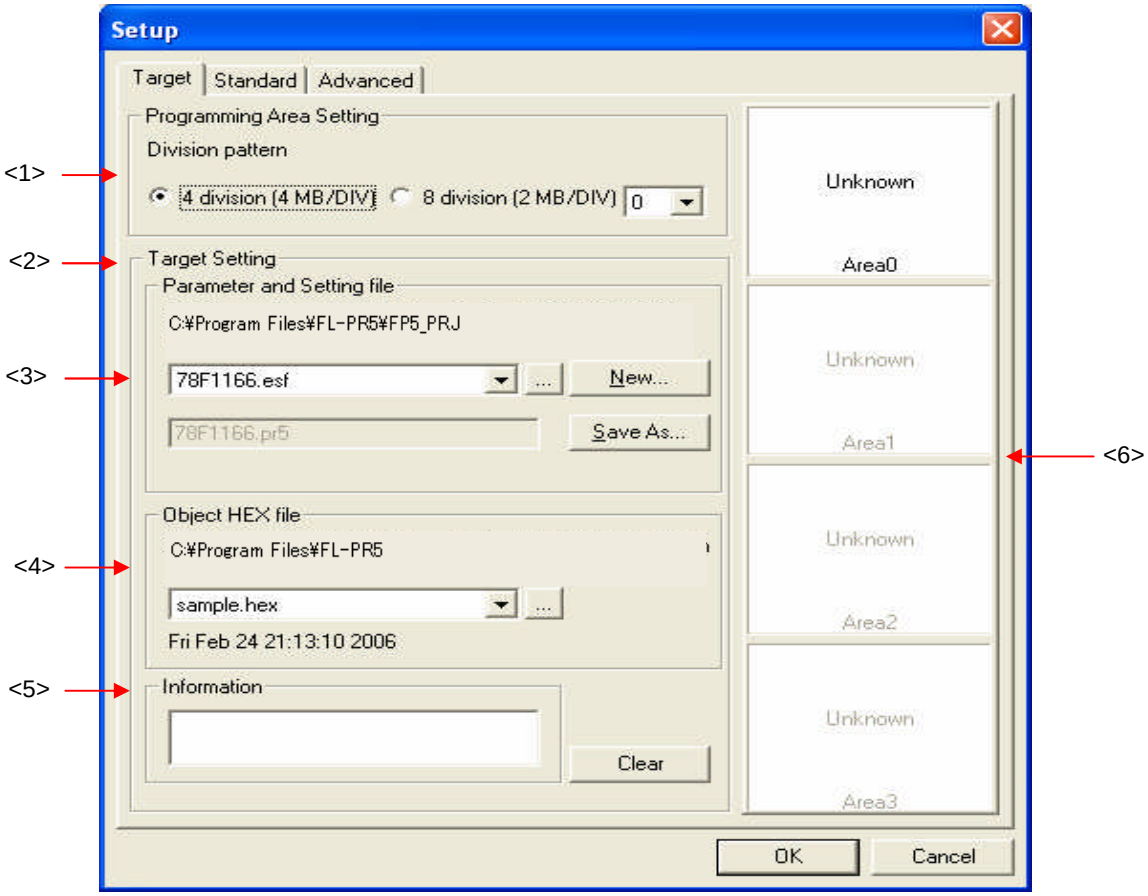
<3> [Parameter and Setting file] area

<4> [Object HEX file] area

<5> [Information] area and Clear button

<6> Programming area map area

Figure 4-39. Device Setup Dialog Box - [Target] Tab



<1> [Programming Area Setting] area

The FP5 has a 16 MB flash memory area for saving program files. This memory area can be used as four 4 MB programming areas (Area 0 to Area 3) or eight independent 2 MB programming areas (Area 0 to Area 7). Program files can be downloaded to each programming area, and which file, PR5 or ESF, is to be saved is selectable in programming area units. That is, files can be individually downloaded in each programming area, and the area used can also be selected individually.

In this area, the factor for dividing the programming area can be selected from 4 (4 MB per area) or 8 (2 per area). If the division factor is changed, data on the programming area map is cleared. In addition, the valid programming area can be selected. If the valid programming area is changed, the focused area in the [Programming area map] area is also changed. By default, the division factor is set to 4 and programming area 0 is selected.

Figure 4-40. [Programming Area Setting] Area

[Division pattern] radio buttons

4 division (4 MB/DIV): The division factor is set to 4 (4 MB per area).

8 division (2 MB/DIV): The division factor is set to 8 (2 MB per area).

[Programming Area Setting] list

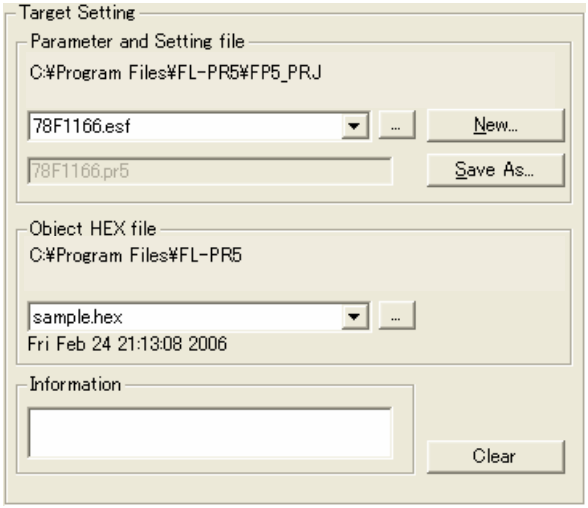
If "4 division (4 MB/DIV)" is selected, the valid programming area is selected from areas 0 to 3.

If "8 division (2 MB/DIV)" is selected, the valid programming area is selected from areas 0 to 7.

<2> [Target Setting] area

In this area, ESF files can be created and selected, and PR5 files and program files can be selected. A warning message will be displayed in the [Information] area if there is a mismatch between PR5 files, ESF files and program files saved in the FP5 and information held in the programming GUI. Information of PR5 files, ESF files and program files, which is set to the current valid programming area, can be deleted.

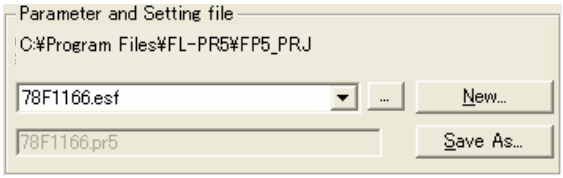
Figure 4-41. [Target Setting] Area



<3> [Parameter and Setting file] area

In this area, ESF files can be created and selected, and PR5 files can be selected.

Figure 4-42. [Parameter and Setting file] Area



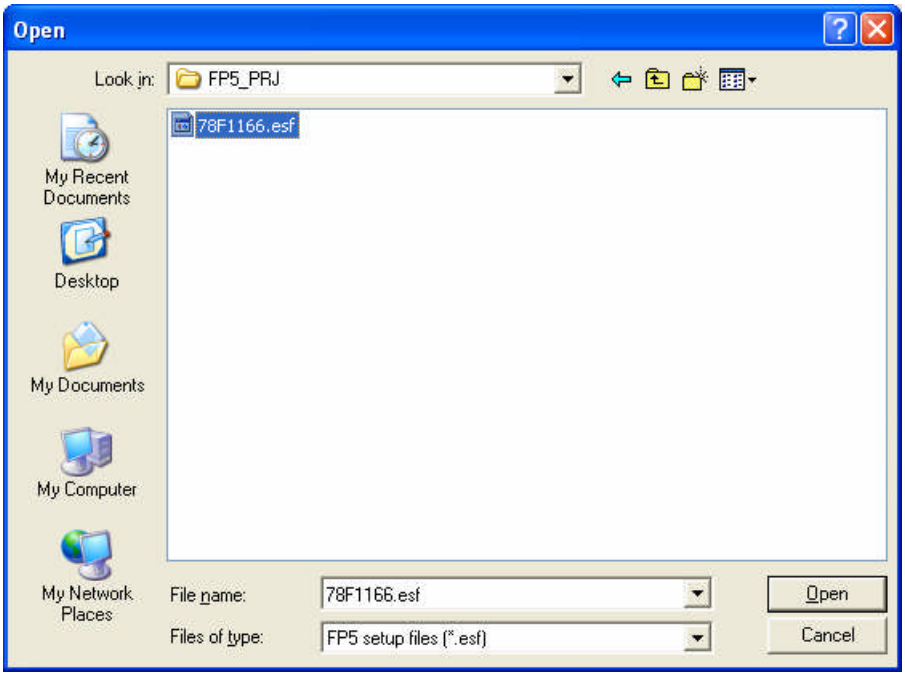
ESF file selection list box

Select the ESF file to be used. If no ESF files are registered in the valid programming area, ESF files stored in the FP5_PRJ folder in the programming GUI installation folder are displayed. If the reference folder is changed by using the [...], [New...] or [Save As...] button, ESF files stored in the changed folder are displayed.

[...] button

Click this button when specifying an ESF file stored in a folder other than the FP5_PRJ folder in the programming GUI installation folder. A dialog box for specifying the ESF file will be displayed. Specify the relevant file, and then click the [Open] button.

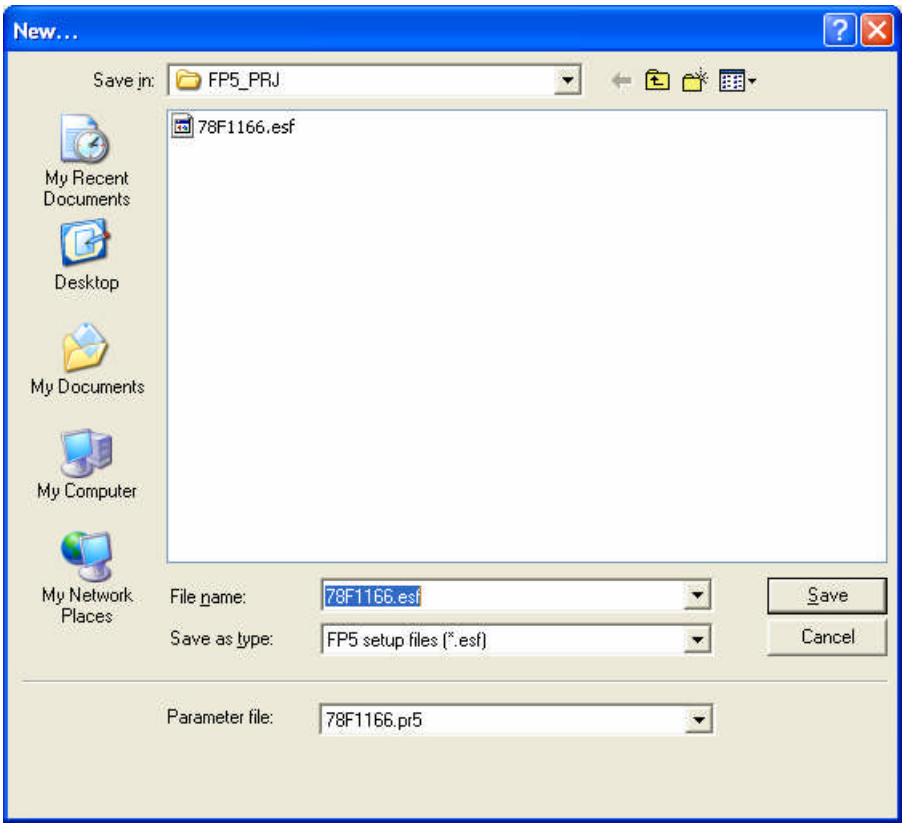
Figure 4-43. ESF File Select Dialog Box



New... button

Click this button to create a new ESF file. The following dialog box will be displayed.

Figure 4-44. New ESF File Creation Dialog Box



The PR5 file stored in the FP5_PRJ folder in the programming GUI installation folder is displayed in the [Parameter file:] list. Select the PR5 file for the target device used.

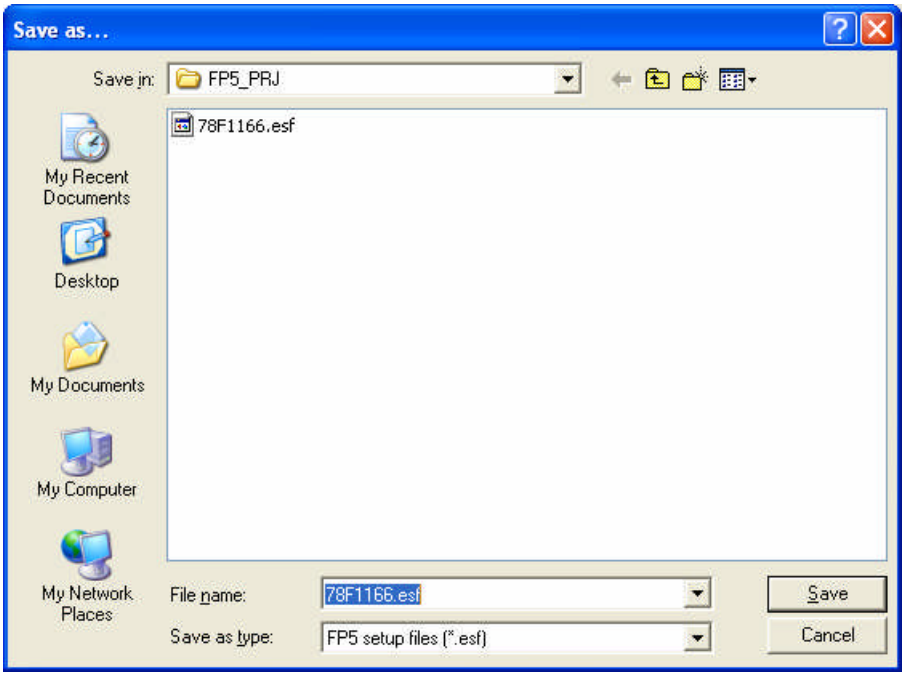
After selecting the PR5 file, input the new ESF file name and then click the Save button.

Save As... button

Clicking this button opens the dialog box for overwriting the current settings made in the Device Setup dialog box to the existing ESF file, or saving as another file.

Specify the file and then click the Save button.

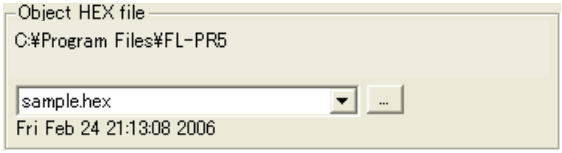
Figure 4-45. [Save as...] Dialog Box



<4> [Object HEX file] area

Select the program file in this area.

Figure 4-46. [Object HEX file] Area



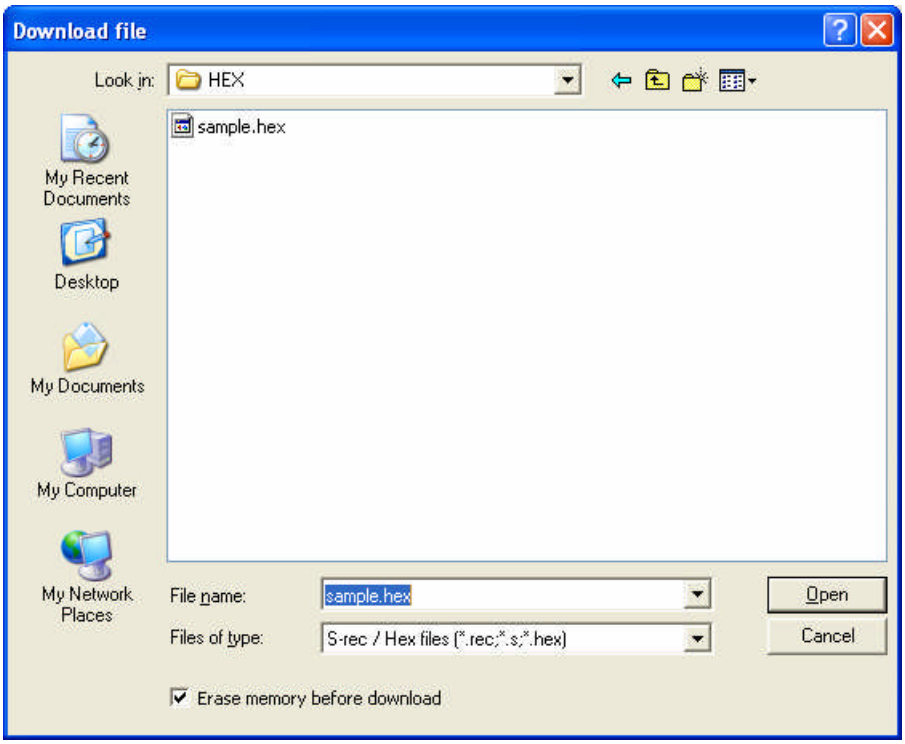
Program file selection list

Select the program file to be used. If no program files are registered in the valid programming area, program files stored in the *bin* folder in the programming GUI installation folder are displayed. If the reference folder is changed by using the ... button, program files stored in the changed folder are displayed.

[...] button

Click this button when specifying a program file stored in a folder other than the *bin* folder in the programming GUI installation folder. The [Download file] dialog box will be displayed. Specify the relevant file, and then click the [Open] button.

Figure 4-47. [Download file] Dialog Box



Whether to erase the FP5 internal memory before downloading new program files can be selected by using the [Erase memory before download] check box. This option should usually be selected.

<5> [Information] area and [Clear] button

This area displays a warning message or is used to clear information on PR5 files, ESF files and program files.

Figure 4-48. [Information] Area and [Clear] Button

[Information] area

A warning message will be displayed in this area if there is a mismatch between PR5 files, ESF files and program files saved in the FP5 and information held in the programming GUI.

[Clear] button

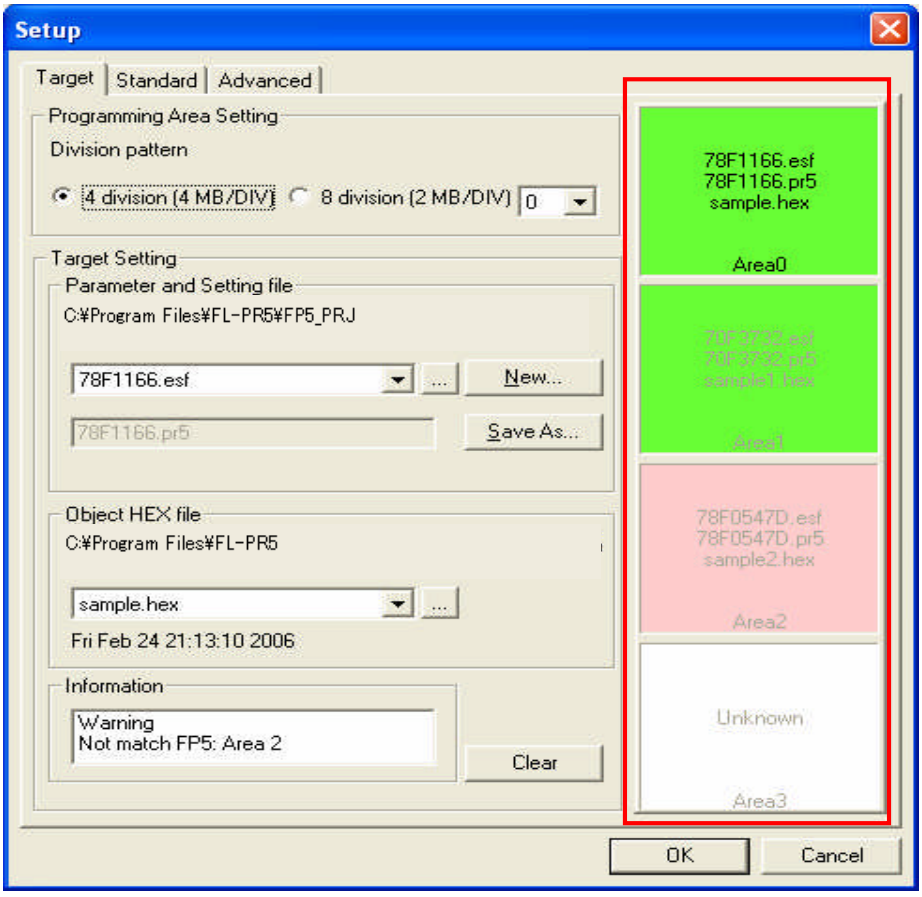
Information of PR5 files, ESF files and program files, which is set to the current valid programming area, can be deleted.

Caution The settings are not reflected to the FP5 internal memory unless the [OK] button is clicked in the Device Setup dialog box.

<6> Programming area map area

The programming area status can be checked in this area. The FP5 programming areas whose information matches information held in the programming GUI are displayed in light green. In the valid programming area, the names of ESF files, PR5 files and program files, and programming area numbers are displayed in black. These items appear dimmed in invalid programming areas. If no area information is held in the programming GUI, "Unknown" is displayed. The FP5 programming areas whose information does not match information held in the programming GUI are displayed in pink. The information held in the programming GUI is displayed in such areas.

Figure 4-49. Programming Area Map Area



(b) [Standard] tab in Device Setup dialog box

On the [Standard] tab, set the programming environment of the flash memory in the target device. All basic settings to configure the user environment and the target device can be performed. Communication channels, speeds and the operation clock supplied to the target device vary depending on the device, so refer to the user's manual of the target device for setting these items.

This tab consists of the following items.

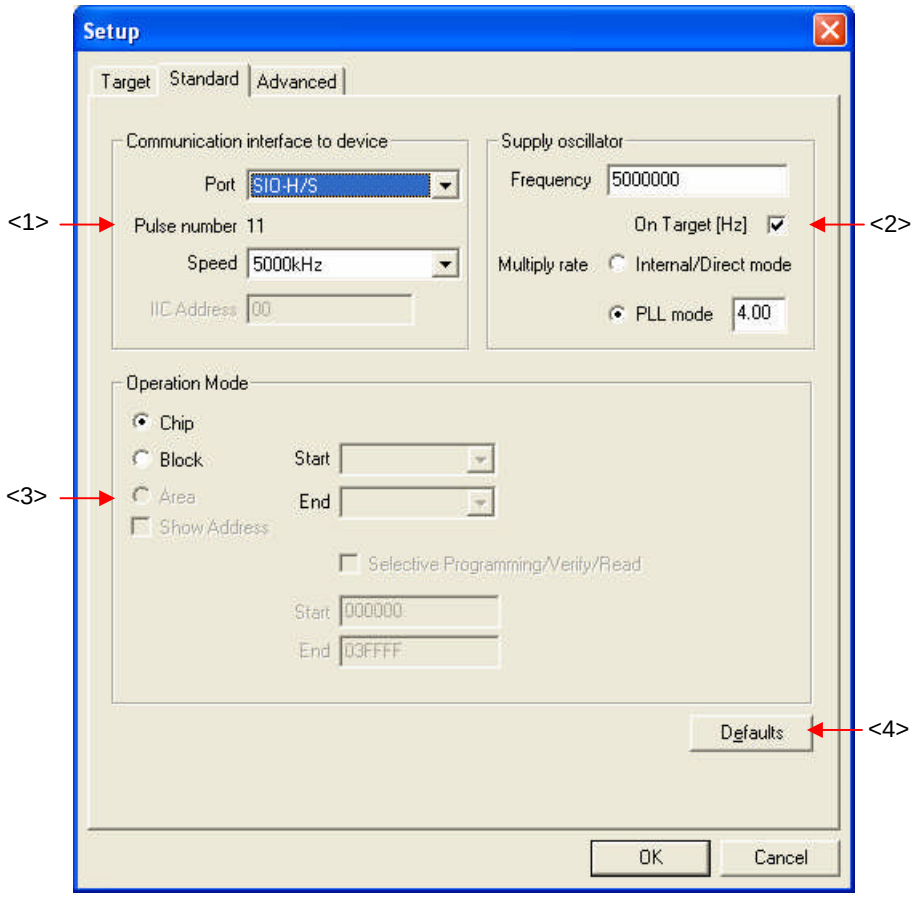
<1> [Communication interface to device] area

<2> [Supply oscillator] area

<3> [Operation Mode] area

<4> [Defaults] button

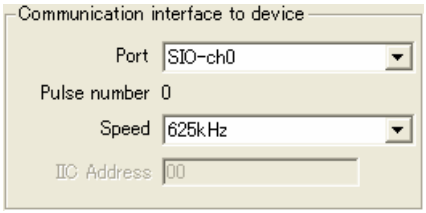
Figure 4-50. Device Setup Dialog Box - [Standard] Tab



<1> [Communication interface to device] area

In this area, select the channel and speed for communication between the FP5 and target device.

Figure 4-51. [Communication interface to device] Area



[Port] list

Select the mode of communication between the FP5 and target device. The communication mode is determined by the number of V_{PP} output from the FP5 or the FLMD0[Note] pulse count. The selectable communication mode differs depending on the target device. Refer to the user's manual of the target device used and select a mode. With some devices, the channel number may start from 1. In this case, the corresponding number is shifted, for example, ch0 shown in the screen corresponds to ch1 of the device, and the displayed channel number must be shifted accordingly.

Note FLMD0 in a single-power-supply flash memory micro controller, or FLMD1 in a two-power-supply flash memory micro controller.

Remark For the available communication channel, refer to the user's manual of the target device, based on the pulse count displayed for "Pulse number".

Table 4-2. Channels for Communication Between FP5 and Target Device

Item on Screen	Description
SIO-ch0	SIO (3-wire clocked communication port) channel 0
SIO-ch1	SIO (3-wire clocked communication port) channel 1
SIO-ch2	SIO (3-wire clocked communication port) channel 2
SIO-H/S	SIO (3-wire clocked communication port, with handshake)
IIC-ch0	I^2C channel 0
IIC-ch1	I^2C channel 1
IIC-ch2	I^2C channel 2
IIC-ch3	I^2C channel 3
UART-ch0	UART (asynchronous communication port) channel 0
UART-ch1	UART (asynchronous communication port) channel 1
UART-ch2	UART (asynchronous communication port) channel 2
UART-ch3	UART (asynchronous communication port) channel 3
Port-ch0	Port (pseudo 3-wire) A
Port-ch1	Port (pseudo 3-wire) B
Port-ch2	Port (pseudo 3-wire) C
CSI-Internal-OSC	SIO (3-wire clocked communication port) (using internal oscillator) * In the case of 78K0 (All Flash)
UART-Ext-FP5CLK	UART (asynchronous communication port) (using FP5 clock) *In the case of 78K0 (All Flash)
UART-Ext-OSC	UART (asynchronous communication port) (using external oscillator) * In the case of 78K0 (All Flash)
UART-Internal-OSC	UART (asynchronous communication port) (using internal oscillator) * In the case of 78K0 (All Flash)

[Pulse number]

V_{PP} or the FLMD0 count corresponding to the selected communication mode is displayed. This item cannot be changed.

[Speed] List box

Select the communication rate of the selected communication channel.

Remark For the available communication speed, refer to the user's manual of the target device.

<When UART-ch0, UART-ch1, UART-ch2, UART-ch3, UART-Ext-FP5CLK or UART-Ext-OSC is selected>

- 9600Baud
- 19200Baud
- 31250Baud
- 38400Baud
- 57600Baud
- 76800Baud
- 115200Baud
- 128000Baud
- 153600Baud
- 250000Baud
- 500000Baud
- 1000000Baud

<When SIO-ch0, SIO-ch1, SIO-ch2, SIO-H/S or CSI-Internal-OSC is selected>

- 9.8kHz
- 156kHz
- 625kHz
- 2500kHz
- 5000kHz

<When IIC-ch0, IIC-ch1, IIC-ch2 or IIC-ch3 is selected>

- 10kBaud
- 20kBaud
- 50kBaud
- 100kBaud

<When Port-ch0, Port-ch1 or Port-ch2 is selected>

- 100Hz
- 200Hz
- 300Hz
- 400Hz
- 500Hz
- 600Hz
- 800Hz
- 1000Hz
- 1200Hz
- 1500Hz
- 2000Hz

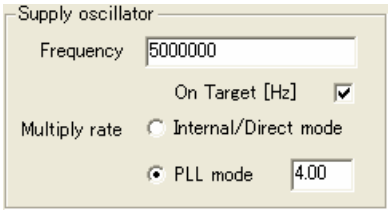
[IIC Address] area

If I^2C is selected as the communication channel, input a hexadecimal number as a slave address of the target device. The valid input range is 8 to 77H. Do not input a unit. The slave address can be any value in the above range but must not be the same as the slave address of another target device on the I^2C. This field is not available if the I^2C port is not selected.

<2> [Supply oscillator] area

Set the clock to be supplied to the target device.

Figure 4-52. [Supply oscillator] Area



[Frequency] text box

Set the oscillation frequency of the clock supplied to the target device. When using the clock mounted on the target system ([On Target] check box selected), input its oscillation frequency. When using the clock on the FP5 side ([On Target] check box cleared), input one of the following.

- 1MHz
- 2MHz
- 4MHz
- 5MHz
- 6MHz
- 8MHz
- 9MHz
- 10MHz
- 12MHz
- 16MHz
- 20MHz

Remark For the selectable frequency, refer to the user's manual for the device used.

[On Target] check box

Specify which clock is supplied to the target device: a clock mounted on the target system, or a clock on the FP5 side. If this check box is selected, the clock mounted on the target system will be used. If this check box is cleared, the clock on the FP5 side will be used.

[Multiply rate] text box

Set the multiplication ratio of the clock supplied to the target device. If the target device includes the PLL circuit, input the multiplication ratio in accordance with the environment used. If the target device does not include the PLL circuit, select "Internal/Direct mode". On the initial screen, the default settings that have been loaded from the PR5 file is displayed.

Remark For the selectable multiply rate, refer to the user's manual for the device used.

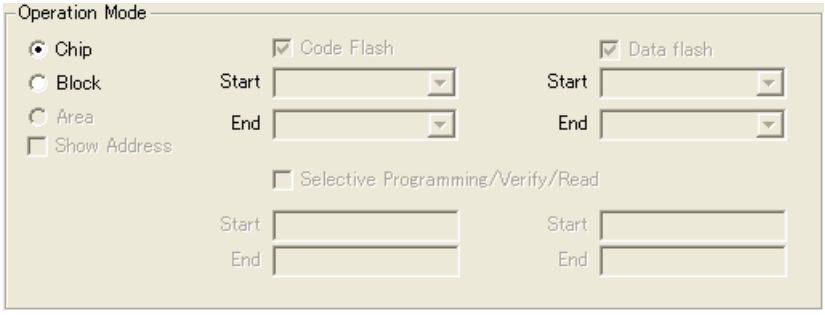
<3> [Operation Mode] area

Switch the operation mode to execute commands, such as flash memory programming, for the entire flash memory area, in area units or in block units. The settings made here are valid for the [Blank Check], [Erase], [Program], [Verify], [Read], [Checksum], and [Autoprocedure(E.P.)] commands. The display varies depending on whether or not the downloaded PR5 file is for a target device that supports data flash.

Figure 4-53. [Operation Mode] Area

The downloaded PR5 file is for a target device that does not support data flash

The downloaded PR5 file is for a target device that supports data flash.



If [Chip] is selected:

The entire flash memory area of the target device is subject to command processing, such as programming.

If [Block] is selected:

Specify the block range subject to command processing, using the [Start] and [End] drop-down lists. These lists show the block numbers where flash memory in the target device is configured.

If [Area] is selected:

Specify the Area number range subject to rewrite processing by using the [Start] and [End] lists.

The [Start/End] lists display the Area number where the target device is configured.

[Show Address] check box

Specifies whether numbers or addresses are displayed in the Start/End lists. If this check box is checked, addresses are displayed. If it is not checked, numbers are displayed.

[Selective programming/Verify/Read] check box

This item is not available.

<4> [Defaults] button

The default settings stored in the PR5 file are restored.

(c) [Advanced] tab in Device Setup dialog box

On the [Advanced] tab, the programming voltage, options added to programming commands, and security settings can be configured. This tab consists of the following items.

<1> [Supply voltage] area

<2> [Command options] area

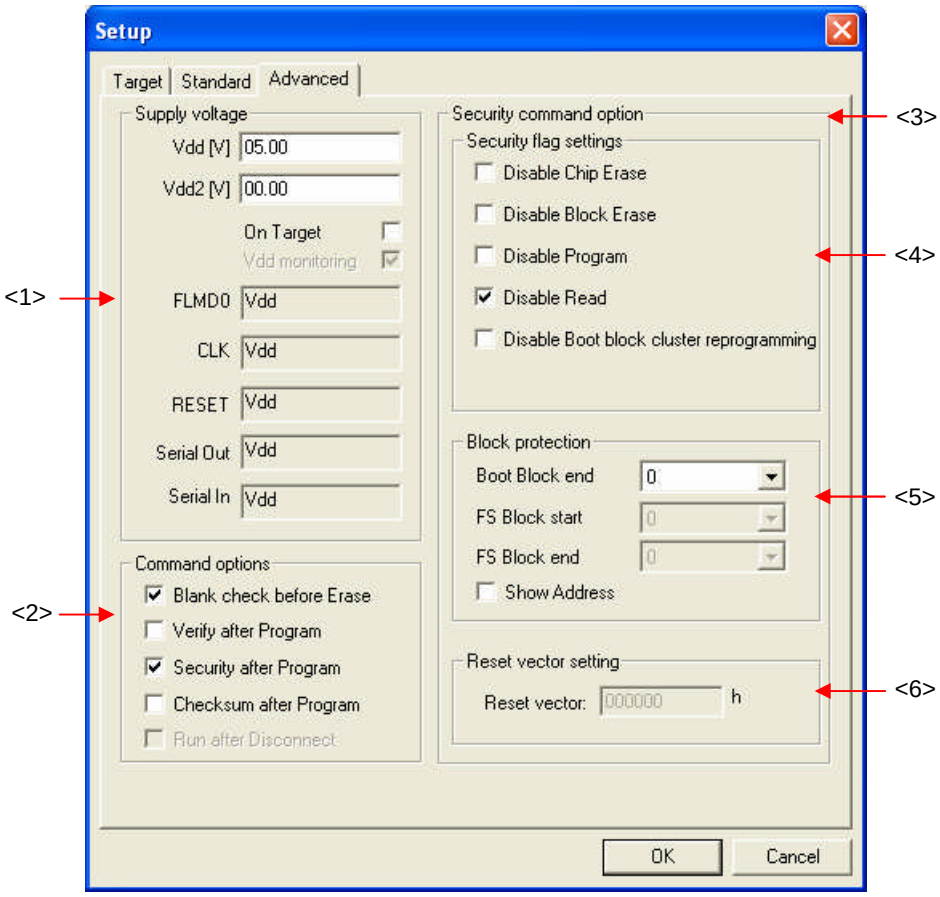
<3> [Security command option] area

<4> [Security flag settings] area

<5> [Block protection] area

<6> [Reset vector setting] area

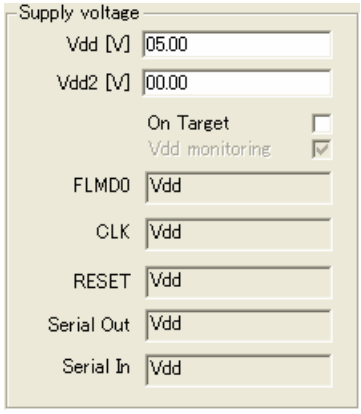
Figure 4-54. Device Setup Dialog Box - [Advanced] Tab



<1> [Supply voltage] area

In this area, specify one (V_{DD}) or two (V_{DD} and V_{DD2}) voltage levels for target device programming, in accordance with the target device type. Basically, V_{DD}/V_{DD2} voltages for target device programming should be supplied from the target system. Supplying from the FP5 is possible, but the current flow is not large enough to operate the whole target system (maximum of 200 mA). Therefore, supply voltage via the FP5 only when a dedicated writing adapter such as an FA adapter is used.

Figure 4-55. [Supply voltage] Area



[Vdd[V]] box

The default Vdd level set in the PR5 file is displayed in volts (V). This level can be changed by input.

[Vdd2[V]] box

The default Vdd2 level set in the PR5 file is displayed in volts (V). If the target device specifications require two types of Vdd for writing to flash memory, specify a lower voltage for Vdd2 (e.g. V_{DD} = 5.0 V, V_{DD2} = 3.3 V). This level can also be changed by input.

[On Target] check box

Select this check box when supplying the V_{DD}/V_{DD2} voltages from the target system.

Caution Set the values of the V_{DD}/V_{DD2} voltages supplied from the target system for Vdd [V] and Vdd2 [V] before selecting this check box. The target system may be damaged if proper values are not set.

The V_{DD} pin power supply detection function varies depending on the setting of the [On Target] check box.

- When V_{DD} is set to be supplied from FP5 ([On Target] check box: not selected)

  If the target system V_{DD} exceeds 0.2 V before V_{DD} is supplied, the message "Target power detected! Check Setup" will be displayed in the action log window.
- When V_{DD} is set to be supplied from the target system ([On Target] check box: selected)

  If V_{DD} is outside the range of ±5% of the V_{DD} set value immediately before communication starts, the message "No VDD applied or Voltage is out of range" will be displayed in the action log window.

[Vdd monitoring] check box

When supplying V_{DD} from the target system ([On Target] check box: selected), whether to enable the V_{DD} pin power supply detection function can be selected with this check box. Select to enable, or clear to disable the function.

Caution When the V_{DD} pin power supply detection function is disabled, the product can be used even if the V_{DD} pins in the FP5 and the target system are not connected. In such a case, make sure that V_{DD} power generated in the target system always matches the output signal power supply generated in the FP5.

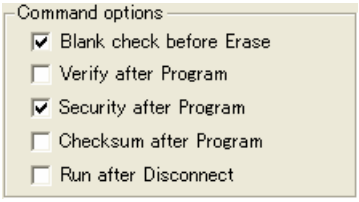
[FLMD0] (or Vpp[V]), [CLK], [RESET], [Serial Out] and [Serial In] boxes

The default levels of these pins set in the PR5 file are displayed in volts (V). Vdd or Vdd2 power supply is used for the signal levels.

<2> [Command options] area

In this area, set options to be added to the [Erase], [Program] and [Autoprocedure(E.P.)] commands.

Figure 4-56. [Command options] Area



[Blank check before Erase] check box

If this check box is selected, the [Blank Check] command is automatically executed before the [Erase] and [Autoprocedure(E.P.)] commands are executed.

[Verify after Program] check box

If this check box is selected, the [Verify] command is automatically executed after the [Program] and [Autoprocedure(E.P.)] commands are executed.

[Security after Program] check box

If this check box is selected, the [Security] command is automatically executed after the [Program] and [Autoprocedure(E.P.)] commands are executed.

[Checksum after Program] check box

If this check box is selected, the [Checksum] command is automatically executed after the [Program] and [Autoprocedure(E.P.)] commands are executed.

[Run after Disconnect] check box

If this check box is selected, the $\overline{\text{RESET}}$ signal level changes from low level to Hi-Z after each command.

If this check box is not selected, the $\overline{\text{RESET}}$ signal changes to low level after each command is finished.

This check box becomes available if the [On Target] check box in the [Supply voltage] area is selected.

If selected, the written program can be automatically executed after each command is finished.

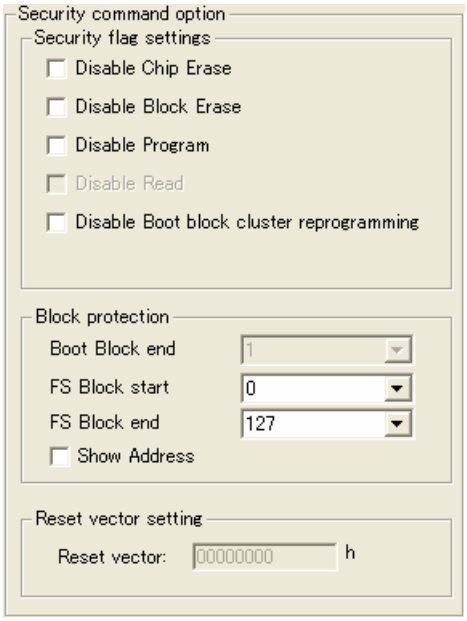
<3> [Security command option] area

Setting of the security functions, flash shield window and reset vector handling can performed in this area.

When the [Get Security Settings] command is enabled, settings in this area can be confirmed by running the [Get Security Settings] command before running the [Security] command.

Caution For setting of the security functions, flash shield window and reset vector handling, refer to the user's manual of the target device.

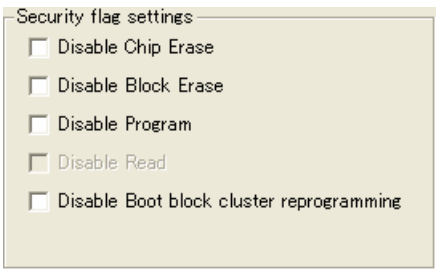
Figure 4-57. [Security command option] Area



<4> [Security flag settings] area

Specify whether to enable the security settings in this area.

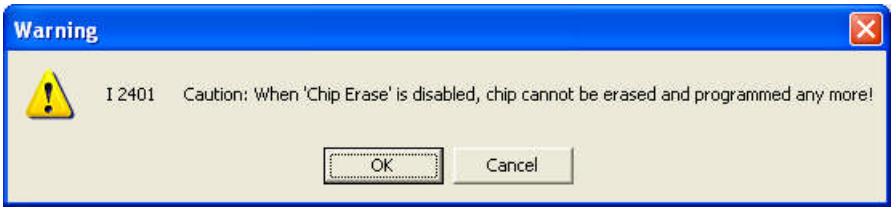
Figure 4-58. [Security flag settings] Area



[Disable Chip Erase] check box

If the [Security] command is executed with this check box selected, the [Erase] command will be disabled for the entire area of the flash memory in the target device. When this check box is selected, the following dialog box appears.

Figure 4-59. [Disable Chip Erase] Warning Dialog Box



Clicking the [OK] button determines the selection of the [Disable Chip Erase] check box.
Clicking the [Cancel] button cancels the selection of the [Disable Chip Erase] check box.

Caution If the [Disable Chip Erase] function is enabled, erasure for the device will no longer be possible, and the [Disable Chip Erase] function will no longer be able to be disabled.

[Disable Block Erase] check box

If the [Security] command is executed with this check box selected, the [Erase] command is disabled for all the selected blocks in the flash memory selected with "Block" in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box. This setting is cleared if the [Erase] command is executed with "Chip" selected in the [Operation Mode] area.

[Disable Program] check box

If the [Security] command is executed with this check box selected, the [Erase] command for all the selected blocks in the flash memory selected with "Block" in the [Operation Mode] area on the [Standard] tab in the Device Setup dialog box and the [Program] command is disabled. This setting is cleared if the [Erase] command is executed with "Chip" selected in the [Operation Mode] area.

[Disable Read] check box

If the [Security] command is executed with this check box selected, the [Read] command is disabled. This setting is cleared if the [Erase] command is executed with "Chip" selected in the [Operation Mode] area.

[Disable Boot block cluster reprogramming] check box

If the [Security] command is executed with this check box selected, the boot block set in the [Boot Block end] drop-down list is regarded as the last block in the [Block protection] area and then the boot area is set, and rewriting to the area is prohibited. If this check box is selected, the following dialog box appears.

Figure 4-60. [Disable Boot block cluster reprogramming] Warning Dialog Box

Clicking the OK button determines the selection of the [Disable Boot block cluster reprogramming] check box.

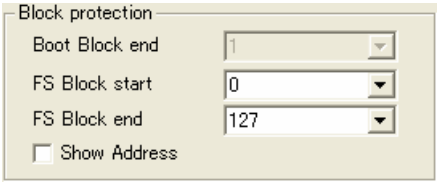
Clicking the Cancel button cancels the selection of the [Disable Boot block cluster reprogramming] check box.

Caution If the [Disable Boot block cluster reprogramming] function is enabled, rewriting of the boot area and execution of the [Erase] command with "Chip" selected in the [Operation Mode] area will no longer be possible for the device, and the [Disable Chip Erase] function will no longer be able to be disabled.

<5> [Block protection] area

In this area, block settings when the [Disable Boot block cluster reprogramming] check box is selected and block settings for the flash shield window function can be performed.

Figure 4-61. [Block protection] Area



[Boot Block end] drop-down list

Select a block number from this list if the [Disable Boot block cluster reprogramming] check box is selected. This list shows the block numbers where the flash memory in the target device is configured. Block 0 is selected by default.

[FS Block start] and [FS Block end] drop-down lists

Select the block subject to the flash shield window function, using these lists. Only the specified range can be written through flash memory self programming. This setting does not affect programming using the programmer. This function can prevent areas out of the specified range from being written to by mistake during flash self programming. These lists show the block numbers where the flash memory in the target device is configured. The entire flash area is selected by default.

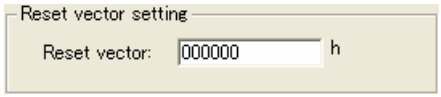
[Show Address] check box

Specify the display format in the [Boot Block end], [FS Block start] and [FS Block end] drop-down lists. If this check box is selected, the block address is displayed. If this check box is cleared, the block number is displayed.

<6> [Reset vector setting] area

The reset vector handling function can be set in this area.

Figure 4-62. [Reset vector setting] Area



[Reset vector] text box

If the [Security] command is executed with an arbitrary address value input, the reset vector is changed to the specified address. This setting is cleared if the [Erase] command is executed with "Chip" selected in the [Operation Mode] area. The initial setting is 000000h.

4.3.4 [Help] menu

Clicking the [Help] menu displays the following pull-down menu.

Figure 4-63. [Help] Menu

(1) [Help Topics] command

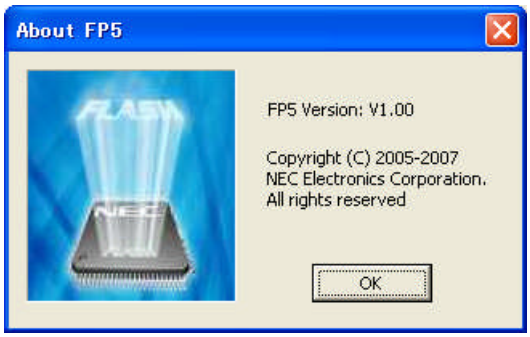
The command is not available.

(2) [About FP5] command

This command opens the following dialog box and shows the versions of the programming GUI.

Clicking the OK button closes this dialog box.

Figure 4-64. [About FP5] Dialog Box



4.4 Toolbar

The commands frequently used with the programming GUI are displayed as buttons on the toolbar. A command can be executed just by clicking the relevant button. Some commands may be unavailable depending on the PR5 file selected, or when the programming GUI is started for the first time. By pointing to a button with the pointer, the hint for the button is displayed on the hint bar.

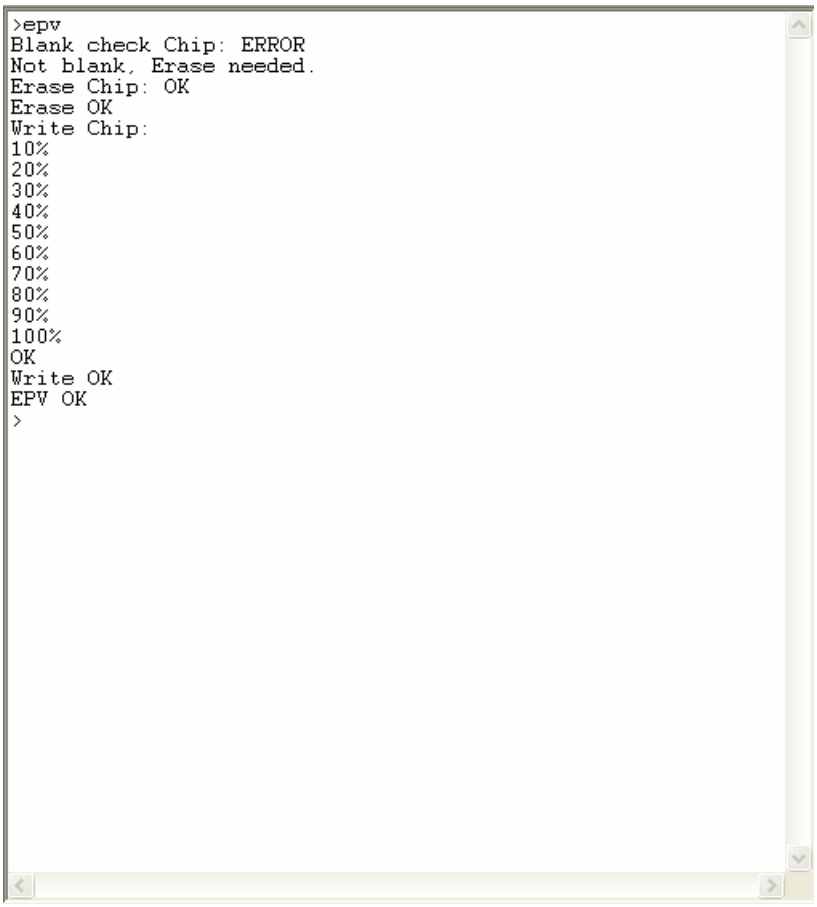
Table 4-3. Toolbar Buttons

	Opens the Device Setup dialog box. This performs the same action as selecting the [Setup] command in the [Device] menu.
	Opens the programming area select dialog box. This performs the same action as selecting the [Select Programming area...] command in the [Programmer] menu.
	Opens the HEX Editor select dialog box. This performs the same action as selecting the [HEX Editor...] command in the [File] menu.
	Executes the [Blank Check] command. This performs the same action as selecting the [Blank Check] command in the [Device] menu.
	Executes the [Erase] command. This performs the same action as selecting the [Erase] command in the [Device] menu.
	Executes the [Program] command. This performs the same action as selecting the [Program] command in the [Device] menu.
	Executes the [Verify] command. This performs the same action as selecting the [Verify] command in the [Device] menu.
	Executes the [Security] command. This performs the same action as selecting the [Security] command in the [Device] menu.
	Executes the [Autoprocedure(E.P.)] command. This performs the same action as selecting the [Autoprocedure(E.P.)] command in the [Device] menu.

4.5 Action Log Window

This window displays the log of programming GUI actions.

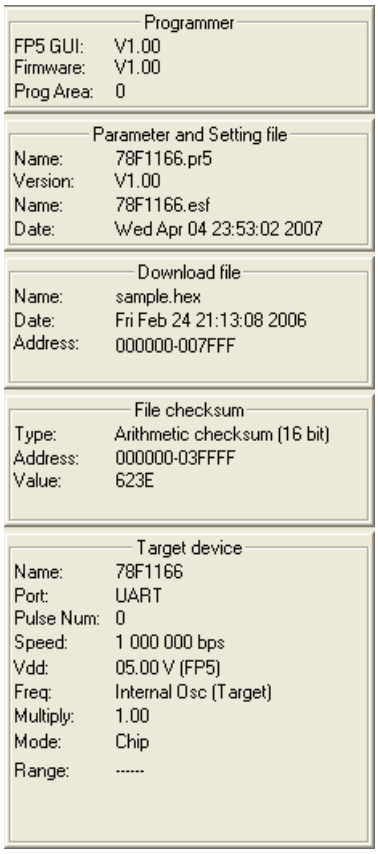
Figure 4-65. Action Log Window



4.6 Programming Parameter Window

This window displays the programming parameter settings.

Figure 4-66. Programming Parameter Window



[Programmer] area

Displays information such as the programming GUI version, FP5 firmware version, and valid programming area number.

[Parameter and Setting file] area

Displays information such as the PR5 file name and its version, and the ESF file name and date set in the valid setting programming area.

[Download file] area

Displays information such as the file name, date, and start and end addresses of the program file set in the valid setting programming area.

[File checksum] area

Displays the checksum result for execution of the [Checksum...] command in the [File] menu.

[Target device] area

Displays information of the settings on the [Standard] tab in the Device Setup dialog box. This area is updated after the OK button in the Device Setup dialog box is clicked and files are downloaded.

4.7 Status Bar

The status bar shows the progress as a color or with a message when a PR5 file, ESF file or program file is selected, or when a command is executed for the target device.

Figure 4-67. Status Bar

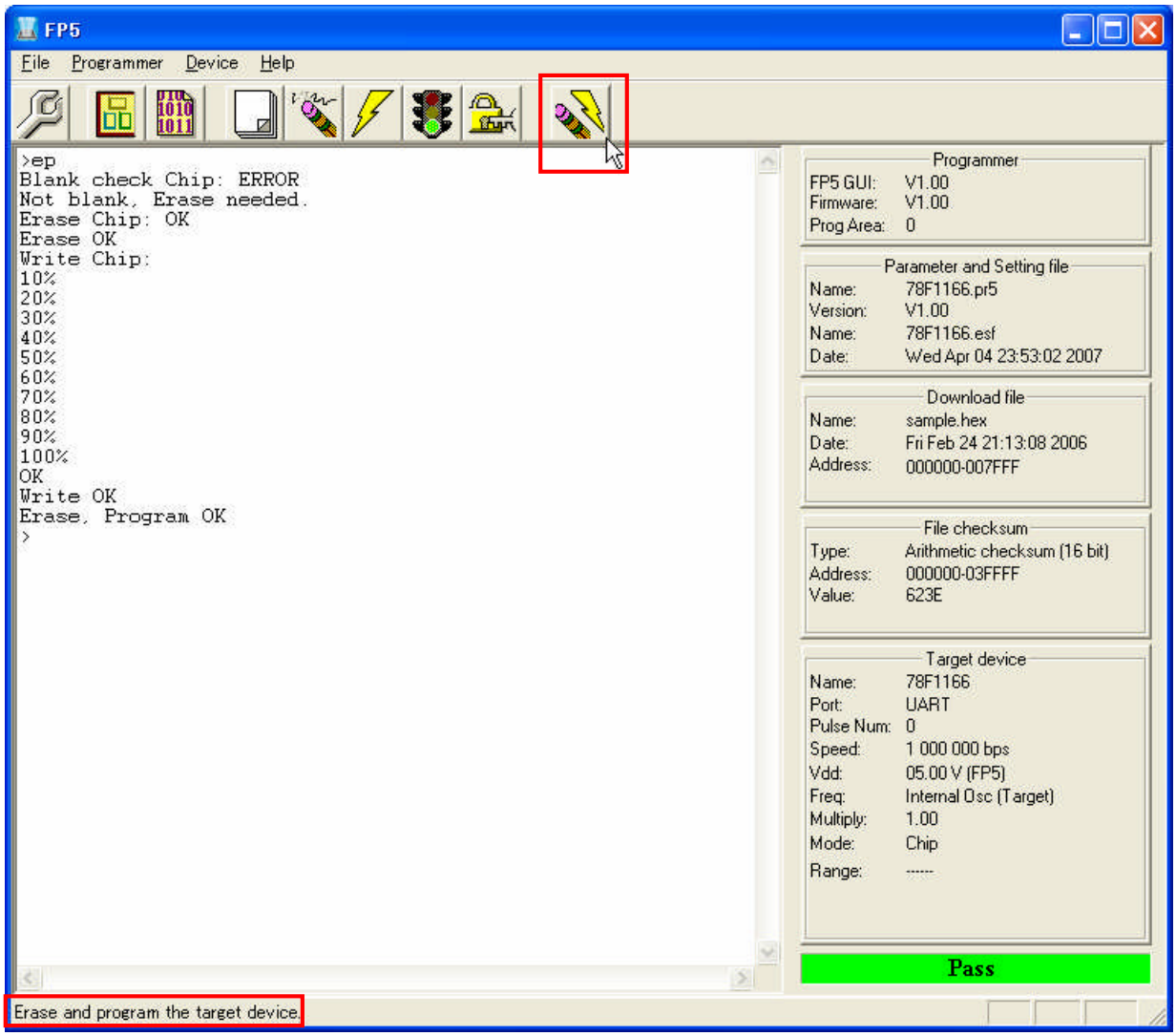
Table 4-4. Status Bar Displays

	Immediately after the programming GUI is started
Running . . .	A command execution is in progress, or a PR5 file, ESF file or program file is being downloaded
Pass	A command execution or downloading of a PR5 file, ESF file or program file is completed normally
Error	A command execution or downloading of a PR5 file, ESF file or program file is terminated abnormal

4.8 Hint Bar

By pointing to a command on the menu bar or a button with the pointer, the hint for the command or button is displayed on the hint bar.

Figure 4-68. Hint Bar



CHAPTER 5 EXAMPLE OF OPERATION USING PROGRAMMING GUI

This chapter explains a series of basic FP5 operations using the programming GUI, taking a case where the μPD78F1166 is used as the target device as an example. This chapter covers how to start the system, execute the [Autoprocedure(E.P.)] command and program the target device.

For the other commands and applications, refer to **CHAPTER 6 USAGE IN STANDALONE MODE**.

• Series of operations described in this chapter:

The operation conditions for this chapter are as follows.

Host machine interface:	USB
Programming area:	Divided by 4, Area 0
Target device:	UPD78F1166 (with program adapter)
Communication channel:	UART @ 1 MHz
Clock setting:	None (Internal OSC) Internal/Direct mode
Operation mode:	Chip
Supply voltage:	Supplied from FP5 (5 V)
Command option:	[Blank check before Erase] enabled
Security setting:	Not used

The operation steps described in this chapter are as follows

(1) Installation of programming GUI
(2) Installation of PR5 file
(3) System connection and installation of USB driver
(4) Connection of program adapter
(5) Startup of programming GUI
(6) Setting of programming environment
(7) Execution of [Autoprocedure(E.P.)] command
(8) System shutdown

(1) Installation of programming GUI

Refer to **CHAPTER 3 SOFTWARE INSTALLATION** and install the programming GUI in the host machine (if it has not been installed yet).

(2) Installation of PR5 file

Refer to **CHAPTER 3 SOFTWARE INSTALLATION**, download the PR5 file for the μPD78F1166 and copy it to the FP5_PRJ folder in the programming GUI installation folder.

(3) System connection and installation of USB driver

<1> Connect the USB connector of the FP5 to the USB port on the host machine using a USB cable.

<2> Plug the FP5 power supply connector into the AC outlet (100 to 240 V) using the supplied AC adapter.

<3> Press the POWER button on the FP5 to turn on power. Do not connect the program adapter (target device) before turning on power. Confirm that the POWER LED on the FP5 is off and that 'Commands >' is displayed in the message display, indicating that the FP5 is ready for operation. If not, the cause may be a defect in the FP5, so consult an NEC Electronics sales representative or distributor.

<4> Refer to **CHAPTER 3 SOFTWARE INSTALLATION** and install the USB driver (in case Found New Hardware Wizard is started by Plug and Play).

(4) Connection of program adapter

<1> Connect the FP5 GND connector to the program adapter using a GND cable.

Caution The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

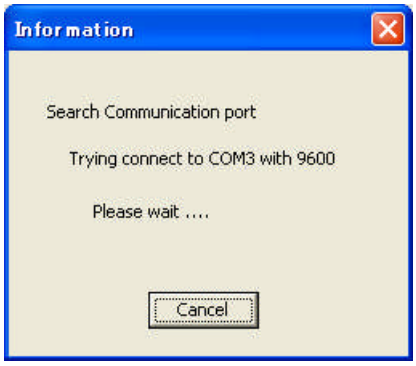
<2> Connect the FP5 target connector to the program adapter using the target cable.

Remark Connect the target system before supplying V_{DD}/V_{DD2} power from the target system.

(5) Startup of programming GUI

<1> Click the Start menu, "All Programs", point to "FL-PR5", and then select "FL-PR5" to start the Programming GUI. The valid communication modes are automatically detected in the order of the USB, and then the serial interface.

Figure 5-1. Connection Between Programming GUI and FP5

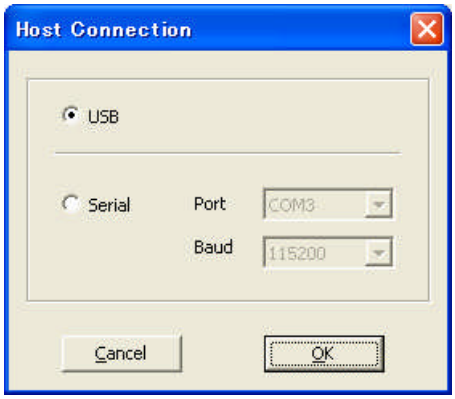


<2> The communication mode can also be selected by cancelling this operation with the Cancel button and selecting the [Setup host connection] command in the [Programmer] menu.

Figure 5-2. [Setup host connection] Command

<3> Perform settings according to the communication port connected to the FP5.

Figure 5-3. Communication Parameter Setup



<4> Click the OK button to enable the new port settings.

<5> When the programming GUI is correctly started, the main window will be opened. The following message will be displayed if the programming GUI is started for the first time or valid programming areas have been cleared, so click the OK button. The Device Setup dialog box will be opened.

Figure 5-4. Message Displayed at the First Startup of Programming GUI

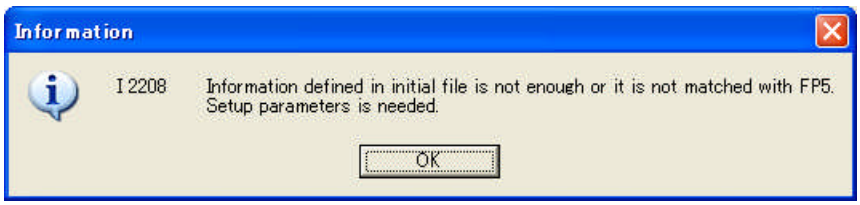
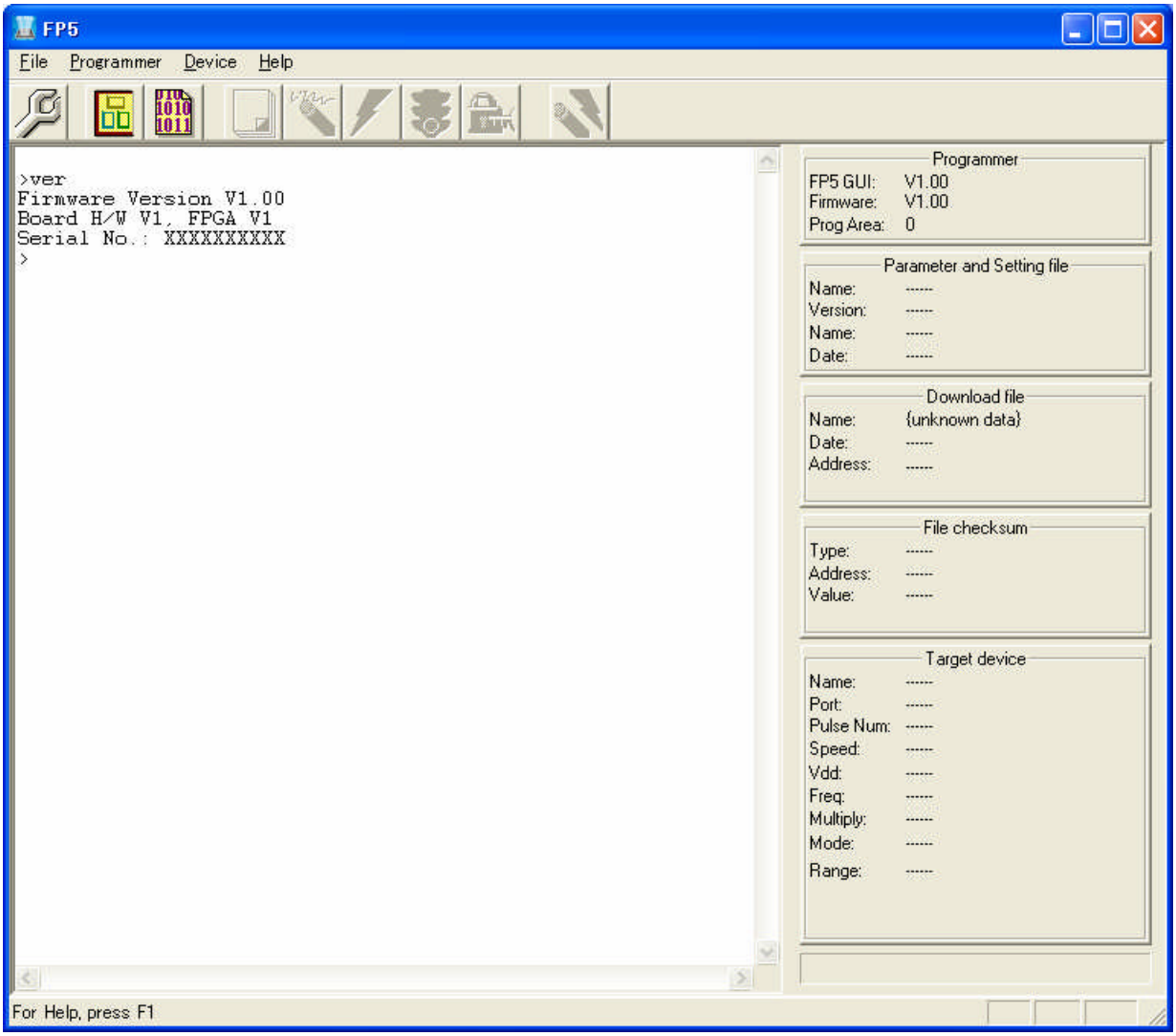


Figure 5-5. Main Window



(6) Setting of programming environment

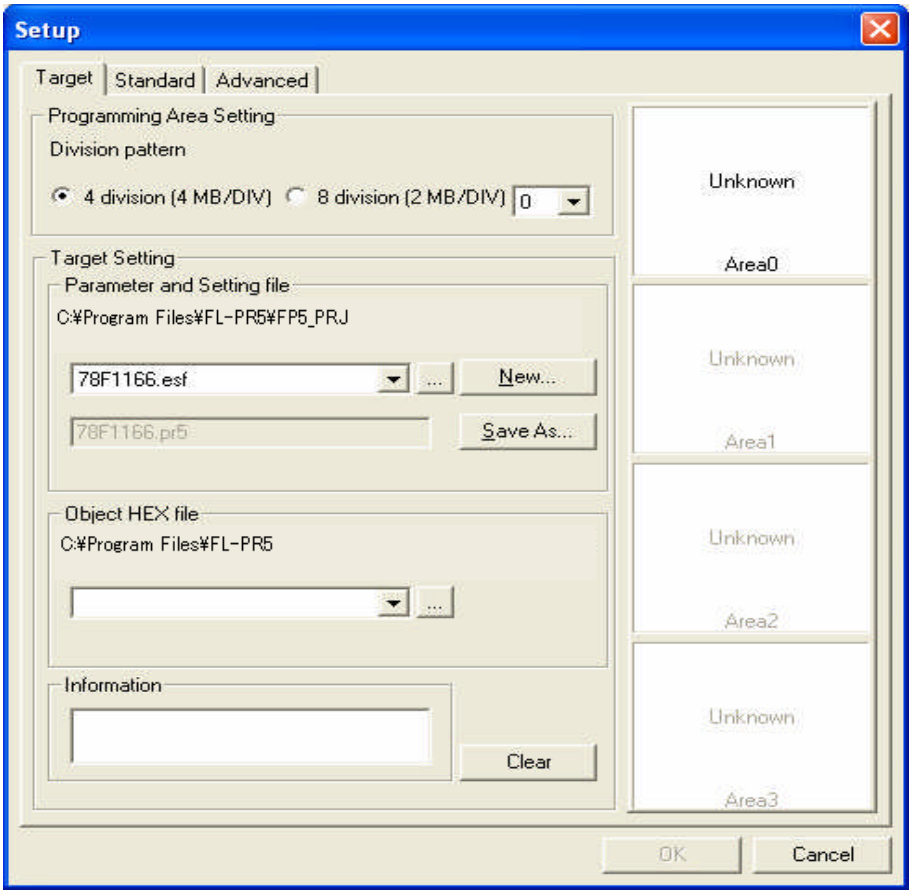
<1> Execute the [Setup...] command in the [Device] menu in the main window.

Figure 5-6. [Setup] Command

Toolbar: 

<2> The Device Setup dialog box ([Target] tab) is opened.

Figure 5-7. Device Setup Dialog Box - [Target] Tab

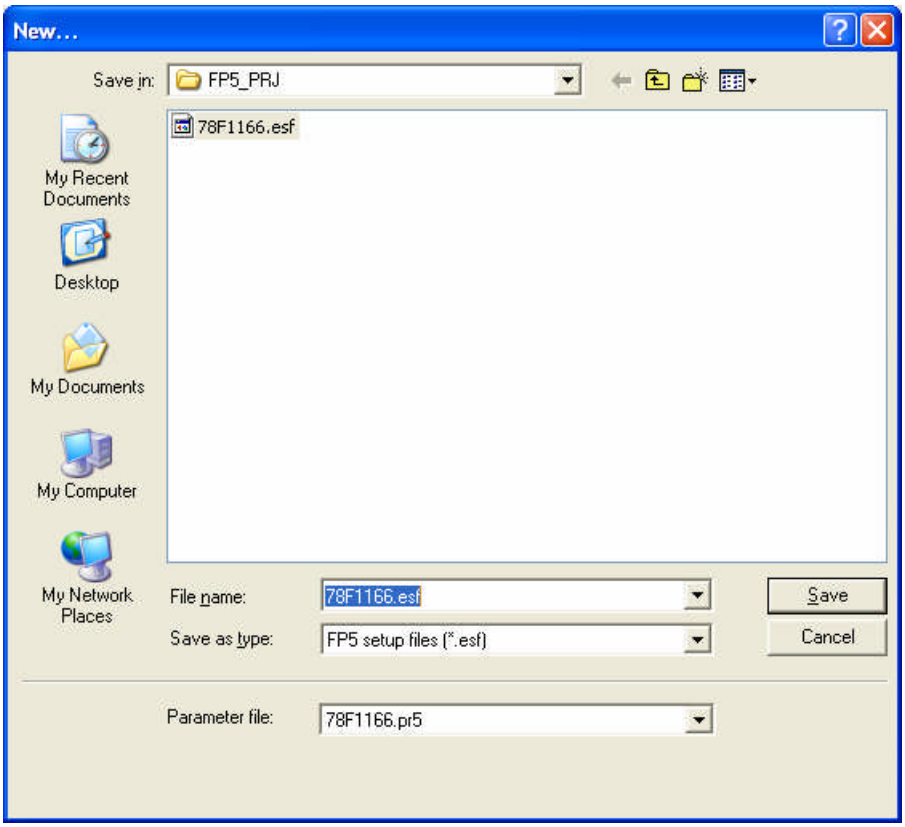


<3> Set the [Programming Area Setting] area. In this example, 4-divided Area 0 is selected.

Figure 5-8. Setting of [Programming Area Setting] Area

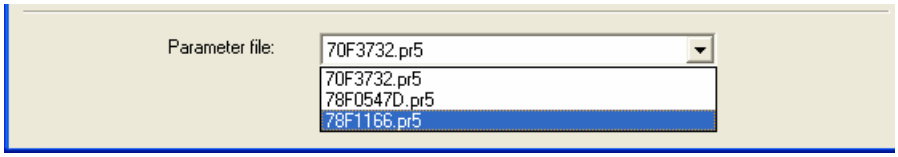
<4> Click the New... button to create a new ESF file for the μPD78F1166.

Figure 5-9. Creation of New ESF File



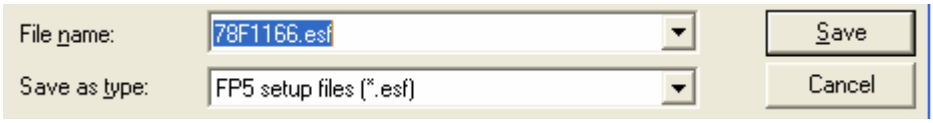
<5> Select 78F1166.pr5 from the [Parameter file] list.

Figure 5-10. Selecting PR5 File



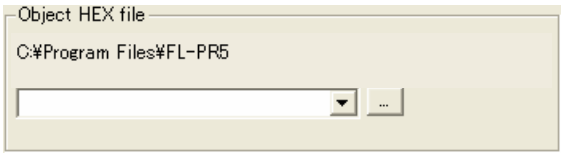
<6> Type the name of the newly created ESF file and click the Save button.

Figure 5-11. Saving ESF File



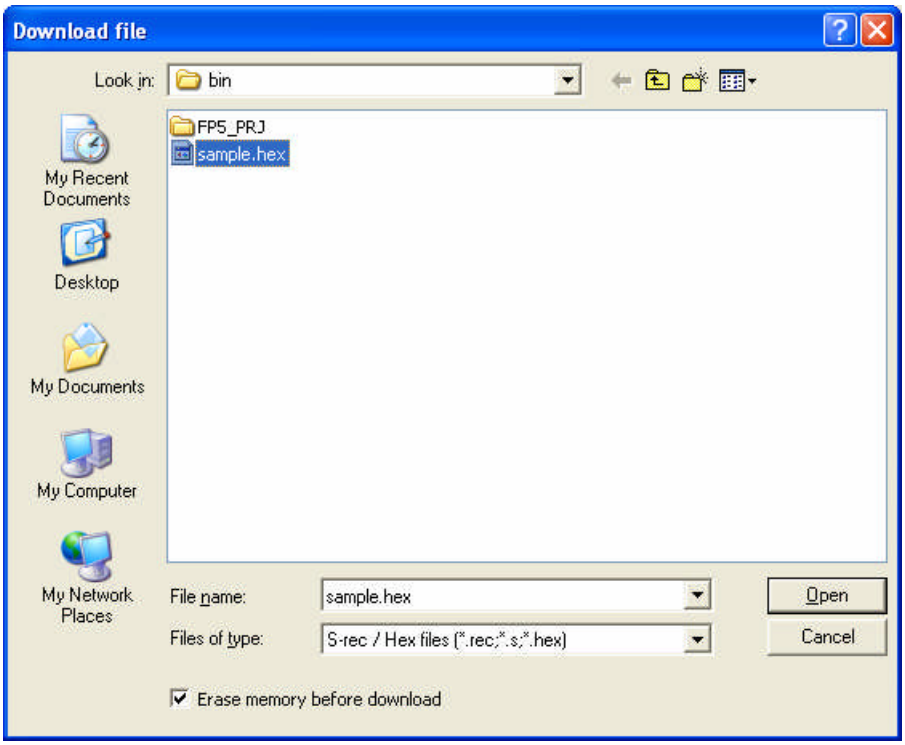
<7> Select the program file. Click the ... button in the [Object HEX file] area.

Figure 5-12. [Object HEX file] Area



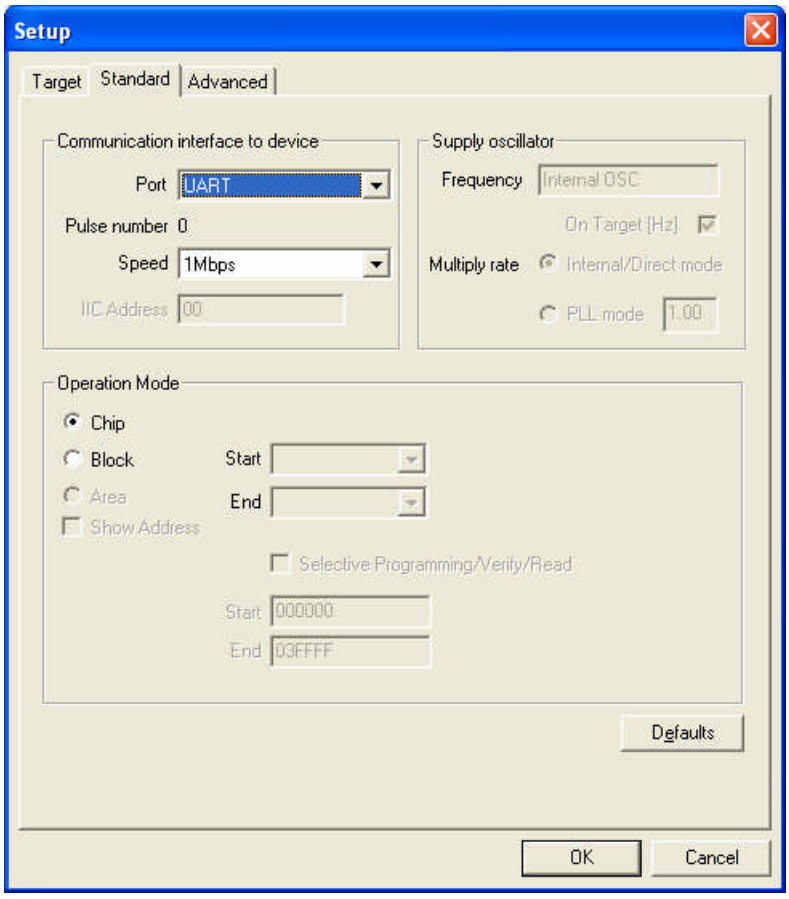
<8> Select the program file and click the Open button. In this example, "sample.hex" is selected.

Figure 5-13. Selection of Program File



<9> Click the [Standard] tab.

Figure 5-14. Device Setup Dialog Box - [Standard] Tab



<10> Set the items in accordance with the programming environment used. In particular, set the [Communication interface to device] area and [Supply oscillator] area in accordance with the specifications of the device selected. Specify a flash memory range to be manipulated in the [Operation Mode] area (the flash memory range that can be set is defined by the PR5 file according to the specifications of the device).

In this example, it is assumed that the following settings are made.

[Communication Interface to device] area

Port: UART

Speed: 1Mbps

[Supply oscillator] area

On Target: Unavailable (using internal oscillator)

Frequency: Unavailable (Internal OSC)

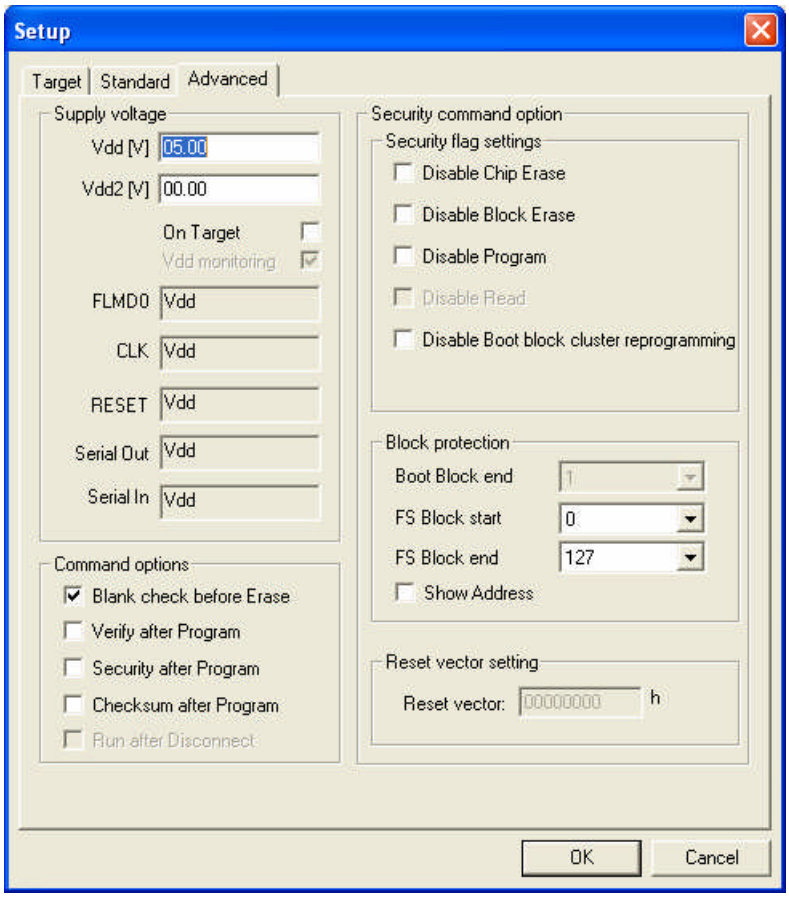
Multiply rate: Unavailable (Internal/Direct mode)

[Operation Mode] area

Chip

<11> Click the [Advanced] tab.

Figure 5-15. Device Setup Dialog Box - [Advanced] Tab



<12> Check the information in the [Supply voltage] area to make sure that they are set in accordance with the programming environment used.

In this example, it is assumed that the following settings are made.

[Supply voltage] area

Vdd[V]: 5.00 V (Follows the value set in the PR5 file.)

Vdd2[V]: 0.00 V (Not used; follows the value set in the PR5 file.)

[On Target] check box

Cleared (Power is supplied from FP5.)

[Command options] area

Blank check before Erase: Selected

[Security command option] area

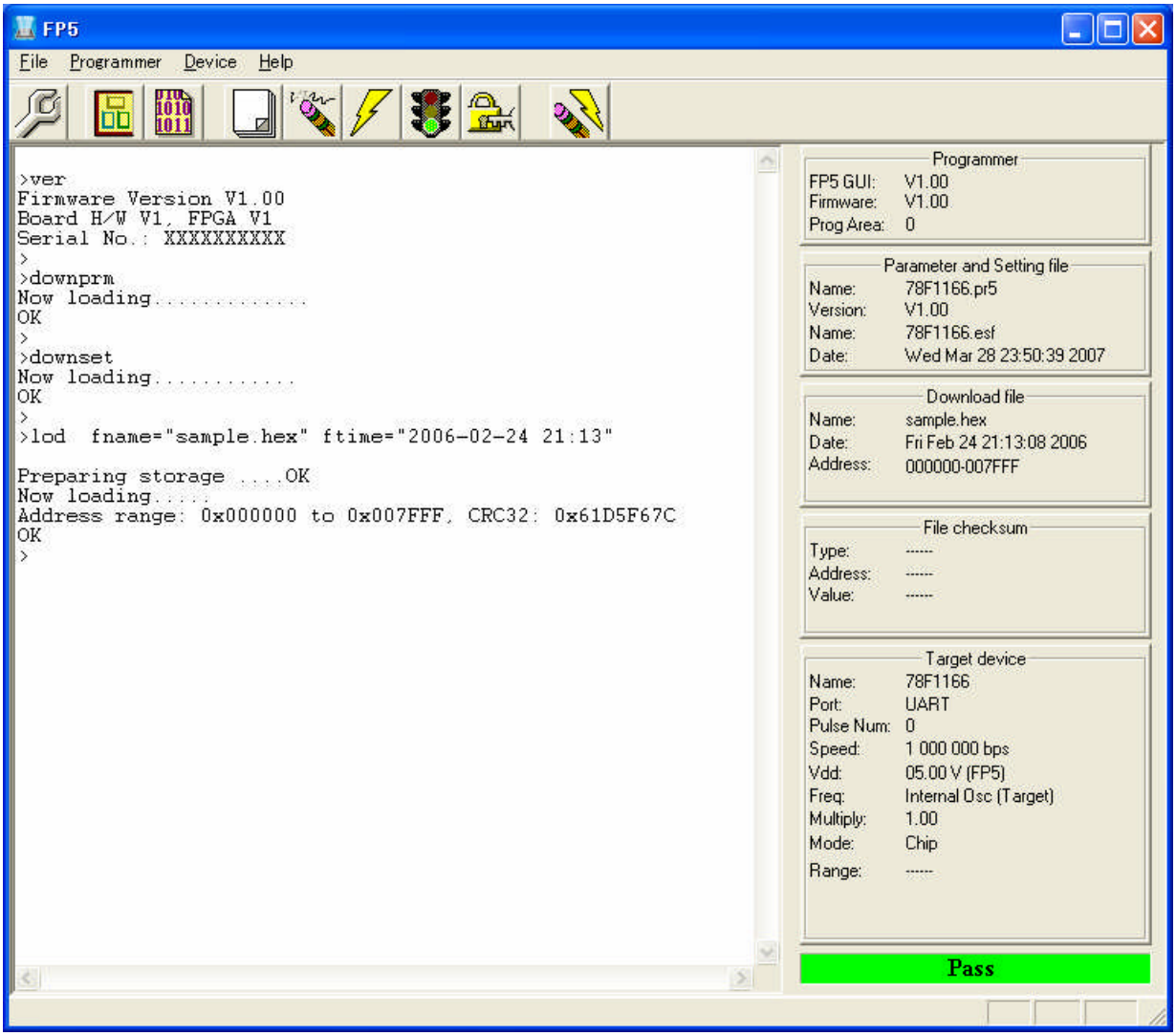
Not used

Remark Set Vdd [V] and Vdd2 [V] and select the [On target] check box before supplying V_{DD}/V_{DD2} power from the target system.

<13> Click the OK button in the Device Setup dialog box.

<14> The programming GUI loads the PR5 file, ESF file and program file to the FP5. When setting is completed, the following window will be displayed. Setting of the programming environment is then finished.

Figure 5-16. Downloading of PR5 File, ESF File and Program File



(7) Execution of [Autoprocedure(E.P.)] command

Execute the [Autoprocedure(E.P.)] command in the [Device] menu.

Figure 5-17. [Autoprocedure(E.P.)] Command

Toolbar: 

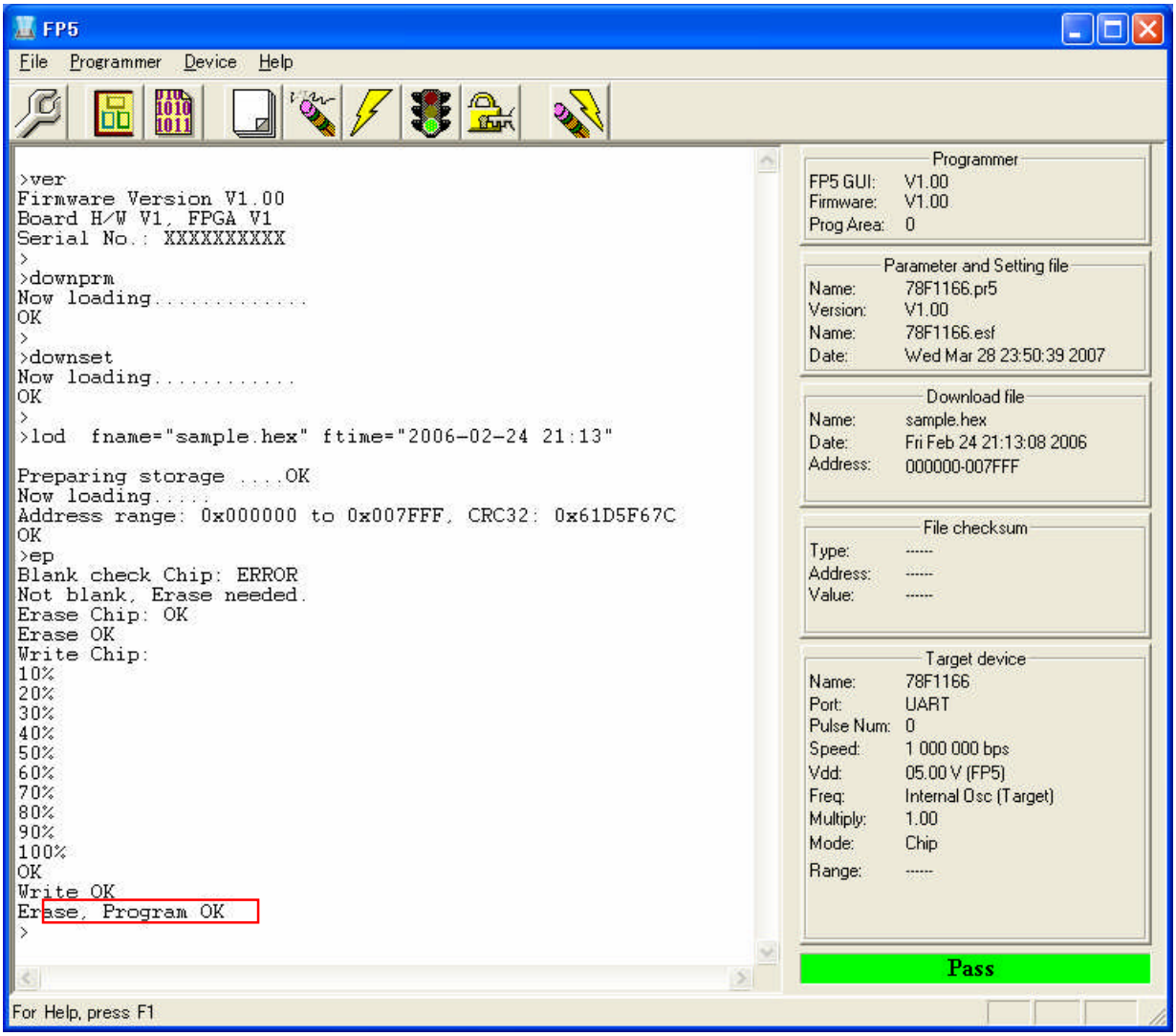
When the [Autoprocedure(E.P.)] command is executed, the [Blank check], [Erase] (if the target area is not blank) and [Program] commands are executed in that order for the μPD78F1166.

Remarks 1. If necessary, insert the target device to be newly written to in the program adapter, and execute the [Autoprocedure(E.P.)] command.

2. Turn off power, connect the target system to be newly written to, and execute the [Autoprocedure(E.P.)] command after power is supplied, before supplying V_{DD}/V_{DD2} power from the target system.

If execution of the [Autoprocedure(E.P.)] command is normally completed, "Erase, Program OK" is displayed in the action log window.

Figure 5-18. [Autoprocedure(E.P.)] Command Execution Result



(8) System shutdown

<1> Remove the program adapter from the target cable.

Remark Turn off power and remove the target system before supplying V_{DD}/V_{DD2} from the target system.

<2> If no more target devices are to be written to, execute the [Quit] command in the [File] menu to terminate the programming GUI. All the settings made so far are saved, so they can be restored when the programming GUI is restarted. (The PR5 files, ESF files and program files are saved to the FP5 internal flash memory.)

<3> Press and hold the POWER button on the FP5 for about 1 second to turn off the POWER LED.

<4> Remove the AC adapter and USB cable from the FP5.

Caution If an error occurred during the above steps, refer to CHAPTER 10 TROUBLESHOOTING and APPENDIX A MESSAGE. In addition, refer to *4.3.2 (6) [Self-Test] command* and perform self-testing.

CHAPTER 6 USAGE IN STANDALONE MODE

The FP5 has a standalone mode in which the FP5 by itself can execute the [Erase], [Program], and [Autoprocedure(E.P.)] commands without a host machine. This mode is useful for using the FP5 on the production line during mass production and for upgrading in the field.

6.1 Before Starting Standalone Operation

In standalone mode, the FP5 can select any programming area based on PR5 files, ESF files and program files stored in the multiple internal flash memory areas (programming areas) and write it. New PR5 files, ESF files and program files cannot be downloaded to the FP5 in this mode. Programming is possible only in environments to which files were downloaded last time by the programming GUI.

6.2 Description of Buttons, Message Display and Status LEDs

In standalone mode, command menus are selected and executed using the control button NEXT, ENTER, CANCEL or START on the top of the FP5 main unit.

The selected command menu is displayed in the message display, and the result of command execution is indicated by the message display and status LEDs.

The command menu consists of two levels of menus: a main menu and submenu.

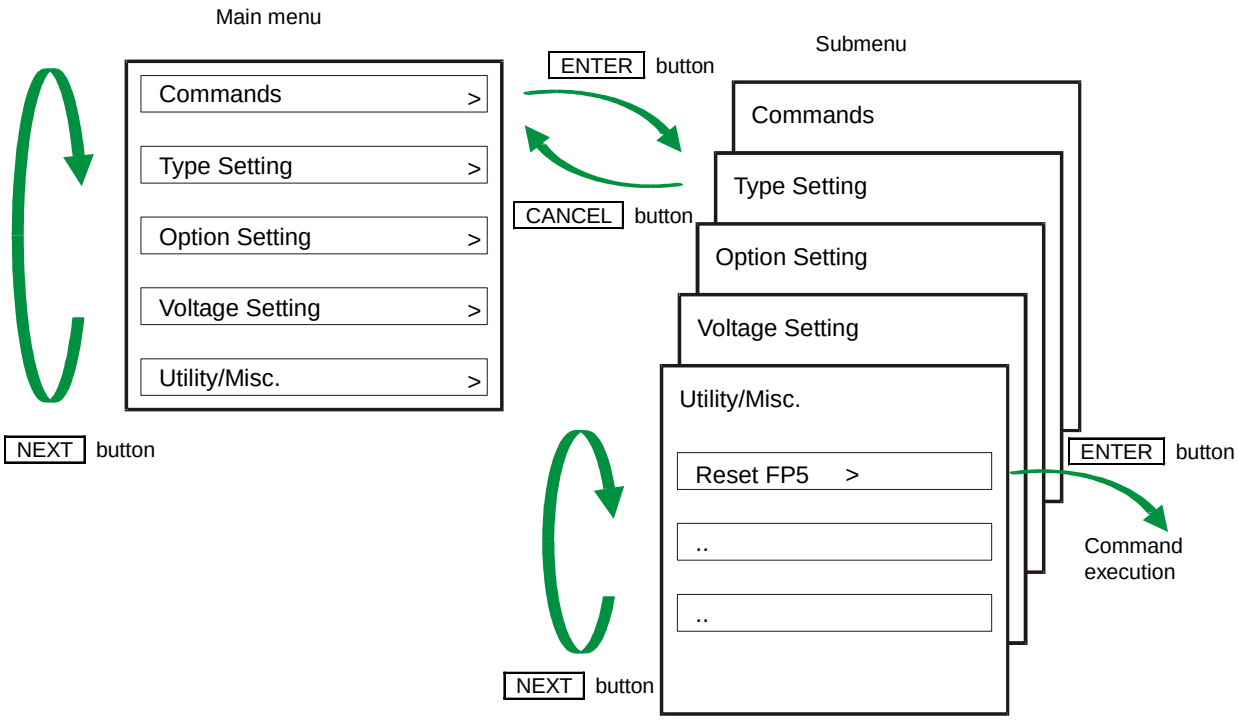
The NEXT button is used to display the next menu on the same level.

The ENTER button is used to select or execute the menu item currently displayed.

The CANCEL button is used to cancel the current selection and return to the previous menu level. The command currently running cannot be stopped, except for the [Read] command.

The START button executes the [Autoprocedure(E.P.)] command. It can be executed from any command menu, and the display returns to the same command menu after execution.

Figure 6-1. Menu Status Transition by Button Input



On the main menu level, the FP5 shows the menu items that can be selected. On the submenu level, the first line in the message display shows the menu item and the second line shows the response from the FP5, if any.

A command prompt '>' displayed at the end of a menu line indicates that it is selectable with the ENTER button, or that the menu (command) can be executed. If the command prompt '>' is not displayed at the end of a menu line, it means that the function is available only for display.

When power to the FP5 is turned on, the POWER LED turns on and 'Commands >' is displayed in the message display.

The status LEDs indicate the status of communication with the device and the result of execution, as follows.

Status LED	Status
Green	The selected command has been executed correctly. The command that has been correctly executed is displayed in the message display.
Orange	The selected command is under execution. The detailed execution status is displayed in the message display.
Red	The selected command has been terminated by an error. The error details are displayed in the message display.

Remark For details on the errors displayed in the message display, refer to error message **A.4 Error Messages Displayed in FP5 Message Display**.

6.3 Standalone Operation Menu

In standalone mode, the programming environment of the target device can be checked and then programs can be written by using the commands explained in this section.

6.3.1 [Commands] menu

The [Commands] menu provides various commands required for programming the target device. Select a command from this menu and press the ENTER button; the FP5 will then execute the command for the target device, based on the settings downloaded to the valid programming area. For details on command execution, refer to **4.4.3 [Device] menu**.

Table 6-1. [Commands] Menu

Main Menu	Submenu	Description
[Commands >]	[E.P.V. >]	Pressing the ENTER button executes the [Autoprocedure(E.P.)] command.
	[Program >]	Pressing the ENTER button executes the [Program] command.
	[Erase >]	Pressing the ENTER button executes the [Erase] command.
	[Verify >]	Pressing the ENTER button executes the [Verify] command.
	[Security >]	Pressing the ENTER button executes the [Security] command.
	[Checksum >]	Pressing the ENTER button executes the [Checksum] command. The checksum value read from the target device is displayed in the message display. Display example: Checksum: 623E
	[Blank check >]	Pressing the ENTER button executes the [Blank check] command.
	[Signature >]	Pressing the ENTER button executes the [Signature read] command. The device name is displayed in the message display. Display example: Signature: D78F1166
	[Prog Area >]	Used to select the valid programming area from the four (4 MB each) or eight (2 MB each) programming areas in the FP5. The valid programming area can be changed by pressing the ENTER button. Display example (if ENTER button is pressed): Commands Prog Area now: 1 (Changes the valid programming area from Area 0 to Area 1.) The currently selected programming area can be checked in the [Programmer] area in the programming parameter window of the programming GUI. The factor for dividing the programming area is the value set in the [Programming Area Setting] area in the Device Setup dialog box.

6.3.2 [Type Setting] menu

The [Type Setting] menu is used to check information (target device programming environment settings) contained in the ESF file downloaded to the FP5. The settings downloaded to the valid programming area are displayed. All the values displayed are those downloaded last time by the programming GUI. The settings cannot be changed using this menu.

Table 6-2. [Type Setting] Menu

Main Menu	Submenu	Description
[Type Setting >]	[Device Port]	Displays any of the following to indicate which mode is selected for communication between the target device and the FP5. SIO 0, SIO 1, SIO 2, SIO H/S, IIC 0, IIC 1, IIC 2, IIC 3, UART 0, UART 1, UART 2, UART 3, PORT 0, PORT 1, PORT 2
	[Multiply Rate]	Displays the multiplication rate of the operating clock for the target device.
	[Serial CLK]	Displays the serial clock rate in Hz that is used for communication between the target device and the FP5.
	[CLK source]	Indicates either of the following as a source of the operating clock supplied to the target device. Programmer: Clock is supplied from the FP5. Target: Clock is supplied from the user system.
	[PG CPU CLK]	Indicates the frequency of the clock supplied from the FP5 in MHz.
	[Target CPU CLK]	Indicates the frequency of the clock on the user system that is supplied to the target device, in MHz.
	[Mode]	Indicates *chip*, *area*, or *block* as the operation mode when the [Blank check], [Erase], [Program], [Verify], [Checksum], or [Autoprocedure(E.P.)] command is executed. Display example: Mode BEPV: chip
	[PRG Area]	Indicates which of the areas in the target device connected to the FP5 is to be written to. This menu shows a valid display only when the operation mode is *area* or *block*. Display example: PRG Area 0 to 1 *In chip mode, the display is always as follows: Display example: PRG Area 0 to 127

6.3.3 [Option Setting] menu

The [Option Setting] menu is used to check the command options and security settings currently set for the FP5. The settings downloaded to the valid programming area are displayed. All the values displayed are those downloaded last time by the programming GUI. The settings cannot be changed using this menu.

Table 6-3. [Option Setting] Menu

Main Menu	Submenu	Description
[Option Setting >]	[BLN before ERS]	Displays the setting of the [Blankcheck before Erase] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[VRF after PRG]	Displays the setting of the [Verify after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[SCF after PRG]	Displays the setting of the [Security after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[SUM after PRG]	Displays the setting of the [Checksum after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Prog Area]	Displays the valid programming area from the four (4 MB each) or eight (2 MB each) programming areas in the FP5. Display example (in the case when the valid programming area is Area 0): Prog Area On (0)
	[Chip ERS dis.]	Displays the setting of the [Disable Chip Erase] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Block ERS dis.]	Displays the setting of the [Disable Block Erase] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[PRG disable]	Displays the setting of the [Disable Program] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[READ disable]	Displays the setting of the [Disable Read] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Boot Blk PRG dis]	Displays the setting of the [Disable boot block cluster reprogramming] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Reset Vector]	Displays the setting of the [Reset vector:] check box in the [Reset vector settings] area on the [Advanced] tab in the Device Setup dialog box. Display example: Reset vector Addr: 0x000000

Main Menu	Submenu	Description
[Option Setting >]	[End Boot Blk]	Displays the setting of the [Boot Block end] check box in the [Block protection] area on the [Advanced] tab in the Device Setup dialog box. Display example: End Boot Blk 0
	[FS area]	Displays the setting of the [FS Block start] and [FS Block end] check boxes in the [Block protection] area on the [Advanced] tab in the Device Setup dialog box. Display example: FS area 0 to 127

6.3.4 [Voltage Setting] menu

The [Voltage Setting] menu is used to check the voltage level setting used when programming the target device currently connected to the FP5. The settings downloaded to the valid programming area are displayed. The settings cannot be changed using this menu.

Table 6-4. [Voltage Setting] Menu

Main Menu	Submenu	Description
[Voltage Setting >]	[Vdd]	Displays the value of V_{DD} supplied to the target device connected to the FP5 in volts.
	[Vdd2]	Displays the value of V_{DD2} supplied to the target device connected to the FP5 in volts.
	[Vdd Source]	Indicates the source of V_{DD} supplied from the target device as either of the following. V_{DD} from PG: V_{DD} is supplied from the FP5. V_{DD} from device: V_{DD} is supplied from the user system.
	[Clk Level]	Indicates the voltage level of the clock signal as either of the following. VDD VDD2
	[Serial Level]	Indicates the voltage level of the serial communication signals. The high level of the serial communication signal is indicated as either of the following. VDD VDD2
	[Vpp]	Indicates the value of V_{PP} supplied to the target device connected to the FP5 in volts.

6.3.5 [Utility/Misc.] menu

The [Utility/Misc.] menu is used to reset the FP5 main unit, tune the LCD contrast, check the firmware version, check the name and version of the PR5 file downloaded, check the name of the program file downloaded, and check the checksum of program files. The settings downloaded to the valid programming area are displayed. The settings cannot be changed using this menu.

Table 6-5. [Utility/Misc.] Menu

Main Menu	Submenu	Description
[Utility/Misc. >]	[Reset FP5 >]	Pressing the ENTER button resets the FP5.
	[Set LCD Contr. >]	Tunes the contrast in the message display. After pressing the ENTER button, the contrast can be tuned using the NEXT (darken) or CANCEL button (lighten). To fix the contrast, click the ENTER button.
	[FP5 F/W Version]	Displays the FP5 firmware version. Display example: FP5 F/W Version V1.00
	[PRM Name]	Displays the name of the PR5 file stored in the FP5 valid programming area. Display example: PRM Name 78F1166
	[PRM File Version]	Displays the version of the PR5 file stored in the FP5 valid programming area. Display example: PRM File Version V1.00
	[HEX File Name]	Displays the name of the program file stored in the FP5 valid programming area. Display example: HEX File Name Sample.hex "n.a." is displayed if the program file is invalid.
	[CRC Sum (FP5)]	Displays the result of executing the [Checksum...] command in the [File] menu in the programming GUI. Display example: CRC Sum(FP5) 623E (ARITHM.)

CHAPTER 7 CONNECTORS AND CABLES

7.1 Power Supply Connector

The power supply connector is laid out on the host interface side of the FP5.

Figure 7-1. Power Supply Connector <FP5 Host Interface Side>

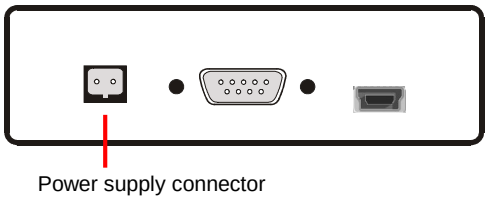
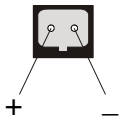


Figure 7-2. Power Supply Connector Pin Assignment



Caution Do not connect an AC adapter other than the one included with the FP5 to the power supply connecter.

7.2 Serial Connector

The serial connector (9-pin D-SUB male connector) is laid out on the host interface side of the FP5.

Figure 7-3. Serial Connector <FP5 Host Interface Side>

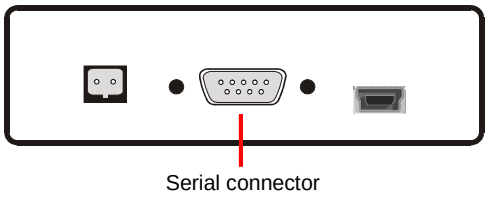


Figure 7-4. Serial Connector Pin Assignment

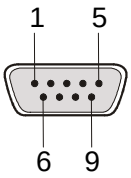


Table 7-1. Serial Connector Pin Configuration

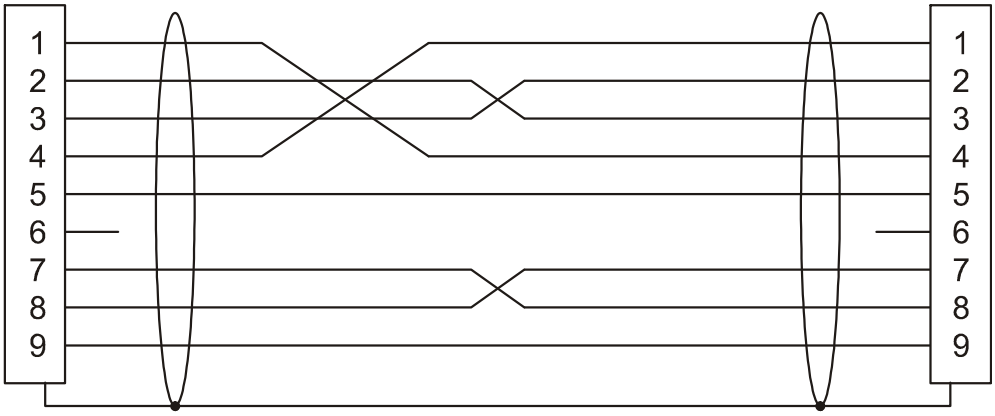
Serial Connector	Signal Name
1	NC
2	RxD
3	TxD
4	NC
5	V_{SS}
6	NC
7	RTS
8	CTS
9	NC

Part number of serial connector (9-pin D-SUB male connector): 070430MB009G200ZU (Suyin Connector Corp.)

7.2.1 Serial cable

The host cable is a standard shielded serial cable (crossed) approximately 3 meters long. The connectors on both sides are 9-pin D-SUB female connectors. The following shows the connection.

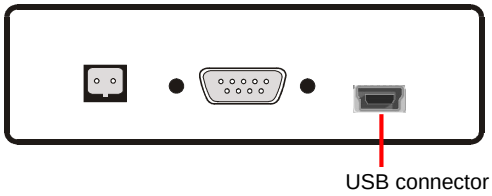
Figure 7-5. Serial Cable Connection



7.3 USB Connector

The mini-B type USB connector is laid out on the host interface side of the FP5.

Figure 7-6. USB Connector <FP5 Host Interface Side>



Part number of mini-B USB connector: UX60A-MB-5ST (made by Hirose Electric Co., Ltd.)

7.3.1 USB cable

The USB cable is approximately 2 meters long. The cable is equipped with a USB mini-B type connector and USB type A connector.

Figure 7-7. GND Cable External View

USB mini-B type USB type A

7.4 Target Connector

The target connector (15-pin HD-SUB female connector) is laid out on the target connector side of the FP5.

Figure 7-8. Target Connector <FP5 Target Connector Side>

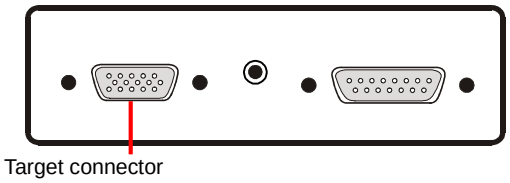


Figure 7-9. Target Connector (15-Pin HD-SUB Female Connector) Pin Assignment

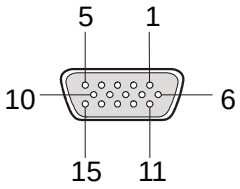


Table 7-2. Target Connector Pin Configuration

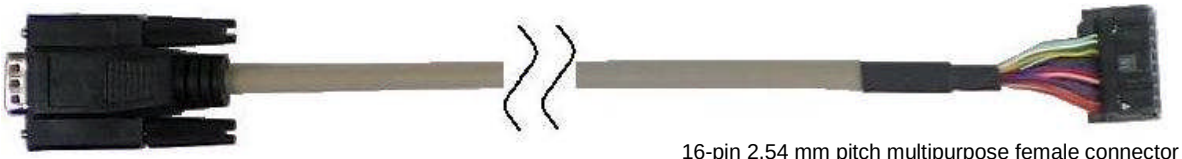
Target Connector	Signal Name
1	SO/TxD
2	SI/RxD
3	SCK
4	$\overline{\text{RESET}}$
5	VDD2
6	FLMD1
7	H/S
8	VDD
9	VDD
10	RFU-1
11	VPP
12	FLMD0
13	VDE
14	CLK
15	GND

Part number of target connector (15-pin HD-SUB female connector): 070431FB015S200ZU (Suyin Connector Corp.)

7.4.1 Target Cable

The target cable is a standard shielded cable approximately 42 centimeters long. The target cable is equipped with a 15-pin HD-SUB male connector and a 16-pin 2.54 mm pitch multipurpose female connector.

Figure 7-10. Target Cable Outline



15-pin HD-SUB male connector

16-pin 2.54 mm pitch multipurpose female connector

Figure 7-11. 15-Pin HD-SUB Male Connector Pin Assignment

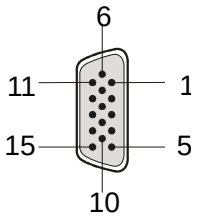


Figure 7-12. 16-Pin 2.54 mm Pitch Multipurpose Female Connector Outline (View from Socket Side)

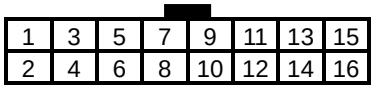


Table 7-3. Target Connector Pin Configuration

Signal Name	15-Pin HD-SUB Male Connector	16-Pin 2.54 mm Pitch Multipurpose Female Connector
GND	15	1
$\overline{\text{RESET}}$	4	2
SI/RxD	2	3
VDD	8, 9	4
SO/TxD	1	5
VPP	11	6
SCK	3	7
H/S	7	8
CLK	14	9
VDE[Note 1]	13	10
VDD2	5	11
FLMD1	6	12
RFU-1[Note 1]	10	13
FLMD0	12	14
Not used[Note 2]	–	15
Not used[Note 2]	–	16

Notes 1. Reserved pins. Leave these pins open.

2. Left open in the target cable.

The following are the recommended connectors (male) to be connected to 16-pin 2.54 mm pitch multipurpose female connectors.

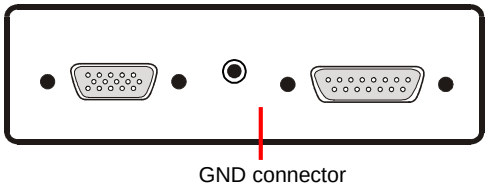
- HIF3FC-16PA-2.54DS (made by Hirose Electric Co., Ltd., right angle type)
- HIF3FC-16PA-2.54DSA (made by Hirose Electric Co., Ltd., straight type)
- 7616-5002PL (Sumitomo 3M Limited, right angle type)
- 7616-6002PL (Sumitomo 3M Limited, straight type)

When using a self-made cable because the supplied cable cannot be used due to the target system specifications, the cable characteristics should be equivalent or higher than those of the supplied cable.
Note that communication may be performed at high speed depending on the communication settings. Consequently, communication errors may occur and causing abnormal operation.

7.5 GND Connector

The banana jack GND connector is laid out on the target connector side of the FP5.

Figure 7-13. GND Connector <FP5 Target Connector Side>



Part number of GND connector (banana jack): PB4 (HIRSCHMANN)

7.5.1 GND cable

The host cable is a standard shielded GND cable approximately 1 meter long. The GND cable is equipped with a banana jack and a spade terminal.

Caution The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

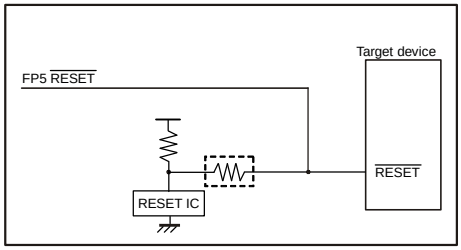
Figure 7-14. GND Cable Outline

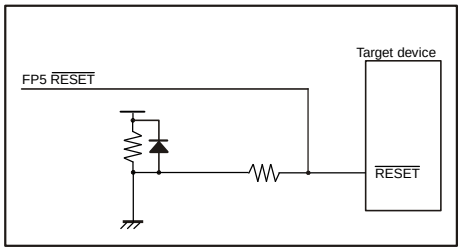
Part number of banana jack: TJ-2167 (made by Sato Parts Co., Ltd.)
Part number of spade terminal: BPF1.25-3 (red) (Daido Solderless Terminals Mfg. Co., Ltd.)

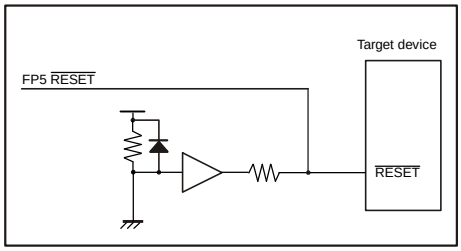
CHAPTER 8 NOTES ON TARGET SYSTEM DESIGN

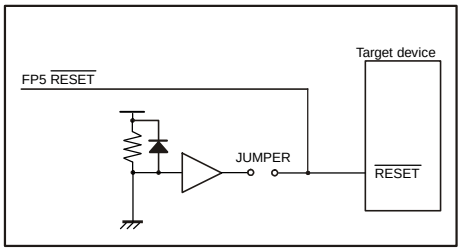
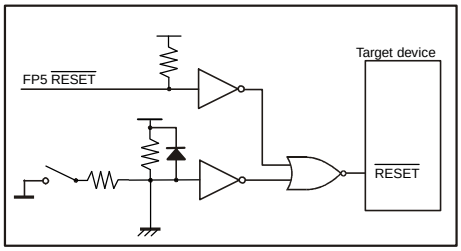
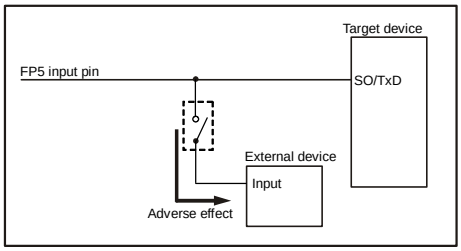
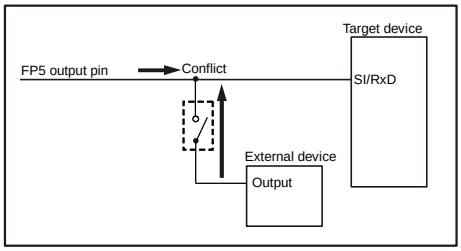
This chapter explains the basic notes on the target system for writing to the flash memory in the target device, using the FP5.

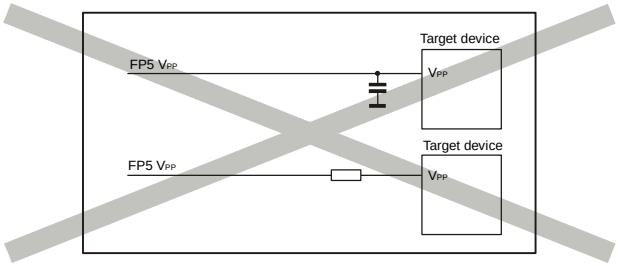
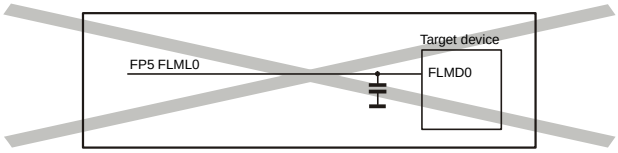
<table>
<tr><th>Target Device Pin</th><th>Recommended Design</th></tr>
<tr><td>Common item</td><td>(When connecting the FP5 output signal pins, refer to CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS and pull up (or pull down) with a resistance in compliance with the device specifications (VIH, VIL).
(When connecting the FP5 input signal pins, refer to CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS and pull up (or pull down) with a resistance in compliance with the device specifications (IOH, IOL).</td></tr>
<tr><td>$\overline{\text{RESET}}$</td><td>Do not connect the $\overline{\text{RESET}}$ signal generator on the target system to the $\overline{\text{RESET}}$ signal of the FP5. Otherwise, a signal conflict will occur. To avoid a conflict, isolate the $\overline{\text{RESET}}$ signal generator from the $\overline{\text{RESET}}$ signal of the FP5. Do not generate $\overline{\text{RESET}}$ while the FP5 is connected. This must be especially noted in a target system in which an external watchdog timer is used.

Connect the $\overline{\text{RESET}}$ signal of the FP5 at a point where the status of the FP5 $\overline{\text{RESET}}$ signal and that of the CPU $\overline{\text{RESET}}$ pin are the same.
Correct connection <1>:
 

RESET IC is an open-drain type circuit. Connect a resistor to the portion above enclosed in the dotted line, as necessary.
Correct connection <2>:
 

Correct connection <3>:
 
</td></tr>
</table>

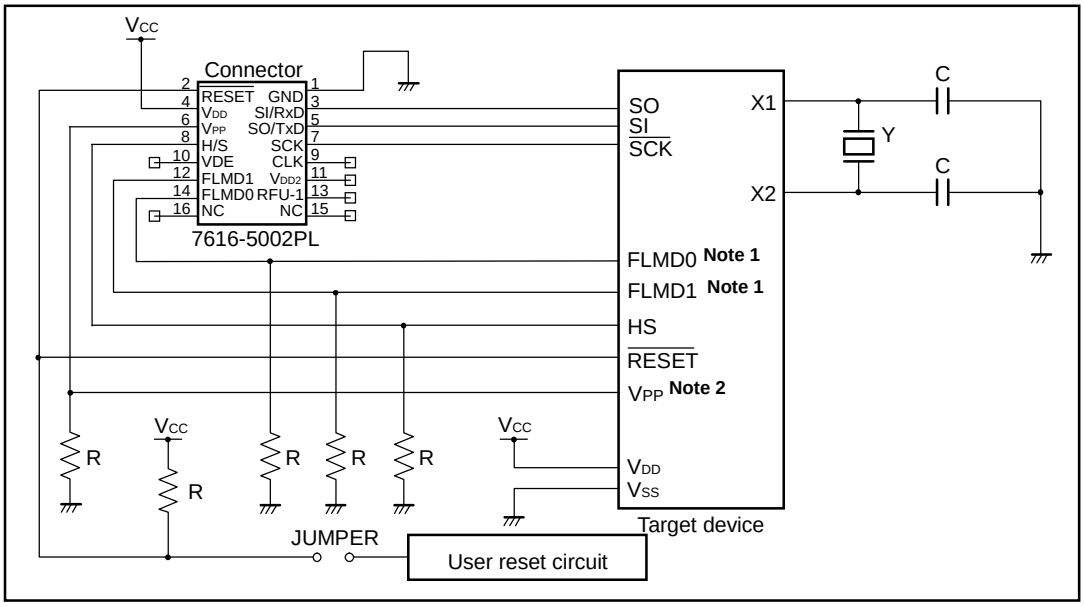
Target Device Pin	Recommended Design
$\overline{\text{RESET}}$	**Correct connection <4>:**  **Correct connection <5>:** 
I/O pins	When a target device pin used by the FP5 is also connected to the input of an external device, and if that target device malfunctions, disconnect the external device as shown in the portion below enclosed in the dotted line or make it output high impedance like dotted line. Example:  If a target device pin used by the FP5 is also connected to the output of an external device like dotted line, and a signal collision occurs, disconnect the external device as shown in the portion below enclosed in the dotted line. Example: 

Target Device Pin	Recommended Design
V_{PP}	Keep the wiring between the FP5 connector and the target device V_{PP} pin as thick and as short as possible. Insert neither capacitors nor resistors into the V_{PP} line unless otherwise stated. Incorrect circuit: 
FLMD0	Insert neither capacitors nor resistors into the FLMD0 line unless otherwise stated. 
FLMD1	Connect the FP5, or GND using pull-down resistance on board.
Others	For the recommended connection of unused pins, refer to the user's manual of the target device. Some target devices have pins that must be connected differently. For these pins also, refer to the user's manual of the target device. Example of pins connected differently: MODE CKSEL REGOUT REGIN, etc.

The following are examples of interface circuits. Refer to the recommended design for the connection of pins in the target device.

<1> SIO-H/S (3-wire clocked communication port, with handshake)

Figure 8-1. SIO-H/S Interface Circuit Example

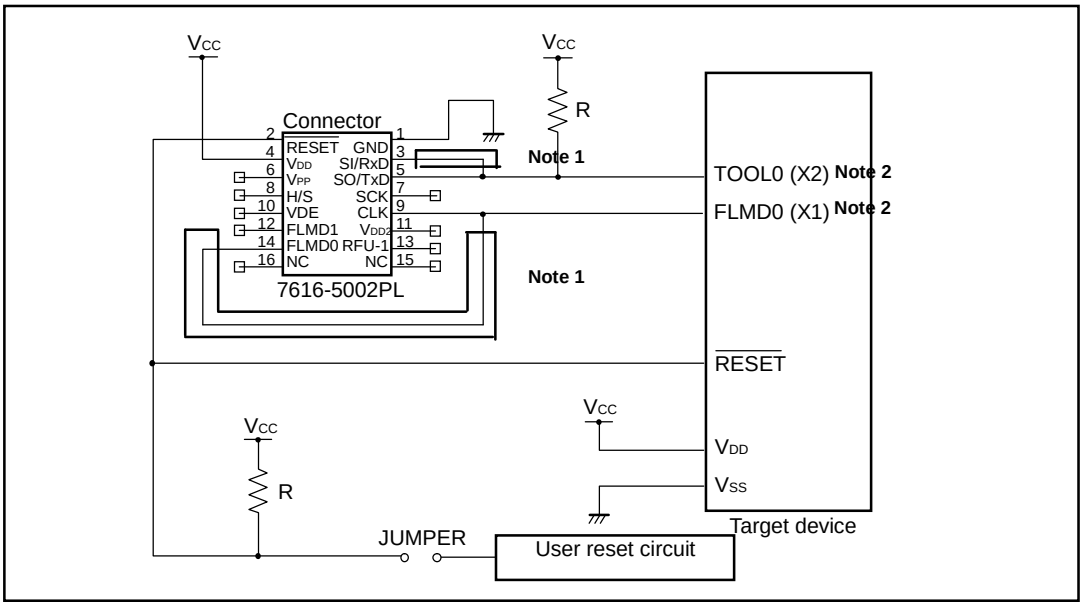


Notes 1. Pin used in internal single-power-supply flash memory microcontroller

2. Pin used in internal two-power-supply flash memory microcontroller

<2> 78K0R, 78K0S/Kx1+, μPD78F9334

Figure 8-2. Circuit Example for 78K0R, 78K0S/Kx1+ and μPD78F9334



Notes 1. These pins do not need to be shorted when using the FP5. Short them if necessary.

2. Read these pins as TOOL0 and FLMD0 when using 78K0R, or X1 and X2 when using 78K0S/Kx1+ or the μPD78F9334.

CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS

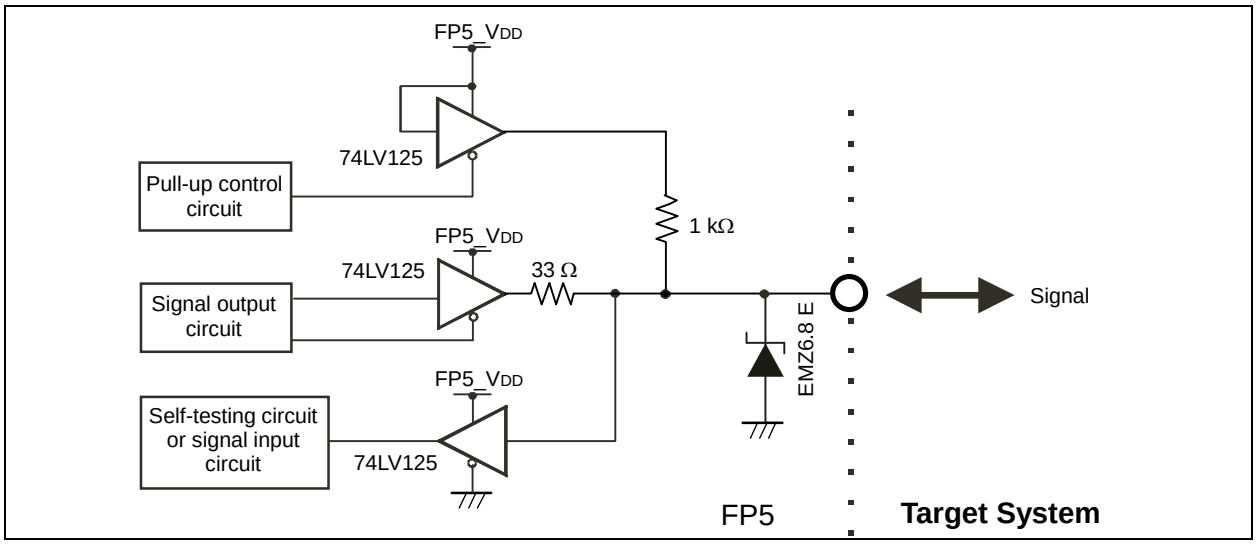
This chapter describes the target interface specifications (signals connected to the FP5 and the target system), by using equivalent circuits.

9.1 SO/TxD, $\overline{\text{RESET}}$ and SCK

When V_{DD}/V_{DD2} are supplied from the target system for target device programming, the FP5 internal voltage regulator is protected so that user V_{DD}/V_{DD2} will not affect the SO/TxD, $\overline{\text{RESET}}$ and SCK signal lines.

In either case, these signal lines output C-MOS level signals. When a 78K0S/Kx1+ microcontroller or the μPD78F9334 is used, the SO/TxD signal line functions as an open-drain output.

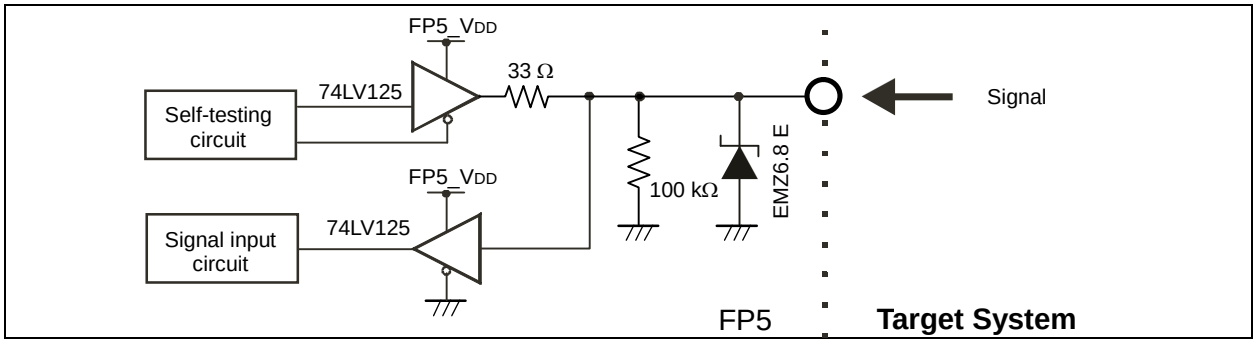
Figure 9-1. SO/TxD, $\overline{\text{RESET}}$ and SCK Pins



9.2 SI/RxD and H/S

The SI/RxD input signal voltages must not exceed the rated maximum voltage.

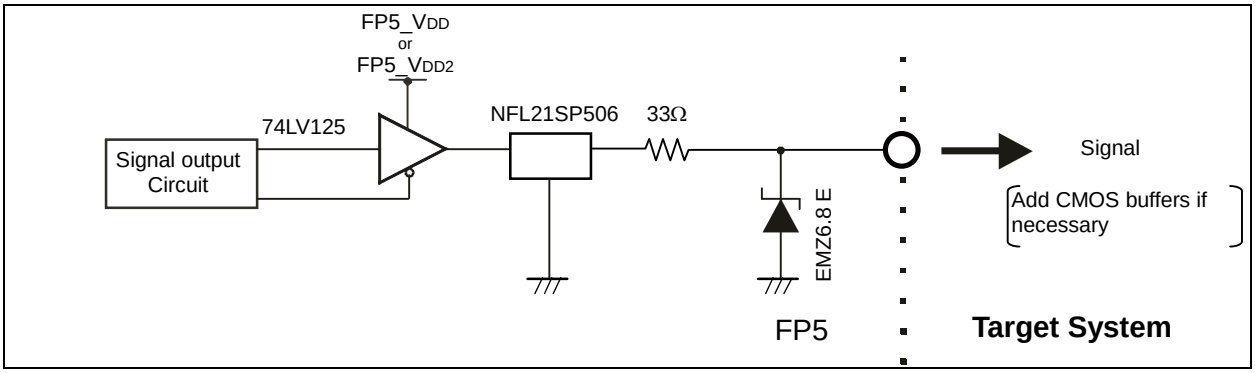
Figure 9-2. SI/RxD and H/S Pins



9.3 CLK

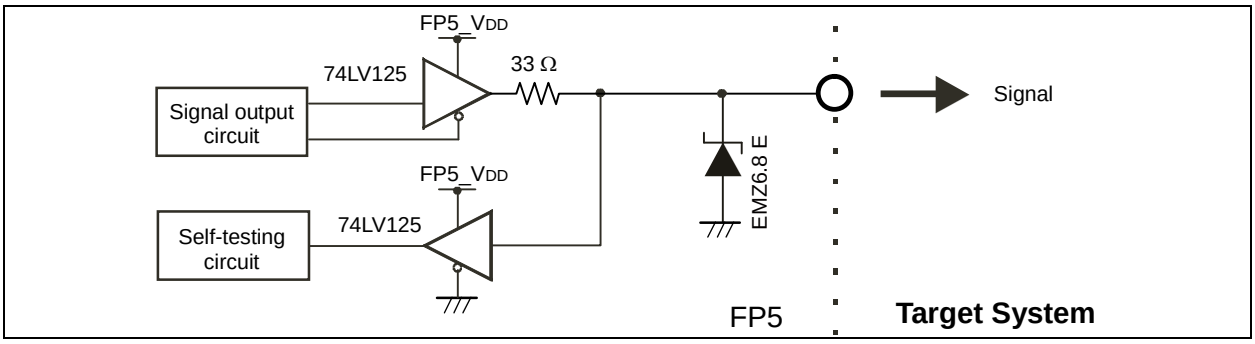
It is recommended to supply the target device operating clock from the target system. When supplying the target device operating clock from the FP5, communication may not be performed normally due to the waveform distortion caused by wiring of clock lines on the target system. In such a case, add elements such as CMOS buffers to the target system as necessary so as to adjust the waveform.

Figure 9-3. CLK Pins



9.4 FLMD0 and FLMD1

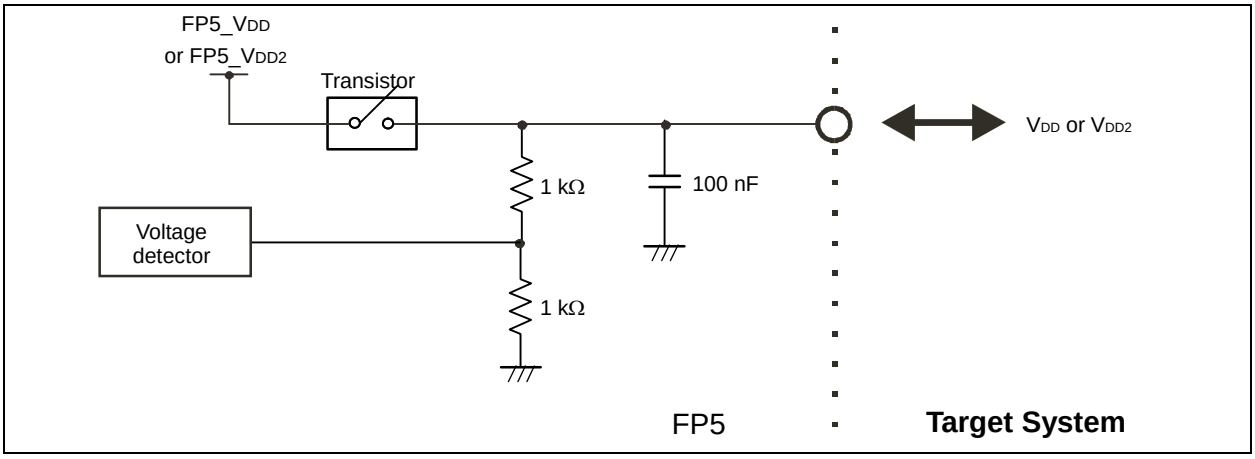
Figure 9-4. FLMD0 and FLMD1 Pins



9.5 V_{DD} and V_{DD2}

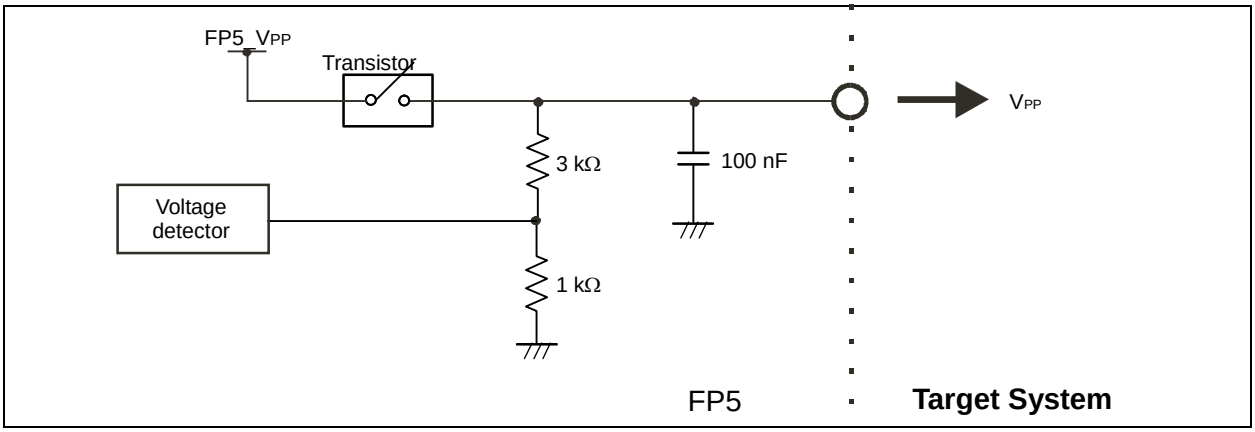
When supplying V_{DD} and V_{DD2} from the target system, the FP5 internal power supply and the external voltage regulator is protected by a transistor.

Figure 9-5. V_{DD} and V_{DD2} Pins



9.6 V_{PP}

Figure 9-6. V_{PP} Pin



CHAPTER 10 TROUBLESHOOTING

This chapter explains troubleshooting.

Remark	Using the self-testing function, the user can find out the reason why the FP5 does not operate normally, such as a defect in the FP5, or problems in other hardware. For how to use the tool, refer to **4.3.2 (6) [Self-Test] command**.

10.1 Problems During Startup

This section explains troubleshooting for problems that may occur between software installation and startup.

(1) The POWER button on FP5 is pressed but the LED does not turn on.

Cause:

The cause may be a poor connection of the FP5 or AC adapter, or a possible defect.

Action:

Confirm that the AC adapter is plugged in firmly. If this does not resolve the problem, consider repair.

(2) When the USB cable is connected and power to the FP5 is turned on, the driver is not recognized by Plug and Play.

Cause:

The USB connector may not be inserted properly into the USB port.

Action:

Confirm that the USB connectors are fully inserted into the USB ports of the host machine and the FP5.

Alternatively, disconnect the USB connector and insert it again after a short time.

(3) The USB driver file cannot be found at a specified location.

Cause:

The programming GUI may not have been installed correctly.

Action:

Refer to **CHAPTER 3 SOFTWARE INSTALLATION** and reinstall the programming GUI.

If the file is requested by Plug and Play, specify the following path for the programming GUI. (VX.XX is the version of the programming GUI.)

C:\Program Files\FL-PR5\driver

(4) The "Add New Hardware Wizard" screen appears when FP5 is connected with the host machine via a USB port.

Cause:

If the USB connector is not inserted into the USB port used during USB driver installation but into another USB port, the FP5 may be recognized as a new hardware item.

Action:

Refer to **CHAPTER 3 SOFTWARE INSTALLATION** and install the USB driver again.

10.2 Problems During Operation

This section explains troubleshooting for problems that may occur during operation.

Remark For causes and actions for the messages displayed in the error dialog box, information dialog box or action log window, refer to **APPENDIX A MESSAGES**.

(1) Error Message "E 1100 communication within host PC and FlashProgrammer is broken" is displayed in the action log window.

Cause 1:

The USB cable or serial cable may not be connected properly, the USB driver may not have been installed correctly, or power to the FP5 has been turned off.

Action 1:

Refer to **10.1 Problems During Startup** and take appropriate action.

Cause 2:

When "NECPCIF" is expanded in the Device Manager while the FP5 is connected via a USB port, "Flash Programmer FP5" is not displayed. Alternatively, a "!" or "×" is attached.

Action 2:

<1> Turn on power to the FP5 while it is connected to the host machine via a USB port, right-click the driver marked with the "!" or "×", and then click [Delete (E)] on the shortcut menu.

<2> Execute [Scan for hardware changes] in the Device Manager.

<3> Reinstall the USB driver with Plug and Play. For how to install the USB driver, refer to **3.2.1 Installation of USB driver**.

Cause 3:

The FP5 may not have been recognized (when connected via USB hub).

Action 3:

Try the following.

<1> Disconnect the USB cable and then reconnect it.

<2> Connect the USB connector to another port on the USB hub.

<3> If the above measures do not resolve the problem, do not use the USB hub but directly connect the USB connector to the USB port of the host machine.

(2) The following messages are displayed in the action log window and the flash memory programming mode cannot be entered.

Synchronization with device failed.

No more device versions to check.

Please check connection.

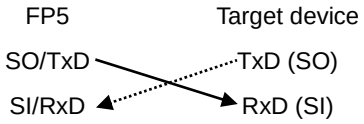
Cannot connect to device.

Cause 1:

The connection between the target system and FP5 may be incorrect.

Action 1:

<1> Connect the SO/TxD and SI/RxD signals from the FP5 with TxD (SO) and RxD (SI) of the target device so that signal input/output are consistent.



<2> The target interface must be isolated from other devices, using jumper switches or the like; otherwise, malfunction may occur. Refer to **CHAPTER 8 NOTES ON TARGET SYSTEM DESIGN**, **CHAPTER 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS** or the user's manual of the target device. Moreover, monitor the actual waveform to confirm that the signal is not distorted and the signal level is correct.

Cause 2:

Connection of pins for other than for the target interface may be incorrect.

Action 2:

Refer to **CHAPTER 8 NOTES ON TARGET SYSTEM DESIGN** or the user's manual of the target device.

Cause 3:

The PR5 file selected in the [Parameter and Setting file] area on the [Target] tab in the Device Setup dialog box may not be correct.

Action 3:

Use the PR5 file that supports the target device.

For details on PR5 files, refer to **1.3 Supported Devices** and **4.3.3 (12) (a) [Parameter and Setting file] area**.

Cause 4:

The clock may not be able to be supplied to the target device.

Action 4:

<1> Check the settings in the [Supply oscillator] area on the [Standard] tab in the Device Setup dialog box. For the correct settings, refer to the supplementary materials for the PR5 file or the user's manual of the target device.

<2> Check the clock supply on the target system by means such as waveform monitoring.

Cause 5:

Power may not be supplied correctly to the target device.

[Action 5]

<1> Check the settings in the [Supply voltage] area on the [Advanced] tab in the Device Setup dialog box.

<2> Check that power is supplied from the target system. If power is supplied from the FP5, a power shortage may occur because its maximum power supply is 200 mA. In such a case, supply power from the target system and then change the setting.

Cause 6:

UART communication may not be synchronized.

[Action 6]

When UART is used, communication may not be synchronized due to a baud rate error of the target device. In this case, change the CPU clock or baud rate, or change the communication channel to another communication mode.

Cause 7:

If using a 78K0S/Kx1+ microcontroller or the μPD78F9334, it is possible that the wrong connection procedure was implemented.

[Action 7]

With devices that using program files in which "use the $\overline{\text{RESET}}$ pin as the input-only port (P34)" is set by the option byte, flash memory programming mode cannot be entered if power is supplied to the target system before the target cable is connected to the target system. Connect the target cable to the target system and then supply power to the target system as prescribed in the connection procedure.

(3) The following message is displayed in the action log window and normal communication is not performed in flash memory programming mode.

ERROR Communication failure or timeout.

Cause 1:

The clock or power supply may not be stable.

Action 1:

Confirm that the clock or power is supplied on the target system.

Cause 2:

Communication may not be stable.

Action 2:

<1> Confirm that no noise is applied to communication.

<2> Confirm that the FP5 and target system are properly connected.

<3> Confirm that unused pins are properly handled.

<4> Confirm that an appropriate clock and communication rate are selected. Stable programming may be achieved by setting a lower value for the clock or communication rate.

APPENDIX A MESSAGES

A.1 Message Format

Messages will be output in the error/warning dialog boxes, information dialog boxes, or action log window during programming GUI operation. Error messages will be displayed on the FP5 message display during standalone operation.

Figure A-1. Error/Warning Dialog Box

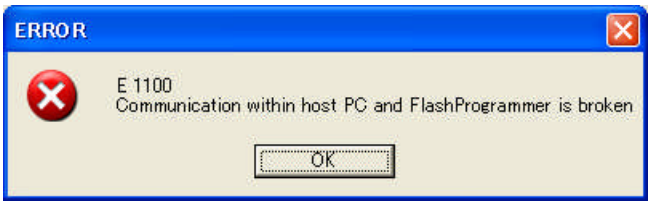


Figure A-2. Information Dialog Box

Figure A-3. Action Log Window

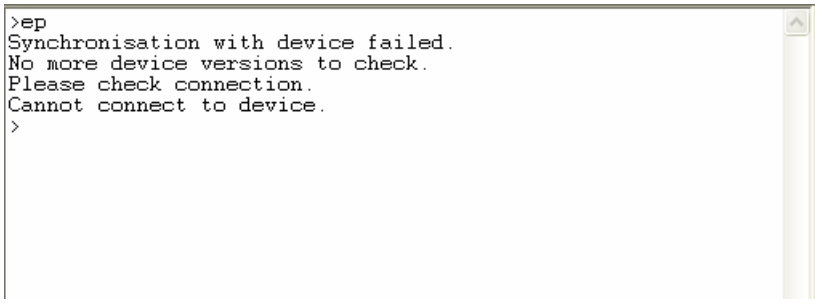
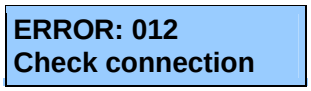


Figure A-4. Error Message FP5 Message Display



A.2 Error/Warning Dialog Boxes for Programming GUI Operation

No.	Message	Description
E 1100	Communication within host PC and FlashProgrammer is broken	An error occurred in communication between the host machine and the FP5. Check the cable connection and FP5 power supply.
E 1101	Can't setup communication within host PC and FlashProgrammer	Communication between the host machine and FP5 cannot be established. Check the cable connection and power supply. Moreover, check if the USB driver is installed correctly.
E 1102	Can't find parameter file	The specified PR5 file could not be found.
E 1103	Open parameter file failed	The specified PR5 file cannot be opened.
E 1105	Unable to open last active PRM/SET file. Using most recent settings.	The PR5/ESF file in the valid programming area cannot be opened. The latest setting will be used.
E 1106	Firmware is not valid or version is lower than requirement.	Incorrect version information or an old version was detected. Update the FP5 firmware.
E 1107	Parameter area format is not match with initial file. Do you want reset parameter area format?	The factor for dividing the programming area does not match the one defined in the INI file. Select whether to reset the division factor.
E 1108	No invalid Parameter file defined. GUI can not work properly.	The GUI will not operate normally because no valid PR5 file has been defined. Set it in the Device Setup dialog box.
E 1201	Invalid file.	The specified file cannot be opened. Set it in the Device Setup dialog box.
E 1202	<Setting file name> is not valid.Using most recent settings.	An incorrect format or value was detected in the ESF file. The ESF file defined in the INI file will be used instead. Set it in the Device Setup dialog box.
E 1203	<Parameter file name> is not valid. Using most recent settings.	An incorrect format or value was detected in the PR5 file. The ESF file defined in the INI file will be used instead. Set it in the Device Setup dialog box.
E 1204	Download of parameter file failed.	Downloading of the PR5 file has failed. The PR5 file may be invalid. Re-set the connection between the host machine and FP5.
E 1205	Download of setting file failed.	Downloading of the ESF file has failed. The ESF file may be invalid. Re-set the connection between the host machine and FP5.
E 1206	File name is not valid.	The specified file cannot be opened for writing.
E 1501	This file is not valid.	The file opened with the HEX Editor is invalid.
E 1502	Caution: Data Flash access unit is DWORD.	The data flash area can be accessed in double-word units, but an access was attempted in unsupported units.
E 1503	Caution: Out of range!	The address range for saving data is out of the code flash or data flash address range. Check the start/end address.
E 1504	Caution: Start address should not larger than End address.	The start address is larger than the end address. Check the start/end address.
E 1505	Caution: End address should not smaller than start address.	The end address is smaller than the start address. Check the start/end address.
E 1506	The file cannot be read.	The file opened with the HEX Editor is invalid.
E 1507	No HEX data.	The program file format may be incorrect.

No.	Message	Description
E 1508	The file cannot be written.	Saving of the program file has failed. Check if this file is occupied by another program.
E 1509	Temporary file could not be created.Abort	The temporary file cannot be created. Creation was aborted. Confirm that sufficient memory capacity is available in Windows.
E 1510	Can not open <file name> Abort	*<file-name>* cannot be opened.
E 1511	File load error. Abort	An error occurred during file reading or writing.
E 1512	Memory cannot be allocated.	Confirm that sufficient memory capacity is available in Windows.
E 1513	Memory reallocation error	Confirm that sufficient memory capacity is available in Windows.
E 1514	Check sum error. Continue?	It was detected that the checksum of the program file opened by the HEX editor was invalid. Click OK to continue checksum verification. Click Cancel to abort checksum verification.
E 1515	Cannot open <file name> Abort.	The program file specified by the HEX editor cannot be opened.
E 1516	Error line : <line number> Data error. Abort DATA Check	An illegal data exists in line *line-number* in the program file.
E 1517	Shortage of memory.	Confirm that sufficient memory capacity is available in Windows.
E 1518	Invalid file name.	The file name is invalid.
E 1519	HEX format error.	An illegal program file format was detected.
E 1520	Too large address.	The address is too large. The maximum address that can be used by the HEX Editor is 420000h.
E 1521	Can not run <command name>	Running of the *command-name* command has failed.
E 1522	Illegal address	The range of the data storage address is invalid. The start address may be larger than the end address.
E 1523	<file name> could not be opened. Abort Save File	*<file-name>* cannot be opened. File saving was aborted.
E 1524	Data error. Abort DATA Check	A data error has been found in the program file. Data checking was aborted.
E 1525	Temporary file could not be read. Abort Save File	Opening of the temporary file has failed. The file may be corrupted.
E 1526	Error line : <line number> Data Count error. Abort "Data Count Check"	A data count error has occurred in line *line-number*. The program file format may be incorrect.
E 1527	Cannot open temporary file.	Opening of the temporary file has failed. The file may be corrupted.
E 1528	File Save error. Abort "Save File"	Saving the file has failed.
E 1529	<line number> Check sum error. Continue ?	A checksum error has occurred in line *line-number*. The program file format may be incorrect. Select whether to continue the operation.
E 1530	Too large address. Edit range: 0 - 0x420000	The program file address is too large. Set an address value in the range 0 to 420000h.

No.	Message	Description
E 1531	Data Flash format error: <data address>: Invalid ID Tag.	The data flash format is invalid. Valid 4 bytes are followed by an ID tag of 4-byte FFh or 4-byte 00h in the data flash area. An error occurs if the ID tag includes defects, or FFh or 00h is included.
E 1532	Parameter of "Start Address" is invalid.	The value input as the start address is not a valid hexadecimal number.
E 1533	Parameter of "End Address" is invalid.	The value input as the end address is not a valid hexadecimal number.
E 1523	<file name> could not be opened. Abort Save File	*<file-name>* cannot be opened. File saving was aborted.
E 1524	Data error. Abort DATA Check	A data error has been found in the program file. Data checking was aborted.
E 1525	Temporary file could not be read. Abort Save File	Opening of the temporary file has failed. The file may be corrupted.
E 1526	Error line : <line number> Data Count error. Abort "Data Count Check" Error line : <line number>	A data count error has occurred in line *line-number*. The program file format may be incorrect.
E 1527	Cannot open temporary file.	Opening of the temporary file has failed. The file may be corrupted.
E 1528	File Save error. Abort "Save File"	Saving the file has failed.
E 1529	<line number> Check sum error. Continue ?	A checksum error has occurred in line *line number*. The program file format may be incorrect. Select whether to continue the operation.
E 1530	Too large address. Edit range: 0 - 0x420000	The program file address is too large. Set an address value in the range 0 to 420000h.
E 1531	Data Flash format error: <dataaddress>: Invalid ID Tag.	The data flash format is invalid. Valid 4 bytes are followed by an ID tag of 4-byte FFh or 4-byte 00h in the data flash area. An error occurs if the ID tag includes defects, or FFh or 00h is included.
E 1532	Parameter of "Start Address" is invalid.	The value input as the start address is not a valid hexadecimal number.
E 1533	Parameter of "End Address" is invalid.	The value input as the end address is not a valid hexadecimal number.
E 1534	Temporary file could not be read. Abort Dump Hex	The temporary file cannot be read. Opening of the HEX Editor was aborted.
E 1535	Can not open <file name> Abort 'Dump Hex'	*<file-name>* cannot be opened. Opening of the HEX Editor was aborted.
E 1536	File load error. Abort 'Dump Hex'	A file load error. Opening of the HEX Editor was aborted.
E 1537	Error line : <line number > Check sum error. Abort "Check sum" Check	An incorrect checksum was detected in line *line-number* in the program file. The program file format may be incorrect.
E 1538	Can not read temporary file.	Reading of the temporary file has failed. The file may be corrupted.
E 1539	Caution: Out of range!	The specified value is out of the valid range.

A.3 Information Dialog Boxes for Programming GUI Operation

No.	Message	Description
I 2100	Please setup host connection again.	After FP5 reset, communication with FP5 was attempted but failed. Try [Programmer] - [Setup host connection] in the menu.
I 2200	Please open 'Setup' form menu. It will help you down load parameter & setting files	Open [Setup] in the menu and then download the PR5 or ESF file.
I 2201	Parameter/setting files are not matched.	Information does not match the one defined in the PR5/ESF file. The cause may be the following: 1. The PR5 or ESF file, which is defined in the INI file, is different from the one stored in the FP5. 2. Information on the PR5 or ESF file is missing in the INI file, but a valid PR5 or ESF file is stored in the FP5. 3. No PR5 or ESF file is stored in the FP5, but valid PR5 or ESF file has been detected because they are defined in the INI file.
I 2202	Parameter/setting files are not find.	The PR5 or ESF file is missing. No valid PR5 or ESF file is defined in the INI file. Store a valid PR5 or ESF file in *installation-folder*\FP5_PRJ.
I 2203	Are you sure, you want to update the Firmware?	Select whether to update the firmware. Click 'Ok' to update the firmware. Click Cancel to cancel the operation.
I 2204	Are you sure, you want to update the FPGA?	Select whether to update the FPGA. Click 'Ok' to update the FPGA. Click Cancel to cancel the operation.
I 2207	Do you really want change parameter area format? All data will lost after this action	Select whether to change the factor for dividing the programming area. After this operation, all data will be lost.
I 2208	Information defined in initial file is not enough or it is not matched with FlashProgrammer. Setup parameters is needed.	The settings in the ESF file are insufficient or do not match the settings made in the FP5. Device setup is required.
I 2209	Information defined in initial file is not complete matched with FlashProgrammer. Do you want to go Setup dialog?	The contents of the ESF file do not match those stored in the FP5. Select whether to open the Device Setup dialog box.
I 2210	Updating the firmware will take several minutes. ATTENTION: -The process of updating your firmware must NOT be interrupted! --Without firmware this FP5 GUI will NOT run properly. Install new firmware in your programmer?	The firmware update will take several minutes. ATTENTION: Firmware update cannot be aborted. The FP5 may not operate normally if proper firmware is not installed. Select whether to update the firmware.
I 2211	Updating the FPGA will take several minutes. ATTENTION: -The process of updating your FPGA must NOT be interrupted! -Without FPGA this FP5 GUI will NOT run properly. Install new FPGA in your programmer?	The FPGA update will take several minutes. ATTENTION: The FP5 may not operate normally if a proper FPGA is not installed. Select whether to update the FPGA.

No.	Message	Description
I 2212	You must be careful before start Self-test. ATTENTION: -Remove any plugs from Target- and Remote-connector before starting. -Any hardware attached to those connectors may be damaged by this test! Start Self-test?	Note the following points before performing self-testing. ATTENTION: Unplug all target connectors and remote connectors. If any hardware is connected, it may be damaged by this testing.
I 2300	Value out of range.	The set value is out of the valid ranges. The valid code flash range is 0-0x400000. The valid data flash range is 0x400000 to 0x420000.
I 2302	Please give file range	Input the file range. No arguments are specified for the range.
I 2401	Caution: When 'Chip Erase' is disabled, chip cannot be erased and programmed any more!	If Chip Erase is disabled, the flash memory in the target device cannot be erased or rewritten.
I 2402	Caution: When 'Boot block cluster reprogramming' is disabled, chip cannot be erased and programmed any more!	If Boot block cluster reprogramming is disabled, the flash memory in the target device cannot be erased or rewritten.
I 2411	The selection is out of range.	The selected communication speed is higher than the maximum value defined in the PR5 file.
I 2412	The selection is out of range.	The selected communication speed is lower than the minimum value defined in the PR5 file.
I 2413	Value is out of range.	The selected clock value is larger than the maximum value defined in the PR5 file.
I 2414	Value is out of range.	The selected clock value is smaller than the minimum value defined in the PR5 file.
I 2415	The selection is out of range.	The Vdd value exceeds the range defined in the PR5 file.
I 2416	The selection is out of range.	The Vdd2 value exceeds the range defined in the PR5 file.
I 2417	The selection is out of range.	The selected value is out of the valid range.
I 2418	Input data is out of range.	The selected clock value exceeds the range defined in the PR5 file.
I 2419	Caution: Boot Block swapping will not be possible with this selection. Anyhow, boot block protection is possible.	Boot swapping is not available because the selected block number is larger than half the total block numbers defined in the PR5 file. Boot block protection can be enabled.
I 2601	Buffer is modified. Are you sure to close?	The HEX Editor temporary file has been changed. This change is lost when the HEX Editor is closed.
I 2602	This file is not valid.	The file selected by the HEX Editor is invalid.
I 2603	End record not found, created.	The end record is missing. The HEX editor will add the HEX format end record ':00000001FF' to the file.
I 2604	Save?	Select whether to save the data. Click 'Ok' to save the data. Click 'Cancel' to not save the data.
I 2605	The file is modified. Are you sure to quit?	The file has been modified. Select whether to abort the operation. Click 'Yes' to abort without saving changes. Click 'No' to continue the operation.
I 2606	The file is modified. Save file?	The file has been modified. Select whether to save changes.

A.4 Error Messages Displayed in FP5 Message Display

No.	Message	Error Condition	Possible Workaround
001	Invalid PRM data	Invalid PRM data	The parameter file may include invalid data, or the file may be defective. Re-set the file using the parameter file downloaded from http://www.necel.com/micro/ods/eng/index.html.
005	Not supported!		The command issued is not supported on the device and thus cannot be used.
006	Command aborted!	Command aborted	The [Read] command has been canceled.
008	Parameter Error!	PR5 file Error	The parameter file may be damaged.
009	Power failure!	Abnormal VDD current	An overcurrent was detected during VDD output. Check the connection with the device.
011	Read. Sig failed	Device signature reading failed	Check if the correct device is selected.
012	Check connection	Connection check	The FP5 cannot establish connection to the target device. The cause may be a wrong connection between the device and the FP5, bad socket contacts or the oscillator not operating.
013	Addr. Range err	Address range error	The address given in the command exceeds the device's address range.
020	Inv. Sig. ID	Invalid signature ID	Check if the correct device is selected.
021	Inv. Sig. Code	Invalid signature code	Check if the correct device is selected.
022	Inv. Sig. func.	Invalid signature function	Check if the correct device is selected.
023	Inv. Sig. addr.	Invalid signature address	Check if the correct device is selected.
024	Inv. device name	Invalid device name	Check if the correct device is selected.
025	Inv. Signature	Invalid signature	Check if the correct device is selected.
026	Inv Dev/Firm ver	Invalid device firmware version	Check if the correct device is selected.
030	Prewrite Timeout	Prewrite timed out	A communication problem occurred between the FP5 and target device. Try the operation again.
032	Prewrite failed	Prewrite retry error	The device may be damaged.
040	Erase Timeout	Erase timed out	A communication problem occurred between the FP5 and target device. Try the operation again.
041	Erase failure	Erase failed	The device may be damaged.
042	Ers time exceed	Erase timed out	The device may be damaged.
043	Ers Timeset err	Erase time setting error	The PR5 file may contain invalid data. Contact NEC Electronics.
050	Bln Timeout	Blank check timed out	A communication problem occurred between the FP5 and target device. Try the operation again.

No.	Message	Error Condition	Possible Workaround
051	Blank chk failed	Blank check failed	The device connected is not empty. Use the 'erase' command before programming.
060	Wrb Timeout	Writeback timed out	There was a communication problem between the FP5 and target device. Try the operation again.
061	Writeback failed	Writeback failed	A device defect is most probably causing this error.
062	Wrb retry exceed	Writeback retry timed out	A device defect is most probably causing this error.
063	Wrb Timeset err	Writeback time setting error	The parameter file may contain invalid data. Contact NEC Electronics.
070	Write timeout	Write timed out	There was a communication problem between the FP5 and target device. Try the operation again.
071	Write failed	Write operation failed	Either the device was not blank before writing or a device defect is causing this error.
072	Write retry err	Write retry error	Either the device was not blank before writing or a device defect is causing this error.
073	Wrt. Timeset err	Write time setting error	The parameter file may contain invalid data. Contact NEC Electronics.
080	Vrf Timeout	Verify timed out	There was a communication problem between the FP5 and target device. Try the operation again.
081	Verify failed	Verify failed	The data in the target device's flash memory is not the same as in the FP5.
090	IVrf Timeout	Internal verify timed out	There was a communication problem between the FP5 and target device. Try the operation again.
091	IVerify failed	Internal verify error	An error was occurred while the write data level was being checked. Erase and write the device again.
092	VGT Comm err	Device communication error	There was a communication problem between the FP5 and target device. Try the operation again.
093	SUM Comm err	Device communication error	There was a communication problem between the FP5 and target device. Try the operation again.
094	SCF Comm err	Device communication error	There was a communication problem between the FP5 and target device. Try the operation again.

APPENDIX B SUPPLEMENTARY INFORMATION

Figure B-1. Relationship Between HEX Editor and Saved Program File

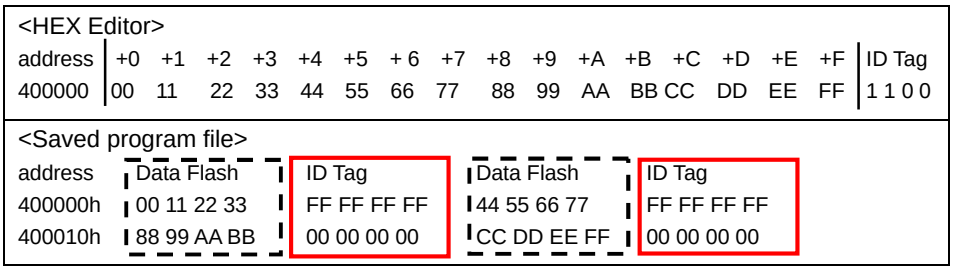


Figure B-2. 32-bit CRC Calculation Specifications

```
/* The generator polynomial used for this table is */
/* x^32+x^26+x^23+x^22+x^16+x^12+x^11+x^10+x^8+x^7+x^5+x^4+x^2+x^1+x^0 */
/* according to Autodin/Ethernet/ADCCP protocol standards */
/* Binary: 0x04c11db7 */

const u32 CRC32_Tab [256]= {
    0x00000000, 0x04c11db7, 0x09823b6e, 0x0d4326d9, 0x130476dc, 0x17c56b6b, 0x1a864db2, 0x1e475005,
    0x2608edb8, 0x22c9f00f, 0x2f8ad6d6, 0x2b4bcb61, 0x350c9b64, 0x31cd86d3, 0x3c8ea00a, 0x384fbdbd,
    0x4c11db70, 0x48d0c6c7, 0x4593e01e, 0x4152fda9, 0x5f15adac, 0x5bd4b01b, 0x569796c2, 0x52568b75,
    0x6a1936c8, 0x6ed82b7f, 0x639b0da6, 0x675a1011, 0x791d4014, 0x7ddc5da3, 0x709f7b7a, 0x745e66cd,
    0x9823b6e0, 0x9ce2ab57, 0x91a18d8e, 0x95609039, 0x8b27c03c, 0x8fe6dd8b, 0x82a5fb52, 0x8664e6e5,
    0xbe2b5b58, 0xbaea46ef, 0xb7a96036, 0xb3687d81, 0xad2f2d84, 0xa9ee3033, 0xa4ad16ea, 0xa06c0b5d,
    0xd4326d90, 0xd0f37027, 0xddb056fe, 0xd9714b49, 0xc7361b4c, 0xc3f706fb, 0xceb42022, 0xca753d95,
    0xf23a8028, 0xf6fb9d9f, 0xfbb8bb46, 0xff79a6f1, 0xe13ef6f4, 0xe5ffeb43, 0xe8bccd9a, 0xec7dd02d,
    0x34867077, 0x30476dc0, 0x3d044b19, 0x39c556ae, 0x278206ab, 0x23431b1c, 0x2e003dc5, 0x2ac12072,
    0x128e9dcf, 0x164f8078, 0x1b0ca6a1, 0x1fcdbb16, 0x018aeb13, 0x054bf6a4, 0x0808d07d, 0x0cc9cdca,
    0x7897ab07, 0x7c56b6b0, 0x71159069, 0x75d48dde, 0x6b93dddb, 0x6f52c06c, 0x6211e6b5, 0x66d0fb02,
    0x5e9f46bf, 0x5a5e5b08, 0x571d7dd1, 0x53dc6066, 0x4d9b3063, 0x495a2dd4, 0x44190b0d, 0x40d816ba,
    0xaca5c697, 0xa864db20, 0xa527fdf9, 0xa1e6e04e, 0xbfa1b04b, 0xbb60adfc, 0xb6238b25, 0xb2e29692,
    0x8aad2b2f, 0x8e6c3698, 0x832f1041, 0x87ee0df6, 0x99a95df3, 0x9d684044, 0x902b669d, 0x94ea7b2a,
    0xe0b41de7, 0xe4750050, 0xe9362689, 0xedf73b3e, 0xf3b06b3b, 0xf771768c, 0xfa325055, 0xfef34de2,
    0xc6bcf05f, 0xc27dede8, 0xcf3ecb31, 0xcbffd686, 0xd5b88683, 0xd1799b34, 0xdc3abded, 0xd8fba05a,
    0x690ce0ee, 0x6dcdfd59, 0x608edb80, 0x644fc637, 0x7a089632, 0x7ec98b85, 0x738aad5c, 0x774bb0eb,
    0x4f040d56, 0x4bc510e1, 0x46863638, 0x42472b8f, 0x5c007b8a, 0x58c1663d, 0x558240e4, 0x51435d53,
    0x251d3b9e, 0x21dc2629, 0x2c9f00f0, 0x285e1d47, 0x36194d42, 0x32d850f5, 0x3f9b762c, 0x3b5a6b9b,
    0x0315d626, 0x07d4cb91, 0x0a97ed48, 0x0e56f0ff, 0x1011a0fa, 0x14d0bd4d, 0x19939b94, 0x1d528623,
    0xf12f560e, 0xf5ee4bb9, 0xf8ad6d60, 0xfc6c70d7, 0xe22b20d2, 0xe6ea3d65, 0xeba91bbc, 0xef68060b,
    0xd727bbb6, 0xd3e6a601, 0xdea580d8, 0xda649d6f, 0xc423cd6a, 0xc0e2d0dd, 0xcda1f604, 0xc960ebb3,
    0xbd3e8d7e, 0xb9ff90c9, 0xb4bcb610, 0xb07daba7, 0xae3afba2, 0xaafbe615, 0xa7b8c0cc, 0xa379dd7b,
    0x9b3660c6, 0x9ff77d71, 0x92b45ba8, 0x9675461f, 0x8832161a, 0x8cf30bad, 0x81b02d74, 0x857130c3,
    0x5d8a9099, 0x594b8d2e, 0x5408abf7, 0x50c9b640, 0x4e8ee645, 0x4a4ffbf2, 0x470cdd2b, 0x43cdc09c,
    0x7b827d21, 0x7f436096, 0x7200464f, 0x76c15bf8, 0x68860bfd, 0x6c47164a, 0x61043093, 0x65c52d24,
    0x119b4be9, 0x155a565e, 0x18197087, 0x1cd86d30, 0x029f3d35, 0x065e2082, 0x0b1d065b, 0x0fdc1bec,
    0x3793a651, 0x3352bbe6, 0x3e119d3f, 0x3ad08088, 0x2497d08d, 0x2056cd3a, 0x2d15ebe3, 0x29d4f654,
    0xc5a92679, 0xc1683bce, 0xcc2b1d17, 0xc8ea00a0, 0xd6ad50a5, 0xd26c4d12, 0xdf2f6bcb, 0xdbee767c,
    0xe3a1cbc1, 0xe760d676, 0xea23f0af, 0xeee2ed18, 0xf0a5bd1d, 0xf464a0aa, 0xf9278673, 0xfde69bc4,
    0x89b8fd09, 0x8d79e0be, 0x803ac667, 0x84fbdbd0, 0x9abc8bd5, 0x9e7d9662, 0x933eb0bb, 0x97ffad0c,
    0xafb010b1, 0xab710d06, 0xa6322bdf, 0xa2f33668, 0xbcb4666d, 0xb8757bda, 0xb5365d03, 0xb1f740b4
};

void Gen_CRC_Sum_Char (u08 c)
{
    s32 i;

    /* Ignore '=', SPACE, CR, LF */
    if ((c == '=') || (c == ' ') || (c == '\r') || (c == '\n'))
        return;

    /* Perform CRC sum algorithm (use table for better speed) */
    i= ((CRC_accum >> 24) ^ (u32) c) & 0xff;
    CRC_accum= (CRC_accum << 8) ^ CRC32_Tab [i];
}
```

Figure B-3. Log File Example

```
----------------------------
Mon Feb 26 15:56:24 2007
------Start record file------
>epv
Blank check Chip: ERROR
Not blank, Erase needed.
Erase Chip: OK
Erase OK
Write Chip:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
OK
Write OK
EPV OK
>
------End record file------
>
Mon Feb 26 15:56:36 2007
```

Figure B-4. Division (Original) Calculation Specifications

```
#define BLOCKSIZ 256

/* You have to store 1-Block ROM data. */
unsigned char rom_data[BLOCKSIZ];

unsigned char
bist_calc()
{
        int i;
        unsigned short bist, bist_temp;

        bist = 0;
        for(i = 0; i < BLOCKSIZ; i++){
                bist_temp = bist & 0x1;
                bist_temp = (bist_temp << 8) | (bist_temp << 9) |
                                        (bist_temp << 11) | (bist_temp << 12);
                bist = (bist >> 1) ^ rom_data[i] ^ bist_temp;
        }
        return((unsigned char)bist);
}
```

APPENDIX C REVISION HISTORY

Document Number	Issued on	Description
SBA1-070002-00	April 6, 2007	Newly created.