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Renesas Electronics Corporation

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User's Manual

Phase-out/Discontinued

PG-FP3

Flash Memory Programmer

[MEMO]

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• Ordering information

• Product release schedule

• Availability of related technical literature

• Development environment specifications (for example, specifications for third-party tools and components, host computers, power plugs, AC supply voltages, and so forth)

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Major Revisions in This Edition

Page	Description
P.15	A description in **Chapter 1** has been changed.
P.16	A description has been deleted from **Table 1-1**.
P.17	A description in **Table 2-1** has been changed.
P.19	A description in **Section 2.2** has been changed.
P.20	**Photo 2-1** has been changed.
P.21	A description has been deleted from **Section 2.3**.
P.25	A description has been added to **Section 3.1**.
P.29	A description in **Section 3.2** has been changed.
P.30	**Figure 3-1 (b)** has been changed.
P.32	**Figure 3-3** has been changed.
P.32	**Figure 3-4** has been changed.
P.33	The screen display example in "Voltage setting" in **Section 3.3** has been changed.
P.34	The screen display example in "Option setting" in **Section 3.3** has been changed.
PP.35, 36	A description in **Chapter 4** has been changed.
P.35	**Photo 4-1** has been changed.
P.39	The screen display example in **Chapter 4 (3)** has been changed.
P.40	The screen display example in **Chapter 4 (4)** has been changed.
PP.48-51	The screen display example in **Section 5.2.2** and a description have been changed.
P.52	The setting range of the V_{PP} voltage in **Section 5.2.3** and the screen display example have been changed.
P.53	The screen display example in **Section 5.2.4** has been changed and Note has been added to **Section 5.2.4**.
P.54	A description has been deleted from **Section 5.2.6**.
P.55	A description has been added to **Section 5.3.1** and the screen display example in **Section 5.3.1** has been changed.
P.56	A description in **Section 5.3.2** has been changed.
P.57	A description in Caution in **Section 5.3.3** has been changed.
P.59	A description in **Section 5.3.4** has been changed.
P.60	A description in **Section 5.3.5** has been changed.
P.60	A description in **Section 5.3.6** has been changed.
P.61	**Figure 5-2** has been changed.
P.62	A description has been added to **Section 5.4.2**.
P.63	A description has been added to **Section 5.4.3**.
P.67	Caution has been added to **Section 6.1**.
P.68	Caution has been added to **Section 6.2**.
P.73	A description in **Section 7.3** has been changed.
P.73	A description in **Table 7-3** has been changed.
PP.80-82	Equivalent circuit examples in **Section 7.4.2** have been changed and the equivalent circuit examples of the V_{DD} I/O and V_{PP} output pins have been added to **Section 7.4.2**.
PP.83-85	Some error messages have been deleted from **Chapter 8**.

The mark ★ shows major revised points.

PREFACE

Readers of This Manual This manual is intended for user engineers who use the PG-FP3 to design and develop systems with an NEC microcontroller with flash memory.

Purpose The PG-FP3 enables programs in the NEC microcontroller with flash memory to be erased, written, or verified with the microcontroller mounted on a user-designed printed circuit board through simple operations on a Windows™ screen.

This manual contains the basic PG-FP3 specifications and explains how to use the PG-FP3.

Organization This manual contains the following chapters:

General, Configuration, Starting and Stopping, Basic Operating Procedure, Command Reference, Stand-alone Function, Hardware Specifications, and Error Messages and Remedial Actions

How to Read This Manual To understand the basic specifications and operation of the PG-FP3, read this manual in the order given in the table of contents. Be sure to read **Chapter 3**, which contains important information on operating the PG-FP3.

It is assumed that the readers of this manual have a basic knowledge of electricity, logic circuits, and microcontrollers. It is also assumed that, especially in the description of applications, they have sufficient knowledge of Windows. For information on using Windows 95, Windows 98, Windows 2000, and Windows NT™ and for the related terminology, refer to the appropriate Windows manual.

Legend

Note	:	Explanation of the item so marked
Caution	:	Important information
Remark	:	Supplementary explanation
Numeric notation	:	Binary .... ×××× or ××××B
		Decimal .... ××××
		Hexadecimal.... 0××××H or ××××H

Terminology

PG-FP3 .... Flash memory programmer

FLASHPRO3 .... Windows application name of PG-FP3

Target .... NEC microcontroller with flash memory or user board on which such a microcontroller is mounted

FA adapter .... Adapter board used to write programs to an NEC microcontroller with flash memory[Note]

Note The FA adapter board is a product of Naito Densei Machida Mfg. Co., Ltd.
<Telephone number>
Naito Densei Machida Mfg. Co., Ltd. Tel:+81-45-475-4191

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CHAPTER 1 GENERAL

The PG-FP3 is a tool for erasing, writing, and verifying programs for an NEC single-chip microcontroller with flash memory on a user board or FA adapter board.

◆ **Features**

★ • Supports all NEC microcontrollers that operate on two supply voltages and have flash memory (as of November 2001)

   • Easy to use in stand-alone mode (with PG-FP3 only) or on Windows 95, Windows 98, Windows 2000, or Windows NT 4.0 using a dedicated application (FLASHPRO3)

   • Compact, portable design the size of a sheet of A5 paper

   • Supports high-capacity microcontrollers[Note] that are expected to be available in the future as well as flash memory of 2 Mbytes

   Note Support of microcontrollers developed in the future may require PG-FP3 firmware and application upgrades.

Phase-out/Discontinued

♦ **Function specifications**

Table 1-1. Function Specifications

★

Item	Specification
Host interface	RS-232-C: D-SUB 25-pin, 9600, 19200, 38400, or 57600 bps
Target interface[Note 1]	Connector: D-SUB 9-pin (receptacle) Level conversion: Within target V_{DD} input range (1.8 to 5.5 V) Protection function: Overvoltage input protection circuit (guaranteed range: 15 V max.) Supported interface: 3-wire, 3-wire + handshake (Max. SCK: 2.0 MHz) Pseudo 3-wire (Max. SCK: 2.0 MHz) UART (Max. bps: 76800 bps) I^2C (Max. SCK: 50 kHz)
Supply voltage[Note 2]	Target V_{PP} supply voltage: 2.7 to 10.3 V, max.: 200 mA Target V_{DD} supply voltage: 1.8 to 6.0 V, max.: 200 mA Whether power is supplied from the PG-FP3 or from the user target can be selected with the TARGET VDD switch. An overcurrent protection circuit is provided for both V_{PP} and V_{DD}.
Supply voltage input	Target V_{DD} supply voltage input: 1.8 to 5.5 V, current consumption: 100 mA max.
CPU clock supply	A 16-, 8-, 4-, or 2-MHz clock can be selected as the target CPU clock. The on-board target clock can be also used depending on the application settings. (PG-FP3-side interface: CMOS level output)
Master ROM	A PROM (CMOS, 32-pin) to which the user program is written can be inserted in the master ROM socket to allow the user program to be downloaded (max.: 500 Kbytes).
Stand-alone	Programming with only the PG-FP3. Functions such as E.P.V., Erase, Program, Verify, and Load can be selected and executed with the MODE key.

Notes 1. The maximum communication rate of the interface varies depending on the device used and the environment.

2. V_{DD} is supplied to the target system to supply power to the device to which a program is to be written. The power is not enough to operate the target system of the user. Use the power supply on the target for on-board program writing.

CHAPTER 2 CONFIGURATION

2.1 PRODUCT ORGANIZATION

The system configuration of the PG-FP3 is illustrated below.

Figure 2-1. PG-FP3 System Organization
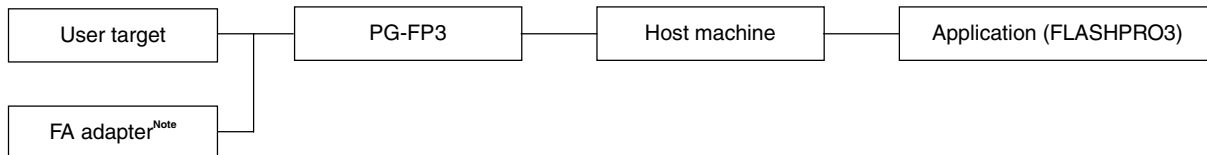
Note The FA adapter is a product of Naito Densei Machida Mfg. Co., Ltd.

The PG-FP3 shipping carton contains the following items:

★   **Table 2-1. Items in the PG-FP3 Shipping Carton**

Item	Qty	Remarks
PG-FP3	1	PG-FP3
Floppy disk	1	Application software
AC adapter	1	Power supply
Target cable	2	IC clip type (TYPE 1) and connector type (TYPE 2)
User's Manual	1	This manual
Packing list	1	Packing list for this product
Warranty	1	

The PG-FP3 is shipped with the above accessories. Make sure that all accessories have been provided by checking the contents of the box against the above table when you unpack the box. If any part or accessory is missing or is damaged, notify NEC.

To use RS-232-C as the host interface, you will need a commercially available RS-232-C straight cable.

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2.2 NAMES AND FUNCTIONS OF PARTS

Parts and their names are illustrated below.

Figure 2-2. PG-FP3 Parts and Names
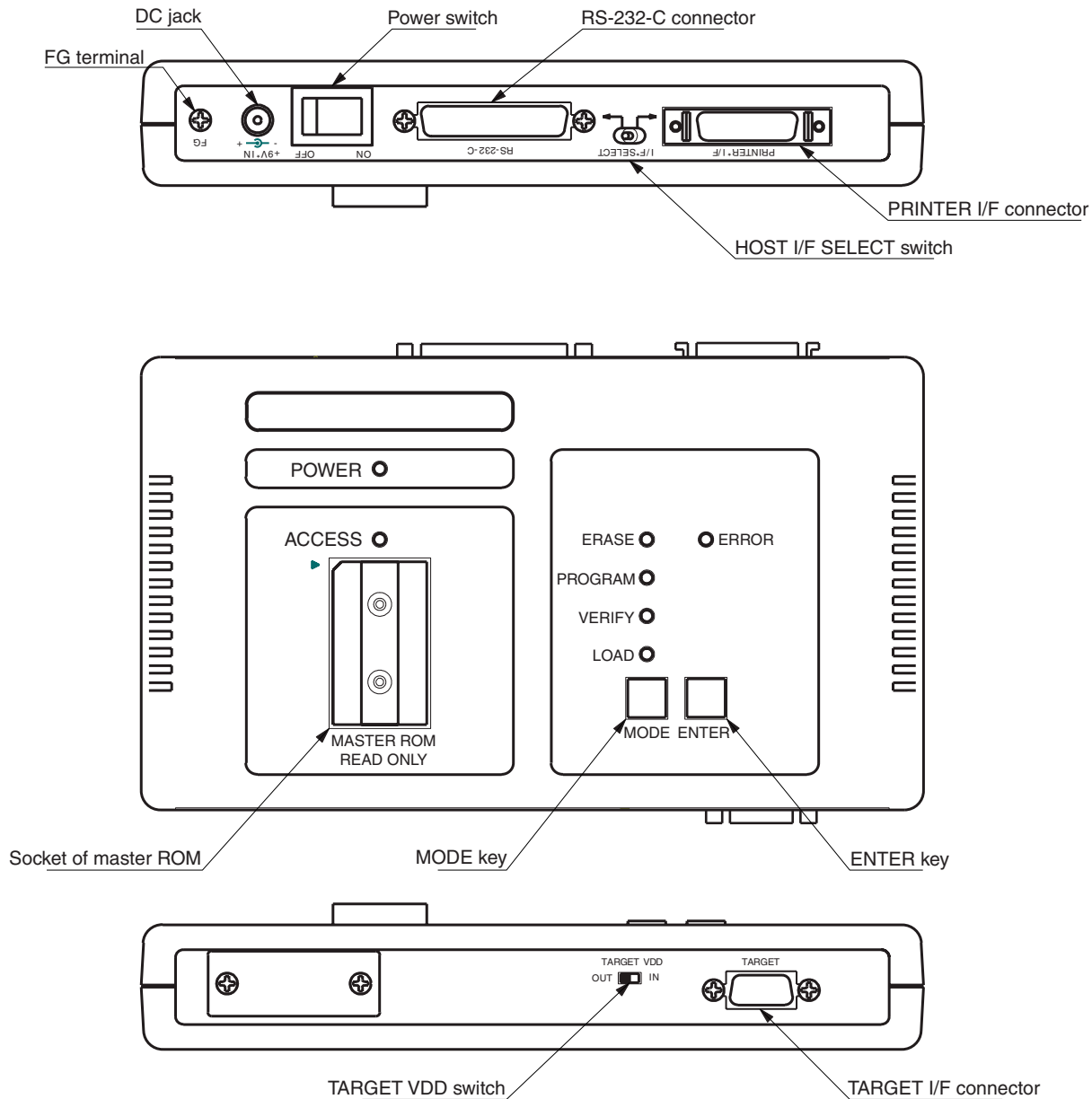
The following explains the functions of the PG-FP3 parts:

* FG terminal
  The FG terminal is a ground terminal on the PG-FP3. If necessary, ground the terminal using the FG cable supplied as an accessory.

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- DC jack

  This is the power supply input jack of the PG-FP3. To supply power to the PG-FP3, use the AC adapter supplied as an accessory.

- Power switch

  This switch turns power to the PG-FP3 on or off. Before turning power on, make sure that all required parts are connected correctly.

- RS-232-C connector

  This connector is used when RS-232-C is used as the host interface. Use a commercially available 25-pin straight cable to connect the host machine and the PG-FP3.

★
- PRINTER I/F connector

  The printer interface connector is not used.

★
- HOST I/F SELECT switch

  Set this switch to the RS-232-C position before turning on power to the PG-FP3.

- Socket of master ROM

  The master ROM socket is used when a user program is downloaded to the PG-FP3 from a source other than the host machine. A commercially available EPROM can be used as the master ROM. The user program can be downloaded from an application or in stand-alone mode.

- MODE key

  This key is used to select a command mode when the PG-FP3 is used in stand-alone mode. Each time this key is pressed, the command mode changes.

- ENTER key

  This key is used to execute a command selected by the MODE key when the PG-FP3 is in stand-alone mode. Select the command to be executed with the MODE key, and press the ENTER key once to execute the command.

- TARGET VDD switch

  This switch selects whether V_{DD} is supplied from the PG-FP3 or from the target board. Usually, V_{DD} is supplied from the target board.

  Supply V_{DD} from the PG-FP3 (TARGET VDD: OUT) only when a writing adapter, such as the FA adapter[Note], is used.

- TARGET I/F connector

  This connector connects the PG-FP3 and the target board. Use the target interface cable supplied as an accessory to make the connection.

  Note The FA adapter is a product of Naito Densei Machida Mfg. Co., Ltd.

2.3 CONNECTIONS OF PARTS

This section explains how to connect the various parts of the PG-FP3.

The PG-FP3 can be used in two ways. It can be connected to a host machine and controlled by application software or it can be used in stand-alone mode without being connected to a host machine. When using the PG-FP3 without being connected to the host machine (i.e., in stand-alone mode), you may skip the description on connection with the host machine.

★

Photo 2-1. Connections (Host, PG-FP3, and Target)
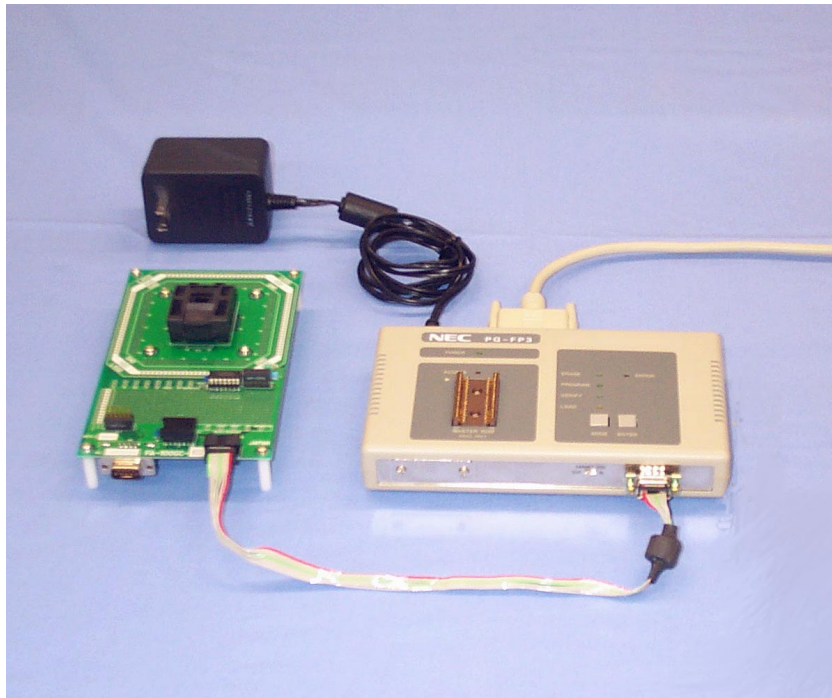
Remark When the PG-FP3 is used in stand-alone mode, interfacing with the target must be specified in advance. To do so, select the device to be used and the communication mode using the application software on the host machine. The setting information is recorded in the PG-FP3. In stand-alone mode, the PG-FP3 interfaces with the target based on this information.

★ **[Connecting a host machine]**

Connection of the host interface cable is illustrated below. The PG-FP3 only supports the RS-232-C as the host interface.

- Connecting the RS-232-C interface
  Set the HOST I/F SELECT switch to the RS-232-C position, and connect the RS-232-C 25-pin straight cable to the RS-232-C connector.

Photo 2-2. Connecting RS-232-C (HOST I/F SELECT Switch Set to RS-232-C Position)
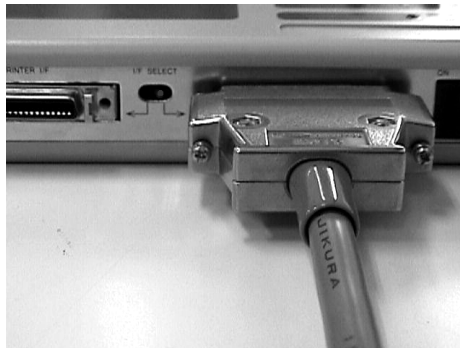
Caution Set the HOST I/F SELECT switch before turning on power to the PG-FP3.

[Connecting the power supply]

With the power switch off, connect the AC adapter supplied as an accessory to the DC jack.

Photo 2-3. Connecting the AC Adapter

[Connecting the target]

Use the target cable supplied as an accessory to connect the target. Whether you use a TYPE 1 or TYPE 2 cable depends on the specifications of the target. If the FA adapter[Note] is used, either use a TYPE 2 cable, or directly connect the target to the PG-FP3.

Note   The FA adapter is a product of Naito Densei Machida Mfg. Co., Ltd.

• When using a user target
Confirm that the TARGET VDD switch is set to the IN position and then connect one end of the target cable to the PG-FP3.

Photo 2-4. Connecting Target Cable to PG-FP3 <1>
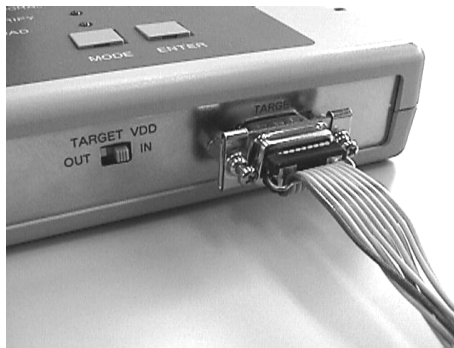
Connect the other end of the target cable to the user target (in the example below, an IC clip is used).

Photo 2-5. Connecting Target Cable to User Target
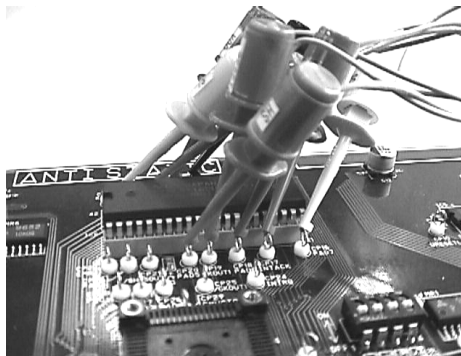
For the details of interface signal connections, see **Section 7.4** and the manual for the device.

- When using the FA adapter

    Confirm that the TARGET VDD switch is set to the OUT position. Connect one end of the TYPE 2 cable to the PG-FP3, and the other end of the cable to the mating connector of the FA adapter. Alternatively, directly connect the D-SUB connector of the FA adapter to the target interface connector of the PG-FP3.

    The FA adapter has a D-SUB connector and a connector supporting the TYPE 2 cable. Connect the FA adapter in either of the ways described above. For the wiring of the FA adapter, refer to the FA adapter manual or the manual for the device.

Photo 2-6. Connecting Target Cable to PG-FP3 <2>
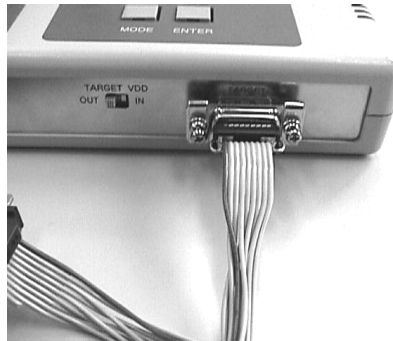
Photo 2-7. Connecting Target Cable to FA Adapter
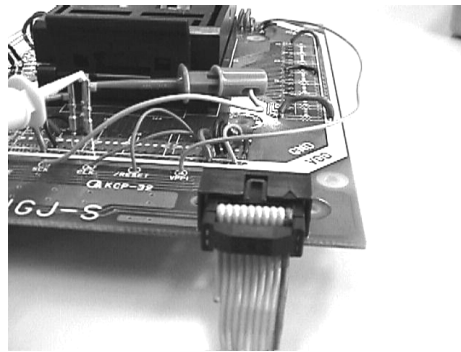
The following is an example of directly connecting the FA adapter to the PG-FP3:

Photo 2-8. Directly Connecting FA Adapter to PG-FP3
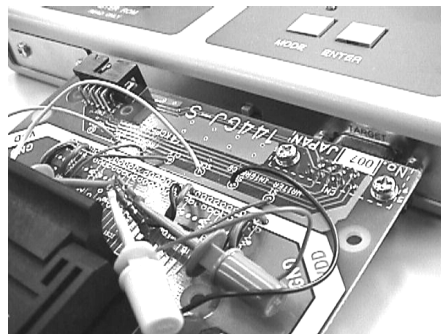
CHAPTER 3 STARTING AND STOPPING

This chapter explains how to install, start, and terminate the application. It also contains information on initialization and on use of the application. Be sure to read this chapter, since it provides very important information about using the PG-FP3. Unless the information in this chapter is not understood and followed, the PG-FP3 may not operate correctly.

3.1 INSTALLING THE APPLICATION

This section explains how to install the application program.

Caution   Because the program file is stored in compressed form on the floppy disk, it cannot be used simply by copying the files on the disk to the hard disk. Be sure to install the program correctly by using the setup program.

- Starting the host machine

★   Turn on power to the personal computer, and start Windows 95, Windows 98, Windows 2000, or Windows NT.
  Host machine: PC-9801 or PC-9821
                IBM PC/AT™ compatible
                CPU: Pentium™ (100 MHz or higher is recommended.)
                RAM: 32 Mbytes or more is recommended.
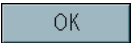
- Starting the setup program
  Select [Run] from the Start menu.
  Enter the name of the drive for which [SETUP DISK] has been set and the file name SETUP.EXE in the [Open] text box in the [Run] dialog box.

  Example When Disk 1 inserted in drive B
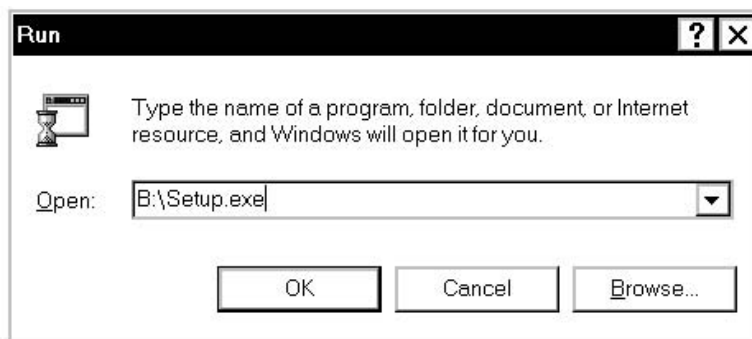
After entering the drive name and file name, click the OK button.

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- Starting installation

    When SETUP.EXE starts, follow the instructions by the setup program until the setting screen for the installation directory is displayed. To stop installation partway, click the [Cancel] button.

    Specify the installation directory in [Destination Directory] in the Choose Destination Location screen. Then, click the [OK] button.

    Example Specifying the [\Program Files\Flashpro3] path of drive C
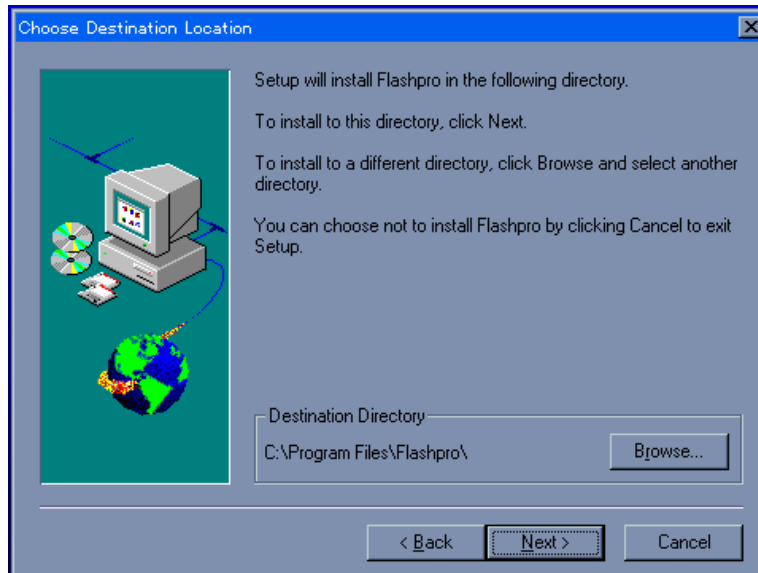
    To start the installation, click the [Next] button. When the installation ends, a confirmation message appears as shown below. Click the [OK] button.
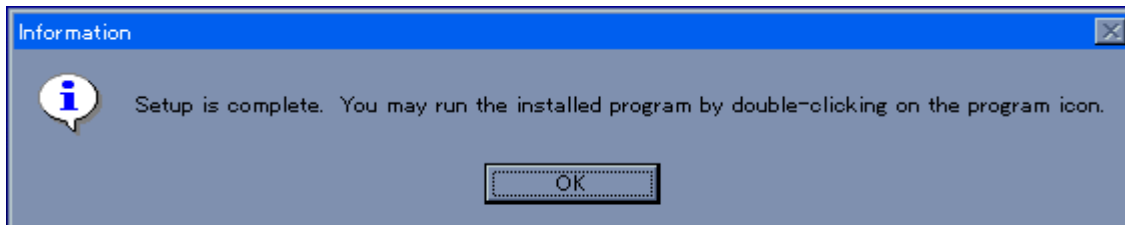
    Now, the installation is completed. An English help file is installed as standard. To use a Japanese help file, copy the flashpro.hlp file from Disk 2 into the installation directory. Note that the English help file is overwritten.

Phase-out/Discontinued

- Uninstalling the program

    To uninstall the PG-FP3 application, execute [Add/Remove Programs] in [Control Panel], and select [FLASHPRO3].

    Uninstallation will start, and the files copied during installation will be deleted.

    Caution   Uninstallation erases all installed components. If FLASHPRO3 is required after uninstallation, reinstall it.

- Installing the parameter file

    The PG-FP3 loads information about the target device as a parameter file and makes the necessary settings for interfacing.

    Caution   The PG-FP3 will not operate correctly unless the parameter file of the device to which programs are to be written has been installed. Be sure to obtain and install the parameter file when using PG-FP3.

    Using Explorer or a similar means, copy the parameter file (XXXXXXX.PRC) to the same location where FLASHPRO3 has been installed. Unless the file is copied to the same location, FLASHPRO3 will not correctly recognize the parameter file.

3.2 STARTING THE APPLICATION

This section explains how to start the application program.

- Connection of each unit and applying power

  For connection of each unit, see **Section 2.3**.

  After completing connections, turn on power to the PG-FP3. When the PG-FP3 is operating normally, the POWER LED lights, the LED on the side of the MODE key blinks, and then the ERASE, PROGRAM, and VERIFY LED indicators light.

Photo 3-1. Starting the PG-FP3
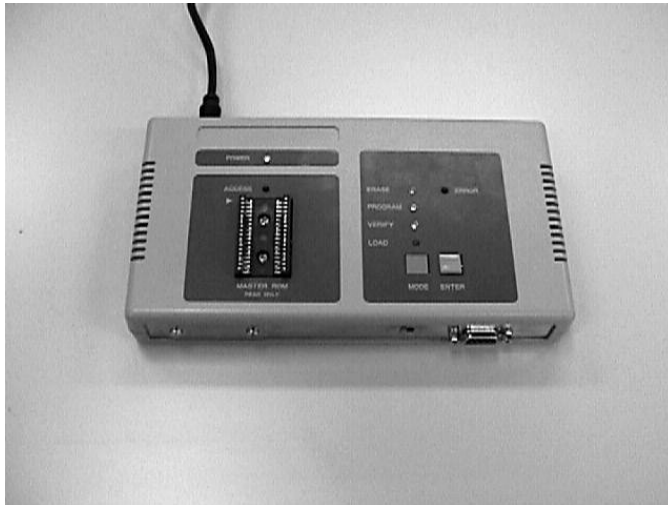
If any of the LEDs mentioned above does not light, the PG-FP3 has probably malfunctioned. If this occurs, notify NEC.

- Starting FLASHPRO3

  Either select FLASHPRO3 from the Start menu or, if a shortcut has been created, double-click the shortcut to start FLASHPRO3. If FLASHPRO3 starts correctly, the following screen is displayed.
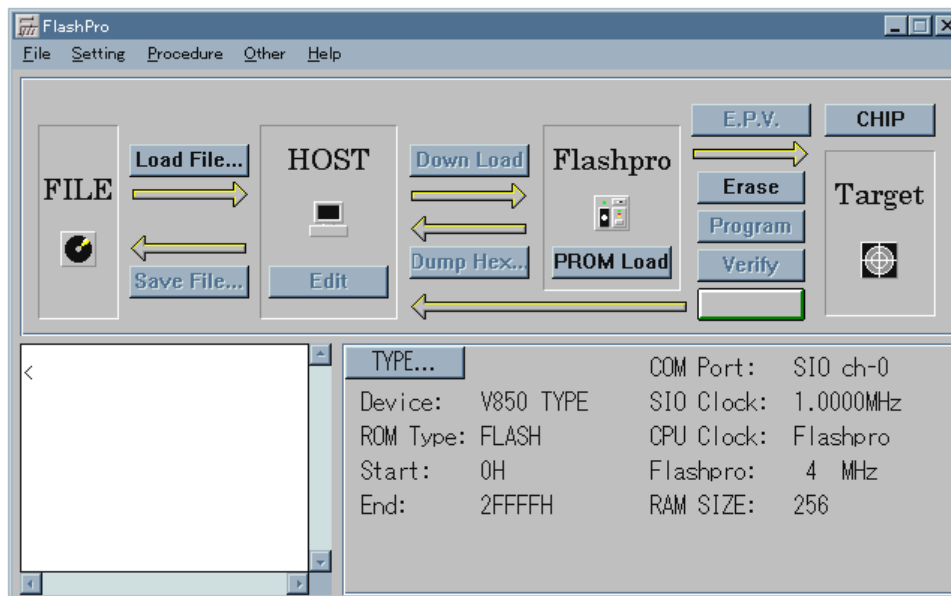
- If FLASHPRO3 does not start correctly

  FLASHPRO3 will not start correctly if the communication settings are wrong or if installation has not been performed correctly.

  When FLASHPRO3 starts, connection with the PG-FP3 is checked. If communication is not being performed normally, the following dialog is displayed.

Flashpro Communication Error

Make sure the connection of "Flashpro".

Make sure the power of "Flashpro".

| Retry | Close | Connection Port... |
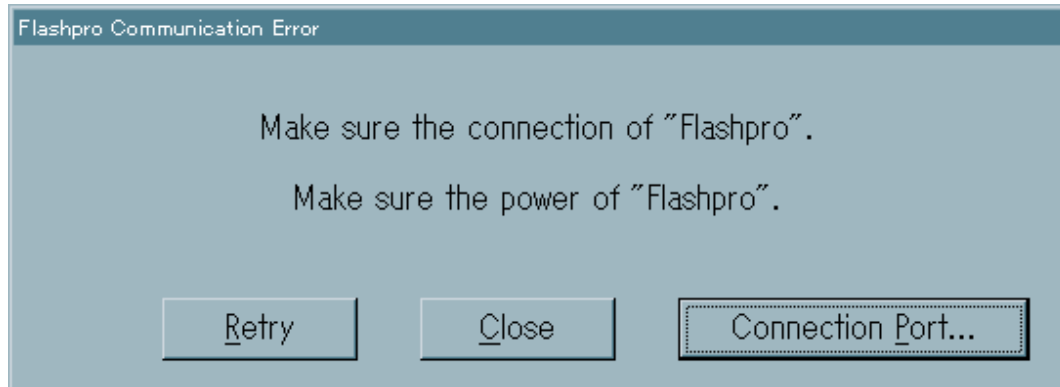
This dialog is displayed because:

1. The cables are not correctly connected.

   Correctly connect the cables. Especially, connect the RS-232-C cable correctly because it is a straight cable.

2. The selected interface is wrong.

   ★ Check to see if the HOST I/F SELECT switch is set to the RS-232-C position.

3. Setting of Connection Port is wrong.

   If the setting of the port is different from the port actually being used for the host, set the correct port.

4. A wrong communication rate is set.

   ★ The PG-FP3 operates at a communication (baud) rate of 9600 bps on starting. If a wrong baud rate is set, correct the setting.

   There is also a possibility that the communication settings for the RS-232-C port are wrong. Also check the RS-232-C port. The correct communication setting is Data: 8 bits, Stop bit: 2 bits, Parity: None, Flow control: None.

5. Other cases

   If all the above are okay but FLASHPRO3 will still not start, either FLASHPRO3 is not correctly installed or the PG-FP3 is damaged. If FLASHPRO3 will not start after it is installed again, notify NEC.

• FLASHPRO3 screen

The FLASHPRO3 screen consists of three subscreens. The operation screen contains command execution buttons in the form of a flowchart so that you can perform a series of operations by referring to the flowchart. The log window screen shows the command flow between the FLASHPRO3 and PG-FP3, the status, and the progress of command execution. The TYPE screen displays the current TYPE settings, allowing you to check the current settings without having to open the TYPE setting window.

Figure 3-1. FLASHPRO3 Screens

(a) Operation Screen
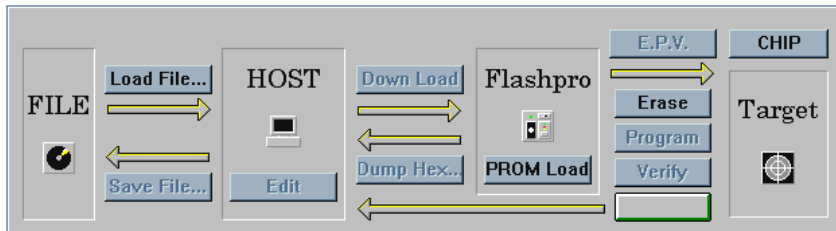
★ **(b) Log Window Screen**

(c) TYPE Screen

3.3 INITIALIZATION AND NOTES ON CORRECT USE

Before a target can be accessed with FLASHPRO3, several settings must be performed for FLASHPRO3. If these settings are not done correctly, communication may not be executed correctly or the target may be damaged.

- Loading parameter file

  The parameter file is loaded with the [Setting..Device] command. If the file is not loaded when FLASHPRO3 starts, settings for the target will not be correctly performed. Consequently, communication may fail or the target may be damaged.

Figure 3-2. Parameter File Setting Dialog Box
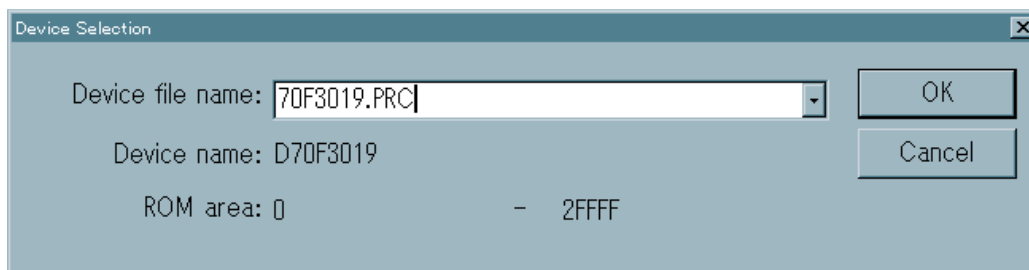
When this dialog box is opened, enter the parameter file name in response to Device file name:. Alternatively, click the button to the right to the text box to display a list of parameter files. Select one and click the [OK] button. The selected parameter file will be loaded.

- TYPE setting
  The TYPE setting dialog box is used to set information necessary for communication with the target. Default information is set when the parameter file is loaded. To change the default setting, either execute the [Setting..Type] command, or click the [TYPE] button on the screen.
  The TYPE setting dialog box below is displayed.

★ **Figure 3-3. TYPE Setting Dialog Box (When the Parameter File Is Loaded)**

If the parameter file has not been loaded, the TYPE setting dialog box below is displayed. In this case, load the file, and then perform TYPE setting.

★ **Figure 3-4. TYPE Setting Dialog Box (When the Parameter File Is Not Loaded)**

In the TYPE setting dialog box, device-specific information is automatically set when the parameter file has been loaded, and the text box is grayed out. The parameters that can be changed by the user in this dialog box are as follows:

1. COMM PORT
    Selects the communication mode with the target. The communication modes that can be selected depend on the device. For details, refer to the manual for the device.
    The communication rate can be also changed. The communication rate also depends on the function and operating clock of the device. For details, refer to the manual for the device.

2. ROM TYPE
    Usually, only FLASH is set. If the device used has an on-chip EEPROM™, however, the internal data of the EEPROM can be read to the PG-FP3 by selecting EEPROM.

3. CPU CLOCK
    Selects the CPU operating clock. When the FA adapter is used, select In Flashpro to choose a clock from Flashpro Clock. When the user target board is used, select On target board and enter the clock frequency of the target board in the text box.
    Some devices have a multiply circuit. In this case, enter a multiple for Multiple Rate.

• Voltage setting
Set the operating voltage of the target. When the [Setting..Voltage] command is executed, the following dialog box opens.
This dialog box is used to set the operating voltage of the target and the V$_{PP}$ voltage. If the parameter file has been loaded, the default voltages are set automatically. Because some devices allow you to select an operating voltage, set the voltage according to target conditions.

★

Phase-out/Discontinued
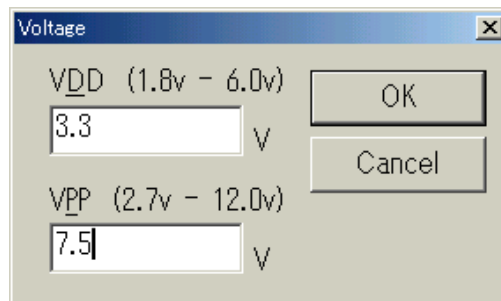
- Option setting

  The Options dialog box is used for detailed setting of the target and is displayed when the [Setting..Option] command is executed.

  This dialog box is used to set the erase time, write time, and convergence time. These parameters are automatically set to the default values when the parameter file is loaded.

  The new values become valid only when the check box is checked before the [Setting..Option] command is executed.

  Do not change these parameter settings unless it is necessary. Changing any of these parameters may damage the device.

★
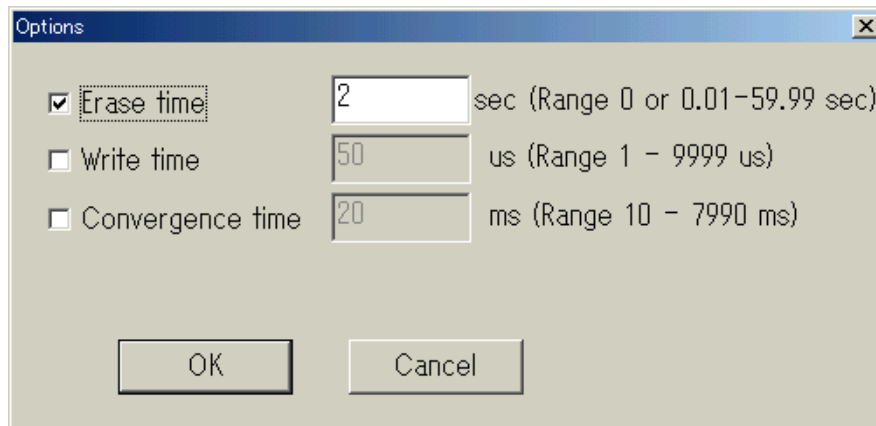
Because the above settings are necessary for correct interfacing with the target, be sure to perform them when starting FLASHPRO3. The information set is recorded in the PG-FP3 and is used to interface with the target when the PG-FP3 is used in stand-alone mode. Any setting that is changed can be saved with the [File..Type Save] command. To perform setting again, use the [File..Load] command.

Caution   Load the parameter file each time FLASHPRO3 is started, even though the file was loaded the previous time FLASHPRO3 was used. The PG-FP3 updates its settings to prevent a wrong target from being selected by reloading the parameter file each time FLASHPRO3 has been started. This is done because the target may be damaged if it is accessed with wrong setting of the parameter file.

3.4 TERMINATING THE APPLICATION

To terminate the application, execute the [File..Exit] command.
After terminating the application, turn off power to the PG-FP3.

Caution   The target may be damaged if power to the PG-FP3 is turned off or if the target is disconnected while a command is being executed. To end operation of the PG-FP3 while a command is being executed, execute the [Procedure..Cancel] command to cancel the current processing, then terminate the application and turn off power to the PG-FP3.

CHAPTER 4 BASIC OPERATING PROCEDURE

This chapter explains the basic operating procedure, using as an example the μPD78F4216 used as the target. Specifically, this chapter discusses how to start the system and how to write a program to the target by executing the E.P.V. command. For the other commands and their usage, see **Chapter 5**.

[Operating conditions in this example]

The operating conditions for the example used in this chapter are as follows:

★
    HOST I/F : RS-232-C
    Target   : μPD78F4216 (with FA adapter)
    Interface : UART 9600 bps
                  Clock In Flashpro 16 MHz
                  Mode CHIP
                  V_{DD} 5.0 V
                  V_{PP} 10.0 V
    Command : E.P.V.

(1) Starting the system

- Connect the PG-FP3 and host.
★   Confirm that the HOST I/F SELECT switch is set to the RS-232-C position.
- Connect the PG-FP3 and target (FA adapter).
    Confirm that the TARGET VDD switch is set to the OUT position.

★   **Photo 4-1. Connection of Host, PG-FP3, and Target**
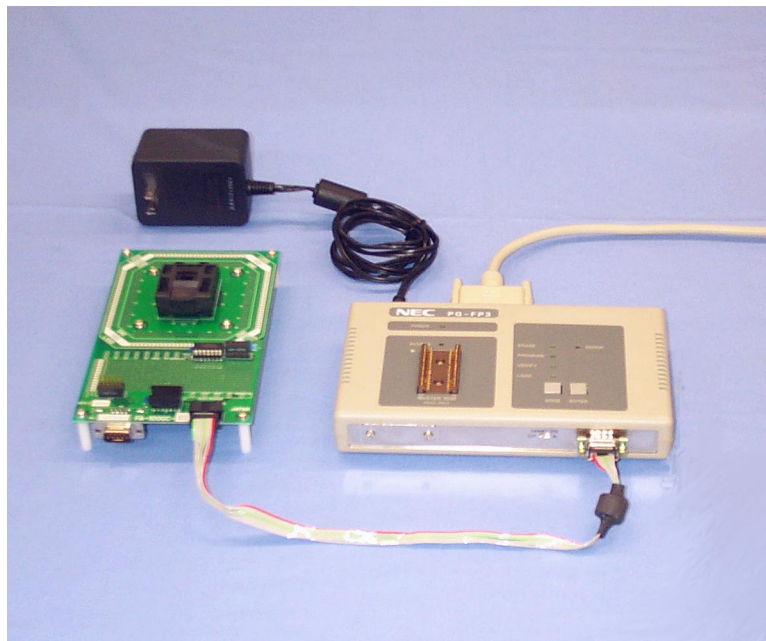
- Turn on power to the PG-FP3.
  Confirm that the LED on the PG-FP3 is blinking.

- Start FLASHPRO3.
  If the communication error dialog box opens at this time, check the [Connection Port] setting and change if necessary.

★ The example below assumes that the PG-FP3 is connected to COM1.

Figure 4-1. Communication Error Dialog Box
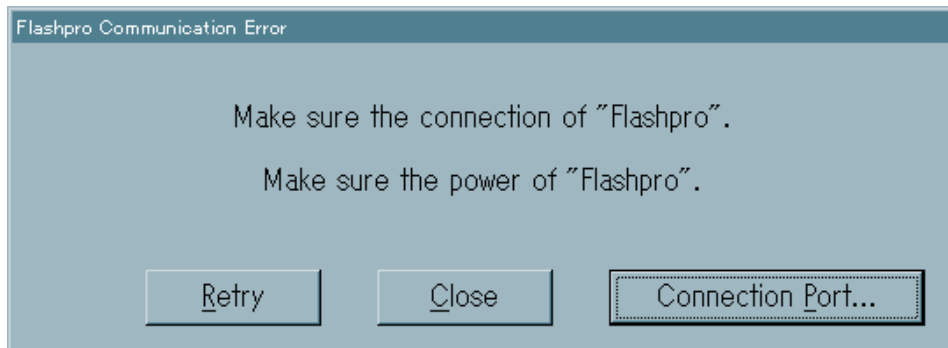
Open the setting dialog box by clicking [Connection Port].

Phase-out/Discontinued
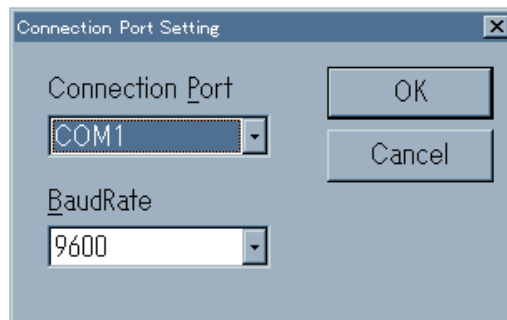
When FLASHPRO3 has been started correctly, the following screen is displayed.
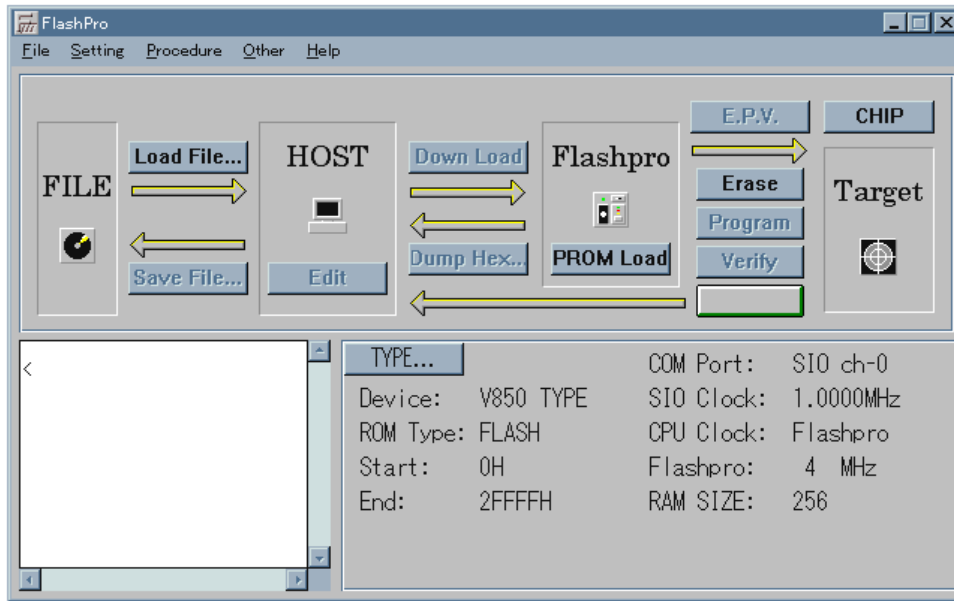
(2) Loading the parameter file

Select [Device] from the [Setting] pull-down menu. The dialog box for loading a parameter file will open. Enter 78F4216.PRC in the box for Device file name: and click the [OK] button.
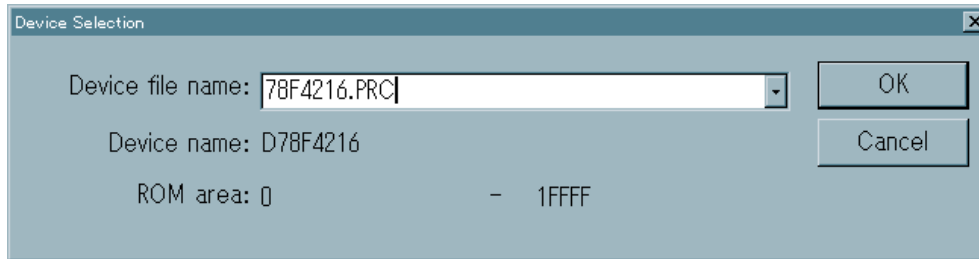
When the parameter file is read, the PG-FP3 is reset for synchronization, then the parameters are read. Consequently, immediately after the parameter file is loaded, the initial status is restored, and the CHIP mode is selected as operating mode.

The Dump HEX command, Program command, Verify command, and E.P.V. command are dimmed. Those commands are disabled until a user program is downloaded.

The screen appearing immediately after the parameter file is loaded is as shown below:

Phase-out/Discontinued
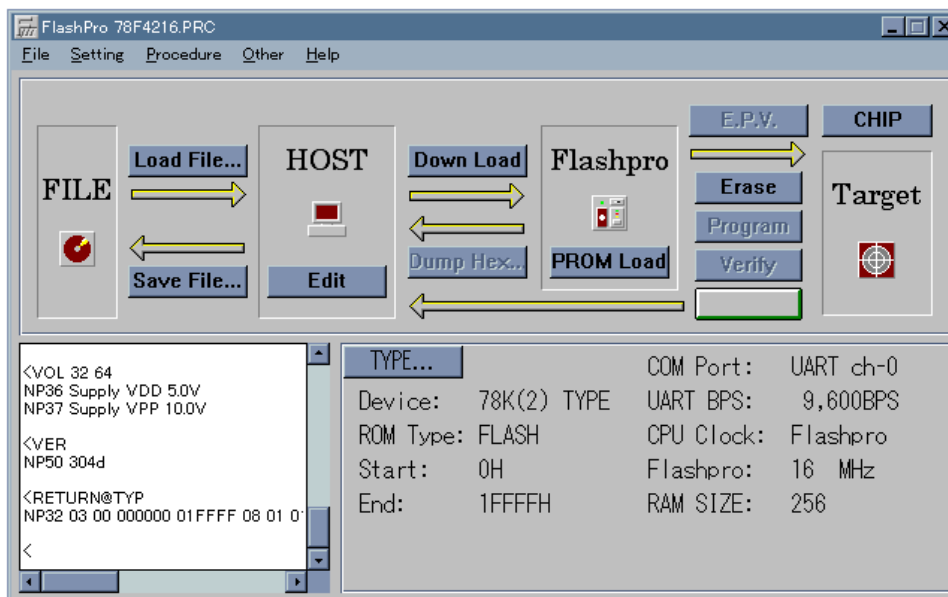
(3) TYPE setting

Open the TYPE setting dialog box by selecting [Type] from the [Setting] pull-down menu, or by clicking the

TYPE... button on the operation screen.

When the window is open, set COMM PORT to UART ch-0, and UART bps to 9600 bps. Then click the [OK] button to accept TYPE setting.

★
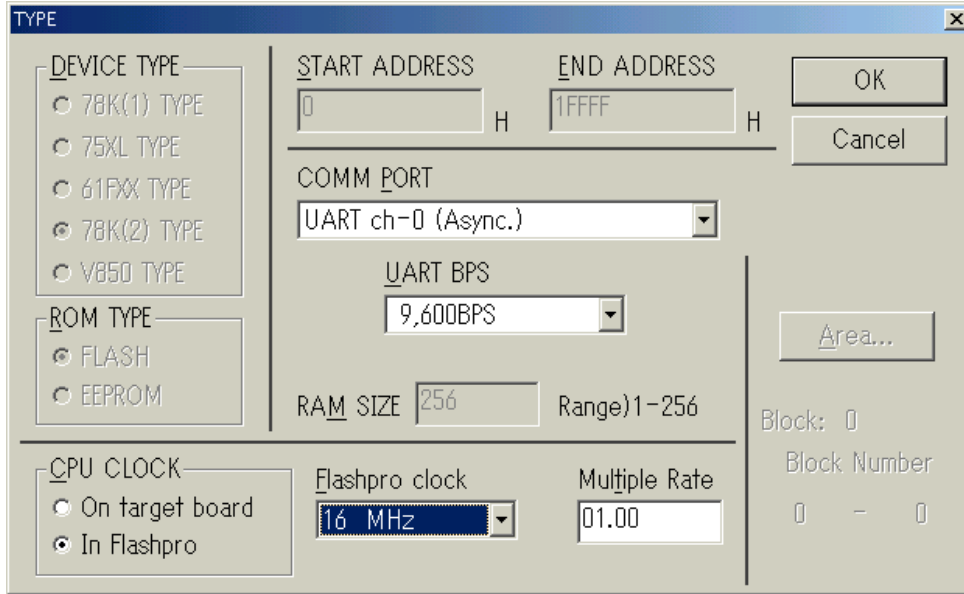
When TYPE setting has been performed, the FLASHPRO3 screen is displayed as follows:

★

Phase-out/Discontinued
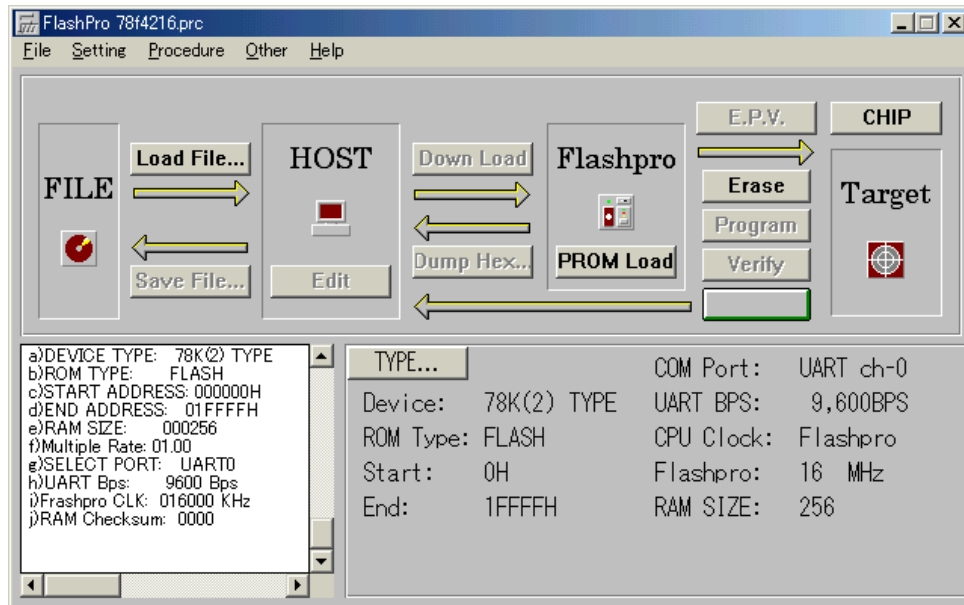
(4) Downloading a user program

Open the dialog box by selecting [Load File] from the [File] pull-down menu, or by clicking the button on the operation screen. Select a HEX file to be downloaded, and load the file into FLASHPRO3. When the file has been loaded, the FLASHPRO3 screen is displayed as follows:

★
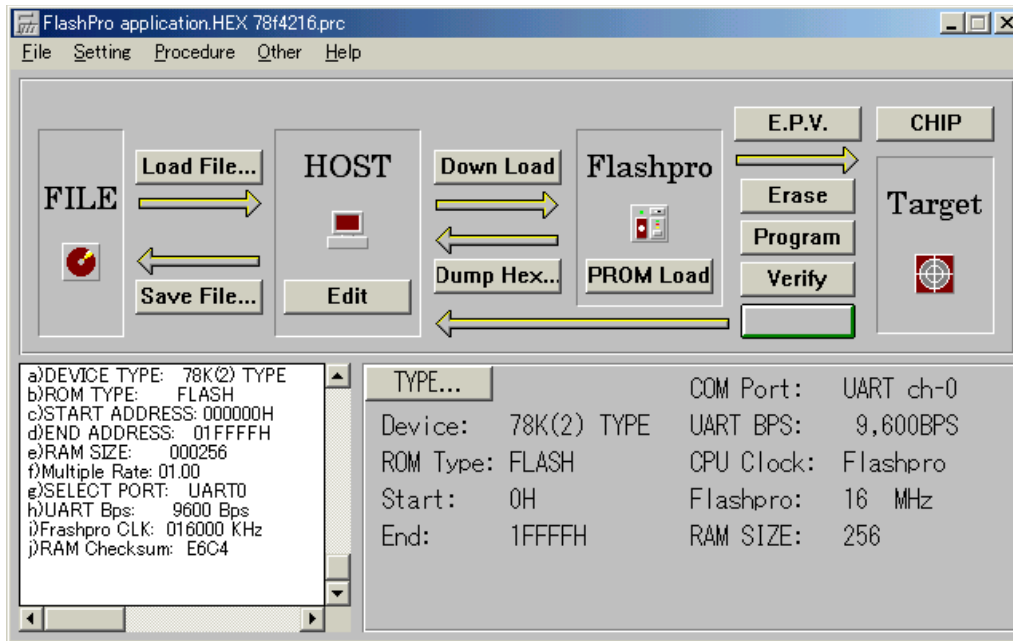
Next, download the file to the PG-FP3 by selecting [Download HEX] from the [Procedure] pull-down menu, or by clicking the **Down Load** button on the operation screen.

After the file has been downloaded, the FLASHPRO3 screen is displayed as follows:

★
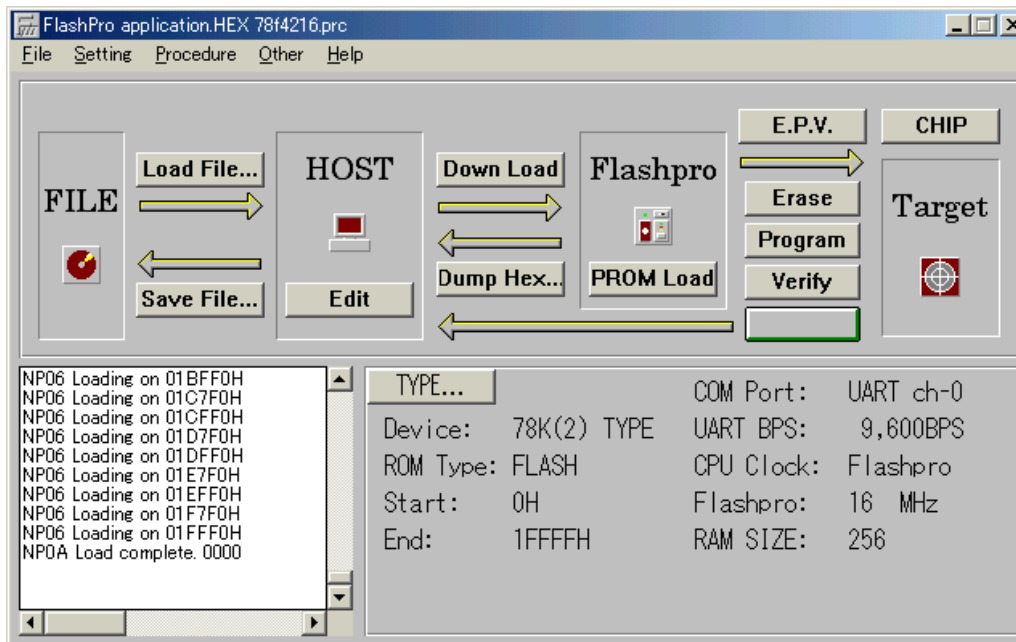
(5) Executing the E.P.V. command

The E.P.V. command can be executed by selecting [E.P.V.] from the [Procedure] pull-down menu, or by clicking the ⬚E.P.V. button on the operation screen.

While the E.P.V. command is executed, the progress of execution is displayed in the log window, and a PG-FP3 LED blinks.

Lighting of LEDs   The ERASE, PROGRAM, and VERIFY LEDs light, and the LED for the phase under execution blinks.

        ERASE   O   ←   Blinks while the program is being erased

        PROGRAM O   ←   Blinks during programming

        VERIFY   O   ←   Blinks while the program is being verified

Normal completion of the E.P.V. processing is indicated by the message Verify OK!, which is displayed in the log window.

(6) Verify check

Next, the program is verified independently. This is done by comparing the data stored in the PG-FP3 with the data of the target.

Verification can be executed by selecting [Verify] from the [Procedure] pull-down menu, or by clicking the ⬚Verify button on the operation screen. While verification continues, its progress is displayed in the log window. In addition, the VERIFY LED on the PG-FP3 blinks, indicating that the command is being executed. If verification is completed normally, the message Verify OK! is displayed in the log window.

(7) Terminating the system

To terminate FLASHPRO3, select [Exit] from the [File] pull-down menu. After terminating FLASHPRO3, turn off power to the PG-FP3.

This completes the series of operations.

CHAPTER 5 COMMAND REFERENCE

This chapter explains each command. A command can be selected from the pull-down menu on the menu bar or by clicking the corresponding button on the screen.

5.1 File

When [File] is clicked, the pull-down menu shown below is displayed. This menu lists mostly the commands that are used to manipulate files.

```
Load File...   Ctrl+L
Save File...   Ctrl+S

Load Type...
Save Type...

Exit
```
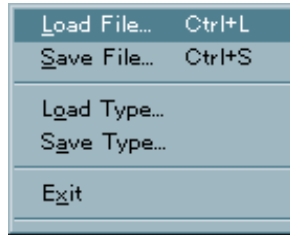
5.1.1 Load File

The [Load File] command loads the user program into FLASHPRO3. The loaded program can be displayed and edited with the [Edit] command. Execute the [Load File] command by selecting it from the pull-down menu or by pressing the **Load File...** button on the screen. When this command has been executed, the window below opens. Select the file to be loaded, and click the [Open] button.

```
Open                                          ? X

Look in:    pg-fp3              ▼  ⬆  ⬛  ⬛ ⬛

┌─────────────────────────────────────────┐
│                                         │
│                                         │
│                                         │
│                                         │
│                                         │
└─────────────────────────────────────────┘

File name:  [                    ]       Open

Files of type:  HEX Files (*.HEX)   ▼    Cancel
```
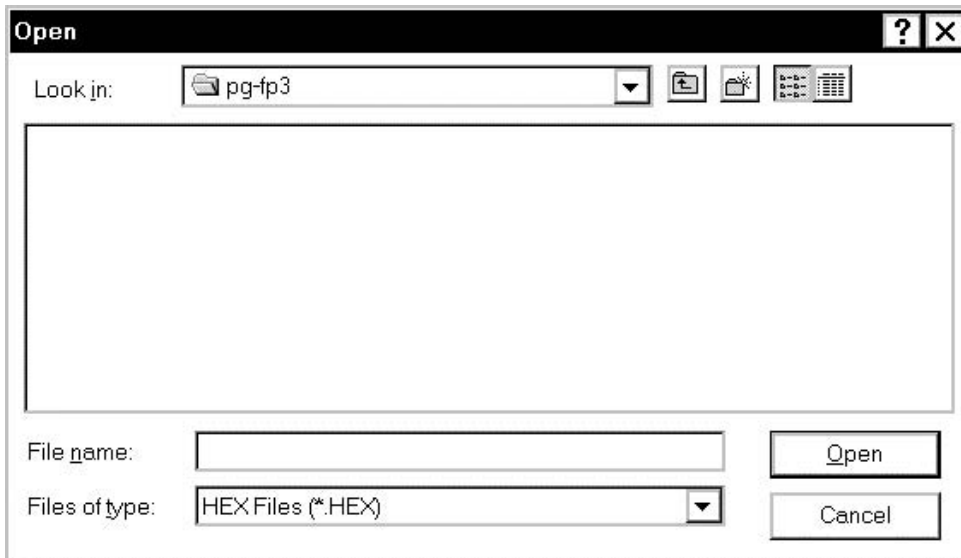
Two types of files can be loaded: Intel expansion HEX and Motorola S format files. An Intel expansion HEX file is recognized as xxxxxx.HEX. A Motorola S format file is recognized as xxxxxx.PRO.

5.1.2 Save File

The [Save File] command saves the user program loaded into FLASHPRO3 or uploaded from the PG-FP3 to a file.

Execute this command by selecting it from the pull-down menu or by pressing the **Save File...** button on the screen. When this command has been executed, the window below opens. Enter the name of the file to be saved, and click the [Save] button.
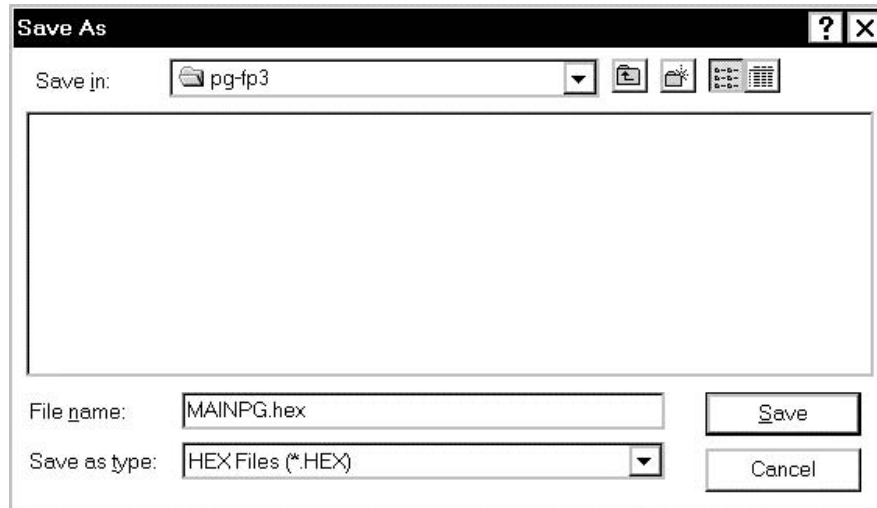
Two types of files can be saved: Intel expansion HEX and Motorola S format files. An Intel expansion HEX file is recognized as xxxxxx.HEX. A Motorola S format file is recognized as xxxxxx.PRO. For selection of a file format, the following dialog box is displayed when the [Save File] command has been executed. Click the button corresponding to the type of file to be saved.

The file format cannot be converted in the file format select dialog box.

Figure 5-1. File Format Select Dialog Box
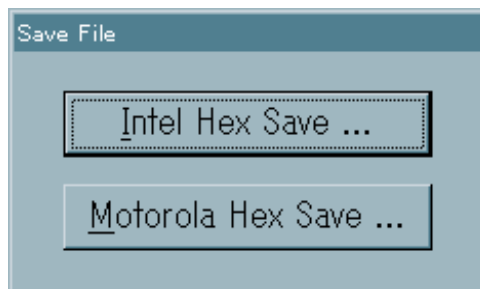
5.1.3 Load Type

The [Load Type] command reloads the file (xxxxxx.TYP) in which the information set with [Setting] has been saved when re-setting is required. When the Type File is loaded again, the previously used environment is restored.

Execute the [Load Type] command by clicking [Load Type] on the [File] pull-down menu. When this command has been executed, the window below opens. Select the Type File to be loaded, and click the [Open] button.
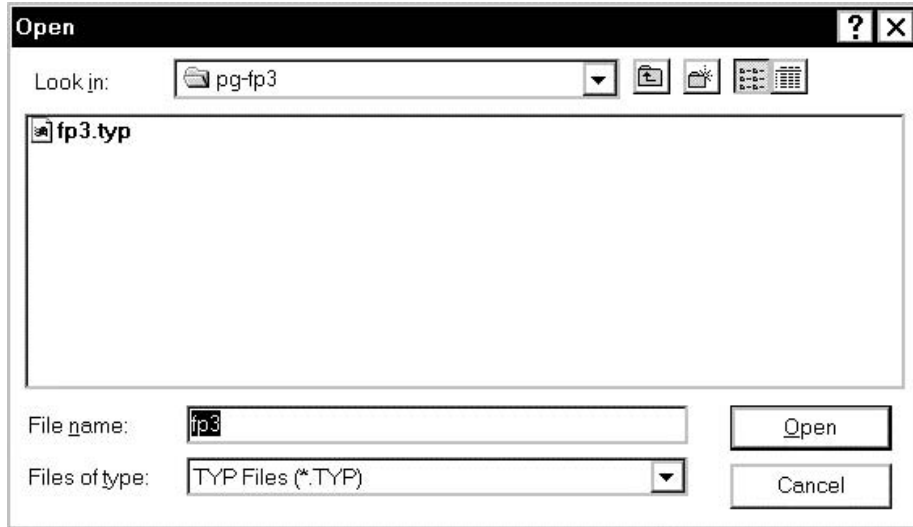
The following information is re-set when Type File is reloaded:

- Parameter file
- TYPE setting information
- Voltage setting information
- Option setting information

5.1.4 Save Type

The [Save Type] command saves information set with [Setting] to a file (xxxxxx.TYP), so that the information can be reloaded when re-setting is required. When Type File is saved, the previously used environment can be restored at any time.

Execute the [Save Type] command by clicking [Save Type] on the [File] pull-down menu. When this command has been executed, the window below opens. Enter the name of the file to be saved and click the [Save] button.
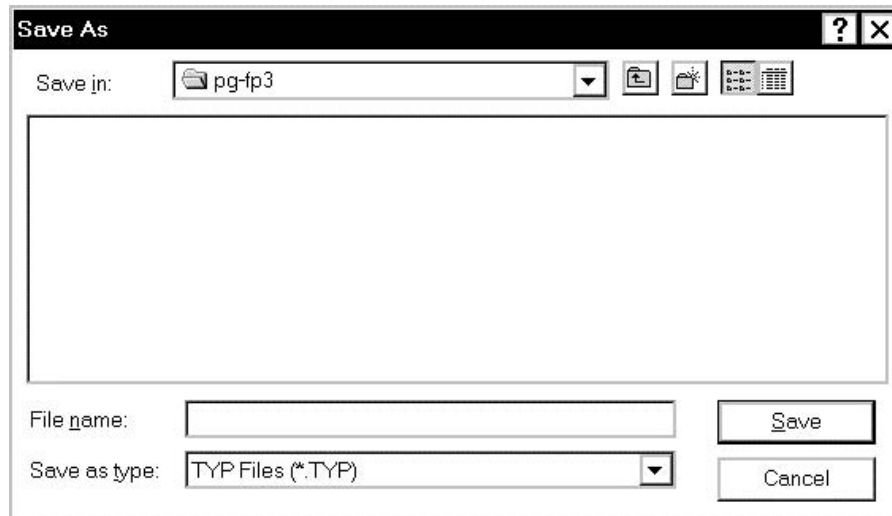
The following information is saved when Type File is saved:

- Parameter file
- TYPE setting information
- Voltage setting information
- Option setting information

5.1.5 Exit

The [Exit] command terminates FLASHPRO3. Execute this command by clicking [Exit] on the [File] pull-down menu. You can also terminate FLASHPRO3 by clicking the [×] button on the right of the task bar.

5.2 Setting

When [Setting] is clicked, the pull-down menu shown below is displayed. This menu lists the commands that are used to set the FLASHPRO3 operating environment (such as setting of the target interface).

Device...	Ctrl+D
Type...	Ctrl+T
Voltage...	
Option...	
Reset	
Connection Port...	

5.2.1 Device

The [Device] command loads information such as information specific to the target device and communication settings into FLASHPRO3 and the PG-FP3. The information on each target device is supplied to the user in the form of a parameter file (xxxxxx.PRC). Loading this file automatically sets each parameter. Execute this command by clicking [Device] on the [Setting] pull-down menu.

When this command is executed, the dialog box below opens. Enter the name of the parameter file for the target to be used, or select an appropriate parameter file by clicking the button to the right of the text box, and then click the [OK] button. This completes the setting of the parameters.

Device Selection

Device file name: 70F3019.PRC   [OK]   [Cancel]

Device name: D70F3019

ROM area: 0   -   2FFFF
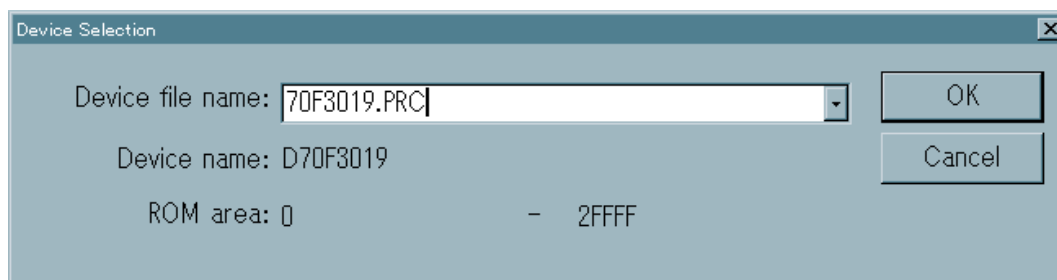
Remarks 1. The information in the parameter file sets information important for interfacing with the target. On starting FLASHPRO3, therefore, be sure to load the parameter file with [Device].

2. The parameter file will not be recognized unless it is installed in the same directory as FLASHPRO3. Install the file correctly by seeing **Section 3.1**.

3. If Type information is saved with [Save Type], the parameter file is also set by loading Type File with [Load Type]. It is therefore not necessary to load the parameter file again with [Device].

Phase-out/Discontinued

5.2.2 Type

The [Type] command sets the mode of communication with the target and operating clock. Because the communication mode and operating clock differ depending on the device used, refer to the manual for the device for details. Execute the [Type] command by clicking [Type] on the [Setting] pull-down menu or by clicking the TYPE... button on the screen.

When this command is executed, the TYPE setting window below opens. After the parameter file has been loaded, the default values for the information specific to the device is grayed out, and the appropriate default values for the device are automatically set for the other items. To change a default value, change the contents of the corresponding item and click the [OK] button. The setting will be changed.

★
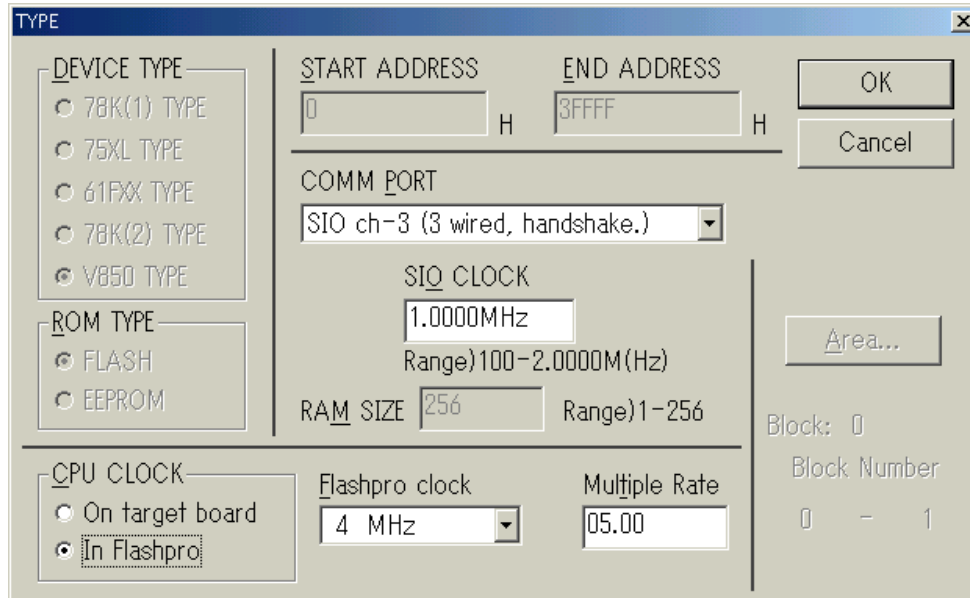
The following describes each parameter in the figure above.

- Selecting the device type (DEVICE TYPE)
  The device type is determined by the information in the parameter file.

- Selecting the internal ROM format for the target microcontroller (ROM TYPE)
  A ROM type cannot be selected for a microcontroller that does not have EEPROM in the parameter file. If a ROM type can be selected, select either of the following ROM types:

  - FLASH   FLASH memory
  - EEPROM   EEPROM

  When FLASH memory is used, the memory cannot be correctly written to unless it has been erased.
  The Erase command cannot be executed when an EEPROM is used.

- Entering the start address (START ADDRESS)
★   The start address is determined by the parameter file. It is automatically set in AREA mode.

Phase-out/Discontinued

- Entering the end address (END ADDRESS)

★   The end address is determined by the parameter file. It is automatically set in AREA mode.

     Remark   The end address range that can be specified with the PG-FP3 is 2 Mbytes (1FFFFFH). This is a hardware specification.

- Selective input of serial port (COMM PORT)
  Select the mode of communication between the PG-FP3 and target device from the modes listed below.
  Some of the following communication modes cannot be used with some devices. Select one of the communication modes listed in the manual for the device. The channel number of some devices starts with ch-1. In this case, the channel numbers on the screen are one less than their corresponding channel numbers of the device. Read ch-0 on the screen as referring to ch-1 of the device, ch-1 to ch-2, and so on.

Parameter on screen	Description
• SIO ch-0	SIO (3-wire clocked communication port) channel 0
• SIO ch-1	SIO (3-wire clocked communication port) channel 1
• SIO ch-2	SIO (3-wire clocked communication port) channel 2
• SIO ch-3 + handshake	SIO (3-wire clocked communication port with handshaking)
• I2C ch-0	I^2C channel 0
• I2C ch-1	I^2C channel 1
• I2C ch-2	I^2C channel 2
• I2C ch-3	I^2C channel 3
• UART ch-0 (Async.)	UART (asynchronous communication port) channel 0
• UART ch-1 (Async.)	UART (asynchronous communication port) channel 1
• UART ch-2 (Async.)	UART (asynchronous communication port) channel 2
• UART ch-3 (Async.)	UART (asynchronous communication port) channel 3
• Port A (Pseudo-3 wired)	Port (pseudo 3-wire) A
• Port B (Pseudo-3 wired)	Port (pseudo 3-wire) B
• Port C (Pseudo-3 wired)	Port (pseudo 3-wire) C

- Entering a communication rate for the UART (UART BPS)
  Select a communication rate from the following if UART is selected for the serial port.

  - 4800 bps
  - 9600 bps
  - 19200 bps
  - 31250 bps
  - 38400 bps
  - 76800 bps

  Caution   **If the target CPU clock is slow, use a slow communication rate. If the communication rate is too fast, communication may not be performed correctly (for details, refer to the target device specifications).**

Phase-out/Discontinued

- Entering a clock frequency in 3-wire or pseudo 3-wire mode (SIO CLOCK)
  If 3-wire or pseudo 3-wire mode is selected with the serial port, enter a communication rate as a decimal number. The valid range for communication rates is from 100 Hz to 2.0000 MHz. Be sure to enter the unit also. Up to six digits can be entered.

  Example   100 Hz = 0.1 kHz = 0.0001 MHz
  1 MHz = 1000 kHz (1000000 Hz is not recognized because it has 7 digits.)

  Caution   **Generally, high-speed communication cannot be performed in pseudo 3-wire mode. Check the operation at several hundred Hz and then increase the communication frequency within the range at which correct operation can be performed. The reason is that it takes a long time to write or verify programs at a low communication rate.**
  Some devices do not operate even at the communication rates that can be set for the PG-FP3. Check the specifications of the device.

- Entering a slave address for I^2C (SIO CLOCK)
  If I^2C is selected for the serial port, enter a slave address as a hexadecimal number. The valid range is 8 to 77H. Do not, however, enter the unit. This slave address can take any value within the range, but must not overlap with the slave address of other devices on I^2C.
  ★   For I^2C, the frequency of the communication clock is fixed to 50 kHz.

- Entering RAM size (RAM SIZE)
  This value sets the packet size for communication with the target device and is determined by the parameter file.

- Entering the CPU clock source (CPU CLOCK)
  Selects whether the clock for the target microcontroller is supplied from the PG-FP3.

  - On target board....... Uses the clock of the target system.
                          The clock is not supplied from the PG-FP3. Open the CLK pin of the target connector.

  - In Flashpro.............. Supplies the clock of the PG-FP3 to the target.
                          Connect the CLK pin of the target connector to the CLK pin of the target microcontroller.
                          For details of connection, refer to the manual for the device.

- Entering the clock frequency of the target system (Target board clock)
  If [On target board] has been selected when a CPU clock source is being entered, enter a frequency as a decimal number. The valid range is 1 to 99.999 MHz. Be sure to enter the unit also. Although up to six digits can be entered, only the first three digits are used.

  Example   4.19 MHz = 4190 kHz (4190000 Hz is not recognized because it has seven digits.)
  If entered, 3.14159 MHz is recognized as 3.14 MHz.

Phase-out/Discontinued

- Selecting a transmission clock frequency from the PG-FP3 (Flashpro clock)
  If [In Flashpro] has been selected when a CPU clock source is being entered, select the clock the PG-FP3 transmits from the frequencies listed below. Different devices provide different operating frequency ranges for the target microcontroller. Select the correct frequency by referring to the manual for the device.

  - 16.0 MHz
  - 8.0 MHz
  - 4.0 MHz
  - 2.0 MHz

  Caution   When the set frequency is changed, execute the [Other-Status] command to check the contents displayed in the log window.

- Setting a multiple for the operating clock (Multiple Rate)
  If the target has a multiplier circuit and operation will be performed in multiple mode, enter a multiple. Usually, this parameter is set to 01.00. To operate in multiple mode, enter a multiple.

  Example To operate in ×5 mode   Enter 05.00.

- AREA setting range
★   In AREA mode, set an area range. In this mode, the [Area] button at the right of the TYPE setting screen becomes active. When this button is clicked, the dialog box below opens. Enter the area range to be used and click the [OK] button. The area range will be set.

  Area: Number of device areas
                     (automatically set)
  Area Number: Selected areas
                     (set by user)
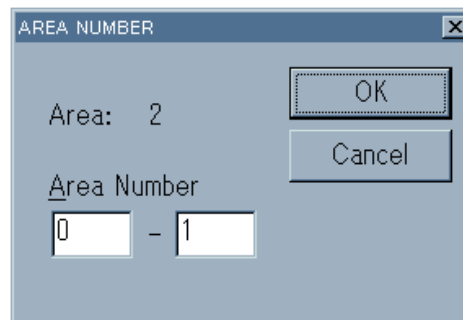
For example, if the area range is specified as 0 to 2 for erasure, Area 0, Area 1, and Area 2 are erased. To specify only one area, enter the same value as the start area and end area.

★   **Caution   To set an area, you must set AREA mode by clicking the CHIP/AREA button in the FLASHPRO3 window or by executing [set Area].**
       For information on changing the mode, see Section 5.3.6.

Phase-out/Discontinued

5.2.3 Voltage

[Voltage] sets the voltage at which the target operates. V_{DD} and V_{PP} voltages differ depending on the device. The V_{DD} and V_{PP} voltages are automatically set by loading the parameter file. However, some devices operate on two supply voltages, and in this case, the default voltage is automatically set. Change this voltage value, if necessary, depending on the operating conditions. For information on changing the voltage value, refer to the manual for the device.

When [Voltage...] is selected from [Setting...] on the menu bar, the dialog box below opens. Enter a voltage and click the [OK] button. The entered voltage will be set.

Settable range
  V_{DD} voltage   1.8 to 6.0 V
★ V_{PP} voltage   2.7 to 12.0 V

Phase-out/Discontinued
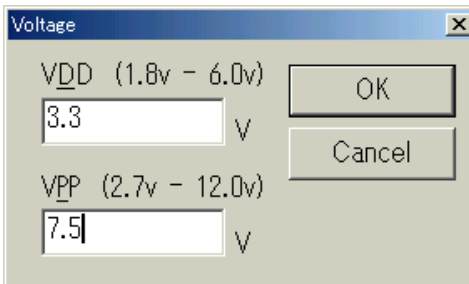
5.2.4 Option

[Option] sets detailed conditions for each device, such as erase time, write time, and convergence time. These conditions are set to the default values when the parameter file is loaded. Unless otherwise specified, use the default values. If incorrect values are specified, the service life of the device may be shortened or the device may be damaged.

Click [Options...] on the [Setting] pull-down menu. The dialog box below will open. Change the parameter setting in this dialog box and click the [OK] button. The setting will be changed.

★
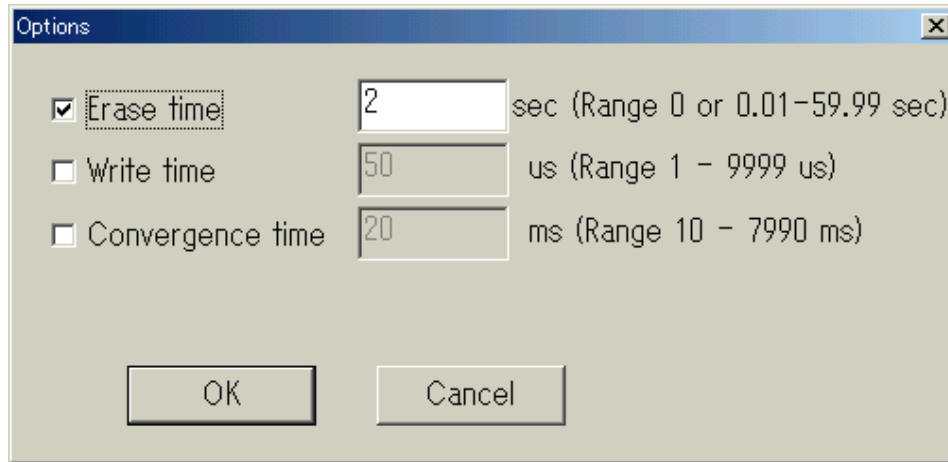
Erase time[Note]:   Sets the erase time for the device.
                                         If 0 second is set, erasure processing is not performed.
Write time: Sets the write time for the device.
Convergence time[Note]:   Sets the time of the function that prevents excessive erasing of the device.

★   **Note** For the EEPROM microcontroller, these items are disabled because the [Erase] command cannot be used.

5.2.5 Reset

[Reset] restarts the PG-FP3 system. The PG-FP3 must be restarted if you want to check the firmware version, or if the system has failed.

Execute this command by selecting [Reset] from the [Setting] pull-down menu. If the PG-FP3 is restarted correctly, an LED on the PG-FP3 blinks and then LEDs ERASE, PROGRAM, and VERIFY light. The firmware version is then displayed in the log window at the lower left of the screen.

★ **5.2.6 Connection Port**

The [Connection Port] command sets a port for communication with the PG-FP3. This command is used to change the baud rate or communication port of the host when RS-232-C is used.

Click [Connection Port] on the [Setting] pull-down menu to execute this command. When the command is executed, the following dialog box opens, allowing you to set a communication port.
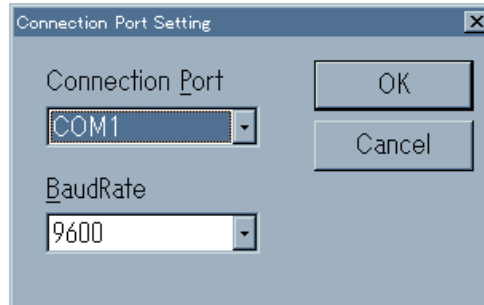
If a wrong port was specified when FLASHPRO3 started, the error dialog box below is displayed. If this dialog box is displayed, check the communication setting, and correct as necessary.
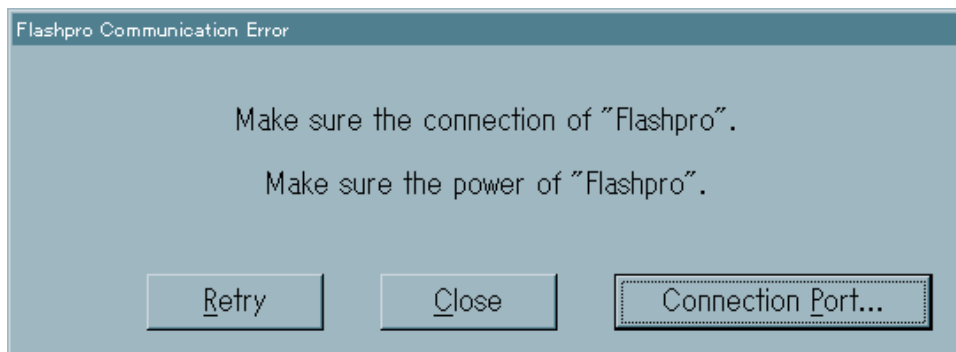
When [Connection Port...] in the dialog box is clicked, a dialog box for port setting opens.

5.3 Procedure

When [Procedure] is clicked, the pull-down menu shown below is displayed. This menu lists commands that manipulate the target by erasing, programming, or verifying the target.

Download HEX Ctrl+D
Blank Check
Erase
Program
Verify
E.P.V.(A)   Ctrl+A
Block Set   Ctrl+N
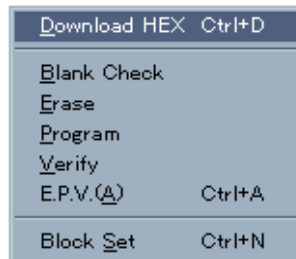
5.3.1 Download HEX

[Download HEX] downloads the user program loaded into FLASHPRO3 with [Load File] to the PG-FP3. The progress of downloading is displayed in the log window. While downloading is in progress, the LOAD LED of the PG-FP3 blinks.

Execute this command by selecting [Download HEX] from the [Procedure] pull-down menu or by clicking the **Down Load** button on the operation screen.

★   When the user program has been completely downloaded, the checksum is displayed in the log window. The checksum function simply adds data starting from address 0H and ending at the 64-K boundary including the ROM area of the target device. Then, it displays lower 4 digits of the result.

When the user program has been completely downloaded, the buttons such as [Program] and [Verify], which could not be executed at startup, become active and are ready to be executed.

★

Phase-out/Discontinued
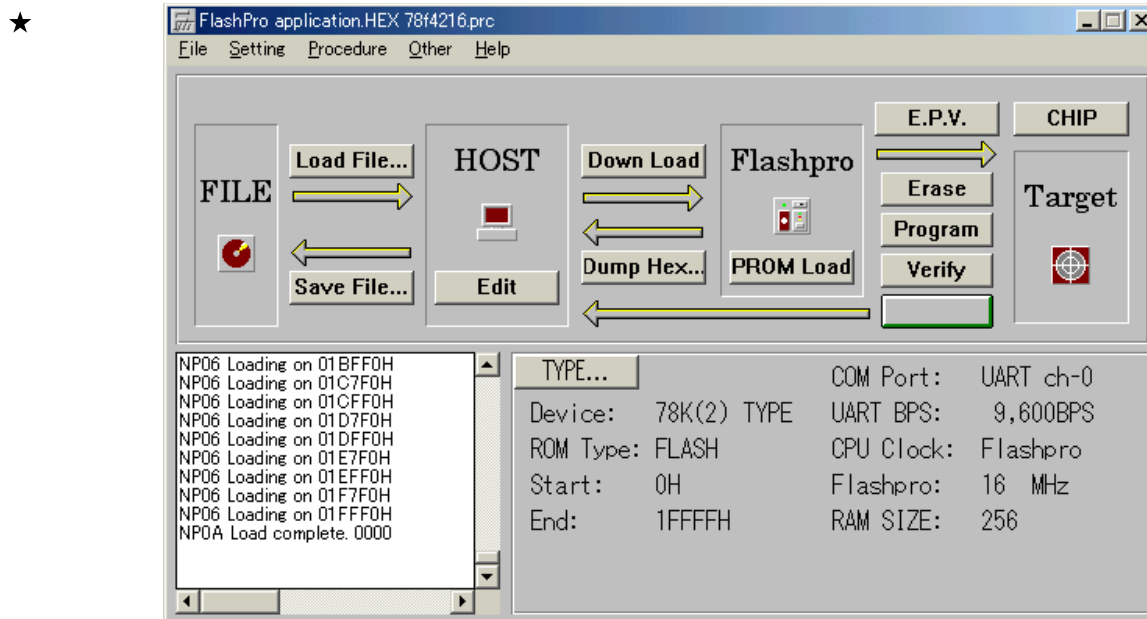
★ **5.3.2 Erase**

The [Erase] command makes a blank check. If the result is OK, the processing is ended. If not, the [Erase] command erases the flash memory. Use this command to keep the device with the flash memory erased. To program the flash memory erased by this command, use the [Program] command. A device that has been just delivered to you is blank and can be programmed without having to be erased.

Execute this command by selecting [Erase] from the [Procedure] pull-down menu or by clicking the [Erase] button on the operation screen.

While the device is being erased, the progress of erasure is displayed in the log window, and the ERASE LED of the PG-FP3 blinks.

> **Cautions 1. The typical erase time is set as specified in the parameter file. Do not change the value set as the erase time except in special circumstances, since the device may be damaged if it is changed. If the target device is erased repeatedly, further erasing may become difficult, and a longer erase time may be required.**
> **2. For the EEPROM microcontroller, the [Erase] command cannot be used.**

The [Erase] command makes a blank check before erasing a device.
When the [Erase] command is executed, if the device has already been blank, the device is not erased.

When a device has already been blank, the following messages are displayed in the log window (they are updated every second if the processing continues more than one second).

```
NP2F Blank checking now… xxs
NP0D Blank Check… OK.
NP0E Wait a moment, please.
NP1C Pre-Erase Device.
```

When a device is not blank, the following messages are displayed and the device is erased.

```
NP2F Blank checking now… xxs
NP3D Blank Check.. Failed
NP18 Erase setting xxxs
NP1A Erase setting OK.
NP30 ROM Erasing now… xxxs……
```

- If erasure is completed normally

```
NP0E ROM Erase... OK.
```

In AREA mode, this message is displayed.

```
NP1C ROM Erase… OK AREA x
```

- If erasure is not successful

```
ER13 ROM Erase... Failed.
```

In AREA mode, this message is displayed.

```
ER5C ROM Erase… Failed. AREA
```

Phase-out/Discontinued

5.3.3 Program

The [Program] command writes the data sent from the writer into the flash memory. Then, the command verifies whether the write level is secured. Use this command when writing a delivered device for the first time or when writing a microcontroller kept with its flash memory erased. To execute [Program], be sure to download the user program to the PG-FP3. Unless a program is downloaded, the [Program] command cannot be executed.

Execute this command by selecting [Program] from the [Procedure] pull-down menu or by clicking the [Program] button on the operation screen.

While a program is being written, the progress is displayed in the log window, and the PROGRAM LED on the PG-FP3 blinks.

★ **Caution   The address range in which a program can be written differs depending on the currently set mode (CHIP or AREA) and the setting conditions.**

While a program is being written, the following messages are displayed in the log window.

```
NP17 Programming 10%
NP17 Programming 20%
         :
NP17 Programming 100%
```

Caution   If the write time is too short, this message may not be displayed.

- If the result of writing is OK, the following message is displayed.

```
NP12 Program..OK.
```

- If an error occurs during writing, this message is displayed (the error message displayed depends on the condition).

```
ER14 Program.. Failed at xxxxxH
ER15 Cannot Program
```

When the device has been correctly written to, the data is verified.

Phase-out/Discontinued

The verification is made in either of the following two methods. The PG-FP3 automatically executes the verification in the method that matches the target device.

<1> Re-sends the written data from the PG-FP3 and verifies the data written in the flash memory against the re-sent data.

```
NP13 Verifying 010 %
NP13 Verifying 020 %
NP13 Verifying 030 %
NP13 Verifying 040 %
NP13 Verifying 050 %
NP13 Verifying 060 %
NP13 Verifying 070 %
NP13 Verifying 080 %
NP13 Verifying 090 %
NP13 Verifying 100 %
NP14 Verify..OK
```

<2> Reads the data programmed in the flash memory, changing the read level, and verifies the data.

```
NP13 Verifying 01s
NP13 Verifying 02s
NP13 Verifying 03s
        :
NP14 Verify..OK
```

If the result of verification is OK, the program has been written correctly.

Phase-out/Discontinued

★ **5.3.4 Verify**

The [Verify] command sends the written data from the PG-FP3 and verifies the data written in the flash memory against the sent data.

This command does not check the write level. Use this command to check whether data communication between the PG-FP3 and the microcontroller with flash memory has been normally performed.

Execute this command by selecting [Verify] from the [Procedure] pull-down menu or by clicking the [Verify] button on the operation screen.

All the data loaded into the memory of the PG-FP3 is verified against the data of the target device. If an area is specified, the data is verified in area units.

This command is usually used to check to see if data has been correctly written after programming.
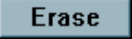
While verification is being executed, the progress is displayed in the log window, and the VERIFY LED on the PG-FP3 blinks.

The following messages are displayed in the log window during verification.

```
NP13 Verifying 10%
NP13 Verifying 20%
          :
NP13 Verifying 100%
```

Caution   If the verify time is too short, the above message may not be displayed.

- If the result of verification is OK

```
NP14 Verify... OK.
```

In AREA mode, this message is displayed.

```
NP1D Verify… OK. AREA x
```

- If verification fails

```
ER16 Verify.. Failed at xxxxxxH
ER17 Verify error.
```

In AREA mode, this message is displayed (the error message displayed depends on the condition).

```
ER16 Verify… Failed at xxxxxxH
ER5D Verify error.. AREA x
```

Phase-out/Discontinued

★　　**5.3.5 E.P.V.**

The [E.P.V.] command makes a blank check. If the result is OK, the [Program] command is executed. If not, the [Erase] command and [Program] command are executed in that order.

When writing a delivered device for a second or subsequent time, use this command.

If the user does not know whether the device has been erased, use this command to write the device.

Execute this command by selecting [E.P.V.] from the [Procedure] pull-down menu or by clicking the E.P.V. button on the operation screen.

While the command is being executed, the progress is displayed in the log window. At the same time, the ERASE, PROGRAM, and VERIFY LEDs on the PG-FP3 light and the LED corresponding the command currently being executed blinks.

The display in the log window is the same as that for each individual command.

The address range during command execution depends on the currently set mode (CHIP or AREA) and the range setting condition. In CHIP mode, the E.P.V. command is executed for the entire space on the target. In the AREA mode, the E.P.V. command is executed only for the specified address range. When executing [E.P.V.] in a mode other than CHIP, therefore, you must specify an address range.

[Verify] of the E.P.V command checks the level of written data but it does not check a communication error between the flash programmer and a device. Therefore, to check whether data communication between them has been performed normally, execute the separate [Verify] command after the E.P.V command is executed.

Cautions 1. Avoid using this command for the device erased by the [Erase] command. The blank check level of the [E.P.V.] command is the same as that of the [Erase] command. Even if the device has been erased, the blank check by this command would detect an error, owing to voltage fluctuations in operation. If this occurs, the device would be erased again.

2. For the EEPROM microcontroller, the [E.P.V] command cannot be used.

★　　**5.3.6 Chip set/Area set**

[Chip set/Area set] selects an operating mode. The display for the command changes depending on the condition of the current mode.

Some devices do not have the AREA mode. Any mode not available to the device is not displayed.

The following explanation assumes that a device with both modes (CHIP and AREA) is being used. Execution of a command is always started in CHIP mode, and the mode changes as follows each time a command has been executed.

CHIP → AREA → CHIP …

At the same time, the command display and the button display on the operation screen change.

Before executing the [Chip set/Area set] command, load the parameter file. Before executing the command, check that the target device is connected. When the command is executed, the application addresses the device according to the parameter file information and device signature information.

If the parameter file is not loaded or if the target device is not connected, correct addressing may not be performed, resulting in a malfunction.

Execute this command to change the mode by selecting [Chip set/Area set] from the [Procedure] pull-down menu or by clicking the CHIP or AREA button on the operation screen.

★ **Figure 5-2. AREA Mode Screen**
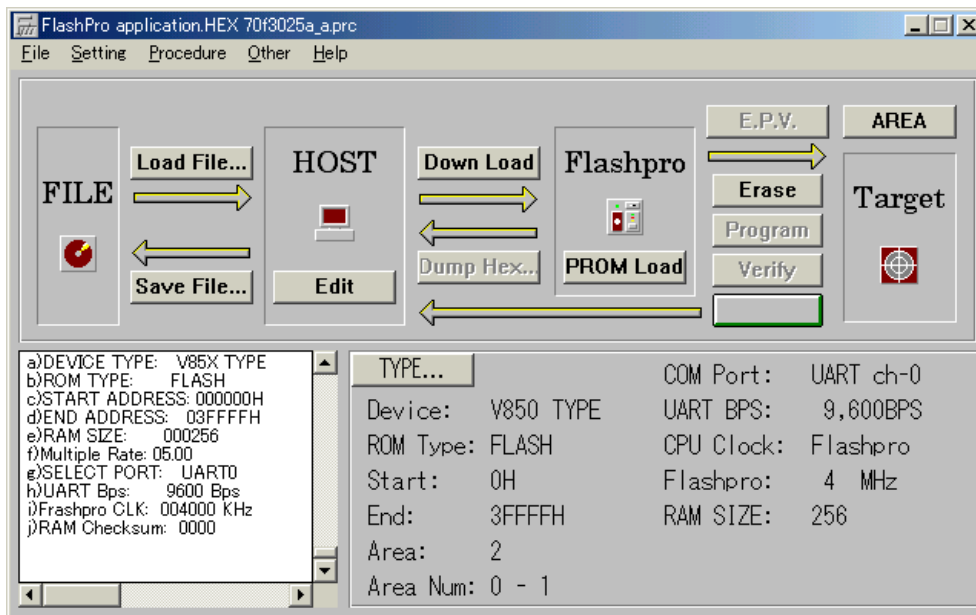
5.4 Other

When [Other] is clicked, the pull-down menu shown below is displayed. This menu mostly lists ancillary function commands.

```
Signature
Status
Dump HEX      Ctrl+H
Supply Status
PROM Load
```
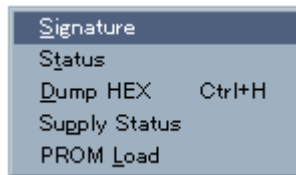
5.4.1 Signature

The [Signature] command reads the signature information of the target device.

Execute this command by selecting [Signature] from the [Other] pull-down menu. When it is executed, the signature information is displayed in the log window as shown below.

The figure shown below shows an example of executing a μPD75F4264 command.

```
NP26 *** SIGNATURE ***

Vendor code  = 10H
ID code       = 7FH
Electrical Inf.  = 41H
Last Address  = 000FFFH
Device name  = D75F4264
NP2D Signature END
```

5.4.2 Status

[Status] displays the TYPE information currently set for the PG-FP3 in the log window. This command is used to check if the current PG-FP3 settings are correct or if the current settings are set for the PG-FP3.

Execute this command by selecting [Status] from the [Other] pull-down menu.

The following information is displayed in the log window:

- Device Type
- ROM Type
- Start Address
- End Address
- RAM Size
- Multiple Rate
- Select Port
- SIO Clock/UART bps
- Flashpro Clock/Target Clock
★   - RAM Checksum

★**5.4.3 Dump HEX**

[Dump HEX] uploads the user program stored on the PG-FP3 to FLASHPRO3 (host side). The uploaded data can be checked by using the [Edit] command.

Execute this command by selecting [Dump HEX] from the [Other] pull-down menu or by clicking the **Dump Hex...** button on the operation screen. When this command is executed, the following dialog box opens, and the addresses to which the program is to be uploaded can be specified.

Edit data outside the specified range is FFH.
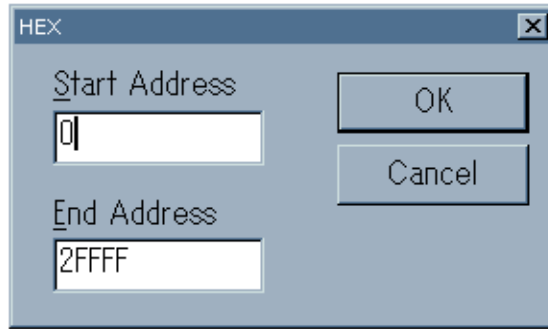
- About [Edit]

[Edit] is used to check the data loaded into or uploaded to FLASHPRO3. The displayed data can be also edited.

Execute this command by clicking the **Edit** button on the operation screen.

When the command is executed, the following window opens and data can be listed or edited.

Figure 5-3. Editor Screen

Phase-out/Discontinued
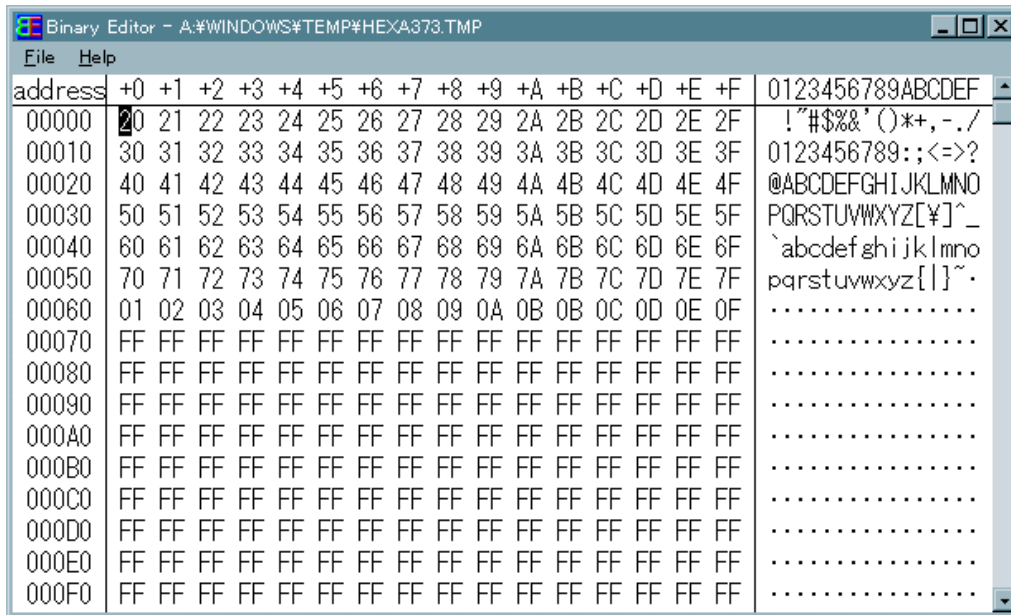
When [Edit] has been used to edit data and [Exit] is selected from the [File] pull-down menu, the following message is displayed.

To cancel the edited data in the FLASHPRO3 buffer, click the [OK] button.

To save the edited data in the FLASHPRO3 buffer, click the [Cancel] button, then select [Commit] from the [File] pull-down menu. The following dialog box is displayed.
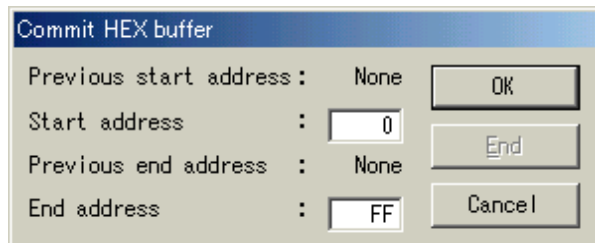
In this dialog box, enter addresses in the Start address and End address fields within which the edited data is to be saved, and click the [OK] button.

Repeating this enables data to be stored in different areas of the buffer[Note].

When data has been stored, click [End].

Note When data is divided and stored in different areas of the FLASHPRO3, the data at the addresses where the divided data is not stored are initialized to FFH.

5.4.4 Supply Status

The [Supply Status] command checks the status of the target power supply (V_{DD}). When this command is executed, the status of the target is displayed in the log window.

Execute this command by selecting [Supply Status] from the [Other] pull-down menu.

Use this command to check the status of the target when the target power supply is used, as when data is written on-board.

5.4.5 PROM Load

[PROM Load] downloads data from the master ROM mounted in the master ROM socket of the PG-FP3. Usually, the master ROM is a function that allows you to download the user program when only the PG-FP3 is used. However, data can be also downloaded by using the master ROM from FLASHPRO3.

Execute this command by selecting [PROM Load] from the [Other] pull-down menu or by clicking the PROM Load button on the operation screen.

It is assumed that a general EPROM is used as the master ROM. For details on the master ROM socket, see **Section 7.2**. The master ROM command reads the signature of the mounted ROM before the master ROM is downloaded in order to check if the ROM is usable or if the ROM is correctly mounted. If the ROM on the master ROM socket is not supported by the PG-FP3, the dialog box below is displayed. If this happens, replace the ROM with the one supported by the PG-FP3.
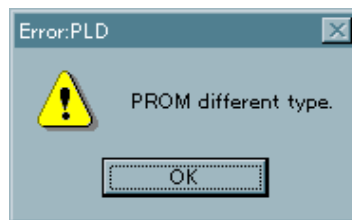
While the master ROM is being accessed, the ACCESS LED lights. Do not remove the ROM while this LED is lit.

5.5 Help

When [Help] is clicked, the pull-down menu shown below is displayed. This menu lists the commands that open the help file or check the version of FLASHPRO3.
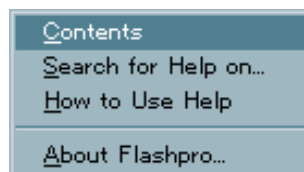
The functions of these commands are as follows:

- Contents................................. Displays the table of contents of the help file.

- Search for Help on keyword ... Searches for information based on a keyword.

- How to Use Help .... Displays information of using the help file.

- About Flashpro3..................... Displays the version information for FLASHPRO3.

CHAPTER 6 STAND-ALONE FUNCTION

The stand-alone function erases, programs, or verifies data with the PG-FP3 alone, without the use of a host. This function is used on a production line when the application system is mass-produced, or used to upgrade a customer's version.

6.1 FUNCTION

The commands that can be executed in stand-alone mode are as follows:

- Program command
- Erase command
- Verify command
- E.P.V. command
- PROM Load command

These commands are selected with the PG-FP3 MODE key. The command currently selected can be identified by an LED on the PG-FP3. Execute the selected command by pressing the ENTER key. The command is set in the command mode specified by [E.P.V.] when the PG-FP3 is started. The command mode changes as follows each time the MODE key has been pressed:

E.P.V. → Erase → Program → Verify → PROM Load → E.P.V. …

While a command is being executed, the LED corresponding to the command blinks.

Cautions 1. Loading the parameter file and setting the TYPE in stand-alone mode must be performed in advance by the host via FLASHPRO3. The information set using FLASHPRO3 is used as the target setting information recorded in the PG-FP3 in stand-alone mode.

★   **2. In stand-alone mode, the checksum of the data downloaded from PROM cannot be checked. Therefore Execute Verify to check against the master device and see whether data has been normally downloaded.**

Phase-out/Discontinued

6.2 OPERATION

The PG-FP3 can execute the E.P.V., Erase, Program, Verify, and PROM Load commands in stand-alone mode. For processing and using the commands, see **Chapter 5**.

In stand-alone mode, it is not necessary to connect to a host. However, a parameter file must be loaded from the host and TYPE setting must be performed by the host in advance.

- Selecting the command mode
  When power is turned on, E.P.V. mode is set. The mode changes as follows each time the MODE key is pressed:

  | E.P.V. → Erase → Program → Verify → PROM Load → E.P.V. … |

Photo 6-1. Selecting the Command Mode
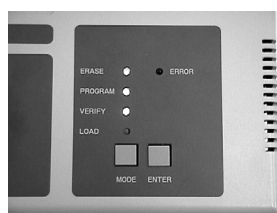
E.P.V. command mode
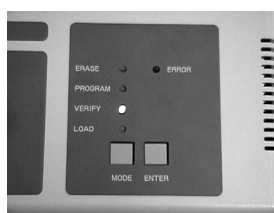
Verify command mode
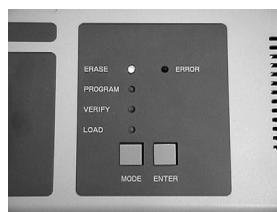
Erase command mode
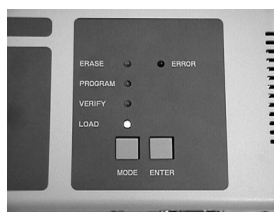
PROM Load command mode
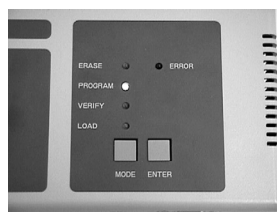
Program command mode

- Executing a command
★   To execute the currently selected command, press the ENTER key. While the command is being executed, an LED indicating the mode blinks.

> **Caution   In stand-alone mode, executing E.P.V., Program, and Verify without first executing PROM Load causes the ERROR lamp to blink, to prevent data from being written mistakenly.**

CHAPTER 7 HARDWARE SPECIFICATIONS

7.1 PRODUCT CONFIGURATION AND OPERATING ENVIRONMENT

Table 7-1. Product Configuration and Operating Environment

Item	Specification
Power supply[Note]	9.0 V, 2.0 A (AC adapter input, plug: 5.5 DIA, center: "+")
Power consumption	Maximum value: Approx. 15 W
Dimensions	$205 \times 117 \times 32$ mm (excluding projections)
Weight	470 g (main unit only)
Operating environment	Temperature: 0 to +40 °C Humidity: 35% to 85% (without condensation)
Storage environment	Temperature: -5 to +45 °C Humidity: 10% to 90% (without condensation)

Note   Do not use any power supply other than the AC adapter supplied as an accessory.

7.2 MASTER ROM SOCKET SPECIFICATIONS

- Usage
  Mount the master ROM, which downloads the user program, in the 32-pin socket on the top of the PG-FP3.

Photo 7-1. Mounting the Master ROM
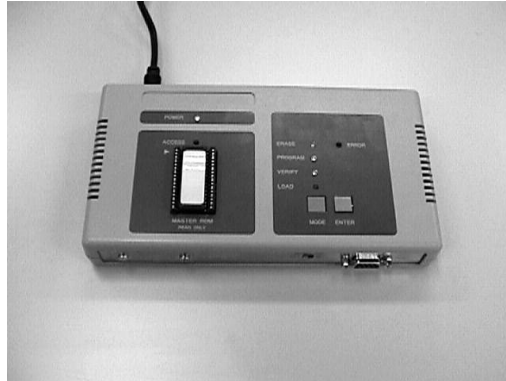
Mount the PROM to which a program has been written in the master ROM socket and execute from the FLASHPRO3 the command that downloads data from the master ROM. The data can be also downloaded from the master ROM by pressing the MODE key on the PG-FP3 to set LOAD mode (the LOAD LED lights) and then pressing the ENTER key.

[Operation from the FLASHPRO3]
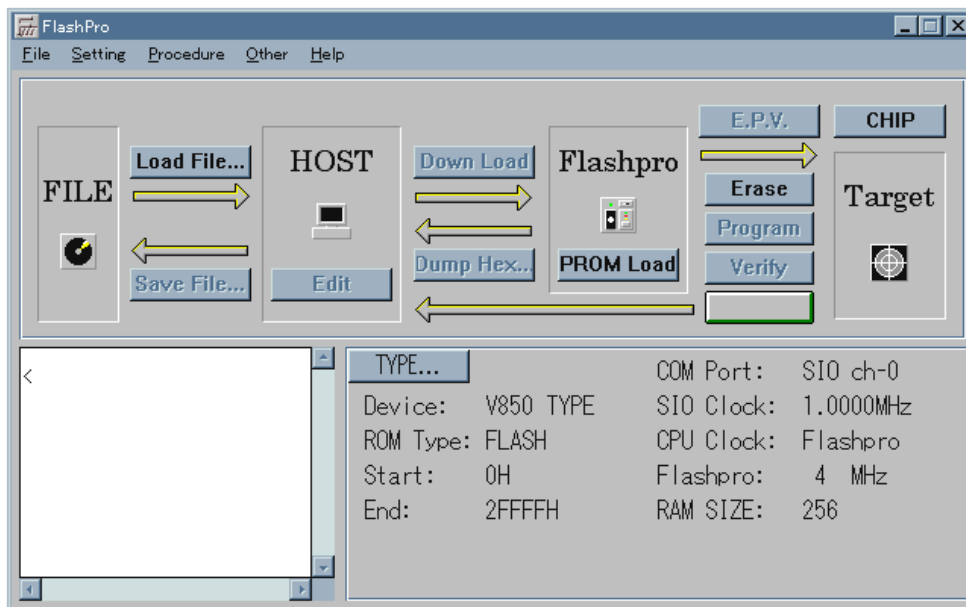
Either click the [PROM Load] button on the screen, or execute the [PROM Load] command from [Procedure].

Phase-out/Discontinued

[Operation from PG-FP3]

Mount the PROM in the master ROM socket of the PG-FP3.

Photo 7-2. Mounting the PROM in the Master ROM Socket
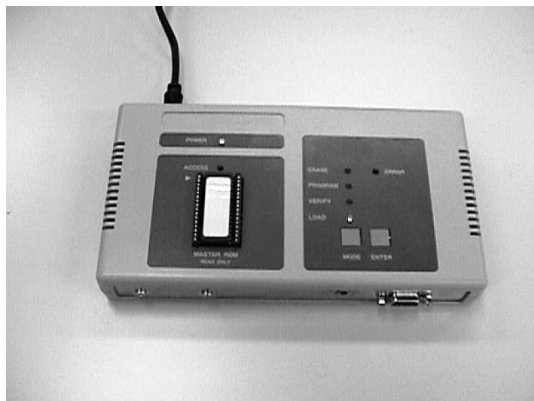
Press the MODE key. Make sure that only the LOAD LED lights (LOAD mode).

In LOAD mode, press the ENTER key. The [PROM Load] command will be executed.

Photo 7-3. Executing the [PROM Load] Command
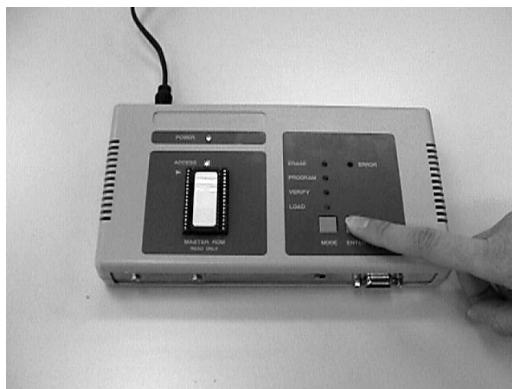
While the master ROM is being accessed, the ACCESS LED lights. Do not remove the PROM from the master ROM while this LED is lit; otherwise, the PG-FP3 and PROM may be damaged.

If an error message is displayed while the [PROM Load] command is being executed, read the message, and take corrective measures by seeing **Chapter 8**. Only the ERROR LED lights if the PG-FP3 is used in stand-alone mode. Check for any damage, and check the mounting direction and the type of the PROM in the case. For a usable PROM, see "Supported ROM specifications" on the next page.

- Supported ROM specifications

  Only an EPROM with 32 or fewer pins and the pin configuration shown below can be used as the master ROM. When the master ROM is accessed, the signature of the PROM is read to check whether the PROM is supported. If the signature cannot be correctly read, replace the PROM with a compatible PROM of another make.

  An attempt to download a program from the master ROM socket by using a product other than a PROM or a jig may damage the ROM socket. Never make such an attempt.

  The following is pin configuration.

Figure 7-1. Pin Configuration (Top View)


```
A19 [      ] Vcc
A16 [      ] A18
A15 [      ] A17
A12 [      ] A14
 A7 [      ] A13
 A6 [      ] A8
 A5 [      ] A9
 A4 [      ] A11
 A3 [      ] _OE
 A2 [      ] A10
 A1 [      ] _CE
 A0 [      ] D7
 D0 [      ] D6
 D1 [      ] D5
 D2 [      ] D4
Vss [      ] D3
```
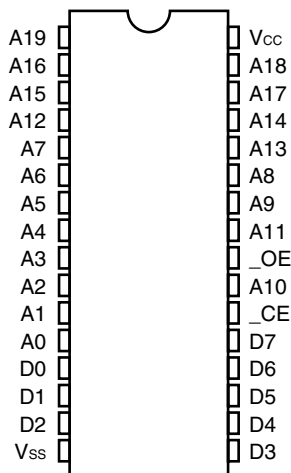
Table 7-2. Pin List

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	A19[Note]	9	A3	17	D3	25	A11
2	A16	10	A2	18	D4	26	A9
3	A15	11	A1	19	D5	27	A8
4	A12	12	A0	20	D6	28	A13
5	A7	13	D0	21	D7	29	A14
6	A6	14	D1	22	_CE	30	A17
7	A5	15	D2	23	A10	31	A18[Note]
8	A4	16	Vss (GND)	24	_OE	32	Vcc

Note The pin list shown in Table 7-2 is for a 1-Mbyte model. A19 and A18 of the 512-Kbyte and 256-Kbyte models are NC.

Phase-out/Discontinued

★   **7.3 HOST INTERFACE**

Use the RS-232-C interface as the host interface.

Set the HOST I/F SELECT switch to the RS-232-C position before turning on power to the PG-FP3.

The specifications of the RS-232-C interface are as follows:

Table 7-3. RS-232-C Interface Specifications

★

Item	Specification
Interface connector	D-SUB 25-pin (receptacle) standard: RDEF-9S-LNA, manufacturer: Hirose
Connection	Connected to host with straight cable
Baud rate	9600, 19200, 38400, or 57600 bps
Communication settings	Data: 8 bits Stop bit: 2 bits Parity bit: None Flow control: None

If the RS-232-C interface is selected when the PG-FP3 starts, the default baud rate of 9600 bps is set.   Unless the baud rate of the application is also 9600 bps on startup, the PG-FP3 cannot connect to the host, possibly causing the Connection Port error dialog box to open. If this happens, correct the setting.

Figure 7-2. Communication Error Dialog Box
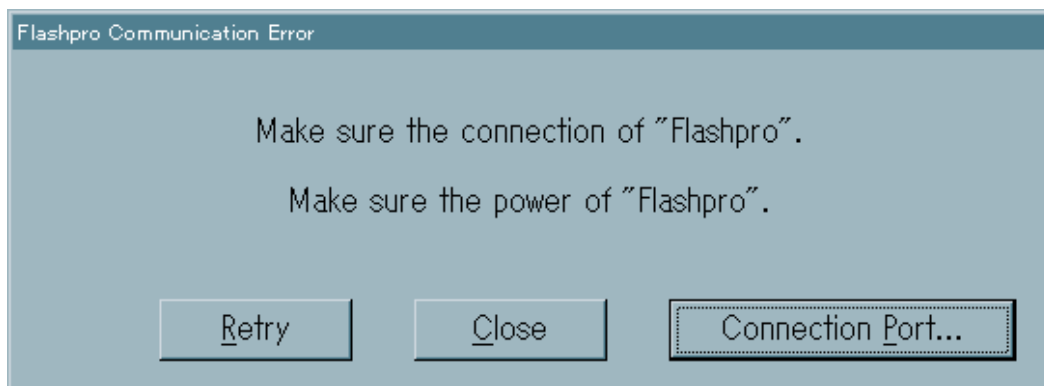
If communication is not performed correctly, the Connection Port and communication settings are probably wrong. Check the settings. For information on performing communication settings, refer to the Windows manual.

The interface connector specifications and interface cable specifications are given on the next page.

[Pin layout]

Pin	Signal Name	IN/OUT	Specification
1	GND	–	Common signal line
2	RxD	IN	Serial data input
3	TxD	OUT	Serial data output
4	CS	IN	Data control signal input
5	RS	OUT	Data control signal output
6	DSR	OUT	Data control signal output (not used)
7	GND	–	Common signal line
8	DCD	OUT	Data control signal output (not used)
9	NC	–	
10	NC	–	
11	NC	–	
12	NC	–	
13	NC	–	
14	NC	–	
15	NC	–	
16	NC	–	
17	NC	–	
18	NC	–	
19	NC	–	
20	DTR	IN	Data control signal input (not used)
21	NC	–	
22	NC	–	
23	NC	–	
24	NC	–	
25	NC	–	

Phase-out/Discontinued

[Cable specifications]

Item	Specification	Connection		
PC/AT or compatible machine, PC98-NX cable	PG-FP3 side connector 　　　　: D-SUB 25-pin (plug) Host side connector 　　　　: D-SUB 9-pin (receptacle) Connection : Straight	D-SUB 25-pin		D-SUB 9-pin
		2	–	3
		3	–	2
		4	–	7
		5	–	8
		6	–	6
		7	–	5
		8	–	1
		20	–	4
		22	–	9
PC-9800 cable	PG-FP3 side connector 　　　　: D-SUB 25-pin (plug) Host side connector 　　　　: D-SUB 25-pin (plug) Connection : Straight	D-SUB 25-pin		D-SUB 9-pin
		1	–	1
		2	–	2
		3	–	3
		4	–	4
		5	–	5
		6	–	6
		7	–	7
		8	–	8
		20	–	20
		22	–	22

7.4 TARGET INTERFACE SPECIFICATIONS

The target interface has signals such as GND, SI, SO, SCK, CLK, _RESET, V_{DD}, V_{PP}, and HS. These signals are used to connect the target. For the information on the required signal lines, refer to the user's manual for each device.

The PG-FP3 comes with two types of cables that can be used to connect the target. Use of these cables is recommended.

The target interface is provided with a protection circuit that protects the PG-FP3 from damage due to input of an overvoltage from an external source. This protection circuit disconnects from the target a signal line that may cause damage if a signal line with a voltage higher than the rated voltage is connected to the interface by mistake. The circuit also informs the user of the abnormal condition. If an abnormal condition is detected, check whether the interface is correctly connected and whether the target is normal. The overvoltage level each signal line of the interface can withstand is shown below. If a voltage exceeding this level is applied to a signal line, the PG-FP3 may be damaged.

Table 7-4. Withstand Voltage of Each Interface Signal

Signal Name	Specification
SI, SO, SCK, CLK _RESET, V_{DD}	Normal maximum voltage level: 5.0 V Voltage level when an abnormal condition is detected: 6.0 to 15.0 V
V_{PP}	Normal maximum voltage level: 10.0 V Voltage level when an abnormal condition is detected: 11.0 to 15.0 V

Phase-out/Discontinued

7.4.1 Interface Specifications

Use the target interface connector to interface with the target.

Bear in mind the following points when connecting the target and designing the target board.

- Supply voltage and operating clock of target

  Basically, supply the power and operating clock to the microcontroller from the target board when programming its flash memory. Power can be also supplied from the PG-FP3, but **a current high enough to operate the entire target cannot be supplied**. In addition, the frequency of the clock that can be supplied from the PG-FP3 is limited to 16, 8, 4, and 2 MHz.

  When supplying power and a clock from the PG-FP3, use a dedicated writing adapter such as the FA adapter[Note]. The level of each interface signal is converted in the PG-FP3 at the operating voltage (V_{DD}). Therefore, even when the power supply (V_{DD}) on the user target is used, connect the V_{DD} line to the target. With a device using two supply voltages and requiring interface signals of different levels, output either of the voltage levels from the PG-FP3, and convert the level of the signal with the different signal level on the target.

- Signal conflict

  If an output from another device is connected to the serial interface pin and reset pin, a signal conflict or malfunction may occur. If this occurs, either isolate the connection with the other device, or make the output from the other device high impedance. Exercise care so that the target is not inadvertently reset during programming.

- Connection of serial port

  When programming flash memory using a UART or SIO, match the input/output of the SI and SO signals when connecting the SI (RxD) and SO (TxD) signals of the PG-FP3 to the SI (RxD) and SO (TxD) of the target.

PG-FP3 side		Microcontroller side
SI (RxD)	$\leftarrow \rightarrow$	SO (TxD)
SO (TxD)	$\leftarrow \rightarrow$	SI (RxD)

When interfacing with I^{2}C, the SI pin of the PG-FP3 serves as a SD (serial data) line. Therefore, connect the SCK and SI pin.

Note   The FA adapter is a product of Naito Densei Machida Mfg. Co., Ltd.

Phase-out/Discontinued

- PG-FP3 pins not wired

   Keep in mind the following points:

   - Open the CLK signal of the PG-FP3 to supply a clock to the microcontroller from the target.

   - Open the SCK signal when using a UART.

   - Open the SO signal when using I^{2}C.

   - Open the HS signal when **not using** SIO + handshaking.

   The pin configuration of the target interface connector and specifications of the interface cable are given below.

[Pin configuration]

Pin	Signal Name	IN/OUT	Specification
1	GND	–	Common signal
2	SI (RxD)	IN/OUT	Serial data I/O (3-wire, UART, I^{2}C)
3	SO (TxD)	OUT	Serial data output (3-wire, UART)
4	SCK	OUT	Serial clock output in 3-wire, I^{2}C mode
5	CLK	OUT	Clock output to target (Select 16, 8, 4, or 2 MHz.)
6	_RESET	OUT	RESET signal output to target (Low: RESET ON)
7	V_{DD}	IN/OUT	V_{DD} input/output to target (Select I/O with select switch.)
8	V_{PP}	OUT	V_{PP} output to target
9	HS	OUT	Handshaking signal output of 3-wire + handshaking communication

Phase-out/Discontinued
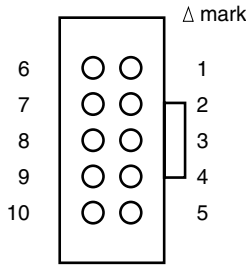
[Cable specifications]

Two types of target interface cables (IC clip type (TYPE 1) and connector type (TYPE 2)) are supplied. Use the appropriate cable for the situation.

If the supplied cables cannot be used because of the specifications of the target and the user prepares a cable, keep the cable length to within 40 cm and use materials with frequency characteristics equivalent to or better than those of the supplied cables.

Note, however, that an error may occur during communication and operation may not be performed correctly if a cable other than those supplied is used because communication rate is too high for the communication setting.

The following are the specifications for each cable.

Item	Specification	Connection	Remarks

TYPE 1	PG-FP3 side connector:
	    D-SUB 9-pin (plug)
	Standard: FDE-9P (05)
	Manufacturer: Hirose
	
	Target side connector:
	    IC clip (9 pcs)
		D-SUB IC clip
		Plug 9-pin (9 pcs)
		    1 --- GND (black)
		    2 --- SI (yellow)
		    3 --- SO (blue)
		    4 --- SCK (white)
		    5 --- CLK (green)
		    6 --- _RESET (green)
		    7 --- V_{DD} (red)
		    8 --- V_{PP} (green)
		    9 --- HS (green)	

TYPE 2	PG-FP3 side connector:
	    D-SUB 9-pin (plug)
	Standard: FDE-9P (05)
	Manufacturer: Hirose
	
	Target side connector:
	    FAS connector
	    10-pin (receptacle)
	Standard: FAS-1001-2101
	Manufacturer:
	    Yamaichi Electric
		D-SUB FAS connector
		Plug 9-pin Receptacle 10-pin
		    1 --- 1
		    2 --- 2
		    3 --- 3
		    4 --- 4
		    5 --- 5
		    6 --- 6
		    7 --- 7
		    8 --- 8
		    9 --- 9
		            10 (Open)
			△ mark
			
			6 ○ ○ 1
			7 ○ ○ 2
			8 ○ ○ 3
			9 ○ ○ 4
			10 ○ ○ 5
			
			(When viewed from socket)
			
			Pin configuration of FAS connector

★**7.4.2 Equivalent Circuit and Load Condition**

The interface equivalent circuit between the PG-FP3 and the target and the load condition that must be satisfied by the target are as follows:

- SI I/O pin
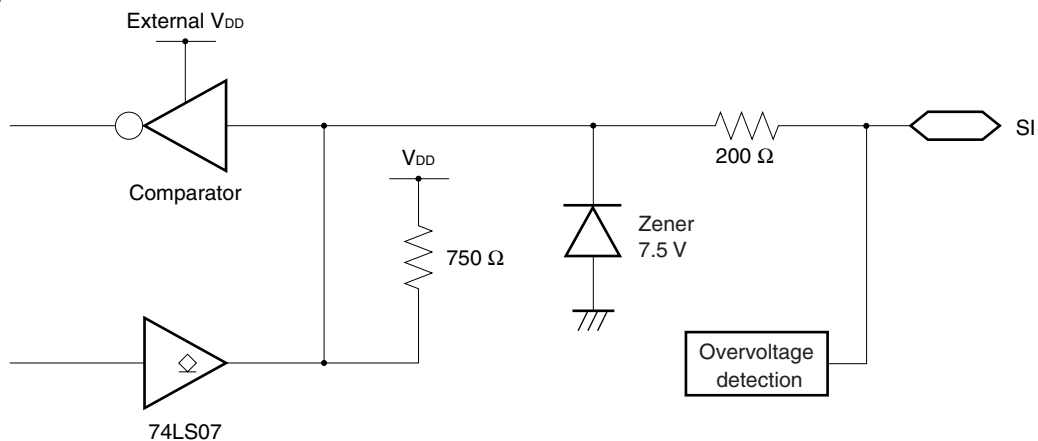
- SO and RESET output pins

- CLK output pin

- SCK I/O pin

External V$_{DD}$

Comparator

74LS07

V$_{DD}$

750 Ω

Zener
7.5 V

200 Ω

SCK

Overvoltage
detection

- HS input pin

External V$_{DD}$

External V$_{DD}$

750 Ω

Comparator

Zener
7.5 V

200 Ω

HS

Overvoltage
detection

- V$_{DD}$ I/O pin

External V$_{DD}$

V$_{DD}$ generation
circuit

Fuse
0.5 A

Relay

1 kΩ

1 MΩ

V$_{DD}$
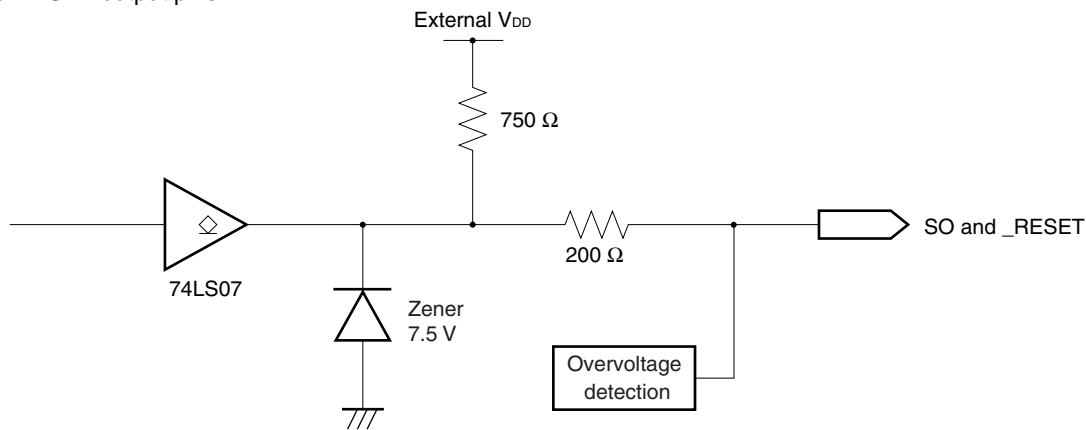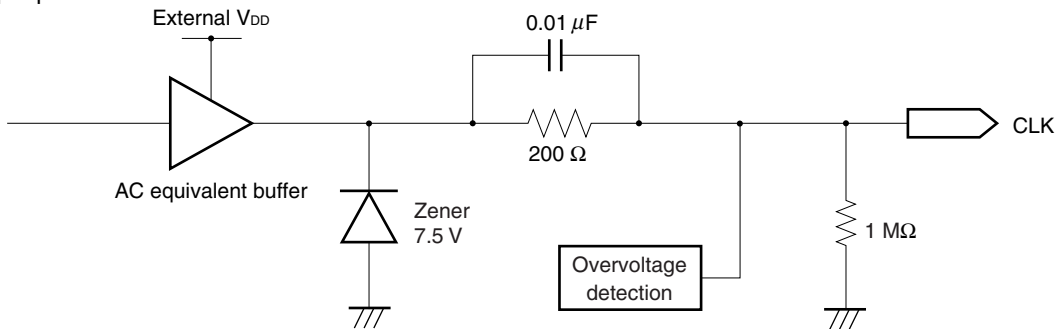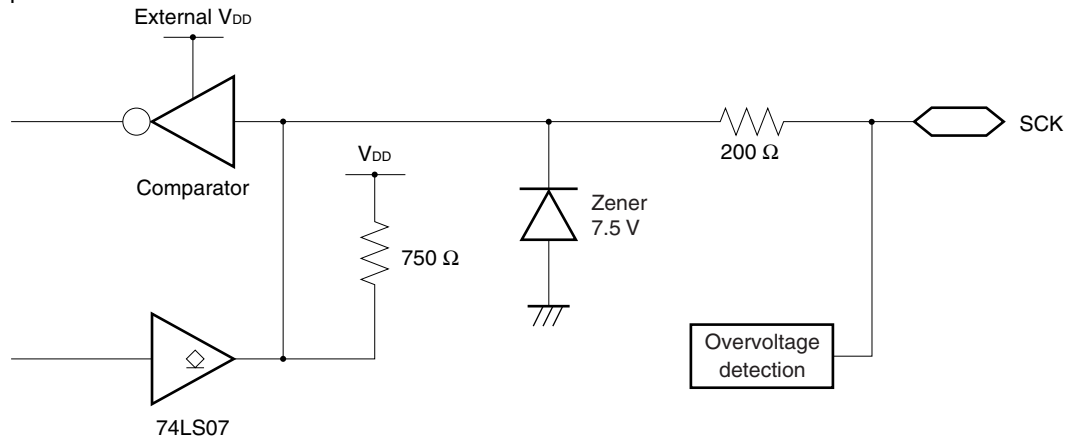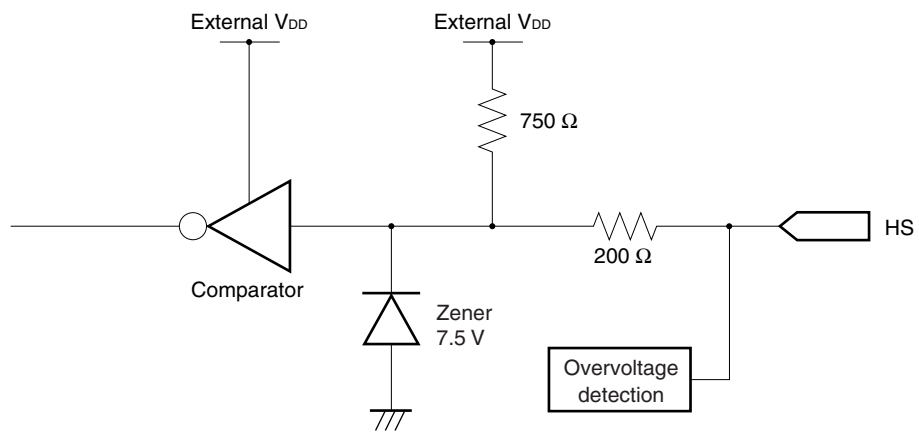
Overvoltage
detection
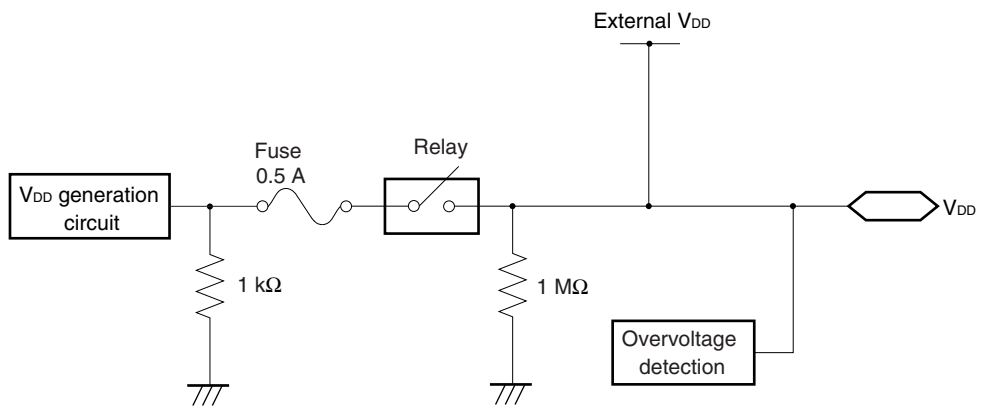
- V$_{PP}$ output pin

- Target load condition
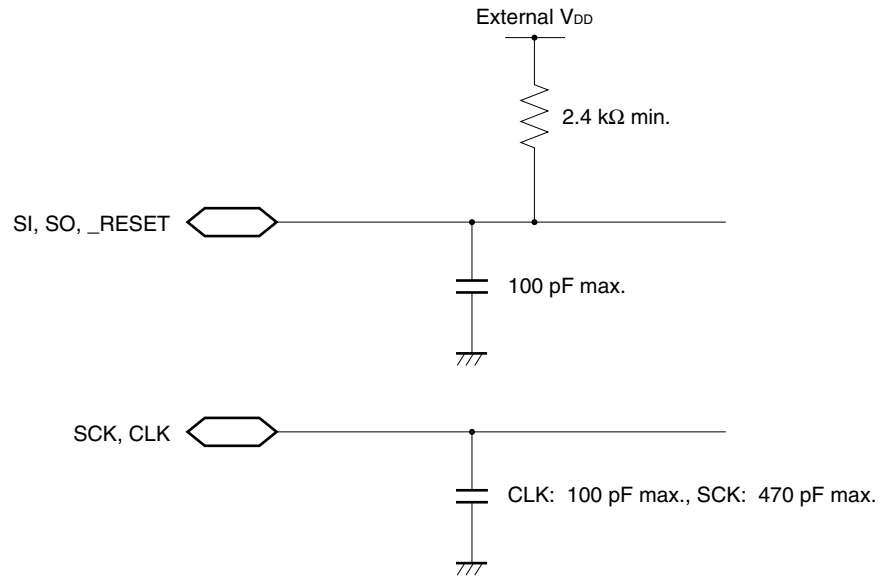
★ **CHAPTER 8 ERROR MESSAGES AND REMEDIAL ACTIONS**

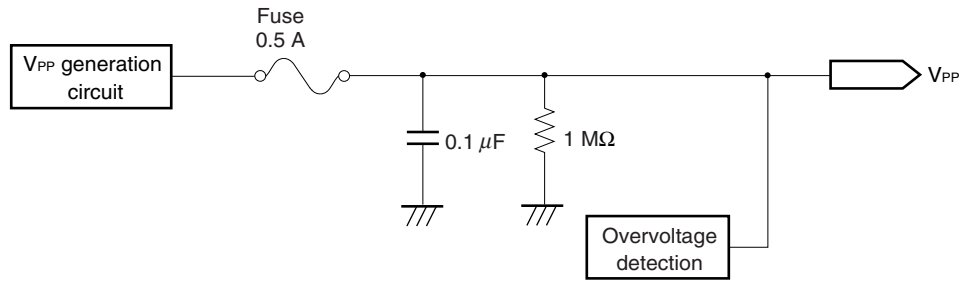| Error No.	Message	Cause/Action	
ER01	Illegal command.	Cause	Input of wrong command
		Action	Enter the correct command.
ER02	Illegal parameter.	Cause	Input of wrong parameter during command input
		Action	Enter the correct parameter.
ER03	Host is closed.	Cause	Incorrect interfacing with host machine
		Action	Check the connection between the PG-FP3 and the host.
ER04	Flash memory cannot read.	Cause	An attempt was made to read flash memory.
		Action	Flash memory cannot be read.
ER05	SYSTEM error.	Cause	PG-FP3 system error
		Action	The PG-FP3 may be damaged.
ER06	Intel HEX format error.	Cause	Intel HEX format cannot be recognized.
		Action	Check to see if the file is in Intel HEX format, and reload the file.
ER07	Check sum error	Cause	A checksum error was detected during loading.
		Action	Load the file again.
ER08	Target initialize error.	Cause	Initialization with the target microcontroller cannot be made.
		Action	Check to see if the target device was correctly set with the TYPE command.
ER09	Target no SIGNATURE.	Cause	The set target microcontroller has no signature.
		Action	Check to see if the target device was correctly set with TYPE setting.
ER0A	No EEPROM.	Cause	The set target microcontroller has no EEPROM.
		Action	Check to see if the target device was correctly set with TYPE setting (cannot be read).
ER0B	Target return error.	Cause	The target microcontroller is not normal.
		Action	Communication with the target device is not normal. Check to see if the correct communication rate was set with the TYPE command.
ER0C	Target status no return.	Cause	An error was detected during communication with the target device.
		Action	Check the connection with the target device again.
ER0D	SW STOP!!	Cause	Execution has been forcibly terminated with the Start/Stop switch.
		Action	Redo the processing from the beginning.
ER0E	No character.	Cause	An illegal character was detected in the displayed character string.
		Action	Turn off power to the PG-FP3 and then back on again.
ER10	EEPROM size over flow.	Cause	The size of the EEPROM exceeds 64 Kbytes.
		Action	Check the Start/End address in the TYPE setting.
ER11	ECC address error.	Cause	An incorrect ECC address was entered.
		Action	Check the entered ECC address and reexecute.
ER12	Blank check.. Failed	Cause	The target microcontroller is not blank.
		Action	Erase the target microcontroller with the Erase command.

Phase-out/Discontinued

Error No.	Message	Cause/Action	
ER13	ROM Erase.. Failed	Cause	The target microcontroller cannot be erased.
		Action	The microcontroller may be damaged.
ER14	Program.. Failed at XXXXXXH	Cause	A write error was detected at address XXXXXXH.
		Action	Erase the device with the Erase command and execute writing again.
ER15	Cannot program.	Cause	An error was detected during writing.
		Action	Erase the device with the Erase command and execute writing again.
ER16	Verify.. Failed at XXXXXXH	Cause	A verify error was detected at address XXXXXXH.
		Action	Erase the device with the Erase command and execute writing again.
ER17	Verify error.	Cause	An error was detected during verification.
		Action	Erase the device with the Erase command and execute writing again.
ER18	Erase Verify error.	Cause	Excessive erasing was detected.
		Action	The microcontroller may be damaged.
ER19	Device error.	Cause	Excessive erasing was detected.
		Action	The microcontroller may be damaged.
ER1A	SLAVE ADDRESS ERROR	Cause	I^2C communication error
		Action	Check the connection with the target system.
ER20	Cannot save TYP.	Cause	The TYPE settings cannot be saved to the PG-FP3.
		Action	The internal flash memory in the PG-FP3 may have been destroyed.
ER21	PROM different type.	Cause	The master ROM mounted in the socket is not supported.
		Action	Replace the master ROM with the one supported by the PG-FP3.
ER22	System flash error.	Cause	An abnormal condition was detected in the PG-FP3 memory.
		Action	The internal flash memory in the PG-FP3 may have been destroyed.
ER23	Flash time out error.	Cause	The memory in the PG-FP3 cannot be accessed.
		Action	The internal flash memory in the PG-FP3 may have been destroyed.
ER24	Cannot get TYPE data.	Cause	The data stored in flash memory cannot be read.
		Action	The internal flash memory in the PG-FP3 may have been destroyed.
ER26	Over run error.	Cause	An overrun error was detected during communication with the host machine.
		Action	Check the connection environment with the host machine.
ER27	Framing error.	Cause	A framing error was detected during communication with the host machine.
		Action	Check the connection environment with the host machine.
ER28	Parity error.	Cause	A parity error was detected during communication with the host machine.
		Action	Check the connection environment with the host machine.

Phase-out/Discontinued

Error No.	Message		Cause/Action
ER32	Cannot execute when ECC set.	Cause	An attempt was made to perform batch processing with a device with ECC memory.
		Action	Batch processing cannot be performed with a device with ECC memory.
ER33	ECC BLOCK address unknown.	Cause	An ECC memory address was not entered.
		Action	An ECC memory address was not entered correctly.
ER34	Unpacked BCD format error.	Cause	A value exceeding the range was specified.
		Action	The version of the PG-FP3 terminal software does not match.
ER35	Cannot get SLAVE address. (1 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER36	Cannot get SLAVE address. (9 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER37	Cannot get SLAVE address. (ACK)	Cause	I^2C communication error
		Action	Check the target microcontroller.
ER38	IIC WRITE error. (1 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER39	IIC WRITE error. (9 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER3A	IIC WRITE error. (ACK)	Cause	I^2C communication error
		Action	Check the target microcontroller.
ER3B	IIC READ error. (1 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER3C	IIC READ error. (9 bit)	Cause	I^2C communication error
		Action	Check the wiring and other devices on I^2C.
ER3D	IIC READ error. (ACK)	Cause	I^2C communication error
		Action	Check the target microcontroller.
ER3E	Illegal select AREA.	Cause	The area set with TYPE setting does not exist.
		Action	Check the area information in the TYPE settings.
ER40	CPU RAM error.	Cause	An abnormal condition was detected in the internal RAM of the PG-FP3.
		Action	The PG-FP3 may be damaged.
ER41	Expansion RAM error.	Cause	An abnormal condition was detected in the expansion RAM of the PG-FP3.
		Action	The PG-FP3 may be damaged.
ER42	Illegal SW Target ON.	Cause	The TERGET VDD switch is V_{DD} OUT but USER V_{DD} is supplied.
		Action	Do not supply power (V_{DD}) from the target when the TERGET VDD switch is V_{DD} OUT.
ER43	Illegal SW Target OFF.	Cause	The TERGET VDD switch is USER V_{DD} but USER V_{DD} is not supplied.
		Action	Supply power (V_{DD}) from the target when the TERGET VDD switch is USER V_{DD}.

Error No.	Message	Cause/Action	
ER44	Target is closed.	Cause	The target system is not connected.
		Action	Check the connection of the target system.
ER45	IIC SCLK is Low level.	Cause	The SCK pin does not go high.
		Action	Check the SCK pin of the target system.
ER50	VPP OUT CURRENT error.	Cause	An excess V_{PP} current was detected.
		Action	Check the V_{PP} pin of the target system.
ER51	VDD OUT CURRENT error.	Cause	An excess V_{DD} current was detected.
		Action	Check the V_{DD} pin of the target system.
ER52	VCC (+5V) CURRENT error.	Cause	An excess V_{CC} (+5 V) current was detected.
		Action	The PG-FP3 may be damaged.
ER53	EPROM VPP CURRENT error.	Cause	An excess EPROM V_{PP} current was detected.
		Action	Check the master PROM. Alternatively, FLASHPRO3 may be damaged.
ER54	User VDD error.	Cause	The target system voltage is abnormal.
		Action	Check the voltage of the target system.
ER5B	Blank check.. Failed AREA	Cause	The specified area is not blank.
		Action	Erase the specified area with the Erase command.
ER5C	ROM Erase.. Failed AREA	Cause	The specified area cannot be erased.
		Action	The specified area may be damaged.
ER5D	Verify error. AREA	Cause	A verify error was detected in the specified area.
		Action	Erase the area with the Erase command, and reexecute writing.
ER5E	Device error. AREA	Cause	Excessive erasing was detected in the specified area.
		Action	The microcontroller may be damaged.
ER5F	Erase setting error. AREA	Cause	A pre-write error was detected in the specified area.
		Action	The microcontroller may be damaged.

APPENDIX A NOTES ON DESIGNING A TARGET

When designing a board using a flash microcontroller, keep in mind the following points if you want to study the possibility of on-board writing.

- Pin processing

  The target may have pins that require special processing when the mode is changed from normal operating mode to flash memory programming mode, or pins that go to high-impedance during programming. In a mode in which the operation of the microcontroller is stopped by pin processing, the programming operation cannot be performed. Therefore, be sure to read the manual for the device before creating the target.

- Interface circuit for the PG-FP3

  Interface circuit examples for a UART (asynchronous communication port) and SIO (3-wire clocked port) are given below. Because the PG-FP3 senses the voltage on the target even when V_{DD} is not supplied to the target, be sure to connect the V_{DD} pin. For information on pin processing of the device, be sure to refer to the manual for the device used.

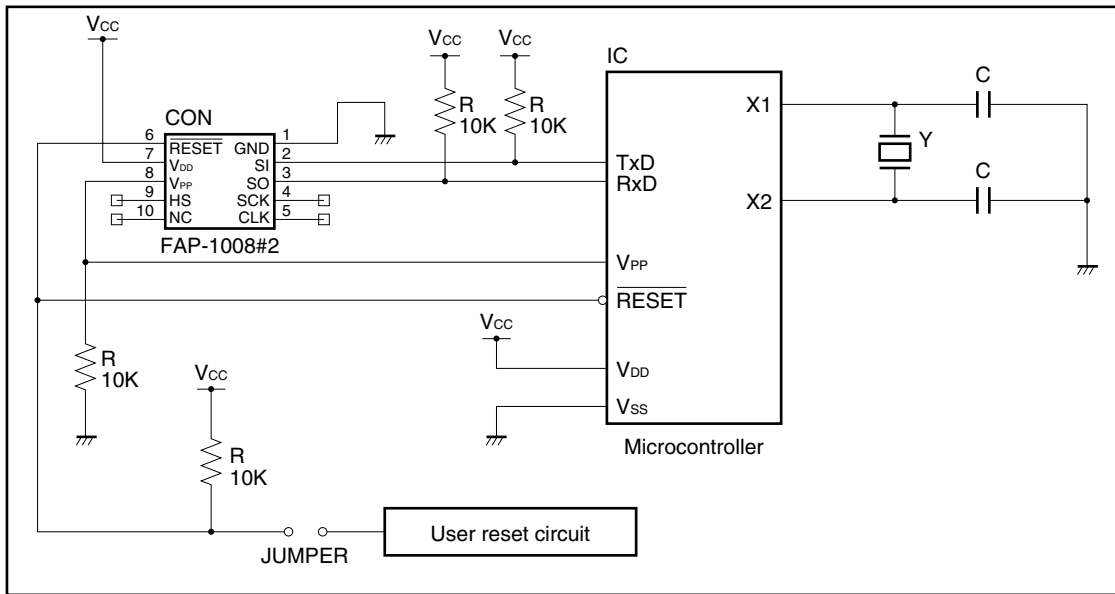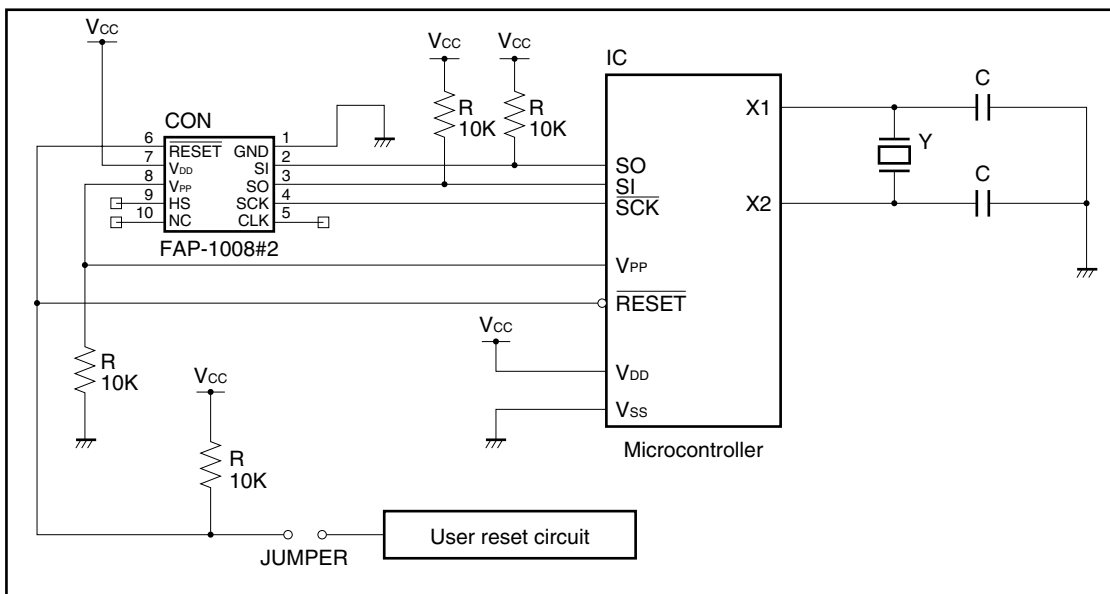**Figure A-1. Interface Circuit Example for a UART**

Figure A-2. Interface Circuit Example for SIO

APPENDIX B REVISION HISTORY

The revision history of this manual is listed below. The Applicable Chapter column indicates the chapters in the corresponding edition.

(1/2)

Edition	Description	Applicable Chapter
Second edition	The setting of the baud rate in the RS-232-C interface specifications and the capacity for downloading the user program have been changed.	Chapter 1
	The PG-FP3 system organization has been changed.	Chapter 2
	A description of EXPANSION CONNECTOR has been deleted from the description of parts.	
	A description of installing has been changed.	Chapter 3
	A description of the Erase command has been added.	Chapter 5
	A description of the Program command has been added.	
	A description of the Verify command has been added.	
	Caution has been added to the description of the E.P.V. command.	
	A description of the Blank Check command has been deleted from the first edition.	
	A description of the Read command has been deleted from the first edition.	
	A description of the Cancel command has been deleted from the first edition.	
	The setting of the baud rate in the RS-232-C interface specifications has been changed.	Chapter 7
	The description of the expansion interface specifications has been deleted from the first edition.	
Third edition	Windows 98, Windows 2000, and Windows NT 4.0 are added as operating systems supported by the FLASHPRO3.	Throughout
	The description of the printer interface is deleted.	
	The screen display example of the TYPE setting dialog box has been changed in accordance with addition of the checksum function and deletion of Block mode.	
	The screen display example has been changed in accordance with change of the settable ranges of items in the Options setting dialog box.	
	The screen display example has been changed in accordance with change of the settable range of the V_{PP} voltage.	
	A description of the microcontrollers supported by the PG-FP3 has been changed.	Chapter 1
	The description of the supplied, printer cable has been deleted, and **Photo 2-1** has been changed.	Chapter 2
	The display example of the log window has been changed.	Chapter 3
	The description of the operating procedure using the printer interface has been changed to that using the RS-232-C.	Chapter 4
	The screen display example has been changed in **Section 5.2.2**, the description of Block mode has been deleted from **Section 5.2.2**, and a description of the communication clock when I^{2}C is used has been added to **Section 5.2.2**.	Chapter 5
	The settable range of the V_{PP} voltage in **Section 5.2.3** has been changed.	
	Caution has been added to **Section 5.2.4**	
	A description in **Section 5.3.2** has been changed.	
	A description of the RAM checksum function has been added.	
	A description in **Section 5.3.5** has been changed.	
	A description has been added to **Section 5.4.3**.	
	Caution has been added to **Sections 6.1** and **6.2**.	Chapter 6

(2/2)

Edition	Description	Applicable Chapter
Third edition	**Section 7.3.1** which describes the printer interface has been deleted from the second edition.	Chapter 7
	A description in **Table 7-3** has been changed.	
	Equivalent circuit examples in **Section 7.4.2** have been changed and the equivalent circuit examples of the V_{DD} I/O and V_{PP} output pins have been added to **Section 7.4.2**.	
	Some error messages have been deleted.	Chapter 8

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