NEC

User's Manual

PG-FP4

Flash Programmer

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CE

FP4 complies with the EMC protection requirements

WARNING

This is a ‘Class A’ (EN 55022 : 1998) equipment. This equipment can cause radio frequency noise when used in the residential area. In such cases, the user/operator of the equipment may be required to take appropriate countermeasures under his responsibility.

EEDT-ST-001-11

CAUTION

This equipment should be handled like a CMOS semiconductor device. The user must take all precautions to avoid build-up of static electricity while working with this equipment. All test and measurement tool including the workbench must be grounded. The user/operator must be grounded using the wrist strap. The connectors and/or device pins should not be touched with bare hands.

EEDT-ST-004-10

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Preface

Readers

This manual is intended for users who want to understand the functions of the PG-FP4 Flash Programmer.

Purpose

By using the PG-FP4, programs can be easily erased from or written to the flash memory of an NEC on-chip flash memory microcontroller, or can be verified on Windows™ screens, while the microcontroller is mounted on the user board.
This manual explains the basic specifications and correct use of the PG-FP4.

Organization

This manual includes the following sections:

- Introduction
- Hardware installation
- Software installation
- PG-FP4 operation using GUI
- Sample programming session using GUI software
- PG-FP4 operation in stand-alone Mode
- PG-FP4 operation using terminal communication
- Sample programming session using terminal communication program
- Connectors and cables
- Design proposals for user systems
- User system interface circuits
- Error messages

Legend

Symbols and notation are used as follows:

Weight in data notation	:	Left is high-order column, right is low order column
Active low notation	:	$\overline{xxx}$ (pin or signal name is over-scored) or /xxx (slash before signal name)
Memory map address:	:	High order at high stage and low order at low stage
Note	:	Explanation of (Note) in the text
Caution	:	Item deserving extra attention
Remark	:	Supplementary explanation to the text
Numeric notation	:	Binary... xxxx or xxxB Decimal... xxxx Hexadecimal... xxxxH or 0x xxxx

Prefixes representing powers of 2 (address space, memory capacity)

K (kilo): $2^{10} = 1024$

M (mega): $2^{20} = 1024^2 = 1,048,576$

G (giga): $2^{30} = 1024^3 = 1,073,741,824$

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Chapter 1 Introduction

The PG-FP4 is a flash programmer for all NEC micro controllers with flash technology. PG-FP4 is designed for both host computer controlled operation and stand-alone operation.

1.1 Main Features of PG-FP4

- PG-FP4 allows on-board programming without removing the target device from the target system.
- User program information is stored in the PG-FP4 internal flash memory in order to program target systems stand-alone without host connection of PG-FP4. The internal flash memory size may vary; the minimum size however, is 2 MB.
- An 8 KB EEPROM stores programming parameters.
- Serial interface connection (RS232C) to host systems, parallel interface for optional fast program download and USB interface are available.
- An extension interface can be configured to control PG-FP4 remotely.
- A graphical user interface is provided as well as an ASCII command line interface for terminal operation.
- SIO, SIO-H/S, UART, I^2C or PORT interfaces are supported for data transfer to the target device.
- Programming Voltage V_{PP} can be selected between 2.0 and 12.0 V.
- PG-FP4 can supply 2.0 – 6.0 V on V_{DD} line (200 mA max.).

Note: PG-FP4 does not require any calibration due to the nature of internal design of this product (internal regulator).

1.2 PG-FP4 Functional Specification

Table 1-1: PG-FP4 Functional Specification

Item	Specification		
Host interface	RS-232C:	D-SUB 9-pin, 9600, 19200, 38400, 57600 or 115200 bps	
	USB[Note 1]:	USB type 'B' connector. USB conforms to USB Rev. 1.1	
	Extension Connector:	D-SUB 25-pin (receptacle)	
Target interface **Notes 2, 4**	Connector:	HD-SUB 15-pin (receptacle)	
	Level conversion:	Within V_{DD} input range (2.0 to 6.0 V)	
	Protection:	Overvoltage input protection circuit (guaranteed range: 15 V max.)	
	Supported interface:	3-wire	(max. 2.5 Mbps)
		3-wire + handshake	(max. 2.5 Mbps)
		UART	(max. 153600 bps)
		I^2C	(max. 100000 bps)
		PORT	(max. 100000 bps)
Supply voltage **Notes 3, 4**	Target V_{PP} supply voltage:	2.0 to 12.0 V	max 200 mA
	Target V_{DD} / V_{DD2} supply voltage:	2.0 to 6.0 V	max 200 mA
	An overcurrent protection circuit is provided for V_{PP}, V_{DD} and V_{DD2}		
Supply voltage input **Note 4**	Target V_{DD} / V_{DD2} supply voltage input:	2.0 to 6.0 V	max 50 mA
CPU clock supply	A 20-, 16-, 12-, 10-, 8-, 6-, 5-, 4-, 2- or 1-MHz clock can be selected as the target CPU clock. The on-board target clock can be also used depending on the application settings.		
Stand-alone	Programming without host PC Functions such as E.P.V., ERASE, PROGRAM and VERIFY can be selected and executed with the *Next* and *Enter* keys.		

Notes: 1. Not supported on Windows 95 and Windows NT

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

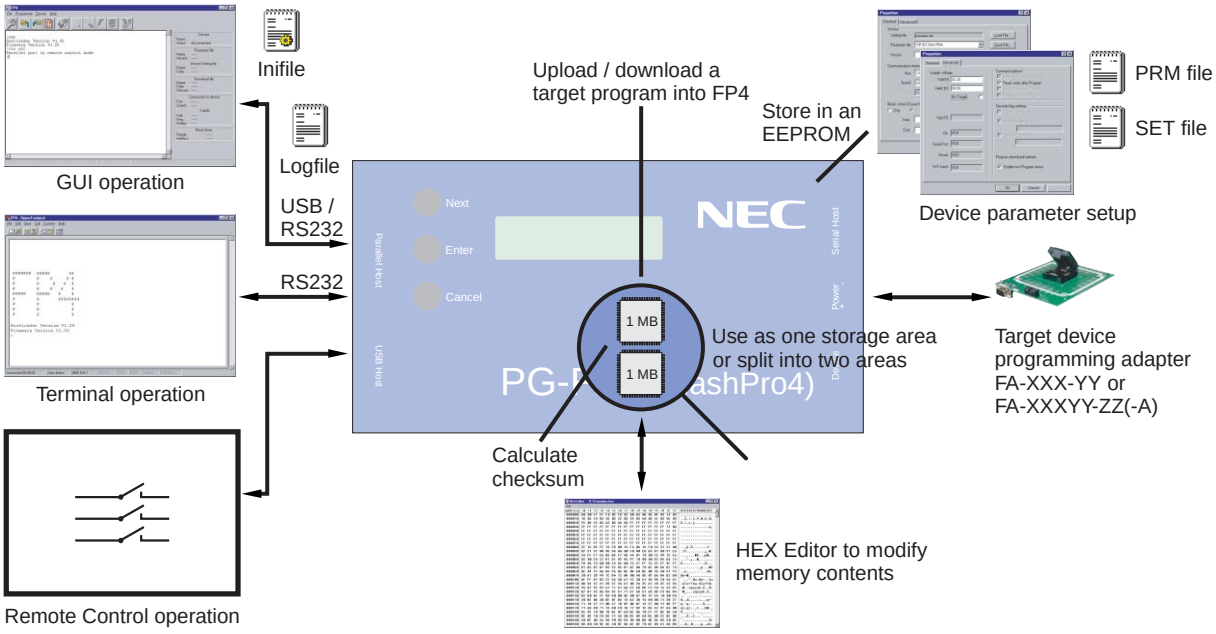
3. V_{DD} supplies power to the target device. The power is not intended to operate any target system of the user. Use the power supply on the target for on-board program writing.

4. From **control code G** onwards, V_{PP}, V_{DD}, V_{DD2} and all target interface signals are additionally voltage protected by zener diodes (V_{PP}: 13 V, all others: 6.8 V). If the supply voltage from the target exceeds those limits, the protection diodes in PG-FP4 may be damaged.

1.3 PG-FP4 Configuration in Host Control Mode

The configuration of PG-FP4 in host control mode is shown in below diagram:

Figure 1-1: PG-FP4 in host control mode



The graphical user interface program (GUI) for PG-FP4 supports target program download / upload, selection of user defined parameter setup, modification of a target program downloaded to PG-FP4, calculation of a memory checksum and various device commands to program and verify flash programming. General and user defined parameter setup data is saved in PRM files and SET files resp. These files are downloaded to PG-FP4 and kept in an internal EEPROM to have parameters available for stand-alone mode. The GUI starts up using most recent settings and saves modified settings in an INI-file. Communication between GUI and PG-FP4 may be logged in an ASCII file.
PG-FP4's internal memory consists of 2 MB (or more) flash memory to hold the target program to be flashed into the target device. This memory area (progarea) may be split up into two independent memory areas of e.g. 1 MB each so that PG-FP4 may keep two different target programs for alternative programming.

This manual familiarises with hard- and software of the PG-FP4 package.

Chapter 2 describes the hardware components and the installation of PG-FP4.

Chapter 3 describes the installation of the GUI and the required steps to upgrade PG-FP4 firmware, if necessary. Reading this chapter is very important as soon as firmware upgrades become available.

Chapter 4 describes the GUI software.

Chapter 5 shows in a sample session how to program flash devices using the GUI.

Chapter 6 describes how to use PG-FP4 in stand-alone mode without any PC or terminal connected.

Chapter 7 describes all control and device commands which are available for operating PG-FP4 in terminal mode.

Chapter 8 shows in a sample session how to program flash devices using a terminal program.

Chapter 9 describes connectors and cables of the PG-FP4 package.

Chapter 10 and chapter 11 contain design proposals for user systems.

Chapter 12 contains the error messages and recommended work-arounds.

It is strongly recommended to read the **README.TXT** file additionally to this manual. The README.TXT file contains last minute information and may contain valuable hints of any kind. The README.TXT is available on the CD-ROM of the PG-FP4 package.

Chapter 2 Hardware Installation

2.1 System requirements

HOST PC	IBM PC/AT compatible PC equipped with PentiumTM (800 MHz or higher is recommended) supporting Windows 95, Windows 98, Windows NT 4.0, Windows Me, Windows XP or Windows 2000 is required to run the PG-FP4 user interface program. 32 MB of RAM or more is recommended. For terminal operation of PG-FP4 any terminal program supporting RTS/CTS handshake may be used.
Host interface	Serial interface (RS232C) capable to handle communication at 9600 (minimum) baud up to 115200 baud. Alternatively, an USB port (Rev 1.1) connection may be used. A parallel port may be used in addition to the serial interface to enable fast data download to PG-FP4.
File formats	Program files must be available in Motorola S file format or Intel HEX file format.
GUI	The graphical user interface (GUI) is available for Windows 95, Windows 98, Windows NT 4.0, Windows Me, Windows XP or Windows 2000 operating systems. About 8 MB of free hard disk space is required to install the GUI software.
Compatible MCU	All NEC devices with flash technology can be programmed.

2.2 Package Contents

Please verify that you have received all parts listed in the package contents list attached to the PG-FP4 package. If any part is missing or seems to be damaged, please contact the dealer from whom you purchased your PG-FP4.

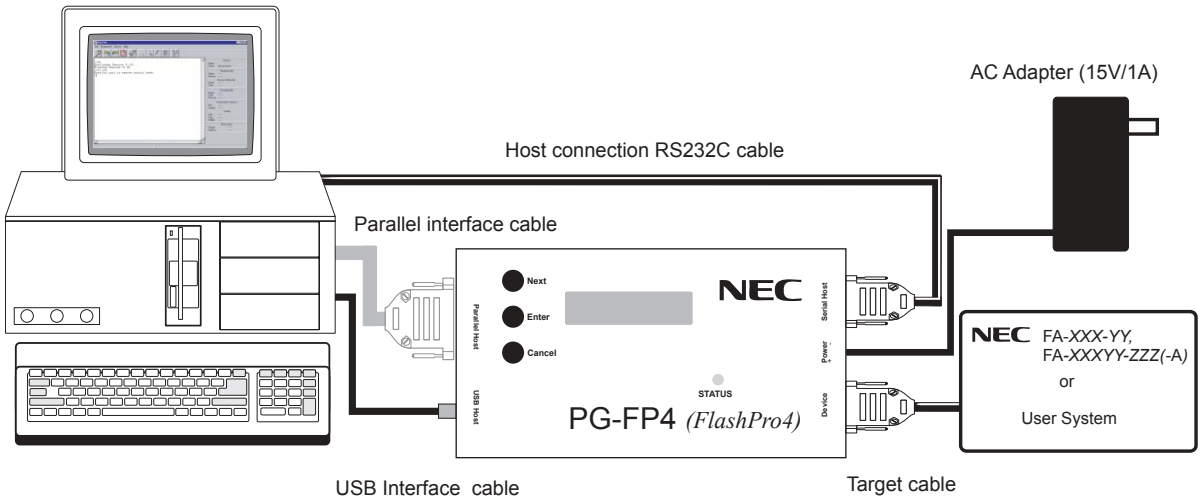
Note: Updates to this User's Manual, additional documentation and/or device parameter file(s) for PG-FP4, if available, may be downloaded from the NEC WEB page(s) at

http://www.eu.necel.com/update

2.3 System configuration and components

The PG-FP4 system configuration is as given in the diagram below:

Figure 2-1: PG-FP4 system configuration



PG-FP4 is connected to the host system via RS232C serial interface cable or USB port cable. An optional parallel interface connection to the host system printer port may be established using the extension connector of PG-FP4. The extension port can only be used for fast program download to PG-FP4.
PG-FP4 is connected to the user system by a target cable. For any detailed specification of the target cable please refer to the chapter “Connectors and Cables” of this documentation.

Remark: The parallel port interface cable is not part of the PG-FP4 package!

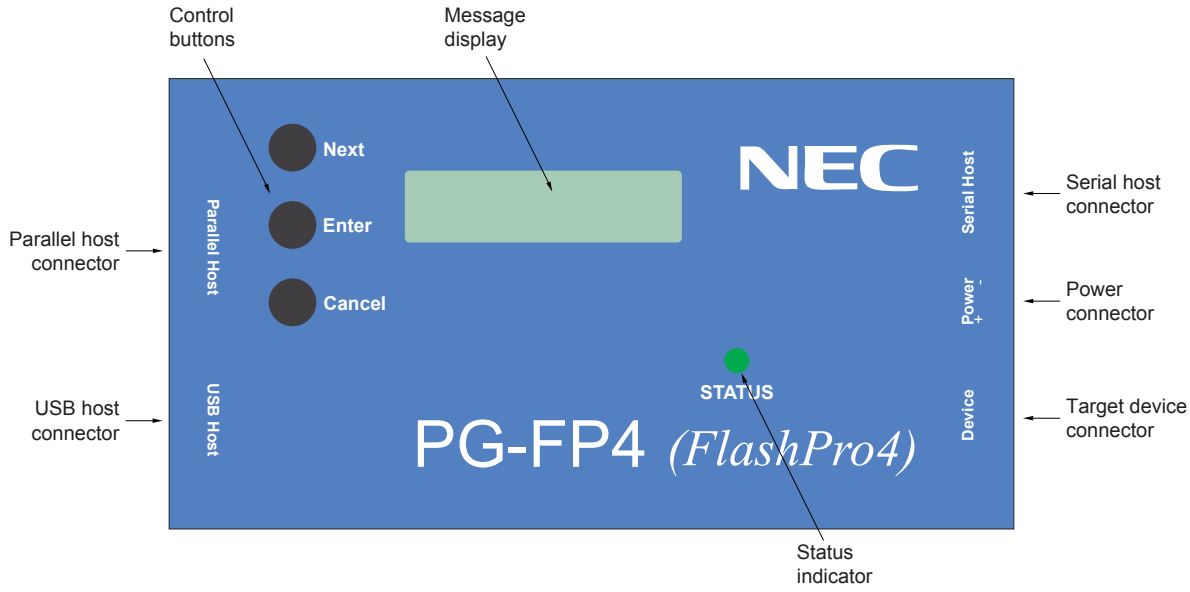
2.3.1 Host computer

A PC is used to communicate with PG-FP4. The PC must support a terminal program to communicate to the PG-FP4 command line interface via serial line including RTS/CTS handshake. For GUI operation of PG-FP4 Windows 95, Windows 98, Windows NT, Windows Me, Windows XP or Windows 2000 must be available.
It also must be equipped with a serial interface or an USB port. An optional parallel interface may be used for fast program download to PG-FP4.

Caution: USB support is not available on Windows 95 and Windows NT!

2.3.2 PG-FP4 control panel and connectors

Figure 2-2: PG-FP4 top view

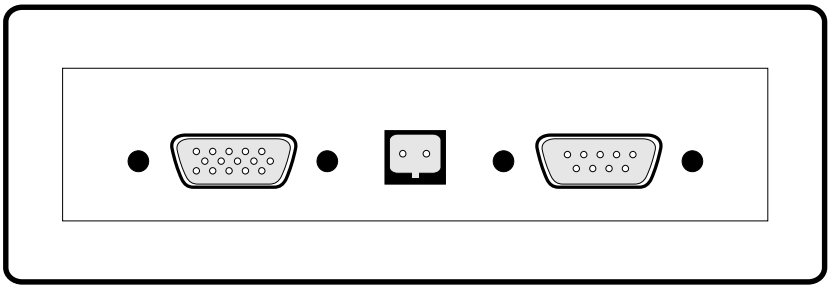


The control buttons are used in stand alone operating mode of PG-FP4.

Next button	Proceeds to the next menu item in sequence.
Enter button	Selects the item shown in the message display.
Cancel button	Cancels the current selection and returns to the previous menu item. Pushing this button also cancels flash device commands such as Erase, Program, Verify, Blank-check, etc.
Message display	A 16 *2 characters LCD display informs about the operating mode. It is mainly used for PG-FP4's stand alone operation mode.
Status indicator	The LED shows the PG-FP4 operating status, indicated by the colours green for ***OK***, red for ***Error*** or yellow for ***Operating***.

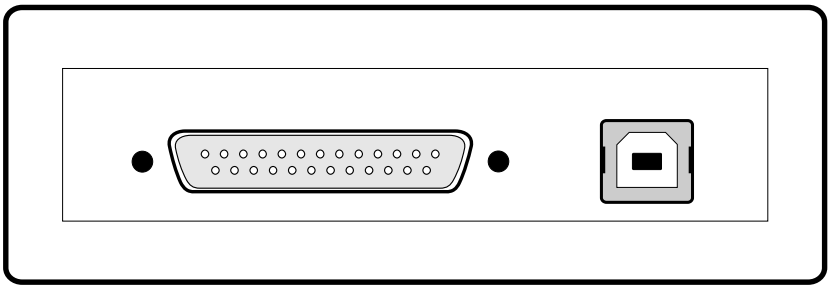
The serial connector, the target connector and the power connector are located on the right side of PG-FP4.

Figure 2-3: PG-FP4 target device / power / serial host connectors



The parallel connector and USB port are located on the left side of PG-FP4. The extension connector may be configured as centronics interface (default) for fast program download or as I/O port for remote operation of PG-FP4.

Figure 2-4: PG-FP4 extension connector / USB port interface



2.3.3 User system

The user system must be equipped with a device interface according to the target cable specification. For any detailed specification please refer to the chapter “Connectors and Cables” of this document.

2.3.4 Power supply

The power supply FW7207/15 is equipped with a DC-plug 2.1 x 55 x 14 and may be connected to mains using one of the available AC-plugs Euro, UK or USA / Japan.

For a specification of the power supply please refer to the chapter “Connectors and Cables” of this document.

Caution: Do not use any other AC adapter! Connect only the provided AC adapter to the power supply jack!

2.3.5 RS232 Host connection

The RS232 host interface enables communication to the PG-FP4. A terminal program or the Windows 95/ Windows 98 / Windows NT 4.0 / Windows Me / Windows XP / Windows 2000 GUI may be used to operate PG-FP4, which is connected to the serial port. RS232 data transfer starts at 9600 baud, 8 data bits, 1 stop bit, no parity and hardware handshake.
The baudrate may be selected form 9600 bps (default), 19200 bps, 38400 bps, 57600 bps or 115200 bps.

For a detailed specification of the host interface please refer to the chapter “Connectors and Cables” of this document.

2.3.6 Extension connector

The extension connector may be configured in one out of two possible configurations:

- Centronics Interface configuration
  Configured as centronics interface program data can be downloaded to PG-FP4 via high speed parallel port from the host system.

- I/O port configuration
  Configured as I/O port PG-FP4 can be controlled remotely. Via I/O port start signal an ERASE-PROGRAM-VERIFY sequence can be started and PG-FP4 signals status information as device connected, busy, OK and error via I/O signal lines.

For a detailed specification of the extension interface please refer to the chapter “Connectors and Cables” of this document.

2.3.7 USB port

The USB port conforms to Rev. 1.1. It supports communication speed of 12 Mbit/s on an USB type B connector.

Remark: USB support is not available on Windows 95 and Windows NT!

2.3.8 Target cable

The target cable is compatible with all NEC flash programming adapters FA-XXX-YY and FA-XXXYY-ZZZ(-A).
The programming adapter are products of Naito Densei Machida Mfg. Co., Ltd (NDK), Japan.

XXX: 20-pin, 28-pin, 30-pin, 42-pin, 44-pin, 64-pin, 80-pin, 100-pin and 144-pin.
YY: Package type GC, GF, GJ, GK, GS and CT.
ZZZ: Lead frame code.

For a detailed specification of the target cable please refer to the chapter “Connectors and Cables” of this document.

Caution: When using the I^2C interface to program a target device, make sure that SI and SO signals lines are externally short-circuited.

2.3.9 Caution about Potential Difference

Before connecting your hardware containing the target device to PG-FP4 via target cable, make sure, that both grounds have the same potential (see also ‘Caution’ notice on page 4).

If this is disregarded, either the target interface of PG-FP4 or parts of your hardware may be damaged.

On PG-FP4 side, you can use e.g. the Extension connector (Signal V_{SS}) or the host connector (signal GND) for grounding purposes. For pinout details, please refer to chapter 9.3 and 9.6.

Chapter 3 Software Installation

3.1 Graphical User Interface

The PG-FP4 graphical user interface software allows easy and most comfortable access to all features of the PG-FP4 flash programmer. It requires Windows 95, Windows 98, Windows NT 4.0 or higher, Windows Me, Windows XP or Windows 2000 as operating system.

3.1.1 GUI Installation

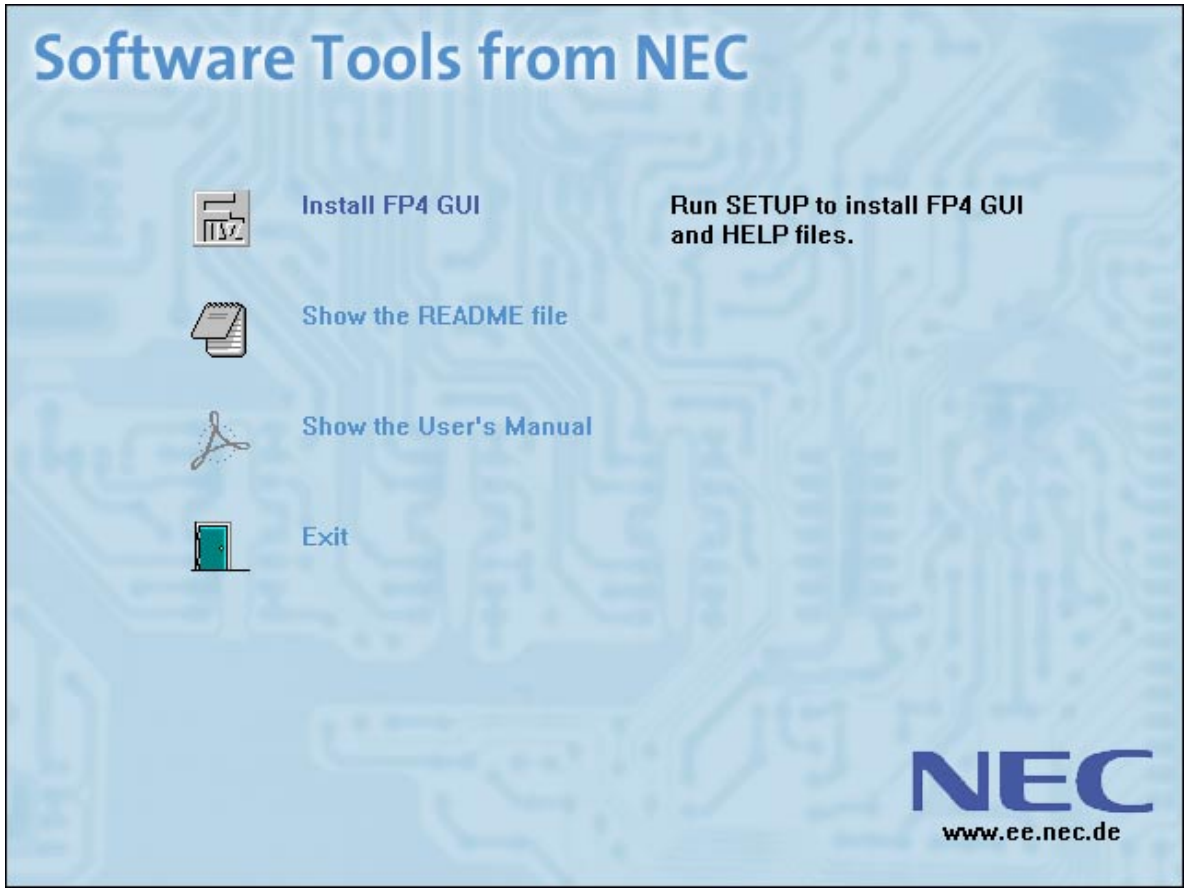
The installation program is located on the CD-ROM, which is delivered with the PG-FP4 package.
To install the GUI software, please perform following steps:

⇒Insert the CD-ROM into your CD-ROM drive. A setup screen opens automatically.

⇒If the setup screen does not open automatically, click the Windows **START** button.
⇒Click **RUN**.
⇒Type in or select '<*CDROM drive letter*>:\autorun.exe'.
⇒Click the **OK** button.

Now the setup intro screen appears.

Figure 3-1: Setup intro screen

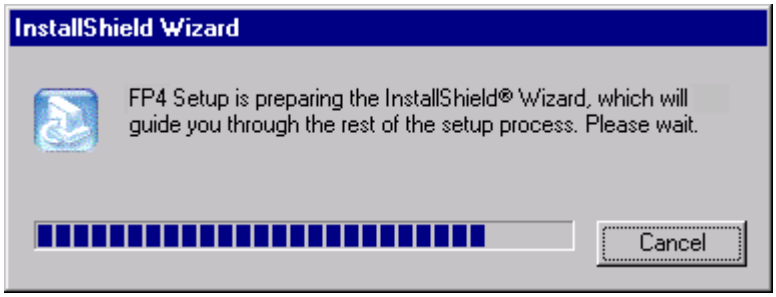


Install FP4 GUI	Runs SETUP.EXE from the SETUP directory.
Show the README file	Opens NOTEPAD to show the README file.
Show the User's Manual	Opens Acrobat Reader to show the User's Manual.
Exit	Exits from the intro screen.

When **Install FP4 GUI** is activated, the setup program starts.

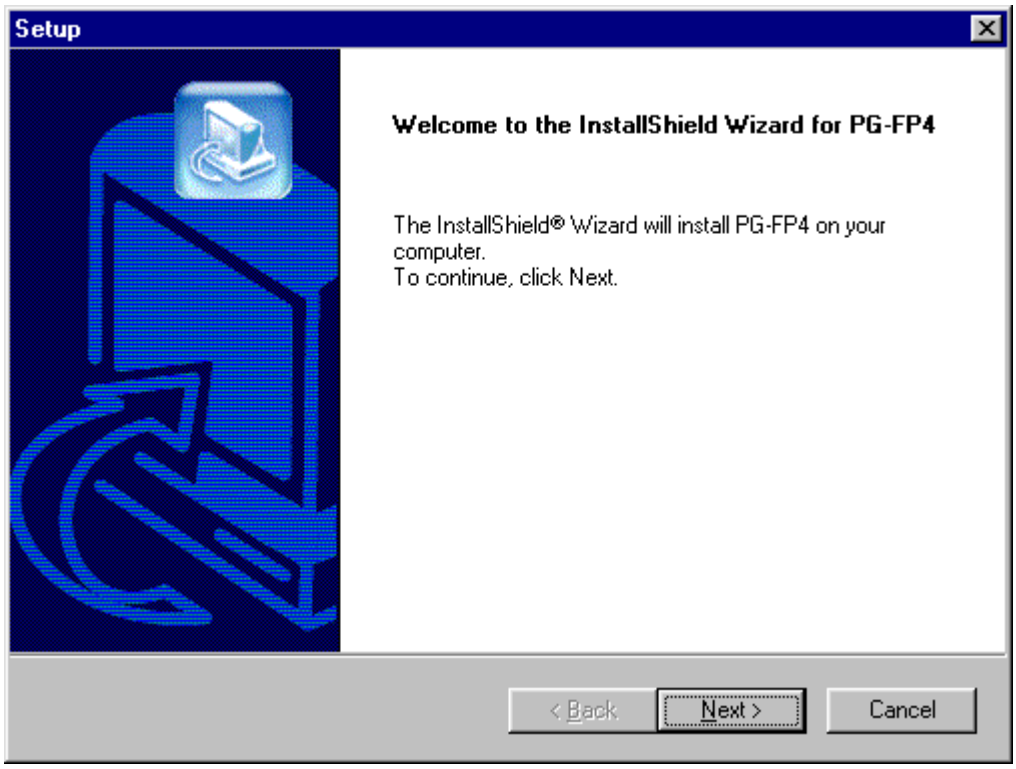
During initialisation of the setup program a progress bar is shown.

Figure 3-2: Setup preparation



After a short while of initialisation the welcome screen appears:

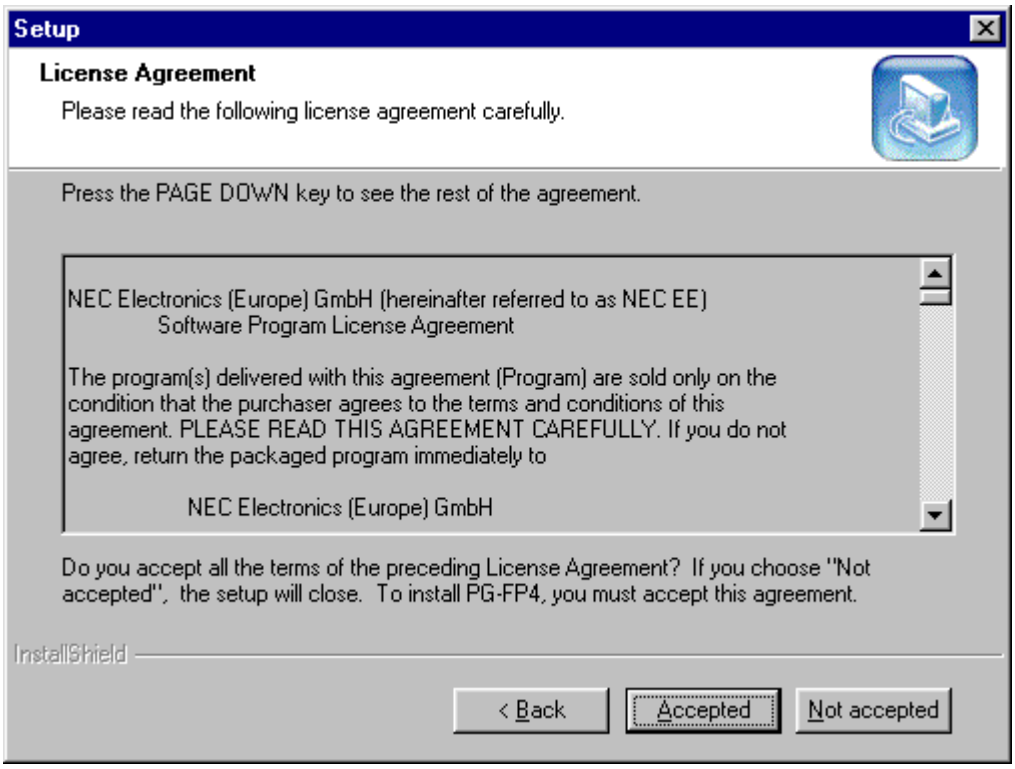
Figure 3-3: Welcome screen



Click ***Next*** to continue the installation.

The *License Agreement* window appears:

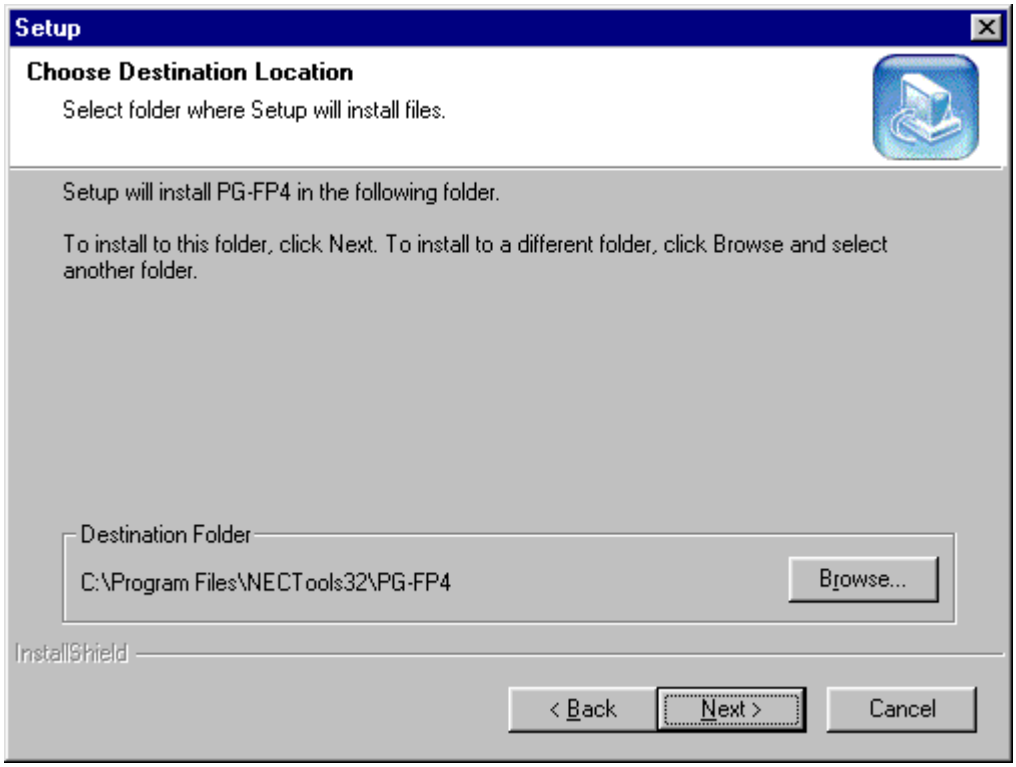
Figure 3-4: License Agreement window



Click ***Accepted*** to continue the installation. If you click ***Not accepted*** the installation procedure exits.

The *Choose Destination Location* window appears:

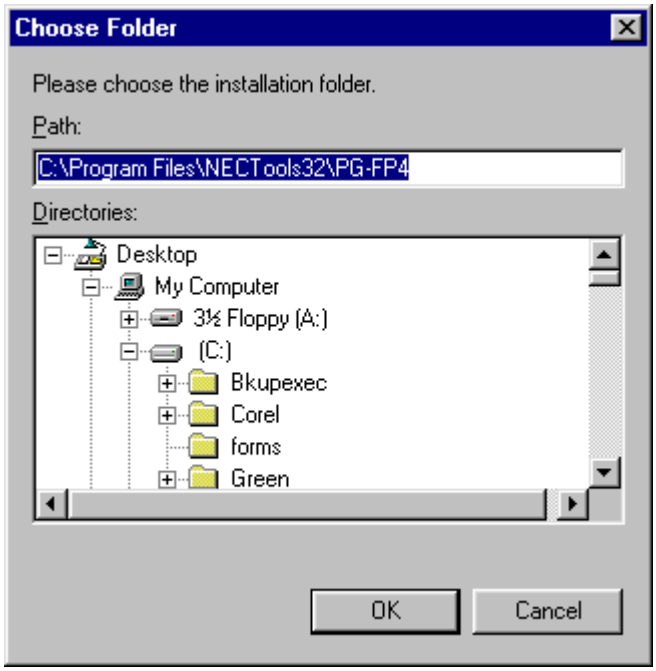
Figure 3-5: Choose Destination Location window



You might exit the installation by clicking the ***Cancel*** button.
You can click the ***Browse*** button to be able to change the installation destination path.
Pressing the ***Next*** button will proceed to the *Setup Program Folder* selection.

When activating the ***Browse*** button**,** the *Choose Folder* window appears:

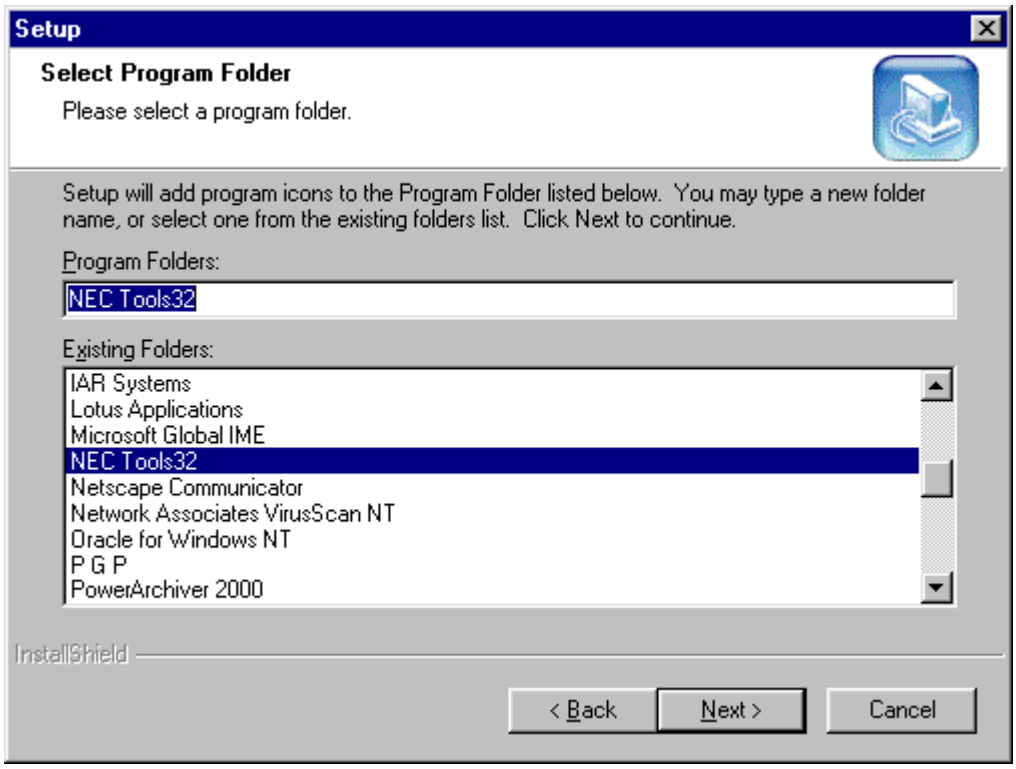
Figure 3-6: Choose Folder window



Here you can change the destination path. Then click ***OK*** to accept the changes or click ***Cancel*** to undo the changes. You will return to the *Choose Destination Location* window (Figure 3-5).

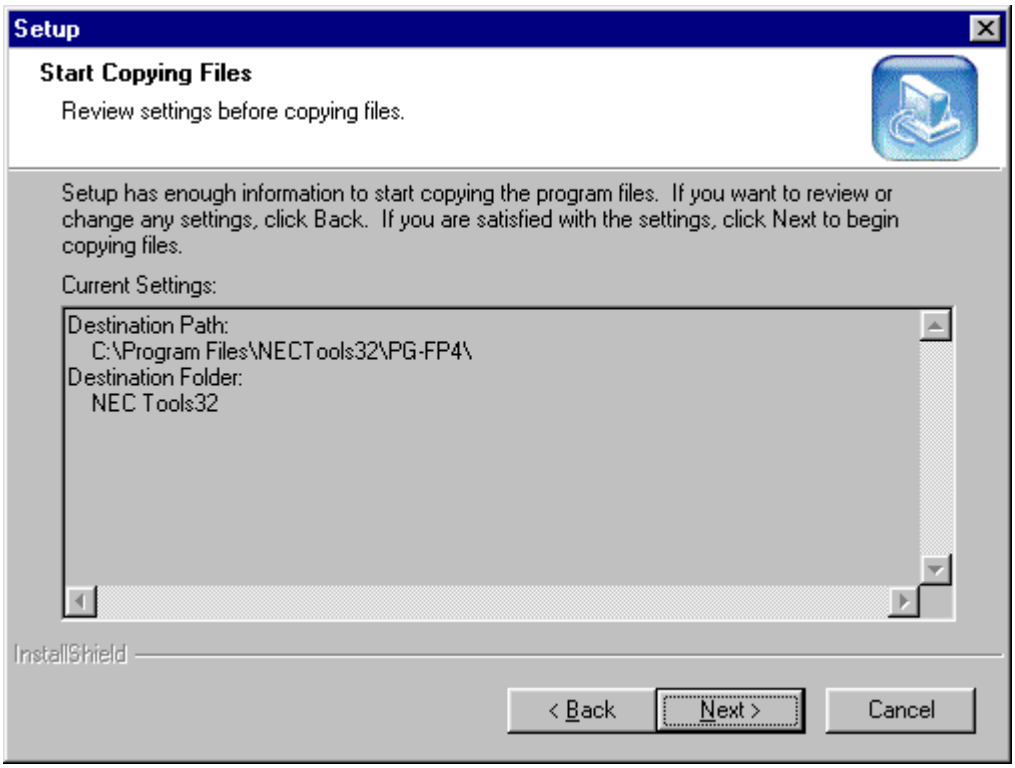
When the *Choose Folder* window is closed, press the ***Next*** button in the *Choose Destination Location* window. The setup procedure opens the *Select Program Folder* window. By default a program group NEC Tools32 will be created for the PG-FP4 files. You may change the folder name by selecting one of the existing folders or by typing a new folder name in the edit field.

Figure 3-7: Select Program Folder window



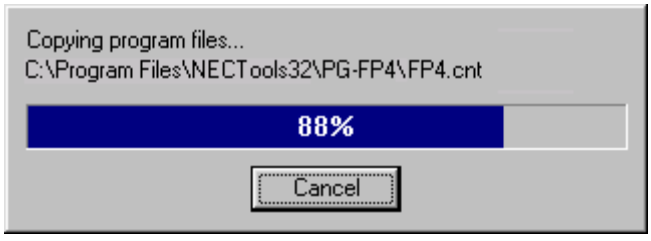
When the correct folder has been selected, the ***Next*** button will show a summary of your selections:

Figure 3-8: Start Copying Files window



Click the ***Next*** button to start the copy process. On the installation progress window you can follow the installation.

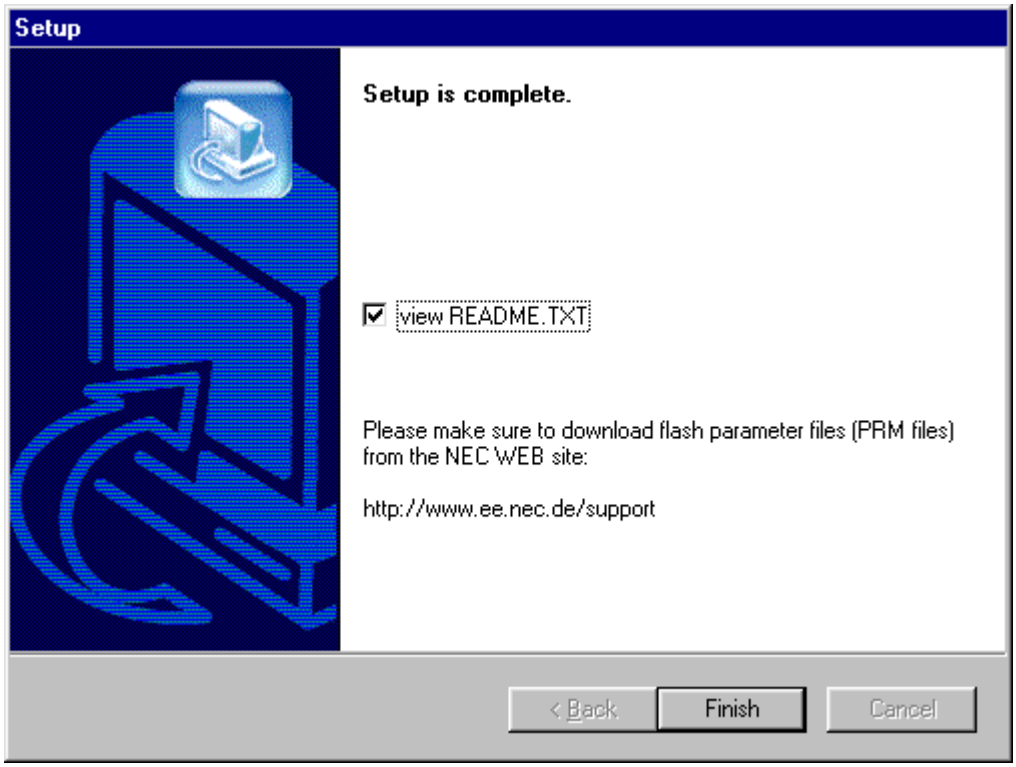
Figure 3-9: Installation progress window



You can always abort the installation with the **Cancel** button.

When the installation is complete, the following message window appears:

Figure 3-10: Setup is complete

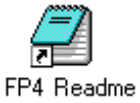


The program has been installed successfully and an entry has been made into the program menu to start the PG-FP4 software. Select the *view README.TXT* checkbox to start Notepad showing you the README.TXT file. Since this file is copied into your PG-FP4 directory anyway you may review it at later times. Press the ***Finish*** button to exit the installation.

The installation process is complete now and the setup utility has installed a new program folder which holds the PG-FP4 GUI Software and a PG-FP4 unInst icon which allows to delete the PG-FP4 GUI software if it is not used any more.

Figure 3-11: Program folder after installation

Figure 3-12: PG-FP4 Icons



Opens the README file for PG-FP4

Starts the PG-FP4 GUI

Starts the PG-FP4 On-line Help

Un-install PG-FP4 from the computer

The setup program installs following files on your hard disk:

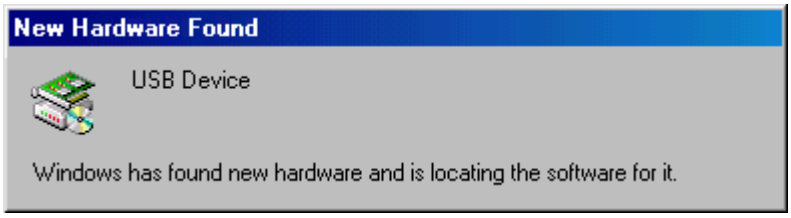
C:\...\NECTools32\PG-FP4	
Readme.txt	Last minute information
FP4.EXE	PG-FP4 GUI
FP4COM.DLL	Communication DLL
FP4.HLP	On-line help file
FP4.CNT	On-line help contents file
FP4.INI	Initialisation file
C:\...\NECTools32\PG-FP4\prm	
<empty>	Storage place for flash parameter files for target devices
C:\...\NECTools32\PG-FP4\set	
<empty>	Storage place for user defined flash parameter files
C:\...\NECTools32\PG-FP4\drivers	
USBIOWIZ.INF	Driver installation INF file
USBIO.SYS	USB driver for Windows 98, Windows Me, Windows 2000, Windows XP

Caution: The parameter files for PG-FP4 must be downloaded separately from the NEC WEB page(s) at *http://www.eu.necel.com/update.*

3.1.2 USB driver installation

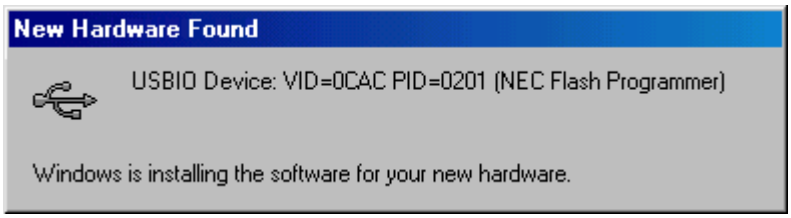
When PG-FP4 is connected first time to an USB interface, Windows 98, Windows Me or Windows 2000 will detect PG-FP4 automatically and start its hardware assistant:

Figure 3-13: PG-FP4 connection to USB port detected



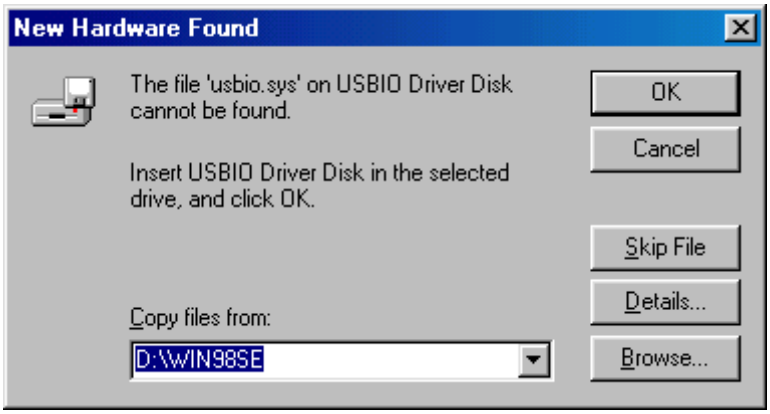
Windows then tries to install the necessary USB drivers for this device:

Figure 3-14: Installation of USB driver message



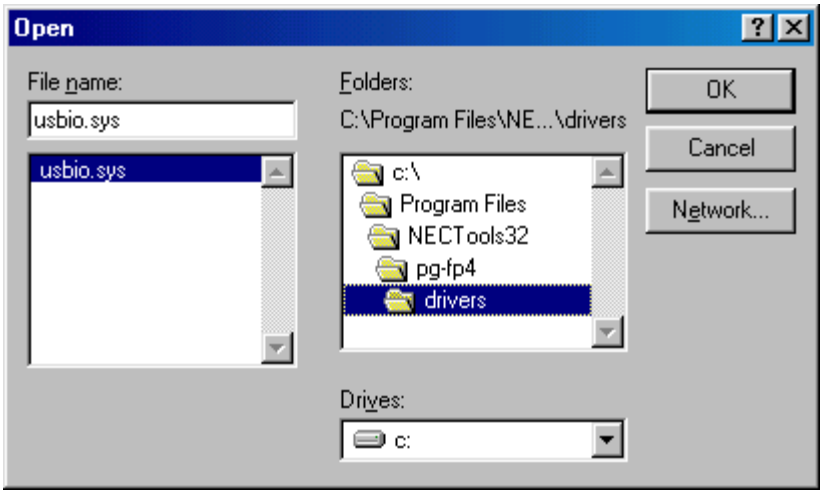
The next dialog requests to select the directory containing the USB driver files for PG-FP4:

Figure 3-15: USBIO driver selection (1)



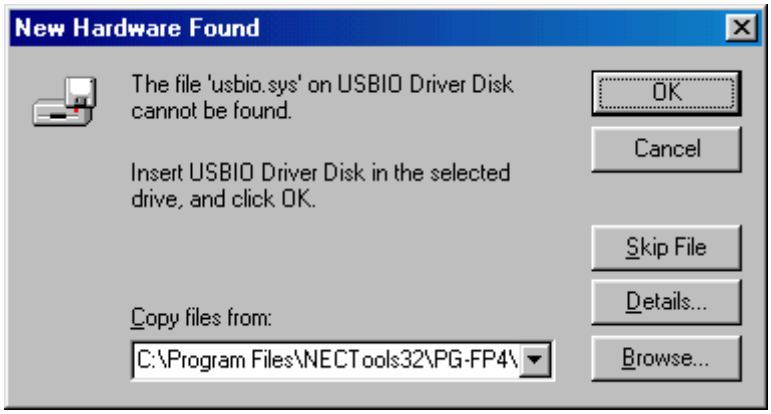
Click the **Browse…** button and select the sub-directory *drivers*, which has been created in the PG-FP4 installation directory during GUI setup:

Figure 3-16: USB driver directory selection



Click the **OK** button in the *Open* dialog and then the **OK** button in the driver selection dialog.

Figure 3-17: USB driver selection (2)



Windows will install the drivers and PG-FP4 becomes ready for communication via USB port.

3.1.3 GUI un-installation

Un-installation of PG-FP4 GUI and all its components can be done by clicking the *FP4 unInst* icon from the PG-FP4 program folder or by selecting *Add/Remove Programs* from the Window's Control Panel.

(1) GUI un-installation using FP4 unInst

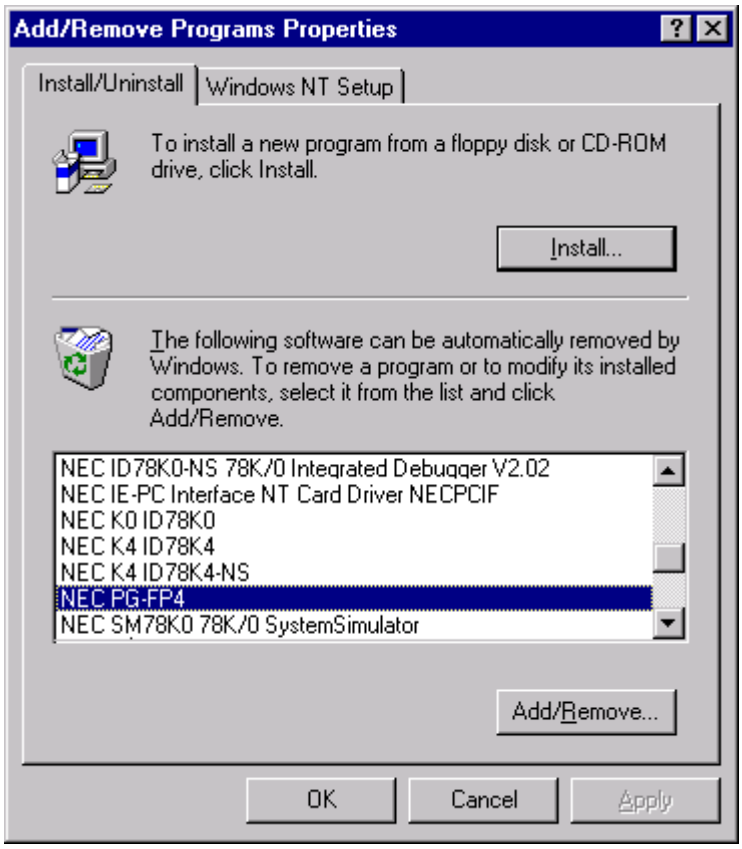
Once all components of PG-FP4 GUI have been installed, clicking the FP4 unInst icon will start the un-installation procedure:
All files installed during setup will be removed from your hard disk except the flash parameter files (PRM files) and customer setting files (SET files).

(2) GUI un-installation using Window's Add/Remove Programs

Click the Windows **START** button, go to the *Settings* →*Control Panel* and select the *Add/Remove Programs* icon.

The *Add/Remove Programs Properties* windows opens:

Figure 3-18: Add/Remove Programs Properties window



Select the *NEC PG-FP4* application (can be listed also as *PG-FP4*) from the list box and click **Add/Remove**.

All files installed during PG-FP4 setup will be removed from your hard disk except the flash parameter files (PRM files) and customer setting files (SET files).

3.2 Terminal installation

If a terminal program is used as communication interface no installation is necessary.

Start communication with PG-FP4 using 9600 bps, 8 data bits, 1 stop bit, no parity and select hardware handshake. Once communication is established you may switch to 19200 bps, 38400 bps, 57600 bps or 115200 bps.

Make sure that communication is done in lower case letters only.

Caution: The parameter files for PG-FP4 must be downloaded separately from the NEC WEB page(s) at *http://www.eu.necel.com/update*.

3.3 Firmware and GUI update installation

In order to guarantee proper operation of PG-FP4 programmer it is mandatory that the correct firmware version is available in the programmer's internal memory.
The GUI will perform a crosscheck about software versions installed. In case the GUI is out-of-date, a warning message will appear:

Figure 3-19: Warning about out-of-date GUI

If the firmware is out of date, the GUI will warn also:

Figure 3-20: Warning about out-of-date firmware version

In both cases, a software update is recommended. Please, check the NEC WEB page(s) at ***http://www.eu.necel.com/update*** and download the necessary software update packages.

3.3.1 Firmware update installation

PG-FP4 is equipped with a self-programming mechanism so that downloading the new firmware program to PG-FP4 and starting the update procedure does not require any other equipment than PG-FP4 itself.
The firmware update may be installed using the GUI or any terminal communication software. Before such process starts, the firmware update shall be copied onto the hard disk of the PC.
A typical name of the firmware program file is `FP4_VUP_xxxx.REC`, where *xxxx* is the version number of this firmware.

(1) Firmware update by GUI

The firmware update procedure starts when you press the ***Yes*** button in the firmware update error message (Figure 3-20). From the appearing File open dialog select the firmware update program file `FP4_VUP_xxxx.REC`. Several commands will be sent to PG-FP4 and a progress indicator informs about download progress.
Refer to section *Update Firmware* in the chapter “PG-FP4 Operation using GUI”.

As soon as the firmware is complete, a message will indicate this:

Figure 3-21: Firmware update complete message

PG-FP4 is now ready for operation.

(2) Firmware update by terminal commands

When you are using a terminal program, firmware updates procedures can only be started on user request. To start firmware update, enter the version update command:

```
version_up ↵
```

PG-FP4 asks for user confirmation before starting the update sequence:

```
Are you sure you want to update bootloader and firmware (y/n)?
```

Enter `y` to continue. PG-FP4 displays:

```
Erasing external Flash...OK
Now loading Firmware...
```

At this stage, PG-FP4 waits to receive the new firmware in S-Record format. From your terminal program, select **SEND ASCII FILE** menu and browse for the new firmware data file you downloaded from the NEC WEB site. Once the file is downloaded, PG-FP4 displays information about processing:

```
    **** CAUTION ****
Now bootloader and firmware will be programmed.
Please ensure that:
 - the correct bootloader file has been downloaded
 - the power is NOT disconnected during this operation
 - the programmer is NOT reset during this operation
Do you want to continue (y/n)?
```

Enter `y` to continue. PG-FP4 displays:

```
Selfprogramming Area(s): 0,1 (Bootloader + Firmware)
Copy Selfprog Library into RAM... OK.
Checking Vpp...OK.
Performing blank check...
not blank, performing erase... OK.

Programming the device.................................. OK.
Doing verify...
Performing blank check...
not blank, performing erase... OK.

Programming the device.................................. OK.
Doing verify... OK.

Programming successful. Restarting FP4.
```

PG-FP4 will restart and the new firmware version number will be shown on the initial screen.

Chapter 4 PG-FP4 Operation Using GUI

4.1 Getting started

Before you start using PG-FP4 you have to make sure that the correct flash parameter file (PRM file) for your target device is installed.

Caution: PRM files are not part of the PG-FP4 software package! They have to be downloaded from the NEC WEB page(s) at http://www.eu.necel.com/update.

PRM files downloaded from the NEC WEB site(s) must be copied into the sub-directory *<PG-FP4 install path>*\PRM, which has been created as an empty directory during GUI setup (see chapter Software Installation). If no PRM file has been installed before, the GUI will report an error and it will not start-up:

Figure 4-1: Error: No PRM file installed

4.2 Start-up the GUI

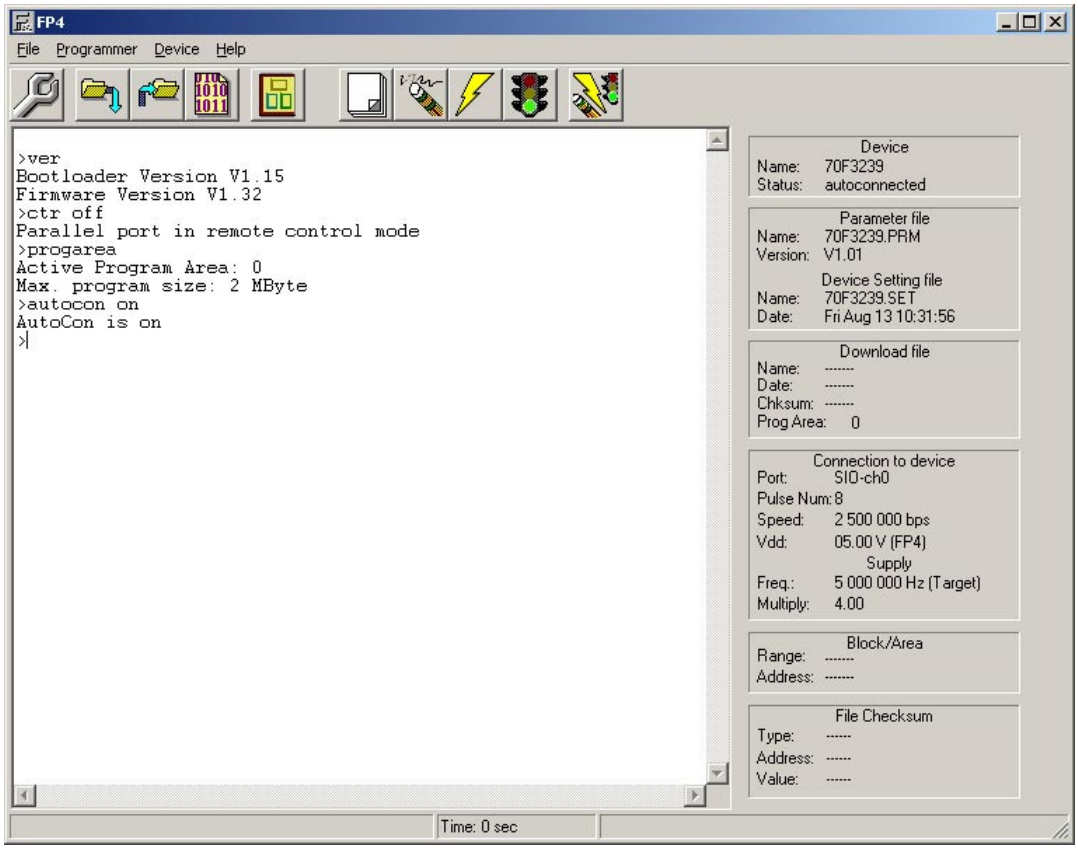
When PRM file(s) have been installed, connect PG-FP4 to your host computer using the provided serial interface cable and the 'Serial Host' connector. After connecting the power supply to PG-FP4 and mains, the message display shows the '`Commands >`' prompt and the status LED is switched off.
PG-FP4 starts up communication using the most recently used communication parameters stored in its internal EEPROM. Default communication speed is 9600 bps.
When being started, the GUI establishes connection to PG-FP4 also using the most recently used communication parameters, which are stored in the FP4.INI file. When there is no FP4.INI file available (this is the case when starting the GUI for the very first time), the GUI scans all serial communication ports using different baud rates to establish connection to PG-FP4.

Figure 4-2: Port scanning at start-up of the GUI

You may wait until the communication channel has been detected automatically or you may interrupt this operation and select the correct communication parameters in the *Programmer →Setup host connection...* menu.

As soon as communication is established, the main window appears.

Figure 4-3: PG-FP4 main window



The programs main window consists of

- the File Checksum information section at the bottom of the right side of the main window, which shows the last checksum value, which has been calculated by using the File →Checksum menu.
- the menu at the top of the window
- the toolbar below the menu with buttons for most important program options
- the status bar at the bottom of the window
- the parameter information section at the right side of the main window which informs about programming parameter settings
- the communication window which displays all commands sent to PG-FP4 and the returning messages from the programmer.

4.3 The Toolbar

The toolbar contains buttons to start the most important procedures of the PG-FP4 quickly.

Table 4-1: Toolbar buttons

	Menu *Device Setup*		Select Programming area		*Device EPV*
	Menu *File Download*		*Device Erase*		*Device Blank check*
	Menu *File Upload*		*Device Program*		
	Menu *HEX Editor*		*Device Verify*		

Depending on the actual target device status or device type some toolbar buttons may be disabled.

4.4 The Menu

Depending on the actual target device status or device type some menu items may be enabled or disabled, i.e. the menu *Device →Erase* is only enabled when a device is connected.

4.4.1 File Menu

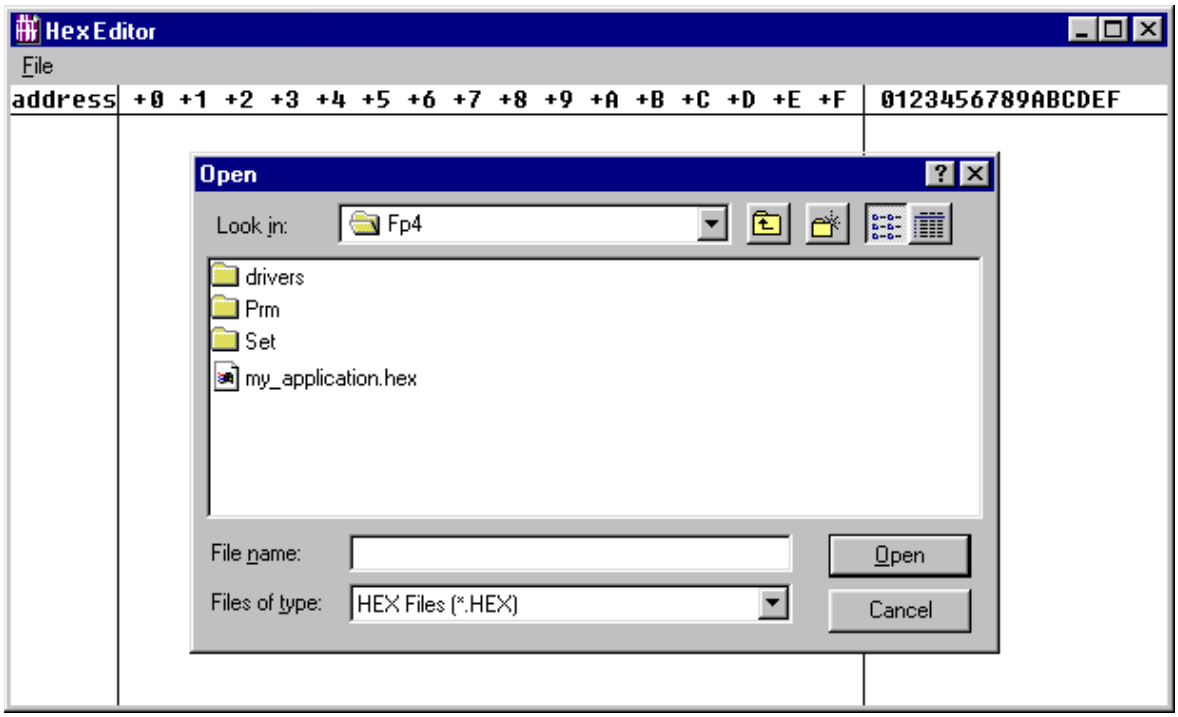
The ***File*** menu allows starting a HEX file editor and to select a program file in various formats for download to and upload from PG-FP4. Also a checksum calculation can be executed.

Figure 4-4: Menu item File

(1) Hex Editor

The ***HEX Editor*** menu allows to edit a program file in Intel HEX file format or Motorola S-Record format. A HEX editor window opens and in a file open dialog the file to be edited can be specified.

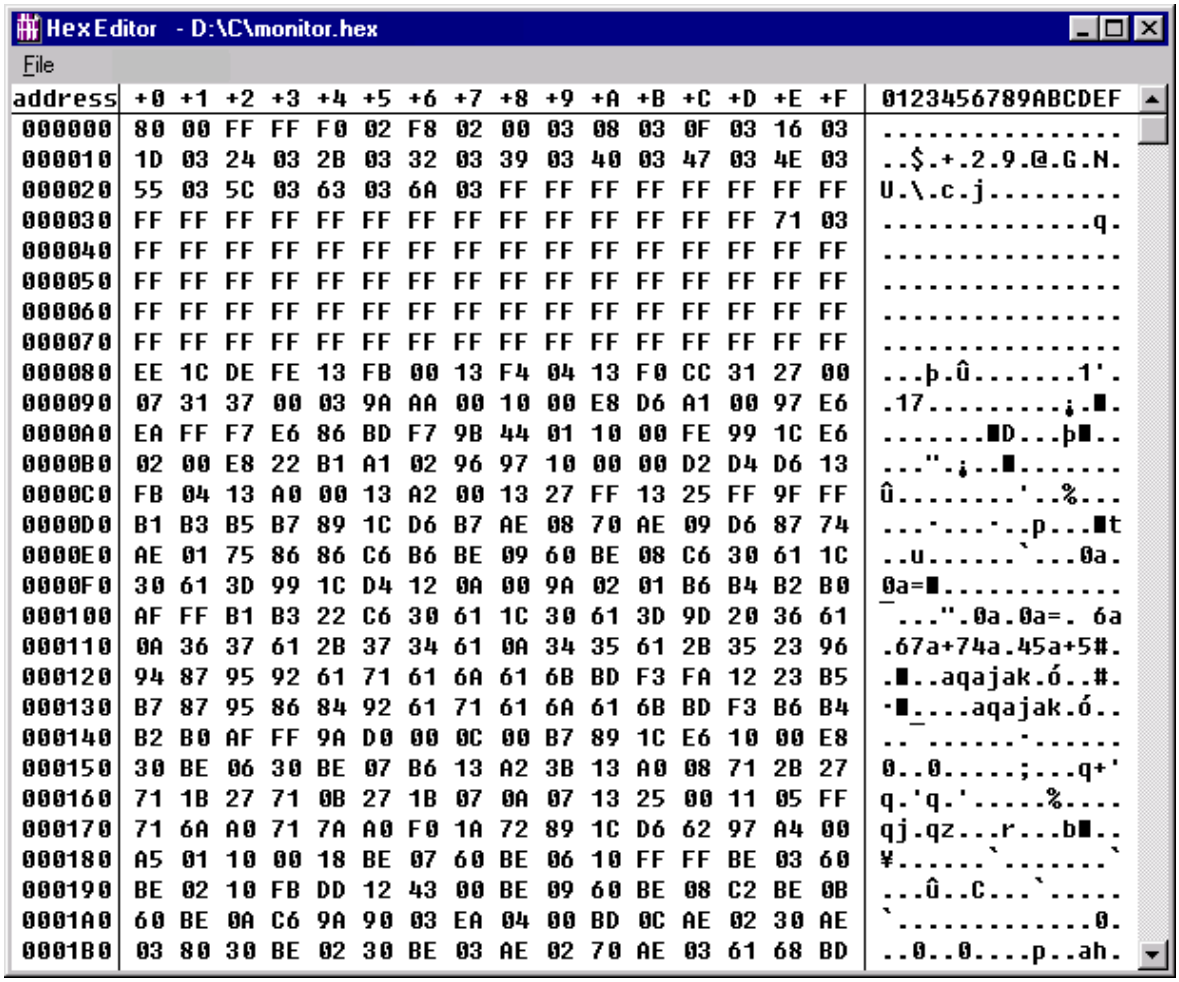
Figure 4-5: HEX Editor file open window



From the *Files of type* list box, HEX Files or SREC Files may be selected.

After selecting a file to open, the HEX editor main window loads the file and displays its contents.

Figure 4-6: HEX editor main window



Modification of the displayed file can be done by placing the mouse cursor inside the HEX editor main window and data input via keyboard is accepted for all shown memory locations.
The HEX editor accepts data only in hexadecimal format, i.e. figures 0-9 and letters A–F. Any other data will be rejected.
The ASCII representation, if any, is shown at the right side of the main window. This area is meant to be for reference only. Data input is not possible in the ASCII window.
Use the scroll bar to move another address range into the visible area of the HEX editor. The address space shown in the HEX editor window is limited to 4 MB.

Keyboard data input functions:

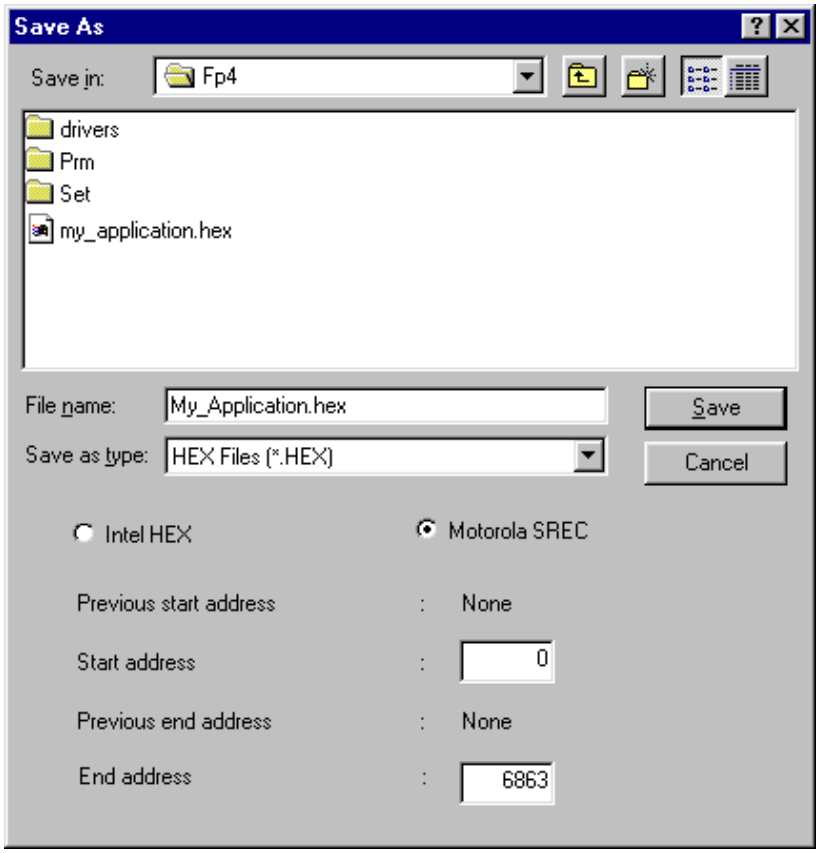
Table 4-2: HEX editor key functions

Key	Function
0-9, A-F	Data entry
→	Move cursor in right direction
←	Move cursor in left direction
↑	Move cursor in upper direction
↓	Move cursor in lower direction
Tab	Move cursor to the next input field

If at least one change has been made to the edited file, the HEX editor ***File*** →***Save*** and ***File*** →***Save As…*** menu items will be enabled to save the modified data.

The ***Save*** menu item saves the file in its original file format and file size while ***Save As…*** allows to specify different options:

Figure 4-7: HEX Editor Save As... dialog

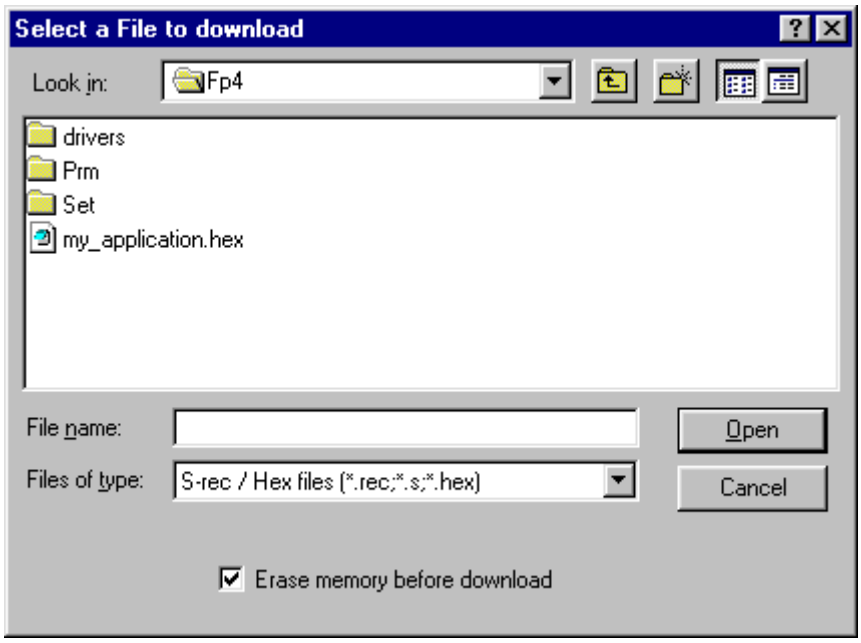


Beside file name and directory location, ***Save As…*** allows selecting a different start address and a different end address for the new file. The original start address and end address is offered as default selection. Also, the output file format may be selected as Intel HEX or Motorola SREC formats.

(2) Download

The ***Download*** menu allows selecting and downloading a program file into the PG-FP4 flash memory. After downloading the program file may be programmed into the device's flash memory.

Figure 4-8: File selection window for program download



The most recently used directory a file has been downloaded from will be offered in this download menu. The directory name will be saved in the key `FileDownloadDirectory...` of the `[Programmer]` section of PG-FP4.INI file. After program download a CRC will be calculated covering the selected programming area and the CRC will be stored in the key `FileDownCrcSum...` of the `[Programmer]` section of FP4.INI file. The CRC will be used to verify PG-FP4s memory contents before an autoprogramming sequence is started. The name of the download file is saved in the key `DownloadFileName...` of the `[Programmer]` section of FP4.INI file.

Erase memory before download can be selected to clear PG-FP4s memory contents before the new program is downloaded.

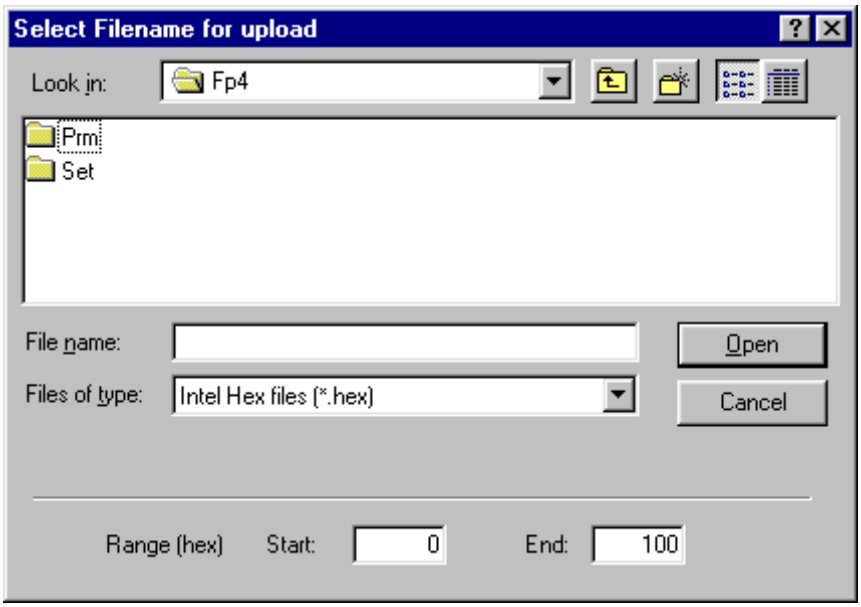
The ***Open*** button starts the download procedure.

The ***Cancel*** button closes the window without downloading the program.

(3) Upload

The ***Upload*** menu allows specifying and uploading a program file from PG-FP4 flash memory to disk.

Figure 4-9: File selection window for program upload



In the appearing window you can

- Select a program file for upload
- Select the upload file format (Intel HEX or Motorola S-Record format)
- Select the memory start- and end addresses to upload

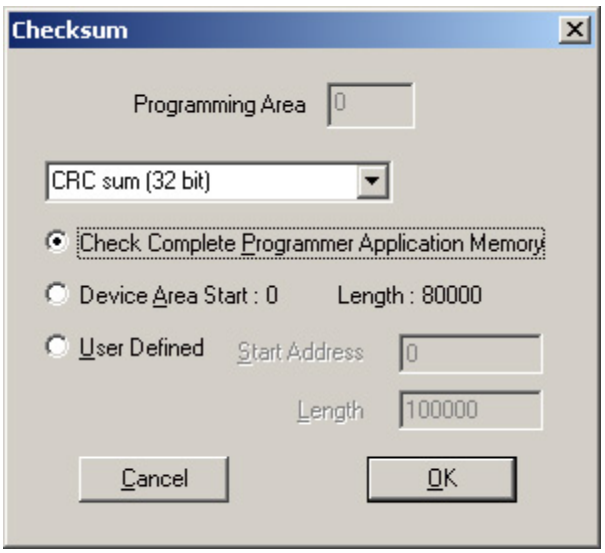
The most recently used directory a file has been uploaded to will be offered in this download menu. The directory name will be saved in the key `FileUploadDirectory` of the `[Programmer]` section of FP4.INI file. Also the file format, start address and end address will be saved in specific keys of the FP4.INI file.

The ***Open*** button starts the upload procedure.
The ***Cancel*** button closes the window without uploading the program.

(4) Checksum

The ***Checksum*** menu may be used to verify that PG-FP4's flash memory area contains the correct download file.

Figure 4-10: Checksum dialog window



Two variants of checksum are available, which are selected from the drop down menu:

- CRC sum (32 bit)
- Arithmetic checksum (16 bit)

The arithmetic checksum algorithm is the same, that is used inside the device, if it supports the 'Checksum' command (see also 'Device' menu).

Select ***Check Complete Programmer Application Memory*** if a checksum shall be calculated covering the whole programming memory area.

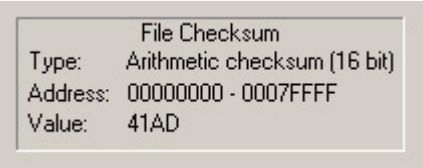
Select ***Device Area*** to calculate a checksum of the memory area according to the target device.

Select ***User Defined*** if a CRC shall be calculated over any other memory area. As soon as this option is enabled, the memory ***Start Address*** and memory ***Length*** need to be specified.

The requested checksum type is calculated by PG-FP4 and displayed in the communication window. Additionally, it is shown in the main window (see Figure 4-11 below) and stored in PG-FP4's EEPROM memory. See chapter 6 how to display the checksum value in Stand-Alone mode.

Note, that the file checksum described here is never calculated and displayed automatically after a file download. This must be done manually after loading a new file.

Figure 4-11: Main window – File checksum



Remark: If programming areas are enabled, the checksum calculation and address data apply to the active programming area only!
For reference, *Programming Area* shows the currently selected programming area.

Source code of the CRC32 function used is provided in chapter *PG-FP4 operation using terminal communication*, section *crc command*.

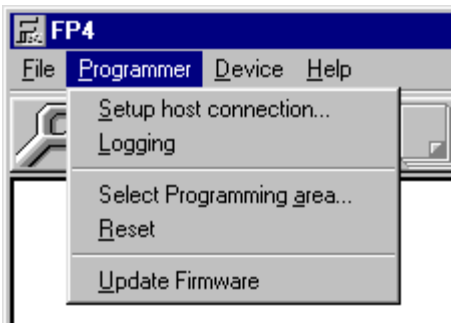
(5) Quit

The ***Quit*** menu terminates the interface program and returns control to the operating system. User settings are saved in the FP4.INI file so that PG-FP4 GUI will start up next time with the same settings.

4.4.2 Programmer menu

The ***Programmer*** menu allows selecting the communication channel and corresponding communication parameters. A log file may be specified to monitor the communication to and from PG-FP4. The default programming area may be selected, the PG-FP4 reset command and a menu item to update PG-FP4 firmware are available.

Figure 4-12: Menu item Programmer

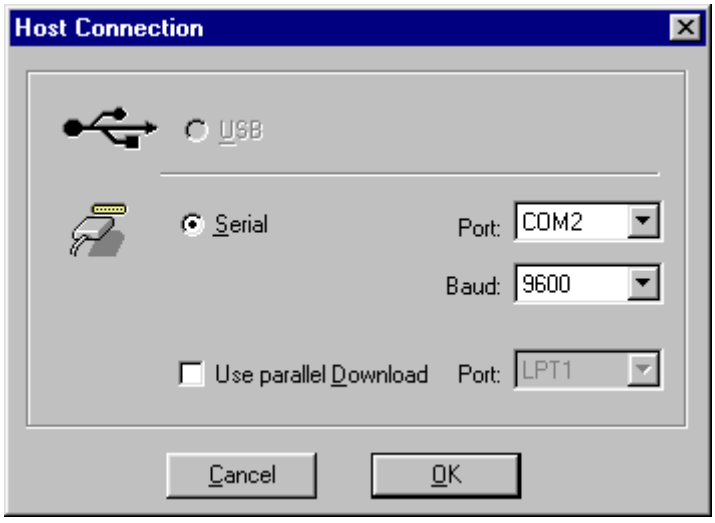


(1) Setup host connection

At startup the GUI automatically tries to connect to PG-FP4 using the parameters `HostConnectionSpeed`, `HostConnectionPort` and `HostDownloadPort` of the section `[GUI]` of FP4.INI.
If this connection cannot be established, the GUI tries to connect via COM1 … COM4, using 9600 baud, 19200 baud, 38400 baud, 57600 baud and 115200 baud on each port until it succeeds.

Additionally, manual selection of the communication channel and communication settings for the connection between PG-FP4 and the PC can be done in this dialog:

Figure 4-13: Host Connection dialog



You may select ***USB*** as communication channel, if USB is supported on your PC.
For ***Serial*** communication ***Port*** and ***Baud*** rate may be selected from the drop down list boxes.

Use parallel Download can be selected in addition to the serial port. If parallel download is selected, data download to PG-FP4 is performed via the selected parallel interface. Despite of this selection, command communication will still be done via the serial interface.

Cautions: 1. The parallel interface cable is not part of the PG-FP4 package!

2. Using the parallel port requires that the LPTx port must not be captured by the operating system! For details, please refer to the documentation of your operating system.

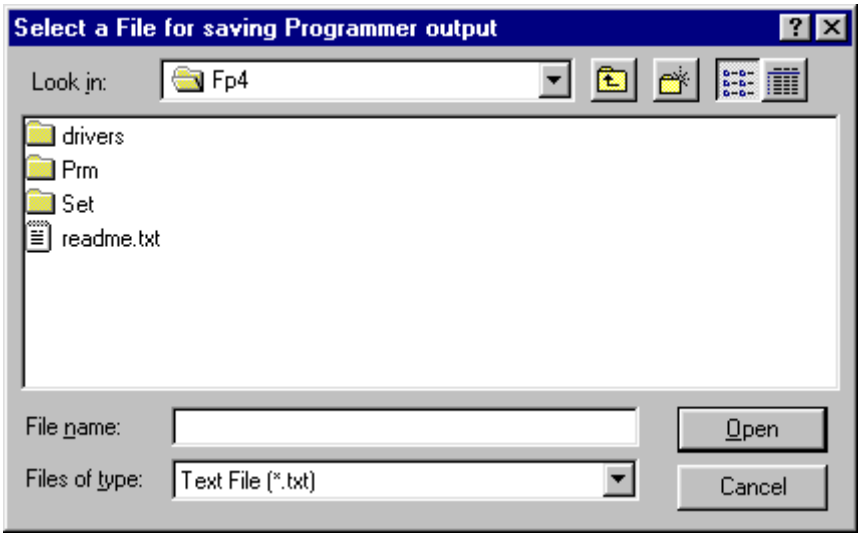
3. USB communication is not supported on Windows 95 and Windows NT!

Clicking the ***Cancel*** button closes the window without changes.
By clicking the ***OK*** button the GUI establishes a connection between PG-FP4 and PC using the selected communication parameters.

(2) Logging

The ***Logging*** menu opens a file open dialog to select the log file name. The log file will capture the communication between the PC and PG-FP4.

Figure 4-14: Log file dialog



Once logging is enabled, a check mark in the *Logging* menu indicates that logging is active. Selecting the menu again will close the log file and stop any further communication logging.

(3) Select Programming area

The ***Select Programming area*** menu allows selection of one out of two different programming areas of PG-FP4.

Figure 4-15: Programming area selection

The PG-FP4 internal memory is split into two independent memory areas of same size, which may hold two different application programs for flash programming. When opening this dialog, the current programming area selection will be displayed.
Additionally, the size of the memory area is displayed in the communication window (be sure to have latest firmware version running for this feature); e.g.:

```
Active Program Area: 0
Max. program size: 2 MByte
>
```

The programming area size depends on the hardware version of your PG-FP4. Minimum is 1 MB; from control code H onwards it is 2 MB.

This feature needs to be enabled in the parameter (PRM) file or customised parameter (SET) file.

(4) Reset

The ***Reset*** menu sends a software reset command to the programmer. The reset performs software reset to the PG-FP4 microcontroller. All voltages (V_{PP}, V_{DD} and V_{DD2}) will be switched off. After reset the communication window will show the current version of PG-FP4 firmware.

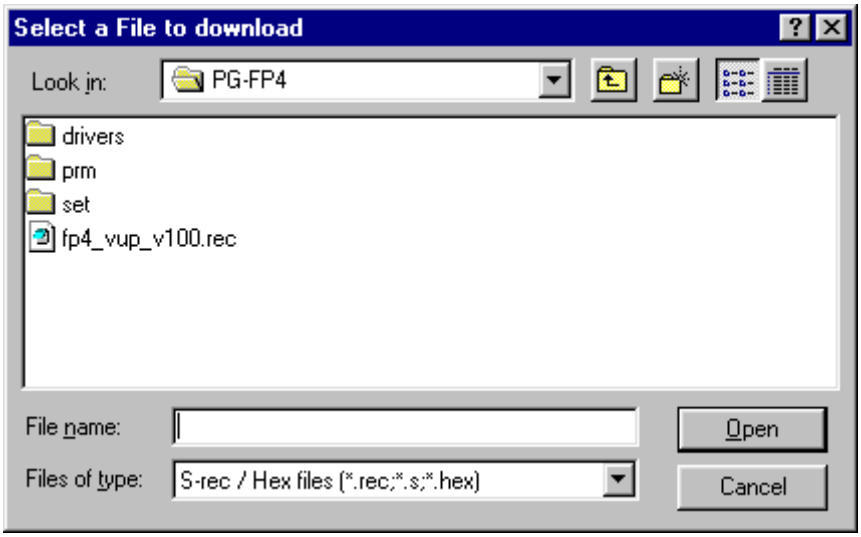
(5) Update Firmware

The ***Update Firmware*** menu initiates the PG-FP4 firmware update sequence. Before starting the update sequence, make sure that you have downloaded the requested update file(s) from the NEC WEB page(s) at **http://www.eu.necel.com/update**.
When the ***Update Firmware*** menu is activated PG-FP4 will ask for confirmation first:

Figure 4-16: Firmware Update confirmation

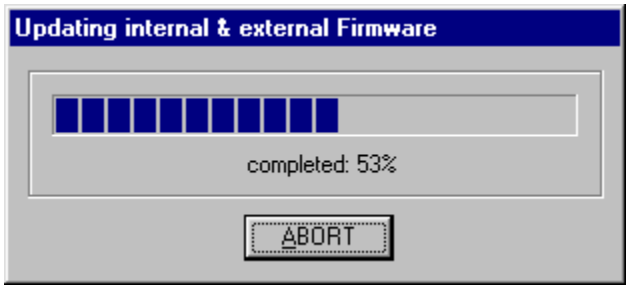
Press the **Yes** button to continue firmware update or press the **No** button to cancel.
After pressing the **Yes** button, the firmware update file in S-record format must be selected:

Figure 4-17: Select firmware update file



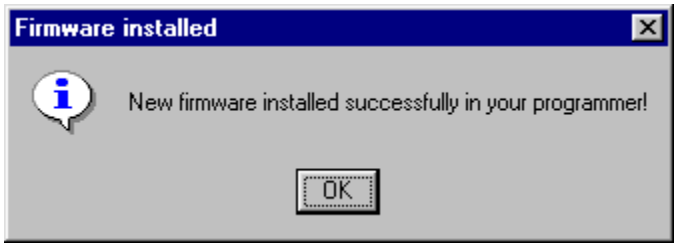
After selecting the requested file, the **Open** button starts the various steps of the update sequence. While the update is running, an indicator shows the progress of the update activities. Also the command window shows several messages according to the update steps currently under execution.

Figure 4-18: Firmware update in progress



The GUI will indicate as soon as the firmware update is completed.

Figure 4-19: Firmware update complete message

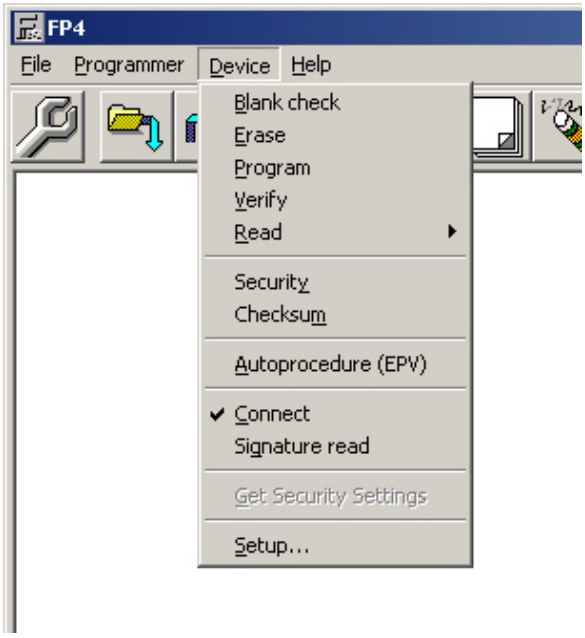


PG-FP4 will execute a reset command and re-starts operation using the new fimware version.

4.4.3 Device Menu

The ***Device*** menu item offers commands to control PG-FP4. Some menu items may be inactive if PG-FP4 has not been connected to the target device or if items are not available for the target device connected to PG-FP4.

Figure 4-20: Menu item Device



(1) Blank Check

The ***Blank check*** command initiates a blank check of the target device connected to PG-FP4. If the flash memory of the target device is erased, the blank check terminates successfully. If the flash memory is not completely erased, an error message is displayed.

The flash memory has to be erased first before programming may start.

Caution: The *Blank check* command is not available for all types of target devices!

(2) Erase

The ***Erase*** command initiates the erase procedure for the target device connected to PG-FP4. Before an erase command is executed, the device is checked by a blank check command. If the device is already blank, the erase command will not be executed.

For single-power-supply flash microcontrollers, the section *Command options* of the Advanced tab of the *Device* →*Setup* menu controls if blank check before erase is executed or not.

Remark: You may abort the erase procedure by the pressing the *Cancel* button on PG-FP4.

After completing the erase command, the GUI displays the target device status.

(3) Program

The ***Program*** command starts the programming procedure of the target device connected to PG-FP4. During device programming, the memory contents of the active programming area (0 or 1) is programmed into the erased flash memory of the target device. The section *Command options* of the Advanced tab of the *Device* →*Setup* menu controls if a *Verify* command is executed automatically after a ***Program*** command or not.

It also executes verification to check if the write level is secured after the user program has been written.
Since programming needs some time (some seconds up to several minutes, depending on the device) a progress window is displayed, indicating the programmers activity. The progress window shows the percentages of the program already programmed into the device.

Remark: You may abort the erase procedure by the pressing the *Cancel* button on PG-FP4.

If ***Read verify after Program*** is set in the Advanced Setup section, a *Verify* command will be executed after each *Program* command.

After completing the program command, the GUI displays the target device status.

(4) Verify

The ***Verify*** command transmits the memory contents of the active programming area (0 or 1) to the target device connected to PG-FP4 and verifies the data against the flash memory contents of the target device. This command does not check the write level, it checks if data communication between PG-FP4 and the target device has been performed correctly.

Since verifying needs some time (some seconds up to several minutes, depending on the device) a progress window is displayed. In case the device needs to be verified completely, the percentages already verified are shown. In case smaller memory areas of the device need to be verified only, a stopwatch is displayed indicating the programmer's activity.

Remark: You may abort the erase procedure by the pressing the *Cancel* button on PG-FP4.

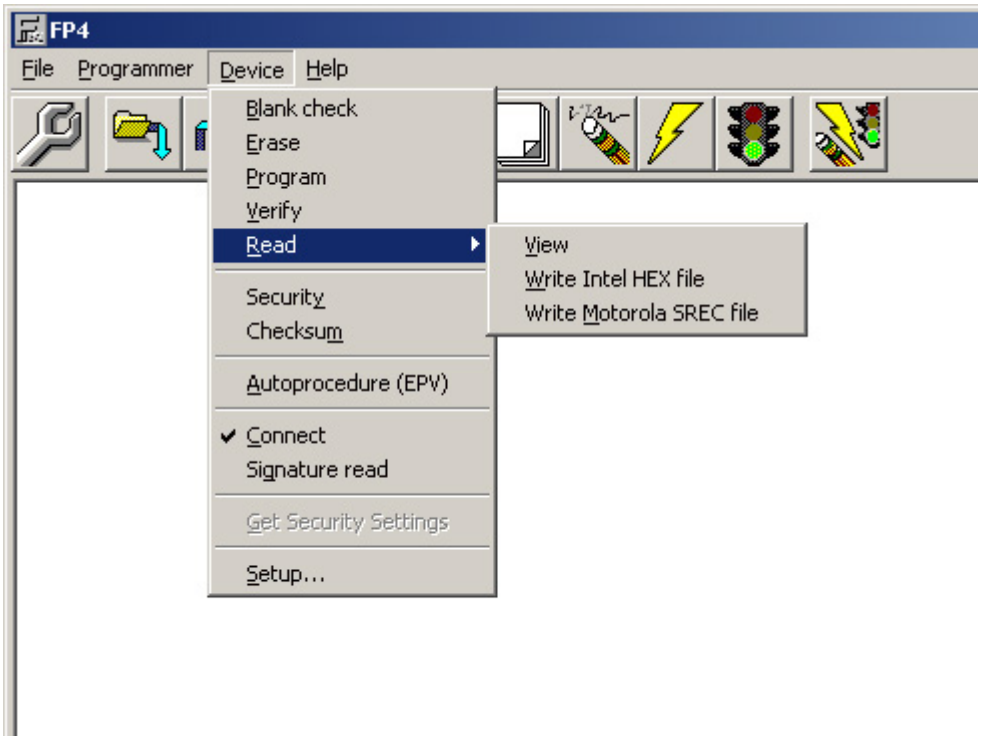
After completing the verify command, the GUI displays the target device status.

(5) Read

The ***Read*** command reads out the flash contents of the target device. The data can be

- displayed in hexadecimal form in the communication window (Selection ***View***)
- saved as a file in Intel HEX format (Selection ***Write Intel HEX file***)
- saved as a file in Motorola S-record format (Selection ***Write Motorola SREC file***)

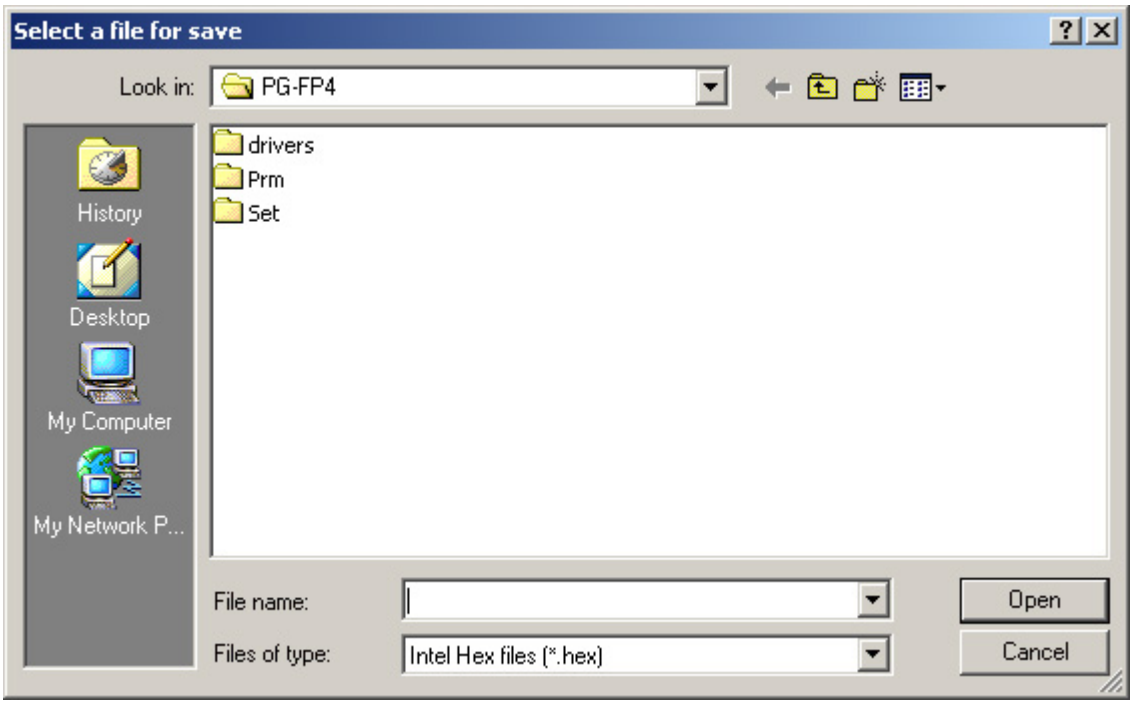
Figure 4-21: Menu item Device – Read



If ‘View’ has been selected, every 256 lines the output is stopped and is continued by hitting a key on the keyboard (e.g. blank).

If the data should be saved as a file, a ‘Select a file’ dialog is opened:

Figure 4-22: Device Read - Save as dialog (Intel HEX)



Remark: You may abort the data output by pressing the ***Cancel*** button on PG-FP4.

The ***Read*** command is not supported for all target devices.

(6) Security

The ***Security*** command sets the security flags in the target device as specified in the device setup dialog, section *Security flag settings*.

The **Security** menu item is not supported for all target devices.

(7) Checksum

The ***Checksum*** command reads the checksum from the target device.

The **Checksum** menu item is not supported for all target devices.

(8) Autoprocedure (EPV)

The ***Autoprocedure (EPV)*** command starts an automatic Blankcheck - Erase - Program - Verify sequence. Before the ***EPV*** command starts it compares the checksum of the downloaded program with the checksum value in the user program area of PG-FP4. If the two values are the same, EPV will be executed.

Since the concerning steps need some time (some seconds up to several minutes, depending on the device) a progress window is displayed, indicating the programmers activity. Regarding the selected commands, their execution behaviour and their possible messages please refer to the corresponding chapter(s).

Remark: You may abort the erase procedure by the pressing the *Cancel* button on PG-FP4.

If ***Read verify after Program*** is not set in the Advanced Setup section, the *Verify* command will not be executed.

After completing the EPV command, the GUI displays the target device status.

(9) Signature Read

The ***Signature Read*** command reads the target device name and its internal flash memory structure. Depending on the result of this command the GUI hides menu items not supported by the target device.

(10) Get Security Settings

The ***Get Security Settings*** command reads out the values of ‘Security Flag’ and ‘End of Boot block’ out of the target device, and stores the values as defaults for the Advanced Device Setup.

This is useful e.g. for evaluation environments, where a device may already have a Security Flag Set.

If e.g. the ‘Disable Block Erase’ is already set, and you try to set the Security Flags with ‘Disable Block Erase’ not set, the device reports an error, because clearing a Security Flag is only possible by performing a Chip Erase.

The ***Get Security Settings*** command is not supported for all target devices.

(11) Setup

The ***Setup*** menu allows configuring target device interface and option settings as well as target environment options of the programmer. Each time the GUI starts, it reads the most recently used customer settings file (SET) and parameter file (PRM) and fills the *Properties* dialog fields and list boxes according the file contents. The standard setup dialog and the advanced setup dialog allow modifying the customisable settings of the SET file only. The PRM files remains unchanged always.

(a) Parameter files

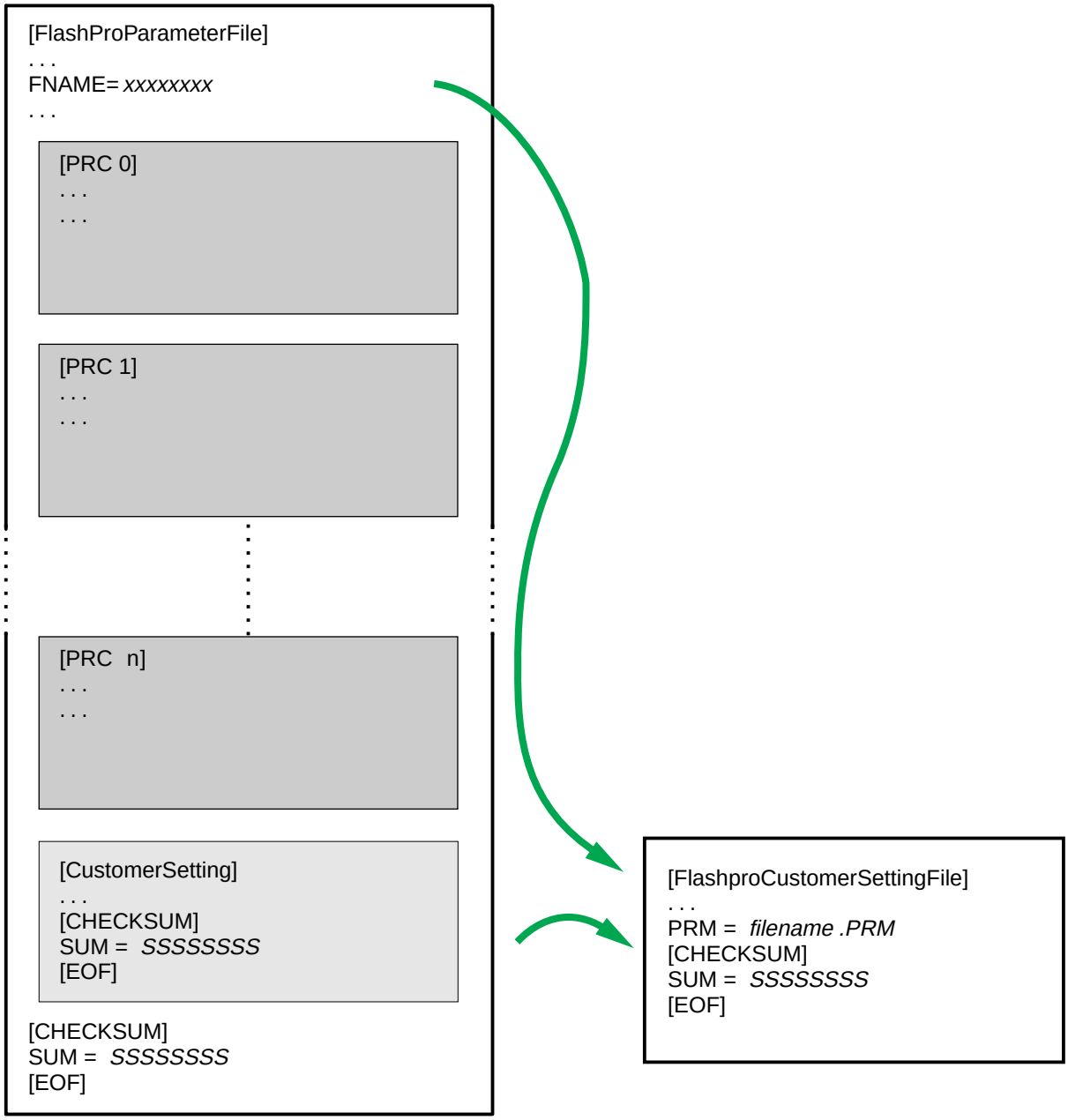
PRM file and SET file contain parameters to configure PG-FP4 according to the flash parameter specification of the target device. The PRM file contains information about various timings and features supported by the target device. Since the information in this file is very critical the user must not modify it. For safety reason, the PRM file is protected by a checksum and PG-FP4 will neither accept a PRM file in GUI mode nor in terminal mode if the checksum is incorrect. Renaming a PRM file is not allowed either.
The SET file contains information about available programming interfaces for the target device, oscillator frequency, operating voltages, etc. and it can be tailored according to user needs. The setup dialog of the GUI allows modifying SET file settings only.

Caution: Please make sure to select the correct PRM file according to the target device in use. Wrong PRM file selection may damage the target device!

(b) PRM / SET file structure

A PRM file downloaded from the NEC WEB site(s) is designed to be used in GUI mode and terminal mode as well. A PRM file may contain parameter settings for more than one version of a device. From the device signature PG-FP4 is able to detect which section of the PRM file is valid for the target device.

Figure 4-23: PRM file structure



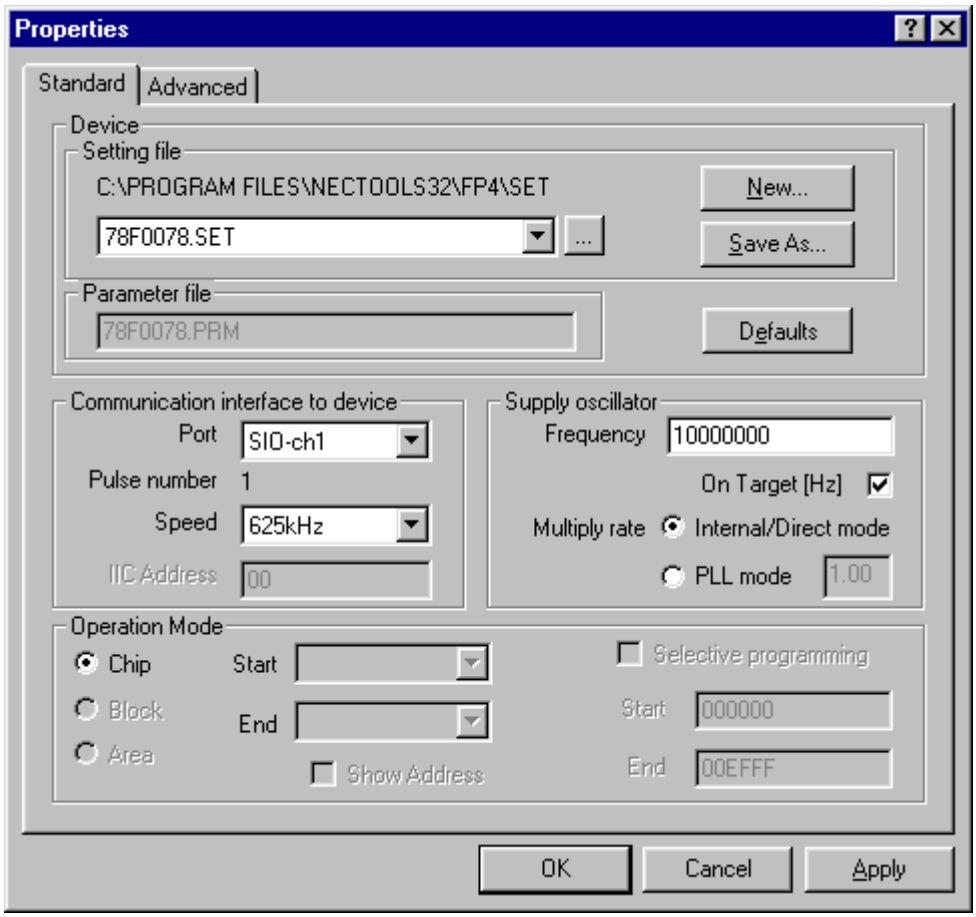
The **PRM** file contains fixed device parameter settings and a default section for user modifiable settings.

The **SET** file contains option and user settings. The GUI extracts the SET file automatically.

(c) Standard Setup

This menu item allows to setup target device and target environment specific options of the programmer.
The following window opens:

Figure 4-24: Device setup window – Standard view



This window shows all basic options, which might be set depending on the target environment and target device. The example shown above displays some common options for the µPD70F3037 device.

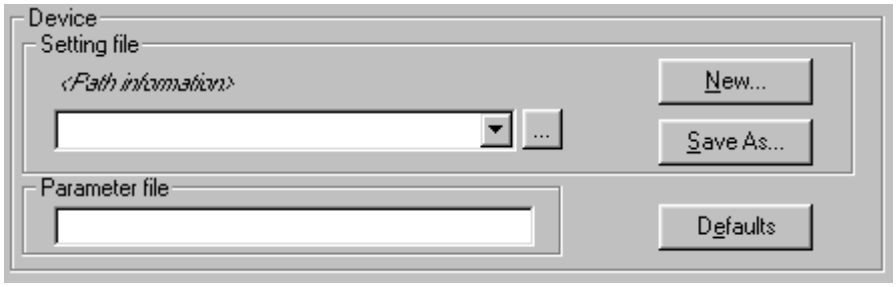
Pressing the ***Apply*** button updates the selected SET file immediately with the changes selected by the user but it does not download the SET / PRM files to PG-FP4. Changes are done permanently. The ***Cancel*** button does not reset them.
Pressing the ***OK*** button updates the SET file according to the parameter settings of the standard and advanced setup tabs and it downloads the PRM / SET files to PG-FP4. Settings of the SET file will thus override the default settings of the customer setting section in the PRM file.
Pressing the ***Cancel*** button closes the dialog without updating or downloading any file.

Remark: The Setup dialog may contain items that do not apply for the selected target device. In such cases the selections will not be enabled.

- **Device selection**

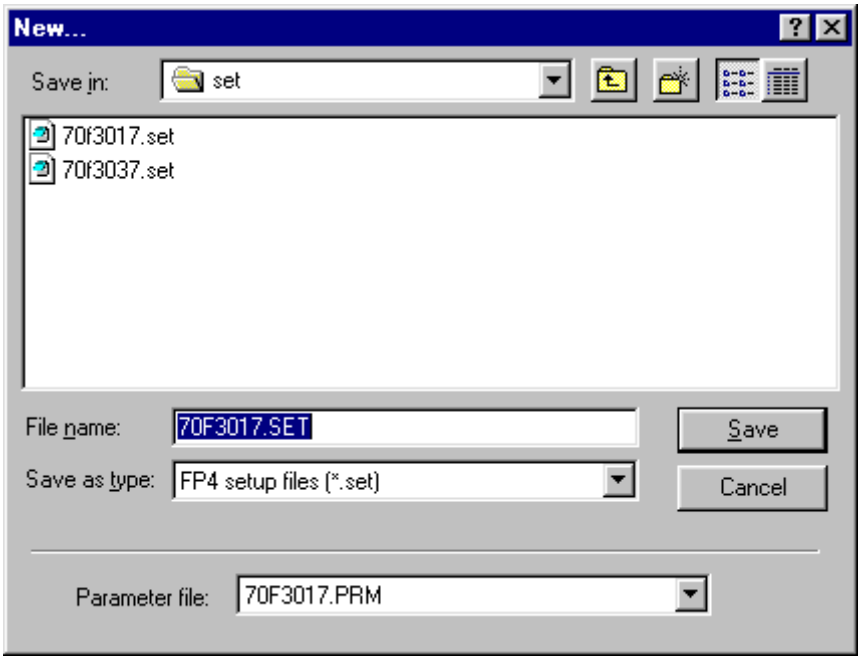
Parameter files contain the basic parameter settings for each flash device and cannot be changed. Customised settings are stored in SET files and do contain all those parameters, which may be changed in the setup dialog.
Each SET file is based on the `[CustomerSetting]` section of a valid PRM file. To select a new device, a previously generated SET file may be selected from the *Setting file* list box. The SET file and the corresponding PRM file will be loaded then.

Figure 4-25: Setup window - Device selection



The **…** button allows to select SET files from a different directory than the default one.
The ***Save As…*** button allows saving current settings into an existing or new customisable SET file.
The ***Defaults*** button changes all parameters to the value given in the `[CustomerSetting]` of the parameter file (PRM file).
The ***New…*** button allows to create a new customisable SET file.

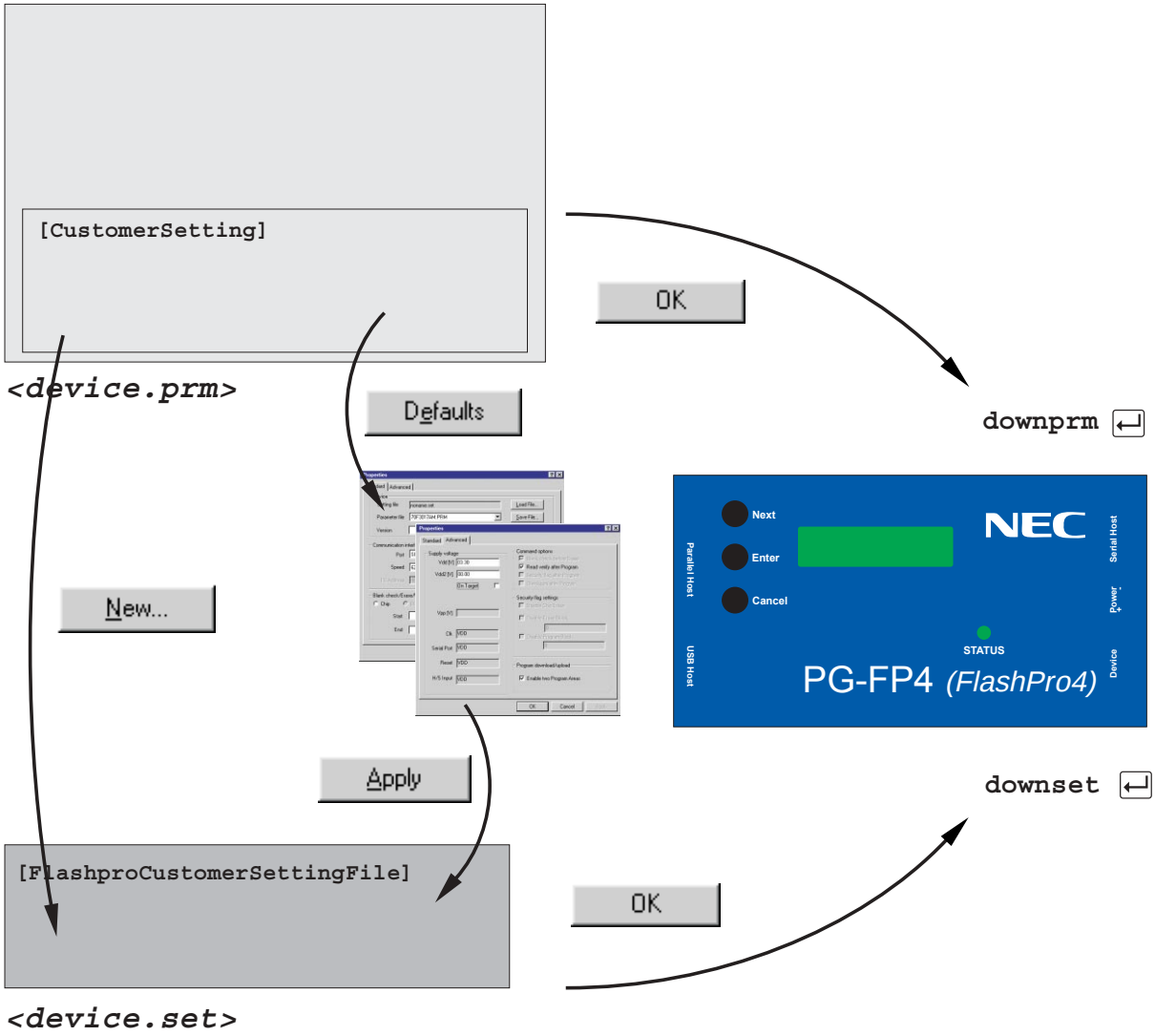
Figure 4-26: Creating a new SET file



A new SET file may be created based on the default settings of an existing PRM file. The ***New…*** dialog requires to select the PRM file first. The list of available PRM files installed in the `\PRM` directory may be selected from the *Parameter file* list box.

When a new *Setting file* selection has been made, the GUI extracts the name of the corresponding PRM file from the SET file and loads the PRM file automatically. The data of the SET file will be used fill the standard and advanced dialog elements.
Clicking the ***Defaults*** button copies the `[CustomerSettings]` section from the PRM file into the corresponding fields of the *Setup* dialog. Clicking the ***Apply*** button reads all dialog fields and writes the contents to the corresponding records of the selected SET file. Clicking the **OK** button downloads the PRM file and the SET file to PG-FP4 using `downprm` and `downset` commands respectively.

Figure 4-27: SET file modification and download

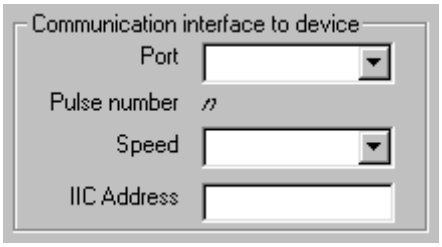


All modifications done in the setup dialog standard and advanced tabs will affect the SET file only.

- **Communication interface to device**

The communication interface to device selects the communication channel between PG-FP4 and the target device.

Figure 4-28: Setup window – communication interface selection



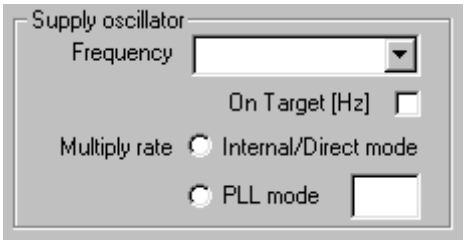
From the ***Port*** list box, the communication port can be selected. The list box contains all available ports of the target device selected.
Pulse number shows the number of pulses to be applied to V_{DD} line to select the Port listed above. This information is supplied for reference only.
From the ***Speed*** list box the communication speed for the selected communication channel can be chosen.
The ***IIC Address*** edit field allows specifying the I^2C address if programming channel I^2C is selected. The I^2C Address edit field will not be accessible if no I^2C port is selected.

Caution: When using the I^2C interface to program a target device, make sure that SI and SO signals lines are externally short-circuited.

- **Supply oscillator**

The supply oscillator selects the oscillator responsible for signal generation for programming and data transfer and its speed.

Figure 4-29: Setup window - oscillator selection



From the ***Frequency*** list box the oscillator frequency use for signal generation can be selected.
The ***On Target*** check box specifies if clock signal is supplied from PG-FP4 or from the target hardware. If this option is selected the **Frequency** cannot be selected from the list box. It must be entered manually.

Multiply rate may be set to ***Internal/Direct mode*** or ***PLL mode***.

For determination, if **Internal/Direct mode** or **PLL mode** has to be selected, use the following rules:

1) If the device does not have a pin (e.g. CKSEL) for switching clock generator PLL ON or OFF, select **Internal/Direct mode**

2) If the device has a pin (e.g CKSEL) for switching clock generator PLL ON or OFF, or, if different PLL factors may be used depending on clock frequency or pin level:

   - select **PLL mode**, if your target hardware or the programming adapter defines by the select pin, that clock generator PLL is ON, or if more than one PLL multiply value is possible.

   Do not change the default value for the PLL multiply factor, except it is explicitly noted in the chapter 'Flash Memory' of the device users manual, that the multiply factor may vary e.g. depending on the input clock frequency.

   - select **Internal/Direct mode**, if your target hardware or the programming adapter defines by the select pin, that PLL is OFF and direct mode is used.

- **Operation Mode**

For some flash devices the flash memory is divided into several blocks or areas.

Figure 4-30: Setup window – Operation Mode

If you select ***Chip***, ***Block*** or ***Area*** mode, you can blankcheck, erase and verify the complete chip memory or single/multiple blocks or areas.

The ***Start*** and ***End*** list boxes allow selecting starting end ending block/area for the desired operation. The **Show Address** checkmark allows toggling between block/area number selection and physical address selection for the operation.

In chip mode the block/area do not apply. If you select chip mode, the required operation affects the complete flash memory of the device.

The **Selective programming** checkmark allows to select programming the complete chip memory or any selected memory area.

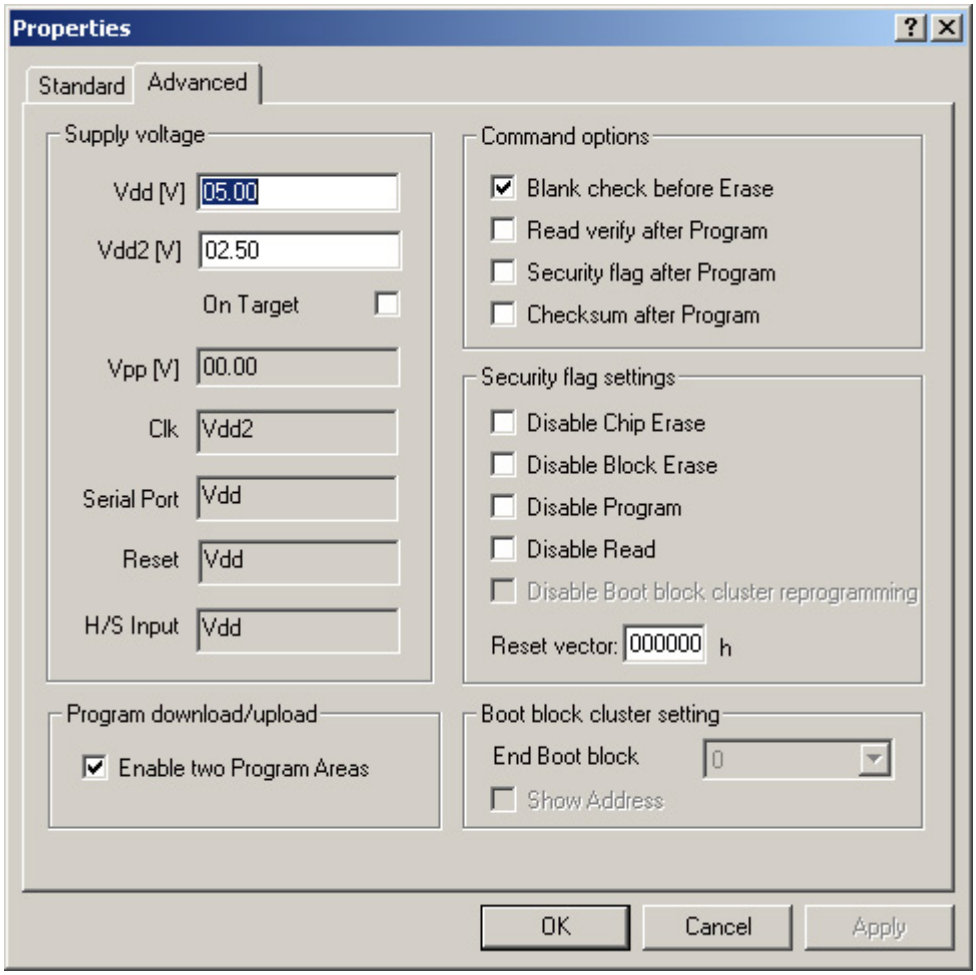
The ***Start*** and ***End*** edit controls allow specifying starting and ending address for the programming operation. The selection for start address and end address must fit into the target device's physical memory.

In chip mode the Start/End address selection do not apply. If you select chip mode, the required operation affects the complete flash memory of the device.

(d) Advanced Setup

By clicking on *Advanced* tab advanced device specific options are shown.

Figure 4-31: Device setup window – Advanced view

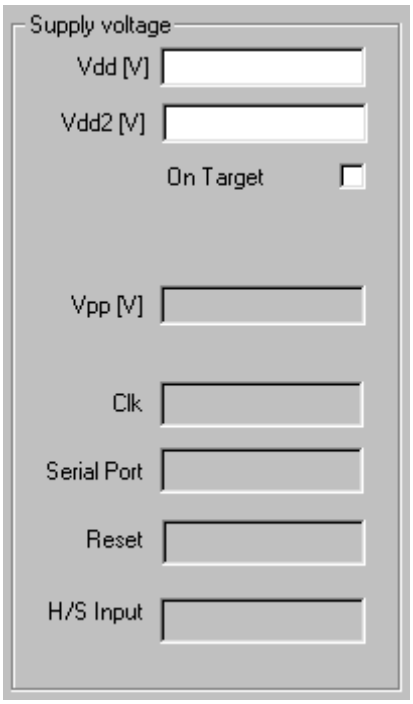


The Advanced Setup allows specifying programming voltages, command options and security flag settings for target device programming. The example shown above displays some advanced options for the µPD70F3239 device.

- **Supply Voltage**

The supply voltage section allows specifying voltage levels for target device programming. Depending on the target device type, one (V_{DD}) or two (V_{DD} and V_{DD2}) voltage levels need to be specified.

Figure 4-32: Setup window – Supply Voltage



V_{DD} value specifies the high level voltage, ***V_{DD2}*** value specifies the signal low level. Values must be entered in units of volts (V).
If ***On Target*** is selected, V_{DD} / V_{DD2} voltages will be supplied form the target hardware and thus cannot be selected in this dialog. However, voltage levels are displayed according to the requirements given in the PRM file.

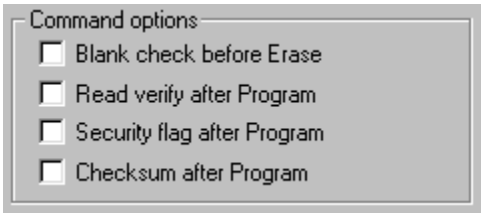
Caution: Make sure that values for V_{DD} and V_{DD2} are entered correctly before you switch to target supply!

The signal levels for ***V_{PP}*** ***Clk***, ***Serial Port***, ***Reset*** and ***H/S Input*** cannot be altered. The selections according to PRM file are shown here.

- **Command options**

The command options section allows specifying operation behaviour of PG-FP4.

Figure 4-33: Setup window – Command options

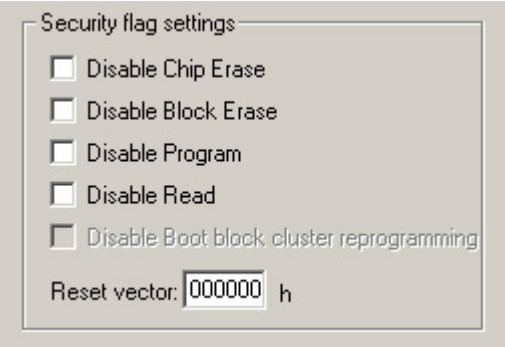


Blank check before Erase performs a blank check operation before each erase command. If the flash memory area is already erased (blank check ok) the erase sequence will not be started.
Read verify after Program enables an automatic verify operation of the programmed flash memory after each target device programming sequence.
When this option is set, a *Verify* command is executed after each *Program* command.
When this option is not set, the *Autoprocedure (EPV)* command will not execute a *Verify* command.
Security flag after Program enables an automatic programming of the selected security flags after each target programming.
The ***Checksum after Program*** performs a checksum calculation inside the target device after each target programming and reports the resulting checksum.

- **Security flag settings**

The security flag settings specify, which of the available security features shall be enabled. Depending on the device type, Security Flag setting is not supported at all, or only some of the Security features are supported.

Figure 4-34: Setup window: Security flag settings



Disable Chip Erase disables further erase commands for the entire target device flash memory area.

Disable Block Erase disables further erase commands for the entire target device memory blocks.

Disable Program disables further program and block erase commands for the entire target device memory blocks.

Disable Read disables further read-out of the target device memory.

Disable Boot block cluster reprogramming disables further erase and programming of the flash blocks belonging to the boot block cluster; that are all blocks with number <= ‘End boot block number’. This number is defined in the **Boot Block cluster setting** window (see below).

The ***Reset vector*** field allows to set the start address of the target device after RESET to any address.

In case **Disable Chip Erase** is set, a warning message will appear to draw the user attention to the fact that no further erasing or programming of the target device will be possible any more.

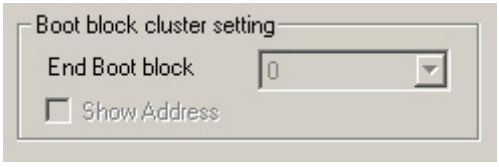
In case **Disable Boot block cluster reprogramming** is set, a warning message will appear to draw the user attention to the fact, that no further erasing or programming of the Boot block cluster will be possible any more.

- **Boot block cluster setting**

Defines the number of the flash block, which is top of the boot block cluster.
The boot block cluster bottom is fixed to block 0.

Example: End Boot block= 3 →Boot block cluster = flash blocks 0, 1, 2, 3

Figure 4-35: Setup window: Boot block cluster setting

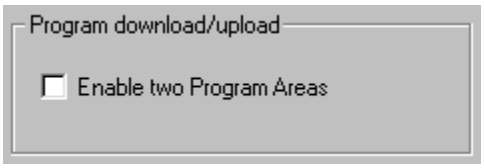


The ***Boot block cluster*** feature is not supported for all target devices.

- **Program download/upload**

Two different target programs can be downloaded into PG-FP4 and may be programmed into the target flash device alternatively.

Figure 4-36: Setup window: Program download/upload



Enable two Program Areas enables selection of programming areas (see **Programmer →Select Programming area…** menu).

4.4.4 Help Menu

The ***Help*** menu displays the help and about box selection.

Figure 4-37: Menu item Help

(1) Contents

The ***Contents*** menu starts the Windows Help engine and opens the contents dialog of PG-FP4 help file.

(2) About

The ***About*** **menu** opens the program entry window:

Figure 4-38: About window

It is displayed until you click on the Micro picture.

4.5 PG-FP4 initialisation file

The PG-FP4 GUI maintains several keys of the initialisation file FP4.INI to keep actual settings and start up with the same settings as during a previous session. FP4.INI is located in the same directory as FP4.EXE itself.
The initialisation file consists of several sections and keys in each section. In case a key is not available in the corresponding section the default setting for that key will be assumed.

Default key setting(s) are marked as bold.

4.5.1 Section [GUI]

Table 4-3: Section [GUI]

Key name	Setting	Description
StartWithMaximizedMainWindow	0	At startup of PG-FP4, the main window will open with default window size.
	1	At startup of PG-FP4, the main window will open with maximised window size.
HostConnectionSpeed	**9600** 19200 38400 57600 115200	Specifies the communication speed. Other communication speeds may be selected.
HostConnectionPort	**COM1** COM2 COM3 COM4 USB	Specifies the communication port. Other COM ports may be selected if available on the host PC.
HostDownloadPort	**COM1** COM2 COM3 COM4 LPT1 LTP2	Specifies the communication port for file download.

4.5.2 Section [Programmer]

Table 4-4: Section [Programmer] (1/2)

Key name	Setting	Description
RecentSetFile	<string>	Specifies the most recently used customisable settings file name. If no file name is given, PG-FP4 will use the file XXX.SET in the subdirectory \SET.
FileDownloadDirectoryArea0	<string>	Most recently used file download directory name to progarea 0. If no name is given here, PG-FP4 startup directory will be used.
FileDownloadNameArea0	<string>	Name of the most recently downloaded file to progarea 0.
FileDownCrcSumArea0	<string>	Saves the most recently used CRC as hexadecimal value of the complete memory after user file download to progarea 0. In case of errors **Failed** will be written into this key.
FileDownloadDirectoryArea1	<string>	Most recently used file download directory name to progarea 1. If no name is given here, PG-FP4 startup directory will be used.
FileDownloadNameArea1	<string>	Name of the most recently downloaded file to progarea 1.
FileDownCrcSumArea1	<string>	Saves the most recently used CRC as hexadecimal value of the complete memory after user file download to progarea 1. In case of errors **Failed** will be written into this key.
FileDownloadDirectoryNoArea	<string>	Most recently used file download directory name, no progarea selected. If no name is given here, PG-FP4 startup directory will be used.
FileDownloadNameNoArea	<string>	Name of the most recently downloaded file, no progarea selected.
FileDownCrcSumNoArea	<string>	Saves the most recently used CRC as hexadecimal value of the complete memory after user file download no progarea selected. In case of errors **Failed** will be written into this key.
FileChecksumType_0	<string>	Type of checksum for last recently calculated file checksum for progarea 0.
FileChecksumCS_0	<string>	Checksum value for last recently calculated file checksum for progarea 0.
FileChecksumAddress_0	<string>	Address range for last recently calculated file checksum for progarea 0.
FileChecksumType_1	<string>	Type of checksum for last recently calculated file checksum for progarea 1.
FileChecksumCS_1	<string>	Checksum value for last recently calculated file checksum for progarea 1.
FileChecksumAddress_1	<string>	Address range for last recently calculated file checksum for progarea 1.
FileChecksumType_2	<string>	Type of checksum for last recently calculated file checksum, progarea disabled.

Table 4-4: Section [Programmer] (2/2)

Key name	Setting	Description
FileChecksumCS_2	<string>	Checksum value for last recently calculated file checksum, progarea disabled.
FileChecksumAddress_2	<string>	Address range for last recently calculated file checksum, progarea disabled.
FileUploadDirectory	<string>	Most recently used file upload directory name. If no name is given here, PG-FP4 startup directory will be used.
FileUploadFilter	1	File upload in Motorola SREC format.
	2	File upload in Intel HEX format.
FileUploadStart	<string>	Most recently used memory start address for file upload.
FileUploadEnd	<string>	Most recently used memory end address for file upload.

Chapter 5 Sample Programming Session Using GUI Software

As an example, a V850/SB1 micro microcontroller will be used to show a typical programming sequence using PG-FP4 GUI software.

1. Use the provided serial cable to connect PG-FP4 to your host computer.

2. Use the target cable to connect PG-FP4 to the target hardware. This may either be a NEC FA-100-GC programming adapter or your own target hardware.

3. Select the suitable AC-plug (EURO, UK or US/JAPAN) and connect it to the AC adapter.

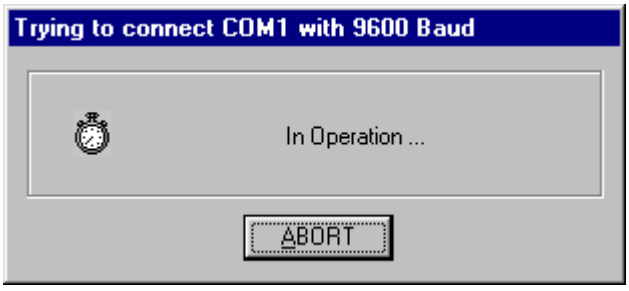
4. Use the AC adapter to connect PG-FP4 and mains. The status LED of PG-FP4 should be off and the LCD display shows '**Commands >**' indicating that PG-FP4 is ready for operation.

5. If not yet done, install the PG-FP4 GUI software on your PC as described in the chapter "Software Installation".

6. Copy the flash parameter file for V850/SB1 to your hard disk and install it into <*PG-FP4 install path*>\PRM. You may obtain it from the NEC internet site ***http://www.eu.necel.com/update***. Make sure that you download the flash parameter files according to your device specification (version number, mask rank).

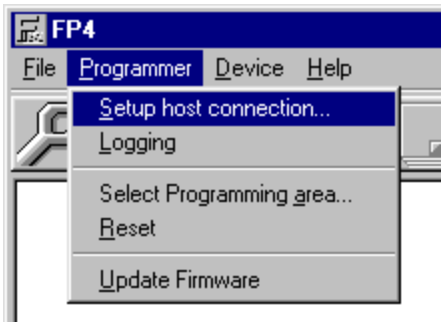
7. Start PG-FP4 GUI software. The GUI tries to establish connection to PG-FP4 using COM1 at 9600 bps. If this does not succeed, it will scan other communication speeds and then other ports.

Figure 5-1: Connection GUI to PG-FP4



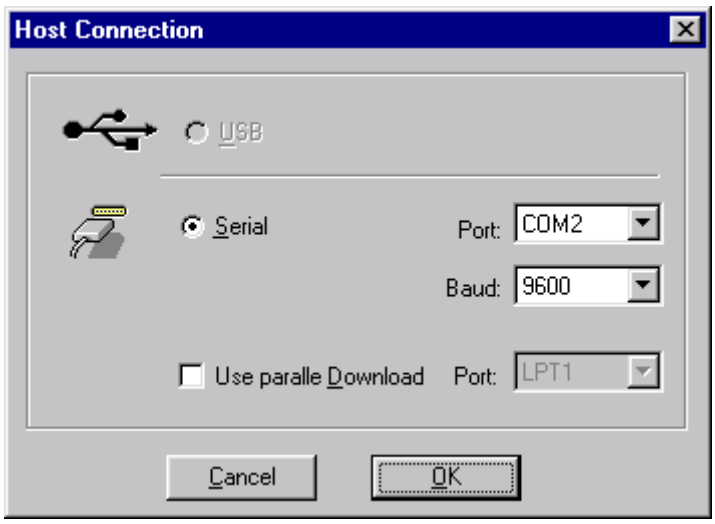
8. You may speed up this procedure by pressing the ***ABORT*** button and select the communication port in the *Programmer →Setup host connection…* menu directly:

Figure 5-2: Setup host connection



9. Select the appropriate port number you connected PG-FP4 to. Initial communication speed shall be set to 9600 bps (factory setting of PG-FP4).

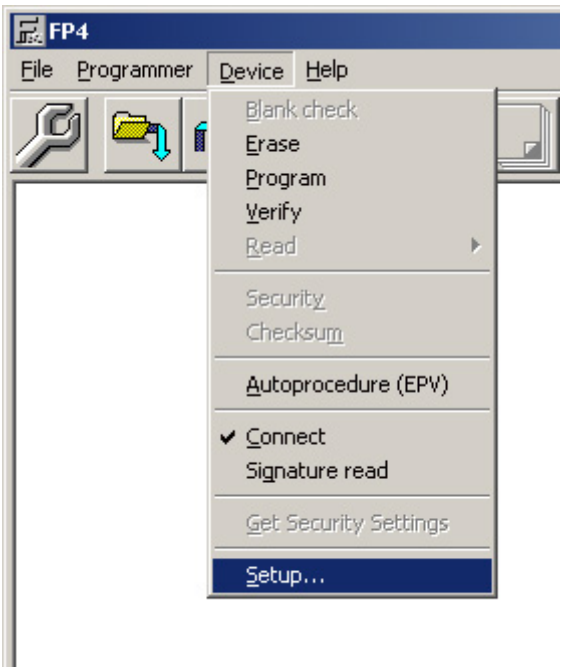
Figure 5-3: Setup communication parameters



10. Select ***OK*** to activate the new port settings.

11. Select the menu item *Device →Setup*

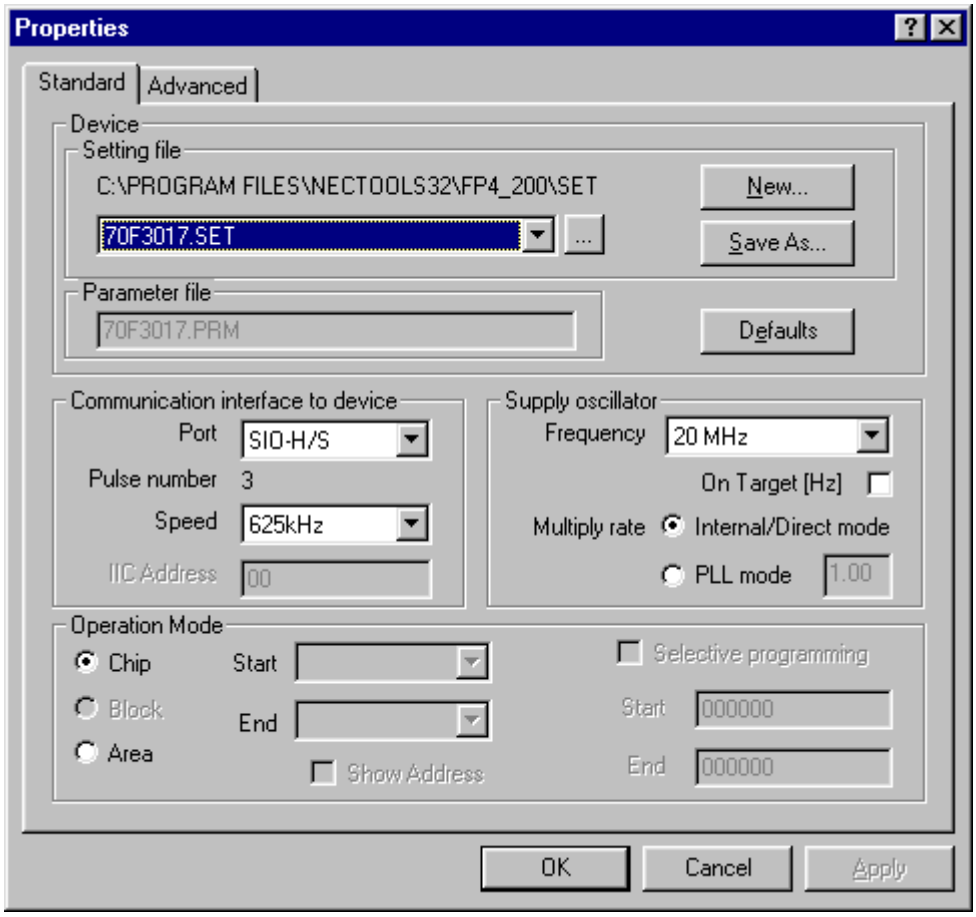
Figure 5-4: Device connect menu



Toolbar: 

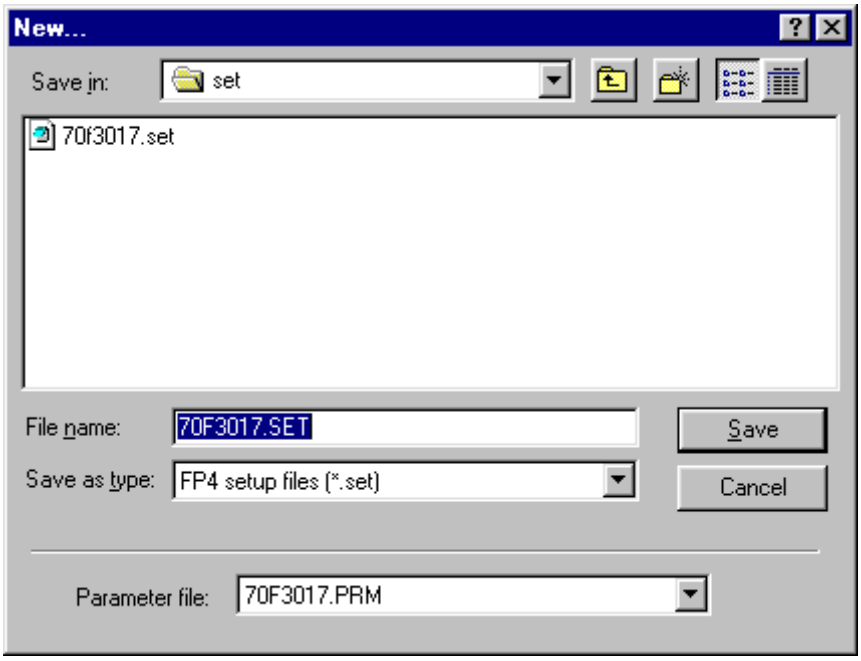
12. The *Standard* dialog for device setup will be activated.

Figure 5-5: Device Setup Dialog



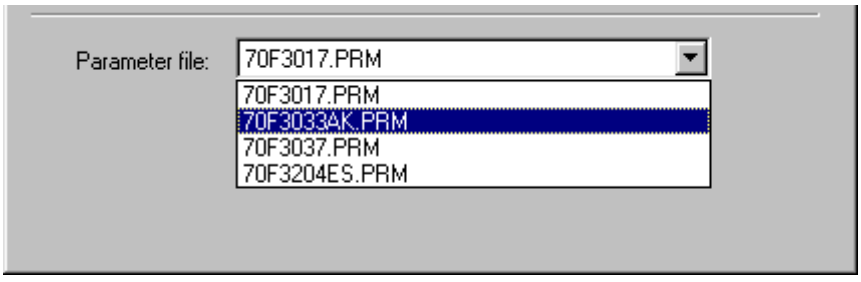
13. To create a new SET file for the V850/SB1 device, press the ***New…*** button.

Figure 5-6: Creating a new SET file



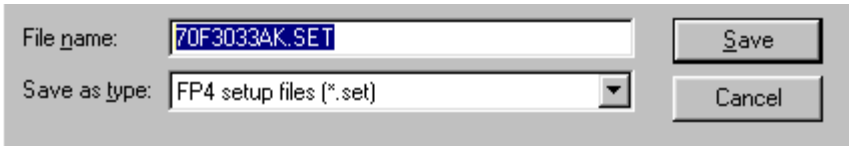
14. Select *70F3033AK.PRM* (µPD703033A, mask rank K) in the ***Parameter file*** drop down box.

Figure 5-7: Device PRM selection



15. Enter a new name for the SET file based on the 70F3033AK PRM file and save it to disk.

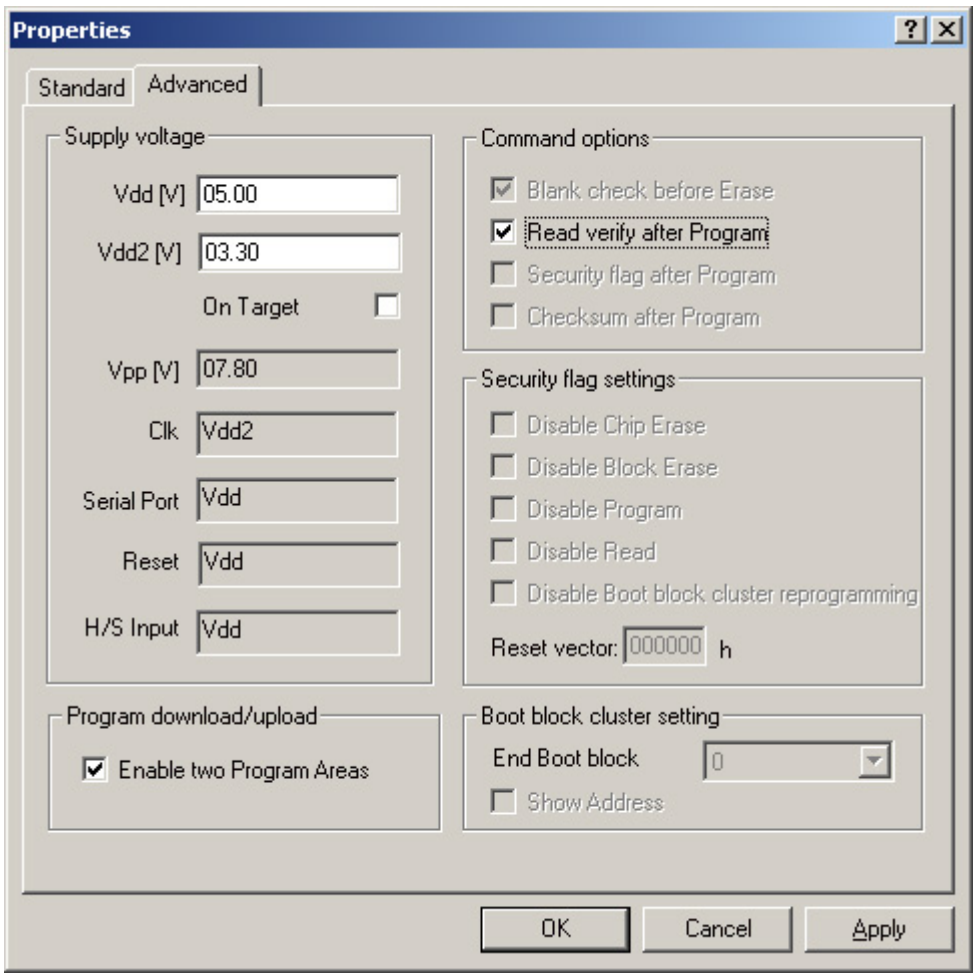
Figure 5-8: Save new SET file



16. Verify that all settings shown in this dialog correspond to the needs of your target environment. Especially ***Communication interface to device*** and ***Supply oscillator*** shall be set according to the device interface you selected. You may also change settings for ***Operation Mode***, if necessary and if enabled for the selected device.

17. Switch to the *Advanced* dialog.

Figure 5-9: Advanced device setup dialog



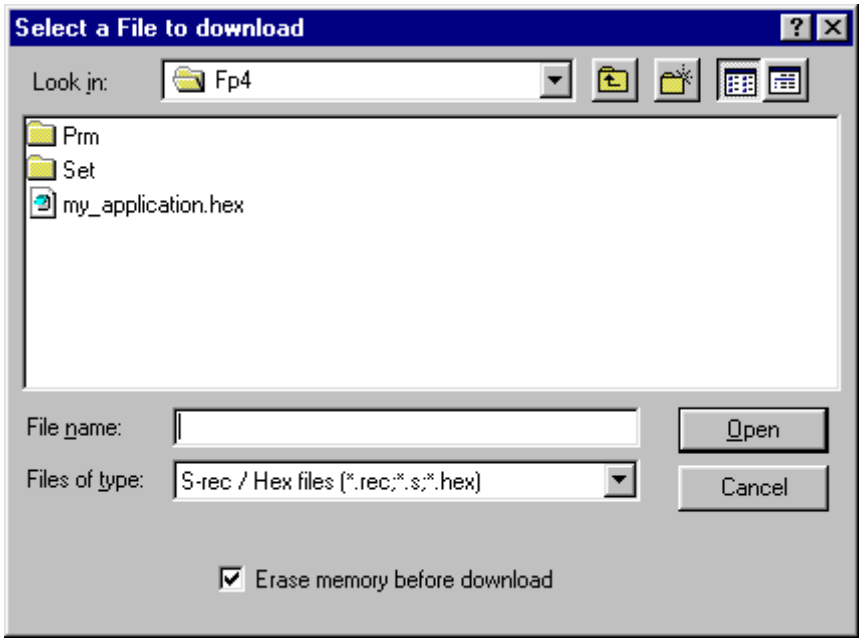
18. Check ***Supply voltage*** information and make sure that the settings are according to your hardware environment, especially when you are going to supply V_{DD} from your target hardware.

19. Press the ***OK*** button. The GUI loads now the parameter settings to PG-FP4.

20. Select the menu item *File →Download*

Figure 5-10: Open a program file for download

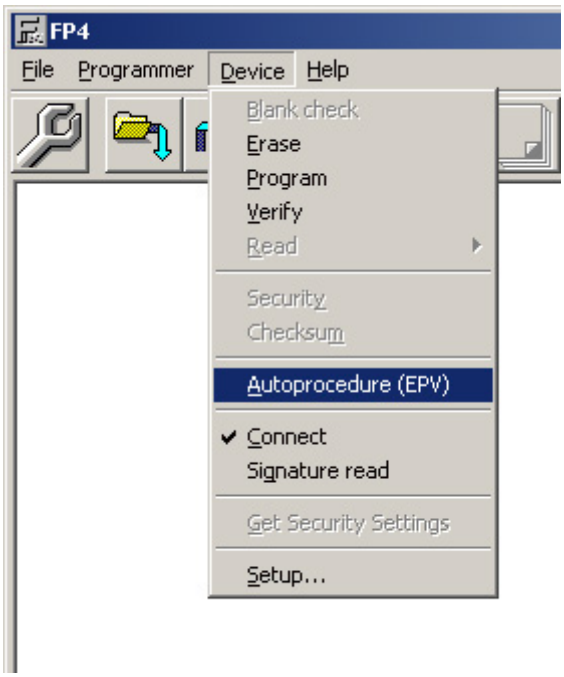
Toolbar:



21. Select the file you would like to program into the target device. Click ***Open*** to start the download sequence. During program download a progress window will show the progress of downloading.
22. Select the *Device →Autoprocedure* menu item.

Figure 5-11: Erase →Program →Verify menu

Toolbar:



The V850/SB1 will be blankchecked, programmed and verified now. When EPV is completed, you may take it out of the programming adapter.

23. If necessary, insert a new device to be programmed into FA-XXX-YY and repeat from step 22.

24. If no other device needs to be programmed exit PG-FP4 GUI. All settings made during this programming session will be saved so that they can be reused GUI software is started up next time. The file FP4.INI will keep the window layout as well as the communication settings and the name of the SET / PRM files used. Also, all target device settings are saved in an EEPROM inside PG-FP4.

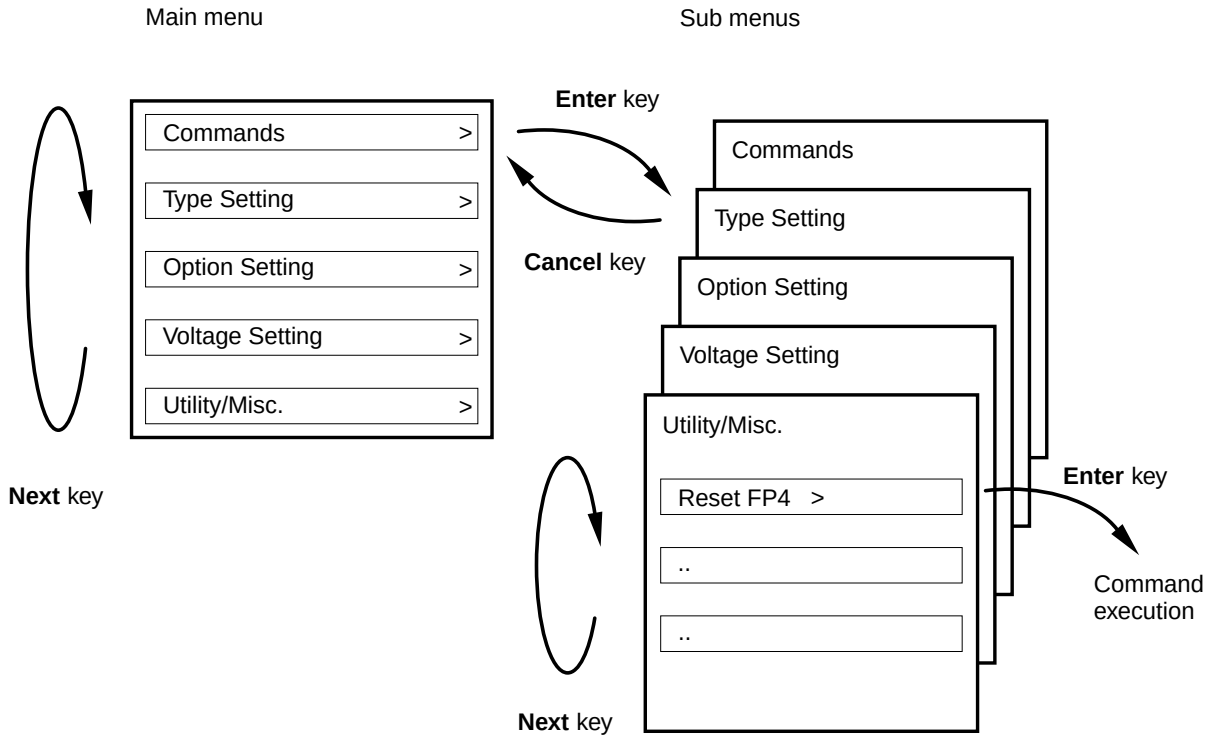
Chapter 6 PG-FP4 Operation in Stand-Alone Mode

PG-FP4 provides features to allow a stand-alone programming mode. In this operation mode, neither GUI nor terminal connection is required to program flash devices. In addition to GUI or terminal mode, the parallel host connection may be used to control PG-FP4 remotely for blank check, erase, program and verify operation.
In this operation mode PG-FP4 will use flash-programming parameters stored in its internal memory area and thus it is not possible to select any new device for flash programming or alter any programming parameter. The most recently used type of device during GUI or terminal operation mode can be programmed only.

For data entry and operation control the **Next**, **Enter** and **Cancel** buttons can be used. The LCD display and the status LED inform about menu and parameter selections and the operation status respectively.

The various commands are organised in a three level menu hierarchy that can be stepped through using the **Next**, **Enter** and **Cancel** buttons. The **Next** button steps to the next menu on the same level. The **Enter** button selects and activates the currently displayed menu item or it performs the requested command, depending on the current menu item. The **Cancel** button stops the currently executed command or it steps back to the previous menu level.

Figure 6-1: Menus controlled by keystrokes



On the first menu level, PG-FP4 shows the menu items that can be selected. A command prompt '>' indicates that the menu can be selected by the **Enter** key or that a given command can be executed. On the second menu level, the first line in the message display shows the menu item and the second line shows the response from the PG-FP4, if any.

After connecting the power supply to mains and PG-FP4 the LCD display indicates by showing '**Commands** >' that PG-FP4 is ready for operation. The status LED is switched off.

LED status indicator:

Yellow

The selected command is being executed. Details of the execution status will be displayed on the message window.

Green

The selected command has been executed correctly.

Red

The selected command has been terminated due to an error. Details of the error will be displayed on the message display.

6.1 PG-FP4 operation menu

PG-FP4 can be controlled using the commands as described in this chapter.

Caution: Most of the commands will return useful information only if

- **a valid parameter file for the device to be connected has been downloaded during a previous programming session**
- **a device corresponding to the downloaded parameter file is physically connected to PG-FP4 via target cable and programming adapter**
- **the application program to be programmed into a flash device has been downloaded to PG-FP4 during a previous programming session.**

After those steps, the host connection is not necessary any more. An **E.P.V.** command or an extension port I/O input signal can start the programming sequence of the flash device connected to PG-FP4.

6.1.1 Commands menu

The command menu offers various commands necessary for rewriting the target device. Select a command from this menu and press the **Enter** button to execute it.

E.P.V.	>	Next **Enter** button pressing starts the erase, program, and verify sequence of the device connected to PG-FP4. The *E.P.V.* sequence affects the target memory area (Chip, Block or Area).**Note 2**
Program	>	Next **Enter** button pressing starts the programming sequence of the device connected to PG-FP4. The *Program* sequence affects the target memory area (Chip, Block or Area).**Note 2**
Erase	>	Next **Enter** button pressing starts the erase sequence of the device connected to PG-FP4. The *Erase* sequence affects the target memory area (Chip, Block or Area).
Verify	>	Next **Enter** button pressing starts the verify sequence of the device connected to PG-FP4. The *Verify* sequence affects the target memory area (Chip, Block or Area).**Note 2**
Security	>	Next **Enter** button pressing programs the security flag in the device connected to PG-FP4. **Note 1**
Checksum	>	Next **Enter** button pressing starts checksum calculation function in the device connected to PG-FP4. The checksum will be displayed on the message display. The *Checksum* sequence affects the target memory area (Chip, Block or Area).**Note 1**
Blank check	>	Next **Enter** button pressing starts the blankcheck sequence of the device connected to PG-FP4. The *Blankcheck* sequence affects the target memory area (Chip, Block or Area).**Note 1**
Signature	>	Next **Enter** button pressing reads the signature from the device connected to PG-FP4. It shows the device name in the message display.
Prog Area	>	Next **Enter** button pressing switches prog area selection from 0 to 1 or vice versa.

Notes: 1. This command is not supported by all flash devices and will therefore not be displayed in all device selections.

2. A user program cannot be downloaded to PG-FP4 in stand-alone operation mode. It must have been downloaded via terminal or GUI during a previous programming session.

6.1.2 Type Setting menu

The type setting menu allows to check the target device rewrite environment currently set. The settings cannot be changed in stand-alone operation mode. All values shown are taken from the parameter file downloaded during a previous programming session.

Device Port	*Device Port* shows which device port has been selected for communication to the PG-FP4. Depending on availability SIO, SIO - H/S, UART, PORT or I^2C may be possible.
Multiply Rate	*Multiply Rate* shows the multiplication factor of the operating clock of the target device.
Serial CLK	*Serial Clock* shows the actual serial clock rate in Hz for communication between PG-FP4 and the device connected.
CLK source	*Clock Source* shows the source of the clock for communication between PG-FP4 and the device. The clock signal may be provided from PG-FP4 or target hardware.
PG CPU CLK	*PG CPU Clock* shows the clock frequency in MHz generated from PG-FP4.
Target CPU CLK	*Target CPU Clock* shows the clock frequency in MHz of the user system supplied to the target device.
Mode	*Mode* shows the operation mode for blankcheck, erase, program and verify commands. This mode may be chip mode, area mode or block mode.
PRG Area	*Prog Area* shows, which area of the device connected to PG-FP4 will be programmed. The units shown depend on the selection of the *Mode* command and can be counted in flash areas or flash blocks.

6.1.3 Options Setting menu

The option setting menu allows checking the command options and security flag settings currently set. The settings cannot be changed in stand-alone operation mode. All values shown are taken from the parameter file downloaded during a previous programming session.

BLN before ERS

Displays the status of the command option *Blankcheck before Erase.*
Blankcheck before Erase can be set to off or on. **Note 1**

on: Blank check is executed before execution of the Erase and EPV commands. If the result of the blank check is OK, erasure processing is not executed.
off: Blank check is not executed before execution of the Erase and EPV commands.

VRF after PRG

Displays the status of the command option *Verify after Program*. *Verify after Program* can be set to off or on. **Note 1**

on: After execution of the Program and EPV commands, data is verified against written data to the flash memory.
off: After execution of the Program and EPV commands data is not verified against written data to the flash memory.

SCF after PRG

Displays the status of the command option *Security Flag after Program*.
Security Flag after Program can be set to off or on. **Note 1**

on: After execution of the Program and EPV commands, the security flag selected by Security flag settings is automatically set.
off: After execution of the Program and EPV commands, the security flag selected by Security flag settings is not set.

SUM after PRG

Displays the status of the command option *Checksum after Program*.
Checksum after Program can be set to off or on. **Note 1**

on: After execution of the Program and EPV commands, the flash memory checksum value of the target device is read from the target device and displayed on the message display.
off: After execution of the Program and EPV commands, the flash memory checksum value of the target device is neither read nor displayed on the message display.

Prog Area

Prog Area shows if multiple program areas are supported for the target device connected to PG-FP4. If multiple program areas are supported, the current selection (0 or 1) will be displayed.

on (0): User program Area 0 (0x00000000 – 0x000FFFFF)
on (1): User program Area 1 (0x00100000 – 0x001FFFFF)
off: Entire 2 MB user program area is selected.

Chip ERS dis.

Displays the status of *Disable Chip Erase* of *Security settings*. *Chip Erase Disabled* can be set to on or off. **Notes 1, 2**

on: *Block Erase* and *Chip Erase* commands are disabled
off: The *Chip Erase* command is enabled.

Notes: 1. This command is not supported in all flash devices.

2. This command sets options, which become active as soon as the security flag is set in the device.

Block ERS dis.	Displays the status of *Disable Block Erase* of *Security settings*. *Block Erase Disable* can be set to on or off. **Notes 1, 2** on: The *Block Erase* command is disabled. off: The *Block Erase* command is enabled.
PRG disable	Displays the status of *Disable Program* of *Security settings*. *Disable Program* can be set to on or off. **Notes 1, 2** on: *Program* and *Block Erase* commands are disabled. off: The *Program* command is enabled.
READ disable	Displays the status of *Disable Read* of *Security settings*. *Disable Read* can be set to on or off. **Notes 1, 2** on: The *Read* command is disabled. off: The *Read* command is enabled.
Boot Blk PRG dis	Displays the status of *Disable Boot Block Programming* of *Security settings*. *Disable Boot Block Programming* can be set to on or off. **Notes 1, 2** on: *Chip Erase* command is disabled, *Program* and *Block Erase* commands are disabled for all blocks, which are part of the Boot block cluster. off: No restrictions for the Boot block cluster.
Reset Vector	Displays the address, where program execution starts after Reset.
End Boot Blk	Displays the last (highest) block of the Boot block cluster.

Notes: 1. This command is not supported in all flash devices

2. This command sets options, which become active as soon as the security flag is been set in the device.

6.1.4 Voltage Setting menu

The settings of the voltage setting menu cannot be changed in stand-alone operation mode. All values shown have been extracted from the parameter file downloaded during a previous programming session.

Vdd	*Vdd* displays the V_{DD} value used for the target device connected to PG-FP4.
Vdd2	*Vdd2* displays the V_{DD2} value used for the target device connected to PG-FP4.
Vdd Source	*Vdd Source* displays the source of V_{DD}. V_{DD} may be provided from PG-FP4 or the target hardware.
Clk Level	*Clock Level* indicates the voltage level of the serial communication signal. High level of the serial communication signal may be set to V_{DD} or V_{DD2}.
Ser Level	*Serial Level* indicates the voltage level of the serial communication signal. High level of the serial communication signal may be set to V_{DD} or V_{DD2}.
Res Level	*Reset Level* indicates the voltage level of the reset signal. High level of the reset signal may be set to V_{DD} or V_{DD2}.
HS Level	*HS Level* indicates the voltage level of the handshake signal. High level of the handshake signal may be set to V_{DD} or V_{DD2}.
Vpp	*Vpp* indicates the V_{PP} value used for the device connected to PG-FP4.

6.1.5 Utility/Misc. menu

Reset FP4	>	*Reset FP4* resets the programmer.
FP4 F/W Version		*PG F/W Version* shows the firmware version number of PG-FP4.
PRM Name		*PRM Name* displays the file name of the downloaded parameter file.
PRM File Version		*PRM File Version* displays the version number of the PRM file downloaded to PG-FP4.
HEX File Name		*HEX File Name* displays the file name of the HEX or SREC file downloaded into PG-FP4. If two prog areas are available, this menu shows the file name of the currently selected area.
CRC Sum (FP4)		*CRC Sum (FP4)* displays the checksum, generated by FP4 through GUI File – Checksum menu. See chapter 4.4.1 for details.

6.2 PG-FP4 remote control mode

The PG-FP4 can be used in remote control mode. In order to enable this mode, the extension connector must have been switch from centronics mode to remote control mode using the `ctr off` ↵ command. The selected mode is stored in PG-FP4's EEPROM and can be used during stand-alone operation.

6.2.1 PG-FP4 extension connector

Figure 6-2: PG-FP4 extension connector and signals

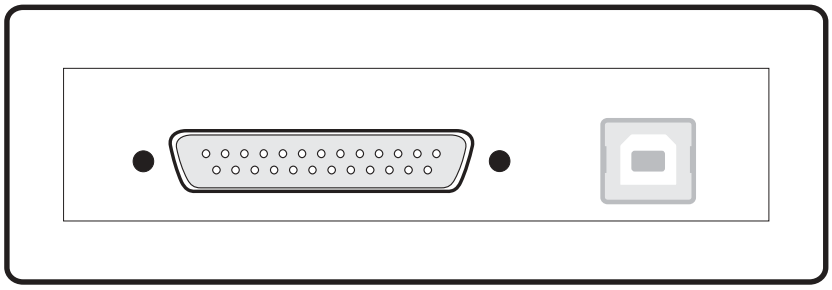


Table 6-1: PG-FP4 extension connector and signals

Pin number	Remote control mode		Operation
2	Start EPV 0	In	A high signal starts *Erase-Program-Verify* sequence of progarea 0. If *progarea* is disabled, this signal starts *Erase-Program-Verify* sequence of the complete PG-FP4 memory area.
3	Start EPV 1	In	A high signal starts *Erase-Program-Verify* sequence of progarea 1. If *progarea* is disabled, this signal will be ignored.
6	Connected	Out	A high signal indicates that connection to the target device has been established.
7	Busy	Out	A high signal indicates that an operation is ongoing.
8	OK	Out	A high signal indicates that the previous operation has been completed successfully.
9	Error	Out	A high signal indicates that the previous operation has not been completed successfully.

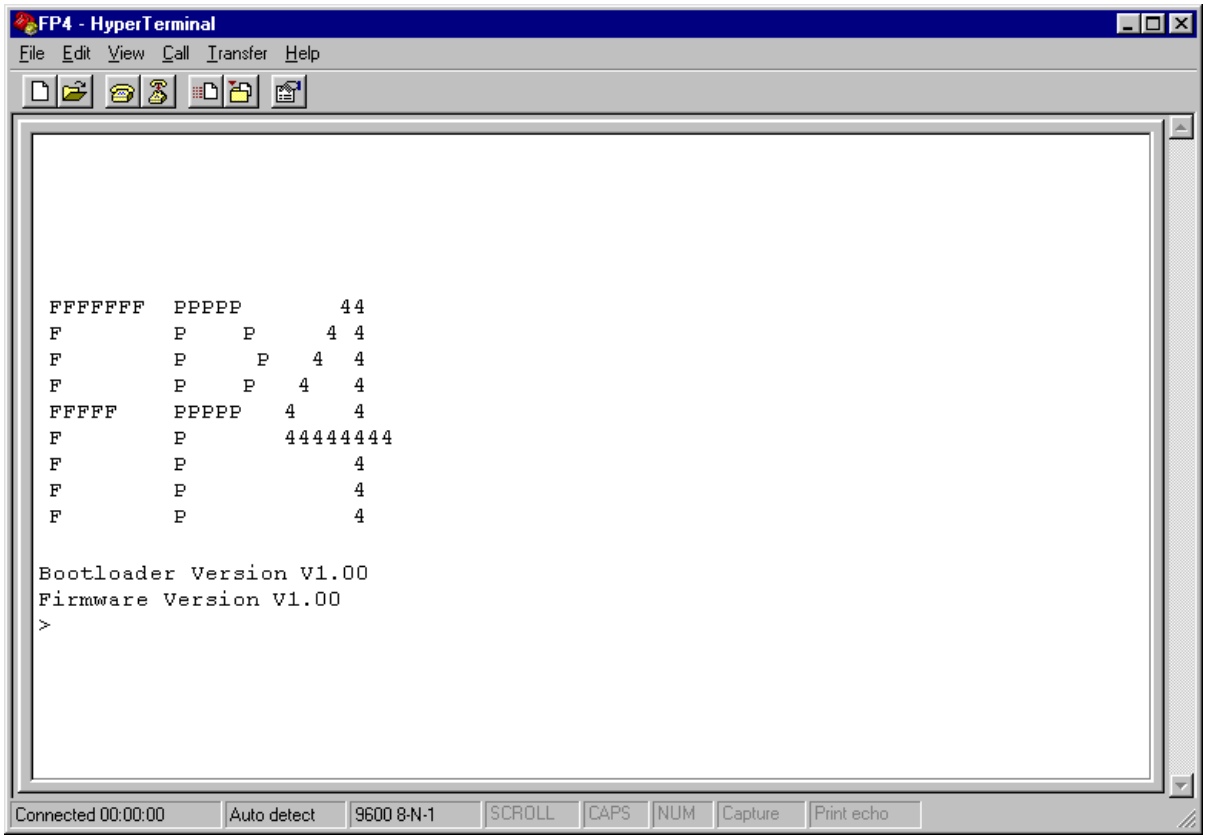
All signals in remote control mode are active high. The signal I/O is TTL level (74ABT241, see chapter "User system interface circuits").

[MEMO]

Chapter 7 PG-FP4 Operation Using Terminal Communication

After unpacking PG-FP4 please connect PG-FP4's 'Serial Host' connector to your host computer using the provided serial interface cable.
Start communication with PG-FP4 using 9600 bps, 8 data bits, 1 stop bit no parity and hardware handshake enabled. Once communication is established you may switch to 19200 bps, 38400 bps, 57600 bps or 115200 bps. Make sure that communication is done in lower case letters only.
After plugging in the power supply the host screen will show the standard output of PG-FP4 showing the firmware version numbers. The status LED is switched off because no connection to any device has been established so far. The LCD display on PG-FP4 shows '**Commands >**' indicating that PG-FP4 is ready for operation.

Figure 7-1: Initial information screen of PG-FP4



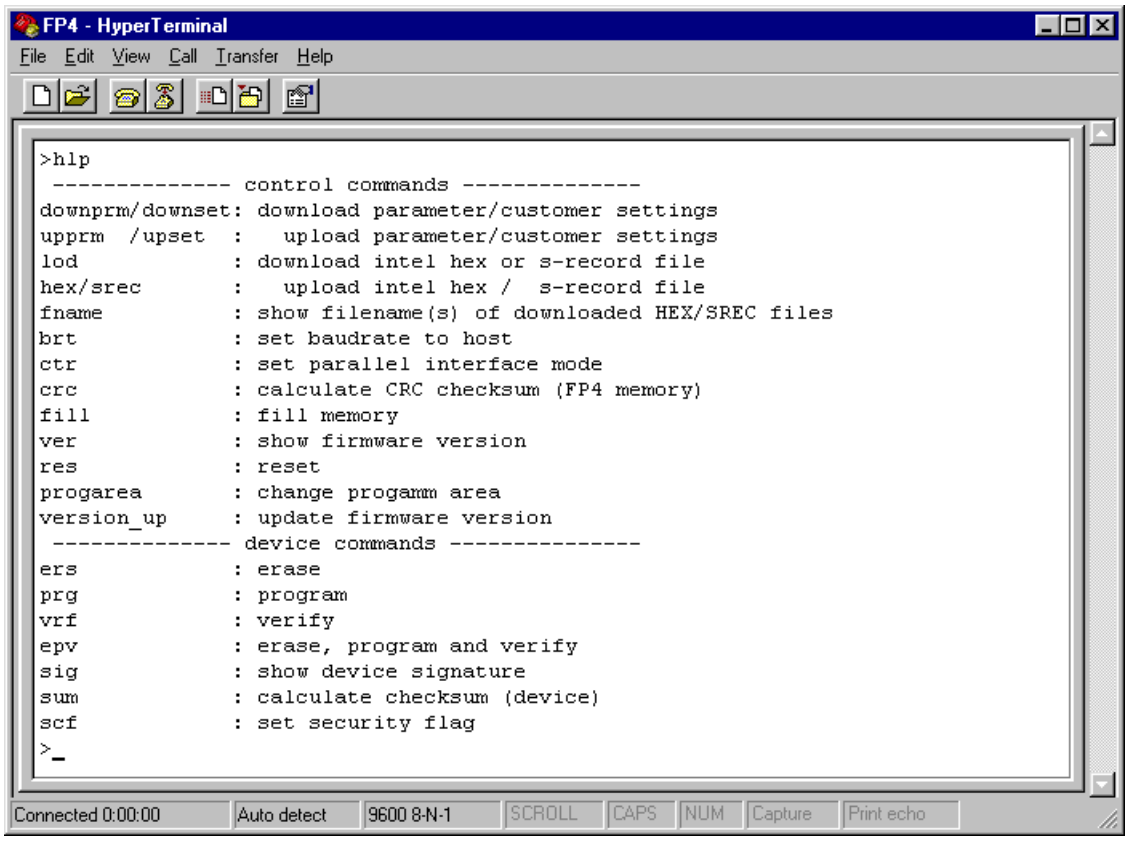
Following steps are necessary to connect a device to PG-FP4 and program it:

- The device has to be connected physically to PG-FP4 using the correct NEC flash programming adapter (FA-XXX-YY, FA-XXXYY-ZZZ(-A)) and the provided target cable.
- Download a standard parameter file (PRM file) and optional a user defined setting file (SET file). PG-FP4 will store all parameters in its internal EEPROM and continue to use those until a new parameter file download overwrites them.
- In order to use the parallel download feature, enter `ctr on` ↵ and use the `lod` command to download the application program file. As soon as PG-FP4 responds with the "*now loading*" message, open a DOS command shell and enter:

  `COPY <file name> LPT`*n* ↵ *n*: parallel port number

For a brief description of available commands, enter `hlp` ↵ in the communication window.

Figure 7-2: PG-FP4 help information



7.1 PG-FP4 Control Commands

PG-FP4 control commands are used to prepare PG-FP4 for flash programming, such as parameter setting, up- and download of application programs and firmware update. Control commands do not require connection to a flash device.

7.1.1 downprm / downset command

The `downprm` / `downset` commands prepare PG-FP4 to load a standard flash parameter file or user flash parameter file respectively via serial communication line. The parameters configure PG-FP4 for programming a connected flash device. All parameters are stored in the PG-FP4 internal EEPROM area so that they will be available also during power off and may be used at later times again.

Command	Description	Screen Output
`downprm` ↵	Prepares PG-FP4 to load a standard flash parameter file	`Now loading...`
`downset` ↵	Prepares PG-FP4 to load a user defined flash parameter file	`Now loading...`

After the `downprm / downset` command has been entered, the terminal program must send a standard flash parameter file (`*.PRM`) or user defined flash parameter file (`*.SET`) in ASCII format to PG-FP4. Select the corresponding *Send File* menu from your terminal program and select the PRM file / SET file you want to send to PG-FP4.

Indicators during download sequence:

Status LED	Message Display	Screen Output
	`**** BUSY ****`	`...`

Indicators after completion of download sequence:

Status LED	Message Display	Screen Output
	`Commands >`	`OK`

Indicators after downprm in case of download error:

Status LED	Message Display	Screen Output (Area mode)
	No error message. See screen output.	`ERROR: <text>`

7.1.2 upprm / upset command

The `upprm / upset` command prepare PG-FP4 to send a standard flash parameter file or user flash parameter file respectively via serial communication line. The parameters will be read from the PG-FP4 internal EEPROM area.

Command	Description	Screen Output
`upprm` ↵	Prepares PG-FP4 to send a standard flash parameter file	`Start output with any key.`
`upset` ↵	Prepares PG-FP4 to send a user defined flash parameter file	`Start output with any key.`

After the `upprm / upset` command has been entered, the terminal program must accept the requested data to store it in an ASCII file. Activate the corresponding *Capture* or *Log* menu from your terminal program to save the data sent by PG-FP4. As soon as the preparation of the terminal program has been completed, any keystroke sent to PG-FP4 will start the upload sequence.
After the `upprm / upset` commands have been entered, the terminal program should save the standard flash parameter data in an ASCII file with the extension `*.PRM` and the user defined flash parameter file in a file with the extension `*.SET`.

Indicators during upload sequence:

Status LED	Message Display	Screen Output
	`**** BUSY ****`	<Parameter file contents>

Indicators after completion of upload sequence:

Status LED	Message Display	Screen Output
	`Commands >`	`OK`

7.1.3 lod command

The `lod` command prepares PG-FP4 to load an application program via serial or parallel communication line (see also ctr command). Depending on the program area selection, the download program will be stored in the PG-FP4 internal flash memory area 0 or flash memory area 1.
In addition to the file itself the name of the download file can be stored in PG-FP4 also.
Using the lod command without parameter the selected program memory area will be erased before the target program is loaded.
Both file formats are accepted, Intel HEX file format and Motorola S-Record file format.

Command	Description	Screen Output
`lod` ↵	Prepares PG-FP4 to load a target program file	`Erasing external Flash...` `Now loading...`
`lod add` ↵	Prepares PG-FP4 to load a target program file in addition to any loaded program	`Now loading...`
`lod fname=`*`filename`* ↵	Prepares PG-FP4 to load a file name. *`filename`* may have up to 16 characters incl. extension.	`Now loading...`

After the `lod` command has been entered, the terminal program must send the requested application program file in ASCII format to PG-FP4. Select the corresponding *Send File* menu from your terminal program and select the target program file you want to send to PG-FP4.

PG-FP4 detects the end of the download sequence automatically by interpreting the download file format. As soon as the corresponding end record has been detected, the download sequence is complete.

Indicators during download sequence:

Status LED	Message Display	Screen Output
	`**** BUSY ****`	`...`

PG-FP4 indicates download completion by displaying the address range detected.

Indicators after completion of download sequence:

Status LED	Message Display	Screen Output
	`Commands >`	`Address range: 0xssssss to 0xeeeeee`

7.1.4 hex / srec command

The `hex` and `srec` commands prepare PG-FP4 to send memory data contents via serial communication line in Intel HEX file format or Motorola S-Record file format respectively. Depending on the program area selection, the data will be read from the PG-FP4 internal flash memory area 0 or flash memory area 1.

Command	Description	Screen Output
`hex` *ss nn* ↵	Prepares PG-FP4 to send data in Intel HEX file format *ss* memory start address *nn* number of bytes to send	`Start output with any key.`
`srec` *ss nn* ↵	Prepares PG-FP4 to send data in Motorola S-Record file format *ss* memory start address *nn* number of bytes to send *ss, nn* are accepted in hexadecimal format.	`Start output with any key.`

After the `hex` / `srec` command has been entered, the terminal program must accept the requested data to store it in an ASCII file. Activate the corresponding *Capture* or *Log* menu from your terminal program to save the data sent by PG-FP4. As soon as the preparation of the terminal program has been completed, any keystroke sent to PG-FP4 will start the upload sequence.

Indicators during upload sequence:

Status LED	Message Display	Screen Output
	`**** BUSY ****`	<Update data in Intel HEX or Motorola S-REC format>

Indicators after completion of upload sequence:

Status LED	Message Display	Screen Output
	`Commands >`	(none)

7.1.5 fname command

The `fname` command shows the name of the HEX file or SREC file downloaded to PG-FP4.
The file name has been set as parameter to the `lod` command.

Command	Description	Screen Output
`fname` ↵	Displays name of downloaded HEX file or SREC file.	File name = <*file name*>

If prog area is enabled for the current device, file names for both prog areas are shown, if available.

Command	Description	Screen Output
`fname` ↵	Displays name of downloaded HEX file or SREC file.	File name [0*] = <*file name 1*> File name [1] = <*file name 2*>

If there is no file name to be shown, '`n.a.`' will be displayed.
An asterix '`*`' marks the currently selected programming area, if enabled.

7.1.6 brt command

The `brt` command changes the serial communication speed between PG-FP4 and the terminal program.

Command	Description	Screen Output
`brt` ↵	Displays current communication speed setting	`Current Baudrate is: xxxxx`
`brt 9600` ↵	Sets communication speed to 9600 bps	`New Baudrate is: 9600`
`brt 19200` ↵	Sets communication speed to 19200 bps	`New Baudrate is: 19200`
`brt 38400` ↵	Sets communication speed to 38400 bps	`New Baudrate is: 38400`
`brt 57600` ↵	Sets communication speed to 57600 bps	`New Baudrate is: 57600`
`brt 115200` ↵	Sets communication speed to 115200 bps	`New Baudrate is: 115200`

Once the communication speed of PG-FP4 has changed you have to change the communication speed of your terminal program as well. Please make sure that you disconnect your terminal program after communication speed has changed and reconnect again to make the new settings valid for the communication session.

7.1.7 ctr command

The `ctr` command allows to configure the extension connector as centronics input port for parallel download or as control port for remote control.

Command	Description	Screen Output
`ctr` ↵	Displays current port setting	`Parallel port in xxxx mode`
`ctr on` ↵	Configure port as centronics port	`Parallel port in centronics mode`
`ctr off` ↵	Configure port as remote control port	`Parallel port in remote control mode`

For detailed information about remote control signals, please refer to chapter “Connectors and Cables”.

7.1.8 crc command

The `crc` command calculates and reports a CRC checksum of the selected programming area.

Command	Description	Screen Output
`crc` ↵	Calculates CRC checksum of the selected programming area.	`Checksum: ss - ee = CCCCCCCC`
`crc nn` ↵	Calculates the CRC checksum of the selected memory area. *nn*: number of bytes	`Checksum: ss - ee = CCCCCCCC`
`crc ss nn` ↵	Calculates the CRC checksum of the selected memory area. *ss*: start address *nn*: number of bytes *ss*, *nn* are accepted in hexadecimal format.	`Checksum: ss - ee = CCCCCCCC`

Note: The parameter *startaddress* is based on the physical start address of the selected programming area.

The CRC32 checksum calculation program source code is given below:

```
#define POLYNOMIAL 0x04c11db7L

static unsigned long crc_table[256];

void gen_crc_table()
/* generate the table of CRC remainders for all possible bytes */
{
    register int i, j; register unsigned long crc_accum;

    for (i = 0; i < 256; i++) {

        crc_accum = ((unsigned long) i << 24);

        for (j = 0; j < 8; j++) {

            if (crc_accum & 0x80000000L)
                    crc_accum = (crc_accum << 1) ^ POLYNOMIAL;
                else
                    crc_accum = (crc_accum << 1);}

          crc_table[i] = crc_accum;
    }
    return;
}

unsigned long update_crc(unsigned long crc_accum, char *data_blk_ptr, int
data_blk_size)
{
/* update the CRC on the data block one byte at a time */
    register int i, j;

    for (j = 0; j < data_blk_size; j++) {
        i = ((int) (crc_accum >> 24) ^ *data_blk_ptr++) & 0xff;
         crc_accum = (crc_accum << 8) ^ crc_table[i];
    }
    return crc_accum;
}

void main(void)
{
    unsigned long init_crc = 0xFFFFFFFFL;
    unsigned long crc;

    unsigned char *data_ptr;
    int data_size;

    gen_crc_table();

    crc = update_crc (init_crc, data_ptr, data_size);
}
```

7.1.9 acs command

The `acs` command calculates and reports an arithmetic checksum of the selected programming area.

Calculation method: acs = (1 + ((Sum of all bytes) xor 0xFFFF)) & 0xFFFF

Command	Description	Screen Output
`acs`	Calculates arithmetic checksum of the selected programming area.	`Checksum: ss - ee = CCCC`
`acs nn`	Calculates arithmetic checksum of the selected programming area. *nn*: number of bytes	`Checksum: ss - ee = CCCC`
`acs ss nn`	Calculates arithmetic checksum of the selected programming area. `ss`: start address *nn*: number of bytes `ss`, `nn` are accepted in hexadecimal format.	`Checksum: ss - ee = CCCC`

Note: The parameter startaddress is based on the physical start address of the selected programming area.

7.1.10 fill command

The `fill` command fills the currently selected programming area memory space or a subset of it with a predefined or user defined byte pattern.
The complete memory area will be erased before the fill command fills the selected memory area with the required byte pattern.

Command	Description	Screen Output
`fill a` ↵	Fills the complete programming area with 0xFF	`Erasing external Flash....OK`
`fill` *`ss nn xx`* ↵	Fills (parts of) the programming area with a user defined byte pattern. *ss*: start address *nn*: number of bytes to fill *xx*: byte pattern to fill in *ss*, *nn*, *xx* are accepted in hexadecimal format.	`Erasing external Flash...OK` `Filling memory...OK`

7.1.11 ver command

The `ver` command displays the version number of the firmware program and bootloader program of PG-FP4.

Command	Description	Screen Output
`ver` ↵	Displays bootloader and firmware version of PG-FP4.	`Bootloader Version Vx.yy` `Firmware Version Vx.yy`

7.1.12 res command

The `res` command resets PG-FP4 to its initial state (power-on reset). PG-FP4 will read communication and programming parameters from its internal EEPROM and will use them.

Command	Description	Screen Output
`res` ↵	Resets PG-FP4.	Start-up screen (see Fig. 7-1)

7.1.13 progarea command

The `progarea` command allows selecting one out of the two available flash memory areas inside PG-FP4 for target program storage.

Command	Description	Screen Output
`progarea` ↵	Displays current progarea setting	`Active Program Area: n` `Max. program size: 2 MBytes`
`progarea 0` ↵	Activates program area 0	`Active Program Area: 0`
`progarea 1` ↵	Activates program area 1	`Active Program Area: 1`

Depending on the size of FP4's flash memory, the address ranges used for progarea 0 and progarea 1 may vary.

In case of 2 MB internal flash memory:

progarea 0: 0x00000000 to 0x000FFFFF (1 MB)
progarea 1: 0x00100000 to 0x001FFFFF (1 MB)
No progarea: 0x00000000 to 0x001FFFFF (2 MB)

In case of 4 MB internal flash memory:

progarea 0: 0x00000000 to 0x001FFFFF (2 MB)
progarea 1: 0x00200000 to 0x003FFFFF (2 MB)
No progarea: 0x00000000 to 0x003FFFFF (4 MB)

If support for multiple programming areas is not supported according to parameter file setting, the message `Program Area usage disabled` is shown.

7.1.14 version_up command

The `version_up` command allows upgrading the PG-FP4 internal bootloader and firmware. PG-FP4 is equipped with a self-programming mechanism so that downloading the new firmware program to PG-FP4 and starting the update procedure are supported.
Before `version_up` command is executed, make sure that the firmware update program file is available on your PC. Please, check the NEC WEB page(s) at ***http://www.eu.necel.com/update*** and download the necessary software update packages.
A typical name of the firmware program file is `PG-FP4_VUP_`*`xxxx`*`.REC`, where *xxxx* is the version number of this firmware.

To start firmware update, enter the version update command:

```
version_up ↵
```

PG-FP4 asks for user confirmation before starting the update sequence:

```
Are you sure you want to update bootloader and firmware (y/n)?
```

Enter `y` to continue. PG-FP4 displays:

```
Erasing external Flash...OK
Now loading Firmware...
```

At this stage, PG-FP4 waits to receive the new firmware in S-Record format. From your terminal program, select **SEND ASCII FILE** menu and browse for the new firmware data file you downloaded from the NEC WEB site. Once the file is downloaded, PG-FP4 displays information about processing:

```
     **** CAUTION ****
Now bootloader and firmware will be programmed.
Please ensure that:
 - the correct bootloader file has been downloaded
 - the power is NOT disconnected during this operation
 - the programmer is NOT reset during this operation
Do you want to continue (y/n)?
```

Enter `y` to continue. PG-FP4 displays:

```
Selfprogramming Area(s): 0,1 (Bootloader + Firmware)
Copy Selfprog Library into RAM... OK.
Checking Vpp...OK.
Performing blank check...
not blank, performing erase... OK.

Programming the device.................................. OK.
Doing verify...
Performing blank check...
not blank, performing erase... OK.

Programming the device.................................. OK.
Doing verify... OK.

Programming successful. Restarting PG-FP4.
```

PG-FP4 will restart and the new firmware version number will be shown on the initial screen.

7.2 PG-FP4 Device Commands

PG-FP4 device commands interact with the target flash device in the NEC flash programming adapter connected to PG-FP4. The connection to a flash target device is established automatically.

7.2.1 bln command

The `bln` command performs a blank check of a target flash device and reports the resulting target device status.

Command	Description
`bln` ↵	Performs a blank check of the flash device.

Caution: The `bln` command is not supported for all flash devices!

Depending on the blank check mode of the target device (chip mode or area mode), message display and screen output will differ. Indicators while blank checking in chip mode:

Status LED	Message Display	Screen Output (chip mode)
	`Blank check Chip` `...`	`Blank check Chip: OK`

Indicators while blank checking in area mode:

Status LED	Message Display	Screen Output (area mode)

	`Blank check Area`
	`N.....`
		`Blank check Area 000: OK`
		`Blank check Area 001: OK`
		`...`
		`Blank check Area` *`NNN`*`: OK`

Indicators after blank check execution of a blank device:

Status LED	Message Display	Screen Output
	`Command >`	`Blank check OK`

Indicators after blank check execution (area mode) of a non-blank device:

Status LED	Message Display	Screen Output (Area mode)
	`Error: 051` `Blank chk failed`	`Blank check Area` *`NNN`*`: ERROR`

Indicators after blank check execution (chip mode) of a non-blank device:

Status LED	Message Display	Screen Output (Chip mode)
	`Error: 051` `Blank chk failed`	`Blank check Chip: ERROR`

7.2.2 ers command

The `ers` command erases a target flash device.

Command	Description
`ers` ↵	Erases the flash device.

Depending on the programming mode of the target device (complete chip or selected area only), message display and screen output will differ. Indicators while programming in chip mode:

Status LED	Message Display	Screen Output (Chip mode)

	`Blank check chip`
	`.....`
	`Prewrite: Chip`
	`N.....`
	`Erase: Chip`
	`.....`
		`Blank check Chip: Not blank,`
		`Erase needed.`
		`Prewrite Chip: OK`
		`Erase Chip:`

If the target device is already erased, the erase procedure will not start:

Status LED	Message Display	Screen Output (Chip mode)
	`Blank check Chip` `.....`	`Blank check Chip: OK,` `Erase skipped.`

Indicators while programming in area mode:

Status LED	Message Display	Screen Output (Area mode)	

	`Blank check Area`
	`N.....`
	`Prewrite: Area`
	`N.....`
	`Erase: Area N`
		`Blank check Area 000:`
		`Not blank, Erase needed.`
		`Prewrite Area NNN: OK`
		`Erase Area NNN:`	

	`Writeback`	`Writeback OK`	**Command depends on the device status**

If the target device is already erased, the erase procedure will not start:

Status LED	Message Display	Screen Output (Area mode)
	`Blank check Area N.....`	`Blank check Area 000: OK, Erase skipped.`

Indicators after successful erase:

Status LED	Message Display	Screen Output
	`Commands >`	`Erase OK`

Indicators after non-successful erase:

Status LED	Message Display	Screen Output
	`Error: 41 Erase failed`	`ERROR`

7.2.3 prg command

The `prg` command programmes a target flash device.

Command	Description
`prg` ↵	Programs the selected memory area of PG-FP4 into the target device.

Depending on the programming mode of the target device (complete chip or selected area only), message display and screen output will differ. Indicators while programming in chip mode:

Status LED	Message Display	Screen Output (chip mode)	

	`Write Chip`
	`Addr: 0x`*`nnnnnn`*
		`Write Chip:`
		`10%`
		`20%`
		`...`
		`100%`	

	`Verify Chip`
	`Internal`
		`OK`
		`Internal Verify Chip: OK`
		`Verify OK`	

	`Addr: 0x`*`nnnnnn`*	`Verify chip:`
		`10%`
		`20%`
		`...`
		`100%`
		`Verify OK`
			If *Read verify after program* is enabled

Indicators while programming a selected memory area:

Status LED	Message Display	Screen Output (memory area mode)	

	`Write Selective`
	`Addr: 0x`*`nnnnnn`*
		`Write` *`ssssssss`* `to` *`eeeeeeee`*`:`
		`10%`
		`20%`
		`...`
		`100%`	

	`Verify Chip`
	`Internal`
		`OK`
		`Internal Verify Chip: OK`
		`Verify OK`	

	`Addr: 0x`*`nnnnnn`*	`Verify chip:`
		`10%`
		`20%`
		`...`
		`100%`
		`Verify OK`
			If *Read verify after program* is enabled

Indicators while programming a selected flash area:

Status LED	Message Display	Screen Output (flash block mode)	

	`Write Selective`
	`Addr: 0x`*`nnnnnn`*
		`Write Area` *`NNN`*`:`
		`10%`
		`20%`
		`...`
		`100%`	

	`Verify Chip`
	`Internal`
		`OK`
		`Internal Verify Area` *`NNN`*`: OK`
		`Verify OK`	

	`Addr: 0x`*`nnnnnn`*	`Verify Area` *`NNN`*`:`
		`10%`
		`20%`
		`...`
		`100%`
		`Verify OK`
			If *Read verify after program* is enabled

Indicators after successful verification:

Status LED	Message Display	Screen Output
	`Commands >`	`Write OK`

Indicators after non successful verification:

Status LED	Message Display	Screen Output
	`Error: 081` `Verify failed`	`ERROR`

7.2.4 vrf command

The `vrf` command verifies the flash device's memory against the memory contents of PG-FP4.

Command	Description
`vrf` ↵	Performs a verification of the target device's memory against the memory contents of PG-FP4.

Depending on verify mode of the target device (chip mode or area mode), message display and screen output will differ. Indicators while verifying in chip mode:

Status LED	Message Display	Screen Output (chip mode)

	`Verify Chip`
	`Addr:...`
		`Verify Chip:`
		`10%`
		`20%`
		`...`
		`100%`

Indicators while verifying in area mode:

Status LED	Message Display	Screen Output (area mode)

	`Verify Area` *N*
	`Addr:...`
		`Verify Area 000:`
		`10%`
		`20%`
		`...`
		`100%`

Indicators after successful verification:

Status LED	Message Display	Screen Output
	`Commands >`	`Verify OK`

Indicators after non successful verification:

Status LED	Message Display	Screen Output
	`Error: 081` `Verify failed`	`ERROR`

7.2.5 read command

The `read` command is used to read out the flash contents of the target device.

Command	Description
`read` ↵ `read` *ss ee* ↵	Read out flash memory of target device, and show data in hexadecimal form. Optional parameters *ss* and *ee* specify start and end address. *ss* and *ee* must be multiples of 0x100.
`read hex` ↵ `read hex` *ss ee* ↵	Read out flash memory of target device, and print data in Intel HEX file format. Optional parameters *ss* and *ee* specify start and end address. *ss* and *ee* must be multiples of 0x100.
`read srec` ↵ `read srec` *ss ee* ↵	Read out flash memory of target device, and print data in Motorola S-record file format. Optional parameters *ss* and *ee* specify start and end address. *ss* and *ee* must be multiples of 0x100.

Indicators while reading data:

Status LED	Message Display	Screen Output

	`Read`	`Read 000000 to 03FFFF:`
		`Press <return> to start/continue output.`
		`000000: 00 00 00 00 00 00 00 00...`
		`000010: 00 00 00 00 00 00 00 00...`
		`000020: BA 05 80 07 30 8A 81 07...`
		`000030: BA 05 80 07 FA 02 81 07...`
		`000040: BA 05 80 07 EA 02 81 07...`
		`...`

In case of any error, the status LED will show a red signal. Please follow the recommendations given on the screen and check the error number in the message display.

7.2.6 epv command

The `epv` command performs an erase, program and verify of a target flash device.

Command	Description
`epv` ↵	Connects PG-FP4 to the target flash device and starts the blank check, erase, program and verify command sequence.

The `epv` command output to screen and messages are the same messages sent for connect, blank check, erase, program and verify.

Note: The `verify` command will only be executed as part of the `epv` command if *Read verify after program* is enabled. See *Advanced setup* section.

7.2.7 sig command

The `sig` command reads the signature from a target flash device.

Command	Description
`sig` ↵	Reads the target device signature and device specific memory information.

Indicators while signature reading:

Status LED	Message Display	Screen Output

	`Signature:`	`Device name: Dxxxxxxx`
		`Device data: xx xx xx`
		`Device end addr: eeeeeeee`
		`Address data 000: xxxxxxxx`
		`Address data 001: xxxxxxxx`
		`...`
		`Address data nnn: aaaaaaaa`
		`Area data NNNN: XXXXXXXX`

Indicators after reading signature successfully:

Status LED	Message Display	Screen Output
	`Signature:` `Dxxxxxxx`	`OK` `Dxxxxxxx>`

In case of any error, the status LED will show a red signal. Please follow the recommendations given on screen and check the error number in the message display.

7.2.8 sum command

The `sum` commands reads the checksum calculated inside the target device and displays it.

Command	Description	Screen Output
`sum` ↵	Requests checksum calculation inside the target device.	`Checksum: 0xCCCC`
`sum` *`ss nn`* ↵	Calculates a checksum of the memory area starting at *`ss`* and covering *`nn`* bytes of the device. *`ss`*: start address *`nn`*: number of bytes	`Checksum: 0xCCCC`

Caution: The `sum` command is not supported for all flash devices!

7.2.9 scf command

The `scf` command sets the security flags in the target device.The security flags are specified in the SET file and may be modified in the GUI advanced setup dialog.

Command	Description	Screen Output
`scf` ↵	Sets the security flags in the target device.	`OK`

Caution: The `scf` command is not supported for all flash devices!

Chapter 8 Sample Programming Session Using Terminal Communication Program

As an example, a V850/SB1 micro-controller will be used to show a typical programming sequence using the Windows HyperTerminal software.

1. Use the provided serial cable to connect PG-FP4 to your host computer.

2. Use the target cable to connect PG-FP4 to the target hardware. This may either be the NEC FA-100GC programming adapter or your own target hardware.

3. Select the suitable AC-plug (EURO, UK or US/JAPAN) and connect it to the AC adapter.

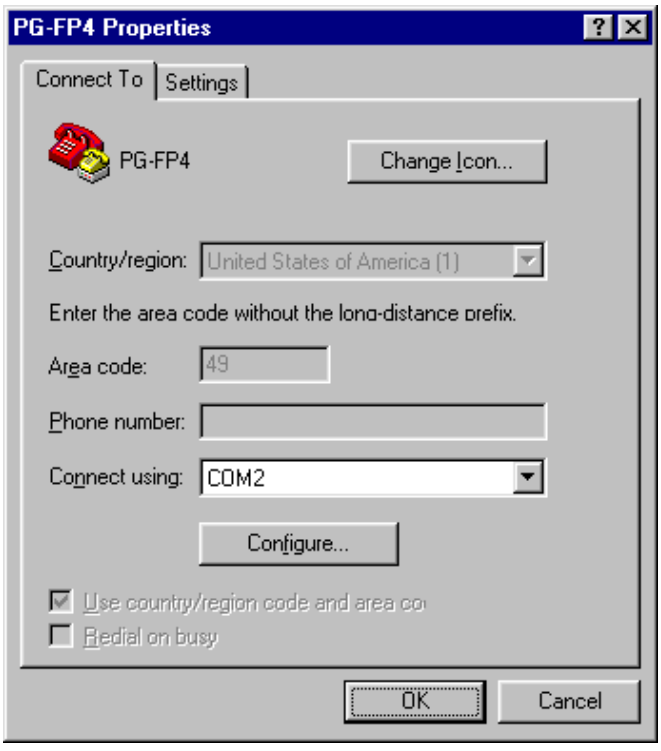
4. Use the AC adapter to connect it to PG-FP4 and mains. The status LED of PG-FP4 should be off and the LCD display shows '**Commands >**' indicating that PG-FP4 is ready for operation.

5. If not yet done, copy the flash parameter file for V850/SB1 to your hard disk and install it into <*PG-FP4 install path*>\PRM. You may obtain it from the NEC internet site ***http://www.eu.necel.com/update***.
   Make sure that you download the flash parameter files according to your device specification (version number, mask rank, etc.).

6. Start HyperTerminal.

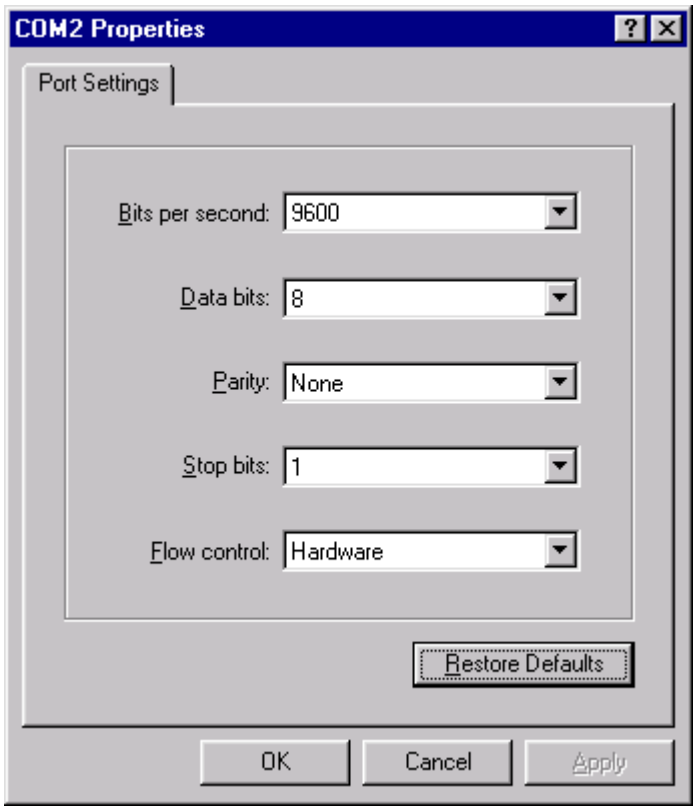
7. Activate *File →Properties* menu to set the appropriate port number you connected PG-FP4 to.

Figure 8-1: HyperTerminal properties window



By pressing ***Configure…*** you proceed to the communication settings for the selected port.

Figure 8-2: Hyperterminal Port Setup



The communication speed shall be set to 9600 bps. Select 8 data bits, no parity, 1 stop bit and hardware flow control in this window. Press ***OK*** to close this dialog.
If any other communication speed has been selected in a previous programming session, PG-FP4 will continue to use this. The terminal program's communication speed must be adjusted in this case.

8. Select *Call* →*Disconnect* and *Call* →*Connect* menus to activate the communication settings made in step 7. You will now be connected to the PG-FP4.
   If you would like to change the communication speed you may use the `brt` command in the HyperTerminal communication window to select any other speed setting. Then return to step 7 to adjust the HyperTerminal settings.

Note: For communication speed higher than 19200 baud it is recommended to use another terminal, i.e. Tera TermPro.
It can be downloaded freely from the WEB. Please, search for the keyword *teraterm* to find the download page.

9. Type `downprm` in the Hyperterminal communication window, activate *Transfer* →*Send Text File* menu. Select the V850/SB1 flash parameter file from the directory you have chosen in step 5. Press ***Open*** to send this file to PG-FP4.
   As soon as the download is complete, PG-FP4 is prepared to program V850/SB1 devices according to the settings in the parameter file.

10. Define the destination memory area for your target program in PG-FP4 by one of the following commands, provided the PRM and SET parameter files allow this setting:

    `progarea 0` ↵ Program area 0 will hold the target program

    or

    `progarea 1` ↵ Program area 1 will hold the target program

11. Start downloading your program by using the

    `lod` ↵

    command. When `Now loading` is displayed on the screen, select *Transfer* →*Send Text File* in HyperTerminal. Highlight the file to be send and press ***Open***. While downloading is processed, several '.' will be displayed.

12. Use the

    `epv` ↵

    command to connect PG-FP4 to the target device and program the application program into the device's flash memory.

13. If necessary, insert another device to be programmed into the programming adapter and repeat step 12.

14. If no other device needs to be programmed exit HyperTerminal. All settings made during this programming session will be saved in the PG-FP4 so that they can be reused next time.

[MEMO]

Chapter 9 Connectors and Cables

9.1 Operating and storage environment

The PG-FP4 operating and storage requirements are given in the table below.

Table 9-1: Operating and storage environment

Item	Specification
Operating Environment	Temperature: 0°C to +40°C Humidity: 35% to 85% (without condensation)
Storage Environment	Temperature: -5°C to +45°C Humidity: 10% to 90% (without condensation)

9.2 Power supply connector

The power supply connector is located on the right side of PG-FP4.

Figure 9-1: Power supply connector

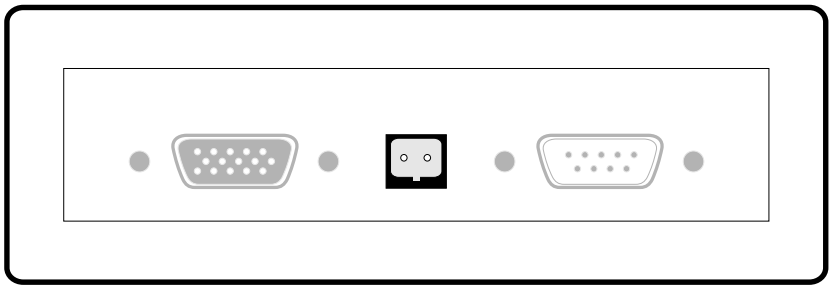
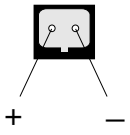


Figure 9-2: Pinout power supply connector



The specification of the power supply is:

AC input range: 100 V to 240 V, 47 Hz to 63 Hz
DC output: 15 V
Current consumption: 0.8 A max.

Caution: Connect only the provided AC adapter to the power supply jack of PG-FP4!

9.3 D-SUB 9 host connector

The host connector is located on the right side of PG-FP4.

Figure 9-3: D-SUB 9 host connector

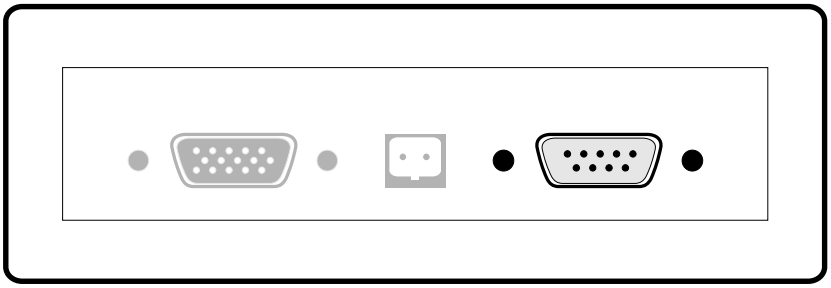


Figure 9-4: Pinout D-SUB 9 host connector

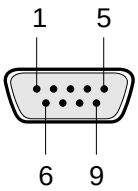


Table 9-2: Pinout of D-SUB 9 host connector

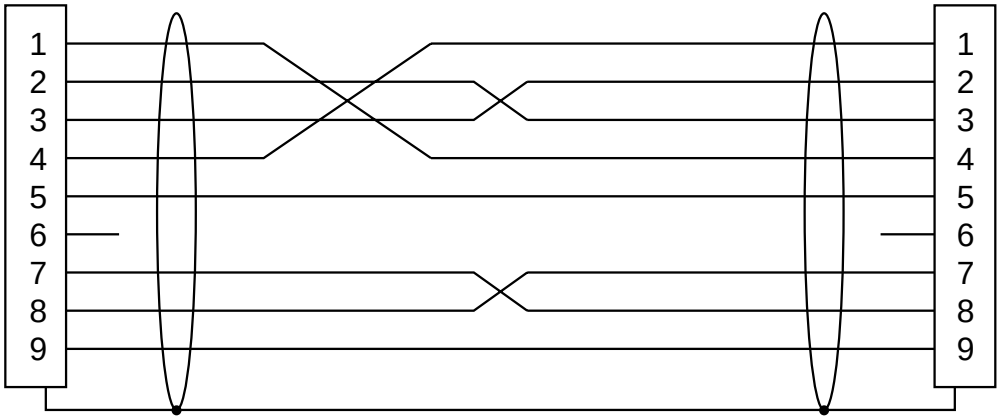
Serial Host D-SUB 9	Signal name at PG-FP4
1	NC
2	RxD
3	TxD
4	NC
5	V_{SS}
6	NC
7	RTS
8	CTS
9	NC

The D-SUB 9 host connector is provided by Provertha.

9.3.1 RS-232 cable (crossed)

The host cable is a standard shielded RS-232 cable of 2 meter to maximum 3 meter length. The connectors on both sides are D-SUB 9-pin female. The connections look as follows:

Figure 9-5: Host cable connections



9.4 HD-SUB 15 target device connector

The target device connector is located on the right side of PG-FP4.

Figure 9-6: HD-SUB 15 target device connector

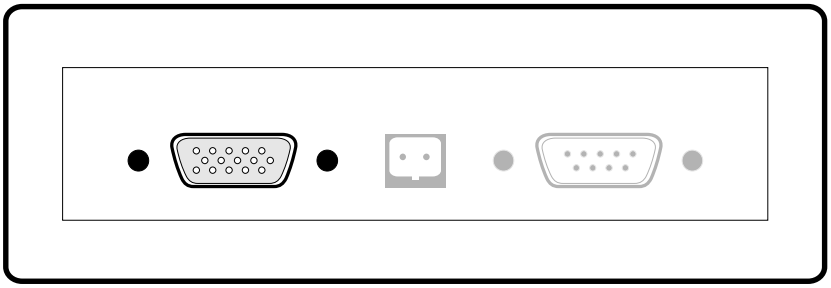


Figure 9-7: Pinout HD-SUB 15 target device connector

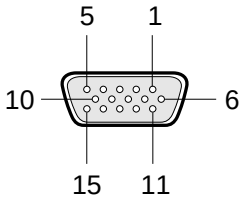


Table 9-3: Pinout of HD-SUB 15 target device connector

PG-FP4 HD-SUB 15	Signal name at PG-FP4
1	SO / TxD
2	SI / RxD
3	SCK
4	$\overline{\text{RESET}}$
5	V_{DD2}
6	FLMD1
7	H/S
8	V_{DD}
9	V_{DD}
10	NC
11	V_{PP}
12	FLMD0
13	VDE
14	CLK
15	GND

The HD-SUB 15 target device connector is provided by Provertha.

9.5 Target cable

The target cable is equipped with two connectors for the NEC programming adapters FA-XXX-YY and FA-XXXYY-ZZZ(-A).

Figure 9-8: Target cable outline

HD-SUB 15 (male) dual row female connector 10-pin / 16-pin, 0.100" grid

Figure 9-9: Target cable pinout

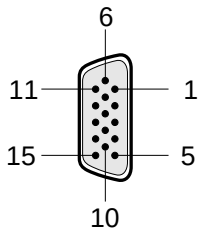
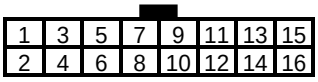


Table 9-4: Target cable pinout

Signal	HD-SUB 15	16-pin	10-pin
SO / TxD	1	5	5
SI / RxD	2	3	3
SCK	3	7	7
$\overline{\text{RESET}}$	4	2	2
V_{DD2}	5	11	-
FLMD1	6	12	-
H/S	7	8	8
V_{DD}	8, 9	4	4
NC	10	13	-
V_{PP}	11	6	6
FLMD0	12	14	-
VDE	13	10	10
CLK	14	9	9
GND	15	1	1

Figure 9-10: Target connectors outline (view from solder side) and pinout



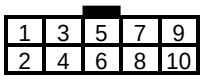


Table 9-5: Target connectors outline (view from solder side) and pinout

Pin number	Signal (16-pin)
1	GND
2	$\overline{\text{RESET}}$
3	SI/RxD
4	V_{DD}
5	SO/TxD
6	V_{PP}
7	SCK
8	H/S
9	CLK
10	VDE
11	V_{DD2}
12	FLMD1
13	NC
14	FLMD0
15	Not used
16	Not used

Pin number	Signal (10-pin)
1	GND
2	$\overline{\text{RESET}}$
3	SI/RxD
4	V_{DD}
5	SO/TxD
6	V_{PP}
7	SCK
8	H/S
9	CLK
10	VDE

Caution: When using the I^2C interface to program a target device, make sure that SI and SO signals lines are externally short-circuited.

9.6 Extension connector

The extension connector can be configured as centronics interface or as remote control port. Depending on the selection, one of the following signal setting is available.

Figure 9-11: D-SUB 25 extension connector

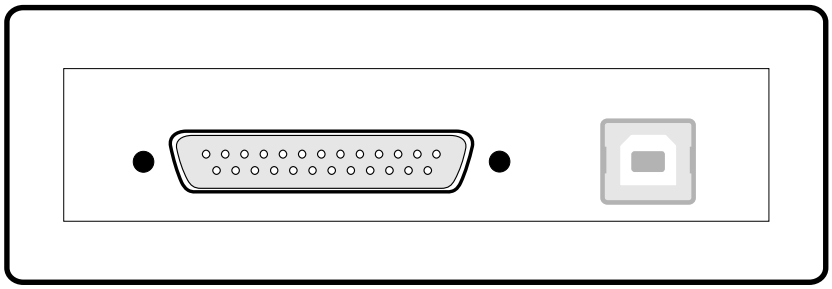


Figure 9-12: Pinout D-SUB 25 extension connector

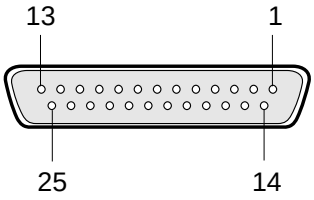


Table 9-6: Pinout of D-SUB 25 extension connector

Pin number	Signal	Centronics mode		Remote control mode	
1	IO3-0	$\overline{\text{Strobe}}$	In	Cancel Button	In
2	IO1-0	D0	IO	Start EPV 0	In
3	IO1-1	D1	IO	Start EPV 1	In
4	IO1-2	D2	IO	Next Button	In
5	IO1-3	D3	IO	Enter Button	In
6	IO2-0	D4	IO	Connected	Out
7	IO2-1	D5	IO	Busy	Out
8	IO2-2	D6	IO	OK	Out
9	IO2-3	D7	IO	Error	Out
10	IO3-2	$\overline{\text{Ack}}$	Out	(*)	Out
11	IO3-1	Busy	Out	(*)	Out
12	V_{SS}				
13	Pull-up				
14	Pull-up				
15	Pull-up				
16	Pull-up				
17	Pull-up				
18	V_{SS}				
19	V_{SS}				
20	V_{SS}				
21	V_{SS}				
22	V_{SS}				
23	V_{SS}				
24	V_{SS}				
25	V_{SS}				

Caution: (*): Reserved for future use, leave open!

Notes: 1. The D-SUB 25 host connector is provided by Provertha.

2. All output signals are active high.

3. Input signal ‘Cancel Button’ is active low, all others are active high.

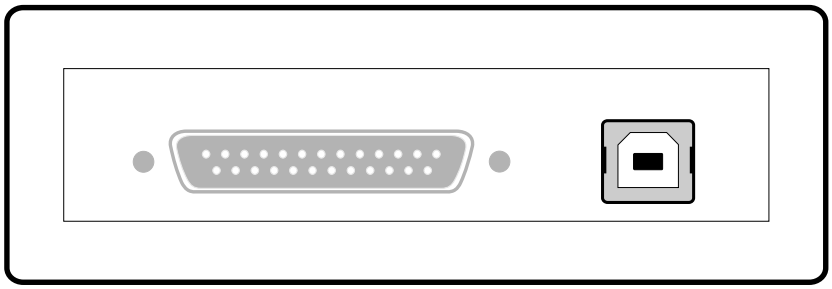
4. Input signals ‘Cancel Button’, ‘Next Button’ and ‘Enter Button’ can be used to control FP4. These signals are evaluated by software; be sure to have latest firmware installed before trying to use this functionality.

5. Pins 13–17 (Pull-up) tied together can be used to apply high level to an input pin. Only one of input pins Start EPV, ‘Next Button’ or ‘Enter Button’ can be set to H-level at the same time, because the Pull-up outputs are connected to V_{DD} via 10 k resistors.

9.7 USB

The USB port connection (Rev. 1.1) allows data transmission up to 12 Mbit/s on an USB type B connector.

Figure 9-13: USB port connector



[MEMO]

Chapter 10 Design Proposals for User Systems

This chapter explains the user system design proposals for rewriting the flash ROM in the microcontroller using PG-FP4.

Table 10-1: User system design proposals (1/3)

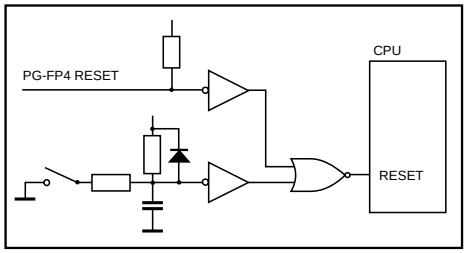
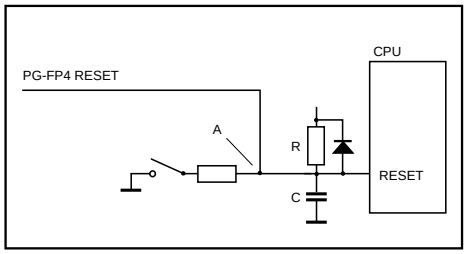
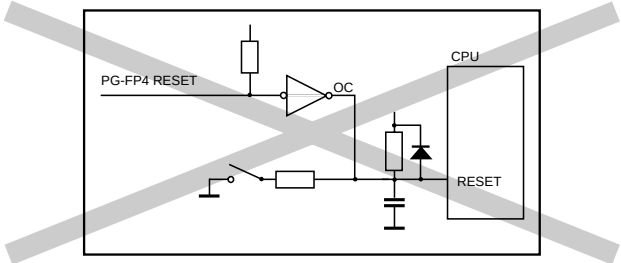
CPU pin	Design proposal
$\overline{\text{RESET}}$	Do not connect the reset signal generator on the target system to the reset signal of the PG-FP4. Otherwise, a signal conflict will occur. To avoid the conflict, isolate the reset signal generator from the reset signal of the PG-FP4. Do not generate $\overline{\text{RESET}}$ while PG-FP4 is connected. Be particularly careful to observe this requirement when using a system with an external watchdog timer.
	Connect the $\overline{\text{RESET}}$ signal of PG-FP4 at a point where the status of the programmer $\overline{\text{RESET}}$ signal and that of the CPU $\overline{\text{RESET}}$ pin are the same. **Correct connection:**   R must be 1 KΩ or more. The value for C must be chosen that the rise time between V_{IL} and V_{IH} does not exceed max. spec of the device. Avoid the following $\overline{\text{RESET}}$ signal connection: • Connection to a point where the target CPU $\overline{\text{RESET}}$ rise time is slower than the PG-FP4 $\overline{\text{RESET}}$ rise time. **Incorrect connection:**  It takes time for the CPU $\overline{\text{RESET}}$ pin to go high after the PG-FP4 $\overline{\text{RESET}}$ level goes from low to high.

Table 10-1: User system design proposals (2/3)

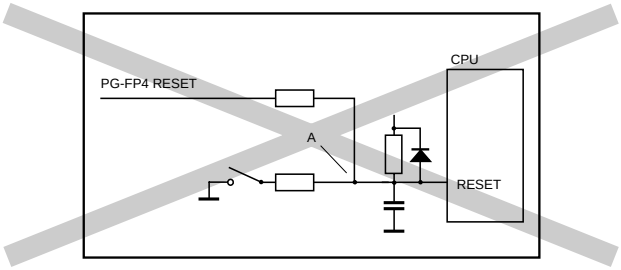
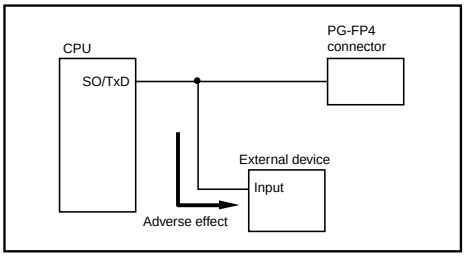
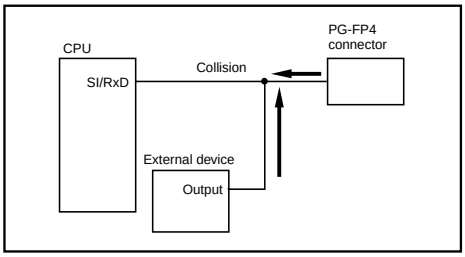
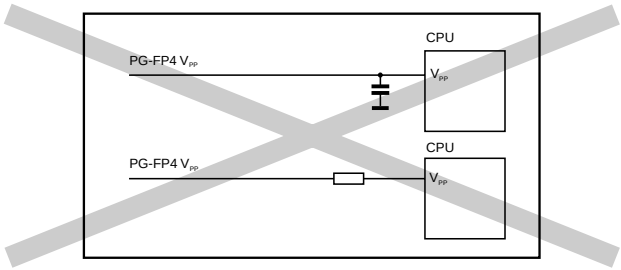
CPU pin	Design proposal
$\overline{\text{RESET}}$	• Connection to a point where the target CPU $\overline{\text{RESET}}$ pin cannot be driven to low level by PG-FP4 $\overline{\text{RESET}}$ signal. **Incorrect connection:**  When the PG-FP4 $\overline{\text{RESET}}$ is driven low, the level of the voltage at point A does not fall.
Serial interface pin	While the PG-FP4 is connected, all those ports that are not being used by the PG-FP4 will be in the input (floating) state. When an external device connected to such a port does not allow the port to enter the floating state, pull the port up or down. When the CPU port used by the PG-FP4 is also connected to the input of an external device, and if that device malfunctions, disconnect the external device. **Example:**  While the CPU port used by the PG-FP4 is also connected to the output of an external device, and if a sign all collision occurs, disconnect the external device. **Example:** 

Table 10-1: User system design proposals (3/3)

CPU pin	Design proposal
V_{PP}	Keep the wiring between the PG-FP4 connector and the CPU V_{PP} pin as thick and as short as possible. Insert neither capacitors nor resistors into the V_{PP} line. **Incorrect circuit:** 
Others	For the unused pins, refer to the user's manual of the device. Some devices have pins that must be processed differently. For these pins also, refer to the user's manual of the device. **Example of pins processed differently:** MODE CKSEL REGOUT REGIN, etc.

[MEMO]

Chapter 11 User System Interface Circuits

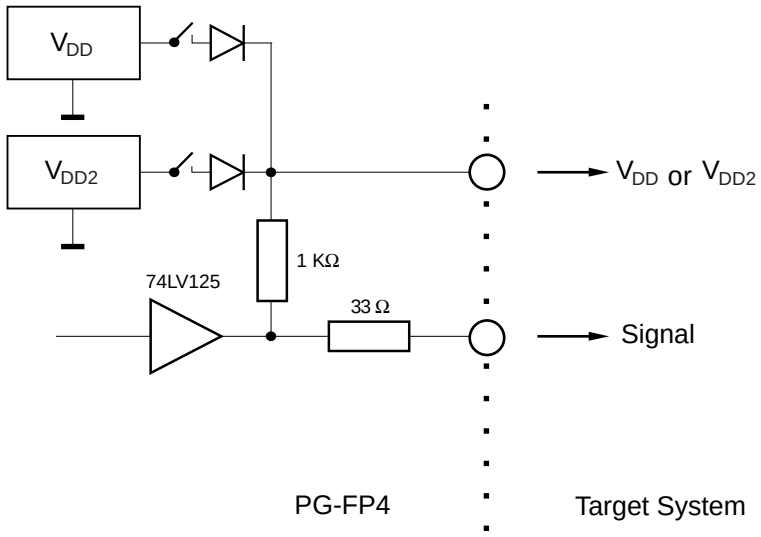
This chapter describes the user system interface circuits of the PG-FP4.

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

11.1.1 V_{DD} / V_{DD2} supplied by PG-FP4

For programming flash devices, V_{DD} and V_{DD2} may be supplied by PG-FP4. The signal lines SO/TxD, SCK and $\overline{\text{RESET}}$ will have TTL level voltage.

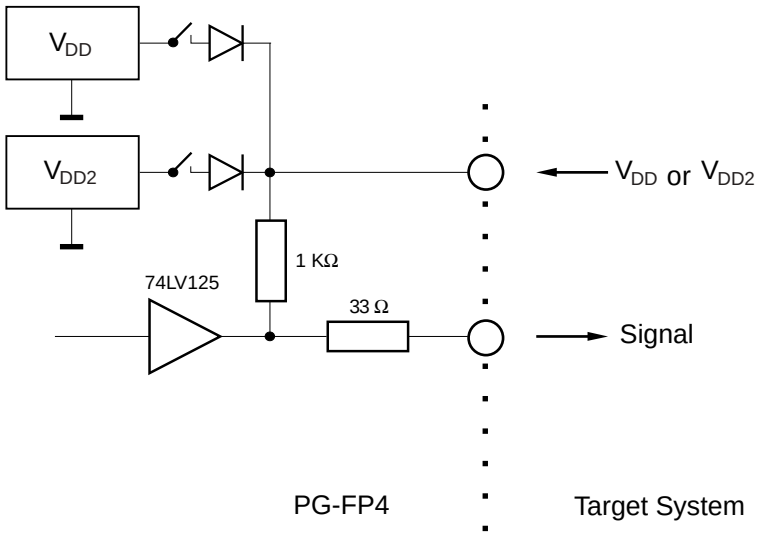
Figure 11-1: PG-FP4 output signal level 1



11.1.2 V_{DD} / V_{DD2} supplied by User System

Alternatively, V_{DD} and V_{DD2} may be supplied by the User System. The PG-FP4 internal voltage regulator is protected so that user V_{DD} / V_{DD2} will only affect the signal lines SO/TxD, SCK and $\overline{\text{RESET}}$.

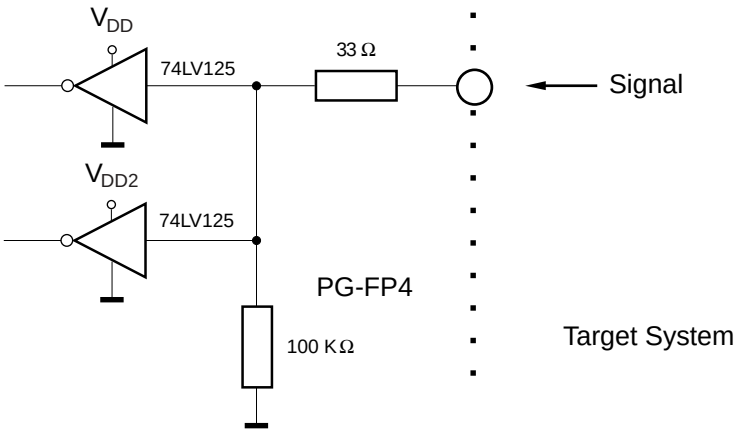
Figure 11-2: PG-FP4 output signal level 2



11.2 SI/RxD, HS

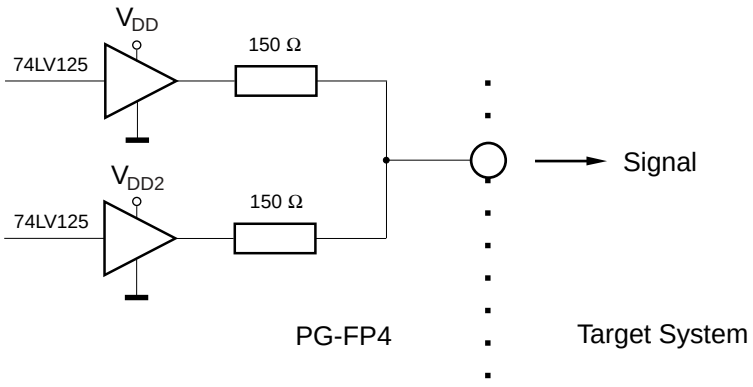
The SI/RxD and HS input signal must not exceed TTL level voltage.

Figure 11-3: PG-FP4 input signal level 3



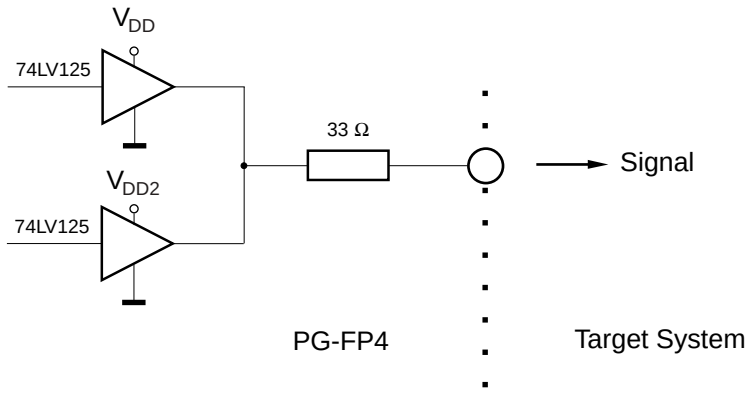
11.3 CLK

Figure 11-4: PG-FP4 output signal level 4



11.4 FLMD0, FLMD1

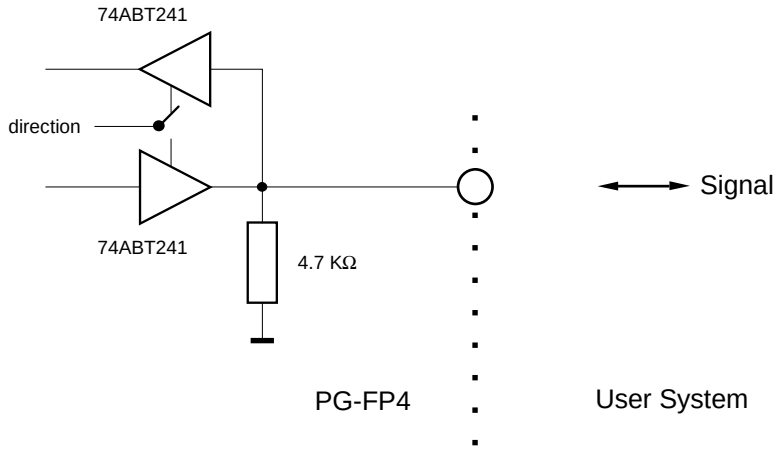
Figure 11-5: PG-FP4 output signal level 5



11.5 Extension Connector

The extension connector input signals must not exceed TTL level voltage.

Figure 11-6: PG-FP4 extension connector signal level



The input signals in remote control mode are active low; the output signals are active high.

Chapter 12 Error Messages

PG-FP4 error and warning messages are displayed on the message display.

12.1 Error messages of PG-FP4 in stand-alone mode

Table 12-1: Error messages of PG-FP4 in stand-alone mode (1/2)

No.	Message text	Error condition	Possible workaround
001	Invalid PRM data	PRM data is invalid	PRM data file contains invalid data or is incomplete or corrupted. Use the original PRM file delivered by NEC. Contact NEC support desk else.
002	Not connected	No device connected to FP4	Issue a ‘con’ command before the command causing this error.
003	Bootstrap Error	Bootstrap error	
005	Not supported!		The command issued is not supported on the device and thus cannot be used.
006	Command aborted!	Command aborted	
008	Parameter Error!	Wrong or illegal Parameter given	
009	Power Failure!	A supply voltage failure has been detected.	There is possibly a shortcut in the target hardware.
011	Read. Sig. failed	Reading device signature failed	Please check if the correct device is selected. If this is the case, please contact NEC.
012	Check connection	Check connection	FP4 cannot establish connection to the target device. This might be due to wrong connections between device and FP4, bad socket contacts or non-working oscillator.
013	Addr. Range err	Address range error	The address given in the command exceeds the device’s address range.
020	Inv. Sig. ID	Invalid Signature ID	Please check if the correct device is selected. If this is the case, please contact NEC.
021	Inv. Sig. code	Invalid Signature code	Please check if the correct device is selected. If this is the case, please contact NEC.
022	Inv. Sig. func.	Invalid Signature function	Please check if the correct device is selected. If this is the case, please contact NEC.
023	Inv. Sig. addr.	Invalid Signature address	Please check if the correct device is selected. If this is the case, please contact NEC.
024	Inv. device name	Invalid device name	Please check if the correct device is selected. If this is the case, please contact NEC.
025	Inv. Signature	Invalid Signature	Please check if the correct device is selected. If this is the case, please contact NEC.
026	Inv Dev/Firm ver	Device or firmware version does not match	Try newer PRM file
030	Prewrite Timeout	Prewrite timeout	Communication problem between FP4 and the target device. Please try the operation again.
032	Prewr. retry err	Prewrite retry error	
040	Erase Timeout	Erase timeout	Communication problem between FP4 and the target device. Please try the operation again.
041	Erase failure	Erase failure	A device defect is most probably causing this error.
042	Ers time exceed	Erase time exceed	A device defect is most probably causing this error.

Table 12-1: Error messages of PG-FP4 in stand-alone mode (2/2)

No.	Message text	Error condition	Possible workaround
043	Ers Timeset err	Erase timeset error	The parameter file may contain invalid data. Please contact NEC.
050	Bln Timeout	Blank check timeout	Communication problem between FP4 and the target device. Please try the operation again.
051	Blankchk failed	Blank check failed	The device connected is not empty. Use the ‘ers’ command before programming.
060	Wrb Timeout	Writeback timeout	Communication problem between FP4 and the target device. Please try the operation again.
061	Writeback failed	Writeback failed	A device defect is most probably causing this error.
062	Wrb retry exceed	Writeback retry exceed	A device defect is most probably causing this error.
063	Wrb Timeset err	Writeback timeset error	The parameter file may contain invalid data. Please contact NEC.
070	Write timeout	Write timeout	Communication problem between FP4 and the target device. Please try the operation again.
071	Write failed	The write operation failed	Either the device was not blank before writing or device defect is causing this error.
072	Write retry err	Write retry error	Either the device was not blank before writing or device defect is causing this error.
073	Wrt. Timeset err	Write timeset error	The parameter file may contain invalid data. Please contact NEC.
080	Vrf Timeout	Verify timeout	Communication problem between FP4 and the target device. Please try the operation again.
081	Verify failed	Verify failed	The data in the target device's flash is not the same as in FP4.
090	IVrf Timeout	Internal verify timeout	Communication problem between FP4 and the target device. Please try the operation again.
091	IVerify failed	Internal verify failed	Verification for 10 years data retention failed. Please program the same device again. If the error still occurs, data retention may be less than 10 years for this device.
092	VGT Comm err	Device Communication error	Communication problem between FP4 and the target device. Please try the operation again.
093	SUM Comm err	Device Communication error	Communication problem between FP4 and the target device. Please try the operation again.
094	SCF Comm err	Device Communication error	Communication problem between FP4 and the target device. Please try the operation again.
095	EXR Comm err	Device Communication error	Communication problem between FP4 and the target device. Please try the operation again.
096	EXW Comm err	Device Communication error	Communication problem between FP4 and the target device. Please try the operation again.
099	READ Comm err	Device Communication error during READ command	Communication problem between FP4 and the target device. Please try the operation again.

12.2 Information messages of PG-FP4 in stand-alone mode

Informational messages do not need any workaround because they do not force an error condition. The message is send as information only and does not require any user action in response.

Table 12-2: Information messages of PG-FP4 in stand-alone mode

No.	Message text	Description
204	Not connected	The target device was not connected to FP4 when a 'disconnect' command was issued.
210	Already conn.	A connect command was issued when the target device was already connected to FP4.

12.3 GUI Fatal Error messages

GUI fatal error messages indicate a severe error and GUI operation will not be stable any more. When the problem persists after restarting the GUI, please contact: ***fm_support@eu.necel.com***.

Table 12-3: GUI Fatal Error messages (1/3)

No.	Message text	Description
F 100	Could not initialize INI-File.	Errors F 100 to F 899 indicate a severe internal error situations.
F 101	Registering GUI Windows failed.	
F 102	Loading GUI Main Menu failed.	
F 103	Creating GUI main window failed.	
F 104	Loading keyboard shortcuts failed.	
F 105	Painting GUI main window failed.	
F 106	Starting debug failed.	
F 107	Setting status bar text failed.	
F 108	Creating tool bar failed.	
F 109	Creating Status Bar failed.	
F 111	Creating Information Window failed.	
F 112	Initialisation of internal GUI status failed.	
F 114	Could not initialize dialog boxes.	
F 115	Could not initialize window for monitoring communication to the programmer	
F 116	Determining program path failed.	
F 117	Could not initialize device setup dialog.	
F 118	Could not initialize debug information.	
F 119	Resizing the Status Bar failed.	
F 121	Moving Info Area failed.	
F 122	Loading tool tip text failed.	
F 123	Setting status bar text failed.	
F 124	Loading menu info text failed.	

Table 12-3: GUI Fatal Error messages (2/3)

No.	Message text	Description
F 125	Creating CRC check dialog window failed.	Errors F 100 to F 128 indicate a severe internal error situations.
F 127	Creating program area selection dialog window failed.	
F 128	Stopping debug failed.	
F 129	F 129 Close Upload_file_handle failed.	Call close file handle function failed
F 200	Invalid start address.	Errors F 200 to F 899 indicate a severe internal error situations.
F 201	Invalid end address.	
F 202	Neither Hex nor SREC specified.	
F 300	Creating splash screen timer failed.	
F 301	Edit control out of space.	
F 304	Determining selected download port number failed.	
F 406	Terminating receive thread failed.	
F 408	Creating status dialog window failed.	
F 410	Download failed.	
F 411	Connection between host and programmer is broken.	
F 412	Communication error.	
F 500	Reading current cursor handle failed.	
F 501	Unknown result of operation.	
F 502	Placing command execution time information in status bar failed.	
F 503	Unknown command (status update).	
F 504	Unknown command (transmit ended with OK).	
F 505	Unknown command (transmit ended with unknown answer).	
F 506	Unknown command (receive timeout).	
F 507	Unknown command (receive error).	
F 508	Unknown command (transmit aborted).	
F 600	Please stop logging communication first.	
F 601	Opening log file failed.	
F 700	USB splash screen timer failed.	
F 750	Please stop debugging first.	
F 751	Opening debug file failed.	
F 752	Debug information overflow. Discharging actual message.	
F 753	Setting up message box failed.	
F 800	Memory cannot be allocated.	
F 801	Shortage of memory.	
F 802	Temporary file could not be read. Abort Save File	
F 803	File save error. Abort Save File	
F 804	error line: <line number>. Data error, abort DATA Check	
F 805	error line: <line number>. Data Count error, abort "Data Count" Check	

Table 12-3: GUI Fatal Error messages (3/3)

No.	Message text	Description
F 806	error line: <line number>. Check sum error, abort "Check sum" Check	Errors F 100 to F 899 indicate a severe internal error situations.
F 807	cannot open Temporary File. Abort "Save File"	
F 808	HEX format error.	
F 809	Too large address.	
F 810	Parameter of "Start Address" is invalid.	
F 811	Parameter of "End Address" is invalid.	
F 812	File load error. Abort	
F 813	Temporary file could not be created. Abort	
F 820	Memory allocation error	
F 902	Unable to find any PRM file. Please install PRM files.	The GUI does not find any PRM file in sub-directory \PRM.
F 903	Invalid character.	
F 904	Invalid file format.	
F 905	Invalid checksum.	
F 906	F 906 Download NWire file failed!	Manage NWire download file failed (before calculate checksum)
F 907	F 907 Download NWire file failed!	Manage NWire download file failed (after calculate the checksum)

12.4 GUI Error messages

In addition to the below listed error messages there can be error message displayed as returned from PG-FP4.

Table 12-4: GUI Error messages (1/3)

No.	Message text	Description
E 200	Opening script file failed.	Opening the specified script file failed. Script file in use?
E 201	E 201 Updating the firmware will take several minutes. ATTENTION: - The process of updating your firmware must NOT be interrupted! - Without firmware this FP4 GUI will NOT run properly. Install new firmware in your programmer?	
E 204	Unknown Version of your firmware! The FP4 GUI may not work properly!	Refer to the Firmware-Update chapter for a description of these messages.
E 205	The firmware you are using requires an update of the GUI! The FP4 GUI may not work properly!	
E 206	E 206 Your firmware is not up to date! Updating the firmware will take several minutes. ATTENTION: - The process of updating your firmware must NOT be interrupted! - Without new firmware this FP4 GUI will NOT run properly. Install new firmware in your programmer?	
E 207	Wrong firmware in programmer! The GUI may not work properly!	
E 208	The programmer memory does not contain the most recent downloaded file (different CRC). Please download your user application(s) again.	Before issuing an EPV command the GUI verifies proper application file contents by verifying actual CRC with the one saved after file download in FP4.ini.

Table 12-4: GUI Error messages (2/3)

No.	Message text	Description
E 209	Searching for a port communicating with the programmer failed. Please check the connection.	No communication with the programmer could be established at all. Sequence of connecting FP4 on start up of the GUI: Read most recent INI-file settings. Try opening the most recent PC port and send the `ver` command to the PG. When 1. failed, the following will be tried 2 times: Open the USB port and send the `ver` command (on Win 98 and Win 2000 only). Open COM1 … COM6 with all possible baud rates and send the `ver` command for each of these combinations. As soon as any of the combinations above succeeds the communication port has been found. When serial communication is established and most recently the parallel download port has been used (`DownloadPort` -key in INI-file): Try opening the parallel PC port and send the `ctr on` command to the PG
E 210	Line too long.	Executing a script file might abort with one of these errors. The content of the line, causing the error is also displayed.
E 211	Nested repeat is not supported.	
E 212	Loop number invalid.	
E 213	File too long.	
E 214	Statement 'repeat <num. rep.>' missing.	Executing a script file might abort with one of these errors. The content of the line, causing the error is also displayed.
E 215	Command not found	
E 216	Download file name missing.	
E 217	Opening download file failed.	
E 218	Upload file name missing.	
E 219	Opening parameter file for upload failed.	
E 220	Opening upload file failed.	
E 221	Command not allowed in script file.	
E 222	Processing a command failed.	
E 223	Command execution failed.	The script syntax was correct and the command has been send to FP4, but the command execution itself showed an error (e.g. verify error on the target device).
E 300	Determining download directory failed.	The selected directory name in the file download dialog is invalid.
E 301	Determining upload directory failed.	The selected directory name in the file upload dialog is invalid.
E 304	Trying to open serial port failed.	Execute command “ver” failed.
E 306	Trying to connect Programmer failed.	
E 307	Trying to open USB failed.	
E 308	E 308 Create upload file failed.	Create upload file failed.
E 309	E 309 Create file failed.	Create *.hex or *.rec file failed.
E 316	Trying to connect Programmer failed.	
E 317	ver command failed	
E 500	Evaluating CRC answer failed.	FP4 answered with an unexpected string after sending the *Checksum* command.
E 501	Operation failed.	Executing a command failed (e.g. verify error signalled from target device).

Table 12-4: GUI Error messages (3/3)

No.	Message text	Description
E 502	Programmer is not responding.	Communication between PC and FP4 timed out.
E 503	Receiving failed.	Reading the PC port failed.
E 600	Appending information to communication logging file failed.	Writing data to the communication log file failed.
E 800	Illegal address	An end address entered in the hex-editor is below the start address.
E 801	The file cannot be read.	Processing the selected file in the Hex-editor failed.
E 802	No HEX data.	The file format could not be read in the Hex-editor.
E 803	The file cannot be written.	The Windows write-file function failed in the Hex-editor.
E 804	E 804 cannot open <file name> abort <command name>	The Windows file-open function failed in the Hex-editor.
E 805	E 805 cannot open <file name> abort "Load File"	When open a file in Hex editor, a NULL handle is returned.
E 806	Check sum error. Continue?	The hex-editor detected a faulty checksum. The checksum will be corrected, when continuing.
E 808	Invalid file name.	The specified file could not be found in the Hex-editor.
E 809	E 809 <file name> could not be opened. abort Save File	The Windows file-open function failed in the Hex-editor.
E 900	Unable to open last active PRM/SET file. Using most recent settings.	The FP4.INI file does not exist or contains invalid entries for `RecentPrmFile` or `RecentSet-File`. The first PRM file from sub-directory \PRM will be loaded instead.
E 901	Searching for fp4com.dll failed.	The communication DLL `fp4com.dll` is not available. Please re-install the FP4 software package
E 902	Unable to write to PRM file.	Error message during maintenance mode only. No user action is required.
E 903	Unable to find any PRM file. Please install PRM files.	The sub-directory \PRM is either not existing or there is not PRM file available in this directory.
E 907	Download of PRM file failed.	Download of PRM returned an error. PRM file may contain errors.
E 908	Download of SET file failed.	Download of SET returned an error. SET file may contain errors.
E 909	This file is not valid	A file opened for HEX editing contains empty lines.
E 910	Checking device name failed.	Erroneous signature data during Device Connect command.
E 911	Checking device end address failed.	Erroneous signature data during Device Connect command.

12.5 GUI Information messages

Informational messages do not need any workaround because they do not force an error condition. The message is send as information only and does not require any user action in response.

Table 12-5: GUI Information messages (1/2)

No.	Message text	Description
I 200	I 200 New firmware installed successfully in your programmer! FP4 device setup has been invalidated by the firmware update. Please setup device configuration again.	Firmware upgrade completed with success.
I 201	Opening parallel download port failed. File download will be done on the serial port.	The Windows internal function to open the parallel port failed (port occupied by any other software?)
I 202	Download via parallel port failed.	Parallel port communication is not OK. Retry or use serial port for download.
I 300	Value out of range.	The value entered in a dialog box is out of the possible max/min range. The max/min value or the most recent value will be written into the dialog element.
I 301	Multiple Program Areas are disabled. Please enable Program Areas usage in the Device Setup Dialog.	The menu command *Programmer\Select Programming area* can only be used when it has been enabled in the advanced tab of the device setup dialog.
I 500	Operation completed successfully.	Executing a command succeeded. Most commands do not show this message.
I 501	This command can only be used for UC2 devices.	The menu entries *Device\Write Security* and *Device\Checksum* can only be used for UC2 devices.
I 502	**Note:** To abort a write, erase or verify operation it is necessary to reset the programmer manually.	Aborting device related commands require additional reset of the Programmer.
I 800	Buffer is modified. Are you sure to close?	The Hex-editor indicates that its contents is not yet saved to disk.
I 801	End record not found, created.	The Hex-editor has implicitly created an end record when loading a file.
I 802	The file is modified. Save?	The Hex-editor indicates that its contents is not yet saved to disk.
I 803	I 803 The file is modified. Save file?	Before close file, can choose save or not save the modification.
I 804	The file is modified. Are you sure to quit?	The Hex-editor indicates that its contents is not yet saved to disk.
I 805	This file is not valid.	Try to open a invalid file in hex editor.
I 905	*.set is not valid. Using most recent settings.	Using old format SET file will also occur this message.
I 906	*.prm is not valid. Using most recent settings.	Using old format PRM file will also occur this message.
I 907	Caution: When 'Chip Erase' is disabled, chip cannot be erased and programmed any more!	The warning is shown when the security flag is set in the advanced dialog.
I 908	I 908 Caution: When 'Boot block cluster reprogramming' is disabled, boot block cannot be erased and programmed any more!	The warning is shown when the flag “Disable Boot block cluster reprogramming” is set in the advanced dialog.
I 911	The selection is out of range.	Menu/Setup/Standard dialog/Speed is larger than the max value.

Table 12-5: GUI Information messages (2/2)

No.	Message text	Description
I 912	The selection is out of range.	Menu/Setup/Standard dialog/Speed is smaller than the min value.
I 913	Value is out of range.	Menu Device/Setup/Standard dialog/Frequency or Multiply rate is larger than the max value.
I 914	Value is out of range.	Menu Device/Setup/Standard dialog/Frequency or Multiply rate is smaller than the min value.
I 915	The selection is out of range.	Menu Device/Setup/Advanced dialog/ Vdd[V] is out of range.
I 916	The selection is out of range.	Menu Device/Upload dialog/ is out of range.
I 917	The selection is out of range.	Menu File/Setup/Advanced dialog/Range[hex] Start or End selection is out of range.
I 918	Input data is out of range	Data typed in for multiply rate in PLL mode exceeds the range of 0.01 to 99.99.
I 919	I 919 Caution: Boot Block swapping will not be possible with this selection.Anyhow, boot block protection is possible.	The warning is shown when change End Boot block in the advanced dialog.

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