PG-FP6

Usage of Communications Commands

Introduction

This document introduces how to use communications commands via a serial interface for programming by the PG-FP6. Using these commands also enables automated control of programming.

Target Devices

RA family

RL78 family

RX family

RH850 family

Renesas Synergy™ microcontrollers

RE family

Power-management ICs

Renesas USB Power Delivery family (C30 group)

ICs for driving motors and actuators (ICs for motor control)

SuperH family

V850 family

78K family

R8C family

Contents

1. Overview

The PG-FP6 flash programmer can be run from a host PC by using serial communications commands. Using communications software to manipulate the PG-FP6 also enables automated programming. For details on the PG-FP6, refer to the user's manual.

https://www.renesas.com/pg-fp6

2. Basic Procedure up to the Use of Communications Commands

This chapter helps you to understand the sequence of the basic procedures to follow up to the execution of communications commands for the PG-FP6 via communications software, taking the RL78/G13 as an example of the target MCU.

- The descriptions in this chapter apply under the following conditions.

Host PC interface:	USB
Programming area:	Area 0
Target MCU:	R5F100LE (RL78/G13)
Programming GUI:	FP6 Terminal V1.04.01
Communications software:	Tera Term Version 4.105*
Power supply:	5 V supplied from the PG-FP6
Clock supply:	32 MHz (on-chip clock oscillator)
Communications interface:	Single-wire UART (1,000,000 bps)
Security setting:	Disabled
Operations of flash memory:	Erasure, programming, and verification
Operating mode:	Chip mode
Flash options:	None

    *Official Web site of Tera Term: http://ttssh2.osdn.jp

- This chapter describes the procedures listed below. Steps 1 to 4 refer to standard operations assuming the use of the FP6 Terminal. If you already understand these steps, start from step 5.
  1. Connecting the host PC and PG-FP6
  2. Connecting a target system
  3. Creating a setting file
  4. Executing commands
  5. Executing commands via communications software
  6. Creating a macro file
  7. Executing the macro file

2.1 Connecting the Host PC

Connect the USB port of the host PC to the PG-FP6 via a USB cable. Also connect the PG-FP6 to the power adapter that comes with the PG-FP6. After that, turn on the power supply switch on the PG-FP6.
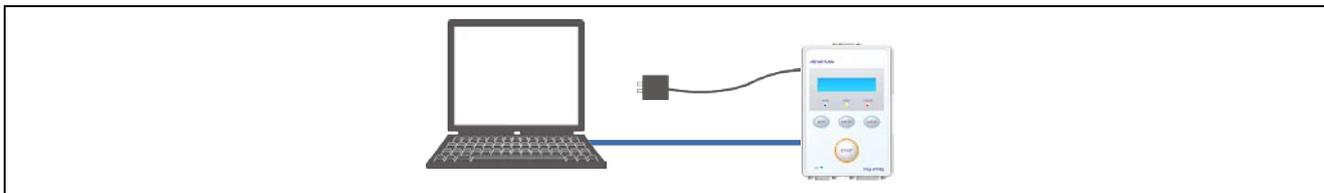
Figure 2.1   Connecting the Host PC

2.2 Connecting a Target System

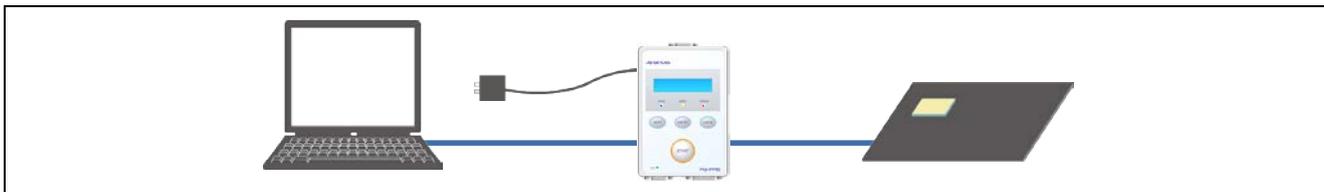Connect the target cable of the PG-FP6 to the target system.

Figure 2.2   Connecting a Target System

2.3 Creating a Setting File

Starting up the FP6 Terminal opens the main window.
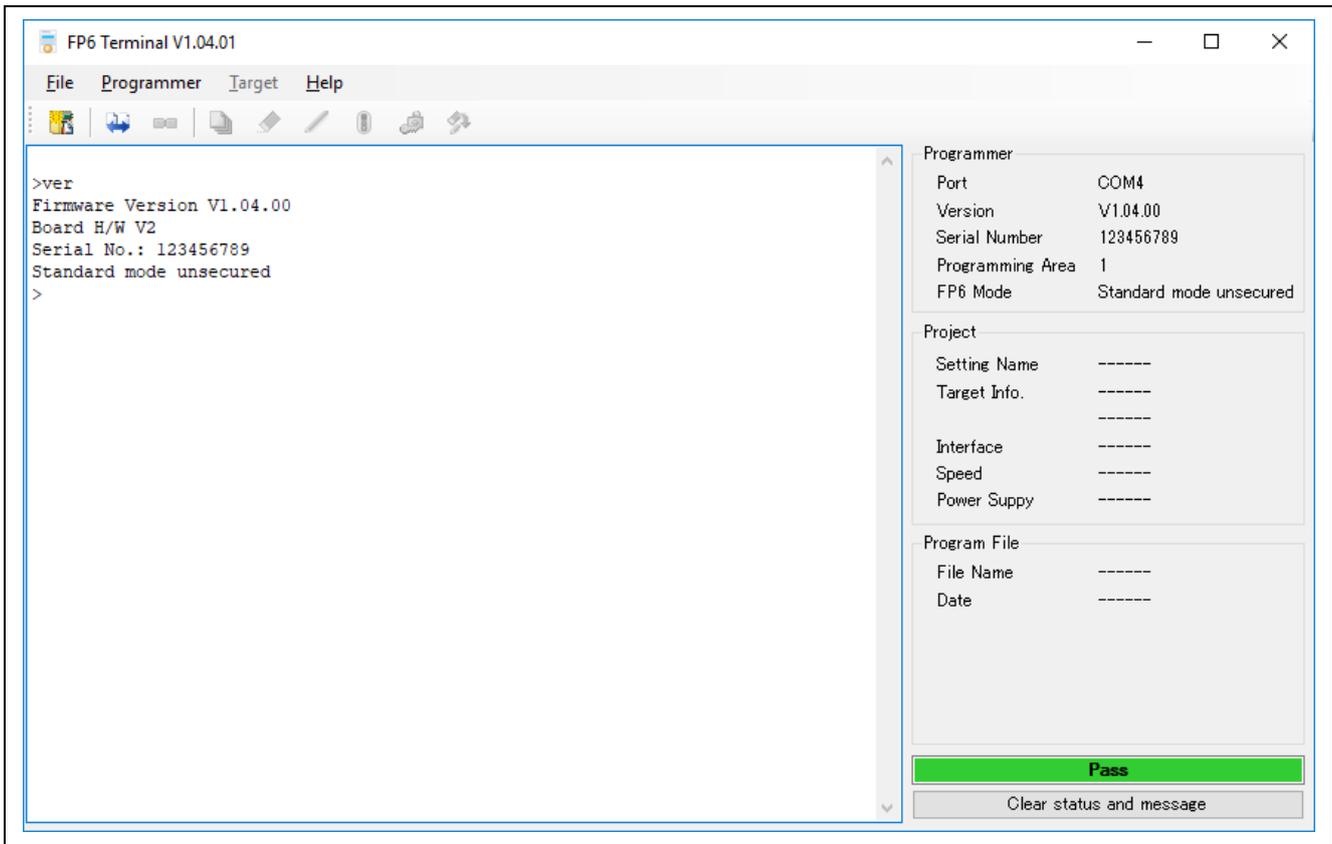
Figure 2.3   **Main Window**

Select [New Setting File…] from the [File] menu to open the [Create New Setting] dialog box.
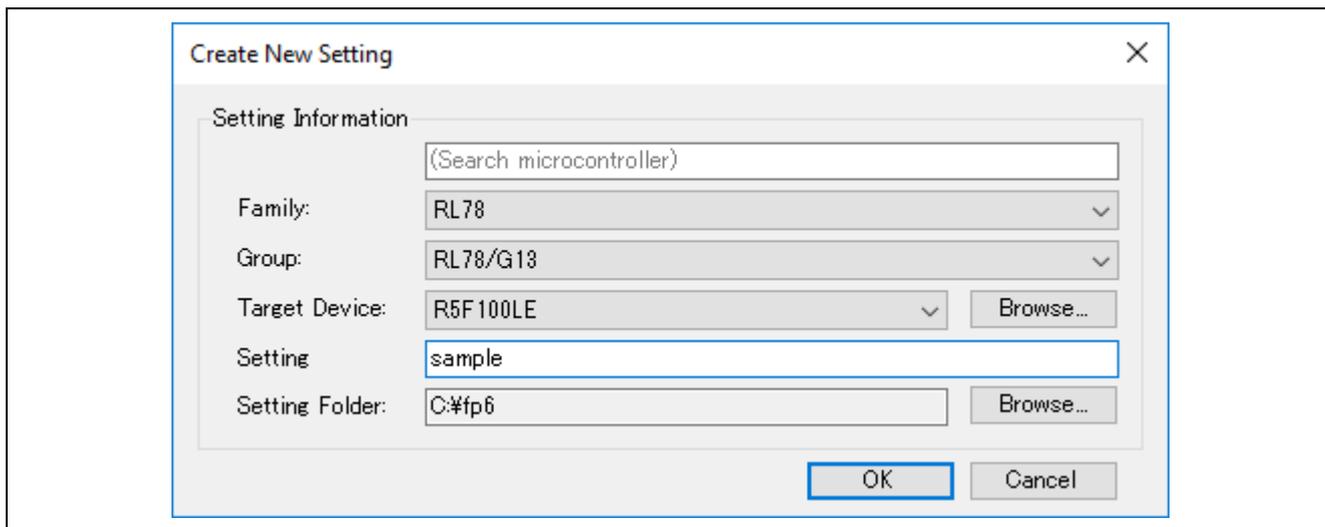
Figure 2.4   **[Create New Setting] Dialog Box**

Make the following settings.

      [Family]:   RL78

      [Group]:   RL78/G13

      [Target Device]: R5F100LE

      [Setting]:   sample

      [Setting Folder]: C:\fp6

Clicking on the [OK] button opens the [Setup] dialog box.

Select "C:\fp6\sample.mot" as the program file on the [Program File] tabbed page.
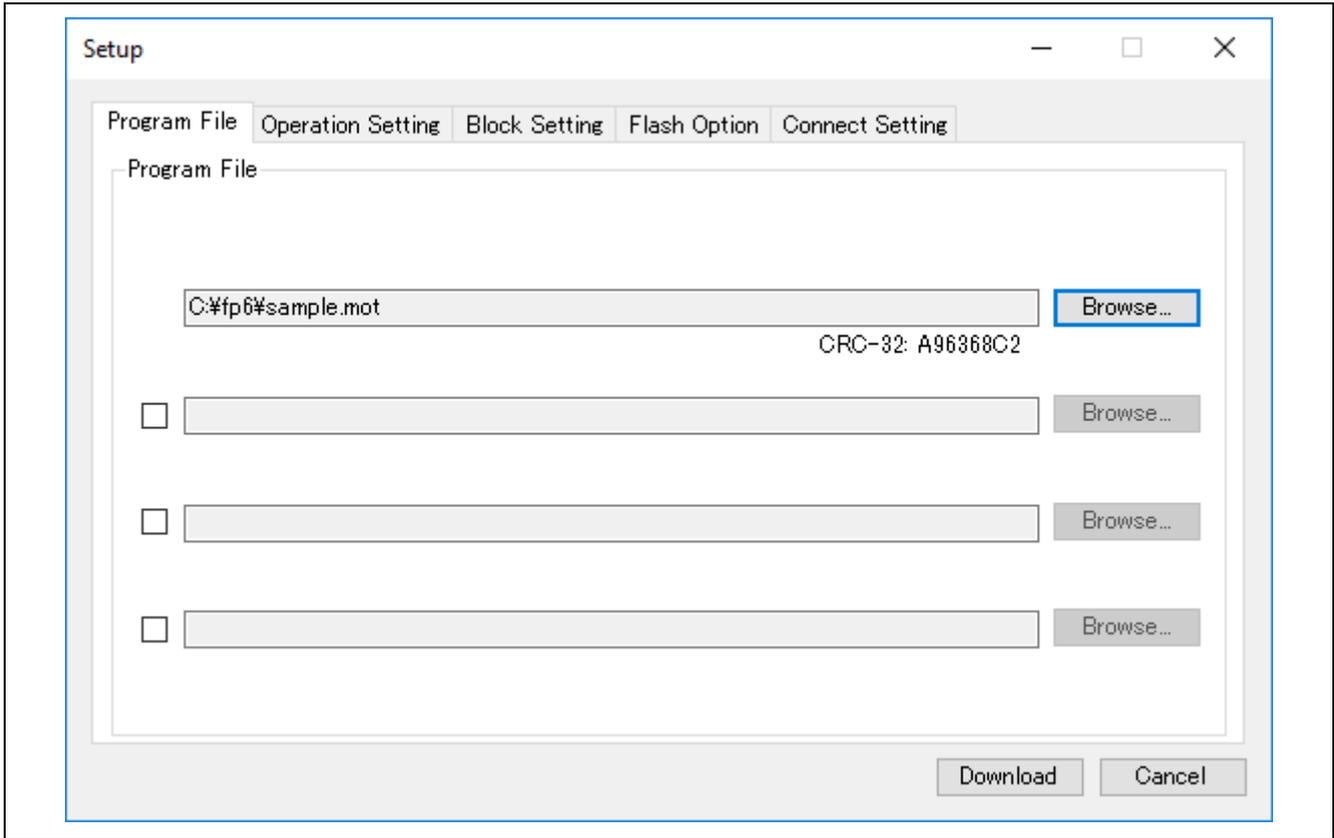
Figure 2.5   [Program File] Tabbed Page

Select [Verify] in the [Command] category on the [Operation Setting] tabbed page.
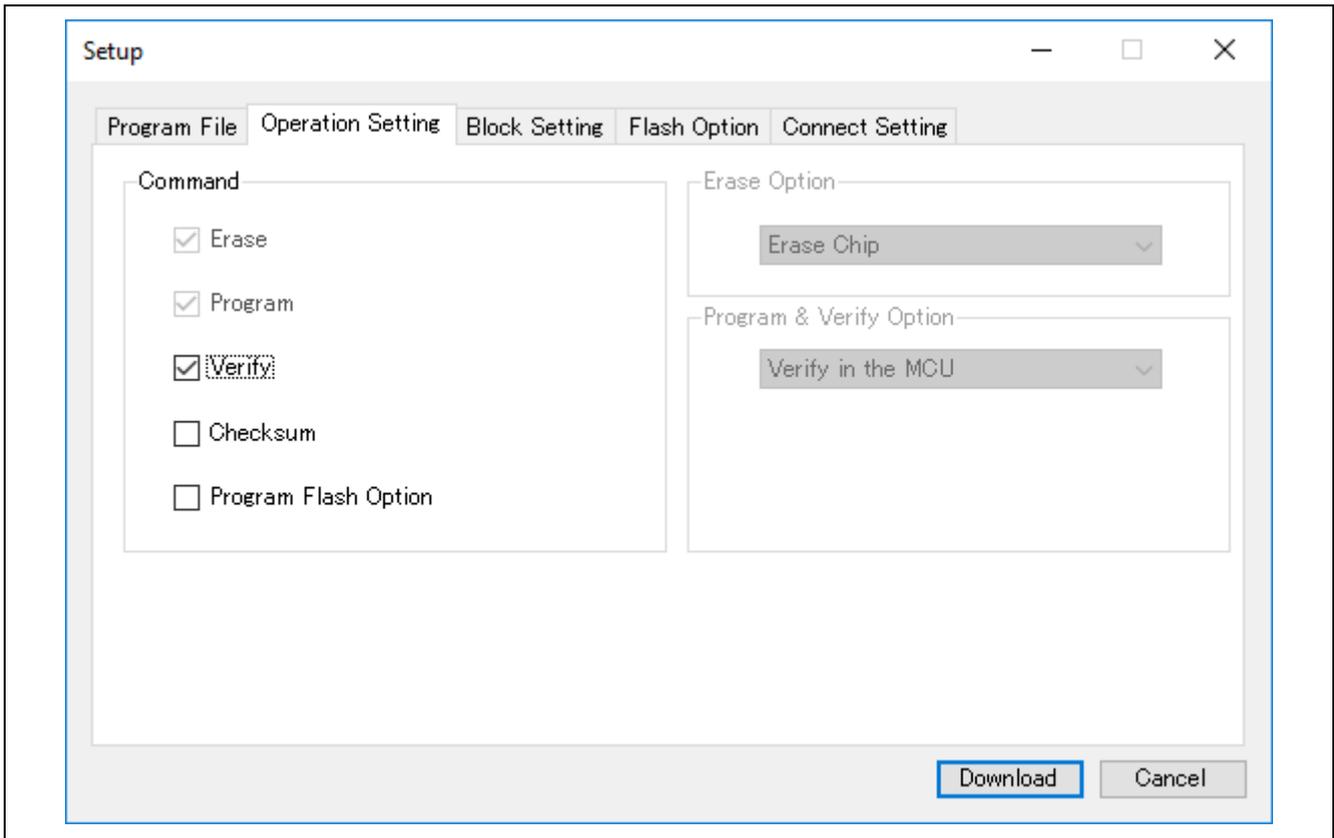
Figure 2.6   **[Operation Setting] Tabbed Page**

Make sure that [Chip Mode] is selected for [Mode] on the [Block Setting] tabbed page.
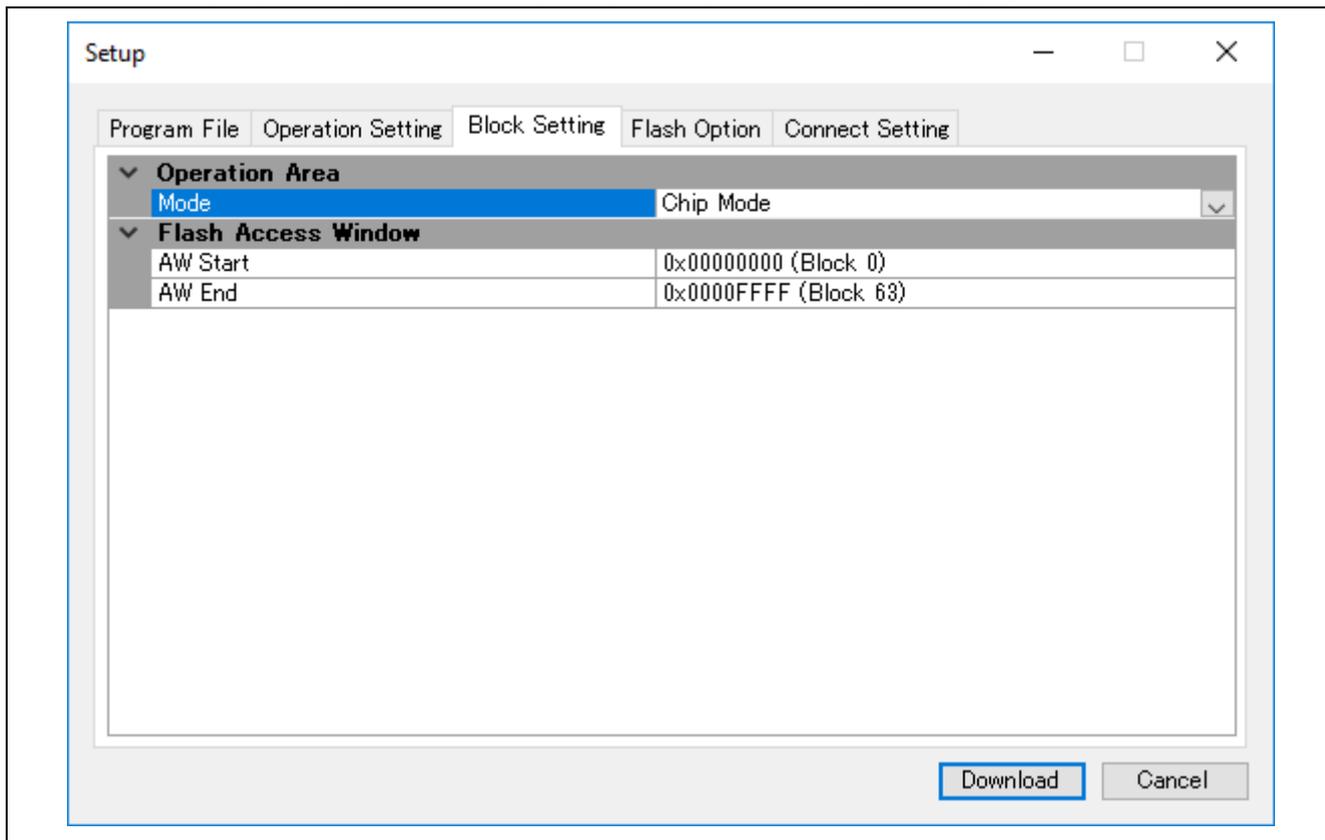
Figure 2.7   [Block Setting] Tabbed Page

Make sure that [Do Nothing] is selected for [Set Option] on the [Flash Option] tabbed page.
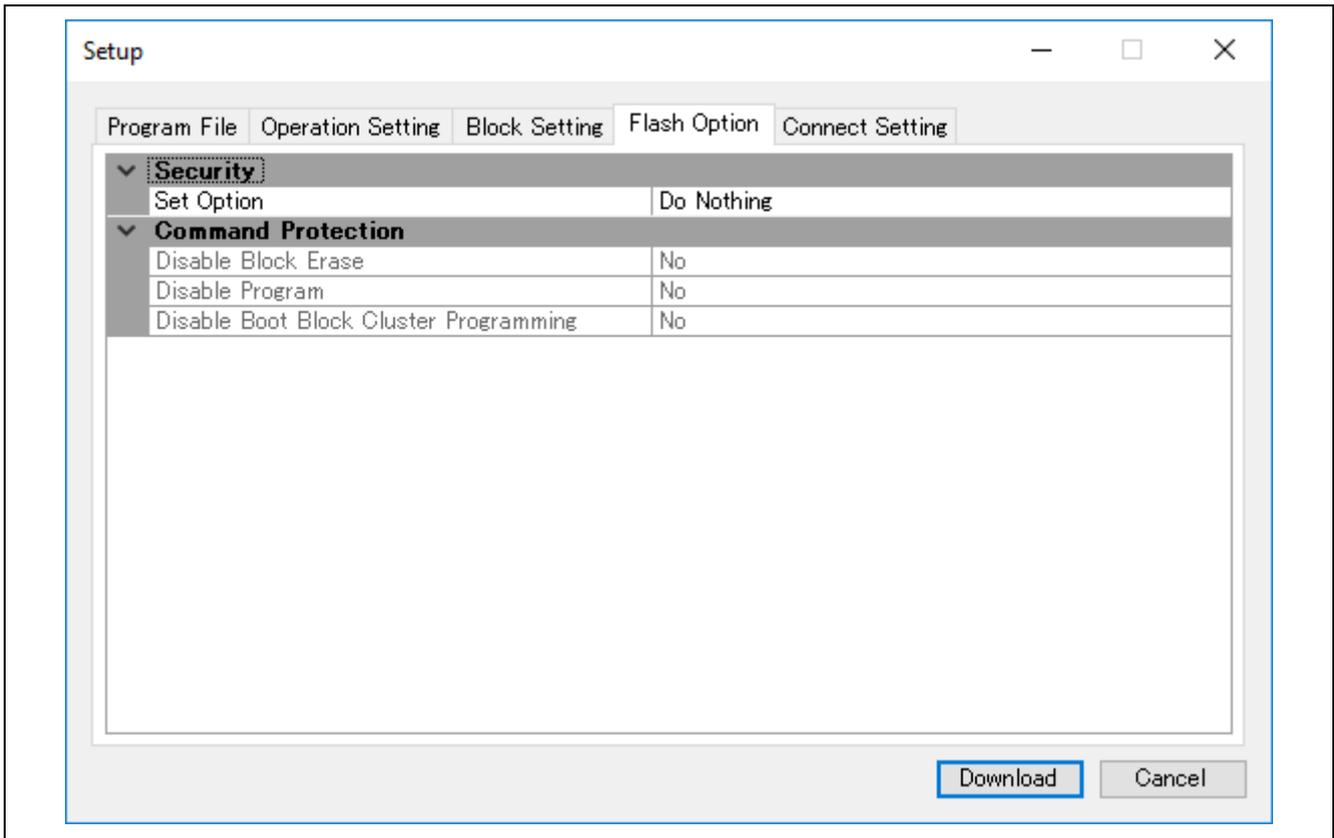
Figure 2.8   [Flash Option] Tabbed Page

On the [Connect Setting] tabbed page, select "1,000,000" as the communications speed. Also make sure that [Power supply from FP6] is selected and the value of VCC is 5.0 V.
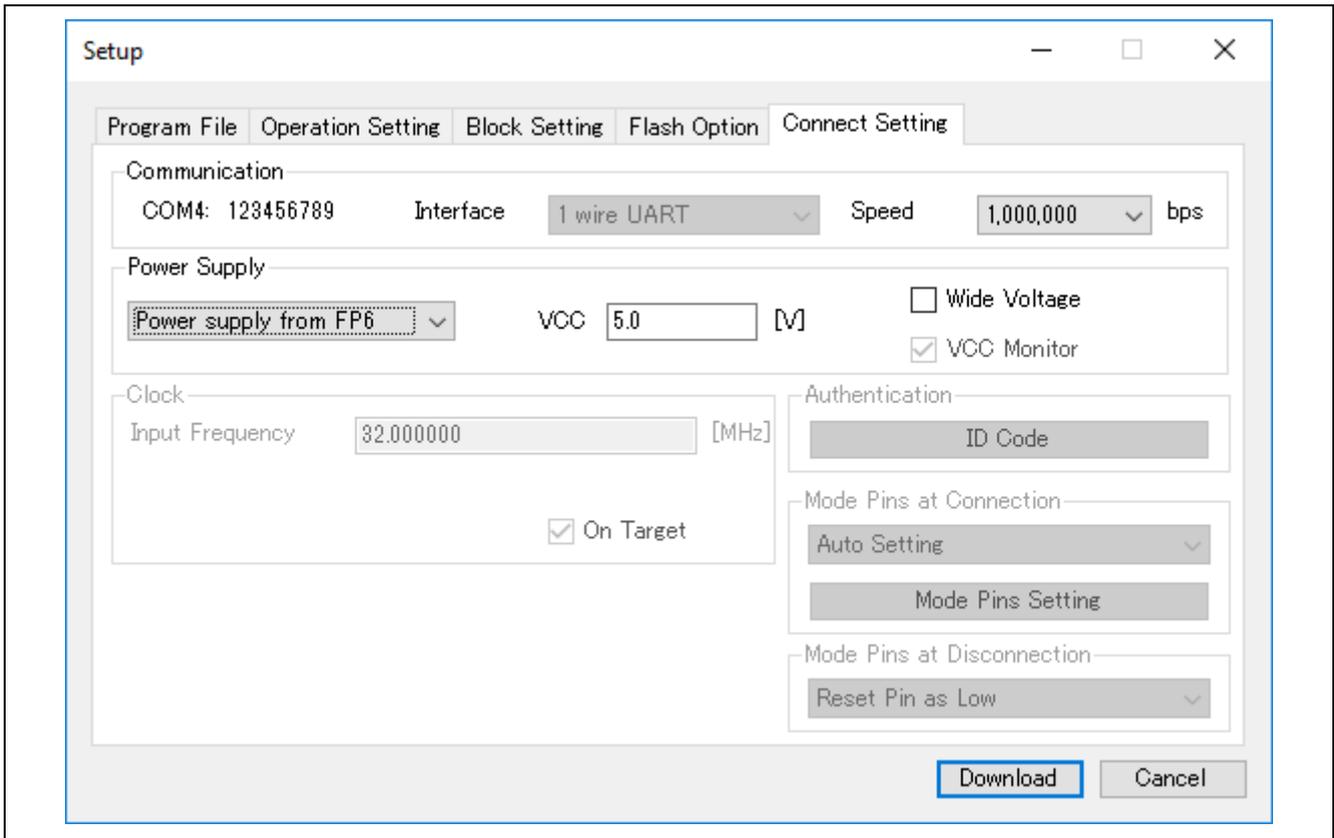
Figure 2.9   [Connect Setting] Tabbed Page

Click on the [Download] button to download a parameter file, setting file, and program file to be stored in the PG-FP6.
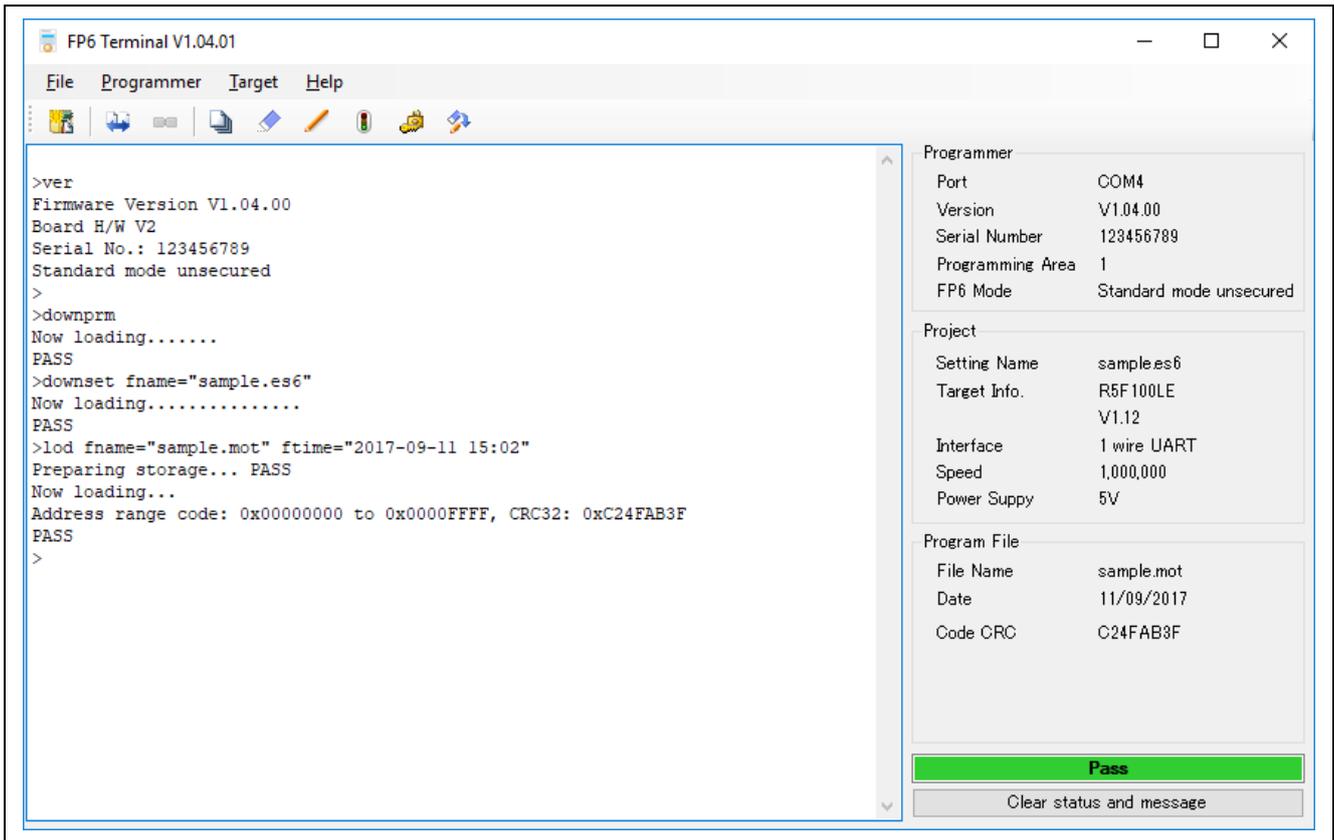
Figure 2.10   **Downloading**

2.4 Executing Commands

Selecting [Start] from the [Target] menu executes erasure, programming, and verification of the flash memory in the R5F100LE.
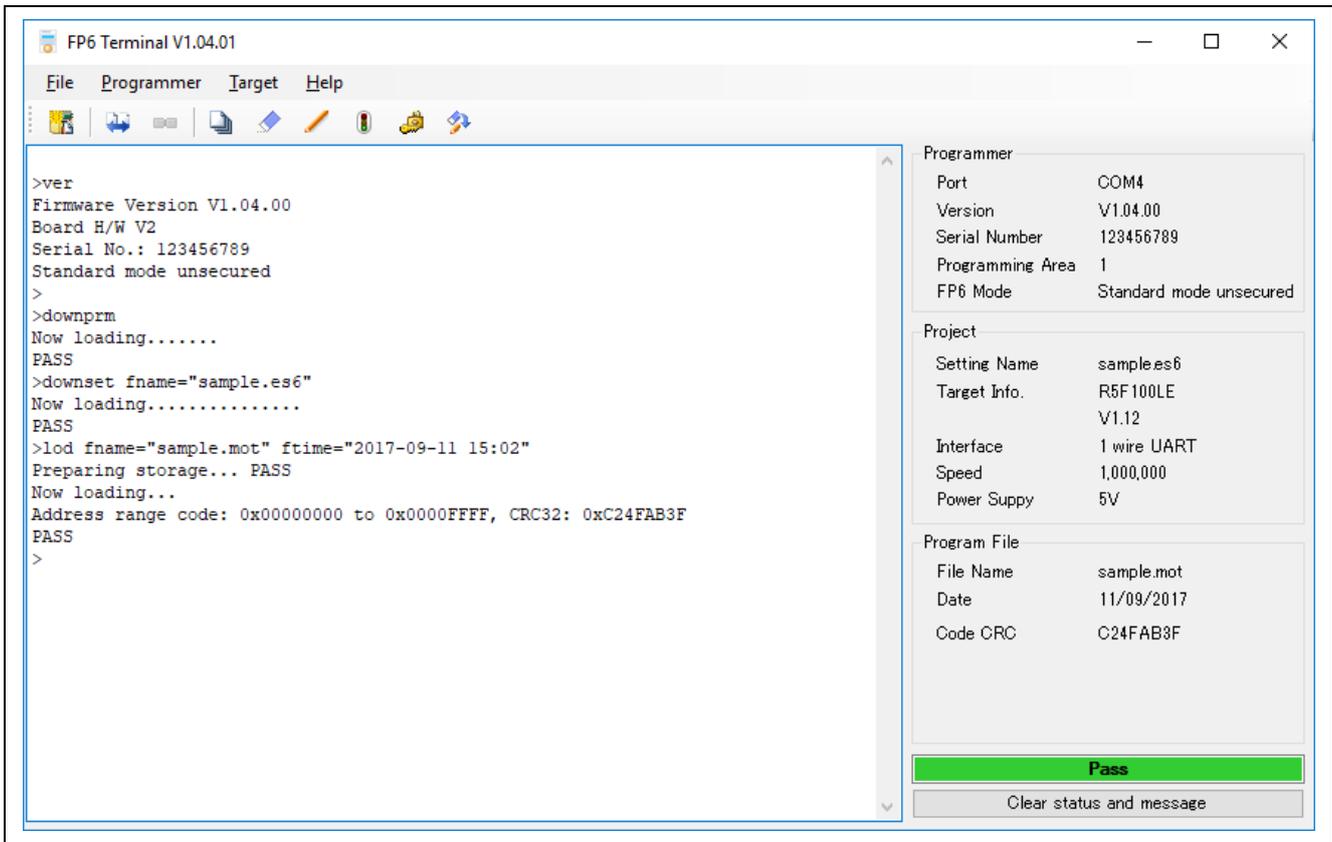
Figure 2.11   Executing Commands

Select [Exit] from the [File] menu to close the FP6 Terminal.

2.5 Executing Commands via the Communications Software

Starting up Tera Term opens the [New connection] dialog box.

Select [Serial] and "COMx: PG-FP6(CDC) (COMx)", where x indicates the number of the port you wish to use, as the port. Click on the [OK] button to open the main window.
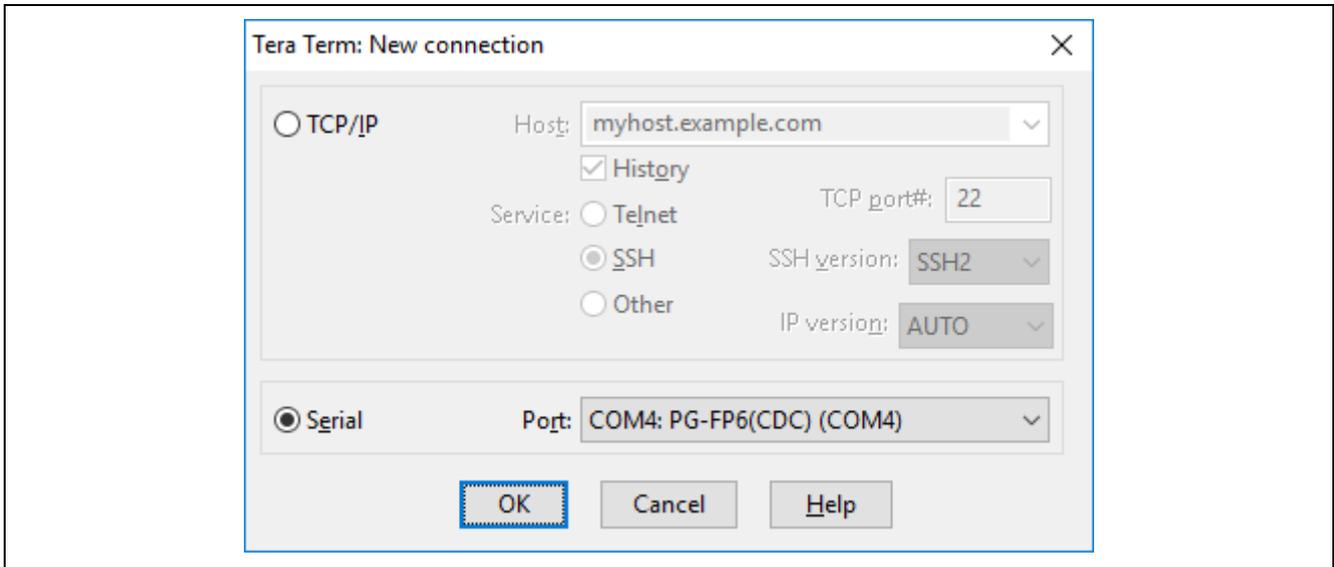
Figure 2.12   [New connection] Dialog Box

Press the Enter key, and the ">" (prompt) character appears on the screen.
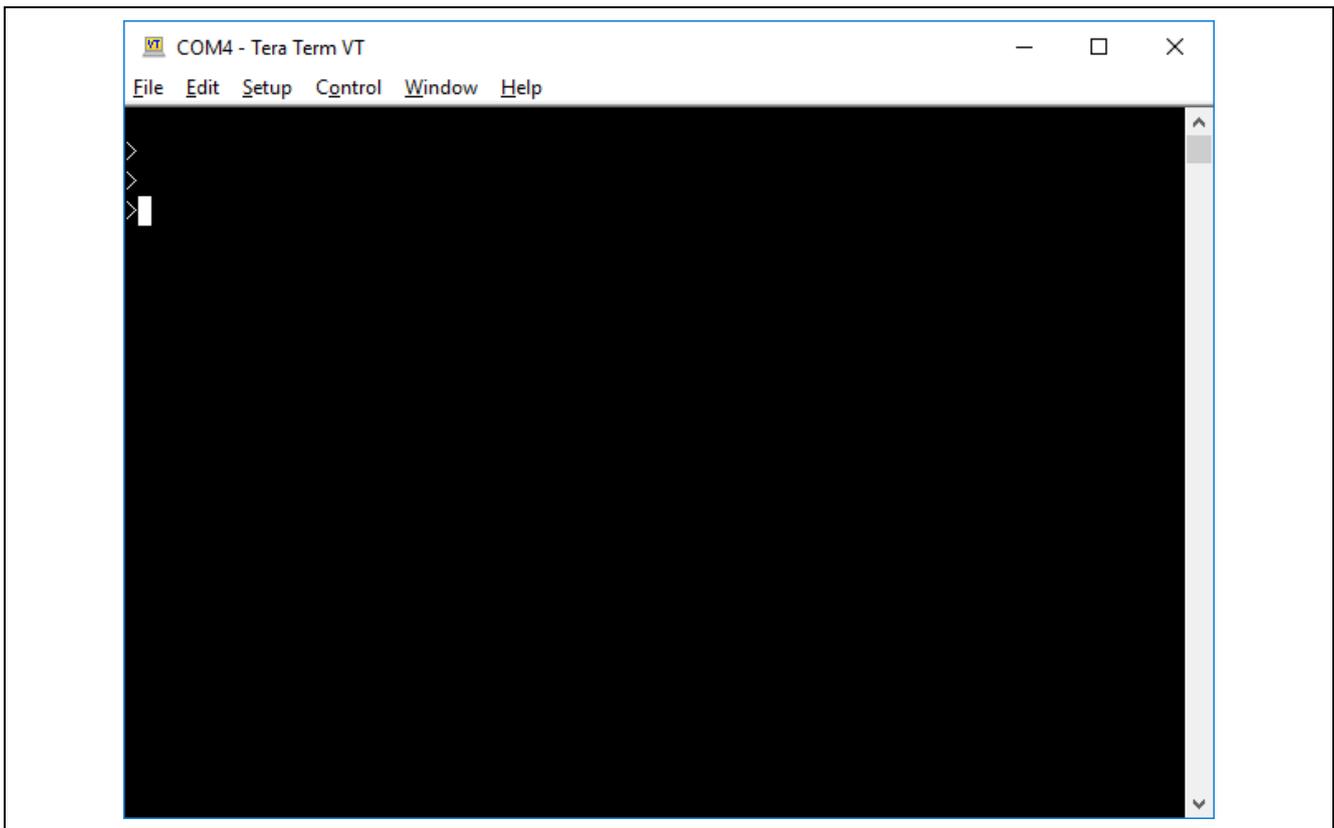
Figure 2.13   Main Window

Enter "ep" to execute erasure, programming, and verification of the flash memory in the R5F100LE.
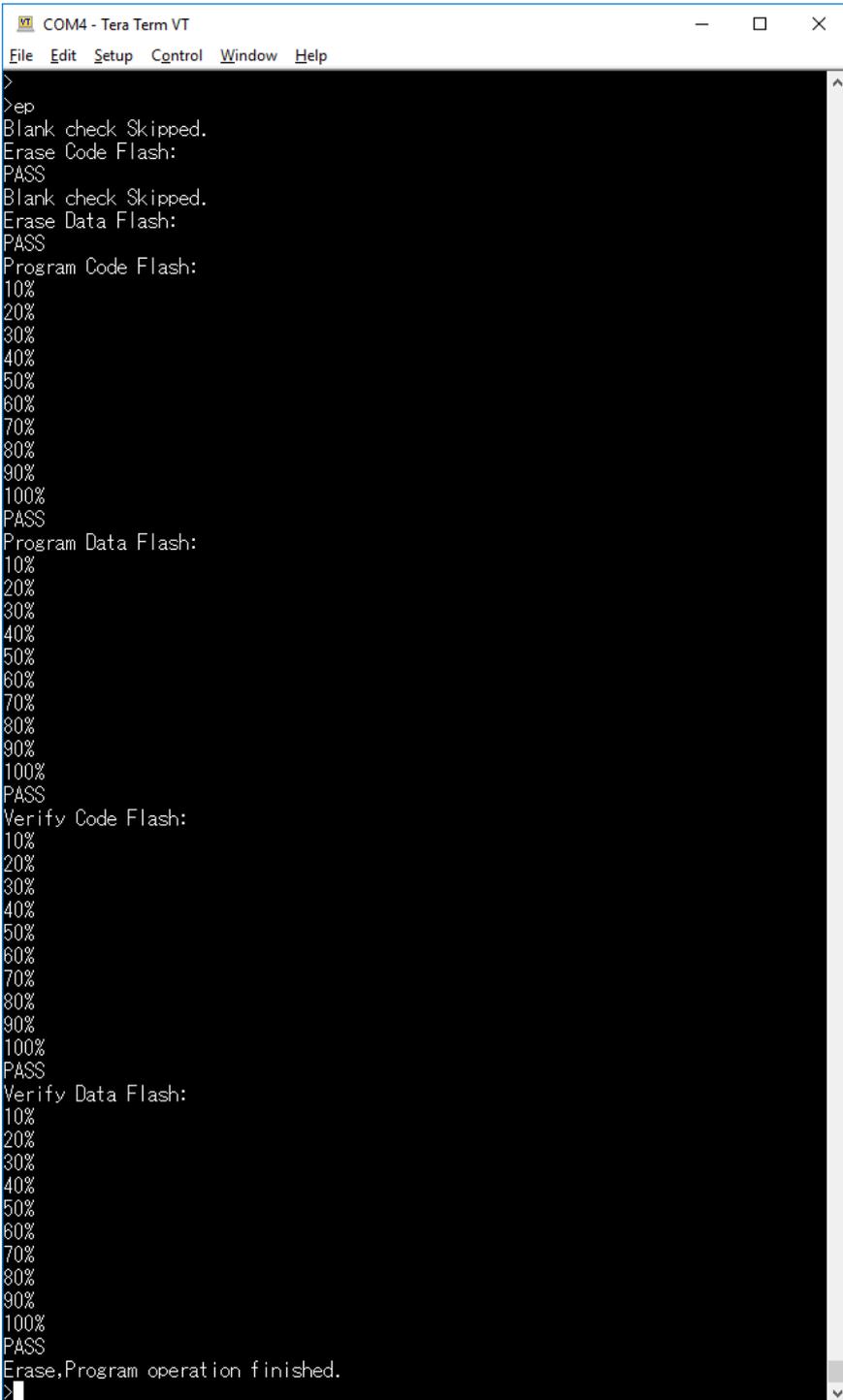
COM4 - Tera Term VT

File Edit Setup Control Window Help

```
>
>ep
Blank check Skipped.
Erase Code Flash:
PASS
Blank check Skipped.
Erase Data Flash:
PASS
Program Code Flash:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
PASS
Program Data Flash:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
PASS
Verify Code Flash:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
PASS
Verify Data Flash:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
PASS
Erase,Program operation finished.
>
```

Figure 2.14   Executing a Command

2.6 Creating a Macro File

Enter the following code in a text editor and save it as "C:\fp6\sample.ttl".

```
sendln 'ep'
end
```

Figure 2.15   Creating a Macro File

2.7   Executing the Macro File

Select [Macro] from the [Control] menu and open the "sample.ttl" macro file. This executes erasure, programming, and verification of the flash memory in the R5F100LE.

Figure 2.16   Executing the Macro File

3. Examples of Executing Communications Commands from Macro Files

This chapter describes automated programming via Tera Term by using macro files that include PG-FP6 communications commands. For details on the communications commands, refer to the user's manual.

https://www.renesas.com/pg-fp6

3.1 Downloading a Parameter File, Setting File, and Program File

The **downprm**, **downset**, and **lod** commands can be used to download parameter files, setting files, and programs files, respectively.

The following is an example of downloading the parameter file "R5F100LE.pr5", setting file "sample.es6", and program file "sample.mot".

```
sendln 'downprm'
wait 'Now loading...'
sendfile 'C:\fp6\sample\R5F100LE.pr5' 1
wait '>'
sendln 'downset'
wait 'Now loading...'
sendfile 'C:\fp6\sample\sample.es6' 1
wait '>'
sendln 'lod fname="sample.mot" ftime="2017-09-11 15:02"'
wait 'Now loading...'
sendfile 'C:\fp6\sample.mot' 1
end"
```

Executing this macro file leads to the following output in Tera Term.

```
>downprm
Now loading.......
PASS
>downprm
Now loading.......
PASS
>downset
Now loading..............
PASS
>lod fname="sample.mot" ftime="2017-09-11 15:02"
Preparing storage... PASS
Now loading...
Address range code: 0x00000000 to 0x0000FFFF, CRC32: 0xC24FAB3F
PASS
>
```

3.2   Programming Multiple Program Files

Using the **add** option of the **lod** command allows you to download multiple program files.

The following example is for the downloading and programming of "sample1.mot" and "sample2.mot".

```
sendln 'lod fname="sample1.mot" ftime="2020-06-18 16:24"'

wait 'Now loading...'

sendfile 'C:\fp6\sample1.mot' 1

wait '>'

sendln 'lod add fname="sample2.mot" ftime="2020-06-18 16:26"'

wait 'Now loading...'

sendfile 'C:\fp6\sample2.mot' 1

wait '>'

sendln 'ep'

end
```

Executing this macro file leads to the following output in Tera Term.

```
>lod fname="sample1.mot" ftime="2020-06-18 16:24"

Preparing storage... PASS

Now loading...

Address range code: 0x00000000 to 0x00007FFE, CRC32: 0xC7D7C74C

PASS

>lod add fname="sample2.mot" ftime="2020-06-18 16:26"

Now loading...

Address range code: 0x00008000 to 0x0000FFFF, CRC32: 0x25FDCC28

PASS

>ep

(Omitted)

Erase,Program operation finished.

>
```

3.3　Consecutive Programming with Multiple Sets of Files

You can download multiple sets of files in different programming areas of the PG-FP6 for use in consecutive programming of desired flash areas of the target MCU.

The following shows an example of downloading two pairs of a setting file and program file in programming areas 0 and 1 of the PG-FP6, respectively, along with a single parameter file (for a specific MCU). These files are to be programmed in areas 0 and 1 of the target MCU.

```
sendln 'progarea 0'
wait '>'
sendln 'downprm'
wait 'Now loading...'
sendfile 'C:\fp6\sample\R5F100LE.pr5' 1
wait '>'
sendln 'downset'
wait 'Now loading...'
sendfile 'C:\fp6\sample\sample1.es6' 1
wait '>'
sendln 'lod fname="sample1.mot" ftime="2020-06-18 16:24"'
wait 'Now loading...'
sendfile 'C:\fp6\sample1.mot' 1
wait '>'
sendln 'progarea 1'
wait '>'
sendln 'downprm'
wait 'Now loading...'
sendfile 'C:\fp6\sample\R5F100LE.pr5' 1
wait '>'
sendln 'downset'
wait 'Now loading...'
sendfile 'C:\fp6\sample\sample2.es6' 1
wait '>'
sendln 'lod fname="sample2.mot" ftime="2020-06-18 16:26"'
wait 'Now loading...'
sendfile 'C:\fp6\sample2.mot' 1
wait '>'
sendln 'progarea 0'
wait '>'
sendln 'ep'
wait '>'
sendln 'progarea 1'
wait '>'
sendln 'ep'
```

> end

Executing this macro file leads to the following output in Tera Term.

```
>progarea 0
Active Program Area: 0
>downprm
Now loading.......
PASS
>downset
Now loading...............
PASS
>lod fname="sample1.mot" ftime="2020-06-18 16:24"
Preparing storage... PASS
Now loading...
Address range code: 0x00000000 to 0x00007FFE, CRC32: 0xC7D7C74C
PASS
>progarea 1
Active Program Area: 1
>downprm
Now loading.......
PASS
>downset
Now loading...............
PASS
>lod fname="sample2.mot" ftime="2020-06-18 16:26"
Preparing storage... PASS
Now loading...
Address range code: 0x00008000 to 0x0000FFFF, CRC32: 0x25FDCC28
PASS
>progarea 0
Active Program Area: 0
>ep
Blank check Skipped.
Erase Code Flash Block 0000 to 0031:
PASS
Program Code Flash Block 0000 to 0031:
(Omitted)
PASS
Verify Code Flash Block 0000 to 0031:
(Omitted)
```

PASS

Erase,Program operation finished.

>progarea 1

Active Program Area: 1

>ep

Blank check Skipped.

Erase Code Flash Block 0032 to 0063:

PASS

Program Code Flash Block 0032 to 0063:

(Omitted)

PASS

Verify Code Flash Block 0032 to 0063:

(Omitted)

PASS

Erase,Program operation finished.

>

3.4 Executing Multiple Consecutive Commands (e.g. Erasure, Programming, and Verification)

You can also execute multiple consecutive commands (e.g. erasure, programming, and verification).

The following shows an example of the specification of three commands (**ers**: erasure, **prg**: programming, and **vrf**: verification).

```
sendln 'ers'
wait '>'
sendln 'prg'
wait '>'
sendln 'vrf'
end
```

Executing these commands leads to the following output in Tera Term.

```
>ers
(Omitted)
PASS
Erase operation finished.
>prg
(Omitted)
PASS
Program operation finished.
>vrf
(Omitted)
PASS
Verify operation finished.
>
```

3.5 Programming Unique Code

The **serno** command can be used to embed a unique code at a specific address in the program file.

If you wish to use this command, ensure that the unique code function is enabled by the given FP6 Manager setting. Select [Programmer] -> [FP6 Manager] from the menu bar of the FP6 Terminal to open the [FP6 Manager] dialog box and deselect the [Restrict Unique Code Function] checkbox.
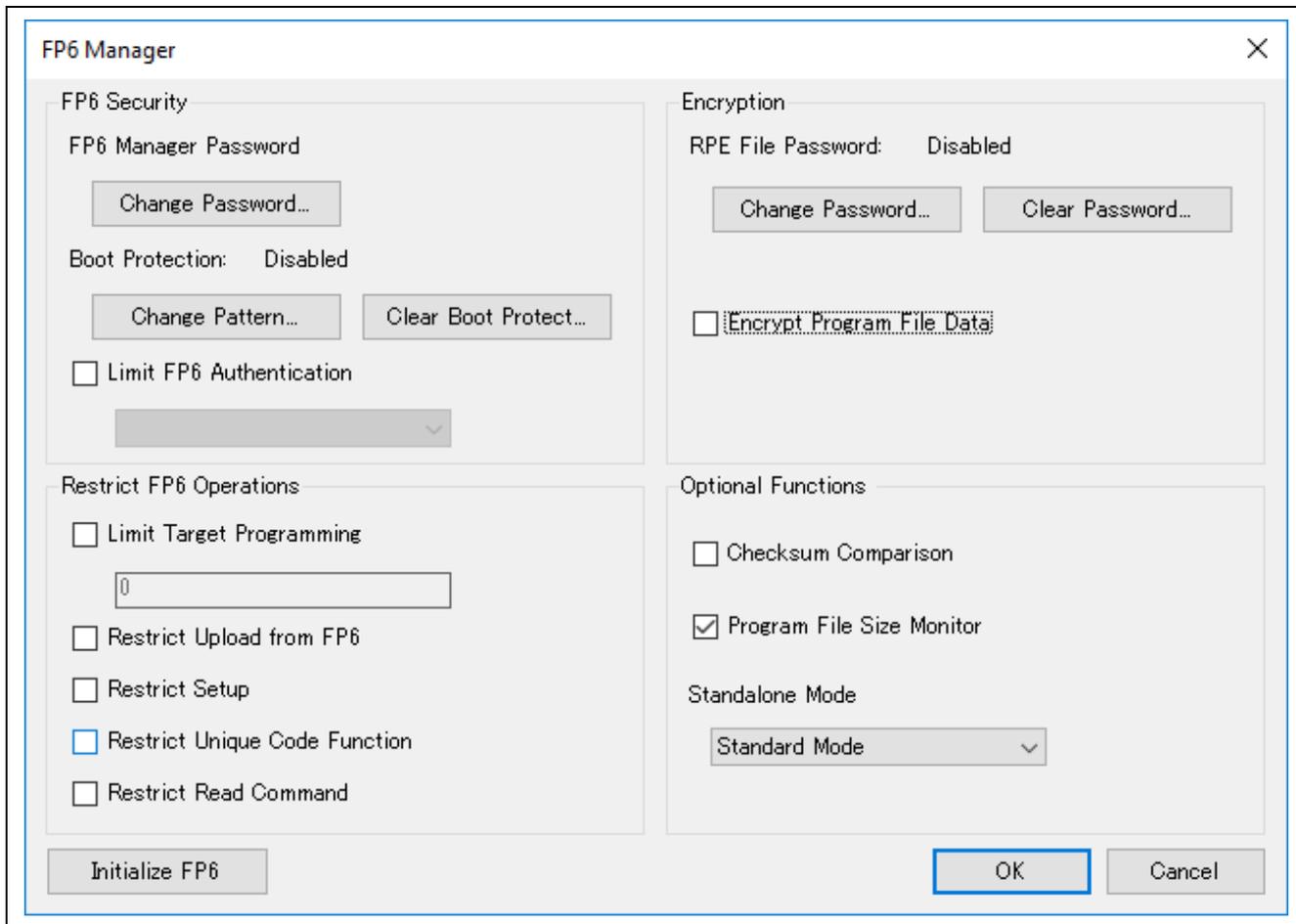
Figure 3.1   [FP6 Manager] Dialog Box

The following shows an example of embedding 0x00010203 at address 0x8000.

```
sendln 'serno 8000 00010203'
wait '>'
sendln 'ep'
end
```

Executing this command leads to the following output in Tera Term.

```
>serno 8000 00010203
OK
>ep
(Omitted)
Erase,Program operation finished.
>
```

3.6　Programming with a Specified PG-FP6

The **connect** command, which is one of the Tera Term macro commands, can be used to specify the number of the COM port to which a PG-FP6 you wish to use is connected.

The following shows an example of programming through a PG-FP6 connected to the COM4 port.

```
connect '/C=4'
sendln 'ep'
end
```

Executing this command leads to the following output in Tera Term.

```
>ep
(Omitted)
Erase,Program operation finished.
>
```

3.7 Simultaneous Programming of Multiple Devices from a Single Host PC (Gang Programming)

Multiple Tera Term windows can be opened on a host PC. You can specify the COM port numbers of different PG-FP6 units in those windows to program multiple devices. The **start** command for the Windows command prompt can also be used to set up a batch file that launches multiple batch files which continue running at the same time.

Note: The FP6 Gang Programmer, a programming GUI that comes with the FP6 Terminal, makes simultaneous programming through multiple PG-FP6 units possible.

This section introduces an example where two Tera Term windows are started at the same time in a single environment (which consists of a parameter file, setting file, and program file) to program the devices connected to two PG-FP6 units.

"ttpmacro.exe" provided by Tera Term is used to run the macro files.

In advance, download a set of a parameter file, setting file, and program file to two PG-FP6 units.

The following example is the "sample1.bat" batch file, which is used to handle programming through the first PG-FP6 (COM port number: x).

```
ttpmacro.exe "C:\fp6\sample1.ttl"

exit
```

The following example is the "sample1.ttl" macro file, which is used to handle programming through the first PG-FP6 (COM port number: x).

```
connect '/C=x'

sendln 'ep'

wait 'Erase,Program operation finished.' 'ERROR'

        if result=0 goto timeouterror

        if result=1 goto pass

        if result=2 goto comerror

wait '>'

        if result=0 goto timeouterror


:pass

messagebox 'Erase,Program operation finished.' 'PASS'

closett

end


:comerror

messagebox 'Command operation error' 'ERROR'

closett

end


:timeouterror

messagebox 'Timeout error' 'ERROR'

closett

end
```

The following example is the "sample2.bat" batch file, which is used to handle programming through the second PG-FP6 (COM port number: y).

```
ttpmacro.exe "C:\fp6\sample2.ttl"
exit
```

The following example is the "sample2.ttl" macro file, which is used to handle programming through the second PG-FP6 (COM port number: y).

```
connect '/C=y'
sendln 'ep'
wait 'Erase,Program operation finished.' 'ERROR'
        if result=0 goto timeouterror
        if result=1 goto pass
        if result=2 goto comerror
wait '>'
        if result=0 goto timeouterror


:pass
messagebox 'Erase,Program operation finished.' 'PASS'
closett
end


:comerror
messagebox 'Command operation error' 'ERROR'
closett
end


:timeouterror
messagebox 'Timeout error' 'ERROR'
closett
end
```

This example is the "sample.bat" batch file, which executes calls of both "sample1.bat" and "sample2.bat".

```
:LOOP
start sample1.bat
start sample2.bat
PAUSE
goto LOOP
```

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