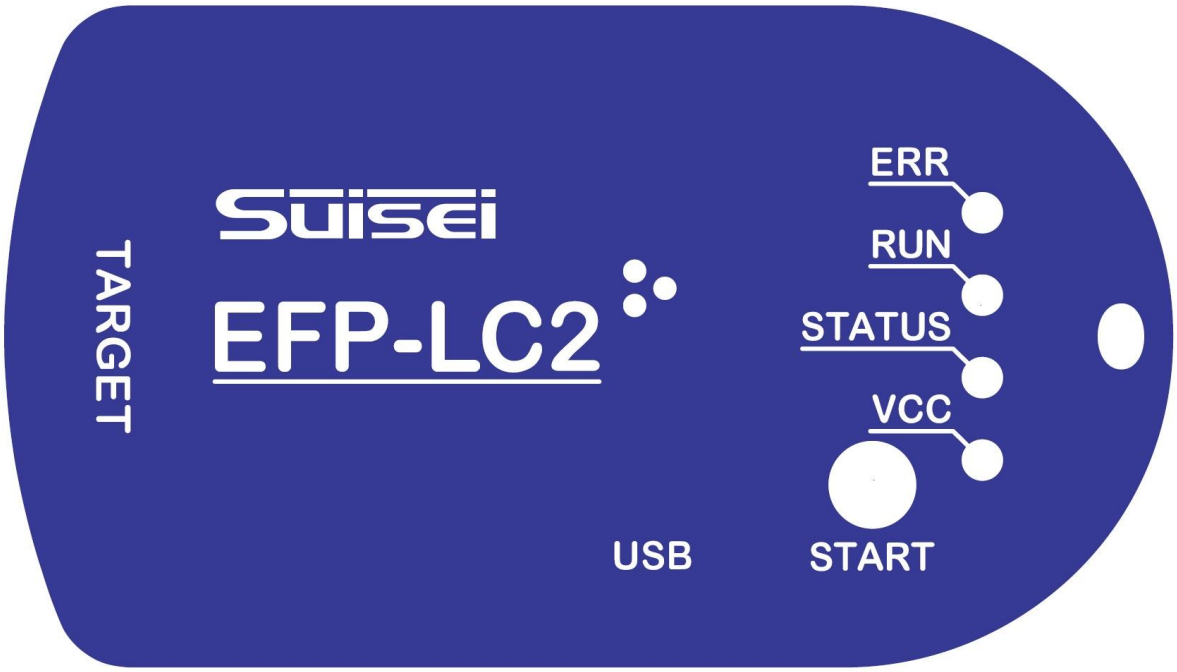
EFP-LC2 Instruction Manual Appendix
Target MCUs: RX Family



SUISEI ELECTRONICS SYSTEM CO., LTD.

If you have any questions about the product, please contact us or your distributor.

The contents of this manual are subject to change without notice.

Please refer to our website (https://www.suisei.co.jp) for the latest information.

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1. summary

This document describes the precautions necessary to write and erase the EFP-LC2 Type-RX to the RX family of MCUs manufactured by Renesas Electronics.

- Please be sure to read the instruction manual carefully before using it.
- If you have any questions about the product, please contact us or your distributor.
- The EFP-LC2 manual consists of the following manuals:
  Please be sure to read the respective manuals before use.
  A) EFP-LC2 Manual: EFP-LC2 hardware specifications, EFP operation applications
  B) Additional Manual: This document (connection information for each microcomputer family, available commands)
  C) Diff Manual: A) or B) Additional microcomputer difference information after issuance, etc.

The contents of this manual are subject to change without notice.
The latest information is available on our website.

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1.1 Supported Devices

The target microcomputers described in this manual are as follows.

- RX Family

*1 Please check our website for the latest list of devices.
https://www.suisei.co.jp/product/efp_lc2/download/EFP-LC2_SupportList_RX.pdf
*2 It may be necessary to update the control software or firmware.
Refer to "EFP-LC2 User's Manual" for update method.
*3 Access to the target microcomputer is switched to boot mode.
For details on the boot mode and precautions, refer to the hardware manual of the target microcomputer to be used.

1.2 Terminology

The terms used in this document are defined and used as follows:

- Main unit: Refers to EFP-LC2.
- Host Machine: Refers to a personal computer for controlling control software.
- Control Software: Refers to LC2-Download Manager.
  The settings in this software may be abbreviated as GUI (Graphical User Interface).
- Target MCUs: Refers to a microcomputer operated via EFP-LC2. It may be referred to as MCU.
- Target System: It refers to the customer's application system in which the target microcomputer is implemented.
- User Programs: It refers to the customer's application program that writes to the target microcomputer.

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1.3 How to connect

The connection between the EFP-LC2 and the target system is Figure 1.1 Use the product attachment EF1TGCB-16WX (Target System Connection Cable : loose wire) or the optional EF1TGCB-B (4-wire Target System Connection Cable) as shown in the product Section.

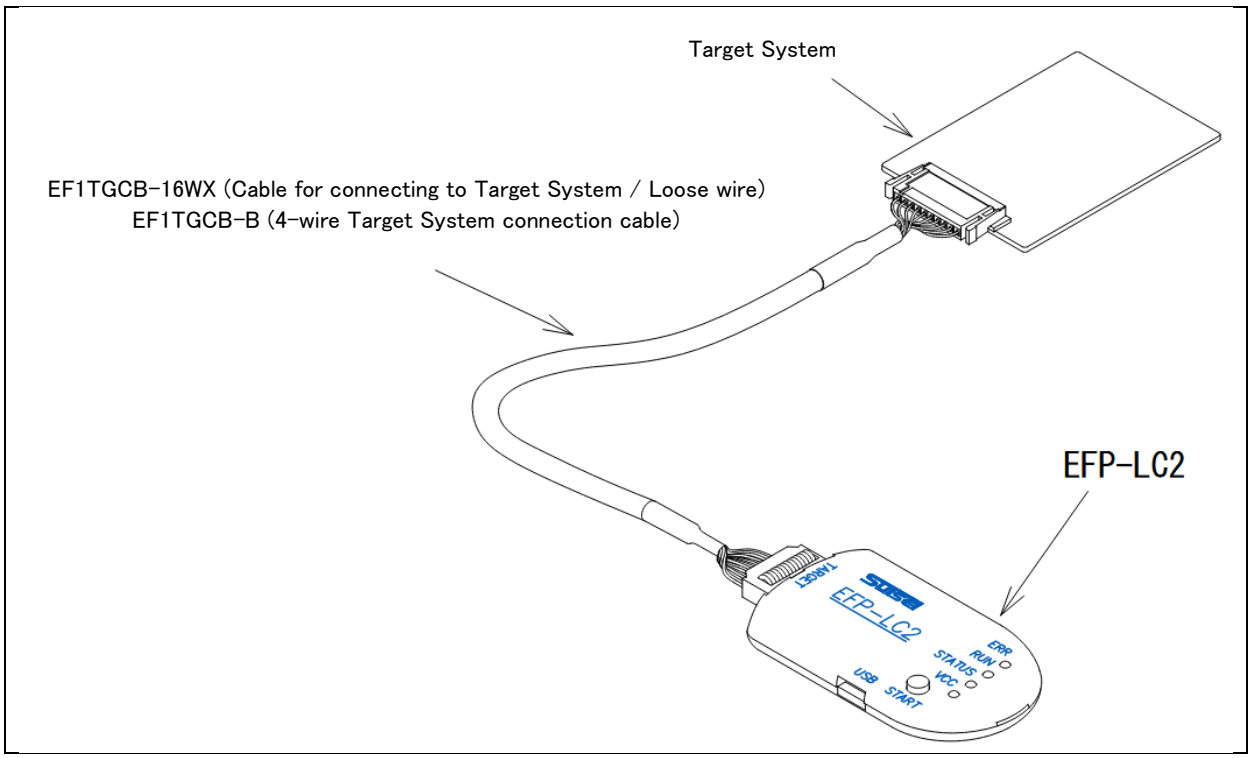

Figure 1.1 Connecting to the target system

1.3.1 Target System Recommended Circuits

The EFP-LC2 is in boot mode (SCI interface) and controls the target microcomputer(Hereinafter referred to as MCU). Target System Recommended Circuits Figure 1.2 It is shown in .

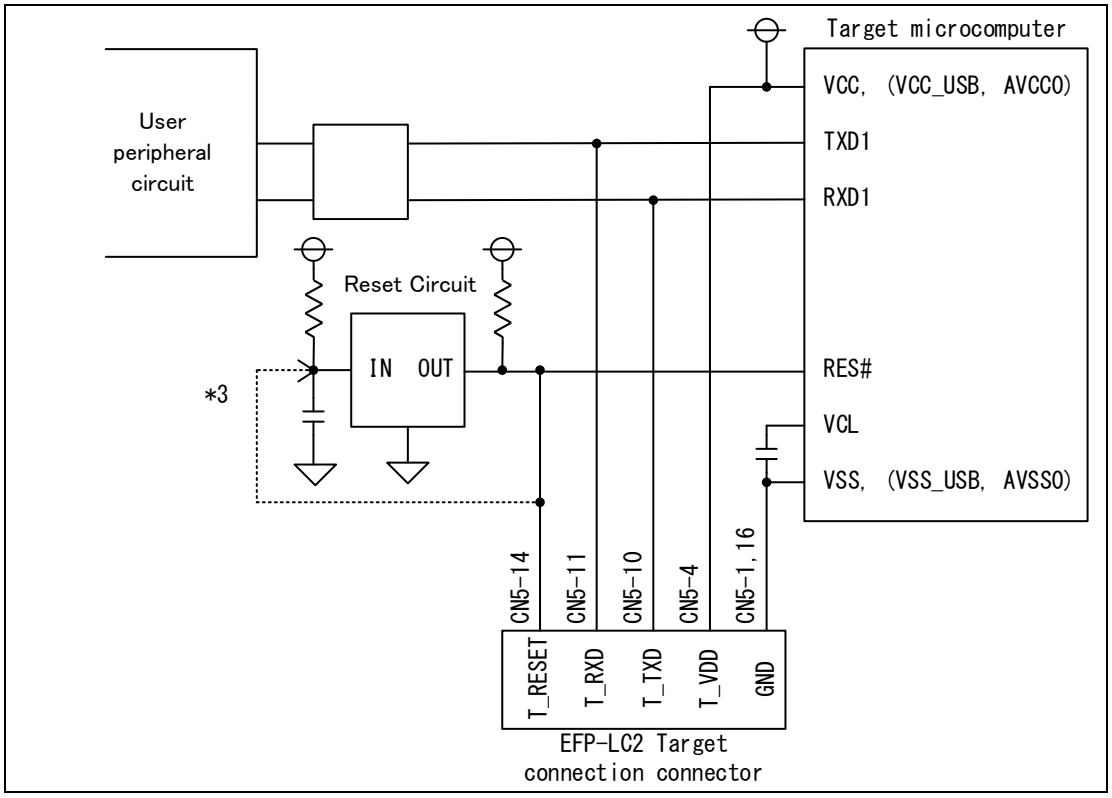

Figure 1.2 Target System Recommended Schematic

Table 1.1 Connecting in Boot Mode (SCI Interface)

Target microcomputer pin name	name	EFP-LC2 Target connection connector	Cable*1 Tip wire color
VCC, VCC_USB*2, AVCC0*2	power	EFP-LC2(CN5- 4): T_VDD	Yellow 1
VSS, VSS_USB*2, AVSS0*2	ground	EFP-LC2(CN5- 1): GND	Brown 1
		EFP-LC2(CN5-16): GND	Blue 2
RES#	Reset Input	EFP-LC2(CN5-14): T_RESET	Yellow 2
RXD1	Data Input RXD	EFP-LC2(CN5-10): T_TXD	Black 1
TXD1	Data Output TXD	EFP-LC2(CN5-11): T_RXD	Brown 2

*1 Cable for connecting to the target system (EF1TGCB-16WX)

*2 If the target microcomputer does not have pins, no processing is required.

*3 The T_RESET of the EFP-LC2 is an open-collector output (Reference 1.3.2.2 Section).

If the RESET circuit is an open-collector output, provide a 1kΩ pull-up process at the RESET pin and connect it.

If the RESET circuit is a CMOS output, either disconnect it with a jumper or connect the T_RESET signal on the EFP-LC2 side to the input of the RESET circuit.

1.3.2 Precautions when connecting

1.3.2.1 Communication Terminals

If the peripheral circuit of the target system is an output circuit, so that the outputs do not collide with each other during boot mode.

Perform a process such as disconnecting with a jumper. An example of a collision prevention circuit Figure 1.3 It is shown in .

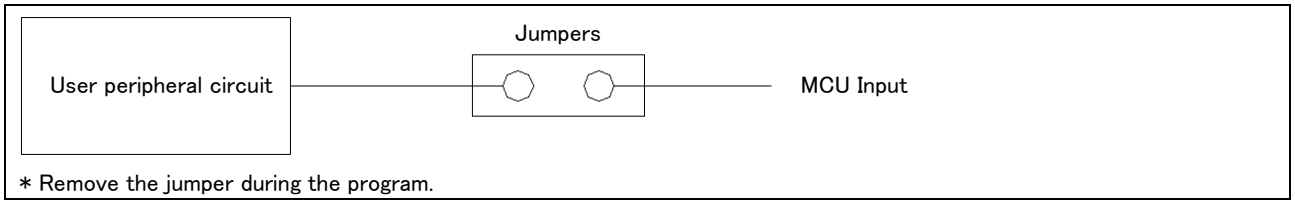

Figure 1.3 Example of collision prevention circuit using jumpers

1.3.2.2 RESET pin

- The RESET circuit in the EFP-LC2 is an open-collector output(See the EFP-LC2 instruction manual for external control signals).
  - A) The RESET circuit of the target system should be connected to the open collector output
    Please connect the RESET terminal with a 1k[Ω] pull-up.
  - B) Target System RESET Circuit Outputs CMOS Output
    As shown in Figure 1.3, either disconnect it with a jumper or connect the T_RESET signal on the EFP-LC2 side to the RESET circuit input.
- The combination of TXD, RXD, and RESET signal output timing of the EFP-LC2 performs mode entry for the target microcomputer.
  The L->H output timing of the TXD, RXD and RESET signals must be 500[ns] or less.
- When the EFP-LC2 is used, the MCU is not released from RESET (except when [Wait] command is used).

1.3.2.3 Smoothed capacitor connection terminal (VCL)

Connect the VCL pin to GND via a capacitor with the specified capacitance as described in the hardware manual of the target microcomputer.

1.3.2.4 Oscillator circuit

When the oscillator circuit of the target microcomputer is an external input (XTAL or XTAL pin), connect it to the oscillator circuit. When operating with an on-chip oscillator, it is not necessary to connect an oscillator circuit.

1.3.2.5 MCU Boot mode setting terminal

The terminal to be set to boot mode should be processed as follows.

Table 1.2 Mode Pin Processing

Series name	Group Name	Pin Name	Terminal processing
RX100	RX110,RX130,RX13T,RX140	MD	L
	RX111,RX113	MD	L
		UB	H
RX200	RX210,RX21A,RX220	MD	L
		PC7	L
	RX23T,RX23E-A,RX23E-B,RX24T,RX24U	MD	L
	RX230/RX231,RX23W,RX260/RX261	MD	L
		UB	L
RX600	RX610,RX621/RX62N,RX62T/RX62G	MD0	H
		MD1	L
	RX630, RX631/RX63N (except 64PinTFLGA), RX634	MD	L
		PC7	L
	RX631/RX63N(64PinTFLGA)	MD	L
		PA6	L
	RX63T (48/64Pin version)	MD	L
	RX63T (100/112/120/144Pin version)	MD	L
		P00	L
	RX64M,RX651/RX65N/RX65W-A,RX660,RX66N,RX66T,RX671	MD	L
		UB	L
RX700	RX71M,RX72M,RX72N,RX72T	MD	L
		UB	L

* H = VCC connection, L = GND connection

2. Simplified PBT

With the control software LC2-Download Manager(Hereafter referred to as GUI), you can easily create a PBT file (script file) by clicking the [Quick Creation] button by following the steps below.

I. Start the control software.
II. Specify [Project Name] and [Target Microcomputer], and then set the program file to be used.
＊For target MCUs set to dual mode (target: Reference Table 3.12), select the MCU type name ending in "-D".
III. Click the [Quick Creation] button.
IV. After completing the necessary settings, click the [Create] button to create [PBT File].

2.1 Command Issuance Order

When using the [Quick Creation] method for a PBT file, a PBT file is created in the order shown in the table below.

Table 2.1 Order of issuance of commands when creating a PBT file

No	Command Name		remarks
1	MCU-Set	t	
2	VDD supply	x	
3	Baud-rate set	s2	
4	Mode entry	m	
5	ID Verification	i	
6	Erase	e	
7	Option	o	Configuration Clear Command
8	Blank check	b	
9	Program	p	
10	Verify	v	
11	Check sum	h	
12	Read	r	
13	Lock bit	k	
14	Access Window Settings	l	
15	Option	o	Other than Clear Configuration

2.2 Basic Settings Tab

On this screen, you can create the following commands: Blank check, Erase, Program, Verify, Check sum, and Read, which are operation commands for Target microcomputer resources.

If the target MCU does not have the function, the check box is disabled.

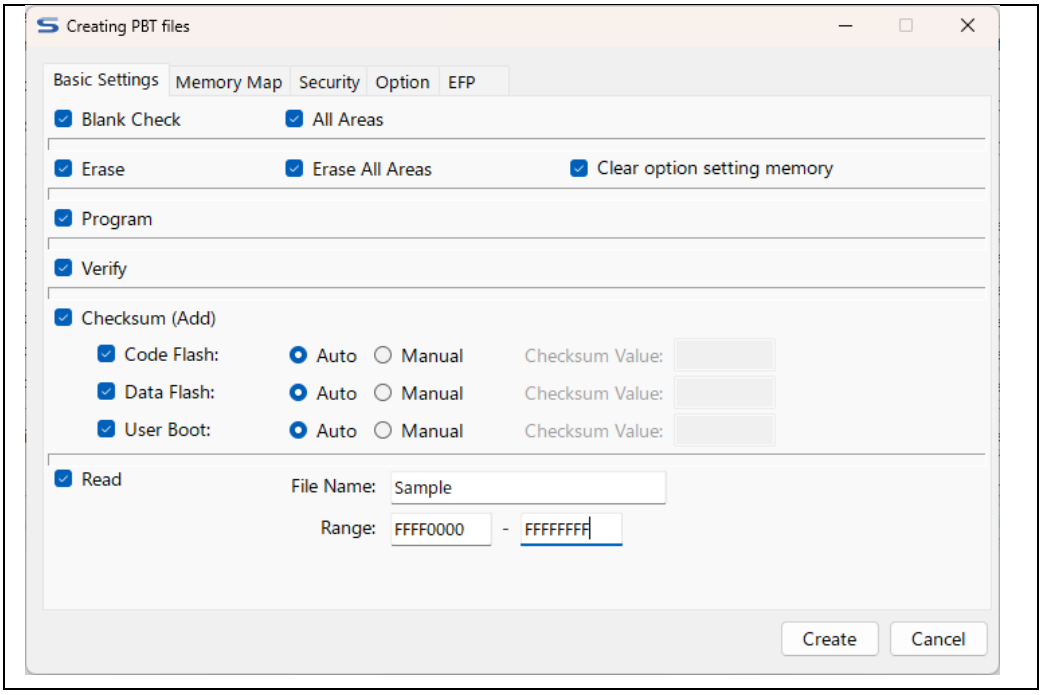

Figure 2.1 Basic Setting Tab

(1)Blank check

For the flash memory of the target microcomputer, use the [Blank check] command (Reference 3.8 Section). When this checkbox is checked ON, a [Blank] command will be generated for the areas that are checked ON for the target block in the [Blank] column on the [Memory Map] tab.

If you want to check blanks for all areas, check [All Areas].

(2)Erase

For the flash memory of the target microcomputer, use the [Erase] command (Reference 3.9 Section). When this checkbox is checked ON, an [Erase] command will be generated for the area that is checked ON for the target block in the [Erase] column of the [Memory Map] tab.

If you want to erase the entire area, check [Erase All Areas].

Also, when clearing the option setting memory, check [Clear option setting memory].

[Configuration clear]command (Reference 3.14.2 Section).

(3)Program

Write the program file to the target microcomputer with the [Program] command (Reference 3.10 Section).

(4)Verify

Compare the target microcomputer with the program file Verify command (Reference 3.11 Section).

(5)Checksum

To check the checksum against the Flash memory of the target microcomputer, use the [Check sum] command (Reference 3.13 Section).

(6)Read

This generates a [Read] command (Reference 3.12 Section) to read the resources of the target microcomputer.

- Enter the name of the file to be read to EFP-LC2.
- Enter the address range to be read.

＊The file name can be up to 183 alphanumeric characters (including extensions).

＊Characters that cannot be used in the file name cannot be used.

2.3 Memory Map Tab

On this screen, you can display the target microcomputer resources and specify the target block when creating the [Blank check], [Erase], and [Lock Bit] commands.

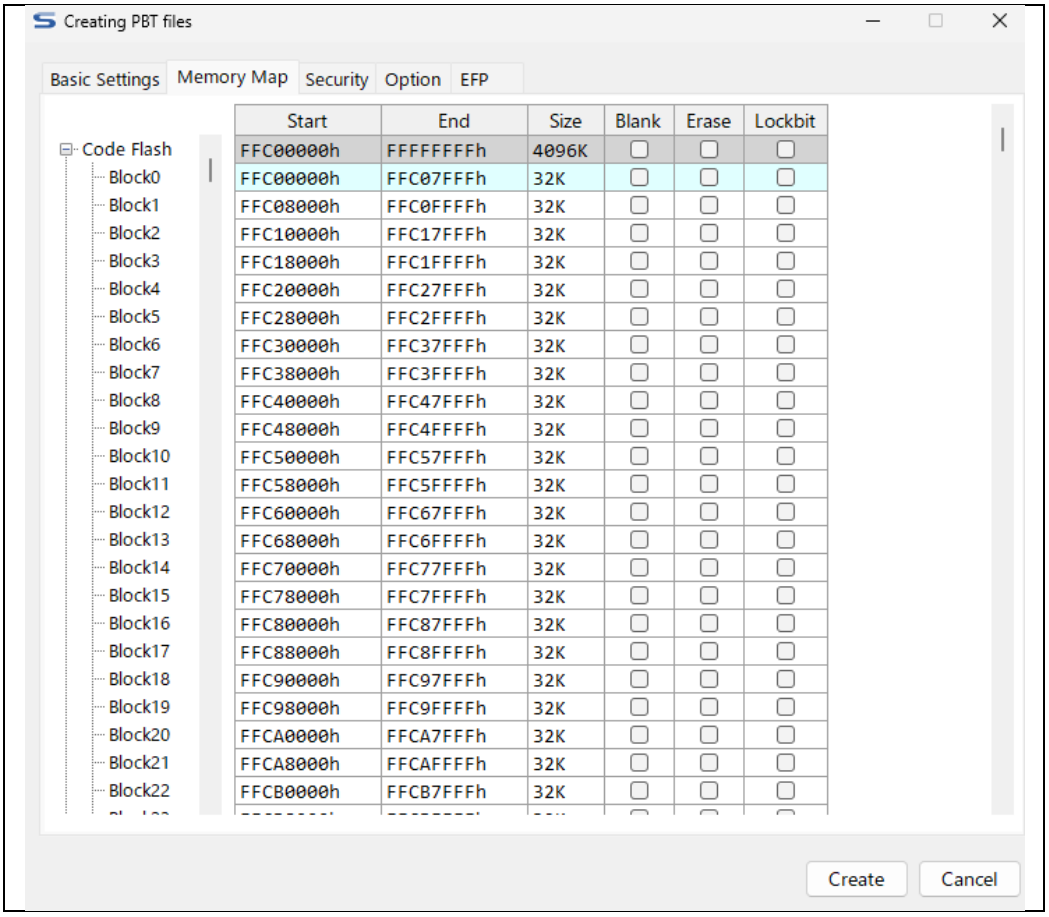

Figure 2.2 Memory Map Tab

< View Details>

- Start: Indicates the starting address of the target block (the first line is the target resource).
- End: Indicates the end address of the target block (the first line is the target resource).
- Size: Indicates the size of the target block (the first line is the target resource).
- Blank: Check the block to be the target of the [Blank check] command.*
- Erase: Check the block to be the target of the [Erase] command.*
- Lockbit: Check the block to be the target of the [Lock bit] command.

* If the Blank Check/Erase checkbox is ON on the Basic Settings tab, a [Blank/Erase] command will be generated for the areas that are checked ON on this tab.
(If the checkboxes for All Areas/Erase All Areas are ON in the Basic Settings tab, all checkboxes on this tab will be automatically turned ON.)

2.4 Security Tab

On this screen, you can create security-related commands to be used on the target microcomputer, such as the [ID-collation] and [Access Window Settings] commands.

If the target MCU does not have the function, the check box is disabled or hidden.

(1)ID Verification

The Verify ID command (Reference 3.6 Section). If you want to use the function, check [ID Verification] and then do the following.

- [Format] (ASCII or HEX) and enter the ID code to be set or verified.
- Select [Processing details] or [ID Type].

(2)Access Window

The Access Window Settings command (Reference 3.7.2 Section).

When using the function, check the [Access Window] and do the following.

- Enter the setting range of the access window to be set in [Start Address] / [End Address].
- The display content changes depending on the selected target microcomputer.

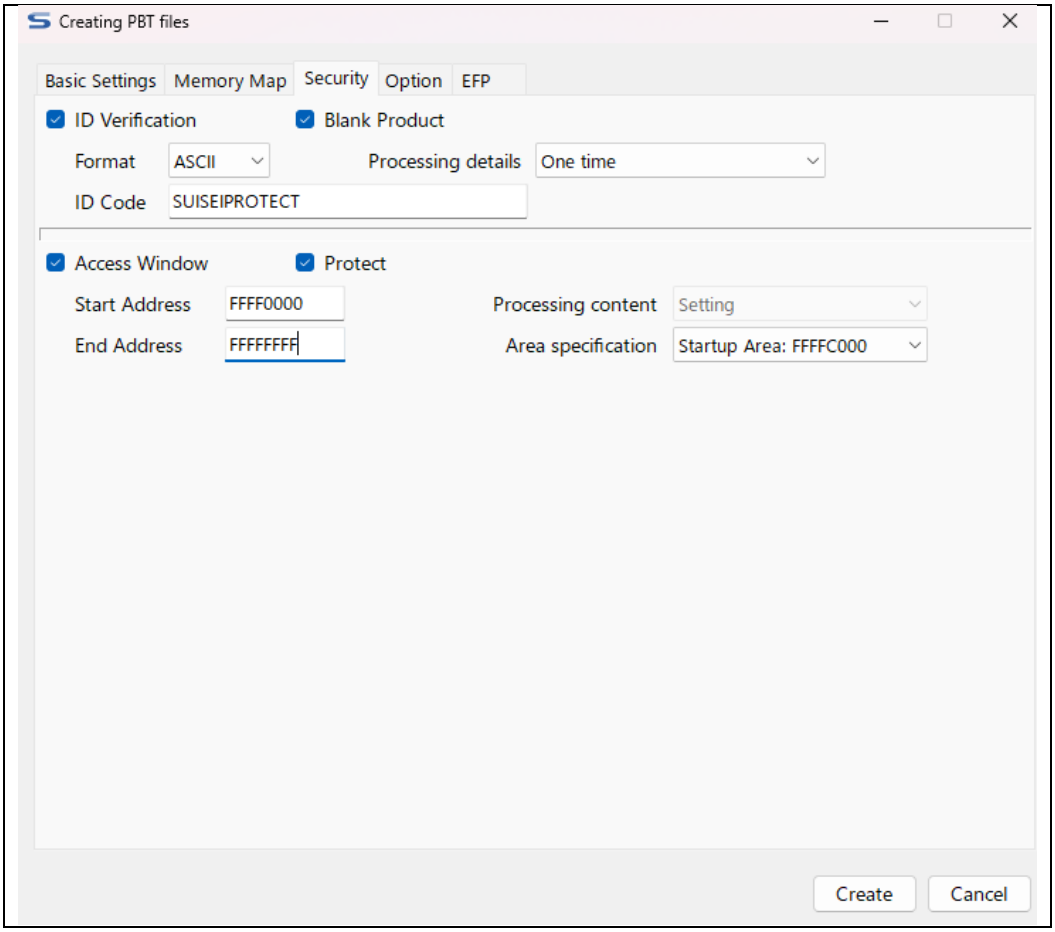

Figure 2.3 Security Tab

2.5 Option Tab

On this screen, the [Options] command (Reference 3.14 Section). If the target MCU does not have a function, this tab itself is hidden.

When using the function, check the [Options] command and do the following.
The display content changes depending on the selected target microcomputer.

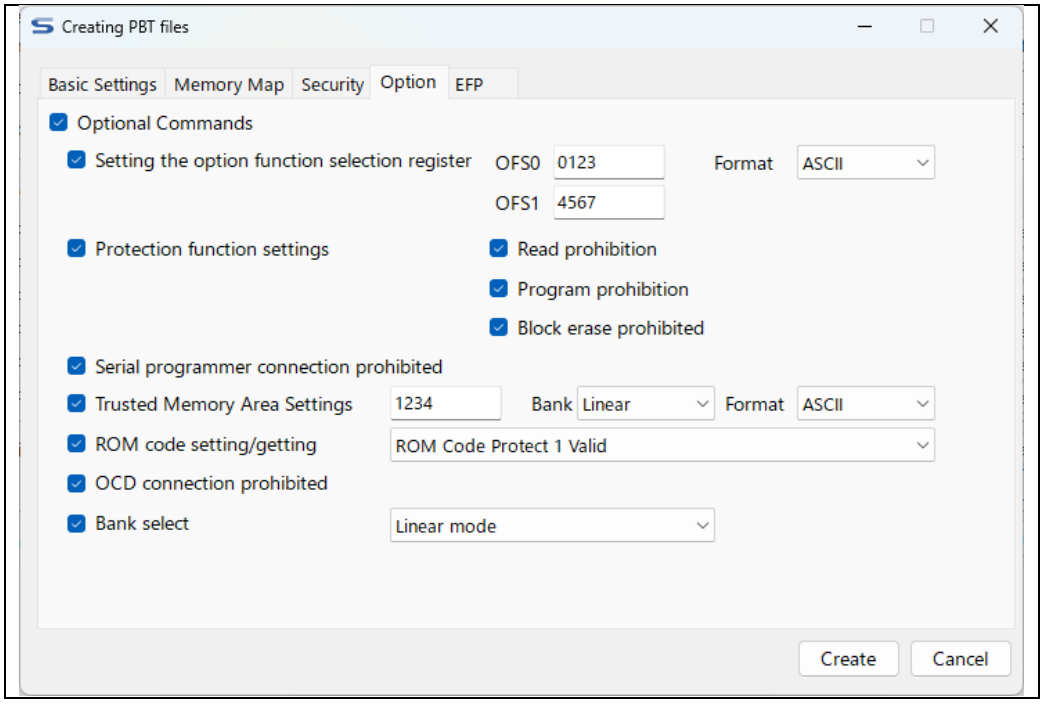

Figure 2.4 Option Tab

(1)Setting the option function selection register

Set the Option Function Select Register 0 (OFS0) and the Option Function Select Register 1 (OFS1).
When using the function, check [Setting the option function selection register] and then do the following.

- [Format] (ASCII or HEX) and enter the values for OFS0 and OFS1 to be set.
- Switching to Format clears the input value.

(2)Protection function settings

Perform the command protection settings using the serial programmer (EFP-LC2, etc.).
When using the function, check [Protection function settings] and then check the process to be protected.

- The protection setting cannot be set for MCUs with serial programming ID authentication enabled.
- After setting [block erase prohibited], it cannot be canceled with EFP-LC2.
  After the command is executed, the MCU data cannot be erased, so please be careful when executing the command.

(3)Serial programmer connection prohibited

This sets whether to allow or prohibit connection to a serial programmer (EFP-LC2, etc.).
When using the function, check [Serial programmer connection prohibited].

- After executing [Serial programmer connection prohibited] (after reset), access with EFP-LC2 will be disabled and it cannot be released, so please be careful when executing this command.

(4)Trusted Memory Area Settings

Enables the trusted memory area of the Code Flash.
When using this function, check [Trusted Memory Area Settings] and then do the following.

- [Format] (ASCII or HEX) and the value you want to set for the TMINF register.

(5)ROM Code setting/getting

The ROM Code Protection Register are used to prohibit the read, program, and erase of flash memory when using a parallel programmer in offboard programming.

When using the function, check [ROM Code setting/getting] and select the processing content.

- [Processing details]
  ROM Code Protect 1 Valid (prohibits reading, programming, and erasing of code flash memory)
  ROM Code Protect 2 Valid (prohibit reading code flash memory)
  Check if ROM code protection is disabled (Check that the ROM code protection function is disabled.)
- [Protection function settings] (2.5(2)This command cannot be used if [Program prohibition] or [Block erase prohibited] is enabled.

(6)OCD connection prohibited

Sets the prohibition of connection with the on-chip debugger (OCD). When using the function, check [OCD connection prohibited].

(7)Bank select

Configure the bank switching settings.

When using the function, check [Bank select].

- This command should be written after executing the command to erase all areas of Code Flash, Data Flash, and User Boot.
  * When Data Flash/User Boot is not functional, it is not necessary to erase the target area.

2.6 EFP Tab

On this screen, you can create the [VDD supply], [Baud-rate set], and [Mode entry] commands, which are the power supply and communication settings between the target microcomputer and the EFP-LC2. The display content changes depending on the selected target microcomputer.

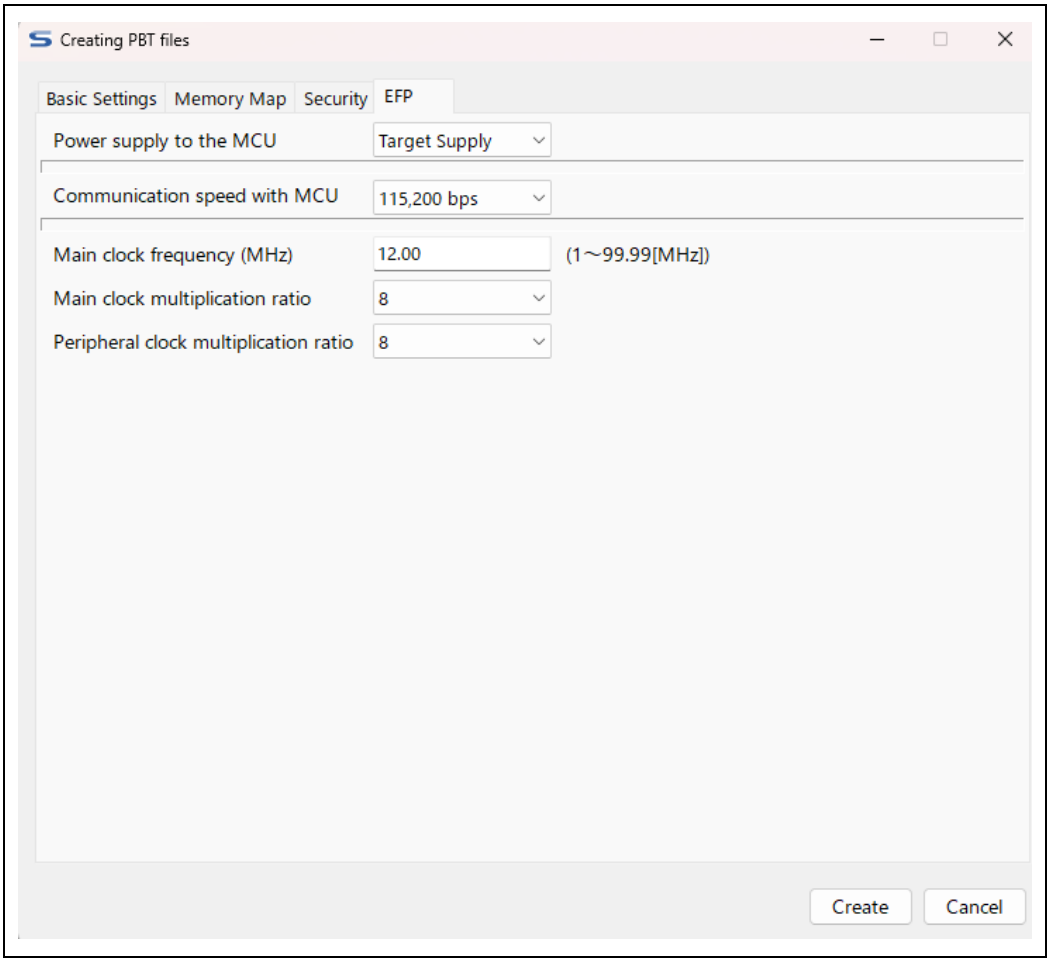

Figure 2.5 EFP Tab

(1)Power supply to the MCU

To configure the power supply settings from the EFP-LC2 to the target microcomputer, use the [VDD supply] command (Reference 3.3 Section).

Power is supplied to the target microcomputer from the target system."Target Supply"does not create commands. When supplying power from the EFP-LC2 to the target microcomputer, select "5.0[V] Supply" or "3.3[V] Supply".

(2)Communication speed with MCU

Generate the [Baud-rate set] command (Reference 3.4 Section) for communication settings between the target microcomputer and the EFP-LC2. Please select one.

*Communication may not be possible even at selectable communication speeds depending on the compatibility with the oscillator mounted on the target system and the operating power supply voltage. In this case, set the communication speed to a lower value.

(3)Mode entry

The [Mode entry] command (Reference 3.5 Section).

- In the Main Clock Frequency field, set the main clock frequency to be used in units of 0.01 [MHz].
  Example: 20[MHz] = > 20.00 or 20
- In the [Main clock multiplication ratio] and [Peripheral multiplication ratio] fields, set the multiplication ratio according to the [Communication speed with MCU].

* If the main clock frequency is not displayed, it will be automatically set because the clock setting in boot mode is decided. Generate a [Mode entry] command.

3. Script File

3.1 Script commands that can be used in PBT files

The first command type can be used in either uppercase or lowercase case.

- When creating a PBT file with the [Quick Creation] function, it is automatically generated by setting it according to the GUI.
- PBT files created for our products such as EFP-LC and those created with a text editor*1, etc. can also be used.

*1 Character encoding is limited to "UTF-8".

classification	Command Name		Overview	page
Preparation for connection with MCU	MCU-Set	t	Target microcomputer settings	16
	VDD supply	x	Whether or not power can be supplied from the EFP-LC2 main unit to the target microcomputer	16
	Baud-rate set	s2	Setting the communication baud rate between the EFP-LC2 and the target microcomputer	17
	Mode Entry	m	Preparation for the start of operation to the target microcomputer	18
Secure MCU Settings	ID-collation	i	Setting/Canceling the ID code protection function	20
	Lock Bits	k	Lock bit setting of the target microcomputer	22
	Access Window Settings	l	Access window settings for the target microcomputer	23
Operations on MCU resources	Blank check	b	Confirm that the target MCU has been erased.	24
	Erase	e	Erasing the target microcomputer	25
	Read	r	Reads out the target microcomputer and stores it in the EFP-LC2	28
	Verify	v	Comparison of data from the target microcomputer with the specified program file in the EFP-LC2	27
	Program	p	Write the specified program file to the target microcomputer.	26
	Check sum	h	Checksum value confirmation of target microcomputer	29
	Option	o	Setting/cancelling the option setting memory of the target microcomputer	30
other	wait	w	Pausing Script Command Actions	34

3.2 [MCU-Set] command

Command to specify the target microcomputer. Please write this command at the beginning of the script file.
It is automatically generated by the [Quick Creation] creation function of GUI.

3.2.1 Compatible varieties

- All Supported MCUs

3.2.2 format

- t=[MCU Type]*1 *1Table 3.1reference

Example:

t=38	Specify RX (Little Endian) as the target microcomputer
t=0	An error occurs (specification out of range)

Table 3.1 List of MCU Types

family	MCU Type	Selection in the GUI	remarks
RX	38	RX(Little)	Little Endian
	39	RX(Big)	Big Endian

* If you specify an MCU type that is not compatible with EFP-LC2 Type-RX, an error will occur.

3.2.3 Precautions

- If the [MCU Set] command is executed with an incorrect MCU Type, it may result in unexpected errors or damage to the target MCU, so please be careful when setting it.
- Table 3.1Please do not make any settings other than those described in the article.
- In GUI, you can only select supported target microcomputers.
- When upgrading the firmware, the [MCU Type] may be changed.

3.3 [VDD Supply] command

Command to supply power from the EFP-LC2 to the target microcomputer. This command should appear after the [MCU Set] command.
This command is not required when power is supplied from the target system to the target microcomputer.
Power is not supplied to the target microcomputer, and If the VDD Supply command is not included in the script, you can use the
An error occurs when issuing the [Erase]/[Program] command.
In the GUI, click the EFP tab of [Quick Creation] (Figure 2.5) It can be set in [Power supply to the MCU].

3.3.1 Compatible varieties

- All Supported MCUs

3.3.2 format

		[VDD Voltage Specification]	[GUI Settings]
x=[VDD Voltage Specification]*1	*1	When not listed	Target Supply
		x=1	5.0[V] Supply
		x=2	3.3[V] Supply

Example:

x=1	; Supplies 5.0 [V] to the MCU.
x=2	; Supplies 3.3 [V] to the MCU.
x	: Ignored on error (no arguments)。

3.3.3 Precautions

- The EFP-LC2 can only supply +5.0[V] or +3.3[V] to VDD.
  Using this command when using an MCU with a power supply voltage range outside this range may damage the MCU.
  Please check carefully before use.
  Example: The absolute maximum rating (power supply voltage) for the RX64M/RX71M is +4.6[V].
  Supplying +5.0[V] from the EFP-LC2 without using a regulator may damage the MCU.
- The current capacity that can be supplied is approximately 300mA.
  If the board's inrush current is high, an error will occur and the EFP-LC2 itself will be reset.
  When using this command, please also check the current consumption of the target system.
- When using this command, do not supply power to the target microcomputer from the target system.
- When using this command, if the power supply voltage (T_VDD terminal) on the target system is detected to be +2 [V] or higher, the EFP-LC2 will not supply (output) power to prevent a power supply collision. This will not result in an error.

3.4 [Baud-rate set] command

Command to set the communication baud rate between the EFP-LC2 and the target microcomputer.
Write this command after the [MCU Set] command or the [VDD Supply] command.
Changing to a faster baud rate will increase the communication speed and shorten the processing time.
It can be set in [Communication speed with MCU] on the EFP tab of [Quick Creation] in the GUI (Figure 2.5).

3.4.1 Compatible varieties

- All Supported MCUs

3.4.2 format

- s2=[setting]*1 *1 Table 3.2reference

Example::

s2=5	Set the baud rate for communication with the target microcomputer to 250 [kbps].
s2	Error (no arguments)

3.4.3 Precautions

- If the oscillator/resonator mounted on the target system is incompatible, an error (device error) may occur when accessing the MCU. Set the communication speed to a lower value.
- After the command is executed, the system operates at the set communication baud rate until the [MCU Set] command is reconfigured or the power is turned off by the EFP-LC2 main unit.
- For PBT files that have already been created with EFP-LC etc., the "s" or "n" commands (old Baud Rate commands) cannot be used.

Table 3.2 Baud-rate set list

Setting Values	Baud rate
s2=0	9,600(Defaults)
s2=1	19,200
s2=2	38,400
s2=3	57,600
s2=4	115,200
s2=5	250,000
s2=6	500,000
s2=7	937,500
s2=8	1,500,000
s2=9	1,875,000
s2=10	2,500,000

Units: [bps]

3.5 [Mode entry] command

In order to access the MCU's built-in resources, such as the [Erase]/[Program] command, it is necessary to execute the [Mode entry] command. This command should be listed after the [Baud-rate set] command.

Please execute the [Wait] command followed by the [Mode Entry] commands.

In the GUI, it is either automatically generated (by using Fixed setting in Table 3.3 or OCO Designation), or it can be set in [Main Clock Frequency] on the EFP tab of [Quick Creation] (Figure 2.5).

3.5.1 Compatible varieties

- All Supported MCUs

3.5.2 format

Table 3.3 Mode entry Type by Group Name

Series name	Group Name	Setting type
RX100	RX110,RX111,RX113	Fixed setting1
	RX130,RX13T,RX140	Fixed setting2
RX200	RX230/RX231,RX23E-A,RX23E-B,RX23W,RX23T,RX24T,RX24U,RX260/RX261	Fixed setting2
	RX210,RX21A,RX220	Fixed Setting3
RX600	RX610,RX621/RX62N,RX62T/RX62G,RX630,RX631/RX63N,RX63T,RX634	Frequency setting
	RX64M,RX66T,RX651/RX65N/RX65W-A,RX660,RX66N,RX671	OCO Designation
RX700	RX71M,RX72M,RX72N,RX72T	OCO Designation

(1)Fixed setting1

- m,1600,1,1 Please set it as shown on the left.

(2)Fixed setting2

- m,0000,1,1 Please set it as shown on the left.

(3)Fixed setting3

- m,3200,1,1 Please set it as shown on the left.

(4)Frequency setting

- m, [Main Clock Frequency]*1, [Main Clock Multiplication Ratio]*2, [Peripheral Clock Multiplication Ratio]*2

Example:

m,1250,8,4 Frequency = 12.50 [MHz]
Main Clock Multiplication Ratio = 8, Peripheral Clock Multiplication Ratio = 4

*1 [Main Clock Frequency]

Enter the operating frequency of the main clock in units of 0.01 [MHz].
Enter it in the [Main Clock Frequency] field of the GUI.
Since the target microcomputer operates only with the external clock in boot mode, specify the operating frequency of the external clock.
Example: 12.4[MHz] = > 1240

*2 [Main Clock Multiplication Ratio]/[Peripheral Clock Multiplication Ratio]

Set the multiplication ratio according to the [Communication speed with MCU].
The multiplication ratio should not exceed the maximum operating frequency.

(5)OCD Designation

- m,OCO,[MCU Details]*1 *1 [MCU details] = Blank: No log output, 1: Log output available

Example:

m,OCO No log output of MCU detailed information

m,OCO,1 There is a log output of detailed information about the MCU.

* When outputting with the [Quick Creation] creation function

Table 3.4 MCU Detailed Information

No	Display items	Contents	remarks
1	DEVICE NAME	MCU Group Name	Always Visible
2	ROM INFORMATION	ROM area, ROM size	
3	OFS data enabled.	OFS0/OFS1 register settings	Displayed only when the setting is enabled
4	Read protected.	Read prohibition is enabled	
5	Program protected.	Program prohibition is enabled	
6	Block erase protected.	Block erase prohibition is enabled	
7	TM setting enabled.	Arbitrary code when setting TM area	
8	Serial connect protected.	Serial programmer connection prohibition is enabled	
9	Serial authentication ID enabled.	Boot mode ID authentication is enabled	
10	OCD ID enabled.	OCD ID is enabled	
11	ROMCODE protect1 enabled.	ROM code protect 1 is enabled	
12	OCD connect protected.	OCD connection prohibition is enabled	
13	Bank mode	Bank mode	
14	ERASE BLOCK	Erase block configuration	[MCU Details] = "1" Displayed only when setting

*1 If boot mode ID authentication is set, the MCU details are output after the [ID Verification] command.

```
[MCU INFOMATION]
DEVICE NAME:
 RX Group
MDE: LITTLE ENDIAN
ROM INFORMATION:
USER AREA:(1)
 FFF80000,FFFFFFFF
 80000(512k)
DATA AREA:(2)
 00100000,00107FFF
 8000(32k)
BOOT AREA:(3)
 FF7F8000,FF7FFFFF
 8000(32k)
ERASE BLOCK: 23
  0 FFFFE000,FFFFFFFF
  1 FFFFC000,FFFFDFFF
  2 FFFFA000,FFFFBFFF
  3 FFFF8000,FFFF9FFF
  4 FFFF6000,FFFF7FFF
  5 FFFF4000,FFFF5FFF
  6 FFFF2000,FFFF3FFF
  7 FFFF0000,FFFF1FFF
  8 FFFE8000,FFFEFFFF
  9 FFFE0000,FFFE7FFF
 10 FFFD8000,FFFDFFFF
 11 FFFD0000,FFFD7FFF
 12 FFFC8000,FFFCFFFF
 13 FFFC0000,FFFC7FFF
 14 FFFB8000,FFFBFFFF
 15 FFFB0000,FFFB7FFF
 16 FFFA8000,FFFAFFFF
 17 FFFA0000,FFFA7FFF
 18 FFF98000,FFF9FFFF
 19 FFF90000,FFF97FFF
 20 FFF88000,FFF8FFFF
 21 FFF80000,FFF87FFF
 22 FF7F8000,FF7FFFFF
```

Figure 3.1 Example of detailed information on MCU

3.6 [ID-collation] command

Sets and cancels the ID code protection function.

- Before executing each command, the ID code protection function is deactivated to allow access to the MCU.
- Use this command only for products that support ID code protection.
  * However, varieties for which ID is always valid (Reference Table 3.5) to execute the command.
- After an MCU is protected by writing an ID code, the MCU resources can be accessed after the protection state is released using the [ID-collation] command.
- This command should appear after the [Mode entry] command.
- Please execute the [Wait] command followed by the [ID Authentication] commands.
- On the Security tab of Simplified PBT in the GUI (Figure 2.3) It can be set in [ID Verification].

3.6.1 Compatible varieties

- All Supported MCUs

Table 3.5 ID Verification Type by Group Name

Series name	Group Name	Setting type	reference
RX100/RX200	-	Specify processing details	3.6.2(2)
RX600	RX610,RX621/RX62N,RX62T/RX62G,RX630, RX631/RX63N,RX63T,RX634	Specify processing details	3.6.2(2)
	RX651/RX65N/RX65W-A,RX66N,RX671	Specify processing details (always ID valid)	3.6.2(1)
	RX64M,RX66T,RX660	ID Type Designation	3.6.2(3)
RX700	RX71M,RX72T	ID Type Designation	3.6.2(3)
	RX72M,RX72N	Specify processing details (always ID valid)	3.6.2(1)

3.6.2 format

(1)Specify the processing content (ID code protection is always enabled)

- i,[Processing content]*1,[ID code] *2,[ID code format] *3

Example:

```
i,0,ESUISEIPROTECTID,0                          ; ASCII code input
i,0,450102030405060708090a0b0c0d0e0f,1          ; HEX Code Input
```

*1 [Processing details] = 0: Verification (1 time) — If ID matching fails, an ID matching error occurs.
= 1: Verification(3 times) — If ID verification fails three times, the target microcomputer is erased.
= 2: Settings — Configure the ID settings.

*2 [ID code] — 16-byte user-set value

*3 [ID code format] — 0: ASCII code input, 1: HEX code input

A) When the ID code protection function is not used (Verification),
set [ID Code] to All F. It is automatically generated when using [Quick Creation] in the GUI.
Example: i,0,FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF,1

B) When using the ID code protect function (blank product: setting), in addition to the command for authentication (contents of A above), a command for setting is required, and the i command must be described on two lines.
Example: i,0,FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF,1
i,2,ESUISEIPROTECTID,0
* If you use [Quick Creation] in the GUI, turn on the [Blank product] check box.

C) When using the ID code protection function (written: verification)
[Number of executions] = 0 or 1, please specify the set [ID code] and [ID code format].
Example: i,0,ESUISEIPROTECTID,0

- To clear the set ID code, you need to execute the [Configuration clear] command (Reference 3.14.2 Section).

(2)Specify processing details

- i,[Processing content]*1,[ID code] *2,[ID code format] *3

Example:

```
i,0,ESUISEIPROTECTID,0                    ; ASCII code input
i,0,450102030405060708090a0b0c0d0e0f,1    ; HEX Code Input
```

*1 [Processing details] = 0: Verification (1 time) If ID matching fails, an ID matching error occurs.
= 1: Verification(3 times) When ID verification fails 3 times,
The target microcomputer is erased.
*2 [ID code] 16-byte user-set value
*3 [ID code format] 0: ASCII code input, 1: HEX code input

(3)ID Type Designation

- i, [ID type]*1, [ID code]*2, [ID code format]*3

Example:

```
i,1,0102030405060708090a0b0c0d0e0f00,1   Boot mode ID authentication code, HEX code input
i,0,SUISEI_DENSHI,0                      OCD ID code setting, ASCII code input
```

*1 [ID type] Only one of the serial programming ID code and the OCD ID code can be set.
0: OCD (On-Chip Debugger) ID code
Set the ID code required when connecting to an on-chip debugger (E1, etc.).
1: Serial Programming (Boot Mode) ID Authentication Code
ID code not set: Set the ID code required when connecting to EFP-LC2.
When ID code is set: The ID authentication code will be compared with an MCU with an ID code already set.
*2 [ID code] 16-byte user-set value (If it is less than 16 bytes, add 0 at the end)
*3 [ID code format] 0: ASCII code input, 1: HEX code input

- It cannot be used if protection (Read, program, block erase prohibition) is already set.
  Also, if you set the boot mode ID authentication code, the protection settings are not available.
- To clear the set ID code, you need to execute the [Configuration clear] command (Reference 3.14.2 Section).
  When changing an MCU with an OCD ID code set to boot mode ID authentication, there is no need to execute the [Clear Configuration] command.

3.6.3 Precautions

- After ID verification is successful, subsequent [ID-collation] commands will be ignored until the target system (power supply to the target microcomputer) is turned off, so no error will occur even if ID verification is performed with an incorrect code.
- If ID code protection release fails on an MCU with an ID written to it, all commands will not be accepted.
  Turn off the power to the MCU once.
- This command will be ignored if the MCU is erased (not protected)*1.
  If an MCU with ID code protection is frequently rewritten, we recommend inserting this command line before executing each command.
  *1 Except for always ID authentication valid.
- After the [Wait] command is executed, the reset will be released, so if you want to continue executing commands, execute the [ID-collation] command again.

3.7 [Lock Bit]/[Access Window Settings] Commands

Specify the settings to allow or prohibit rewriting only the specified area.

Table 3.6 Lock bits/Access Window types by group name

Series name	Group Name	Protection Type	reference
RX100	RX110,RX111,RX113,RX130,RX13T	Access Window	3.7.2.1
	RX140,RX260/RX261	Access Window (protect function available)	3.7.2.1
RX200	RX230/RX231,RX23T,RX24T,RX24U, RX23E-A,RX23E-B,RX23W	Access Window	3.7.2.1
	RX210,RX21A,RX220	Lock Bits	3.7.1
RX600	RX610,RX621/RX62N,RX62T/RX62G, RX630,RX631/RX63N,RX634,RX63T	Lock Bits	3.7.1
	RX64M,RX660,RX66T	Lock bit (consecutive)	3.7.1
	RX651/RX65N/RX65W-A,RX671,RX66N	Access Window (Startup area selection function)	3.7.2.2
RX700	RX71M,RX72T	Lock bit (consecutive)	3.7.1
	RX72M,RX72N	Access Window (Startup area selection function)	3.7.2.2

3.7.1 Lock Bits command

The lock bit of the target microcomputer (designated block) can be set to lock to prevent accidental deletion or writing due to mistakes.

- In command execution, set the specified block to lock.
- The lock can be released by disabling and erasing the lock bit.
- Only Code Flash has a lock bit protection feature.
- If an address other than the memory range of the target microcomputer is incorrectly described, an error will occur.
- If you lock an area that is set to TM (Trusted Memory), you will not be able to unlock it.
  Please note that this cannot be released even by clearing the configuration.
- This can be set in the [Lockbit] field on the Memory Map tab of the [Quick Creation] in the GUI (Figure 2.2).

3.7.1.1 format

(1)MCUs that cannot be specified consecutively

- k,[lock block end address]*1 — Lock bit setting for specified blocks

Example:

k,FFFFFFFF — The end address of the target block is FFFFFFFFh

*1 [lock block end address] — The end address of the block for which you want to set the lock bit.

(2)Continuously selectable MCU

- k,[First address]*1,[End Address]*2 — Lock bit setting for a specified range (target MCU: Reference Table 3.6)

Example:

k,FFE00000,FFFFFFFF — Lock FFE00000h-to-FFFFFFFFh area

*1 [First address] — The address of the beginning of the block for which the lock bit is to be set.
*2 [End address] — The end address of the block for which you want to set the lock bit.

3.7.2 Access Window Settings command

This command allows rewriting only within a specified range (access window) during self-programming, and prohibits rewriting anywhere else. This can be set in [Access Window] on the [Simplified PBT] Security tab (Figure 2.3) in the GUI.

3.7.2.1 Format (without startup area selection function)

- I, [First address]*1, [End address]*2, [Processing details]*3

Example:

I,FFFF0000,FFFFFFFF,0		Set FFFF0000h-FFFFFFFFh to the Access Window
I,FFFF0000,FFFFFFFF,FF		Unsetting the Access Window
I,FFFF0000,FFFFFFFF,V		Matching a configured access window

*1 [First address]		Block first address of the access window to be set
*2 [End address]		Block end address of the access window to be set
*3 [Processing details]	= 0:	Access window setting
	= 1:	Access window settings (with protection) * Target: Reference Table 3.6
	= FF:	Clearing the Access Window
	= V:	Matching the configured access window

- An error occurs when an address outside the memory range of the target microcomputer is described.
- Set, unset, and match the specified address range.
- An error occurs when there is a mismatch between the address of the access window set at the time of matching and the address specified in the command.

3.7.2.2 Format (with startup area selection function)

- o, f, [BTFLG]*1, [FSPR]*2, [first address]*3, [end address]*3

*1 [BTFLG]	Startup area selection bit	0: FFFF C000h - FFFF DFFFh is used
		1: FFFF E000h - FFFF FFFFh is used
*2 [FSPR]	Access window protection bit	0: Protected (when setting in the GUI: checked on)
		1: No protection(When setting in the GUI: Check OFF)
		Please note that once set to 0, it cannot be changed back to 1.
*3 [First address]/ [End address]		Block start/end address of the access window to be set

An error occurs when an address outside the memory range of the target microcomputer is described.

A) Both the access window function and the startup area selection function are not used = > command is not issued.

B) Use only the access window function

*1 Set [BTFLG] to 0.

*2 Set [FSPR] to 0 or 1.

*3 For [First Address]/[End Address], set the block beginning/end address of the access window.

Example:

o,f,0,1,FFFF0000,FFFFFFFF	Set FFFF0000h-FFFFFFFFh to Access Window

C) Use only the startup area function selection

*1 [BTFLG] = Set the area to be set.

*2 Set [FSPR] = 1 (no protection).

*3 Set [First Address]/[End Address] to the first address of Code Flash.

Example:

o,f,1,1,FFFF0000,FFFF0000	Startup Area Select Bit(Use FFFFE000h-FFFFFFFFh)
	No protection

D) Used with the access window function and the startup area selection function

Example:

o,f,0,0,FFFF0000,FFFFFFFF	Set FFFF0000h-FFFFFFFFh to Access Window
	Startup Area Select Bit (Using FFFFC000h-FFFFDFFFh)
	Protected

3.8 [Blank check] command

Make sure the target MCU is erased. This can be done in the GUI by selecting [Blank Check] and [All Areas] on the [Quick Creation] Basic settings tab (Figure 2.1) or [Blank] on the Memory Map tab (Figure 2.2).

3.8.1 Compatible varieties

- All Supported MCUs

Table 3.7 [Blank check] command specifications by group name

Series name	Group Name	All-blank check	Blank check
RX100	RX110,RX111,RX113,RX130,RX13T,RX140	Resource Units (Code Flash/Data Flash*1/User Boot*1)	Yes
RX200	RX210,RX21A,RX220		Yes*2
	RX230/RX231,RX23T,RX24T,RX24U, RX23E-A,RX23E-B,RX23W,RX260/RX261		Yes
RX600	RX610,RX621/RX62N,RX62T/RX62G		Yes*2
	RX630,RX631/RX63N,RX634,RX63T		Yes*2
	RX64M,RX66T,RX651/RX65N/RX65W-A, RX660,RX66N,RX671	No	Block-by-block (Reference Table3.8)
RX700	RX71M,RX72M,RX72N,RX72T	No	

*1 When installed in the target MCU

*2 If the Data Flash area has been erased, an error may occur due to undefined data being read due to the microcomputer specifications. Please use the All areas (All Blank check).

3.8.2 All areas (All Blank check)

Check whether all block data has been erased in each area of the target microcomputer.

3.8.2.1 format

- b,[Flash memory type]*1

Example:

b,1 Code Flash all-block blank check

*1 [Flash memory type] = 1: Code Flash, 2: Data Flash, 3: User Boot

- If you try to do this on an unsupported MCU (Reference Table 3.7), an error will occur. Use the [Blank check] command for block specification.

3.8.3 Block specification (Blank check)

Confirm that the data in the specified area of the target microcomputer has been erased. It takes longer to process than an all-blank check.

3.8.3.1 format

- b,[start address],[end address]

Example:

b,FFFFF000,FFFFFFFF

Table3.8 Access Units by Group

Series name	Group Name	Unit [Byte]		
		Code Flash	Data Flash	User Boot
RX600	RX660,RX64M,RX66T	256*1	16*3	256*1
	RX651/RX65N/RX65W-A,RX66N,RX671	128*2	4*4	-
RX700	RX71M,RX72T	256*1	16*3	256*1
	RX72M,RX72N	128*2	4*4	-

*1 Start address: XXXX XX00h, End address: XXXX XXFFh.

*2 Please specify the start/end addresses as a combination of XXXX XX00h/XXXX XX7Fh or XXXX XX80h/XXXX XXFFh.

*3 Start address: XXXX XXX0h, End address: XXXX XXXFh.

*4 Please specify the start/end addresses as a combination of XXXX XXX0h/XXXX XXX3h or XXXX XXX4h/XXXX XXX7h or XXXX XXX8h/XXXX XXXBh or XXXX XXXCh/XXXX XXXFh.

- In areas where TM (Trusted Memory) is configured, a blank error occurs.
- An error occurs when an address outside the memory range of the target microcomputer is described.

3.9 [Erase] command

Erases the target MCU. This can be set in the GUI's [Quick Creation] – Basic Setting tab (Figure 2.1) – [Erase] or [All Area Erase], or in the Memory Map tab (Figure 2.2) – [Erase].

3.9.1 Compatible varieties

- All Supported MCUs

Table 3.9 Group [Erase] Command Specifications

series	group	Erase		All Erase
		Designated Blocks	Continuous Block Specification	
RX100	RX110,RX111,RX113,RX130,RX13T,RX140	Yes	Yes	Yes
RX200	RX210,RX21A,RX220,RX230/RX231,RX23T,RX24T,RX24U, RX23E-A,RX23E-B,RX23W,RX260/RX261	Yes	Yes	Yes*1
RX600	RX610,RX621/RX62N,RX62T/RX62G,RX630, RX631/RX63N,RX634,RX63T	Yes	Yes	Yes*1
	RX64M,RX66T,RX651/RX65N/RX65W-A,RX660,RX66N,RX671	Yes	Yes	Yes*1
RX700	RX71M,RX72M,RX72N,RX72T	Yes	Yes	Yes*2

*1 The User Boot area is not included.
When [Erase All Areas] is selected, [Quick Creation] generates the [All Erase] command and the [Erase] command for the User Boot area.

3.9.2 Erase All Areas (All Erase)

- Format: e　　* MCU without lock bit function
- Format: e,,[lock bit format]*1　　* MCU with lock bit function

Example:

e　　* MCU without lock bit function
e,,0　　* Lock bit enabled setting (MCU with lock bit function)
e,,1　　* Lock bit disable setting (MCU with lock bit function)

*1 [Lock bit format]　　0: Lock bit enabled, 1: Lock bit disabled

- If you execute All Erase while TM is set, everything except the TM setting area will be erased and the lock bit will also be released. No error occurs.
- The User Boot area is not covered. Erase the specified block.
- Clearing the configuration area (OFSM) of the option setting memory
  [Configuration clear] command (Reference 3.14.2 Section).
- If you enable the lock bit format, only unlocked blocks are erased.
  Locked blocks are not erased.
- The block specified by the lock bit is disabled, and all blocks are erased regardless of the lock or unlock status.

3.9.3 Erase Specified Blocks (Erase)

- e,[Target block end address],[Lock bit format]　　Specified Block Erase
- e, [first address], [end address], [lock bit format]　　Erasing multiple blocks in a row (supported: Reference Table 3.9)

Example:

e,ffffffff　　FFFFFFFFh erases the block of the last address (MCU without lock bit function)
e,ffffffff,1　　FFFFFFFFh erases the block of the last address (lock bit disabled)
e,FFF80000,FFFFFFFF,1　　Erase FFF80000h-FFFFFFFFh blocks (lock bit disabled)

3.9.4 Precautions

- If you enter an address other than an erasable block, an error will occur.
- If you erase with the lock bit enabled, you will get an error if the area is locked (When erasing one block).
- If you enable the lock bit format, only unlocked blocks are erased.
  Locked blocks are not erased.
- If the lock bit is disabled, all specified blocks will be erased regardless of their locked or unlocked state, and the lock bit will also be cleared.
- An error occurs in the following cases:
  - When the protection function (block erase is prohibited)
  - TM (Trusted Memory) setting area
  - When the access window is set, the area outside the setting range
- When program commands are prohibited, the order of deletion of internal resources is specified.
  Example (RX71M Group): User Boot Area -> Data Flash Area -> Code Flash Area
  For details, refer to the hardware manual of the target microcomputer.

3.10 [Program] command

Write the program file already downloaded to the EFP-LC2 to the target microcomputer.
This can be set in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) under [Program].

3.10.1 Compatible varieties

- All Supported MCUs

3.10.2 format

- p,[filename]*1,[Start Address]*2,[End Address]*3 ＊ MCU without lock bit function
- p, [File name]*1, [Start address]*2, [End address]*3, [Lock bit format]*4 ＊MCU with lock bit function

Example:

p,SAMPLE. Hxw,FFFFFF00,FFFFFFFF	MCUs without lock bit function
p,SAMPLE. Hxw,FFFFFF00,FFFFFFFF,0	Lock Bit Enabled
P,SAMPLE. Hxw,FFFFFF00,FFFFFFFF,1	Lock Bit Disabled

＊1 [File name]	Program file name(Extension = MOT, HEX or HXW) The file name can be up to 183 alphanumeric characters (including extensions). Characters that are not allowed in the file name are not allowed.
＊2 [Start address]	The start address of the program file to be written
＊3 [End address]	End address of the program file to be written
＊4 [Lock bit format]	0: Lock bit enabled, 1: Lock bit disabled

3.10.3 detail

- An error occurs when an address outside the memory range of the target microcomputer is described.
- If you write something other than half-width English characters Hxw/MOT/HEX in the file extension, you will get an error.
- When downloaded to EFP-LC2, the program file is converted to HXW format in 256-byte increments.
- If you enter an address other than the address range of the created Hxw file, an error will occur.
- Writing the option setting memory to the configuration area (OFSM) is done using the [Options] command (3.14Refer to the Please use it.
- Even if an area is locked, if the data in that area has been erased, it is possible to write to it by disabling the lock bit.
- An error occurs in the following cases:
  - When setting the protection function (program prohibition setting)
  - TM (Trusted Memory) setting area
  - When the access window is set, the area outside the setting range
  - Writing to areas that are not blank
  - Set the locked area to lock bit enabled and write it.

3.11 [Verify] command

This reads out the resources of the specified range of the target microcomputer and compares them with the contents of the specified program file downloaded into the EFP-LC2. This can be set in the [Verify] tab of the [Quick Creation] in the GUI (Figure 2.1).

3.11.1 Compatible varieties

- All Supported MCUs

Table 3.10 [Verify] Command Specifications by Group

series	group	correspondence
RX100	RX110,RX111,RX113,RX130,RX13T,RX140	Yes
RX200	RX210,RX21A,RX220	Yes*1
	RX230/RX231,RX23T,RX24T,RX24U, RX23E-A,RX23E-B,RX23W,RX260/RX261	Yes
RX600	RX610,RX621/RX62N,RX62T/RX62G	Yes*1
	RX630,RX631/RX63N,RX634,RX63T	Yes*1
	RX64M,RX66T,RX651/RX65N/RX65W-A, RX660,RX66N,RX671	Yes
RX700	RX71M,RX72M,RX72N,RX72T	Yes

*1 If the Data Flash area is blank, undefined data will be read out due to the microcomputer specifications.

3.11.2 format

- v,[file name],[start address],[end address]

Example:

v,SAMPLE. Hxw,C0000,FFFFF

The program file "SAMPLE. HXW" and the
data in the specified range (start address/end address) of the target microcomputer.

*1 [File name]	Compare the file names of the programs that have been downloaded to the EFP-LC2 (Extension = MOT, HEX or HXW) The file name can be up to 183 alphanumeric characters (including extensions). Characters that are not allowed in the file name are not allowed.
*2 [Start address]	The start address of the program files to be compared.
*3 [End address]	End address of the program file to be compared

3.11.3 detail

- An error occurs when an address outside the memory range of the target microcomputer is described.
- If you write something other than half-width English characters Hxw/MOT/HEX in the file extension, you will get an error.
- If you enter an address other than the address range of the created Hxw/MOT/HEX file, an error will occur.
- An error occurs in the following cases:
  - When the protection function is set (Read prohibition setting)
  - TM (Trusted Memory) setting area
    * When the matching data is not "0". Because "0" is read in the set area.
  - When the access window is set, the area outside the setting range

3.12 [Read] command

The target microcomputer's resources are read and saved to the EFP-LC2's built-in resources under the specified file name (HXW format).
The data can be saved as a file on the host machine by uploading EFP internal data using GUI.
This can be set in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) under [Read].

3.12.1 Compatible varieties

- All Supported MCUs

Table 3.11 Group [Read] Command Specifications

series	group	correspondence
RX100	RX110,RX111,RX113,RX130,RX13T,RX140	Yes
RX200	RX210,RX21A,RX220	Yes*1
	RX230/RX231,RX23T,RX24T,RX24U, RX23E-A,RX23E-B,RX23W,RX260/RX261	Yes
RX600	RX610,RX621/RX62N,RX62T/RX62G	Yes*1
	RX630,RX634,RX631/RX63N,RX63T	Yes*1
	RX64M,RX66T,RX651/RX65N/RX65W-A,RX660,RX66N,RX671	Yes
RX700	RX71M,RX72M,RX72N,RX72T	Yes

*1 If the Data Flash area is blank, undefined data will be read out due to the microcomputer specifications.

3.12.2 format

- r, [file name]*1, [start address]*2, [end address]*3

Example:
r,Read.Hxw,FFFFF000,FFFFFFFF "Read.Hxw"Reads the area of FFFFF000h-FFFFFFFFh to EFP-LC2

*1 [File name]	Hxw file name to be saved in EFP-LC2 The file name can be up to 183 alphanumeric characters (including extensions). Characters that are not allowed in the file name are not allowed.
*2 [Start address]	The starting address of the area to be read
*3 [End address]	End address of the area to be read

3.12.3 detail

- EFP-LC2 can only save one read Hxw file.
  If a file with the same name exists, it is overwritten.
- If you write something other than half-width English characters Hxw in the file extension, you will get an error.
- An error occurs when an address outside the memory range of the target microcomputer is described.
- Specify the [Start address] and [End address] according to the access unit (Refer Table3.8).
- An error occurs in the following cases:
  ・When the protection function is set (Read prohibition setting)

3.13 [Check sum] command

The data checksum value is checked to see if it matches the data on the target microcomputer.
This can be set in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) under [Checksum].

3.13.1 Compatible varieties

- All Supported MCUs

3.13.2 format

- h, [Flash memory type] *1, [ROM capacity] *2, [Checksum value]*3

Example::

h,1,256,1D4B59E6	256KB Code Flash

*1 [Flash memory type]	1: Code Flash, 2: Data Flash, 3: User Boot
*2 [ROM capacity]	Written in KB (e.g., 2MB = 2048)
*3 [Checksum value]	Byte-added long word data (4 bytes)

3.13.3 detail

- The checksum value is a long word data obtained by adding all the data of the target resource one byte at a time.
- The calculated size of SUM is as follows, and if the size is less than the following in each area, the SUM is calculated at the nearest size that is larger than or equal to the installed size. Missing space is calculated as 0xFF.
  - ・Data Flash, User Boot 8KByte × 2n(n=0,1,2...)
  - ・Code Flash 64KB × 2n(n=0,1,2,...)
- An error occurs in the following cases:
  - – When the protection function is set (Read prohibition setting)
  - – TM (Trusted Memory) setting area
    - * This area is not subject to the calculation of the sum value.
  - – When the access window is set, the area outside the setting range
  - – Blank Data Flash area
    - * The blank Data Flash area is an irregular value.

3.14 [Option] Commands

Set the [Option] command for the settings in the option setting memory (OFSM).
You can also clear them with the [Configuration clear] command.
You can set this in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) [Option Setting Memory] and Options tab (Figure 2.4).

3.14.1 Compatible varieties

Table 3.12 Group-specific [Option] command support function

series	group	Protected	option Function Selection	serial programmer	OCD	TM function	bank selection	ROM code
RX600	RX64M	Yes	Yes	Yes	No	Yes	No	No
	RX66T	Yes	Yes	Yes	No	Yes	No	Yes
	RX651/RX65N/RX65W-A	No	Yes	Yes	No	Yes	Yes	Yes
	RX660	Yes	Yes	Yes	Yes	Yes	No	Yes
	RX66N	No	Yes	Yes	No	Yes	Yes	Yes
	RX671	No	Yes	Yes	Yes	Yes	Yes	Yes
RX700	RX71M	Yes	Yes	Yes	No	Yes	No	No
	RX72N	No	Yes	Yes	No	Yes	Yes	Yes
	RX72M	No	Yes	Yes	No	Yes	Yes	Yes
	RX72T	Yes	Yes	Yes	No	Yes	No	Yes

*1 Protected (Reference 3.14.4 Section) = No Read, No Program, No Block Erase
*2 option function Selection (Reference 3.14.3 Section)
*3 serial programmer (Reference 3.14.5 Section)
*4 OCD(Reference 3.14.6 Section)
*5 TM function (Reference 3.14.6 Section)
*6 bank selection (Reference 3.14.9 Section)
*7 ROM code (Reference 3.14.8 Section)

3.14.2 [Configuration Clear] Command

Clears the configuration data.
A command is created when [Clear option setting memory] is ON on the [Quick Creation] Basic settings tab (Figure 2.1) of the GUI.

3.14.2.1 format

- o,c

- When the TM function is enabled, the code flash memory, which is the TM target area, is also erased.
- If the Code Flash area, Data Flash area, and User Boot area are not blank, this command cannot be used.
  This command should be written after executing the command to erase all areas of Code Flash, Data Flash, and User Boot.
  * When Data Flash/User Boot is not functional, it is not necessary to erase the target area.
- The configuration clear is enabled by resetting. Please execute it separately from the PBT file such as the [Program] command.
- This command cannot be used in the following cases.
  - Lock bit in any block, protection in the access window is set
  - When Block Erase Command Prohibition is enabled
- If Boot Mode ID Code Protect is enabled, this command will be executed and the protection will be disabled after the reset.
- After clearing the configuration, the state will be set as shown in Table 3.13.

Table 3.13 State after clearing the configuration

item	setting
Optional function selection register (OFS0, OFS1)	All 0xFF
protection - Block erase command prohibited - Program command prohibition - Read command prohibited	invalid
Serial programmer connectability - ID authentication in serial programming mode - Serial programmer connection prohibited	invalid
ID Code	All 0xFF
TM function	invalid
ROM Code Protect	invalid
OCD connection availability	invalid
Bank Selection	Linear
MDE	Little Endian

*Only when the function is installed

3.14.3 Option Function Select Register

Set the Option function Select Register 0 (OFS0) and the Option function Select Register 1 (OFS1).

3.14.3.1 format

- o,o,[Setting value]*1,[Data type]*2

Example:

o,o,0123456789ABCDEF,1	Set the OFS0 register to "0x01234567" and the OFS1 register to "0x89ABCDEF".

*1 [Setting value]	Set the data in the order of OFS0 and OFS1
*2 [Data type]	0: ASCII code input, 1: HEX code input

3.14.4 Command Protection Setting

Perform the command protection settings using the serial programmer (EFP-LC2, etc.).

3.14.4.1 format

- o,p,[Setting value]*1

Example:

o,p,07	No Reads, programs, or block erases

*1 [Setting value] Two-digit hexadecimal number

Bit2 = Read command prohibited (0: readable, 1: no read)
Sets whether to allow/ prohibit the execution of read commands by the serial programmer.

Bit1 = Program command prohibition (0: Programable, 1: no program)
Sets whether to allow/ prohibit the execution of program commands by the serial programmer.

Bit0 = Block erase command prohibited (0: erasable, 1: no erase)
Sets whether to allow/prohibit the execution of block erase commands by the serial programmer.

- The protection setting cannot be set for MCUs with serial programming ID authentication enabled.
- After setting [Block erase prohibited], it cannot be canceled with EFP-LC2.
  After executing the command, you will not be able to erase the data on the MCU, so please be careful when executing the command.
- For [Setting value], set a two-digit hexadecimal number between 01 and 07.

3.14.5 Serial Programmer Connection Prohibition

Prohibits connection to serial programmers (EFP-LC2, etc.).

3.14.5.1 format

- o,s

- [Serial programmer connection prohibited] takes effect after the script ends.
- After executing [Serial programmer connection prohibited] (after reset), access with the EFP-LC2 will be impossible and it cannot be released, so please be careful when executing this command.

3.14.6 On-Chip Debugger Connection Prohibition

Sets the prohibition of connection with the on-chip debugger (OCD).

3.14.6.1 format

- o,d

- [OCD connection prohibited] will take effect after the script is completed (after reset).

3.14.7 Trusted Memory function enabled

Enable the TM area (Trusted Memory) of Code Flash.

3.14.7.1 format

(1)No bank switching function

- o,t,[Setting value]*1,[Data type]*2

Example:

o,t,ABCD,0	Set the TM area (refer to the hardware manual of the MCU for the target of the TM area) Set the TMINF register to ABCD (0x41424344)

(2)There is a bank switching function

- o,t,[Setting value]*1,[Bank] *3,[Data type]*2

Example:

o,t,ABCD,l,0	Set the TM area (refer to the hardware manual of the MCU for the target of the TM area) Set the TMINF register to ABCD (0x41424344)

*1 [Setting value]	4 bytes of data to be set in the TMINF register
*2 [Data type]	0: ASCII code input, 1: HEX code input
*3 [Bank]	L: Linear Mode, D: Dual Mode

- [Trusted Memory Area Settings] will take effect after the script is completed (after reset).
- When data of 3 bytes or less is set in [Setting value], it will be filled in the upper end of the TMINF register and the vacant lower end will be set to "00".

3.14.8 ROM code setting/getting

The ROM Code Protection Register are used to prohibit read, program, and erase flash memory when using parallel programmers in offboard programming.

3.14.8.1 format

- o,r,[processing details]*1

Example:

o,r,1	Set to ROM Code Protect 1 (00000000h written to ROM Code Protection Register)
o,r,b	When the ROM Code Protection Register is 00000000h or 00000001h An error occurs (if ROM Code Protection Register is disabled, no error occurs)

*1 [Processing details]

1: Set ROM Code Protection Register to 1 (prohibits reading, programming, and erasing of code flash memory)
2: Set ROM Code Protection Register to 2 (prohibits reading of code flash memory)
B: Check ROM Code Protection Register *B can be a lowercase letter

- If you execute the "O, R, B" command on an MCU that is in ROM code protection 1 state, an error occurs.
  - The generated log file will record error code = 5C01.
  (If ROM code protection 2 state, error code = 5C02 will be recorded.)
- This command cannot be used if program command prohibition is enabled or block erase command prohibition is enabled.

3.14.9 Bank Select

Sets the switch to dual mode.

3.14.9.1 format

- o,b,[Bank Selection]

- [Bank Selection] takes effect after the script is finished (after a reset).
- This command should be written after executing the command to erase all areas of Code Flash, Data Flash, and User Boot.
  * When Data Flash/User Boot is not functional, it is not necessary to erase the target area.
- For target MCUs set to dual mode (target: Reference Table 3.12), select the MCU type name ending in "-D".

*1 [Bank Selection]

"L" :	Linear
"D0":	Dual mode,Bank 1 address is FFF00000h to FFFFFFFFh Bank 0 address is FFE00000h to FFEFFFFFh Set MDE.BANKMD[2:0] to 3'b000, BANKSEL.BANKSWP[2:0] to 3'b000
"D1":	Dual mode,Bank 1 address is FFE00000h to FFEFFFFFh Bank 0 address is FFF00000h to FFFFFFFFh Set MDE.BANKMD[2:0] to 3'b000, BANKSEL.BANKSWP[2:0] to 3'b111

3.15 [Wait] command

A command to pause during PBT file operation. The [WAIT] command will pause for the time set in [Pause seconds] (1 to 99 [s]) or until it is released by pressing the [START] button on the EFP-LC2.
This command is not supported by the GUI's [Quick Creation] creation function.

3.15.1 Compatible varieties

- All Supported MCUs

3.15.2 format

- w=[Pause seconds]

*1 [Pause seconds]	Specify the number of seconds to pause (valid from 0-99, 0 is waiting for key input)

Example:

w=7	Stop script execution for 7 seconds
w=0	Stop executing commands until there is a keystroke

3.15.3 detail

- After executing the [WAIT] command, the reset on the target system is released.
- The target microcomputer can be operated with the target system connection cable connected.
- During pause, the buzzer will beep every second while waiting for the specified time to elapse.
- When stopped waiting for key input, a warning sound (beep beep beep) will be generated once every 5 minutes.
- The wait state can be released by pressing the [START] button while waiting for key input.
- This command can be used any number of times in one PBT file.
- Regarding the buzzer sound during pause and when waiting for key input, you can switch whether or not the buzzer sounds by selecting "Settings (E)" -> "EFP Buzzer Settings (B)" -> Buzzer: ON or OFF in the LC2-Download Manager menu. (Buzzer: OFF will not sound.)
- Since the boot mode is released by reset, if the target MCU is in a state that requires ID authentication, please execute the [Mode entry] and [ID-collation] commands after the [Wait] command.

<Use>

- For MCUs that can be protected, write with protection after checking operation without protection.
- You can operate without disconnecting the target system connection cable during debugging or at exhibitions.

<Notes>

- For safety reasons, EFP-LC2 does not release the reset of the target microcomputer so that the user program does not start operating even if the script ends after writing to the target microcomputer.
- When using this command, when the reset is released after writing to the target microcomputer, the target system connection cable is connected, so there may be differences from the operation of the target system alone. In addition, we do not guarantee the operation of the MCU when the reset is released.
- As mentioned above, this command may cause safety problems depending on the circuit configuration of the target system, so please consider this point carefully and use it at your own risk.
  We cannot be held responsible for any damage caused by use.

Revision Records

revision	date	Revision details
Rev.1.00	2025/05	First edition.
Rev.1.01	2025/09	3.15.3 Added information about ON/OFF of buzzer sound when a wait command is issued.
Rev.1.02	2026/02	Due to support for full-width characters in file names, the character encoding that can be used in script files is limited to "UTF-8".
		Corrected *1 (Data Flash is not supported for some MCU models) in Table 3.7 of the blank command (corrected the description)
		Corrected *1 (Data Flash is not supported for some MCU models) in Table 3.10 of the verify command (corrected the description)
		Corrected *1 (Data Flash is not supported for some MCU models) in Table 3.11 of the read command (corrected the description)