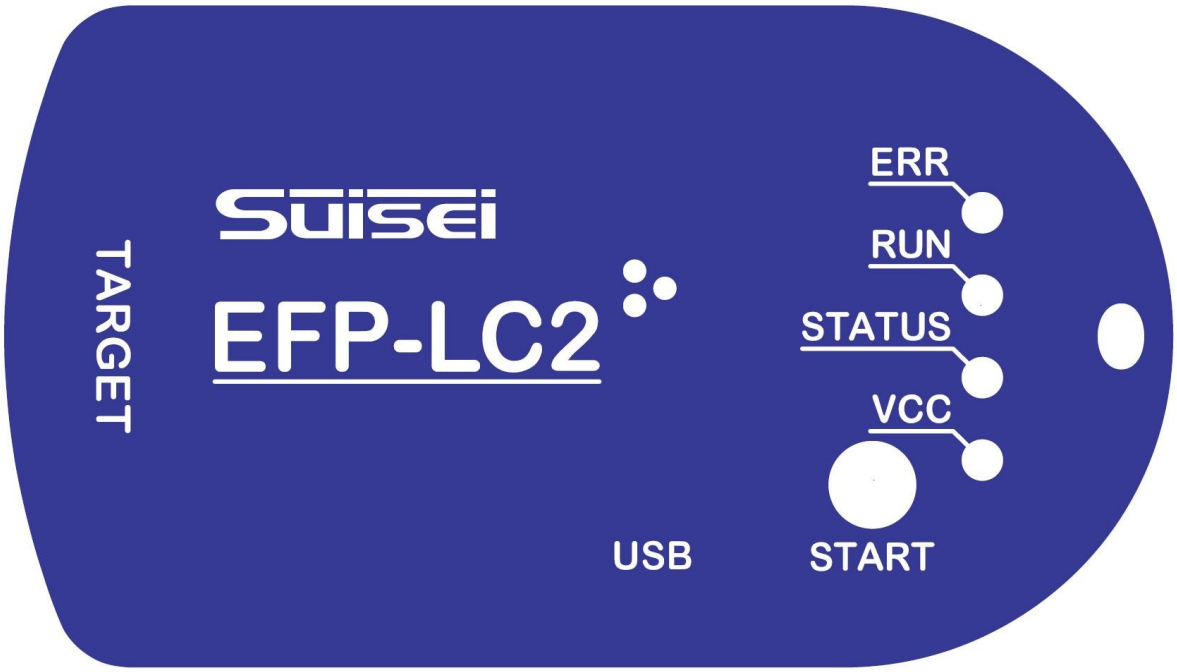
EFP-LC2 Instruction Manual Appendix
Target MCUs: RL78 Family



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.

Rev1.01 2025/09

1. summary

This document describes the precautions necessary to write and erase the EFP-LC2 Type-RL78 to the RL78 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.

- RL78 Family

*1 Please check our website for the latest list of devices.
https://www.suisei.co.jp/product/efp_lc2/download/EFP-LC2_SupportList_RL78.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.

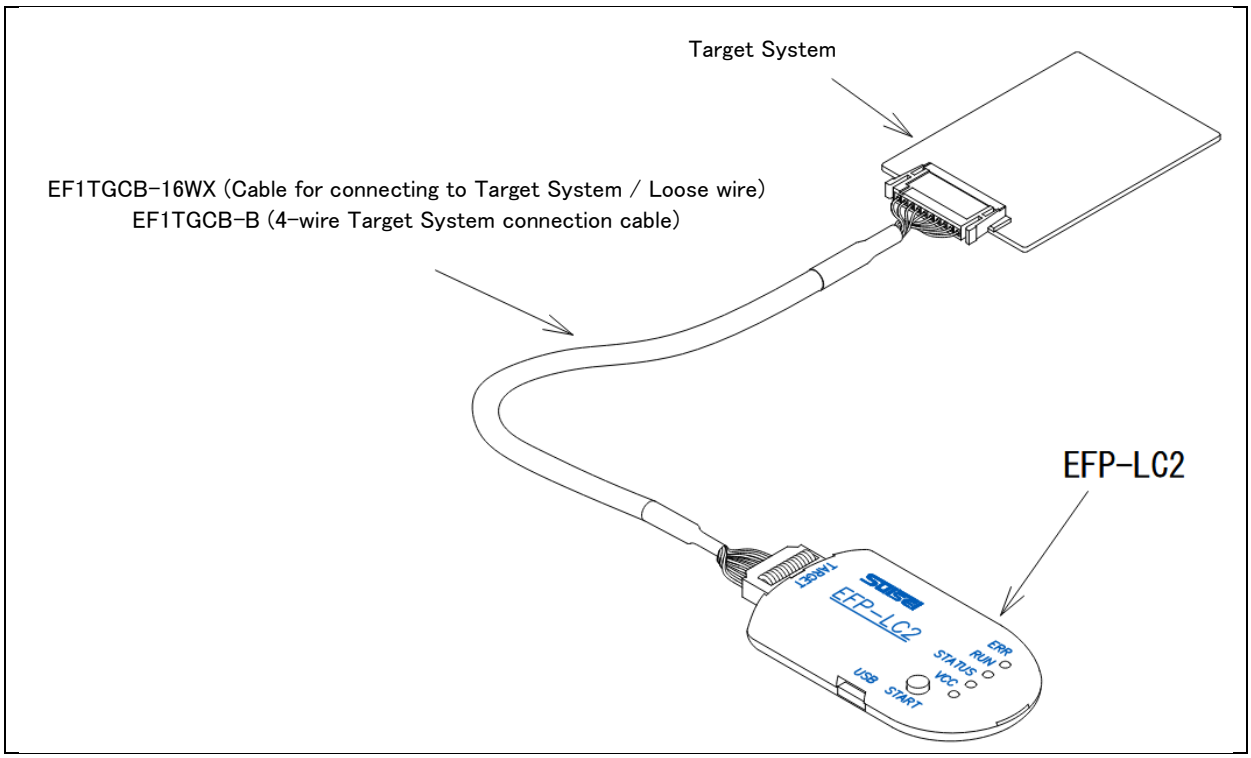


Figure 1.1 Connecting to the target system

1.3.1 Target System Recommended Circuits

The EFP-LC2 is in single-line UART and controls the target microcomputer(Hereinafter referred to as MCU).

Target System Recommended Circuits Figure 1.2 It is shown in .

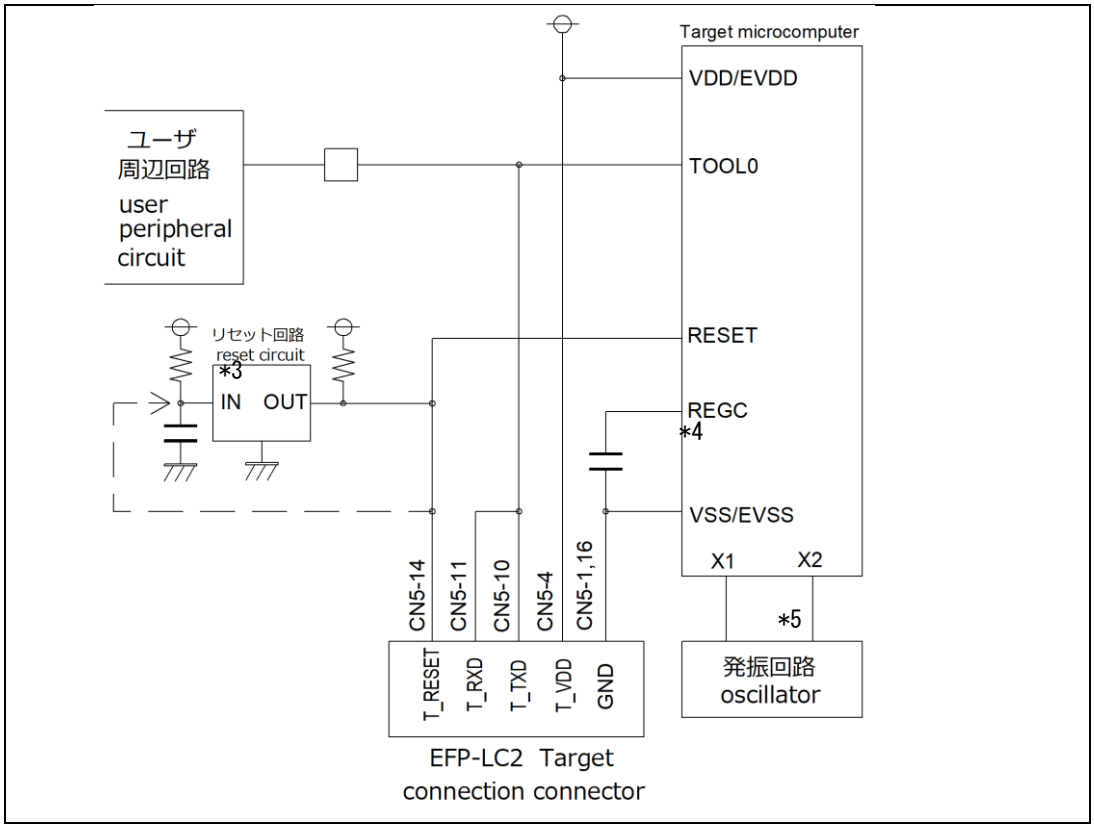


Figure 1.2 Target System Recommended Schematic

Table 1.1 Connecting in single-line UART

Target microcomputer pin name	name	EFP-LC2 Target connection connector	Cable*1 Tip wire color
VDD, EVDD0*2, EVDD1*2, AVDD*2	Power	EFP-LC2(CN5- 4): T_VDD	Yellow 1
VSS, EVSS0*2, EVSS1*2, AVSS*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
TOOL0	Data I/O for flash memory programmer	EFP-LC2(CN5-10): T_TXD	Black 1
		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.

*4 For capacitor value, refer to the hardware manual of the MCU. If the MCU does not have a REGC pin, there is no need to connect this.

*5 When operating with the on-chip oscillator, there is no need to connect an oscillator 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 .

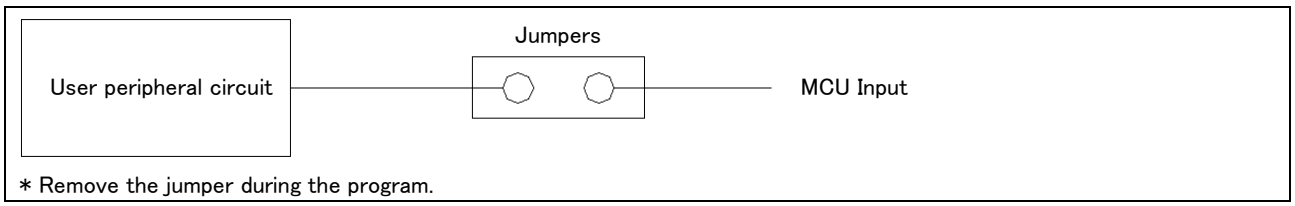


Figure 1.3 Example of collision prevention circuit using jumpers

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 Pin for connecting regulator output stabilization capacitance for internal operation (REGC)

Connect the REGC pin to GND via a capacitor with the specified capacitance as described in the hardware manual of the target microcomputer.(Note: If the MCU does not have a REGC pin, there is no need to connect this.)

1.3.2.4 Oscillator circuit

When the oscillator circuit of the target microcomputer is an external input (X1 , X2 pin), connect it to the oscillator circuit.
When operating with an on-chip oscillator, it is not necessary to connect an oscillator circuit.

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.
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	ID Verification	i	Only when programmer connection ID authentication function is enabled
5	Signature	g	
6	Erase	e	
7	Security release	d	
8	Blank check	b	
9	Program	p	
10	Verify	v	
11	Check sum	h	
12	Security set/verify	l/l2	
13	Option	o	

2.2 Basic Settings Tab

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

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

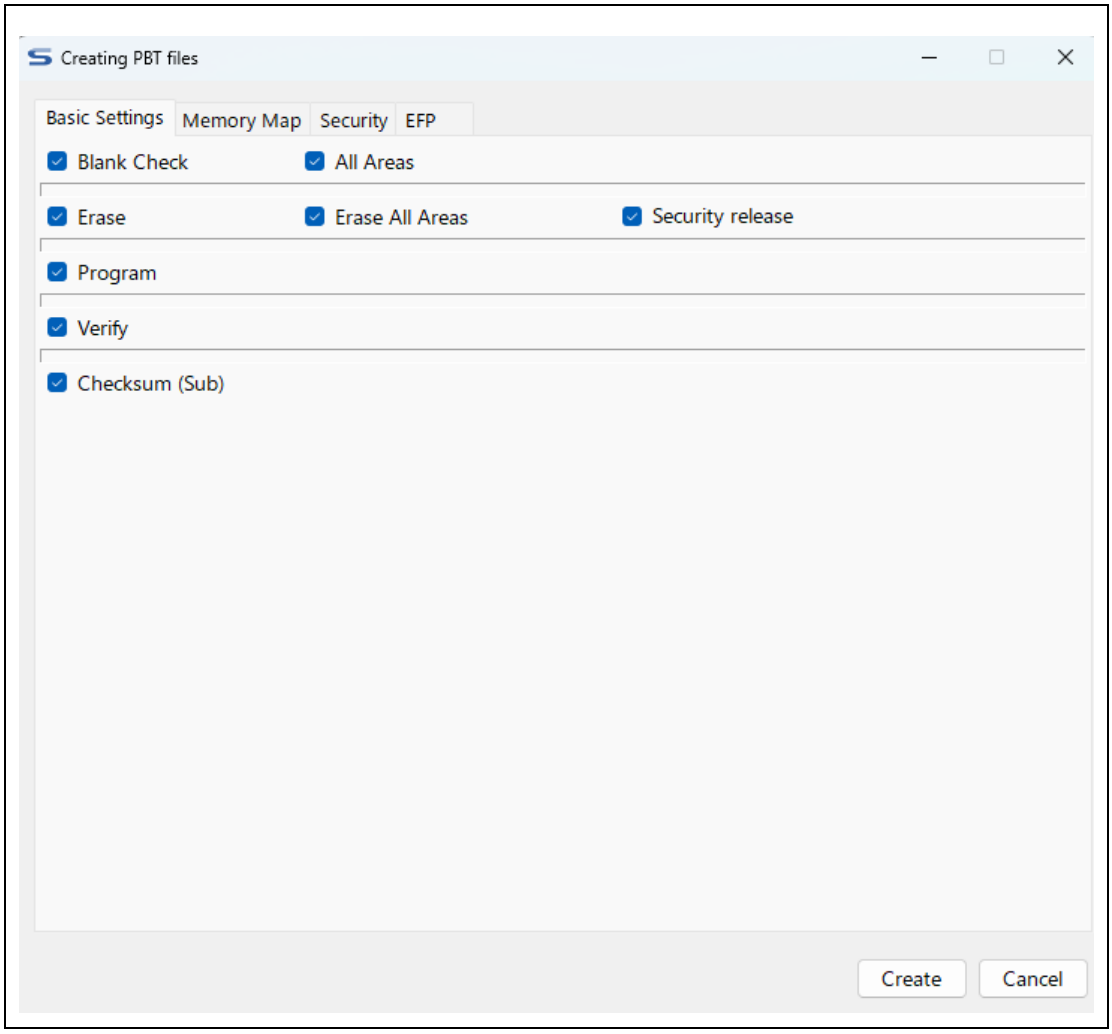


Figure 2.1 Basic Setting Tab

(1)Blank check

For the flash memory of the target microcomputer, use the [Blank check] command (Reference 3.6 Section).
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 3.7 Section).
If you want to erase the entire area, check [Erase All Areas].

Also, when disabling write protection, check [Security release].Generate the [Security release] command (Reference 3.13 Section).

(3)Program

Write the program file to the target microcomputer with the [Program] command (Reference 3.9 Section).

(4)Verify

Compare the target microcomputer with the program file [Verify] command (Reference 3.10 Section).

(5)Checksum

To check the checksum against the Flash memory of the target microcomputer, use the [Check sum] command (Reference 3.11 Section).

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], and [Erase] commands.

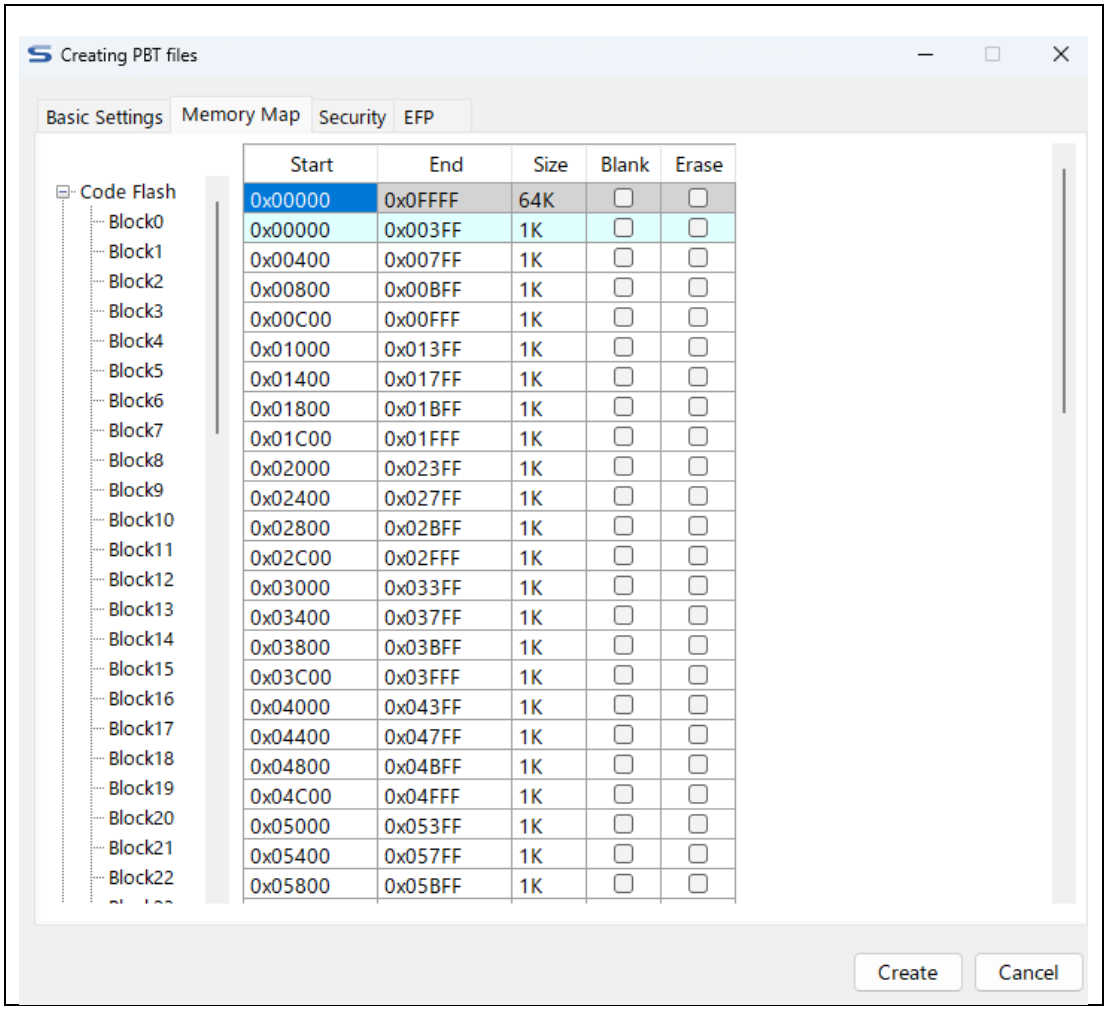


Figure 2.2 Memory Map Tab

<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.

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] , [Security set] and [Signature] commands.

If the target MCU does not have the function, the check box is disabled or hidden. For RL78 (Protocol B), this tab itself does not appear.

(1)ID Collation(RL78 (Protocol C) only)

The [ID-collation] command (Reference 3.5 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 verified.
- Select [Processing details] or [ID Type].

(2)Signature

Generates the [Signature] command (Reference 3.8 Section).

When using this function, check [Signature Check] and then do the following.

- Please enter the model name of the target microcomputer (maximum 10 characters).

(3)Security set

Generates the [Security Settings] command (Reference 3.12 Section).

When using this function, check [Security Settings] and then do the following.

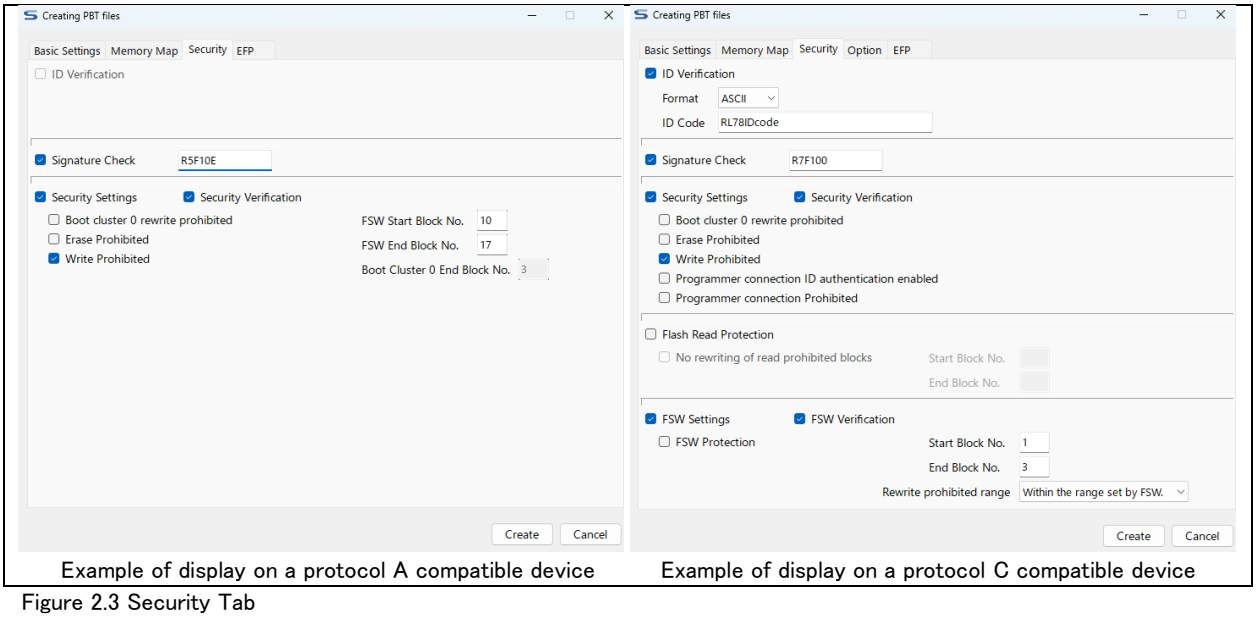
- When setting a flash shield window (FSW), enter the setting range in [Start Block] and [End Block].
- To enable the Write Protection/Erase Protection/Boot Cluster 0 Rewrite Protection/Programmer Connection ID Authentication Enabled/Programmer Connection Prohibition settings, check the respective checkboxes.
- To check the status of your security settings, check [Security Verifycation].
- The displayed content will change depending on the selected target microcomputer.
- To prevent changes to the FSW settings, check the [FSW Protection] box. (RL78 (Protocol C) only)
- For RL78 (Protocol C), select whether the FSW rewrite prohibited range is within the FSW setting range or outside the setting range.

(4)Flash read protection (RL78 (Protocol C) only)

Use the [Security Settings] command to set the flash read protect function (Reference 3.12.2.2 Section).

When using this function, check [Flash Read Protection] and then do the following:

- Enter the [Start Block] and [End Block] where you want to prohibit leads.



Example of display on a protocol A compatible device　　Example of display on a protocol C compatible device

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

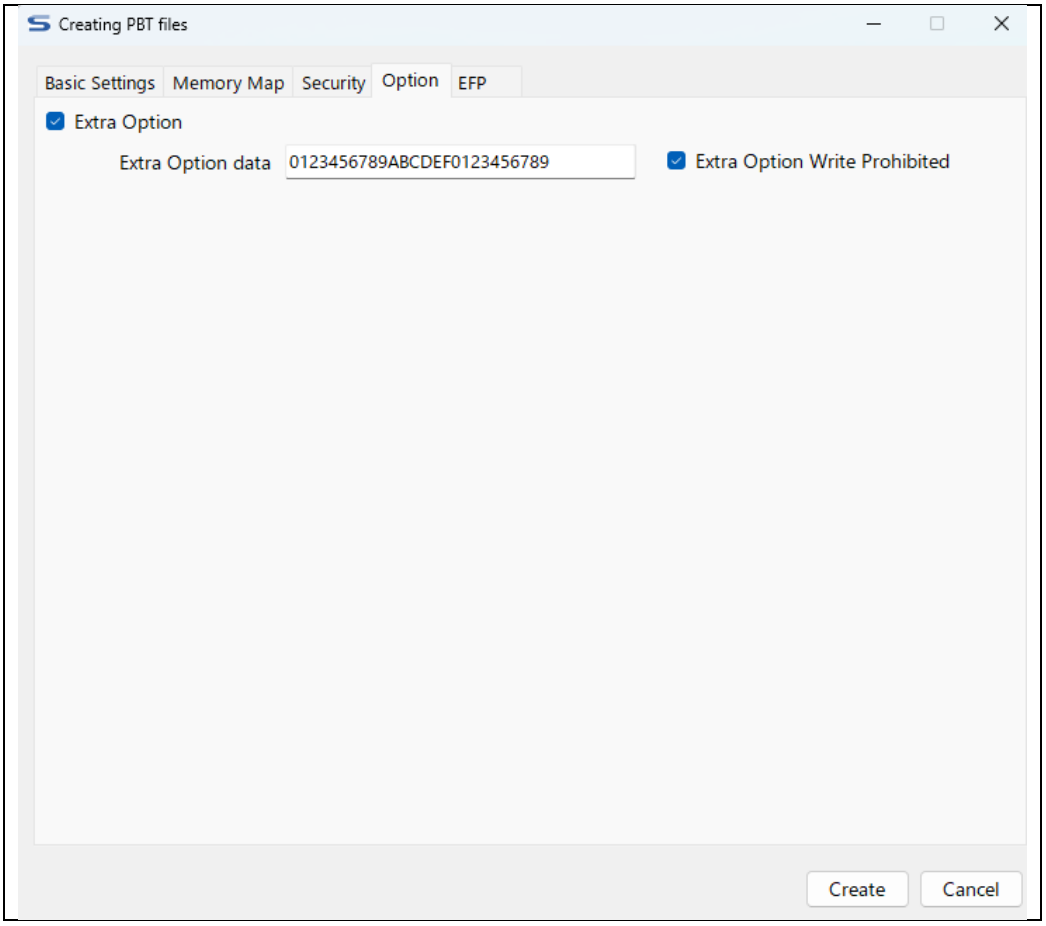


Figure 2.4 Option Tab

(1)Extra option settings (RL78 (Protocol C) only)

Configure the settings when using the extra options function.
When using the function, check [Extra Options] and then do the following.

- Please enter the data to be set (13 bytes). (An error will occur if the input value is not 13 bytes.)

2.6 EFP Tab

On this screen, you can create the [VDD supply], and [Baud-rate set] 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.

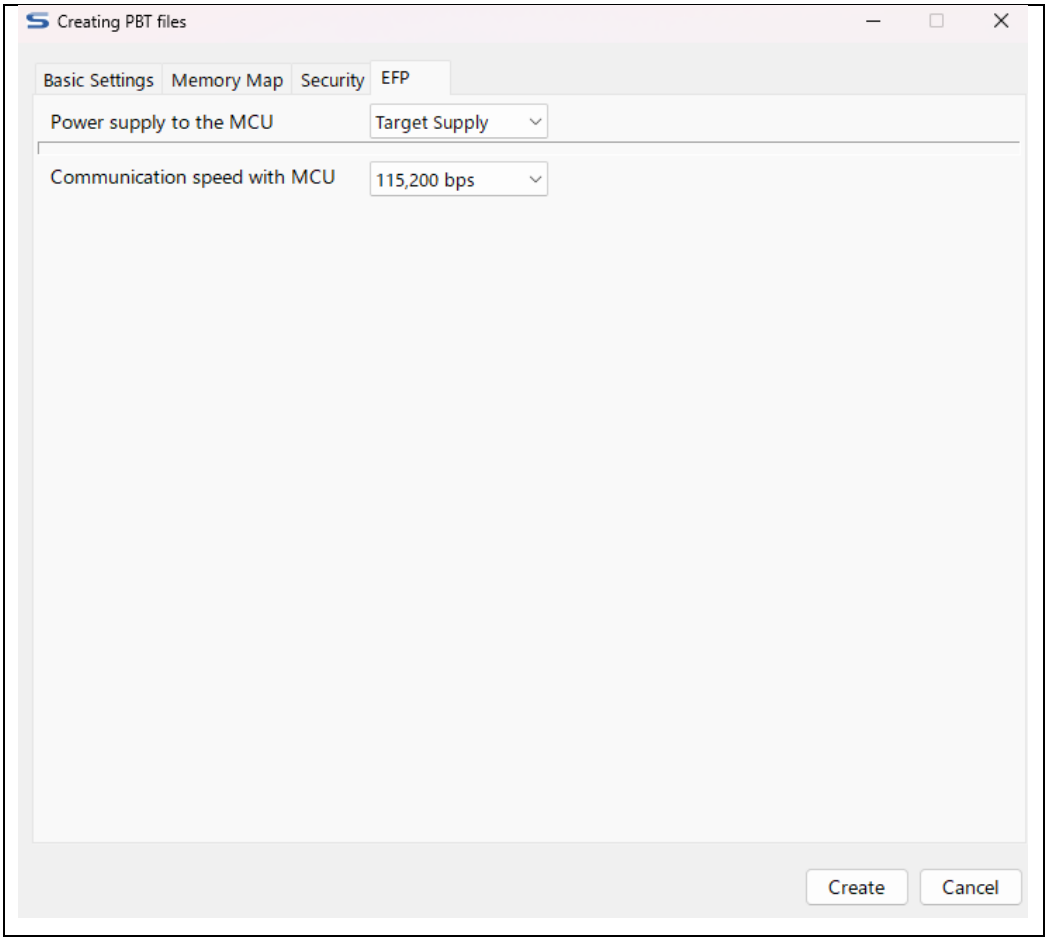


Figure 2.5 EFP Tab

(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.

*If the target microcomputer does not have the function, it will not be displayed.

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 "Shift JIS" or "UTF-8".
- For program and erase commands, no error occurs even if the command ends with a lock bit specification of ,0 or ,1. (Backward compatibility is provided for PBT files created with EFP-LC/RC2.)

Table 3.1 List of script commands that can be used in PBT files

classification	Command Name		Overview	page
Preparation for connection with MCU	MCU-Set	t	Target microcomputer settings	15
	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
Secure MCU Settings	ID-collation	i	Canceling the ID code protection function	18
	Security set/verify	l/l2	l: Flash shield window setting/verification, security setting/verification l2: Flash shield window setting/verification, security setting/verification, read-protection block setting (For command details, see the page on the right.)	24
Operations on MCU resources	Blank check	b	Confirm that the target MCU has been erased.	19
	Erase	e	Erasing the target microcomputer	20
	Signature	g	Check the model name of the target microcomputer	21
	Program	p	Write the specified program file to the target microcomputer.	21
	Verify	v	Comparison of data from the target microcomputer with the specified program file in the EFP-LC2	22
	Check sum	h	Checksum value confirmation of target microcomputer	23
	Security release	d	Canceling functions set by security setting/verification command (For command details, see the page on the right.)	26
	Option	o	Setting extra option functions of the target microcomputer	27
other	wait	w	Pausing Script Command Actions	28

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 3.2 reference

Example:

t=37 Specify RL78(Protocol A) as the target microcomputer
t=0 An error occurs (specification out of range)

Table 3.2 List of MCU Types

family	MCU Type	Selection in the GUI	remarks
RL78	37	RL78(Protocol A)	RL78/G11,G12,G13,G13A,G14,G1A,G1C,G1D, G1E,G1F,G1G,G1H,G1P,L12,L13,L1C,L1A,I1A, I1B,I1C,I1D,I1E,H1D,D1A,F12,F13,F14,F15,F1A
	41	RL78(Protocol B)	RL78/G10,G15,G16,G1M,G1N
	43	RL78(Protocol C)	RL78/G22,G23,G24

* If you specify an MCU type that is not compatible with EFP-LC2 Type-RL78, 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 3.2 Please 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

- x=[VDD Voltage Specification]*1

[VDD Voltage Specification]	[GUI Settings]
*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) of the AVDD pin of the RL78/G1A 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

- MCU type listed in Table 3.3
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.3 Baud rate setting command correspondence table

MCU type name
37 : RL78(Protocol A)
43 : RL78(Protocol C)

3.4.2 format

- s2=[setting]*1 *1 Table 3.4 reference

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" commands (old Baud Rate set commands) cannot be used.

Table 3.4 Baud-rate set list

Setting Values	Baud rate
s2=4	115,200(Defaults)
s2=5	250,000
s2=6	500,000

Units: [bps]

3.5 [ID-collation] command

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 when the programmer connection ID authentication is enabled for the model that supports the programmer connection ID authentication.
- 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.
- Write this command after executing the VDD supply command.
- On the Security tab of Simplified PBT in the GUI (Figure 2.3) It can be set in [ID Verification].

3.5.1 Compatible varieties

- MCU type listed in Table 3.5
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.5 ID-collation types by MCU type

MCU type name	detail
43 : RL78(Protocol C)	Reference 3.5.2 Section

3.5.2 format(RL78(Protocol C))

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

Example:

```
i,PROTECT_ID,0                          ; ASCII code input
i,0102030405060708090a,1                ; HEX Code Input
```

*1 [ID code] 10-byte user-set value
*2 [ID code format] 0: ASCII code input, 1: HEX code input

3.5.3 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.
- If programmer connection ID authentication is disabled (not protected), this command will be ignored.
- If the product type does not support the programmer connection ID authentication function, an error will occur when the command is executed.
- If the ID code does not have the specified number of bytes, the upper part will be filled with 0xFF before matching.
  (Example: If i,00,1 is executed for RL78 (Protocol C), the ID code will be matched as 0xFFFFFFFFFFFFFFFFFF00.)

3.6 [Blank check] command

Check whether the target microcomputer has been 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).

3.6.1 Compatible varieties

- All Supported MCUs

3.6.2 Block specification (Blank check)

Confirm that the data in the specified area of the target microcomputer has been erased.

3.6.2.1 format

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

Example:
b,0000,FFFF

Table 3.6 Access Units by Group

MCU type name	Unit [Byte]	
	Code Flash	Data Flash
37:RL78(Protocol A)	1KB*1	1KB*1,5
41:RL78(Protocol B)	All areas*4	All areas*4,5
43:RL78(Protocol C)	2KB*2	256Byte*3

*1 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X3FF or 0xXXXX X400/0xXXXX X7FF or 0xXXXX X800/0xXXXX XBFF or 0xXXXX XC00/0xXXXX XFFF.
*2 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X7FF or 0xXXXX X800/0xXXXX XFFF.
*3 Start address: 0xXXXX XX00, End address: 0xXXXX XXFF.
*4 For RL78 (Protocol B), specify the all areas.
*5 Do not specify a data flash area for products that do not have one.

- An error occurs when an address outside the memory range of the target microcomputer is described.
- Specify the start and end addresses in blocks.

3.7 [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].

3.7.1 Compatible varieties

- MCU type listed in Table 3.7
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.7 Group [Erase] Command Specifications

MCU type name	Erase		All Erase
	Specified Block	Continuous Blocks Specification	
37:RL78(Protocol A)	Yes	Yes	Yes*1
43:RL78(Protocol C)	Yes	Yes	Yes*1

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

3.7.2 Erase All Areas (All Erase)

- Format: e

  Example:
  e

- The data flash is not included. Please erase using the Specified blocks erase or continuous block specification erase.

3.7.3 Erase Specified Block (Erasing only one block)

- e,[Target block first address] Specified Block Erase

  Example:
  e,0000 Erase only the block whose first address is 0000h

3.7.4 Erase Continuous Blocks Specification (Erasing multiple consecutive blocks)

- e, [first address], [end address] Erase multiple consecutive blocks

  Example:
  e,2000,7FFF Erase 2000h–7FFFh blocks

3.7.5 Precautions

- An error occurs when security is enabled (block erase is disabled).
- If you enter an address other than an erasable block, an error will occur.
- For RL78 (Protocol B), the erase command cannot be executed alone. Use the program command (reference section 3.9). (The entire area is erased before writing.)

3.8 [Signature] command

This command checks the model name of the target microcomputer.
This can be set in the GUI's [Quick Creation] Security tab (Figure 2.3) under [Signature].

3.8.1 Compatible varieties

- MCU type listed in Table 3.8
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.8 Signature command types by MCU type

MCU type name
37 : RL78(Protocol A)
43 : RL78(Protocol C)

3.8.2 format

- g,[MCU model name (up to 10 characters)]*1 ;You can also use a capital G for g.

Example:

```
g,R5F100LE          ;Confirm that the MCU model name is R5F100LExx.
g,R5F               ;Confirm that the MCU model name is R5Fxxxxxxx.
g                   ;The model name of the MCU connected to the EFP-LC2 is recorded in the log file.
```

*1 If the MCU model name is not specified (only g), only the microcomputer model name will be referenced.

3.8.3 detail

- Check that the model name of the target microcomputer matches the parameter contents.
- The parameter can be set to 1 to 10 characters, and only the set characters will be compared.

3.8.4 Usage example

- If the parameters do not match, an error will occur, preventing accidental writing to a microcomputer from a different series.

3.9 [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].

3.9.1 Compatible varieties

- All Supported MCUs

3.9.2 format

- p,[filename]*1,[Start Address]*2,[End Address]*3

Example:

```
p,SAMPLE. Hxw,0000,FFFF
```

*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

Table 3.9 Access Units by Group

MCU type name	Unit [Byte]	
	Code Flash	Data Flash
37:RL78(Protocol A)	1KB*1	1KB*1,5
41:RL78(Protocol B)	All areas*4	All areas*4,5
43:RL78(Protocol C)	2KB*2	256Byte*3

*1 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X3FF or 0xXXXX X400/0xXXXX X7FF or 0xXXXX X800/0xXXXX XBFF or 0xXXXX XC00/0xXXXX XFFF.
*2 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X7FF or 0xXXXX X800/0xXXXX XFFF.
*3 Start address: 0xXXXX XX00, End address: 0xXXXX XXFF.
*4 For RL78 (Protocol B), specify the all areas.
*5 Do not specify a data flash area for products that do not have one.

3.9.3 detail

- An error occurs when an address outside the memory range of the target microcomputer is described.
- If you write something other than Hxw/MOT/HEX in the file extension, you will get an error.
- The start and end addresses must be specified in blocks.(For RL78 (Protocol B), specify the all areas.)
- 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.
- RL78 (Protocol B) uses the erase and program command, which erases the all areas before writing.
- An error occurs in the following cases:
  - Writing to areas that are not blank(Excluding RL78 (Protocol B))
  - When write protection is set using the security setting command

3.10 [Verify] command

Compares the resources of the specified range of the target microcomputer with the contents of the specified program file downloaded into the EFP-LC2. This can be set in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) under [Verify].

3.10.1 Compatible varieties

- MCU type listed in Table 3.10
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.10 Verify command types by MCU type

MCU type name
37 : RL78(Protocol A)
43 : RL78(Protocol C)

3.10.2 format

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

Example:
v,SAMPLE. Hxw,0000,FFFF
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

Table 3.11 Access Units by Group

MCU type name	Unit [Byte]	
	Code Flash	Data Flash
37:RL78(Protocol A)	1KB*1	1KB*1,5
41:RL78(Protocol B)	All areas*4	All areas*4,5
43:RL78(Protocol C)	2KB*2	256Byte*3

*1 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X3FF or 0xXXXX X400/0xXXXX X7FF or 0xXXXX X800/0xXXXX XBFF or 0xXXXX XC00/0xXXXX XFFF.
*2 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X7FF or 0xXXXX X800/0xXXXX XFFF.
*3 Start address: 0xXXXX XX00, End address: 0xXXXX XXFF.
*4 For RL78 (Protocol B), specify the all areas.
*5 Do not specify a data flash area for products that do not have one.

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 Hxw/MOT/HEX in the file extension, you will get an error.
- The start and end addresses must be specified in blocks.
- If you enter an address other than the address range of the created Hxw/MOT/HEX file, an error will occur.

3.11 [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].

3.11.1 Compatible varieties

- All Supported MCUs

3.11.2 format

- h,[start address],[end address],[Checksum value][*1]

Example::

h,0000,FFFF,12AB — Compare whether the checksum from 0000h to FFFFh is 0x12AB.

*1 [Checksum value] — Data (2 bytes) subtracted sequentially from the initial value 0x0000 in 1-byte units or, CRC sum value of the entire area (RL78 (Protocol B) only)

Table 3.12 Access Units by Group

MCU type name	Unit [Byte]	
	Code Flash	Data Flash
37:RL78(Protocol A)	1KB[*1]	1KB[*1,5]
41:RL78(Protocol B)	All areas[*4]	All areas[*4,5]
43:RL78(Protocol C)	2KB[*2]	256Byte[*3]

*1 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X3FF or 0xXXXX X400/0xXXXX X7FF or 0xXXXX X800/0xXXXX XBFF or 0xXXXX XC00/0xXXXX XFFF.
*2 Please specify the start/end addresses as a combination of 0xXXXX X000/0xXXXX X7FF or 0xXXXX X800/0xXXXX XFFF.
*3 Start address: 0xXXXX XX00, End address: 0xXXXX XXFF.
*4 For RL78 (Protocol B), specify the all areas.
*5 Do not specify a data flash area for products that do not have one.

3.11.3 detail

- The checksum value is word-sized data obtained by sequentially subtracting the data in the specified address range in 1-byte units from the initial value 0x0000. (For RL78 (Protocol B), it is the CRC sum value for the all areas.)
- An error occurs when an address outside the memory range of the target microcomputer is described.
- The start and end addresses must be specified in blocks.(For RL78 (Protocol B), specify the all areas.)

3.12 [Security settings] Commands

Use the [Security Settings] command to set security settings for the target microcomputer. Also, use the [Security Release] command to release security.
You can set this in the GUI's [Quick Creation] Security tab (Figure 2.3) [Security settings].

3.12.1 Compatible varieties

- MCU type listed in Table 3.13
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.13 Security setting command types by MCU type

MCU type name	detail
37 : RL78(Protocol A)	See 3.12.2.1
43 : RL78(Protocol C)	See 3.12.2.2

3.12.2 [Security settings] Command

This sets the target microcomputer to disable write operations, block erase operations, boot cluster 0 rewrite operations, and flash shield window (FSW), etc.
A command is created when [Security settings] is ON on the [Quick Creation] Security tab (Figure 2.3) of the GUI.

3.12.2.1 format(RL78(Protocol A))

- I, [boot block number], [FSW start block number], [FSW end block number], [protection details (hexadecimal)]
  ; Both uppercase and lowercase letters are allowed.

  Example::
  I,3,0,0,4 ;Setting 0000h to 03ffh as the FSW area. Write operations by the programmer are prohibited.
  (For the boot block number, specify the last block number of boot cluster 0.
  For the last block number of boot cluster 0, refer to the MCU hardware manual.)

- Details of the protection are as follows (see also Table 3.14).
  bit2 = Write protection setting ;0 = programmable, 1 = no program
  bit1 = Block erase protection setting ;0 = erasable, 1 = no erase
  bit0 = Boot cluster 0 Rewrite protection setting ;0 = rewritable , 1= no rewrite

Table 3.14 Status after security settings

Protection details	Write protection setting	Block erase Protection setting	Boot cluster 0 Rewrite Protection setting
0	programmable	erasable	rewritable
1	programmable	erasable	no rewrite
2	programmable	no erase	rewritable
3	programmable	no erase	no rewrite
4	no program	erasable	rewritable
5	no program	erasable	no rewrite
6	no program	no erase	rewritable
7	no program	no erase	no rewrite

3.12.2.2 format(RL78(Protocol C))

- I2, [security type] *1, [Start block number or protection details (hexadecimal)], [end block number], [Protection details (hexadecimal) or read-protected block rewrite enable/disable]
  ; Both uppercase and lowercase letters are allowed.
  *1 The meaning of subsequent arguments to the I2 command varies depending on the [security type].
  0: Flash shield window setting/verification, 1: Security setting/verification, 2: Read prohibition block setting

Table 3.15 Security setting command format for RL78 (Protocol C)

<table>
<tr><th>Security type</th><th>command format</th></tr>
<tr><td>0: Flash shield window setting/verification</td><td>I2,0,[Start block number],[end block number],[Protection details (hexadecimal)]

・Protection details
bit1=FSPR: Setting to prohibit changes to the flash shield window (FSW) settings
0:Allow changes to the FSW setting area
1:Prohibit changes to the FSW setting area

bit0=FSWC: Specify the range of the flash shield area
0:Rewriting is permitted within the range where the FSW is set, and is prohibited elsewhere.
1:Rewriting is prohibited within the range where the FSW is set, and is permitted elsewhere.</td></tr>
<tr><td>1: Security setting/verification</td><td>I2,1,[Protection details (hexadecimal)]

・Protection details
bit4=IFPR: Programmer/on-chip debugger connection prohibited
0: Connection enabled
1: Connection disabled
(Please note that if you disable the connection, you will not be able to connect to the EFP-LC2.)

bit3=IDEN: Programmer connection ID authentication
0: ID authentication is disabled.
1: ID authentication is enabled.
(Please note that once ID authentication is enabled, it cannot be disabled.)

bit2=WRPR: Write-prohibited
0: Writing is enabled.
1: Writing is disabled.

bit1=SEPR: Block erase prohibited
0: Block erasure is enabled.
1: Block erasure is disabled.

bit0=BTPR: Boot cluster 0 rewrite prohibited
0: Rewriting of the Boot cluster 0 is enabled.
1: Rewriting of the Boot cluster 0 is disabled.</td></tr>
<tr><td>2: Read prohibition block setting</td><td>I2,2,[Start block number],[end block number],[read-protected block rewrite enable/disable]

・read-protected block rewrite enable/disable details
0= Rewrite enabled
1= Rewrite disabled</td></tr>
</table>

Example::

```
I2,0,08,0F,2;Set 4000h - 7FFFh as the flash shield window and disable rewriting within the range.
I2,1,08                ;Enable programmer connection ID authentication.
I2,2,20,2f,1 ;Changing of the 10000h - 17FFFh read protection block setting is disabled.
```

3.12.2.3 Precautions

- If you disable block erasure or boot cluster 0 rewrite using the I/I2 command, you cannot enable it again. After executing the command, you will no longer be able to erase blocks on the target microcomputer or erase or write to boot cluster 0.

We recommend that you run this command using a separate PBT dedicated to security settings after checking the operation of the target board.

3.12.3 [Security verify] Command

By adding ",V" to the end of the security setting command, you can check the security status set on the target microcomputer. (Note: L2,2 (read prohibition block setting) is excluded.)

3.12.3.1 format

- I, [boot block number], [FSW start block number], [FSW end block number], [protection details (hexadecimal)],v ;(RL78(Protocol A)
- I2, [security type:0/1 only], [Start block number or protection details (hexadecimal)], [end block number], [Protection details (hexadecimal)],v ;(RL78(Protocol C))

; Both uppercase and lowercase letters are allowed.

Example::

I,3,0,0,2,v	;Check whether erasure is prohibited. (RL78(Protocol A))
I2,0,08,0f,2,v	; 4000h-7FFFh is set in the flash shield window, and a comparison is made to see if the range is set to write protected. (RL78(Protocol C))
I2,1,08,v	; It will be confirmed that the programmer connection ID authentication is enabled. (RL78(Protocol C))

Details:

The parameters in the command are compared with the security status set in the target microcomputer.

Precautions:

If the parameters do not all match, an error will occur.

3.13 [Security release] Commands

A command to initialize the security settings on the target microcomputer.
You can set this in the GUI's [Quick Creation] Basic settings tab (Figure 2.1) [Security release].

3.13.1 Compatible varieties

- MCU type listed in Table 3.16
  (Note: An error will occur if this command is executed with an MCU type other than the supported models.)

Table 3.16 List of MCU types that support security release commands

MCU type name
37 : RL78(Protocol A)
43 : RL78(Protocol C)

3.13.1.1 format

- d ;You can also use a capital D for d.

Example:

d	;Initializes the write protection and FSW that have been set.
d=0	;An error occurs (arguments cannot be used).
d=	;An error will occur. (Same as above)

3.13.1.2 details

- Executing the security release command initializes the write protection and flash shield window (FSW) that have been set.
- If Boot Cluster 0 is write-protected or erase-protected, an error occurs. (Boot Cluster 0 write-protection and erase-protection cannot be disabled.)
- If the code flash area and data flash area is not blank, an error will occur.
- If the Programmer Connection ID Authentication is set to Enabled, no error occurs, but you cannot change the Programmer Connection ID Authentication from Enabled back to Disabled.
- If the extra option is set to "rewrite prohibited," no error occurs, but you cannot change the extra option from "rewrite prohibited" back to "rewrite permitted."
- For RL78 (Protocol C), read-prohibited blocks are also initialized.

3.14 [Option] Commands

Set the settings for the extra area in the [Option] command.
You can set this in the GUI's [Quick Creation] Options tab (Figure 2.4).

3.14.1 Compatible varieties

- RL78/G2x series (can be used with RL78 (Protocol C) compatible devices)

3.14.2 Extra options

Sets the extra option functions.
Create a command in the Extra Options section of the GUI's [Quick Creation] Options tab (Figure 2.4).

3.14.2.1 format

- o,e,[Extra options data]*1,[Extra options: Rewrite disabled/enabled]*2
  ; Both uppercase and lowercase letters are allowed.

  Example:
  o,e,0123456789ABCDEF0123456789,1 ;Write 0x0123456789ABCDEF0123456789 to the extra area.

  *1 [Extra options data] (13Byte fixed) ;If the input value is not 13 bytes, an error will occur.
  *2 [Extra options: Rewrite prohibition/permission] ;0: Extra option rewrite enabled,
  ;1: Extra option rewrite disabled
  (Note: Please note that once you set it to rewrite-disabled, you cannot change it back to rewrite-enabled.)

3.14.2.2 details

- If you want to rewrite extra option data, you must do so after executing the security release command.

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.)

<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	2025/08	First edition.
Rev.1.01	2025/09	Corrected the description of each execution command due to the start of support for RL78 (Protocol B).