EFP-RC2 Supplementary manual
(For RX66T）

Suisei Electronics System CO.LTD.,
1st Edition issue Apr. 2020

1. General Description

This supplement contains information required for reading, writing and erasing data to/from Renesas Electronics RX66T series MCU with built-in flash memory.

2. Operating Environment and List of supporting MCU

2.1 Operating Environment

Use the MCU mentions in this supplement in an environment as follows.

Table2.1 Operating environment

MCU series name	EFP-RC2 Version
RX66T series	Ver.2.00.04 or later
If your S/W version of EFP-RC2 is old one, download the latest version data from the website below. < EFP-RC2 latest S/W free download site > http://www.suisei.co.jp/download_e/productdata_efprc2_e.html	

2.2 List of supporting MCU

Show correspondence MCU table in Table2.2 The program to the RX family in EFP-RC2 needs the setting of the MCU type.

Please set MCU type by MCU set command of the script command.

Please refer to MCU set command of the EFP-RC2 instruction manual for the details of the **MCU set command**.

Table2.2 List of supporting MCU

Set value of the MCU type	Correspondence MCU series name
38 : RX (Little endian) 39 : RX (Big endian)	RX66T

3 Connect EFP-RC2 with target system

Please connect EFP-RC2 and the connection with the user target system using EF1TGCB-X(tip wire press cable) or EF1TGCB-B(4 wire type target connection cable) to show it in Fig3.1.

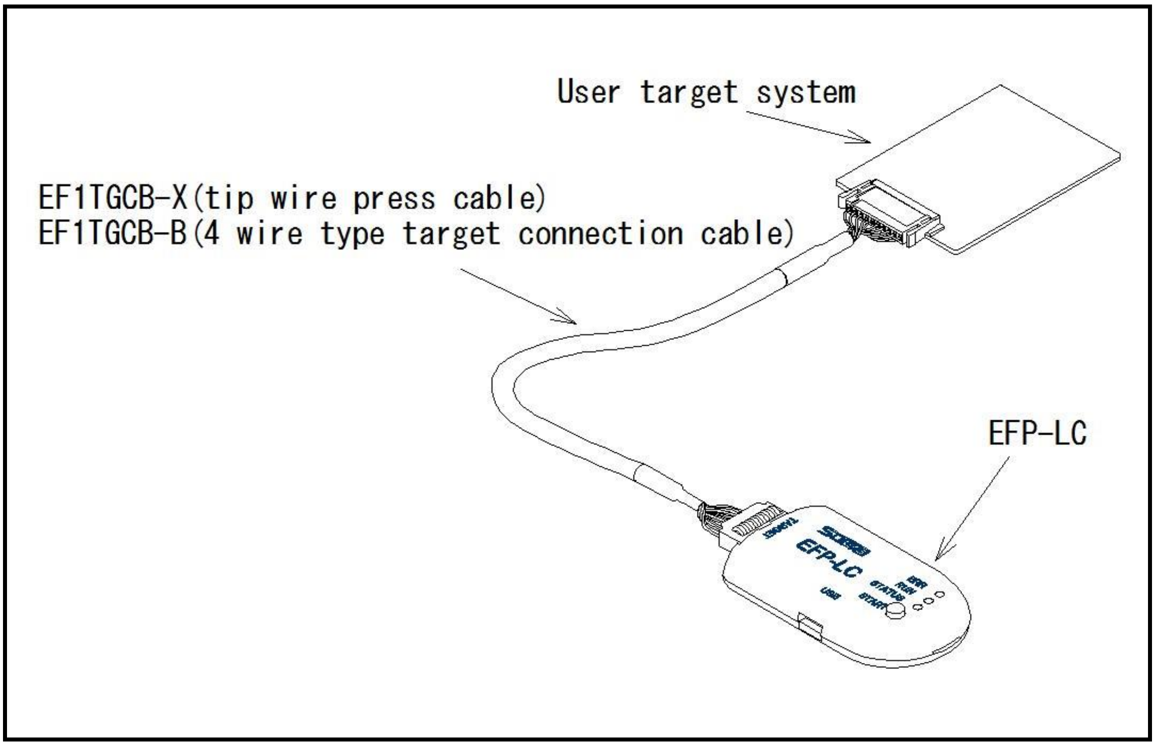

User target system
EF1TGCB-X(tip wire press cable)
EF1TGCB-B(4 wire type target connection cable)
EFP-LC
TARGET
EFP-LC
ERR
RUN
STATUS
START
USB

Fig3.1 Connection with target system

4 Pin Connection

Table4.1 lists the connection of target connection cable pin of the RX66T series.

Table4.1 Connection of the Target Connection Cable Pin (RX66T series)

Pin No. (EFP-RC2 side)	Target End Wire Color	Signal	4-wire Cable Pin No.	MCU Connection Pin For Serial Input/Output	Input/Output (writer side)
1	Orange/red dotted1	GND	1	Connects to VSS pin *3	—
3	Gray/red dotted1	T_VPP	4	Unconnected	Open
4	Gray/black dotted1	T_VDD	5	Connects to VCC pin *1	Input
8	White/black dotted1	T_PGM/OE/MD	8	Unconnected *4	Output
9	Yellow/red dotted1	T_SCLK	6	Unconnected	Output
10	Yellow/black dotted1	T_TXD	7	Connects to RXD pin*5	Output
11	Pink/red dotted1	T_RXD	2	Connects to TXD pin*5	Input
12	Pink/black dotted1	T_BUSY	3	Unconnected *4	Input/Output
14	Orange/black dotted2	T_RESET	9	Connects to RESET pin *2	Output
16	Gray/black dotted2	GND	10	Connects to VSS pin *3	—

< Supplement of Pin Treatment >

*1 : Supply VCC from user side to match source voltage of output buffer used on EFP-RC2 side with user side source voltage (VCC).

*2 : Reset cancel is not carried out during using a writer. To execute user program, you should therefore unplug the target connection cable to the writer. As for RESET output at writer side, see Note 2 in the page 4.

*3 : The signal GND has 2 pins(No.1,16)of EFP-RC2 side connector. When connecting to the target board, you can connect with using only one pin, but connecting more than 2pins is recommended.

<Supplement for others >

*4: When the Handling of mode pins is not possible with a user target board, please be connected to the mode terminal of MCU.
T_PGM/OE/MD = “H” Output, T_BUSY = “L” Output

*5: Connect to the pins (boot mode SCI interface pins) described in the table of "I / O pins used in boot mode" in the MCU hardware manual.

5 User target recommendation circuit

5.1 User target recommendation circuit

A recommended sample of user target MCU peripheral circuit for RX66T is shown in Fig5.1.

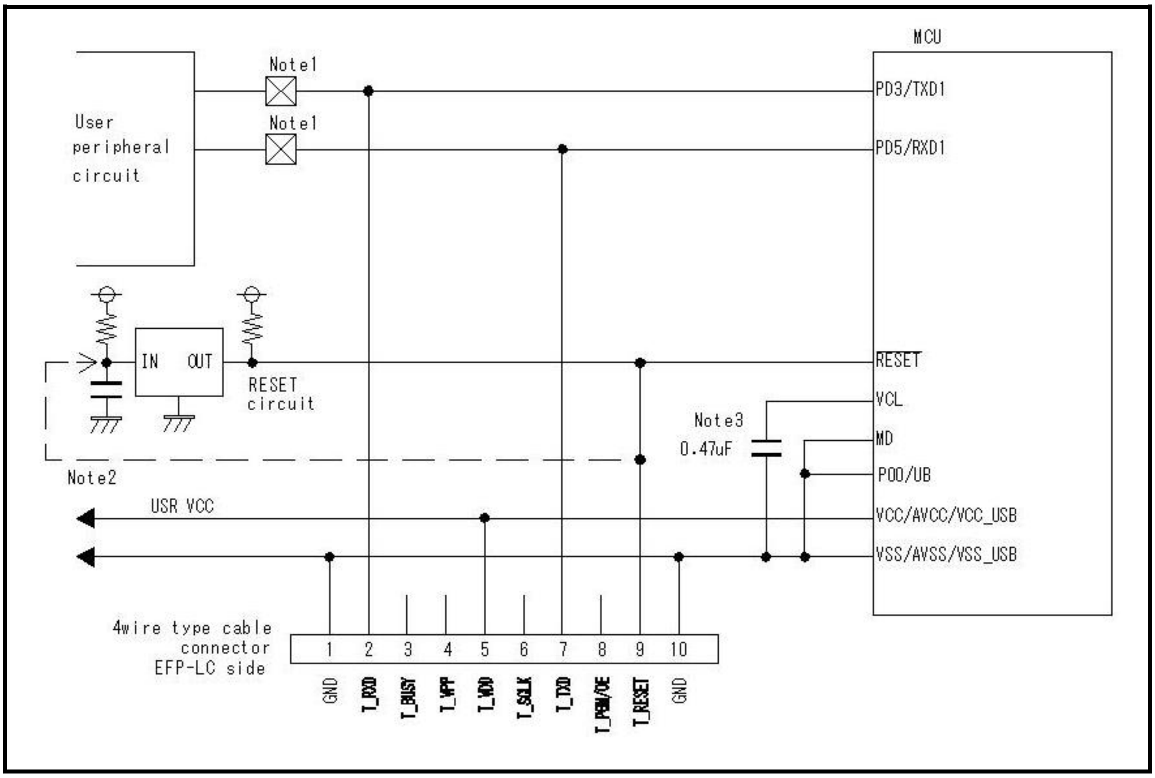


Fig5.1　User Target Peripheral Circuit Example（For RX66T）

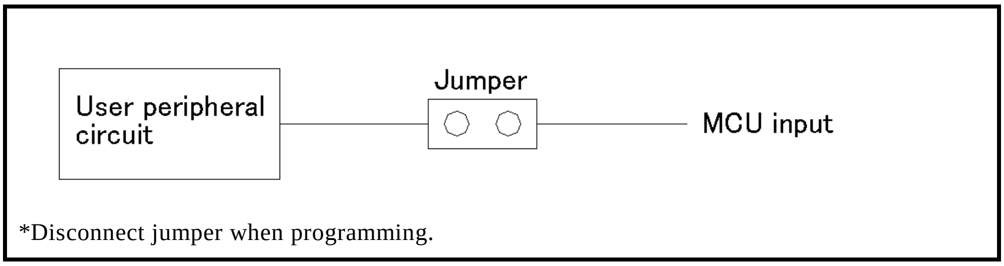
1: If the user peripheral circuit is an output circuit, you should disconnect by jumper to avoid output collision when executing serial I/O mode. (see Fig5.)

2: EFP-RC2 side reset output is an open collector therefore connect to the RESET pin with 1kΩ pull-up resistor for open collector output. If the reset circuit is CMOS output, disconnect by jumper as described in Notes 1, or connect the EFP-RC2 side T_RESET signal to reset circuit input.
By TXD from a writer, RXD and in combination in RESET signal output timing, a serial input and output mode entry is performed. Please become less than 500ns in the L → H output timing of TXD, RXD and the RESET signal.

3: Please connect the VCL terminal to GND through capacitor (0.47uF).

5.2 Collision prevention circuit example

An example of collision prevention circuit when user peripheral circuit outputs is shown Fig5..



*Disconnect jumper when programming.

Fig5.2 Collision Prevention Circuit Using Jumper

5.3 Handling of mode Pins

For the RX66T series, implement the terminal treatment of the mode terminal as shown in Table 5.1.

When the handling of the Mode pins is not possible on a user target board, connect the T_BUSY pin of EFP-RC2 to the mode pin of MCU.

Table5.1 Handling of mode pins

MCU series name	Mode pin name	Pin handling	pin handling in EFP-RC2
			Signal name（4-wire Cable Pin No.）
RX66T	MD	L	T_BUSY (3)
	P00	L	T_BUSY (3)

*: L connects with GND

6 List of available commands

Show a list of available commands in table6.1 in RX66T series.

Table6.1 List of available commands(RX66T series)

Command name	Description command	Summary	Page no.
MCU-set	T	Target MCU is set.	7
VDD Supply	X	It supplies VDD in target MCU	7
Baudrate set	S	Change transmission rate.	8
Mode entry	M	Carry out a mode entry to communication with RX family.	10
ID setting/verification	I	Setting and verification of ID code protection function	11
Erase	E	Flash ROM with built-in MCU, all areas are erased.	12
Blank check	B	Check that the MCU built-in ROM has been erased	13
Program	P	The content of the Hxw file is written with built-in MCU ROM.	14
Verify	V	The data with built-in MCU ROM is collated with the content of the Hxw file.	15
Read	R	Reads data from MCU internal ROM to EFP-RC2	15
Check sum	H	confirm a checksum value of the MCU built-in ROM.	16
Lock bit	K	The lock bit with built-in MCU ROM is set in the lock.	16
Option	O	Option protect setting	17
Wait	W	The script operation is stopped temporarily.	20

7 Command descriptions for RX66T series

Explain the command for dedicated of the RX66T series.

7.1 MCU set command

Command by which target MCU is specified

Format : t=x
t=xx ; x disregard the effective following from the head to 2 digits.

XX: 38 and 39 are effective. The first two digits are valid and the rest are ignored.

38: RX (little endian)
39: RX (big endian)

Description example :

T = 38; Specify RX little endian as the target MCU

Detail:

Target MCU according to compatible products is designated.
Please describe this command on the top of PBT file.

7.2 VDD supply command

Format : x=1

Description example :

x=1 ; Vdd is supplied to MCU

Detail:

1. VDD(+5V) is supplied to target MCU and access including data read, verification, writing in, etc. is enabled.
2. In case power is not supplied to target MCU and VDD supply command is not included in script, an error occurs.

Note:

: Only + 5V can output VDD from EFP-RC2.
If the power supply voltage exceeds the absolute maximum rating of the MCU, the MCU may be damaged. Please use it after confirming enough.

: Current capacity that can be provided is up to about 300mA. Nonetheless in case incoming current of substrate is too much, an error occurs, and in the worst case EFP-RC2 itself is reset. In case this command is used, please do so, taking account of consumption current of target substrate.

: Please describe this command after MCU set command.

7.3 Baudrate set command

The command which changes the baud rate to access.

Format : N=xxx

xxx : (Valid until 1-256）

Description example :

N=4 ；500kBps is used for access with MCU.
N ；Error (no argument)

Detail:

RX family is in communication at 9600bps when accessing data read, verify, and writing.

You can shorten the processing time to change the baud rate to access. The value to be set, please refer to Table7.1-Table7.2.

Please description after the MCU set command (T command) This command is.

Note:

After setting, changing does MCU setting (T command) or works at the baud rate that set until cut the power supply of the main body of EFP-RC2.

Table7.1 Setting baud rate(1)

Setting	Baud rate	Setting	Baud rate	Setting	Baud rate	Setting	Baud rate
N=1	2000000	N=25	80000	N=49	40816	N=73	27397
N=2	1000000	N=26	76923	N=50	40000	N=74	27027
N=3	666666	N=27	74074	N=51	39215	N=75	26666
N=4	500000	N=28	71428	N=52	38461	N=76	26315
N=5	400000	N=29	68965	N=53	37735	N=77	25974
N=6	333333	N=30	66666	N=54	37037	N=78	25641
N=7	285714	N=31	64516	N=55	36363	N=79	25316
N=8	250000	N=32	62500	N=56	35714	N=80	25000
N=9	222222	N=33	60606	N=57	35087	N=81	24691
N=10	200000	N=34	58823	N=58	34482	N=82	24390
N=11	181818	N=35	57142	N=59	33898	N=83	24096
N=12	166666	N=36	55555	N=60	33333	N=84	23809
N=13	153846	N=37	54054	N=61	32786	N=85	23529
N=14	142857	N=38	52631	N=62	32258	N=86	23255
N=15	133333	N=39	51282	N=63	31746	N=87	22988
N=16	125000	N=40	50000	N=64	31250	N=88	22727
N=17	117647	N=41	48780	N=65	30769	N=89	22471
N=18	111111	N=42	47619	N=66	30303	N=90	22222
N=19	105263	N=43	46511	N=67	29850	N=91	21978
N=20	100000	N=44	45454	N=68	29411	N=92	21739
N=21	95238	N=45	44444	N=69	28985	N=93	21505
N=22	90909	N=46	43478	N=70	28571	N=94	21276
N=23	86956	N=47	42553	N=71	28169	N=95	21052
N=24	83333	N=48	41666	N=72	27777	N=96	20833

unit ［bps］

Table7.2 Setting baud rate(2)

Setting	Baud rate	Setting	Baud rate	Setting	Baud rate	Setting	Baud rate
N=97	20618	N=137	14598	N=177	11299	N=217	9216
N=98	20408	N=138	14492	N=178	11235	N=218	9174
N=99	20202	N=139	14388	N=179	11173	N=219	9132
N=100	20000	N=140	14285	N=180	11111	N=220	9090
N=101	19801	N=141	14184	N=181	11049	N=221	9049
N=102	19607	N=142	14084	N=182	10989	N=222	9009
N=103	19417	N=143	13986	N=183	10928	N=223	8968
N=104	19230	N=144	13888	N=184	10869	N=224	8928
N=105	19047	N=145	13793	N=185	10810	N=225	8888
N=106	18867	N=146	13698	N=186	10752	N=226	8849
N=107	18691	N=147	13605	N=187	10695	N=227	8810
N=108	18518	N=148	13513	N=188	10638	N=228	8771
N=109	18348	N=149	13422	N=189	10582	N=229	8733
N=110	18181	N=150	13333	N=190	10526	N=230	8695
N=111	18018	N=151	13245	N=191	10471	N=231	8658
N=112	17857	N=152	13157	N=192	10416	N=232	8620
N=113	17699	N=153	13071	N=193	10362	N=233	8583
N=114	17543	N=154	12987	N=194	10309	N=234	8547
N=115	17391	N=155	12903	N=195	10256	N=235	8510
N=116	17241	N=156	12820	N=196	10204	N=236	8474
N=117	17094	N=157	12738	N=197	10152	N=237	8438
N=118	16949	N=158	12658	N=198	10101	N=238	8403
N=119	16806	N=159	12578	N=199	10050	N=239	8368
N=120	16666	N=160	12500	N=200	10000	N=240	8333
N=121	16528	N=161	12422	N=201	9950	N=241	8298
N=122	16393	N=162	12345	N=202	9900	N=242	8264
N=123	16260	N=163	12269	N=203	9852	N=243	8230
N=124	16129	N=164	12195	N=204	9803	N=244	8196
N=125	16000	N=165	12121	N=205	9756	N=245	8163
N=126	15873	N=166	12048	N=206	9708	N=246	8130
N=127	15748	N=167	11976	N=207	9661	N=247	8097
N=128	15625	N=168	11904	N=208	9615	N=248	8064
N=129	15503	N=169	11834	N=209	9569	N=249	8032
N=130	15384	N=170	11764	N=210	9523	N=250	8000
N=131	15267	N=171	11695	N=211	9478	N=251	7968
N=132	15151	N=172	11627	N=212	9433	N=252	7936
N=133	15037	N=173	11560	N=213	9389	N=253	7905
N=134	14925	N=174	11494	N=214	9345	N=254	7874
N=135	14814	N=175	11428	N=215	9302	N=255	7843
N=136	14705	N=176	11363	N=216	9259	N=256	7812

unit ［bps］

7.4 Mode entry command

Execute a mode entry command and make each command feasible.
Record detailed MCU information in a log file.

Format : M,OCO[,MCU detailed information]

MCU detailed information : Blank: No log output, 1: Log output

Description example：

M,OCO : No log output of MCU detailed information
M,OCO,1 : MCU detailed information log is output

Detail:

Firstly it is necessary to execute a mode entry command to execute a command in RX66T series. Please fill in this command after baud rate setting command. (S command)

Table7.3 shows the MCU information that can be referenced by this command.
No.1-2 is always displayed when this command is executed.
No.3-10 is displayed only when the setting is valid.
No.11 is displayed when MCU detailed information is set to “1”.

Table7.3 MCU information

No.	Display location	What to display
1	DEVICE NAME	MCU series name
2	ROM INFORMATION	ROM area, ROM size
3	OFS DATA Enabled!!	OFS0 / OFS1 register setting
4	READ Protected.	Read protection enabled
5	PROGRAM Protected.	Program protect is enabled
6	BLOCK ERASE Protected.	Block erase protect is enabled
7	TM SETTING Enabled.	Arbitrary code when setting TM area
8	SERIAL CONNECT Protected!!	Serial programmer connection prohibition function is enabled
9	SERIAL AUTETICATION ID Enabled.	Boot mode ID authentication is enabled
10	OCD ID Enabled.	OCD ID is valid
11	ERASE BLOCK	Configuration of erase block

Note:

If boot mode ID authentication is set, MCU detailed information is output after the ID collation command.

7.5 ID setting / verification command

Setting and verification of ID code protection function

Format : I, [ID type], [ID code], [ID code format]

* ID type : 0:OCD (On-chip debugger) ID code
1: Boot mode ID authentication code

* ID code : User setting value of 16 bytes (If less than 16 bytes, add 0 at the end)

* ID code format : 0 ： input by ASCII codes, 1 ： input by HEX codes

Description example :

```
i,1,0102030400507080 90a0b0c0d0e0f00,1                ;Boot mode ID code, HEX input
i,0,SUISEI_DENSHI,0                                   ;OCD ID code, ASCII input
```

Detail :

(1) Setting of boot mode ID authentication code
Set the ID code required for EFP-RC2 connection to the MCU for which ID code is not set.

(2) Verification of boot mode ID authentication code
The MCU that has already set the ID code is compared with the ID authentication code.

(3) OCD ID code setting
Set the ID code required when connecting to an on-chip debugger (such as E1).

Either the OCD ID code or the boot mode ID authentication code can be set.
Write this command after the mode entry command (M command).

Note:

* It cannot be used if protection (read, program, block erase prohibited) has already been set.
If the boot ID authentication code is set, the protection setting cannot be used.

* To clear the set ID code, it is necessary to execute the configuration clear command. (refer P.18)

* When changing MCU with OCD ID code to boot mode ID authentication, execution of configuration clear command is not required.

* Use the ID code setting according to your application.

7.6 Erase command

Erasing MCU built-in ROM.

Format :
```
E,,[lock bit form]                                                ;all area erase
E,[Block End address],[Lock bit form]                             ;block erase
E,[Block Start address], [Block End address], [Lock bit form]     ;Erase of continuous block
```

* Block Start address : Start address of the block to erase.
* Block End address : End address of the block to erase.
* Lock bit form : 0 : effective, 1 : invalidity

Description example:
```
E,,1                              ;all area erase
E,FFFFFFFF,1                      ;One block erase
E,FFF80000,FFFFFFFF,1             ;Erase Consecutive Blocks
```

Detail:

All erase erases the user area and data area. The user boot area is not erased.

In one block erase, only the specified block can be erased.

When erasing multiple consecutive blocks, it is possible to batch erase multiple blocks in the specified range by specifying the start address and end address.

If the lock bit format is enabled, only unlocked blocks are erased. Locked blocks are not erased.

If lock bit format invalid is selected, it will be erased regardless of the lock / unlock status.

Note:

* A protection error will occur if block erasure prohibition of the protection function is enabled or in areas where TM (trusted memory) is set.

* If all erase is executed while TM is set, all areas except the TM setting area will be erased. No error occurs.

7.7 Blank check command

Format: B,[Start address],[End address]

* Start address : Start address of the area to be Blank check.
* End address : End address of the area to be Blank check.

Description example:

B,FFFFF000,FFFFFFFF

Detail:

Checks that the MCU built-in ROM within the specified range has been erased.

Note:

* In the RX66T series, execution units differ between the code flash area and data flash area. Specify the start address and end address as shown in the table below.

Table7.4　Start / End Address

Memory area	Execution unit [Byte]	Start address	End address
Code flash	256	xxxxxx00h	xxxxxxFFh
Data flash	16	xxxxxxx0h	xxxxxxxFh

* A blank error will occur if the area is set to TM (trusted memory).

7.8 Program command

The content of the Hxw file is written with built-in MCU ROM.

Format: P,[Hxw file name],[start address],[end address],[lock bit form]

* Hxw file name : Please specify the name of the Hxw files that have been downloaded to EFP-RC2.
* start address : Start address of the area to be written
* end address : End address of the area to be written
* lock bit form : 0 : lock bit effective, 1 : Lock bit invalidity

Description example:

```
P,SAMPLE.Hxw,FFFFF000,FFFFFFFF,1
```

Detail:

Write Hxw data from the start address to the end address in the MCU built-in ROM.
If the lock bit is enabled, an error occurs if there is a locked area.
If the lock bit is invalid, writing can be performed even if there is a locked area if the data has been erased.

Note:

* The maximum size of the Hxw file that can be stored in the EFP-RC2 is 2 MB, so when writing data of 2 MB or more, split the Hxw file and save it.

* An error will occur if an address outside the address range of the Hxw file is described in the start address and end address.

* In the RX66T series, the write execution unit differs between the code flash area and data flash area. Specify the start / end address according to the execution unit shown in Table7.4 of “7.7 Blank Check Command”

* When the end address of the MOT file is not xxxxxxFFh, in the case of the conversion from MOT in RC-Downloader to Hxw file, please set "Setting type" in "Manual" in an item of "Hxw data domain setting". Please convert top address into xxxxxx00h with an end address as xxxxxxFFh.
MOT file area that does not exist in the source file at this time, 0xFF is set as data.

* If the program prohibition of the protection function is enabled or if the area is set to TM (trusted memory), a protection error will occur.

* When writing to the configuration area (120000h – 1200FFh) of the option setting memory, use the O command (P.17)

7.9 Verify command

Format : V,[Hxw file name],[start address],[end address]

- * Hxw file name : Please specify the name of the Hxw files that have been downloaded to EFP-RC2.
- * start address : Start address of the area to be verify check
- * end address : End address of the area to be verify check

Description example:

```
V,LC-PBT.Hxw,FFFFF000,FFFFFFFF
```

Detail:

The contents of the MCU internal ROM in the specified range are compared with the contents of the Hxw file.

Note:

* Specify the start / end address according to the execution unit shown in Table7.4 of ”7.7 Blank Check Command”.

* If read protection of the protection function is enabled, a protection error will occur.

* Since "0" is read from the area set as TM (trusted memory), a verification error will occur if the collation data is not "0".

7.10 Read command

Format: R,[Hxw file name],[start address],[end address]

- * Hxw file name：Specify here the hxw file name, to be read in EFP-RC2.
- * start address：Start address of the area to be read.
- * end address：End address of the area to be read.

Description example:

```
R,read.Hxw,FFFF0000,FFFFFFFF
```

Detail:

Reads the data in the specified range of the MCU built-in ROM to the EFP-RC2 CF card.
If a file with the same name exists, it will be overwritten.

Note:

* Specify the start / end address according to the execution unit shown in Table7.4 of ”7.7 Blank Check Command”

* If read protection of the protection function is enabled, a protection error will occur.

* "0" is read from the area where TM (trusted memory) is set.

* If an erased data flash area is read, the read data will be undefined.

7.11 Check sum command

The command verify the check sum of MCU built-in ROM data.

Format: H,[Type of Flash],[ROM capacity],[check sum value]

* type of Flash : 1 : user area, 2 : data area, 3 : user boot area
* ROM capacity : Input by KB unit (64KB -> 64)
* check sum value : 4Byte (The long word data which added by a 1 byte unit (hexadecimal))

Description example:

```
H,1,256,1D4B59E6
```

Detail:

Check that the checksum value specified in the Pbt file matches the checksum value of the data in the MCU internal ROM.

Note:

* The checksum value is longword data obtained by adding all data in the ROM area in byte units.

* If there is an unwritten area in the data area, the data will be undefined.

7.12 Lock bit command

The lock bit at every the block with built-in MCU ROM can be set in the lock, and the thing to prevent the miss-erase and miss-writing.

Format : K,[Lock block end address] ;Set the lock bit of the specified one block.
K,[Lock block start address],[Lock block end address] ;Set lock bits for multiple blocks in specified range.

* Lock block end address : End address of block to set lock bit
* Lock block start address : Start address of block to set lock bit

Description example:

```
K,FFF8FFFF                  ; Lock one block from FFF88000h to FFF8FFFFh
K,FFF80000,FFFFFFFF         ; Lock the area from FFF80000h to FFFFFFFFh
```

Detail:

In the RX family, lock bit protection can be set for each block in the user area.
In the RX66T series, lock bits for multiple blocks can be set collectively by specifying the start / end address.

Note:

* To release the lock, the lock bit must be invalidated and erased.

* An error will occur if the corresponding block start / end address of the MCU is incorrectly described.

* If you lock the area set as TM (Trusted Memory), you will not be able to unlock it. Note that in this state, the configuration clear command cannot be used.

7.13 Optional command

Set / cancel the option function selection register, etc.

Format: o,[Command type],[Character string],[Data type]

* Command type : Specify optional command type
c: Configuration clear
o: Setting of option function selection registers (OFS0, OFS1)
p: Protection function setting (read, program, block erase prohibited)
s: Prohibit serial programmer connection
t: TM (trusted memory) area setting
r: ROM code setting / reference command

* Character string: Data by command
Set value of option function select register : Data is set in the order of OFS0 and OFS1
Protection function setting : Combined value of the following bits
BIT2 = 1 Read prohibited
BIT1 = 1 Program prohibited
BIT0 = 1 Block erase prohibited
TM setting confirmation code : 4-byte data set in TMINF register
ROM code setting / reference command :Behavior changes depending on the character
1 = MCU set to ROM code protect 1
2 = MCU set to ROM code protect 2
B = Check that ROM code protection is disabled
(B can be lowercase)

* Data type: 0:input by ASCII codes, 1:input by HEX codes

Description example:

o,c	; Execute configuration clear command
o,o,012345789ABCDEF,1	; Set 0123567h to the OFS0 register Set 89ABCDEFh to the OFS1 register
o,p,07	; Read, program, block erase prohibited
o,s	; Prohibit serial programmer connection
o,t,ABCD,0	; Set TM area in user area (blocks 8 and 9) Set 4142344h to the TMINF register
o,r,1	; Set MCU to ROM code protect 1 (Write 00000000h to ROM code protect register)
o,r,b	; Error occurs when ROM code protect register is 00000000h or 00000001h (No error occurs if ROM code protection is disabled)

Detail:

It is possible to set the OFS register, protection function, serial programmer connection, TM area, and ROM code protection. It can be canceled by executing the configuration clear command.　(Refer to P18)

Note:

* TM area setting and serial programmer connection prohibition become effective after the script ends.

* If the serial programmer connection prohibition is executed, access with the EFP-RC2 will not be possible and cannot be canceled. Therefore, be very careful when executing this command.

* The block erasure prohibition of the protection setting cannot be canceled by EFP-RC2. After executing the command,

the MCU data cannot be erased. Therefore, be very careful when executing the command.

* Protection settings cannot be set for MCUs that have boot mode ID authentication enabled.

* When data of 3 bytes or less is set in the TM setting confirmation code, the upper byte of the TMINF register is filled, and "00" is set in the empty lower byte.

* If an "O,R,B" command is executed for an MCU in ROM code protect1 status, an error will occur.
Error code = 5C01 is recorded on the generated log file.
(In the case of ROM code protect2 status, error code = 5C02 is recorded.)

Configuration clear

Clears the protection function, ID code, endian, OFS, and ROM code protection.
The configuration cannot be cleared unless all ROM data has been erased.

To execute the configuration clear, execute the command in the following procedure.
The configuration clear is executed after executing o,c.

<Reference script (Configuration clear procedure)>

Script format	Command description
; MCU type set	
T=38	38: Select RX (little endian)
; Baud rate setting	
N=1	Set communication baud rate to 2Mbps
; Mode entry	
M,oco	Works with on-chip oscillator, no log output
; ID verification	
i,1,0102030405060708090A0B0C0D0E0F00,1	Verification of boot ID authentication code (If the ID code is not set, the ID code will be set.)
; Erase all area	
e,FF7FFFFF,1	Clear user boot area
e,00100000,00107FFF,1	Clear data area
e,FFF80000,FFFFFFFF,1	Clear user area
; Configuration clear	
o,c	Execute configuration clear command

After executing the configuration clear command, the status is set as shown in Table 7.5

Table 7.5 State after executing the configuration clear command

data	Configuration
Block erase command prohibited	Invalid
Program command prohibited	Invalid
Read command prohibited	Invalid
ID authentication in serial programming mode	Invalid
Prohibit serial programmer connection	Invalid
ID code	All FFH
MDE	Little endian
OFS0, OFS1	All FFH
TM function	Invalid
ROM code protection	Invalid

Note:

* This command cannot be used when the lock bit is set.

* This command cannot be used when block erase is disabled.

7.14 Wait command

Command which stops temporarily while script is operating.

Format: W=xx

* xx : Specifies the number of seconds to pause (Valid until 0-99. Waiting for key input is 0.)

Description example:

W=7 ;The script execution is stopped during the 7 seconds.
W=0 ;The script execution is stopped until START button input

Detail:

The wait command can stop the script operation for 1 to 99 seconds or until there is a key input.
When the wait command is executed, MCU reset of the target substrate is released.
MCU can operate with the cable for writing connected.
The warning sound ((*pipipi*)) is generated once while stopping the key input waiting at each passage of five minutes.
In case of key entry waiting, after START button is pressed and it is unlocked, commands after Wait command can be continuously executed. This command can be used any number of times in one PBT file.

Use example:

It is possible to operate the software for simple debugging or demonstration without disconnecting the cable, for example, when performing write protection after the operation check.

Note:

* In the RX66T series, to reset and cancel boot ID authentication, it may be necessary to set boot ID authentication after a wait command.

* The normal on-board writer does not release the reset of the target MCU (the target board does not operate) for safety after the writing is completed. If reset is released after writing, MCU operation may be affected in the circuit to which the writing cable is connected. When performing an operation check, etc., turn off the power, remove the writing cable, etc., and then turn on the power to the target board.

* This command may cause a safety problem depending on the circuit configuration of the target board. Please consider this point carefully and use it at your own risk.

* We cannot take responsibility for any damage caused by use. Also, MCU operation at reset release is not guaranteed.

8 Reference script

The script for reference when writing and erasing the RX66T series is described below.
Refer to “7.Command descriptions for RX” for details of the script command.

<Reference script (ROM capacity: User area 512KB)>

Script format	Command description
; MCU type set	
T=38	38: Select RX (little endian)
; Baud rate setting	
N=1	Set communication baud rate to 2Mbps
; Mode entry	
M,oco	Works with on-chip oscillator, no log output
; ID verification	
i,1,0102030405060708090A0B0C0D0E0F00,1	Verification of boot ID authentication code
	(If the ID code is not set, the ID code will be set.)
; Erase all area	
e,,1	Erase user area and data area
e,FF7FFFFF,1	Erase user boot area
; Blank check	
b,FFF80000,FFFFFFFF	Blank check of user area
b,00100000,00107FFF	Blank check of data area
b,FF7F8000,FF7FFFFF	Blank check of user boot area
; program	
p,User_Prog.hxw,FFF80000,FFFFFFFF,1	Write program to user area
p,Data_Program.hxw,00100000,00107FFF,1	Write program to data area
p,Boot_Program.hxw,FF7F8000,FF7FFFFF,1	Write program to user boot area
; Verify check	
v,User_Prog.hxw,FFF80000,FFFFFFFF	Verify check with “User_Prog.hxw”
v,Data_Program.hxw,00100000,00107FFF	Verify check with "Data_Program.hxw"
v,Boot_Program.hxw,FF7F8000,FF7FFFFF	Verify check with "Boot_Program.hxw"

9 Trouble shooting

This section introduces some errors that occur in EFP-RC2 and how to deal with them.

Table9.1 List of errors

Error code	Cause and remedy
2001	[Start address error] (1) Is there a mistake in setting the start address? (2) Do the start addresses of PBT and Hxw match? Please set "Hxw data domain setting" to "Manual" and match the address of Hxw with script or match the address of script to Hxw file.
2002	[End address error] (1) Is there a mistake in setting the end address? (2) Do the end addresses of PBT and Hxw match? Please set "Hxw data domain setting" to "Manual" and match the address of Hxw with script or match the address of script to Hxw file.
41xx	[Device error] (1) Is the power supply voltage of the MCU used within the normal range? (2) Is there a mistake in terminal connection between MCU and EFP-RC2? (3) There is a possibility of contact failure of connector and IC socket. Please clean the connector and IC socket.
4184	[R8C communication timeout error] (1) For the R8C/Tiny MCU, the communication baud rate may not be correct. Please change the baud rate setting.
5000	[Program error] (1) Is there a mistake in terminal connection between MCU and EFP-RC2? (2) There is a possibility of contact failure of connector and IC socket. Please clean the connector and IC socket. (3) Is the data of the write target device erased?
5200	[Blank error] (1) Are you erasing the data before executing the blank command? If the lock bit is valid and erasing, please erase with the lock bit invalid.
8200	[ID mismatch error] (1) It does not match the written ID code. The ID codes do not match.

Supplementary information about the script error

The EFP-RC2 compare the addresses of Hxw file address and PBT file written in PBT file.
Script error will be raised if the following conditions are satisfied.

1. Start Address of the Hxw file <= Start Address of the Pbt file
2. End Address of the Pbt file <= End Address of the Hxw file

If an error occurs, such as program error or device error, recommend that you check the following steps.

1. MCU power supply voltage is within the normal range?
2. There are no problems in the wiring of the EFP-RC2 and MCU?
3. Poor contact has not occurred in the IC socket and connector?

With respect to poor contact, refer to "**10.2 About the poor contact**".

10 reference

10.1 Write time

Table10 shows the writing time of RX66T (512KB).

Measurement condition:

EFP-RC2 F / W	Ver. 2.00.04
External power supply voltage	5.0 [V]
Clock	on-chip oscillator clock (no external clock is used)
Communication baud rate	2,000,000 [bps]

The command was executed for the program ROM area (FFF80000h-FFFFFFFFh).

Executed command	Execution time (unit: [Sec])
Erase	2.41
program	5.14
Verify check	3.59

Table10　Write time measurement result

10.2 About the poor contact

If the connector or IC socket has poor contact, it needs to be cleaned. We recommend using a nanotech brush (Kita Manufacturing Co., Ltd.) for cleaning IC sockets.

Nanotech brushes can remove dirt and traces of solder transfer from contact pins, improving conductivity. Try it if you experience poor contact problems.

If you need a nanotech brush, please contact Kita Manufacturing (see the following site).

Nanotech brush (Kita Manufacturing Co., Ltd.)　　https://www.kita-mfg.com/english/product/nanotec/

Fig 10 shows a micrograph of an IC socket with poor contact. Conduction failure has occurred in the white part visible in the socket contact area.

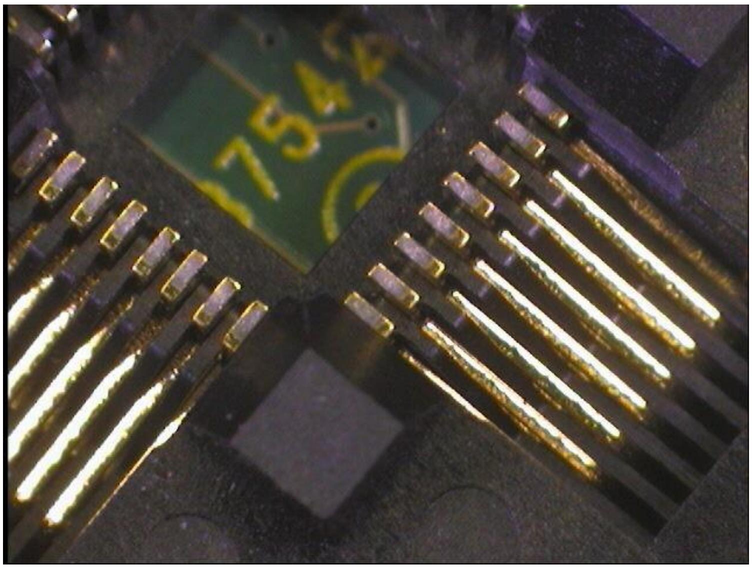


Fig 10　State where contact failure has occurred

Revision history

Revised version	date	Content
1st Edition	April 3, 2020	Create New