# Interfacing FlashRunner 2.0 with V850_B devices

This algo support two different protocols: `CSI3WHS` and `UART1`.
The algorithm support 2 different family: `UX6LF` & `RC30F`:
Regarding this algorithm, the most important difference between the 2 families `UX6LF` & `RC30F` are reported below:

- Different sclk entry (`UX6LF` → 100000, `RC30F` → 666000)
- `RC30F` has not a chip erase command, so the chip erase is performed with a loop or single block erase (`0x8000` bytes for Code, `0x20` bytes for eeprom)
- `UX6LF` family can program the eeprom with *Id_Tag bytes*, if the source file is created with *Id_Tag*. - see [ID_TAG][]
- The `RC30F` has not the *Id_Tag* support, so there is a different verify eeprom for this family performed with read operations.
- Only `RC30F` family perform an unprotect, indeed there is the securityrelease command (0xA2)

Additional Parameters List:

- `SIPU` (SI Pull Up Enable) – Enable/Disable SI software pull up - *Only for CSI3WHS Protocol*
- `SOPU` (SO Pull Up Enable) – Enable/Disable SO software pull up - *Only for CSI3WHS Protocol*
- `ID_TAG` (Eeprom ID_TAG feature) - Select YES if the source file has been produced with ID_TAG feature - see [ID_TAG][]

Below the *granularity* Manual Commands - *ALIGNMENT*:

| COMMAND | UX6LF | RC03F |
|---|---|---|
| BLOCKERASE | 0x8000 (32768 bytes) | 0x20 (32 bytes) |
| BLANKCHECK | 0x400 (1024 bytes) | 0x400 (1024 bytes) |
| | | |
| PROGRAM/VERIFY | 0x10 (16 bytes) Flash, | 0x400 (1024 bytes) Flash, |
| | 0x04 (4 bytes) EEprom | 0x02 (2 bytes) EEprom |
| | | |
| READ/DUMP | 0x10 (16 bytes) Flash | 0x10 (16 bytes) Flash, |
| | 0x04 (4 bytes) EEprom | 0x02 (2 bytes) EEprom |

## UNPROTECT command

The `UNPROTECT` command is avaliable only for `RC03F` family. Use it after the `MASSERASE` command in order to activate the Security programming.

## HCU Hexfile

The HCU Hexfile is a specific format for `.rec` files for *RL78, V850ES,E1 V850E2R, V850E2K* Renesas Families.


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Further informations on `HEX_Utility_HCU_SDM_for_EL_FP_Service_IDS-4903-03E_.pdf` provided by Renenesas after a support request.
The document reports the informations about `Option Data` definitions.
Starting from version `2.00` that format can be used directly, without changing addressing for Option Bytes and OCDID, indeed the memory maps are different: Offset has been removed and the new address is defined inside the HexFile

| MEMORY | BEFORE 2.00 | VERSION 2.00-HCU Hexfile |
|---|---|---|
| Option Bytes | 0xFF000000 | 0xF00028 |
| OCD | 0xFF100000 | 0xF00018 |

## ID_TAG

There is **only 1 flash_tech** that support the **EEprom ID_TAG** feature: `UX6LF`.
There are two different ways to program this memory type:

- `WITH_ID_TAG` by checking `ID_TAG` as optional parameter
- `WITHOUT_ID_TAG` by un-checking `ID_TAG`
- The `ID_TAG` value is related with the source file - it is a compiler option

See the table below to better understand what does `ID_TAG` do, with an example of *8byte* programming.

| FRB | ID_TAG YES | ID_TAG NO |
|---|---|---|
| 00010203 04050607 | | |
| | 00010203 04050607 | 00010203 FFFFFFFF 04050607 FFFFFFFF |

Basically, while programming with ID_TAG, the size is always double because there is a **FFFFFFFF** involved. See also Read operation.


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# Commands List

Memory types:
F → Flash
E → EEprom
O → Option Bytes
D → OCD ID

## MASSERASE

**MASSERASE** <F|E|C>

This function perform a Masserase for F, E or whole memory

## BLOCKERASE

**BLOCKERASE** <F|E> <start_addr> <size>

Single blockerase for F or E

## BLANKCHECK

**BLANKCHECK** <F|E> or BLANKCHECK <F|E> <start_addr> <size>

Blankcheck command for Flash or Eeprom - Auto or Manual mode allowed

## PROGRAM

**PROGRAM** <F|E|O|D> or PROGRAM <F|E> <start_addr> <size>

Program command for F, E, O or D - Auto or Manual mode allowed.

The O & D memory type can be only Auto.

## VERIFY

**VERIFY** <F|E|O|D> <R|S> or VERIFY <F|E> <R|S> <start_addr> <size>

Verify command for F, E, O, D - Auto or Manual mode allowed.

R – Normal verify with Read-Out method

S – Normal verify with Checksum method

## READ

**READ** <F|E> <start_addr> <size>

Read function for F, E – Address check

## DUMP

**DUMP** <F|E> or DUMP <F|E> <start_addr> <size>

Dump function for F, E – Address check



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## RUN

Run in User Mode command

## PROTECT

```
PROTECT <security_byte_0> <security_byte_1> <security_word_0>
<security_word_1>
```

This command protect only the F with 6 security bytes

## UNPROTECT

This command clears the flash option data. *Available only for* `RC03F` *family*

## GET_SIGNATURE

This command return the signature buffer (32bytes)

## GET_OB

This command return the Option Bytes (36bytes – `UX6LF` family, 4bytes – `RC03F` family)

## GET_OCDID

This command return the OCD_ID Bytes (12bytes – `UX6LF` & `RC03F` family)

## GET_SECURITY

This command return the security Bytes (6bytes – `UX6LF` & `RC03F` family)

## CONNECT

Connect function: Power on and entry

## DISCONNECT

Disconnect function: Power off and exit



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