

# Interfacing FlashRunner 2.0 with EM93 devices

## Supported Protocol

- **SPI:** max supported frequency: 10MHz. Aside from the standard SPI lines (Clock, MISO, MOSI and Chip Select), the protocol also requires the lines EN (Enable), RDY (driven by the device) and a 30KHz square wave (used for the initialization procedure). **Important:** The RDY pin is highly susceptible to disturbances. To reduce situations in which the FlashRunner2.0 incorrectly reads the value of the RDY pin, a pull-down resistor on the RDY line (~4.7KHz) is recommended.

## Supported Memories

- **NVM Main**
- **NVM Info page 2:** programmable (user data). Pages 0 and 1 are reserved/inaccessible.
- **NVM Info page 3:** read-only (EM data)

## Algorithm Commands

The letter after the command names specifies on which memory region the command is to be executed:

- F: NVM Main
- I: NVM Info page 2
- R: NVM Info page 3 (read only)

Many commands support the parameters <start\_addr> and <size>, that specify to execute the command, respectively, from which address and for how many addresses.

### CONNECT

Powers-on the device, enters programming mode and checks the connection.

### MASSERASE

**MASSERASE** <F|I>, or **MASSERASE** <F|I> <start\_addr> <size>

Erases (completely or partially) the selected memory

### BLANKCHECK

**BLANKCHECK** <F|I> or **BLANKCHECK** <F|I> <start\_addr> <size>

Checks that the selected memory is blank by reading back the selected memory.

**BLANKCHECK** <F|I> S, or **BLANKCHECK** <F|I> S <start\_addr> <size>

Checks that the selected memory is blank by comparing the expected CRC value, calculated on the selected memory, to the CRC calculated by the device. This command does not appear in the project creation wizard of the workbench.

## PROGRAM

**PROGRAM** <F|I>, or PROGRAM <F|I> <start\_addr> <size>

Programs the selected memory using the data loaded into the FRB file. Warning: for old ROM versions of some devices, the last word of NVM main and info page 2 cannot be programmed. These words are skipped during programming and verifying for devices with old ROM versions.

## VERIFY

**VERIFY** <F|I> R, or VERIFY <F|I> R <start\_addr> <size>

Verifies that the data written into the selected memory corresponds to the data of the FRB file.

**VERIFY** <F|I> S, or VERIFY <F|I> S <start\_addr> <size>

Verifies the content of the memory by comparing the expected CRC value, calculated on the selected memory, to the CRC calculated by the device.

## READ

**READ** <F|I|R>, or READ <F|I|R> <start\_addr> <size>

Reads the selected memory, printing it into the terminal.

## DUMP

**DUMP** <F|I|R>, or DUMP <F|I|R> <start\_addr> <size>

Reads the selected memory, dumping it into the dumping file.

## DISCONNECT

Powers-off the device.

## WRITE\_REGISTER

**WRITE\_REGISTER** <start\_addr> <value>

Program the selected address (register of a peripheral, RAM...) with the specified value.

## READ\_REGISTER

**READ\_REGISTER** <start\_addr>, or READ\_REGISTER <start\_addr> <size>

Reads the selected address (register of a peripheral, RAM...). It is possible to read more than one register at a time by using the parameter <size>.