

Parallel Programming

Enter Programming Mode

The following algorithm puts the device in Parallel Programming mode:

1. Apply 4.5 - 5.5 V between V_{CC} and GND, and wait for at least 100 μ s.
2. Set \overline{RESET} to "0", wait for at least 100 ns and toggle XTAL1 at least six times.
3. Set the Prog_enable pins listed in Table 85 on page 180 to "0000" and wait at least 100 ns.
4. Apply 11.5 - 12.5V to \overline{RESET} . Any activity on Prog_enable pins within 100 ns after +12V has been applied to \overline{RESET} , will cause the device to fail entering Programming mode.

Note, if External Crystal or External RC configuration is selected, it may not be possible to apply qualified XTAL1 pulses. In such cases, the following algorithm should be followed:

1. Set Prog_enable pins listed in Table 85 on page 180 to "0000".
2. Apply 4.5 - 5.5V between V_{CC} and GND simultaneously as 11.5 - 12.5V is applied to \overline{RESET} .
3. Wait 100 μ s.
4. Re-program the fuses to ensure that External Clock is selected as clock source (CKSEL3:0 = 0b0000) If Lock bits are programmed, a Chip Erase command must be executed before changing the fuses.
5. Exit Programming mode by power the device down or by bringing \overline{RESET} pin to 0b0.
6. Entering Programming mode with the original algorithm, as described above.

Considerations for Efficient Programming

The loaded command and address are retained in the device during programming. For efficient programming, the following should be considered.

- The command needs only be loaded once when writing or reading multiple memory locations.
- Skip writing the data value \$FF, that is the contents of the entire EEPROM (unless the EESAVE Fuse is programmed) and Flash after a Chip Erase.
- Address high byte needs only be loaded before programming or reading a new 256 word window in Flash or 256 byte EEPROM. This consideration also applies to Signature bytes reading.

Chip Erase

The Chip Erase will erase the Flash and EEPROM⁽¹⁾ memories plus Lock bits. The Lock bits are not reset until the program memory has been completely erased. The Fuse bits are not changed. A Chip Erase must be performed before the Flash or EEPROM are reprogrammed.

Note: 1. The EEPROM memory is preserved during Chip Erase if the EESAVE Fuse is programmed.

Load Command "Chip Erase"

1. Set XA1, XA0 to "10". This enables command loading.
2. Set BS1 to "0".
3. Set DATA to "1000 0000". This is the command for Chip Erase.
4. Give XTAL1 a positive pulse. This loads the command.
5. Give \overline{WR} a negative pulse. This starts the Chip Erase. RDY/ \overline{BSY} goes low.
6. Wait until RDY/ \overline{BSY} goes high before loading a new command.