

# Xytronic LF-1600 Open Source Firmware

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## Selecting the correct firmware hex image:

The hex subdirectory of this package contains various pre-built configurations of the firmware.

- There are hex images available for legacy (through-hole) boards and newer SMD boards.
- Images for controller types AtMega-88 (the original controller) or AtMega-328p (upgrade controller) are available.
- Images with or without debug support (debug vs. release) are available.

If you don't know which one pick, take either `hex/board_legacy/atmega88/release` OR `hex/board_smd/atmega88/release` depending on your board type.

## Installing the firmware:

1. Set the fuse bits of the AtMega88 to:

```
LFUSE = 0xE2
```

```
HFUSE = 0xDD
```

```
EFUSE = 0x01
```

Set the fuse bits of the AtMega328p to:

```
LFUSE = 0xE2
```

```
HFUSE = 0xD9
```

```
EFUSE = 0x05
```

Note that the original firmware uses different fuses. So this step must not be omitted.

If you use avrdude, a command similar to the following can be used:

```
avrdude -B 200 -p m88 -c avrisp2 -P usb -U lfuse:w:0xE2:m -U hfuse:w:0xDD:m -U efuse:w:0x01:m
```

OR

```
avrdude -B 200 -p m328p -c avrisp2 -P usb -U lfuse:w:0xE2:m -U hfuse:w:0xD9:m -U efuse:w:0x05:m
```

2. Flash the firmware image file `xytronic-lf.hex` to the program memory of the AtMega88.

If you use avrdude, a command similar to the following can be used:

```
avrdude -B 1 -p m88 -c avrisp2 -P usb -U flash:w:xytronic-lf.hex
```

OR

```
avrdude -B 1 -p m328p -c avrisp2 -P usb -U flash:w:xytronic-lf.hex
```

3. Write the EEPROM image file `xytronic-lf.eep.hex` to the EEPROM memory of the AtMega88.

If you use avrdude, a command similar to the following can be used:

```
avrdude -B 1 -p m88 -c avrisp2 -P usb -U eeprom:w:xytronic-lf.eep.hex
```

OR

```
avrdude -B 1 -p m328p -c avrisp2 -P usb -U eeprom:w:xytronic-lf.eep.hex
```