Cricut Expressions Hardware

From Cricut Hacking Wiki

The Cricut Expressions machine is a wider version of the basic Cricut.

Its components are mostly the same, except for an additional control knob for control of the cutter pressure.

```
It uses the same NEMA 17 motors used in the smaller unit.
```

The PCB is mostly the same, except for an additional connector on the right side (in this photo) that connects to the added encoder. As Cricuts have evolved, all versions now seem to use identical hardware. Even the newest"baby bug" uses a motherboard marked "Expression". It used to just be "Creates" that shared the expression motherboard.

I tried using an expression keyboard/power switch on one of the new expression/babybug boards and it wouldn't power up. It appears existing firmware will not allow this board to be used in an expression. I haven't tried a hard reset (pwrbtn/stopswitch). Bill D.

The following information probably applies to the Cricut Personal as well, but was collected from a Cricut Expression.

MicroController Information:

```
The Device Signature = 0x1e9704, The expected Device Signature 0x1e9702.
```

Analysis This may occur for multiple reasons, Atmel manufacturing sometimes changes the Device Signature for unknown/internal reasons. It's possible that it has an additional meaning for example a custom batch just for a specific customer or since the number of values has a sequence and a limit, it is more likely it's an Id used for Non-Retail Parts.

```
The 4096 bytes of EEPROM are protected and reads as 0xFF.
```

```
The 128 kB of FLASH is protected and can't be read at all.
```

The fuse settings

```
Low: 0xFF
Operates between 3 and 16 Mhz based on an External Crystal Oscillator
Start-up Time from Power-down and Power-save: 16k CK
Additional Delay from Reset: 65ms
```

Analysis: The Cricut Personal uses a 16 Mhz Crystal for the ATmega and the extra time is so that the power and the Crystal both reach a stable point before the main program executes.

```
High: 0xD8
SPI Enable: True
Boot Size: 4096 words
Boot Loader: Enabled
```


```
Extended: 0xFC
Watch Dog Timer: Always On
ATmega103 Compatibility Mode: Enabled
```

Analysis: Watchdog timer is enabled very standard for MicroControllers. Enabling the ATmega103 compatibiltiy mode is kind of interesting but the reason for it is unknown at this time.

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