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Atmega Fuse Repair Programmer User Guide

To use this device, simply insert your avr in the correct socket (see Table 1 below) and connect power. Within one second the programmer will restore the fuses to factory defaults. Either the green LED or the yellow LED will illuminate. A Green LED indicates success, A Yellow LED indicates failure. Failure can be caused by a number of reasons:

1. **You do not have the correct power supply. This is often the problem when the programming fails. Once power is connected, the red led will illuminate to indicate power has been applied. If it does not, you are not using the correct power supply. Please use a 13.5 - 16 Volt DC power supply with positive center on the plug. It is very important that you measure the output from your power supply using an accurate voltmeter! We are not responsible if you damage the programmer, or anything connected to it. Incorrect voltage or polarity may cause damage to you and/or the programmer!**

2. **You are not inserting the chip in the correct socket. Please see Table 1 below.**

3. **The device signature cannot be read. Is the device damaged? Is it inserted correctly?**

4. **The device is not supported. Please check the device list below. (Table 1) or enter terminal mode and disable signature verification. (read more below)**

5. **Do you have jumper J1 installed? If the lock bits have been programmed and J1 is installed, the programmer will fail. The device must be erased if the lock bits have been programmed. Please remove jumper J1 and power cycle the programmer, and try again. For more information see "Erase Bypass" below.**

   Please Remember: This device is not designed to circumvent LOCK BITS!

Erase Bypass

By installing jumper J1, the erase function will be skipped. This feature allows you to save the code while restoring the fuses. J1 must be installed before the device is powered on. If the lock bits have been programmed, programming will fail if J1 is installed. You must remove J1 in order to restore fuses to default values.

AGAIN, This programmer is not designed to circumvent LOCK BITS!

Mode 3 Advanced Mode

This mode works with a terminal on your PC. It allows reading and writing of the fuse bytes. Also included is a feature that disables signature verification, allowing the user to program fuses on avr devices that are not in the device list (Table 1).

WARNING: We are not responsible for damage caused by programming non standard fuse values. **KNOW WHAT YOU ARE DOING!**

**The fuse programmer supplies the MAX232 with 5 Volts.
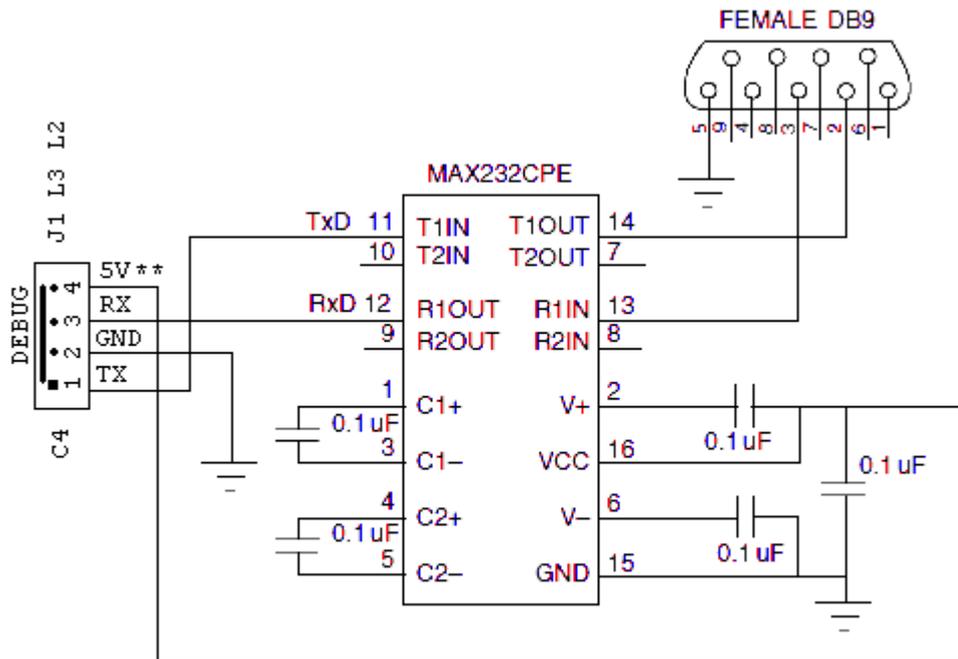
**The Fuse Programmer supplies the Max232 with 5V.

Fig 1. Connecting the Programmer to the Computer's Serial Port

When connected, the programmer will display fuse information or error messages to a terminal at 9600 baud.

Hyperterminal settings:
Baud Rate: 9600,
Data Bits: 8,
Stop Bits: 1,
Parity: None,
Flow Control: None,
Terminal Emulation: VT-100 (ANSI).

A low Cost Serial to TTL Converter can be found on our website here.

If you do not have a serial port on your PC, the programmer can be connected to one of our low cost USBtoTTL adapters found on our website here. See Table 2 below for connection details.

Atmega Fuse Repair Programmer Debug Ports	USBtoTTL Converter
1. RX	TXD
2. TX	RXD
3. -	GND
4. +	5V

Table 2. Connecting the Programmer to the Computer's USB Port using the USBtoTTL.
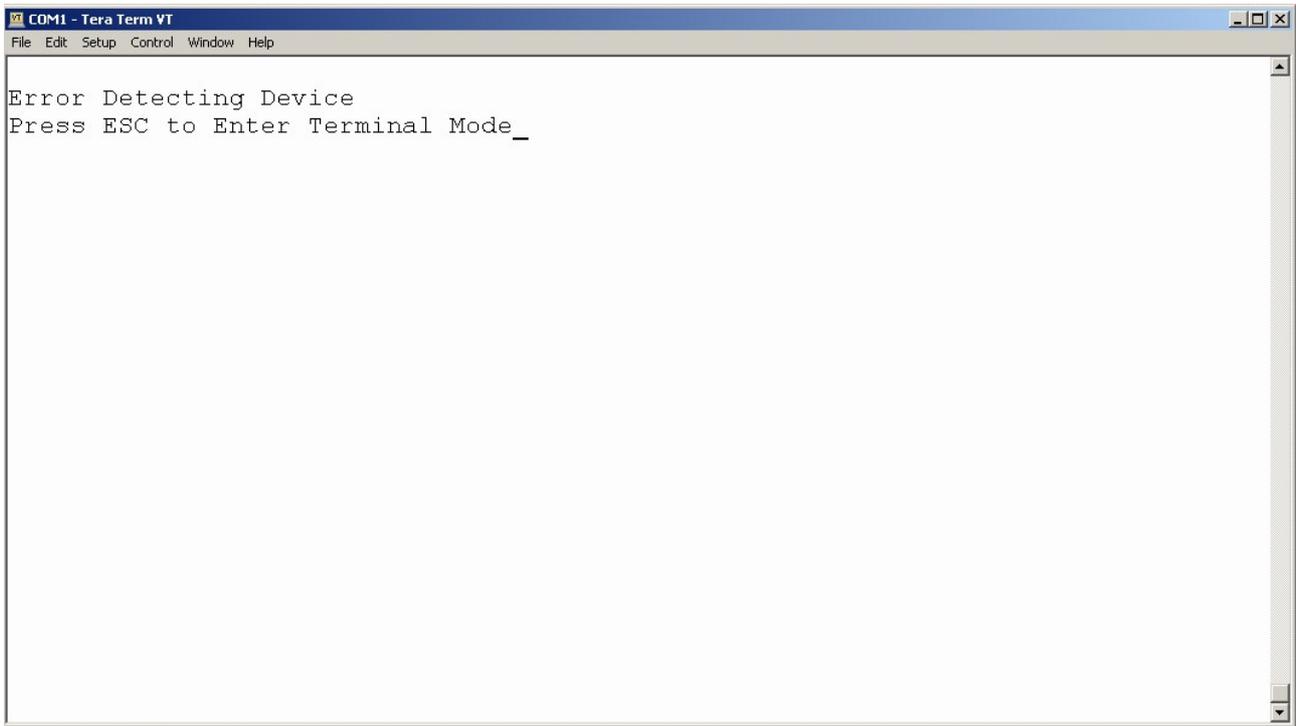
Supported Devices for Atmega Fuse Repair Programmer:
**** (All SMD pins must be wired directly to the socket)

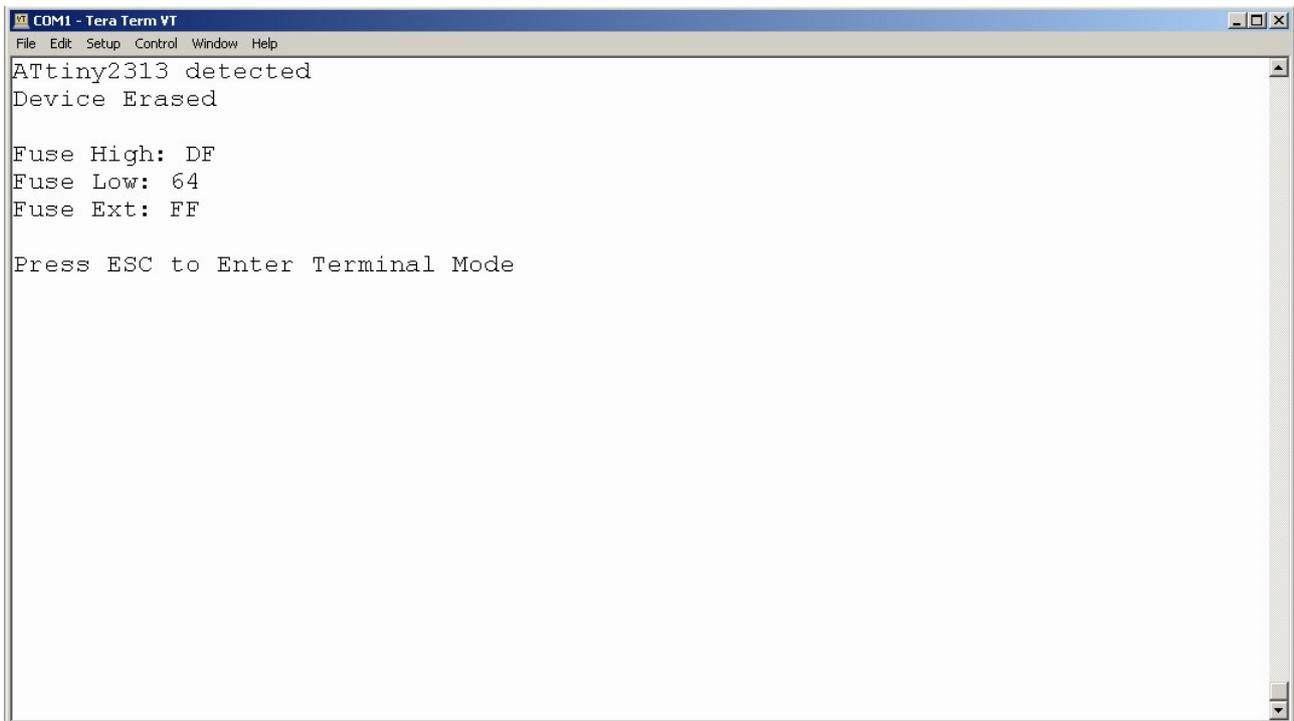| Socket #1	Socket #2	Socket #3	Socket #4	Socket #5
ATmega16	ATtiny2313	ATmega8515	ATmega8	ATtiny26
ATmega16L	ATtiny2313A	ATmega8515L	ATmega8A	ATtiny26L
ATmega32	ATtiny2313V	Atmega128**	ATmega8L	ATtiny261
ATmega32L	ATtiny4313	**	ATmega48	ATtiny261A
ATmega161	****The	ATmega162	ATmega48A	ATtiny261V
ATmega161L	following	ATmega162V	ATmega48V	ATtiny461
ATmega164	devices are		ATmega48P	ATtiny461A
ATmega164A	supported in		ATmega48PA	ATtiny461V
ATmega164P	auto mode,		ATmega48PV	ATtiny861
ATmega164V	however		ATmega88	ATtiny861A
ATmega164PV	they must		ATmega88A	ATtiny861V
ATmega164PA	be wired to any		ATmega88P	
ATmega324	socket.		ATmega88PA	
ATmega324A	ATtiny43U		ATmega88V	
ATmega324P	ATtiny87		ATmega88PV	
ATmega324PA	ATtiny88		ATmega164	
ATmega324V	ATtiny167		ATmega164A	
ATmega644			ATmega164P	
ATmega644A			ATmega164PA	
ATmega644P			ATmega168	
ATmega644V			ATmega168A	
ATmega644PA			ATmega168V	
ATmega644PV			ATmega168P	
ATmega8535			ATmega168PA	
ATmega8535L			ATmega168PV	
Atmega1284			ATmega328P	
ATmega1284P			ATmega328PV	

Table 1.

Using the Programmer

If the programmer is connected to the terminal, and it is powered up with no devices inserted, you will see a screen like this:

```
COM1 - Tera Term VT                                              _ □ ×
File  Edit  Setup  Control  Window  Help

Error Detecting Device
Press ESC to Enter Terminal Mode_




```

If a device was inserted, you will see this message:

```
ATtiny2313 detected
Device Erased

Fuse High: DF
Fuse Low: 64
Fuse Ext: FF

Press ESC to Enter Terminal Mode
```

Pressing ESC gets you into Terminal MODE or MODE3 (Advanced Mode). You will then see a screen like this:

```
Fuse Restore Programmer Version 4.0A
 (1) Read Fuses
 (2) Program Fuses
 (3) Factory Defaults
 (4) Disable Signature Verification
```

You now have Four Options:

1. Read Fuses. Have you ever been curious to know what the fuse values are when your device has been corrupted? Pressing "1" will show you the fuses. Then pressing any key will always return you back to the main menu.

2. Pressing "2" will allow you to program the fuses on any of the devices in the device list. If you would like to program any device NOT in the device list (Table 1 below), you must select "4" (Disable Signature Verification) before pressing "2", Program Fuses.
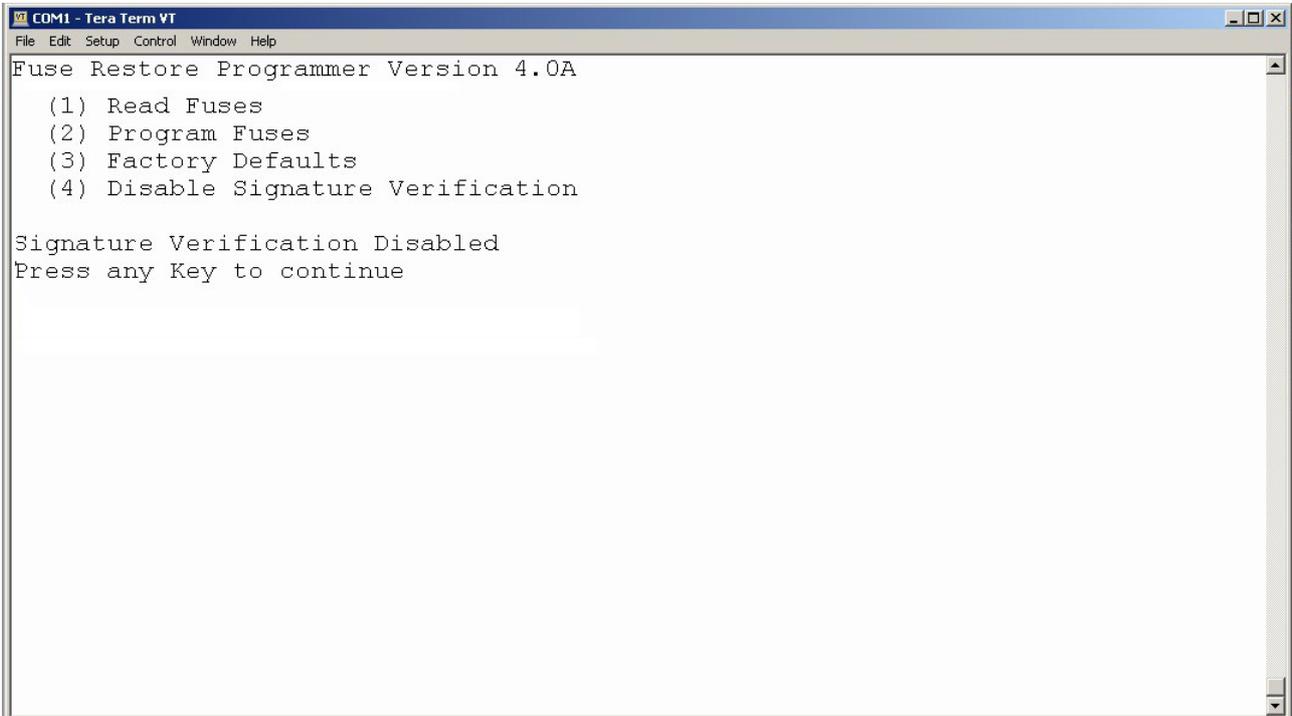
**AGAIN, PLEASE Be careful here! NON Standard fuse values may cause unknown results preventing your device from entering programming mode, even with this programmer!!
BE SURE YOU KNOW WHAT YOU ARE DOING!!**

**If signature verification is disabled (Selection "4") , the programmer does not know any information about the device it is trying to program. (i.e. The default fuse values, or whether or not the device has high, low or extended fuse bytes or all three).
When programming a device (i.e. a mature avr device such as the 90S series) you will be asked for all three fuse bytes. Even though the device has only one fuse byte, you must enter the same fuse byte for all three fuse bytes.**

For example, you want to restore the SPIEN fuse on a AT90S2313 and disable the FSTRT fuse at the same time, enter hex value DF (not case sensitive) for all three values (high fuse, low fuse, and extended Fuse bytes). The device will ignore the extra fuse bytes. After programming, the fuse repair programmer will read back three fuse bytes. This mode does not work for restoring factory defaults since the information is unknown as to what the default values are based on the device's signature.

The only way to Enable Signature Verification (if you disabled it) is to restart the programmer. (unplug power and reconnect) or select Factory Defaults by pressing "3". Signature verification is always enabled by default. When pressing "4" (Disable Signature Verification), you will see a screen like this:

```
Fuse Restore Programmer Version 4.0A

  (1)  Read Fuses
  (2)  Program Fuses
  (3)  Factory Defaults
  (4)  Disable Signature Verification

Signature Verification Disabled
Press any Key to continue
```

3. Factory Defaults selection "3".
Pressing "3" will restore the fuses to factory defaults, same as in standalone mode. If signature verification was disabled, it will be re-enabled by selecting factory defaults.

You can exit Advanced mode by powering off the programmer.

Any questions? Email us at: microcontrollerprog@yahoo.com