



Twin Tec

User Instructions for Mega Boot Programmer Software for TCFI and VRFI Fuel Injection Controllers

CAUTION: CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING. THE USER IS ASSUMED TO BE FAMILIAR WITH MICROSOFT WINDOWS AND PC OPERATION.

INTRODUCTION

The Mega Boot Programmer utility runs under Microsoft Windows XP/Vista/7/8. This utility allows reprogramming the application firmware contained on the Atmel ATmega RISC microcontroller used within all Twin Tec units. The ATmega microcontroller has a special self programming function using what is commonly referred to as a 'boot loader.' The boot loader is a permanent module of firmware code that allows updating the application firmware by means of the PC link interface.

This instruction sheet covers the Mega Boot Programmer utility used to reprogram application firmware within Twin Tec TCFI Gen 4-7 and VRFI Gen 3-4 fuel injection controllers. Older TCFI and VRFI units are no longer supported. **The term TCFI is used as a generic term to refer to these products throughout this instruction sheet.**

Using the software requires the Twin Tec USB Interface P/N 102004 for PC connectivity. The USB interface is compatible with Windows XP/Vista/7/8. The PC must have a free USB port. If you have an older PC without USB capability, you cannot use the software. For USB driver installation, COM port configuration, and module connections, please refer to the USB interface instructions.

PC REQUIREMENTS

We recommend a laptop with Pentium processor and super VGA display (SVGA with 1024 x 768 pixel resolution) running Windows XP/Vista/7/8. A high speed Pentium processor is not required, but processors slower than 300 MHz may exhibit sluggish program loading and response. The PC must have a CDROM drive for program loading and an available USB port.

SOFTWARE INSTALLATION

The software is supplied on CDROM media or in the form of a compressed file downloaded from our website. The installation process uses InstallShield. This industry standard installer is based the new

Microsoft Windows Installer service that greatly reduces potential problems such as version conflicts and allows for application self-repair.

Before proceeding with installation, shutdown any other applications that may be running. For Windows Vista, you must disable the User Account Control (UAC) during installation. If you are not familiar with the UAC, please refer to the Vista UAC Tech Note on our website's Tech FAQ for details.

Use the Windows Explorer or the Run command from the Windows Start Menu to launch setup.exe in the Mega_Boot_Pro folder on the CDROM or the setup.exe file downloaded from our website. InstallShield will install the software in an appropriate folder under Program Files.

Once InstallShield has completed the installation, Mega Boot Programmer will appear on the Windows Start Menu. You can then launch it just as you would any other Windows program.

RUNNING THE PROGRAM

Turn the ignition key and engine run/stop switches on to provide power to the ignition. Do not start the engine.

If the module has been removed from the motorcycle, you can do bench top programming by using an adapter harness that includes a small 12 volt DC power supply. Use adapter P/N 18007 for TCFI/VRFI Gen 3-4, P/N 18015 for TCFI Gen 5 and Gen 7 units, and P/N 18016 for TCFI Gen 6 units.

When launched for the first time, the program uses COM1 as the default port. In most cases, you will have configured the USB interface to use a different COM port, such as COM5. Use the Port Setup command on the Communications menu to select the correct COM port. The program will remember the new port setup. Turn the ignition key and engine run/stop switches on to provide power to the TCFI unit. Do not start the engine.

When the program is first loaded, Buffer Status, Device Selection, and Data Port Setup options appear. All operations are by means of a menu at the top of the

screen, similar to other Windows programs. The main menu selections are File, Program, Options, and Help. Some menu selections and check boxes that are not required outside a manufacturing environment are disabled (grayed out).

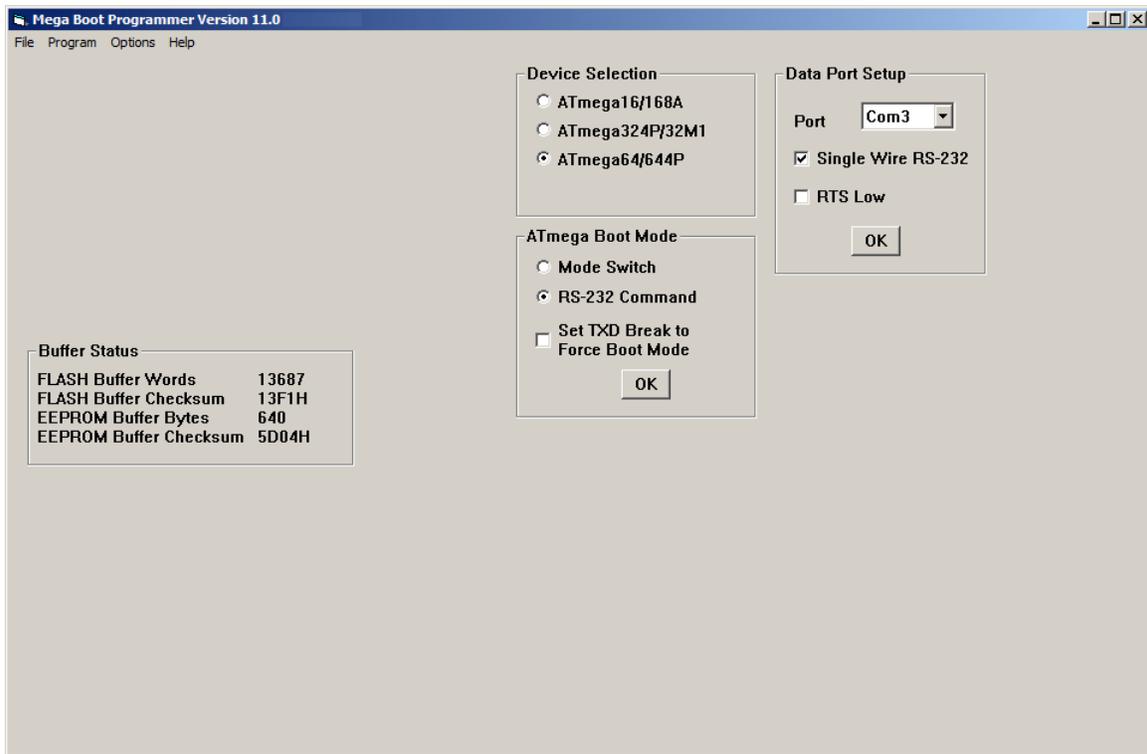
Device selection. Please note that TCFI Gen 6 and Gen 7 units have both a main processor and an auxiliary processor. The main processor in all TCFI and VRFI units is an Atmel ATmega64. Programming of the auxiliary processor including appropriate device selection is described in detail on page 4.

The File menu has selections for opening a FLASH (firmware) or EEPROM (parameter data) file, and exiting the program. Data is loaded from a file to a buffer (a temporary storage area maintained by the

utility). Separate buffers are maintained for FLASH and EEPROM. Once a buffer contains data, an on-screen status display shows the number of words (FLASH) or bytes (EEPROM) and a checksum. Mega Boot Programmer accepts standard Intel hex format FLASH (.hex) or EEPROM (.eep) files. Your firmware update will include a readme file that lists the file names for the required FLASH and EEPROM files along with the corresponding checksums.

The Program menu controls interactions with the target. Reprogramming is done by clicking on the Auto (Program FLASH and EEPROM) command. You can click on Read Firmware ID to verify that the module has the correct firmware revision. Additional commands that are not required for field reprogramming are grayed out.

Figure 1 - Mega Boot Programmer Setup for Main Processor in All Units



MAIN PROCESSOR PROGRAMMING SEQUENCE

Use this sequence for all TCFI Gen 3-5 units and for the main processor in TCFI Gen 6-7 units.

1. Before reprogramming firmware, you should use the PC Link software to download and save tables and module parameters. These will all return to default values when the unit is reprogrammed and any customization or air/fuel ratio learning will be lost. Any statistics data (i.e. engine run time) will also be lost.
2. Start Mega Boot Programmer. Select ATmega64 device. Open the firmware files, i.e. Open FLASH and EEPROM from File menu). The buffer status box should show file size and checksum values matching those listed in the update bulletin. At this point the Mega Boot programmer screen will appear as in Figure 1, except that the FLASH and EEPROM file size and checksum values will be based on your update and COM port selection will depend on your PC.
3. Make sure that the USB interface is connected.
4. Turn the ignition key and engine run/stop switches on to provide power to the TCFI/VRFI unit. Do not start the engine.
5. You can click on Read Firmware ID to verify that the module has the correct firmware revision.
6. Click on the Auto command from the Program menu. A progress bar is displayed during the programming process. Mega Boot Programmer automatically verifies the firmware after programming. A message box appears to announce that programming has been successful or that verification has failed.
7. Click on Read Firmware ID command from the Program menu. Verify that the firmware ID

matches that listed in the firmware update.

8. End Mega Boot Programmer by using Exit from the File menu.
9. Use PC Link software to restore any customized tables and module parameters.
10. Turn off the engine run/stop switch and ignition key. Disconnect the USB interface.

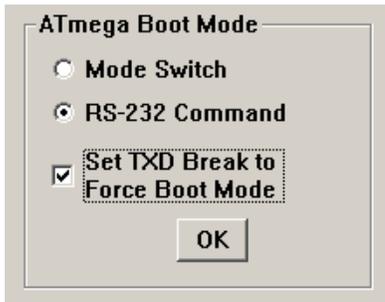
RECOVERING FROM LOST COMMUNICATIONS OR OTHER ERRORS

If the main processor in TCFI or VRFI modules become corrupted during PC Link or programming operations, recovery may be possible by reprogramming using a special procedure that forces the module into boot mode.

1. Disconnect the TCFI/VRFI module. **Do not reconnect the module until step 6.**
2. Start Mega Boot Programmer. Select ATmega64 device. Open the firmware files same as during normal programming operations. The buffer status box should show file size and checksum values matching those listed in the update bulletin.
3. Make sure that the USB interface is connected.
4. Turn the ignition key and engine run/stop switches on. Do not start the engine.
5. In the ATmega Boot Mode dialog box, click on Mode Switch and then on RS-232 Command. This will enable the Set TXD Break to Force Boot Mode option box. Click on this option box. The dialog box will now appear as shown in Figure 2. You do not need to click on OK (this merely hides the dialog box).
6. Reconnect the TCFI/VRFI module.

WARNING: If battery voltage drops below 11 volts, power loss occurs, or the programming operation is inadvertently interrupted (i.e. cable accidentally disconnected), the device may be rendered non-functional. Programming will take approximately 10 minutes for TCFI and VRFI units. When programming on a motorcycle, we suggest that you make sure the battery is fully charged. To minimize power drain, disconnect the headlamp fuse and WEGO. 2012 and later motorcycles with body control module (BCM) do not have a separate headlamp fuse. Disconnect the headlamp or use a battery charger.

Figure 2 – Forcing Boot Mode



7. Click on Set TXD Break to Force Boot Mode again to disable this option. The screen should now appear as shown in Figure 1 (same as during normal programming operations).
8. Click on the Auto command from the Program menu. A progress bar is displayed during the programming process. Mega Boot Programmer automatically verifies the firmware after programming. A message box appears to announce that programming has been successful or that verification has failed.
9. Click on Read Firmware ID command from the Program menu. Verify that the firmware ID matches that listed in the firmware update.
10. End Mega Boot Programmer by using Exit from the File menu.
11. Use PC Link software to restore any customized tables and module parameters.
12. Turn off the engine run/stop switch and ignition key. Disconnect the USB interface

If this reprogramming operation is not successful, the module is non-repairable and no further actions are possible.

TCFI GEN 6 AUXILIARY PROCESSOR PROGRAMMING SEQUENCE

1. Start Mega Boot Programmer. Select ATmega168A device. Open the firmware file, i.e. Open FLASH from File menu). Note that the auxiliary processor doesn't require EEPROM programming and no EEPROM file is supplied. The buffer status box should show file size and checksum values matching those listed in the update bulletin. At this point the Mega Boot

programmer screen will appear as in Figure 3, except that the FLASH file size and checksum values will be based on your update and COM port selection will depend on your PC).

2. Make sure that the USB interface is connected.
3. Turn the ignition key and engine run/stop switches on to provide power to the TCFI unit. Do not start the engine.
4. Click on the Enter Auxiliary Boot Load Mode command from the program menu. An acknowledgment message will be displayed.
5. You can click on Read Firmware ID to verify that the module has the correct firmware revision
6. Click on the Program Application FLASH command from the Program menu. A progress bar is displayed during the programming process. Mega Boot Programmer automatically verifies the firmware after programming. A message box appears to announce that programming has been successful or that verification has failed.
7. Click on Read Firmware ID command from the Program menu. Verify that the firmware ID matches that listed in the firmware update.
8. Turn off the engine run/stop switch and ignition key. Disconnect the USB interface.
9. End Mega Boot Programmer by using Exit from the File menu.

TCFI GEN 7 AUXILIARY PROCESSOR PROGRAMMING SEQUENCE

1. Start Mega Boot Programmer. Select ATmega32M1 device. Open the firmware file, i.e. Open FLASH from File menu). Note that the auxiliary processor doesn't require EEPROM programming and no EEPROM file is supplied. The buffer status box should show file size and checksum values matching those listed in the update bulletin. At this point the Mega Boot programmer screen will appear as in Figure 4, except that the FLASH file size and checksum values will be based on your update and COM port selection will depend on your PC).
2. Make sure that the USB interface is connected.

3. Turn the ignition key and engine run/stop switches on to provide power to the TCFI unit. Do not start the engine.
4. Click on the Enter Auxiliary Boot Load Mode command from the program menu. An acknowledgment message will be displayed.
5. You can click on Read Firmware ID to verify that the module has the correct firmware revision.
6. Click on the Program Application FLASH command from the Program menu. A progress bar is displayed during the programming process. Mega Boot Programmer automatically verifies the firmware after programming. A message box appears to announce that programming has been successful or that verification has failed.
7. Click on Read Firmware ID command from the Program menu. Verify that the firmware ID matches that listed in the firmware update.
8. Turn off the engine run/stop switch and ignition key. Disconnect the USB interface.
9. End Mega Boot Programmer by using Exit from the File menu.

Figure 3 - Mega Boot Programmer Setup for TCFI Gen 6 Auxiliary Processor

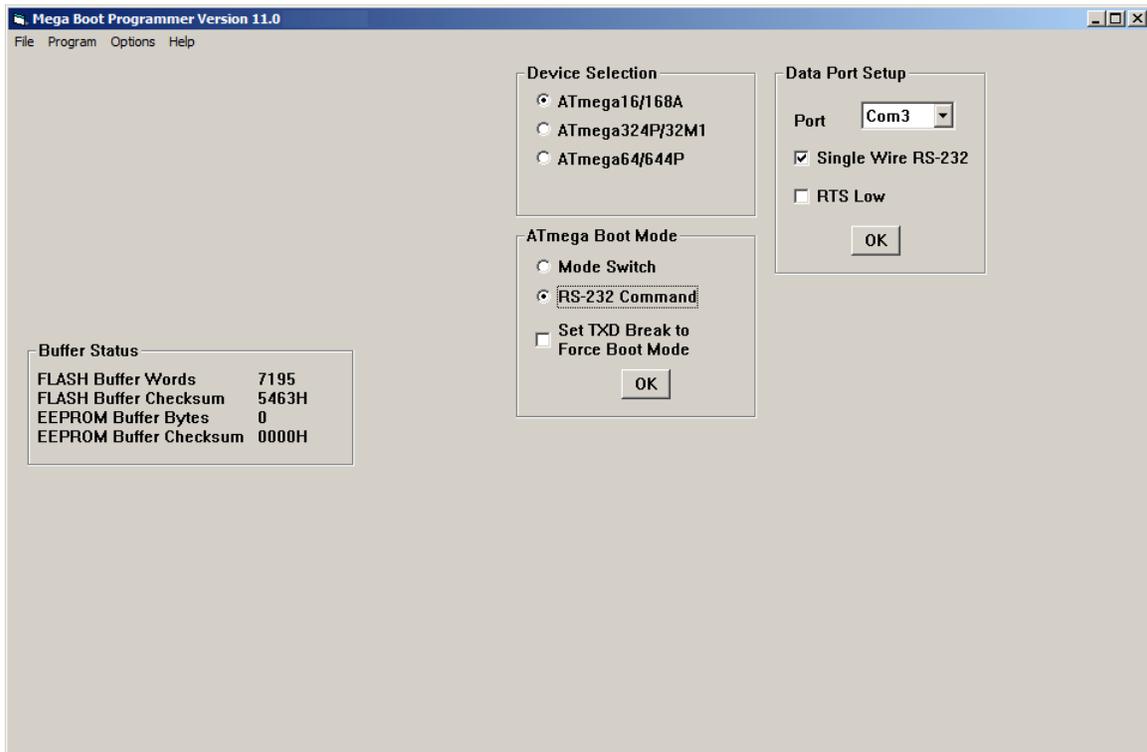


Figure 4 - Mega Boot Programmer Setup for TCFI Gen 7 Auxiliary Processor

