Firmware Update Guide

Your Kessler Engineering AT-AUTO$_{(tm)}$ features field upgradeable firmware that can be updated from anywhere you have a PC with an Internet connection and an RS-232 serial port. Follow these steps to upload your AT-AUTO$_{(tm)}$ with the latest firmware version or to revert back to a previous firmware version.

Note! The AT-AUTO$_{(tm)}$ has undergone a number of unpublished hardware changes, including variations in the inductor and capacitor. Beginning in approximately October, 2010, production switched to a shorter roller inductor and a slightly larger capacitor. As a result of these changes, the lookup table values for L and C had to be modified for proper operation. These tuners were shipped with version 2.11 firmware.

In order to support all hardware variants, whenever new versions of firmware are to made available there will be two variants – one for tuners with the shorter inductor and one for tuners with the longer inductor, and these variants shall be identified by appending "Short_L" or "Long_L" to the version name.

Figure 1.1 shows a side-by-side comparison of an AT-AUTO with the older long style inductor, and the newer short style inductor. The only difference in a particular variant of firmware such as **2.12_Long_L** and **2.12_Short_L** is the default L and C match tables. If the incorrect variant is loaded, the tuner will recall nominal settings that are significantly in error and might not be able to tune successfully, especially on 160-40m. If this occurs, merely reload the proper firmware variant appropriate to your particular AT-AUTO$_{(tm)}$. If your tuner was manufactured prior to approximately October, 2010, your tuner was built using the longer style roller inductor.

Normally, manufacturers log all such hardware variations and associate and track them by the product serial numbers. The particular tuner's serial number would then provide the definitive answer as to which firmware variant to use. However, the previously assigned serial numbers were generally done so at random and serial number records were not maintained.

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I apologize for the inconvenience, but the user should visually inspect their AT-AUTO to determine which firmware variant to use. Please refer to Figure 1.1 for a side-by-side comparison of the roller inductor lengths.
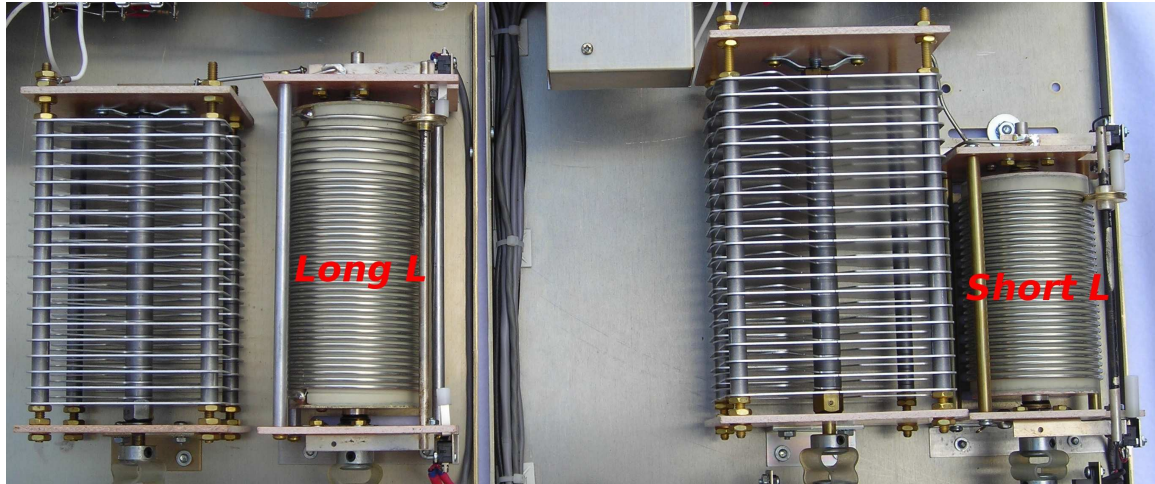

Figure 1.1: Long and Short Inductor Variants

Warning: The AT-AUTO$_{(tm)}$ microprocessor has been programmed with a firmware bootloader (either Version I or Version II). AT-AUTOs$_{(tm)}$ shipped prior to $\approx$ October 2009 were programmed with the Version I bootloader. After October, 2009, all AT-AUTOs$_{(tm)}$ were supplied with the Version II bootloader. While either bootloader is fully compatible with all versions of AT-AUTO firmware, etc., special precautions should be observed when uploading firmware if using the Version I bootloader.

If you have an AT-AUTO$_{(tm)}$ produced prior to $\approx$ October 2009 (Version I bootloader), the stepper motors should be unplugged from the AT-AUTO$_{(tm)}$ control board prior to initiating the upload process. Failure to do so may cause damage to the control board motor driver ICs.

The AT-AUTO$_{(tm)}$ microprocessor chip may be returned to Kessler Engineering for re-programming with the Version II bootloader to prevent this problem in the future. Once the microprocessor is reprogrammed with the Version II bootloader, the user need not disconnect the stepper motors when uploading AT-AUTO$_{(tm)}$ firmware. Contact Kessler Engineering for specifics.

1. Ensure AT-AUTO's$_{(tm)}$ internal hardware jumpers are configured correctly (See Table 1.1 on page 8).

2. **Completely disconnect the "Transceiver Data" and any CI-V connections at the rear of the AT-AUTO$_{(tm)}$!**

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3. Download "Kessler Engineering - Firmware Uploader" software from our website at: **http://www.Kessler EngineeringLLC.com**. The software is located in the "Downloads" section.

4. Unzip the software and place it in a folder on you PC desktop or hard drive.

5. Connect your AT-AUTO$_{(tm)}$ to your PC's RS-232 serial port with the Kessler Engineering-supplied "Firmware Upload Cable"

6. Turn *On* your Kessler Engineering AT-AUTO$_{(tm)}$.

7. Make sure your PC is connected to the Internet.

8. Locate the "Firmware Uploader" software and double click on the icon to start the software

9. The program will start and you should see the following screen:

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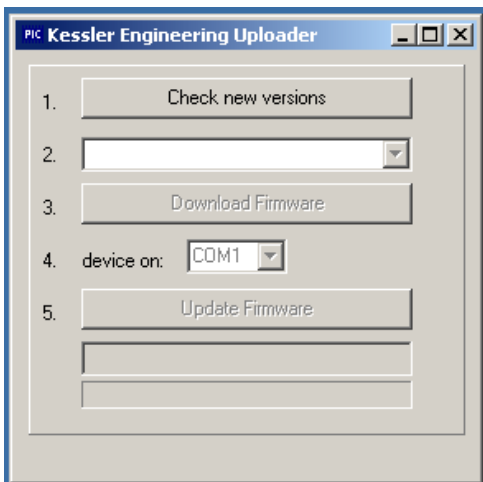
10. Click on the "Check new version" button to check availability of uploadable firmware for your AT-AUTO$_{(tm)}$. Afterward you should see something similar to the following screen indicating that firmware is available and for you to select the desired version:
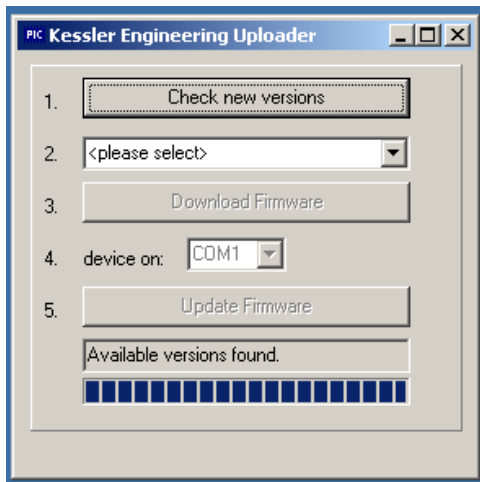

11. Click the arrow in the "<please select>" block and you will be presented with all a selection of available firmware versions:
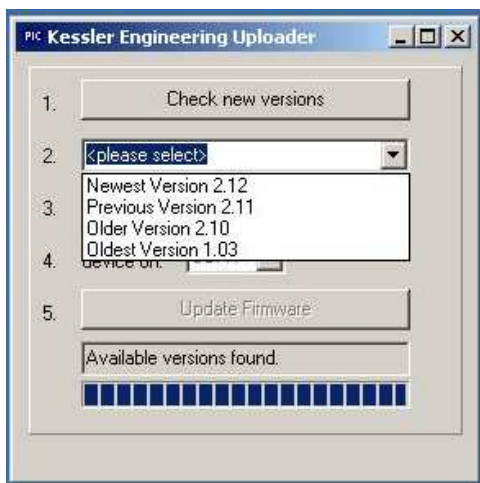

12. Click on the desired firmware version and you will then be prompted to download the selected firmware:

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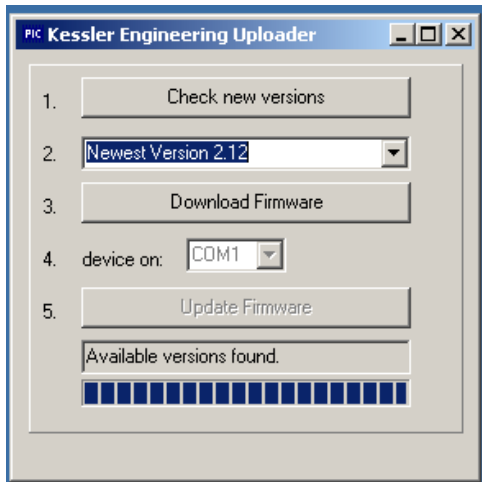
13. Click on the "Download firmware" tab. Once the firmware is downloaded, select the com port that the AT-AUTO$_{(tm)}$ is connected to:
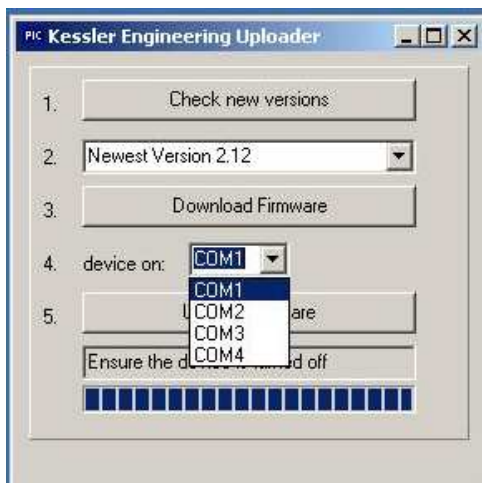
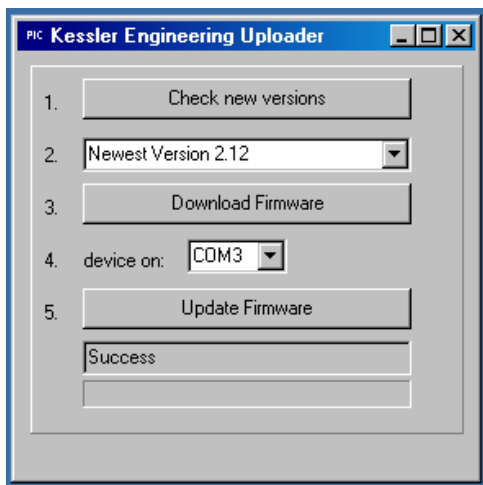14. Click on the "Update Firmware" and the bootloader will begin searching for the AT-AUTO$_{(tm)}$:

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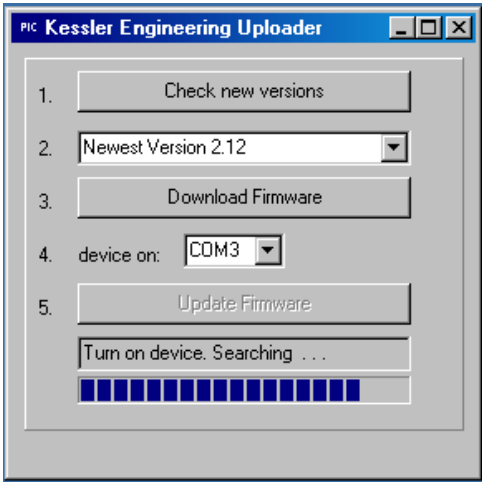
15. Firmware should soon start writing to the AT-AUTO$_{(tm)}$:

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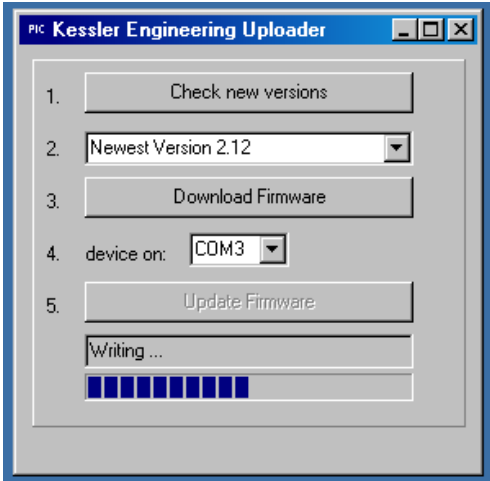
16. Once the process completes:

The AT-AUTO$_{(tm)}$ should automatically reset itself, re-home L and C, and then momentarily display the firmware version that is now installed.

17. Your firmware is now updated and you should exit the bootloader program.

Note: If the stepper motors were unplugged from the AT-AUTO$_{(tm)}$ control board prior to initiating the upload process, switch the AT-AUTO$_{(tm)}$ *Off*, reconnect the stepper motors, and then switch the AT-AUTO$_{(tm)}$ back *On* again, and let the homing process complete.

Hardware Requirements for Firmware Updating

The PC serial port is often labeled "COM1", "COM2", etc. Some newer computers no longer come with RS-232 serial ports included, but USB to RS-232 serial adapters are available. If your computer does not have a serial port, these adapters may be purchased relatively inexpensively from your local computer hardware supplier.

Note: The AT-AUTO$_{(tm)}$ firmware updating works best when directly connected to a genuine RS-232 serial port. Some of the USB to RS-232 converts have proven problematic and may be unsuitable for firmware updating. However, the quality of USB to RS-232 serial converters in general seems to have improved and you might not encounter problems.

The serial cable used for the firmware update must include the "RTS" (Request to Send) handshake line. The Kessler Engineering-supplied serial cable is intended for this purpose.
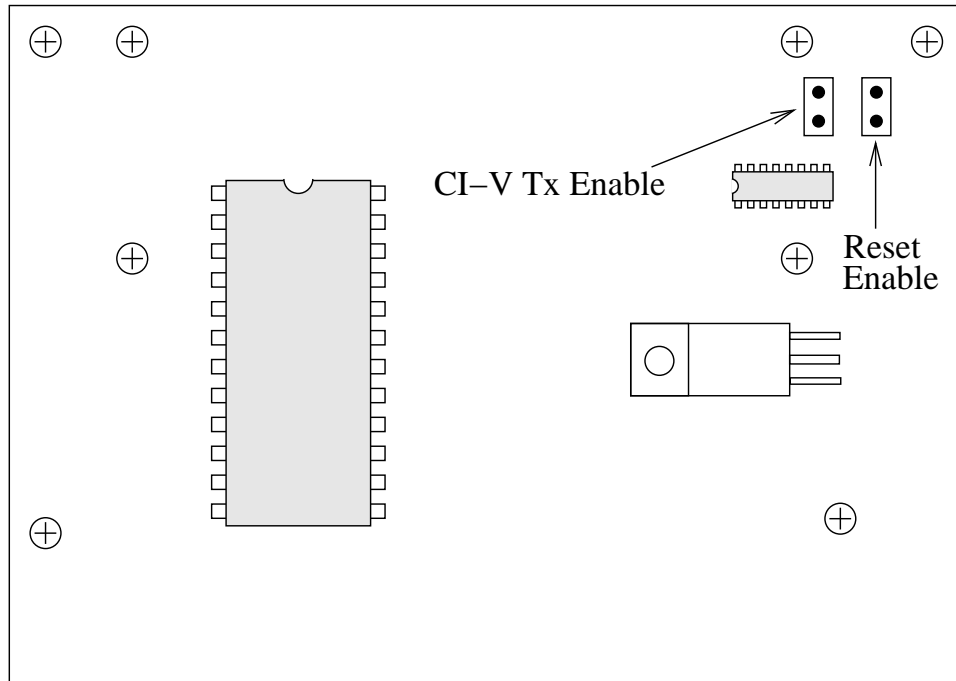
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Figure 1.2: Jumper Locations

Table 1.1: Jumper Settings

Operation	Reset Enable	CI-V Tx Enable
CI-V Transceive from Any Icom	Don't Care	Don't Care
CI-V Transceive from Specific Icom	Don't Care	Don't Care
Smart QSY with CI-V Transceive OFF	Open	Closed
Smart QSY via CAT*	Closed	Open
Smart QSY Via CAT**	Open	Open
Firmware Update	Closed	Open
Remote Control via CAT	Open	Open
Remote Control via CI-V	Open	Closed
Default	Closed	Open

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