TCF-S Firmware Upgrade

TCF-S / TCF-S3 Temperature Compensating Focusers

The TCF Temperature Compensating Focuser was introduced in 1999 with a patent awarded for the unique design and temperature compensation capability in 2000. Since then, the product line has expanded to include a 3-inch version TCF-S3 and integrated version TCF-Si and TCF-S3i focusers without the external hand control. This document applies only to the TCF-S and TCF-S3 focuser with an external Hand Controller box.

TCF-S Hand Controller

The original TCF-S focusers included an external hand controller with red digital read-out (DRO) display, IN and OUT pushbuttons, a Program button and associated RUN/LEARN slide switch, and a 3-position slide switch for PC/MANUAL control and closed-loop AUTO A or AUTO B temperature compensation modes. Connections at the top of the hand controller box include a 12VDC power input (2.5x5.5mm) connector, 6-pin RJ12 connector for serial communications, and an 8-pin RJ45 socket for connection to the TCF-S focuser body. Stepper control voltages and return temperature data are passed along an 8-wire Control Cable through the RJ45 connector to the DB9 connector on the focuser motor housing.

Control Board Revisions

Several revisions of the TCF-S control board exist with Revision 5 (Rev 5) being the most recent. Refer to Appendix B in the TCF-S Technical Manual for diagrams showing the various board revision layouts. Many Rev 3 and Rev 4 boards exist in the field and can be used with the latest software and ASCOM drivers providing the firmware is brought up the latest version by following the instructions below. The current version 6 and higher software drivers REQUIRE the latest firmware. The TCF-S firmware can only be updated by replacing the internal PIC chip with the firmware pre-programmed onto the PIC chip.

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Current Firmware Versions

The current firmware version is displayed on the TCF-S controller DRO display when the hand controller is first powered up while the focuser is homing. The focuser need not actually be connected to view the current firmware version. Simply plug the controller in and turn the slide switch to ON.

As of December 2015, the latest firmware version for the TCF-S Rev 3 and Rev 4 controller boards is **V2.40**. The current version TCF-S firmware for Rev 5 boards is **V4.11**.

Contact Optec for the very latest firmware version or to purchase a replacement PIC chip Reference stock item #17565.

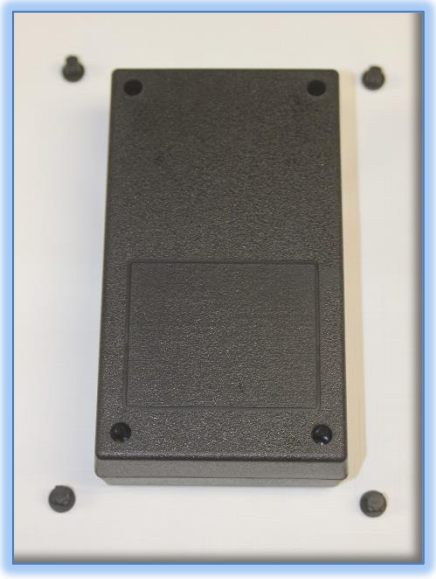
Instructions for Updating your TCF-S Firmware.

The instructions below apply to the Revision 5 TCF-S boards, but can also be used to upgrade the firmware in Rev 3 or Rev 4 boards as well. Be sure to follow static safety principles before starting your work by grounding yourself and work surface. If you are not comfortable replacing the PIC chip, contact Optec technical support. We will perform the installation at no charge.

Follow these steps to upgrade the PIC firmware.

Step 1 – Remove Rubber Feet

Make sure TCF-S Control box is turned OFF and all cabling is disconnected. Flip box over so the DRO and buttons are face down. Note the rubber feet (4) and remove them by pulling straight out.



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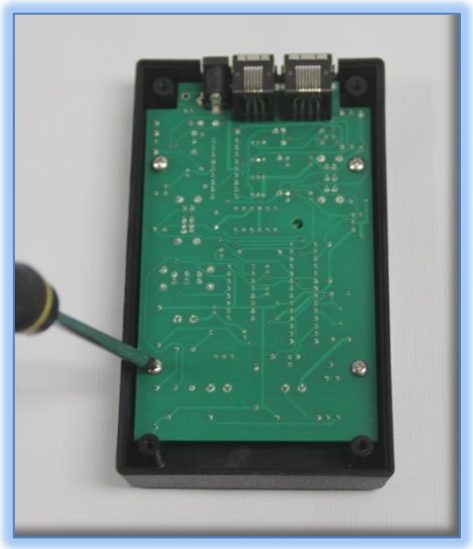
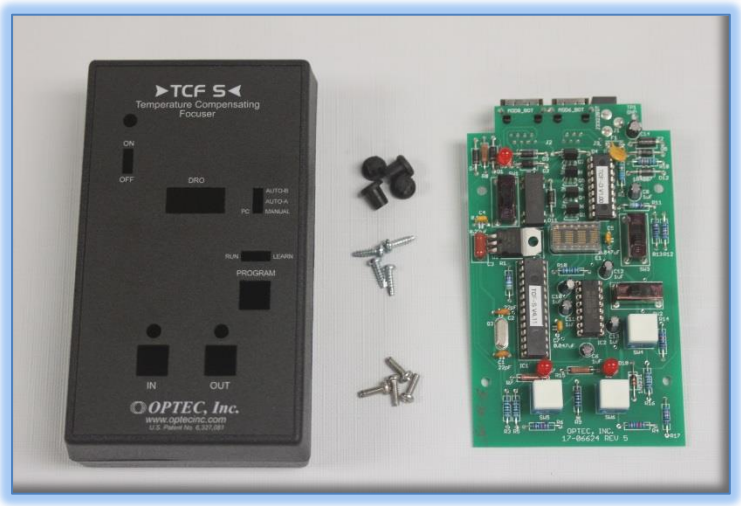
Step 2 – Remove Board

A Phillips-head screw inside each foot hole needs to be removed. Use a small Phillips-head screw driver to remove the back cover. Next, unscrew the four slotted or Phillips head screws holding the board in place. Flip the board over and keep the screws in a safe place.





Step 3 – Locate and Remove PIC chip.

The board should now be oriented as shown. The PIC chip to be replaced is the longer 28-pin DIP (dual in-line package) located near the center of the board. There should be a label indicating the version number.

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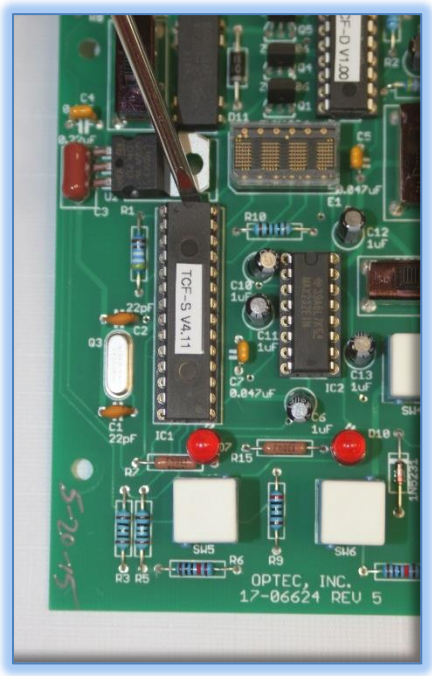
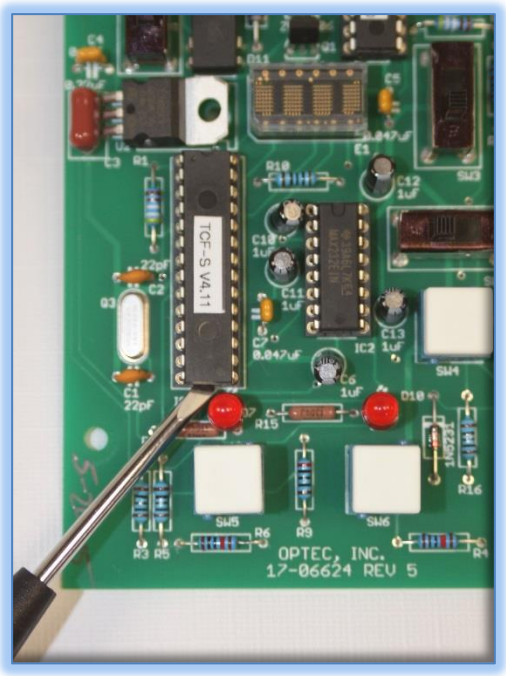
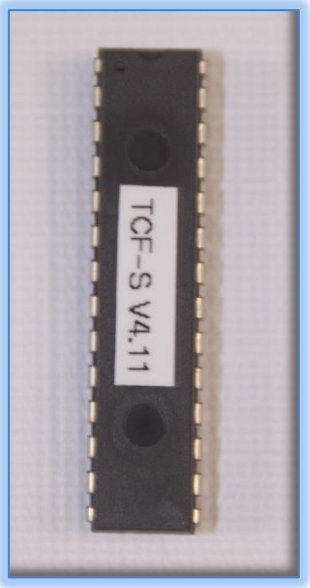
Note the location of the notch indicating Pin 1 on the PIC chip. Using a flat head screwdriver carefully pry one end of the PIC, then the other to remove it from the socket. Use caution when removing the chip, being careful not to damage the socket.





Step 4 – Install new PIC chip.

Take the replacement PIC chip with the new firmware and notice the curved notch at the top in the picture at right. This notch designates Pin 1 on the DIP package. Also note the curved cut out section on the socket towards the top of the picture. This notch identifies pin 1 on the socket.



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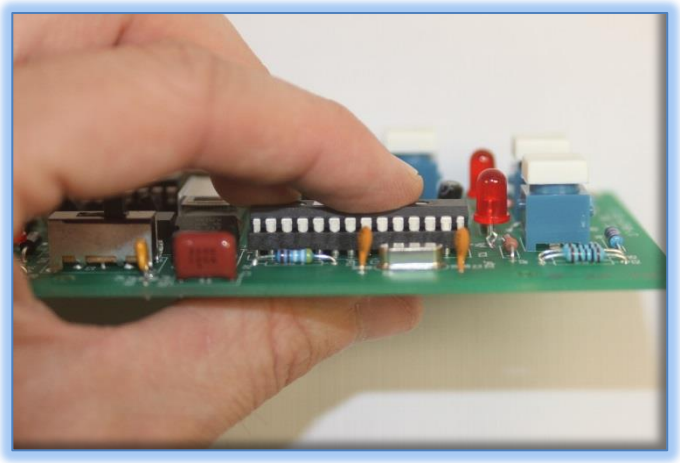
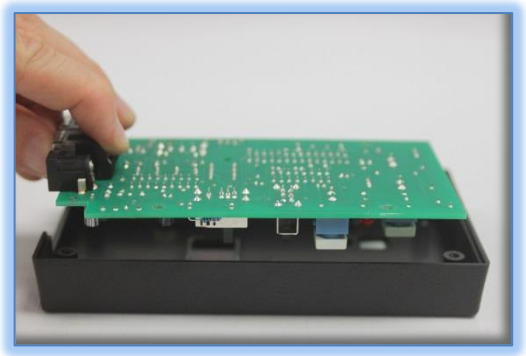
Step 5 – Seat PIC into socket

Align both curved cut out sections, both with the chip and the socket. Making sure the pins are aligned with the socket holes (this may require the pins being bent inward slightly), push the chip into place until it is properly seated as shown.



Step 6 – Re-install Board

Re-install the board into the front cover being certain the LED's and buttons are lined up properly with the holes in the front half of the control box. When you power up the hand control, the front display should show the new firmware version number.



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Step 7 – Re-connect Cables and Test

Reconnect the power cable, Control Cable, and USB/Serial cable. Turn on focuser and confirm the DRO lights up and displays the new firmware version. Confirm that the focuser is homing. An ER=1 will display if the temperature probe is not properly connected.

Step 8 – Install Software Drivers

Visit the TCF-S Download Page and download the latest TCF-S Control Software and ASCOM drivers.

Test the serial connection and ASCOM Local Server software to connect your favorite auto-focus software.

Contact Optec Support if you encounter any problems or have any questions while upgrading your TCF-S firmware.

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