

# MicroTouch Autofocuser Operating Instructions

The MicroTouch Autofocuser is designed to work with Feathertouch Focusers from Starlight Instruments. It allows automatic focusing with CCD and DSLR cameras. Included is FocusMax software to automatically focus the telescope for imaging. Manual focus is also possible using the hand controller. The hand control features an LCD screen for displaying a digital readout of focus position as well as information used for programming the temperature compensation feature.

The MicroTouch Autofocuser is compatible with Feathertouch Crayford focusers, Feathertouch SCT MicroFocusers, and Feathertouch MicroFocusers for Takahashi and TeleVue refractors. An optional larger focus motor allows use with the Starlight Instruments 3.5" focuser.

## Included Parts

- **Hand Control**
- **Focus Motor**
- **Focuser Gear**
- **Motor Connector Cable**
- **USB Cable**
- **12-Volt Power Cord (AC or DC, user selected)**
- **3 Hex-Head Wrenches**
- **MicroTouch & FocusMax Software**

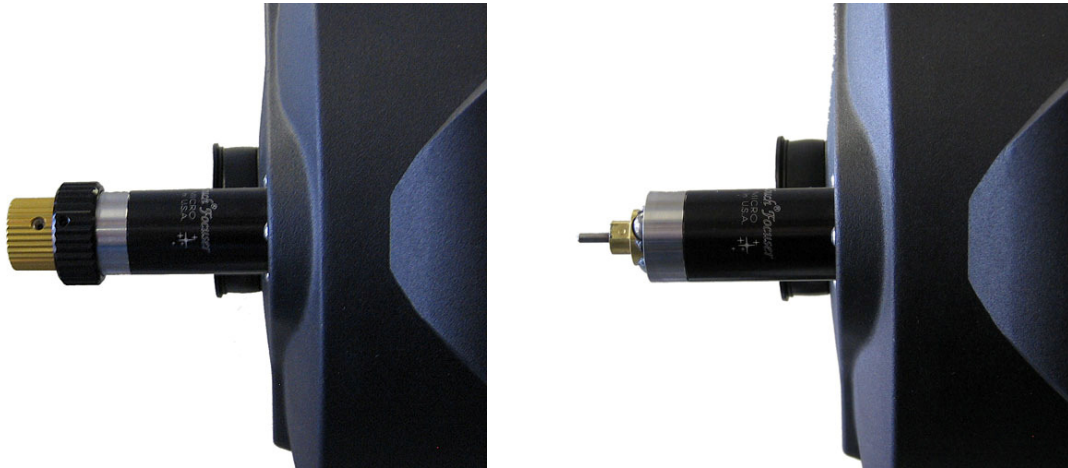


*Hand control, receiver, motor, cables*

## Installing the Focus Motor

The following directions are illustrated using a Feathertouch SCT MicroFocuser, but the instructions are identical for any Feathertouch focuser.

- 1) Begin by removing both the brass fine focus and black standard focus knobs from the focuser. Use the included medium size hex-head wrench to remove the knobs.



- 2) Install the small brass gear onto the focus shaft. The gear goes toward the telescope, with the smaller gear hub away from the scope, as shown below. The gear should touch the brass bearing hub on the focuser. Use the small hex-head wrench to lock the gear in place.

**Note:** *The gear has a small insert to allow installation on different size focus shafts. The insert can only be removed from one side. Using one of the hex-head wrenches to push the insert out can be helpful.*

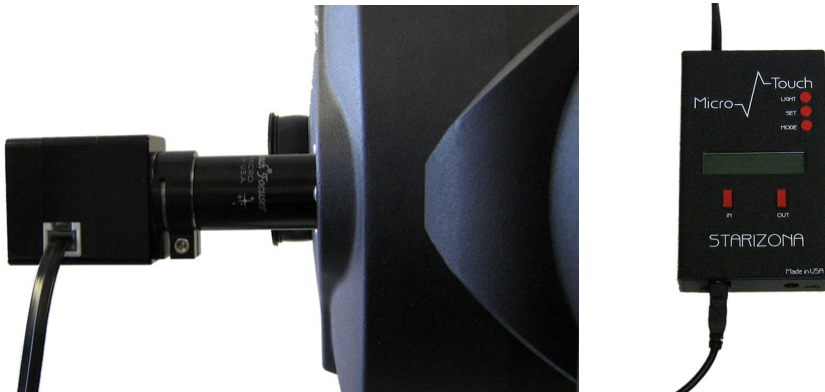


- 3) Slide the focus motor onto the focuser. You may need to rotate the motor slightly to allow the motor gear and focuser gear to mesh. The motor can be rotated to the desired position after the gears have meshed. When installed properly, the motor will completely cover the silver portion of the focuser. Use the large hex-head wrench to lock the motor in place.



### Connect Hand Control

- 4) Use the included RJ11 cable to connect the motor to the hand control.



### Using the MicroTouch Autofocuser Manually

You can use the MicroTouch focuser to focus the telescope visually by using the **IN** and **OUT** buttons. This is also how you will approximately focus the telescope when using a camera, before using the autofocus routine.

## MicroTouch Hand Control Menus

The LCD screen light turns on when the hand control is powered up. If desired, press the **LIGHT** button to turn the light off.

Pressing **MODE** once displays the current ambient temperature. The default display is °F. To change to °C, press the **SET** button while the temperature is displayed.

The following menus are accessed sequentially by pressing the **MODE** button: **Temp Comp**, **Learning**, **Wireless**, **Motor Rev**, and **Reset Position**. Each is described in detail below.

### Temp Comp

This activates the Temperature Compensation feature of the MicroTouch Autofocuser. Press **SET** to turn this feature on. In order for the Temperature Compensation feature to work, it must learn how to compensate for changes based on the optical system being used. This is done using the **Learning** menu (below).

### Learning

The Temperature Compensation feature works by learning how much focus change is necessary to compensate for a given temperature change. For example, on a certain system, a temperature drop of 1°F might require a focus position shift of 25 counts. Therefore, if the temperature drops by 2 degrees, the focuser would move 50 counts to keep the telescope in focus. The focuser must learn the exact focus shift required for a given telescope and configuration (so adding a focal reducer, for example, would require the focuser to be recalibrated).

To activate the Learning mode, press and hold the **SET** button for a few seconds until the display shows **Mode: Learning**. The word Learning will blink while the focuser is being calibrated. The current position of the focuser is displayed.

Press **MODE** once to view the current temperature. Wait until the temperature has changed. A temperature change of 5°F is recommended for the most accurate calibration. Once the temperature has changed, refocus the telescope (either manually or using the autofocus routine described in the next section). Return to the Learning menu and hold **SET** again until the display shows **Mode: Idle**. The temperature compensation is now set.

Go to the Temp Comp menu and press **SET** to turn the temperature compensation on. More advanced temperature compensation control is available through the MicroTouch software.

## **Wireless**

This turns the wireless communications on or off. The default for the MicroTouch Autofocuser is **OFF**. If the autofocuser is upgraded to the wireless version, the mode must be changed to **ON**.

## **Motor Rev**

This reverses the direction of the motor.

## **Reset Position**

The default position of the digital readout is 30000. The range of focus is 0-60000. If the focuser is moved to either end of this range, press **MODE** until **Reset Position?** appears. Press and hold the **SET** button until the display blinks and resets. The position has now been reset to 30000. If a different default position is desired, it is possible to program this using the MicroTouch software (described below).

## Installing the MicroTouch and FocusMax Software

Load the included CD. On the CD will be two installation files, one for the MicroTouch software and one for FocusMax. The MicroTouch software installation file is called Setup. Open this file and follow the directions given to install the MicroTouch software. The program will be located in the Windows Start Menu under **All Programs > Starizona > MicroTouch > MicroTouch**.

Open the FocusMax installer and follow the directions given to install the FocusMax software. The program will be located in the Windows Start Menu under **All Programs > FocusMax**.

## Installing the MicroTouch Hardware Drivers

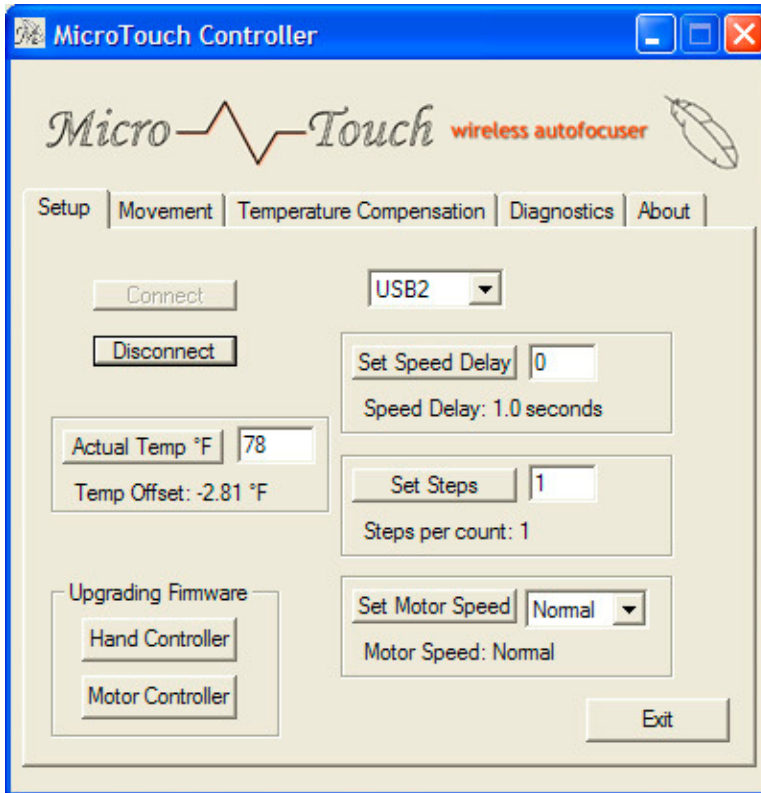


Connect the included USB cable to the hand control then to the computer. The **Found New Hardware Wizard** should appear. Select the automatic install routine. The wizard should find the included drivers and successfully install the hardware.

If, for some reason, Windows cannot automatically install the hardware, you can run the hardware installer again and manually select the driver. The driver is located in the **Program Files > Starizona > USB2Driver** folder and is called SiUSBXp.sys.

## MicroTouch Software

Launch the MicroTouch software. The **Setup** menu is displayed. The default connection is **USB2**. The MicroTouch Autofocuser is backward compatible to USB1.1. If your computer only has USB1.1 ports, select **USB** from the drop down menu. Press **Connect** to connect to the MicroTouch Autofocuser.



## Setup Menu

### Actual Temp °F

The temperature read by the MicroTouch temperature sensor may not be exactly the same as the actual ambient temperature, due to heat given off by the electronics in the autofocuser. Note that for the temperature compensation feature, only the difference in temperature—not the actual temperature—is the only factor. However, if you wish the displayed temperature to be correct, you can enter the known ambient temperature in this box and the software will calculate the offset between the actual and displayed temperatures and show the actual temperature in the Temperature Compensation window.

## Set Speed Delay

This sets the time delay before the motor ramps up to full speed. The default is 1.0 second. This means the focus motor will begin moving slowly then accelerate to full speed after 1 second. This allows more precise manual focusing. Changing the value to 0 would eliminate any delay and the motor would turn full speed immediately upon a move command.

## Set Steps

This sets the number of steps of the motor per count of the digital display. The default is 1 step per count. For each count on the digital display the motor will move one step, i.e., pressing the **IN** or **OUT** button once will move the motor one step. There are 300 counts per revolution of the motor (and since the motor drives the 10:1 fine focus of the Feathertouch Focuser, this equals 3000 counts per revolution of the focuser). Increasing the steps per count reduces the resolution but increases the range of the focuser. For example, setting the steps per revolution to 2 cuts the resolution in half, but doubles the focus range. The count range is still 0-60000, but the equivalent range is 0-120000. It may be desirable to change the steps per count if greater focus range is needed for focusing eyepieces visually or for a focuser with a greater range of travel. Any value from 1-10 can be selected.

## Set Motor Speed

There are two choices for motor speed, **Normal** and **High**. **Normal** speed turns the motor gear about once every 1 second. **High** speed doubles the rate of revolution. **High** speed allows large focus changes in less time, but it produces less torque, so heavier loads, such as a large-format CCD camera on a Crayford focuser, should always be moved at **Normal** speed to avoid slippage.

## Upgrading Firmware

If new versions of the MicroTouch firmware for either the hand control or the motor control become available they can be downloaded and installed into the MicroTouch Autofocuser.

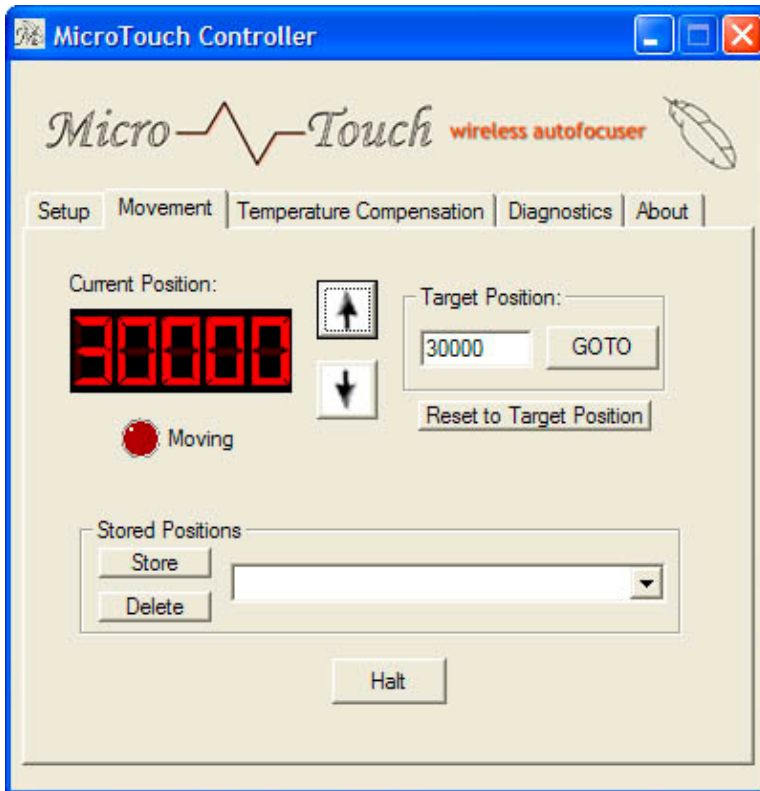
To upgrade the hand control firmware, select the **Hand Controller** button under **Upgrading Firmware**. A window will display allowing you to select the firmware file. Press and hold both the **IN** and **OUT** buttons on the hand control then select the file on the computer while holding the buttons down. Release the buttons after selecting file. The LCD will display **PROG MODE** and the firmware will be downloaded to the hand control.

To upgrade the motor controller firmware, simply click on the **Motor Controller** button under **Upgrading Firmware** and select the appropriate file in the window that appears. The upload will begin automatically.



## Movement Menu

The Movement menu is the main window for controlling the MicroTouch Autofocuser in manual mode.



The current position of the focuser is displayed. The up and down arrows correspond to the **OUT** and **IN** buttons on the hand control, respectively. (**IN** decreases the count, **OUT** increases the count.)

**Target Position** allows the user to select a given position and send the focuser to that position. The default position is 30000. Select the desired position and press **GOTO** to move the focuser to that position. Any value from 0-60000 can be selected.

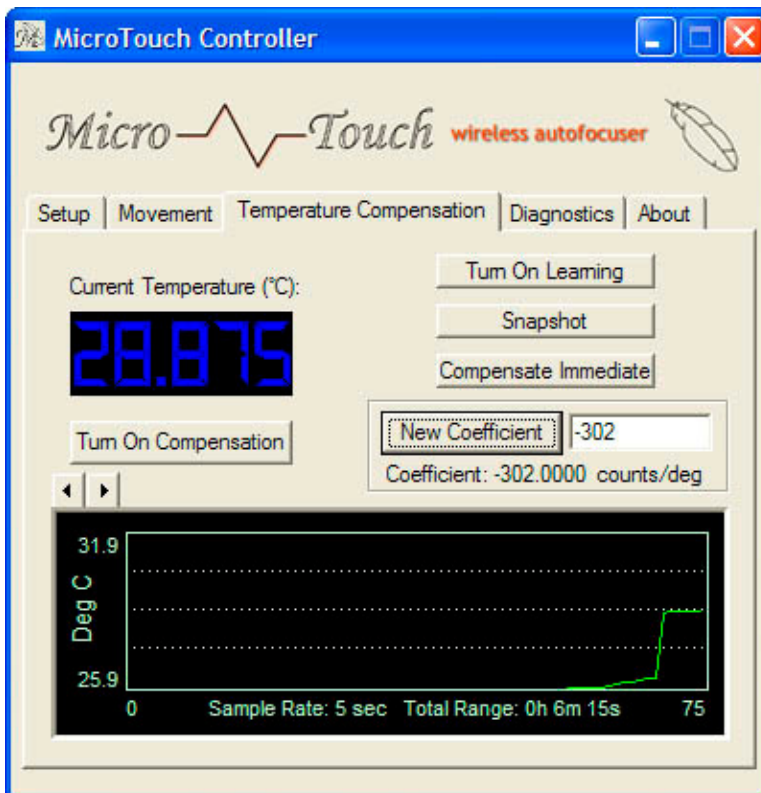
Pressing **Reset to Target Position** changes the displayed count to the **Target Position**. For example: The default focus position when the MicroTouch is turned on is 30000. If, after manually focusing the telescope using the **IN/OUT** buttons, the position reads 15000, you can enter 30000 into the **Target Position**, select **Reset to Target Position**, and the counter will be set to 30000 without moving the focuser. This sets the current position to the middle of the focus range. Any value from 0-60000 may be selected.

**Stored Positions** can be saved. For example, if you use a narrowband filter for imaging which significantly changes the focus position, you can find the correct focus position and save that position. For example: The telescope is focused then the counter reset to 30000. The telescope is then refocused for the filtered camera. Say the new value is 31500. This position can be saved by selecting **Store** under **Stored Positions**. In the future, after the telescope is properly focused without the filter and the counter reset to 30000, the stored position can be selected from the drop down menu and the focus position of the filtered camera selected. (Note that offset positions such as this will only be approximate as temperature changes may affect actual focus differences. Offset focus positions are still helpful for getting the telescope close to focus before running the autofocus routine.)

The **Halt** button can be used to stop the MicroTouch focuser in the process of moving to a new position.

## Temperature Compensation

This menu gives you control over the temperature compensation feature of the MicroTouch Autofocuser. It includes the same basic controls as the hand control, as described above, as well as additional features for more advanced control.



The current temperature is displayed in °C. **Turn On Learning** works the same as the Learning feature in the hand control, described above. Once calibrated, the temperature coefficient (the number of counts per degree of temperature change) is displayed. This number can be manually changed by typing in a new number and selecting the **New Coefficient** button. This is helpful if you change between multiple systems which have previously been calibrated so that the temperature coefficients are known.

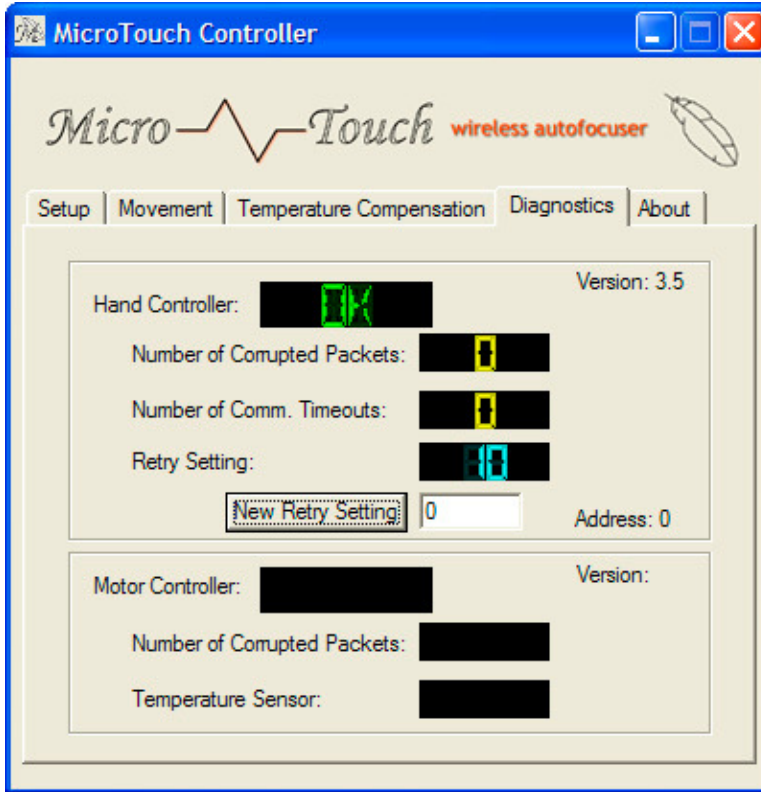
**Turn On Compensation** activates the temperature compensation function. In this mode, temperature compensation is continuous and no manual position commands will be accepted by the focuser. Press the **Turn Off Compensation** button to exit this mode.

A useful feature for users taking sequences of images is to only adjust focus between exposures. To do this, select **Snapshot** to store the current temperature and position information. After an exposure has finished, select **Compensate Immediate** and the focuser will move to the correct new position based on the new temperature.

At the bottom of the Movement screen is a strip chart showing temperature trend. The arrow buttons at the upper left of this chart can be used to change the sample rate. The default is 5 seconds, meaning the chart will plot the temperature every five seconds. This gives a range of 6 minutes 15 seconds. Any sample rate value can be selected from 1-250 seconds. This gives a time span of 1 minute 15 seconds up to 5 hours 12 minutes 30 seconds. The chart can display a range of +/- 3 degrees. If the temperature changes by more than +/- 1 degree, the chart shifts to move the current temperature curve to the center of the graph.

## Diagnostics Menu

The Diagnostics window shows the current status of the MicroTouch Autofocuser and its connection to the computer.



When properly connected, the **Hand Controller**, **Motor Controller** and **Temperature Sensor** status windows will display **OK**. The windows for **Number of Corrupted Packets** and **Number of Comm. Timeouts** displays the history of the communication status between the hand control and wireless receiver.

Version numbers of the hand controller and motor controller firmware are displayed. See above for details on upgrading firmware.