

FocusPro support for ASCOM

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FocusPro support for ASCOM

Preface

This document describes the support that Astrometric Instrument's FocusPro produce provides for the ASCOM Focuser Interface Standard. FocusPro consists of FocusPro hardware (e.g. stepper motor driver electronics and focuser mechanism) and FocusPro.exe which is a Microsoft Windows ActiveX program providing a user interface to hardware and exposing the ASCOM Focuser object.

For details on the ASCOM Focuser Interface Standard go to the <http://ascom-standards.org/> website.

This document addresses the following software versions and/or standards:

- ASCOM Focuser Interface Standard version 1.0
- FocusPro.exe version 0.10.000 (or later)

Sections of this document

- Possible Trappable Errors
- Implementation of ASCOM Focuser Interface Properties
- Implementation of ASCOM Focuser Interface Methods
- More Resources

Possible Trappable Errors

The Maestro ASCOM Focuser Interface driver will potentially raise one of these trappable error codes:

- **0x80040400**: For a un-implemented ASCOM property or method: 0x80040400 and the message: "<name> property or method is not implemented in FocusPro's ASCOM driver."
- **0x80040404**: For a range error in a property value or method parameter: 0x80040404 and the message: "<name> ASCOM property or method is used with a value out of range.". This error will occur when, for example, attempting to pass a Position parameter to the Move() method that is greater than MaxIncrement.
- **0x80040420**: If FocusPro hardware is not found: 0x80040420 and the message: 'FocusPro hardware not found'.
- **0x80040421**: If there is an error communicating with FocusPro hardware: 0x80040420 and the message: "Error communicating with FocusPro".

Implementation of ASCOM Telescope Interface Properties

Absolute: True if the focuser is capable of absolute position; that is, being commanded to a specific step location.

Support when read

FocusPro is capable of absolute position and always returns True.

Support when written

Not a writeable property.

IsMoving: True if the focuser is currently moving to a new position. False if the focuser is stationary.

Support when read

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FocusPro reports False if its MoveMode is Fixed (i.e. not moving).

FocusPro reports True if its MoveMode is not Fixed (i.e. GoTo, Homing, Fast or Slow).

Support when written

Not a writeable property.

Link: State of the connection to the focuser.

Support when read

Fully supported. Returns True if it is connected to the hardware and False otherwise.

Support when written

When FocusPro software is running, it continuously attempts to connect to the hardware. The Client can write Link however FocusPro ignores the action since it will have already connected to hardware if possible.

If Link is written, and FocusPro has not connected to the hardware (for whatever reason) then the trappable error code 0x80040420 will be raised with the message "FocusPro hardware not found."

MaxIncrement: Maximum increment size allowed by the focuser; i.e. the maximum number of steps allowed in one move operation.

Support when read

Fully supported. Returns the maximum number that FocusPro allows for any movement. The max step position (and hence largest movement in steps) that FocusPro hardware supports is 4,194,303 (0x003FFFFFF hex) however FocusPro software provides a "Motor step ratio" that allows one step, from the perspective of the user, to translate to N motor steps. Therefore the MaxIncrement allowed is 4,194,303 divided by this Motor step ratio (as set at FocusPro's user interface).

Note: FocusPro's InLimit and OutLimit switches may prevent motion to the full MaxIncrement value.

Support when written

Not a writeable property.

MaxStep: Maximum step position permitted.

Support when read

Fully supported. Returns the maximum step position that FocusPro allows which is the same as MaxIncrement.

Note: FocusPro's InLimit and OutLimit switches may prevent motion to the MaxStep position.

Support when written

Not a writeable property.

Position: Current focuser position, in steps.

Support when read

Fully supported. Returns the present step position of FocusPro which is generally positive since FocusPro's limits are setup such that:

- Home position and In Limit are one and the same.

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- When Homing finds the HomeInLimit the focuser step position is set to 0.

Therefore, in general, negative position is not possible however for focusers that do not enable the In Limit, or given lack of repeatability in the exact location of the HomeInLimit, it is possible to achieve negative step position with FocusPro's Fast or Slow motion commands or from handpaddle control. FocusPro does not allow negative GoTo position however.

Support when written

Not a writeable property.

StepSize: Step size (microns) for the focuser.

Support when read

Not presently supported.

Support when written

Not a writeable property.

TempComp: The state of temperature compensation mode (if available), else always False.

Support when read

Returns False since FocusPro does not presently support temperature compensation.

Support when written

Not presently supported.

TempCompAvailable: True if focuser has temperature compensation available.

Support when read

Returns False since FocusPro does not presently support temperature compensation.

Support when written

Not a writeable property.

Temperature: Current ambient temperature as measured by the focuser.

Support when read

Fully supported. Returns the temperature (in degrees Celsius) of FocusPro's temperature sensor.

Support when written

Not a writeable property.

Implementation of ASCOM Telescope Interface Methods

CommandString(Command): Send a string command to FocusPro hardware, returning a response string.

Note: this method is not part of the ASCOM Focuser Interface Standard. It is provided as extra/optional functionality.

FocusPro.exe uses the CommandString() method to allow the Client to send ATCL string commands directly to FocusPro hardware. The hardware's response to the ATCL command is provided in the return string.

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Note: FocusPro.exe and FocusPro hardware communicate via a subset of the Astrometric Telescope Control Language (ATCL). ATCL is typically communicated over serial link (e.g. RS232 or RS422/USB/Ethernet with suitable converters) to the port labeled "Com" on FocusPro hardware. The CommandString() method allows ASCOM Clients direct access to ATCL.

To pass an ATCL command directly to FocusPro hardware, call the CommandString() method with a string parameter that is an ATCL command. The return string from the CommandString() function is the response from the hardware. For example, to set maximum velocity (using the SetFocusMaxVel command mnemonic "HSfe") to 0x80 you could use the following VBA CommandString() code:

```
Set Focuser = CreateObject( "FocusPro.Focuser" )
Response = Focuser.CommandString( "HSfe80" )
```

More information on ATCL is provided at www.astrometric.com/support/resources/ATCL.html.

Additional notes:

- Per ATCL protocol, commands must be preceded by '!' and terminated with ';'. The CommandString() method does not require this characters be included in the string (they are included by Maestro).
 - Per ATCL protocol, all strings returned from the hardware are terminated with a semicolon (;'). The CommandString() method removes this semicolon from return strings.
 - Not all ATCL commands return a string. Many return only the ATCL_ACK character (hex code 0x8F) to indicate all is OK, or the ATCL_NACK character (hex code 0xA5) to indicate a problem. For these ATCL commands, the CommandString() method will return a one-character string with the ATCL_ACK or ATCL_NACK character.
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Halt(): Immediately stop any focuser motion due to a previous Move() method call.

Fully supported.

Move(Position): Move the focuser to the given step position, return immediately after starting the move.

Fully supported.

Note: FocusPro accepts a position parameter between 0 and MaxIncrement. Negative move position is not allowed (see further details under Position property).

SetupDialog(): Display a dialog box for the user to enter in custom setup parameters, such as a COM port selection.

Not supported. FocusPro presents a dialog box stating "Please use FocusPro software to make settings for connection-to and use-of FocusPro." when this method is called.

More Resources

Complete details on ASCOM standards can be found at <http://ascom-standards.org/>. This includes information on developing client software and/or scripts.

Visit our www.astrometric.com/support/resources/ASCOM.html page for the most up-to-date version of this document and a complete set of Visual Basic for Applications scripts that exercise all the ASCOM Focuser Interface Standard properties and methods supported by FocusPro.exe.