

FocusLynx Command Reference

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Introduction

The FocusLynx controller can be controlled via serial RS-232, a wired Ethernet connect or a Wi-Fi (wireless Ethernet) connection. The command syntax is universal regardless of which medium is being used to send the command and receive responses. A simple textual command structure has been laid out so that even simple terminal applications can be used to manually control the FocusLynx controller.

The command processor on the FocusLynx controller is designed to use a Start-Command character and an End-Command character. This allows for commands of varying lengths and the ability to start a new command or terminate a command at any time. The Start- and End-Command characters are '<', and '>' respectively.

After the Start-Command character the next two characters designate whether the command is intended for Focuser1, Focuser2 or the hub (controller) itself. For example, <F1HOME> would be used to request Focuser1 to begin the home procedure. The command characters which follow the destination designators are dependent on the specific command. See the following reference for more information.

Syntax Conventions

In the following syntax reference all upper-case letters are constant for the given command, all lower-case letters are parameters for the command. The x parameter is always used in place of a focuser number, 1 or 2 and the z parameter is always used as an end-of-command parameter, if needed.

Generic Responses

The controller will immediately respond to every command with a bang (!) character and a newline (ASCII 0x10) character to indicate that a command was successfully received. If a syntax error was detected or an unrecognized command was received the controller will respond with a string of text indicating an error code and error message in place of the expected response.

Basic Commands

Command: Say Hello

Syntax: <F_xHELLO>

Parameters: x – Focuser number.

Description: This command requests the specific focuser to “say hello”. The controller will respond with the focusers user-defined nickname.

Example Command: <F1HELLO>

Example Response:

!

Optec 2” TCF-S

Command: Halt focuser

Syntax: <F_xHALT>

Parameters: x – Focuser number.

Description: This command requests the specific focuser to immediately halt its current motion. The controller will respond with the “HALTED” to acknowledge the command was received. If Temperature Compensation was active at the time the Halt command was received, temperature compensation will be automatically disabled.

Example Command: <F1HALT>

Example Response:

!

HALTED

Command: Home focuser

Syntax: <F_xHOME>

Parameters: x – Focuser number.

Description: This command requests the specific focuser to begin its homing routine. The controller will respond with “H” to indicate that it has started homing.

Example Command: <F2HOME>

Example Response:

!

H

Command: Center focuser

Syntax: <F_xCENTER>

Parameters: x – Focuser number.

Description: This command requests the specific focuser to move to the center of its travel. The center position is half of the focusers Max Position. The focusers maximum position is defined by the device type that is selected. The controller will respond with “M” to indicate that it has begun moving to center.

Example Command: <F2CENTER>

Example Response:

!
M

Command: Move Absolute

Syntax: <F_xMAzzzzzz>

Parameters: x – Focuser number, z – Target position left-padded with 0's to a total length of 6 digits.

Description: This command requests the specific focuser to begin moving to the absolute position specified. The target position must be between 0 and the focusers maximum position.

Example Command: <F1MA000100> (*Request move to absolute position 100*)

Example Response:

!
M

Command: Begin Relative Move In

Syntax: <F_xMIRz>

Parameters: x – Focuser number, z – Move Speed (0 = high, 1 = low)

Description: This command instructs the controller to begin a relative move in the IN direction for the specified focuser. The move will stop when the focuser reaches the end of its travel or the controller receives the End Relative Move command.

Example Command: <F1MIR1>

Example Response:

!
M

Command: Begin Relative Move Out

Syntax: <F_xMORz>

Parameters: x – Focuser number, z – Move Speed (0 = high, 1 = low)

Description: This command instructs the controller to begin a relative move in the OUT direction for the specified focuser. The move will stop when the focuser reaches the end of its travel or the controller receives the End Relative Move command.

Example Command: <F1MOR1>

Example Response:

!
M

Command: End Relative Move

Syntax: <F_xERM>

Parameters: x – Focuser number

Description: This command instructs the controller to cease any relative move that may be in progress. The controller will respond with “STOPPED” to acknowledge that the move is stopped. If Temperature Compensation was enabled before the relative move was started, temperature compensation will be resumed after this command is issued.

Example Command: <F1MA000100>

Example Response:

```
!  
STOPPED
```

Command: Get Status

Syntax: <F_xGETSTATUS>

Parameters: x – Focuser number

Description: This command will request the controller to report the status of the specified focuser. The first line of the status report is “STATUS_n” and the last line is “END” to indicate that the output is complete. The *n* character will be either 1 or 2 which indicates the corresponding focuser. The status output contains the following fields:

Temp(C): The current temperature in degrees Celisus

Curr Pos: The current position of the specified focuser

Target Pos: The absolute position that the device is currently moving to (if the device is moving)

IsMoving: This flag is set to 1 if the device is moving and 0 if the device is stationary

IsHoming: This flag is set 1 while the device is homing and zero otherwise.

IsHomed: For focusers that support homing, this flag will be set to 0 if the focuser has not been homed and set to 1 when homed.

FFDetect: Set to 1 when using an Optec FastFocus Focuser

TmpProbe: This flag indicates the status of an attached temperature probe. A value of 1 means a probe is attached, 0 means no probe is detected.

RemotelO: This flag indicates the status of an attached In/Out remote. A value of 1 means a remote is attached, 0 means no remote is detected.

Hnd Ctrlr: This flag indicates the status of an attached hand controller. A value of 1 means a hand controller is attached, 0 means no hand controller is detected.

Example Command: <F1GETSTATUS>

Example Response:

```
!  
STATUS1  
Temp (C)   = +21.7  
Curr Pos   = 108085  
Targ Pos   = 000000  
IsMoving   = 1  
IsHoming   = 1  
IsHomed    = 0
```

```
FFDetect = 0
TmpProbe = 1
RemoteIO = 0
Hnd Ctlr = 0
END
```

Command: Get Configuration Settings

Syntax: <F x GETCONFIG>

Parameters: x – Focuser number.

Description: This command will request the controller to report the configuration settings of the specified focuser. The first line of the configuration report is “CONFIG n ” and the last line is “END” to indicate that the output is complete. The n character will be either 1 or 2 which indicates the corresponding focuser. The configuration output contains the following fields:

Nickname: The user-defined nickname of the specified focuser

MaxPos: The maximum absolute position that the selected focuser is capable of moving to. This setting is determined automatically based on the selected Device Type.

Dev Typ: A two character designator of the currently set device type for the specified focuser. See the section entitled [Appendix A – Device Types](#) on page 16 for device type details.

TComp ON: The current status of temperature compensation. 1 indicates the device is currently temperature compensating, 0 indicates temperature compensation is disabled.

TemCo A-E: These items indicate the temperature coefficient for the respective temperature compensation mode. The units of the temperature coefficients are stepper motor steps per degree.

TC Mode: Indicates the currently selected temperature compensation mode. When temperature compensation mode is turned on this value selected mode indicates which temperature coefficient will be used for compensation.

BLC En: This flag indicates whether the internal backlash compensation is turned on or off. A value of 1 indicates that this feature is turned on, 0 indicates the feature is off.

BLC Stps: This value indicates the number of steps that the focuser will travel past the target position before returning to the target position in order to compensate for mechanical backlash in the focusing device. A positive value indicates the compensation will occur when the focuser move to a greater absolute position. A negative value indicates the compensation will occur on moves to a lesser position.

LED Brt: This value indicates the current setting for the brightness of the red power LED on the FocusLynx controller enclosure

TC@Start: This value indicates if the *Temperature Compensate at Start* feature is turned on or off. A value of 1 indicate the feature is on, 0 indicates the feature is off. When this feature is enabled the device will automatically perform a temperature compensation move immediately following device power-up.

Example Command: <F2GETCONFIG>

Example Response:

!

```
CONFIG
Nickname = FocusLynx Foc2
Max Pos  = 125440
Dev Typ  = OE
TComp ON = 0
TempCo A = +0086
TempCo B = +0086
TempCo C = +0086
TempCo D = +0000
TempCo E = +0000
TC Mode  = A
BLC En   = 0
BLC Stps = +40
LED Brt  = 075
TC@Start = 0
END
```

Command: Get Hub Info

Syntax: <FHGETHUBINFO>

Parameters: none

Description: This command requests the hub to report the Hub Information. The device will respond with HUB INFO to indicate the start of hub information. The end of the hub information is indicated with the "END" string. The hub information includes the following items:

Hub FVer: The firmware version currently running on the FocusLynx controller

Sleeping: Sleep mode status

Wired IP: If the focuser hub is connected to a network via wired Ethernet this is the value of the IP address which was obtained from the DHCP server.

WF Atchd: Indicates whether the controller has detected an attached Wi-Fi module or not. 1 means attached, 0 means not attached.

WF Conn: Indicates where successful communication has taken place between the Wi-Fi module and the FocusLynx controller.

WF FVer: Indicates the firmware version of the Wi-Fi module.

WF FV OK: Indicates if the firmware version installed in the Wi-Fi module is compatible with the FocusLynx firmware. 1 means they are compatible, 0 means not compatible.

WF SSID: Indicates the SSID (wireless network name) that the Wi-Fi module is currently configured to connect to.

WF IP: If the Wi-Fi module successfully connected to a network this value indicates the IP address which was obtained from the DHCP server. If the Wi-Fi module is configured in Ad-hoc mode the Wi-Fi IP address will be generated by the Wi-Fi module itself.

WF SecMd: Indicates the security mode that the Wi-Fi module is configured to use when connecting to a wireless network. See the section entitled [Appendix B – Wi-Fi Security Modes](#) on page 16 for more information.

WF SecKy: Indicates the security key or password used by the Wi-Fi module to connect to a wireless network.

WF WepKI: When the Wi-Fi module security mode is configured for WEP this value indicates the security key index to use for authentication.

Example Command: <FHGETHUBINFO>

Example Response:

```
!  
HUB INFO  
Hub FVer = 1.0.0  
Sleeping = 0  
Wired IP = 169.168.1.10  
WF Atchd = 1  
WF Conn = 1  
WF FVer = 1.0.0  
WF FV OK = 1  
WF SSID = FocusLynxConfig  
WF IP = 192.168.1.11  
WF SecMd = A  
WF SecKy =  
WF WepKI = 0  
END
```

Set Configuration Commands

The following commands are used to set device configuration settings. These commands are similar to the basic commands except that they contain the characters SC which stands for “Set Config”. The two characters following the “SC” indicate which configuration setting is being set. The rest of the characters provide necessary information that is specific to each command. In the syntax definitions lower-case letters still indicate a parameter. See the Parameters section under each command for more information.

Command: Set Device Nickname

Syntax: <FxSCNNzzz...>

Parameters: x – Focuser number, zzz - The new nickname (max of 16 characters)

Description: This command is used to set a custom nickname for the specified focuser. The nickname is the string that is returned by the controller when the *Say Hello* command is executed. The FocusLynx controller will respond with “SET” to indicate that the setting was successfully updated.

The following example is used to Set Configuration, New Nickname to “My Optec Focuser”.

Example Command: <F1SCNNMyOptecFocuser>

Example Response:

```
!  
SET
```

Command: Set Device Type

Syntax: <F_xSCDTzz>

Parameters: x – Focuser number, zz – Two characters indicating the desired device type.

Description: This command is used to set the device type of the specified focuser. It is very important that the device type is set to the correct value for the attached device. The FocusLynx controller uses the device type to determine a safe speed and motor power to use when operating the device. Selecting an improper value may cause damage to an attached focuser. The FocusLynx controller will respond with “SET” to indicate that the setting was successfully updated. See the section entitled [Appendix A – Device Types](#) on page 16 for a table of device types and supported focusers.

The following example is used to Set Configuration, Device Type to “OA” which indicates that the device is an Optec TCF-S 2” focuser.

Example Command: <F1SCDTOA>

Example Response:

```
!  
SET
```

Command: Set Current Position

Syntax: <F_xSCCPzzzzzz>

Parameters: x – Focuser number, zzzzzz – New position to set.

Description: This command is used to sync (set) the current position of a focuser to a specific value. The new position parameter must be a numeric value of exactly 6 characters in length and left-padded with 0’s. This command is only accepted for focusers which are unable to home. All Optec Focusers must home and thus cannot use this command. The FocusLynx controller will respond with “SET” to indicate that the position have been set.

The following example is used to Set Configuration, Current Position to 1500.

Example Command: <F1SCCP001500>

Example Response:

```
!  
SET
```

Command: Set Temperature Compensation Enabled/Disabled

Syntax: <F_xSCTEz>

Parameters: x – Focuser number, z – Enable/Disable bit (1 or 0 respectively)

Description: This command allows the user to enable or disable the temperature compensation feature built into the FocusLynx controller. Temperature compensation can be enabled and disabled independently on either of the two focuser ports. The example below enables temperature compensation for Focuser 1.

Example Command: <F1SCTE1>

Example Response:

```
!
```

SET

Command: Set Temperature Compensation Mode

Syntax: <FxSCTMz>

Parameters: x – Focuser number, z – Desired mode to set active (A through E)

Description: This command should be used to set the active mode used when temperature compensating. The example below sets mode C as the active temperature compensation mode thus making temperature coefficient C the coefficient that will be used for compensation.

Example Command: <F1SCTMC>

Example Response:

!

SET

Command: Set Temperature Compensation Coefficient

Syntax: <FxSCTCmszzzz>

Parameters: x – Focuser number, m – Mode to which the coefficient applies, s – The sign (+ or -) of the coefficient, zzzz- The coefficient (in steps per degree) expressed as a four digit number left-padded with zeros.

Description: This command allows the user to set the value of a specific temperature coefficient for a specific focuser. The value must include a sign (+ or -) and four numeric digits. The following example set the temperature coefficient D for Focuser 1 to positive 92.

Example Command: <F1SCTD+0092>

Example Response:

!

SET

Command: Set Temperature at Start Enabled/ Disabled

Syntax: <FxSCTSz>

Parameters: x – Focuser number, z – Enable/Disable bit (1 or 0 respectively)

Description: This command allows the user to enable or disable the Temperature Compensation at Start feature built into the FocusLynx controller. When the feature is enabled the FocusLynx controller will automatically perform a temperature compensation move when the device is powered on. The device will perform this move based on the recorded temperature and position of the last time temperature compensation was enabled. This feature can be enabled and disabled independently on either of the two focuser ports. The example below enables the Temperature Compensation at Start feature for Focuser 2.

Example Command: <F2SCTS1>

Example Response:

!

SET

Command: Set Backlash Compensation Enabled/Disabled

Syntax: <FxSCBEz>

Parameters: x – Focuser number, z – Enable/Disable bit (1 or 0 respectively)

Description: This command allows the user to enable or disable the backlash compensation feature built into the FocusLynx controller. Backlash compensation is sometimes needed to correct for mechanical imperfection in focusing devices. By always approaching every position from the same direction the problem mechanical backlash can be avoided. To accomplish the FocusLynx controller will move the focuser beyond the target position by a user-defined number of steps before returning to the target position. The following example enables backlash compensation for Focuser 2.

Example Command: <F2SCBE1>

Example Response:

```
!  
SET
```

Command: Set Backlash Compensation Steps

Syntax: <FxSCBSzz>

Parameters: x – Focuser number, zz – The magnitude of the value.

Description: This command allows the user to specify the number of steps that the focuser will move beyond the target position before returning to the target position. Backlash compensation will be performed on all outward moves (never on inward moves). The position value must be two numeric digits left-padded with zeros. The following example sets the number of backlash compensation steps for Focuser 2 to 50.

Example Command: <F2SCBS50>

Example Response:

```
!  
SET
```

Command: Set LED Brightness

Syntax: <FHSCLBzzz>

Parameters: zzz – The desired brightness (0 to 100)

Description: This command can be used to set the brightness of the power-indication LED on the FocusLynx controller enclosure. Changing the values adjusts the total current through the LED thus increasing or decreasing its brightness. A value of zero will turn the LED off. The following example sets the brightness of the LED to 85. Please note that the first two characters of the command are “FH”. This is because the LED brightness is not specific either Focuser 1 or Focuser but rather the *Hub* itself.

Example Command: <FHSCLB085>

Example Response:

```
!  
SET
```

Command: Reset To Factory Defaults

Syntax: <FxRESET>

Parameters: x- Focuser number

Description: This command will reset all configuration and status information for the focuser to factory defaults.

Example Command: <F1RESET>

Example Response:

```
!  
SET
```

Wi-Fi Configuration Commands

The FocusLynx controller has an optional Wi-Fi plug-in module that enables PC's, mobile devices, or any device that supports Wi-Fi connections to communicate with it. The following commands apply to only those devices which have the Wi-Fi module installed.

In the previous section all of the commands began with the characters "SC" which stands for *Set Configuration*. The Wi-Fi commands all begin with the characters "SW" which stands for *Set Wi-Fi configuration*.

IMPORTANT: In order to commit changes to the Wi-Fi module you must issue the *Push Wi-Fi Settings* command which instructs the FocusLynx controller to save the new settings that you have entered. Before you can call the Push Wi-Fi Settings command you **MUST** first issue the commands to set the SSID, security mode, security-key (if applicable) and security-key-index (if applicable).

It is advised that you do not attempt to modify Wi-Fi settings while connected to the controller via the Wi-Fi.

Command: Set Wi-Fi SSID

Syntax: <FHSWSSnzzz...>

Parameters: n – SSID name section index, zzz... – SSID name

Description: This command is used to set a new SSID (wireless network name) which will be used by the Wi-Fi module when connecting. The command processor on the FocusLynx Controller can only handle parameters which are 16 characters long or less. According to the Wi-Fi protocol an SSID can be up to 32 characters long. Thus multiple commands must be issued in order to set the SSID to a value greater than 16 characters long. The n parameter of this command tells the controller which section of the name you are setting according to the following:

n=0: characters 1 through 16

n=1: characters 17 through 32

The following example sets the wireless SSID to "My Private Network"

Example Command:

```
<FHSWSS0My Private Netwo>  
<FHSWSS1rk>
```

Example Response:

```
!  
SET  
!  
SET
```

Command: Set Wi-Fi Security Mode

Syntax: <FHSWSMz>

Parameters: z – Security mode code (See [Appendix B – Wi-Fi Security Modes](#))

Description: This command is used to set the security mode that the Wi-Fi module will use when connection to a wireless network. [Appendix B – Wi-Fi Security Modes](#) contains a table of all of the available security modes and their respective codes.

The following example sets the Wi-Fi security mode to WEP-40 (mode D).

Example Command: <FHSWSMD>

Example Response:

```
!  
SET
```

Command: Set Wi-Fi Security Key

Syntax: <FHSWSKnzzz...>

Parameters: n – Key section index, zzz... - New security key

Description: This command is used to set the Wi-Fi security key and functions the same way as the *Set Wi-Fi SSID* command. The security key can be up to 64 characters in length thus four sections of 16 characters are needed. The n parameter indicates to the section of the key being set according to the following:

n=0: characters 1 through 16
n=1: characters 17 through 32
n=1: characters 33 through 48
n=1: characters 49 through 64

The number of characters required for the security key depends on the selected security mode and the network settings of the network you are trying to connect to. See the section entitled [Appendix B – Wi-Fi Security Modes](#) on page 16 for more information.

The following example sets the security key to “My Private Security Key 123456 7654321”

Example Command:

```
<FHSWSK0My Private Secur>  
<FHSWSK1ity Key 123456 7>  
<FHSWSK2654321>
```

Example Response:

```
!  
SET  
!  
SET  
!  
SET
```

Command: Set Wi-Fi Security WEP Key Index

Syntax: <FHSWWI z>

Parameters: z – WEP key index (1 through 4);

Description: This command is used to set the WEP key index which is used by the Wi-Fi module when connecting to a wireless network which uses WEP authentication. The key index can be any value 1 through 4. The key index is setup and determined by the network administrator. The following example sets the WEP security key index to 2.

Example Command: <FHSWWI2>

Example Response:

```
!  
SET
```

Command: Push Wi-Fi Settings

Syntax: <FHSWPS>

Parameters: None

Description: All of the Wi-Fi settings described above do not take effect until this command is executed. It is important that you set all other necessary Wi-Fi settings before executing this command. Once this command is executed the Wi-Fi module will attempt to reconnect to a wireless network using the received parameters.

Example Command: <FHSWWI2>

Example Response:

```
!  
SET
```

Command: Wi-Fi Module Reset

Syntax: <FHWIFIRESET>

Parameters: None

Description: This command forces the Wi-Fi module to perform a software reset.

Example Command: <FHWIFIRESET>

Example Response:

```
!  
SET
```

Command: Restore Wi-Fi Defaults

Syntax: <FHWIFIDEFAULTS>

Parameters: None

Description: This command will force the Wi-Fi module to restore its default settings. By default the Wi-Fi module is configured to create an Ad-hoc network which devices can connect directly to without using a router or switch. The Ad-hoc network can be used to assist you in configuring the controller to connect up to your existing network. It is recommended that you do not operate the device long term in Ad-hoc mode as the Ad-hoc network is slower and has more overhead.

Example Command: <FHWIFIDEFAULTS>

Example Response:

```
!  
SET
```

Appendix A – Device Types

- OA: Optec TCF-S 2"
- OB: Optec TCF-S 3"
- OC: Optec TCF-S 2" with Extended Travel
- OD: Optec Fast Focus (Edge HD) for 11" Telescopes

- SA: Starlight Focuser - FTF2008BCR
- SB: Starlight Focuser - FTF2015BCR
- SC: Starlight Focuser - FTF2020BCR
- SD: Starlight Focuser - FTF2025
- SE: Starlight Focuser - FTF2515B-A
- SF: Starlight Focuser - FTF2525B-A
- SG: Starlight Focuser - FTF2535B-A
- SH: Starlight Focuser - FTF3015B-A
- SI: Starlight Focuser - FTF3025B-A
- SJ: Starlight Focuser - FTF3035B-A
- SK: Starlight Focuser - FTF3515B-A
- SL: Starlight Focuser - FTF3545B-A
- SM: Starlight Focuser - AP27FOC3E
- SN: Starlight Focuser - AP4FOC3E

Appendix B – Wi-Fi Security Modes

- A: Open Network (no security)
- B: WPA with Passphrase (8 to 63 ASCII characters)
- C: WPA with Key (64 Hex characters)
- D: WEP-40 (5 ASCII characters or 10 Hex characters)
- E: WEP-104 (13 ASCII characters or 26 Hex characters)