

# FocusLynx Command Reference

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## Introduction

The FocusLynx controller can be controlled via serial RS-232, a wired Ethernet connection or a Wi-Fi connection (with an optional WiFi add-in card). 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.

The serial connection uses a baud rate of 115200. Ethernet and WiFi use TCP on ports 9760 and 9761 respectively.

## 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 (\n) (ASCII 0xA) 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<sub>x</sub>HELLO>

**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<sub>x</sub>HALT>

**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<sub>x</sub>HOME>

**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<sub>x</sub>CENTER>

**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<sub>x</sub>MAzzzzzz>

**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<sub>x</sub>MIRz>

**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<sub>x</sub>MORz>

**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<sub>x</sub>ERM>

**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<sub>x</sub>GETSTATUS>

**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<sub>n</sub>” 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 Celsius

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.

RemoteIO: 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.

Reverse: This flag means that the device is in reverse mode. For all non-homing focusers the move directions are now reversed. 1 means reverse is on, 0 means that it is off.

**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
Reverse  = 1
END
```

## Command: Get Configuration Settings

**Syntax:** <FxGETCONFIG>

**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 “CONFIGn” 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 can move to. This setting is determined automatically based on the selected Device Type. For none homing focusers this can be changed with a Set Maximum Position command.

Dev Typ: A two character designator of the currently set device type for the specified focuser. See the section entitled Wired Configuration Commands

Command: Set Static IP

**Syntax:** <FHSETSIPz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 50)

**Description:** This command is used to set the IP address to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The following example sets the IP address to “192.168.1.50”

**Example Command:**

```
<FHSETSIP192.168.1.50>
```

**Example Response:**

```
!
SET
```

## Command: Set Static Mask

**Syntax:** <FHSETHSMz.z.z.z>

**Parameters:** z – IP octet (IE 255 255 255 0)

**Description:** This command is used to set the Mask block to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Mask to “255.255.255.000”

**Example Command:**

```
<FHSETHSM255.255.255.0>
```

**Example Response:**

```
!
```

```
SET
```

## Command: Set Static Gateway

**Syntax:** <FHSETHSGz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 1)

**Description:** This command is used to set the Gateway to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Gateway to “192.168.1.1”

**Example Command:**

```
<FHSETHSG192.168.1.1>
```

**Example Response:**

```
!
```

```
SET
```

## Command: Turn DHCP On or Off

**Syntax:** <FHSETHSDn>

**Parameters:** n – 0 for off, 1 for on

**Description:** This command tells the focuser to turn the DHCP client off or on. See Appendix C – Networking for details.

**Example Command:** <FHSETHSD1> turn dhcp on

**Example Response:**

```
!
```

```
SET
```

## Command: Push Wired Settings

**Syntax:** <FHSAVEIP>

**Parameters:** None

**Description:** This command tells the focuser to save the wired network settings. This should be used after the IP and Mask values have all been changed. It may take several seconds for the changes to be applied and a power cycle may be necessary. See Appendix C – Networking for details as to the changes that can be made.

**Example Command:** <FHSAVEIP>

**Example Response:**

!

SET

Appendix A – Device Types on page 19 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.

TempCo 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 [Appendix B – Wi-Fi Security Modes](#) 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
```

## Command: Get Temperature Compensation and Step Size Information

**Syntax:** <FnGETTCI>

**Parameters:** n- Focuser number

**Description:** This command will return the current temperature compensation settings and the focuser step size. **Added with 2.0.1**

**Example Command:** < F1GETTCI>

**Example Response: (Notes in parenthesis)**

```
!  
TEMP COMP1  
TComp ON = 0          (1 if the temperature compensation is on, 0 for  
off)  
OTC Mode = A         (The current Temperature Compensation Mode)  
TC@Start = 0        (1 if the temperature compensation is on, 0 for  
off)  
TempCo A = -0040 (The temperature compensation coefficient for mode A)  
TempCo B = +0086 (The temperature compensation coefficient for mode B)  
TempCo C = +0086 (The temperature compensation coefficient for mode C)  
TempCo D = +0086 (The temperature compensation coefficient for mode D)  
TempCo E = +0086 (The temperature compensation coefficient for mode E)  
TempIn A = +10460   (The temperature compensation intercept for mode  
A)  
TempIn B = +03500   (The temperature compensation intercept for mode  
B)  
TempIn C = +03500   (The temperature compensation intercept for mode  
C)  
TempIn D = +03500   (The temperature compensation intercept for mode  
D)  
TempIn E = +03500   (The temperature compensation intercept for mode  
E)  
StepSize = 01000    (The focuser step size in units of microns time  
10000)  
END
```

## Command: Get Hub IP Info

**Syntax:** <FHGETHIP>

**Parameters:** none

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

Curr. IP = The current IP Address (static or dynamic)

Cur Mask = The current Mask (static or dynamic)

Gateway = The current Gateway (static or dynamic)

Pri. DNS = The Primary DNS

Sec. DNS = The Secondary DNS

Def. IP = The Static IP to use if DHCP is off

Def.Mask = The Static Mask to use if DHCP is off

DHCP On = The current DHCP state (1 for on, 0 for off)  
NetBIOS = The NetBIOS name of the hub. Should be FOCUSLYNX  
MAC Addr = The MAC Address of the Ethernet

**Example Command:** <FHGETHIP>

**Example Response:**

```
!  
HUB IP INFO  
Curr. IP = 169.254.20.70  
Cur Mask = 255.255.0.0  
Gateway = 192.168.1.1  
Pri. DNS = 169.254.1.1  
Sec. DNS = 0.0.0.0  
Def. IP = 192.168.1.100  
Def.Mask = 255.255.255.0  
DHCP On = 1  
NetBIOS = FOCUSLYNX  
MAC Addr = 00:04:A3:67:CF:C4  
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, new lines and < > are not allowed)

**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:** <FxSCDTzz>

**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 Wired Configuration Commands

Command: Set Static IP

**Syntax:** <FHSETSIPz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 50)

**Description:** This command is used to set the IP address to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The following example sets the IP address to “192.168.1.50”

**Example Command:**

```
<FHSETSIP192.168.1.50>
```

**Example Response:**

```
!
```

```
SET
```

## Command: Set Static Mask

**Syntax:** <FHSETHSMz.z.z.z>

**Parameters:** z – IP octet (IE 255 255 255 0)

**Description:** This command is used to set the Mask block to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Mask to “255.255.255.000”

**Example Command:**

```
<FHSETHSM255.255.255.0>
```

**Example Response:**

```
!
```

```
SET
```

## Command: Set Static Gateway

**Syntax:** <FHSETHSGz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 1)

**Description:** This command is used to set the Gateway to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Gateway to “192.168.1.1”

**Example Command:**

```
<FHSETHSG192.168.1.1>
```

**Example Response:**

```
!  
SET
```

## Command: Turn DHCP On or Off

**Syntax:** <FHSETHSDn>

**Parameters:** n – 0 for off, 1 for on

**Description:** This command tells the focuser to turn the DHCP client off or on. See Appendix C – Networking for details.

**Example Command:** <FHSETHSD1> turn dhcp on

**Example Response:**

```
!  
SET
```

## Command: Push Wired Settings

**Syntax:** <FHSAVEIP>

**Parameters:** None

**Description:** This command tells the focuser to save the wired network settings. This should be used after the IP and Mask values have all been changed. It may take several seconds for the changes to be applied and a power cycle may be necessary. See Appendix C – Networking for details as to the changes that can be made.

**Example Command:** <FHSAVEIP>

**Example Response:**

```
!  
SET
```

Appendix A – Device Types on page 19 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:** <F1SCD`TOA`>

**Example Response:**

!  
SET

## Command: Set Current Position

**Syntax:** <F`x`SCCP`zzzzzz`>

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

**Example Command:** <F1SCCP`001500`>

**Example Response:**

!

## Command: Set Temperature Compensation Enabled/Disabled

**Syntax:** <F`x`SCTE`z`>

**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:** <F1SCTE`1`>

**Example Response:**

!  
SET

## Command: Set Temperature Compensation Mode

**Syntax:** <F`x`SCTM`z`>

**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:** <F<sub>x</sub>SCTCmszzzz>

**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:** <F1SCTCD+0092>

**Example Response:**

!

SET

## Command: Set Temperature at Start Enabled/ Disabled

**Syntax:** <F<sub>x</sub>SCTSz>

**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:** <F<sub>x</sub>SCBEz>

**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:** <F $x$ SCBS $zz$ >

**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:** <FHSCLB $zzz$ >

**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: Set Reverse Mode

**Syntax:** <F $x$ REVERSE $z$ >

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

**Description:** This sets the reverse setting to on. For non-homing focusers the definition of max and min are switched, and the move directions reverse. This is meant to be used with focusers that are mechanically reversed. **Added with 1.0.9**

**Example Command:** <F1REVERSE0>

**Example Response:**

```
!  
SET
```

## Command: Set Maximum Position

**Syntax:** <F $n$ SETMAX $zzzzzz$ >

**Parameters:**  $n$ – Focuser number,  $z$  – Target position left-padded with 0’s to a total length of 6 digits.

**Description:** This command will set the maximum position for non-homing focusers. **Added with 2.0.1**

**Example Command:** <F1SETMAX017000>

**Example Response:**

!

SET

## Command: Set The Temperature Compensation Slope Intercept

**Syntax:** <FnSETINTabzzzzzz>

**Parameters:** n- Focuser number, a- Target Temperature Compensation Mode, b- The sign of the Intercept, z – Target position left-padded with 0's to a total length of 6 digits.

**Description:** This command will set Temperature Compensation Intercept. This is only used when Temperature Compensation At Start is turned on. This allows the Focuser to compensate for temperature changes that occurred while the Focuser was turned off. **Added with 2.0.1**

**Example Command:** <F1SETINT+017000>

**Example Response:**

!

SET

## Command: Set Focuser Step Size

**Syntax:** <FnSETFSSzzzzzz>

**Parameters:** n- Focuser number, z – Target position left-padded with 0's to a total length of 5 digits.

**Description:** This command will set the focuser step size in units of microns per step \* 1000 and then rounded to the nearest int. This is only used in FocusLynx Commander to calibrate the microns per step. Maximum Microns Per step: 6.5535. **Added with 2.0.1**

**Example Command:** <F1SETFSS01200> (Sets the step size to 1.12 microns per step)

<F1SETFSS00120> (Sets the step size to .112 microns per step)

**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](#) for more information.)

**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=2: characters 33 through 48*  
*n=3: 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 [Appendix B – Wi-Fi Security Modes](#) for more information.

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

**Example Command:**

```
<FHSWSK0My Private Secur  
<FHSWSK1lity 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:** <FWWIFIRESET>

**Parameters:** None

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

**Example Command:** <FWWIFIRESET>

**Example Response:**

```
!  
SET
```

## Command: Restore Wi-Fi Defaults

**Syntax:** <FWWIFIDEFAULTS>

**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:** <FWWIFIDEFAULTS>

**Example Response:**

```
!  
SET
```

## Wired Configuration Commands

### Command: Set Static IP

**Syntax:** <FHSETSIPz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 50)

**Description:** This command is used to set the IP address to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The following example sets the IP address to “192.168.1.50”

**Example Command:**

```
<FHSETSIP192.168.1.50>
```

**Example Response:**

```
!
```

```
SET
```

### Command: Set Static Mask

**Syntax:** <FHSETHSMz.z.z.z>

**Parameters:** z – IP octet (IE 255 255 255 0)

**Description:** This command is used to set the Mask block to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Mask to “255.255.255.000”

**Example Command:**

```
<FHSETHSM255.255.255.0>
```

**Example Response:**

```
!
```

```
SET
```

### Command: Set Static Gateway

**Syntax:** <FHSETHSGz.z.z.z>

**Parameters:** z – IP octet (IE 192 168 1 1)

**Description:** This command is used to set the Gateway to z.z.z.z, allowing for a static IP to be set. This address is only used if the DHCP client is set to off (see Command: Turn DHCP Off). All four blocks must be set. The maximum value for each block is 255.

The allowed range of each block is determined by the network settings of the network you are trying to connect to.

The following example sets the Gateway to “192.168.1.1”

**Example Command:**

```
<FHSETHSG192.168.1.1>
```

**Example Response:**

```
!  
SET
```

## Command: Turn DHCP On or Off

**Syntax:** <FHSETHSDn>**Parameters:** n – 0 for off, 1 for on**Description:** This command tells the focuser to turn the DHCP client off or on. See Appendix C – Networking for details.**Example Command:** <FHSETHSD1> turn dhcp on**Example Response:**

```
!  
SET
```

## Command: Push Wired Settings

**Syntax:** <FHSAVEIP>**Parameters:** None**Description:** This command tells the focuser to save the wired network settings. This should be used after the IP and Mask values have all been changed. It may take several seconds for the changes to be applied and a power cycle may be necessary. See Appendix C – Networking for details as to the changes that can be made.**Example Command:** <FHSAVEIP>**Example Response:**

```
!  
SET
```

## Appendix A – Device Types

OA:	Optec TCF-Lynx 2"	<i>[available v1.00]</i>
OB:	Optec TCF-Lynx 3"	<i>[available v1.00]</i>
OC:	Optec TCF-Lynx with Extended Travel	<i>[available v1.00]</i>
OD:	Optec Fast Focus Secondary Focuser	<i>[available v1.00]</i>
OE:	Optec TCF-S Classic converted (original unipolar motor)	<i>[deprecated v2.00]</i>
OF:	Optec TCF-S3 Classic converted (original unipolar motor)	<i>[deprecated v2.00]</i>
OG:	Optec Gemini (reserved for future use)	<i>[unused]</i>
OI:	Optec TCF-Leo Hi-Speed	
OJ:	Optec TCF-Leo Hi-Torque	
FA:	FocusLynx QuickSync FT Hi-Torque	<i>[available v1.03]</i>
FB:	FocusLynx QuickSync FT Hi-Speed	<i>[available v1.03]</i>
FC:	FocusLynx QuickSync SV – (reserved for future use)	<i>[reserved]</i>
FD:	DirectSync TEC with bipolar motor - higher speed	
FE:	FocusLynx QuickSync Long Travel Hi-Torque	<i>[available v1.08]</i>
FF:	FocusLynx QuickSync Long Travel Hi-Speed	<i>[available v1.08]</i>
RA:	Robo-Focus NPM and Hurst motors	<i>[available v2.0.0]</i>
SA:	Starlight Focuser - FTF2008BCR	<i>[deprecated v1.01]</i>
SB:	Starlight Focuser - FTF2015BCR	<i>[deprecated v1.01]</i>
SC:	Starlight Focuser - FTF2020BCR	<i>[deprecated v1.01]</i>
SD:	Starlight Focuser - FTF2025	<i>[deprecated v1.01]</i>
SE:	Starlight Focuser - FTF2515B-A	<i>[deprecated v1.01]</i>
SF:	Starlight Focuser - FTF2525B-A	<i>[deprecated v1.01]</i>
SG:	Starlight Focuser - FTF2535B-A	<i>[deprecated v1.01]</i>
SH:	Starlight Focuser - FTF3015B-A	<i>[deprecated v1.01]</i>
SI:	Starlight Focuser - FTF3025B-A	<i>[deprecated v1.01]</i>
SJ:	Starlight Focuser - FTF3035B-A	<i>[deprecated v1.01]</i>
SK:	Starlight Focuser - FTF3515B-A	<i>[deprecated v1.01]</i>
SL:	Starlight Focuser - FTF3545B-A	<i>[deprecated v1.01]</i>
SM:	Starlight Focuser - AP27FOC3E	<i>[deprecated v1.01]</i>
SN:	Starlight Focuser - AP4FOC3E	<i>[deprecated v1.01]</i>
SO:	FeatherTouch Motor Hi-Speed (includes Micro-Touch unipolar)	<i>[available v1.03]</i>
SP:	FeatherTouch Motor Hi-Torque (includes Micro-Touch unipolar)	<i>[available v1.03]</i>
SQ:	Starlight Instruments - FTM with MicroTouch (unipolar)	<i>[available v1.03]</i>
SR:	Starlight Instruments – FeatherTouch Posi-Drive	<i>[available v1.10]</i>
TA:	Televue Focuser – with Micro-Touch unipolar motor	<i>[available v1.03]</i>

ZZ: default setting – no function

*[available v1.00]*

## 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)

## Appendix C – Networking

Effective with firmware version 2.2.0, Optec engineers have made significant improvements to the TCP/IP stack provided by chip manufacturer Microchip Technology, Inc. ([www.microchip.com](http://www.microchip.com)).

Both wired and WiFi Ethernet connections take advantage of these TCP/IP stack improvements for more reliable communications and network connection. Response speed with either connection method is greatly improved. Part of this improvement is made by limiting the number of available socket connections to the FocusLynx hub to five or fewer Ethernet clients.