

Motorized Filter Wheel Accessory with RS-232C
Conix Product#FiltrWhl

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Introduction

The Motorized Filter Wheel is an accessory which permits remote selection of one of 6 filters in the optical path of the illumination system of many different microscopes. The Motorized Filter Wheel is installed between the Episcopic-Fluorescence Attachment and the lamp house. The stand-alone version of the system consists of a Filter Wheel attachment and a Control Module. The system permits remote manual filter selection via the six push-buttons on the Control Module, or computer selection of a filter block using an RS-232C link. In addition, an electrically actuated shutter can be opened either via a push button on the Control Module or by remote computer. The system can be integrated into automated microscopy processes.

Features:

- Remote-Manual operation by push buttons on Control Module.
- Selection of one of 6 filters in wheel
- Remote Shutter open/close
- Two manual filter slots with dual filter slides
- User installable 25 mm filters
- Controllable by any computer with RS-232C communication capacity.
- Continuous indication of filter selection by illuminated LED
- Clean room compatible.
- Aluminum case shields against RFI radiation from controller microprocessor and motor.

Compatible With The following Light houses:

- Nikon 100W HBO
- Nikon 50W HBO

Illustration #1

Installation

Mounting the Motorized Filter Wheel on a Microscope stand

Install the Motorized Filter Wheel by attaching it to the end of the Epi-illuminator with the bayonette ring. Attach the lamp house to the Filter Wheel with its bayonette ring.

Connect control and power cables.

- (1) Connect the cable from the Filter Wheel into the connector on the short cable extending from the Control Module.
- (2) If the Motorized Filter Wheel is to be controlled by a computer, connect the Control Module to the computer as described in the section on computer control.
- (4) Insert the cord end connector from the power supply into the Power Connector on the rear of the Control Module.
- (5) Plug the power supply into a 120VAC 60Hz receptacle.

CAUTION: Plug the power supply into the controller before attaching it to a receptacle.

Operation

LED Display.

The lighted LED indicates the current filter selected. If no LED is lighted then the system is not responding properly. If an LED is flashing then that filter is in the access position (the insert filter position).

Filter installation

To put a filter into the wheel, press the button for the selected filter position, then after the LED is lighted press the button again and hold down for one second. The LED will blink, indicating the wheel is in position for a filter to be loaded.

The system will return to normal operation as soon as a filter position is selected.

Cautions about filter installation:

- (1) Use only plastic 4-40 screws to retain the filter in the wheel.
- (2) Use plastic screws whose threaded length is no longer than the thickness of the specific filter being installed. Use of screws longer than this will cause severe damage.

- (3) Avoid dropping screws or a filter into the filter wheel housing.
(Initial filter installation is done most easily with the filter wheel removed from the microscope stand and laying with the wheel horizontal.) **Caution: Severe damage to the shutter can result from dropped objects lodging in the filter wheel housing.**

Computer Controlled Operation Of The Accessory.

(1) Connection of communication cable.

A communication cable is provided equipped with MOD 6 connectors. Insert the one end of the cable into the RS-232C Modular Connector on the rear of the Controller Module.

An adaptor is provided to convert the MOD 6 connector to DB-9, which is compatible with a standard IBM AT style serial port.

Another adaptor is provided which converts the DB-9 to DB-25, which is compatible with the standard serial port of a IBM PC/XT style computer. Other devices may require specific adaptors, refer to the schematic, in the technical section of this manual, for wiring information.

Use the proper adapter to make the proper connection with the serial port in your computer.

(2) Operation by computer control.

Any computer system capable of generating ASCII alphanumeric character output can be used to control the Accessory. The Control buttons are not disabled while it is linked to the control computer. The Accessory can be controlled manually at any time during program operation provided that computer control software has not disabled the buttons.

(3) Demonstration programs.

Three demonstration programs are included to provide an introduction to external computer control of the Accessory. These programs are not intended to serve as operational software, or fulfill any application other than to demonstrate external computer control of the Accessory.

The demonstration programs require an IBM-compatible personal computer equipped with a floppy disk drive, DOS 3.1 or above, and 512K memory.

Summarized in the read.me file included on the disk with the software demos.

Communication Specifications

The Communications interface is an interface between a host computer and the controller. The communication is established through an RS-232C serial connection. The programming protocol is with text (standard ASCII alphanumeric characters), along with some special control characters such as carriage returns, spaces and tabs. The controller responds to a set of built-in commands with unique names. The commands can be executed by simply sending the command name with some parameters (if required). The controller will respond in ASCII and may include the result requested.

RS-232C Settings:

Format: 8-Bits, 1-Stop Bit, No Parity
Baud Rates: 9600

General Format Of Commands

Each line sent to the Controller should have a command and be terminated with a carriage return character. The first item on the line should be the command. Each line can contain only one command and the Controller's commands are not case sensitive. The allowed commands are listed below. After the command are the parameters, some commands have no parameters. Finally, each command must be terminated with a carriage return character. The carriage return indicates to the Controller the end of a command. The specific items can be separated with white space characters (such as spaces, tabs). The entire command string cannot exceed 40 characters.

(command) [data] <cr>

where:

(command) any valid ASCII command.
[data] ASCII numeric data (if applicable).

For Example:

Command: **FILTERW<cr>**
Response: **:A 2<cr>**

Response

:A <DATA><cr> Everything is OK <returned data>
:N <ERROR CODE><cr> Error.

Every command returns a response: The response is in the form of a colon followed by a status character (either an A or N). The colon is sent by the Controller as soon as the command is received. The status character is not sent until the function has completed (i.e. after the motor has moved/stopped). Do not send another command until the last function has been completed and returned a response. If for some unknown reason the Controller does not respond with a colon, then the command was not received properly (due to communications problems) and the command must be resent. In this case, the Controller's internal buffer must be emptied by sending an ESC character (ASCII 27). This is necessary since your last command may have been partially received and still reside in the Controller's internal buffer. It is not a bad idea to send an ESC character before every command, but it is not necessary.

Examples:

command:	FilterW 2<cr>	(move to location 2)
response:	:A 2<cr>	(everything is OK, current)
command:	Filterw <cr>	(where is unit?)
response:	:A 2 <cr>	(Turret Position 2)
command:	AQRST<cr>	(an illegal command)
response:	:N -1 <cr>	(error code -1)

PRESENTLY ASSIGNED ERROR CODES

-1	Unknown Command
-2	Unknown Position
-3	Halt Command

ASCII Commands

Buttons:

format: **BUTTONS ON/OFF <cr>**

This command will turn the buttons located on the controller either on or off. If no parameters are given, this command returns the current status of the buttons. In addition to the status, the number of the button being pressed, 0=> no button depressed.

Response:

A positive response is sent back immediately after the command is received.

:A<CR>

Example:

BUTTONS ON<cr>

Response:

:A ON 00<cr>

**;buttons on, no button being
pressed**

ASCII Commands

Calibrate the Filter Wheel Position:

format: **Calibrate <cr>**

This command will re-home the Filter Wheel, then move back to the current location. If the system was between position when calibrate was called, then the system will return to the nearest position. This command should not be needed unless the system has somehow lost positioning count information. The system automatically calls this routine on powerup to determine where it is.

Response:

A ':' is sent back immediately after the command is received. the 'A' is returned when the command is complete.
:A <CR>

Example:

Calibrate<cr> Move home then return to current position.
:A

ASCII Commands

Change the Filter Wheel location:

format: **Filterw X <cr>**
 or **FW X<cr>**

This command will Move the Filter Wheel to a new location. the returned value is the current location after the move. A returned value of zero implies a error has occurred and the Filter Wheel either didn't get to the new location or there is a internal error of some sort.

Response:

A ':' is sent back immediately after the command is received. the 'A' is returned when the command is complete.
:A X<CR>

Example:

Filterw 1<cr> Move to location 1
:A 1 current location after move is 1

ASCII Commands

Halt Motor: (Special Interface requirements)

format (ASCII Only):

HALT

The ASCII version of this command behaves differently than the hex code version. The ASCII version like all other ASCII commands is only interpreted after the previous command is completed. This makes the ASCII form of the command less useful than the hex code version.

Response (ASCII Only):

A positive response is sent back immediately after the command is completed.

:A

Hex code: 0x7D (HEX Only)

The hex code version of this command is interpreted differently than standard commands. The moment the processor receives the hex code it stops the motor, DO NOT SEND a line terminator, it is then interpreted as an empty string, which results in an 'N -1 Unknown Command' ERROR. This command also flushes the internal receive buffer.

There is no response from this command itself. But if a previously entered command has been halted the normal response from that command will be returned.

ASCII Commands

To move to the loading zone.:

format: **Load X <cr>**

This command will Move the give Filter Wheel position into the loading zone so a filter can be inserted. The LED will flash when the system is in the load mode. Changing the filter location by computer or pressing any of the filter buttons will resume normal operations.

Response: A ':' is sent back immediately after the command is received.
 the 'A' is returned when the command is complete.
 :**A X<CR>**

Example:

Load 1<cr>	Move to load position 1
:A Load 1	

ASCII Commands

Reset the system:

format: **RESET<cr>**

hex code: 0x7F

This command will reset the system, as if the power had been turned off. When the hex code is used this command does an automatic power on reset regardless if a command is being executed. No response is given if hex code is used.

Response:

A positive response is sent back prior to the command being completed; The command responds prior to reset.

:A<CR>

Example:

RESET<cr>

ASCII Commands

Change the shutter state.:

format: **SHUTTER OPEN/CLOSE/TOGGLE/TIME<cr>**
hex code: 0x7F

This command will change the state of the shutter. You can Open, Close, Toggle or have a timed toggle. The Open, Close and toggle change the state of the shutter. The timed mode, allows the operator to enter a time (in milliseconds) that the shutter will stay toggled for, then the system will return to the previous state.

Response: A positive response is sent back when the command is complete.
 :**A<CR>**

Example: Shutter 100 Toggle the shutter wait 100 milliseconds
 then toggle back
 Shutter Open Open the Shutter
 Shutter Close Close the shutter
 Shutter Toggle Change the state of the shutter.

ASCII Commands

Get Version:

format: **VERSION<cr>**

Hex Code: 0x7C

This command returns the current version code of the firmware.

Response:

A positive response is sent back when the command is complete.

:A<CR>

ASCII Commands

Who:

format: **WHO<cr>**

This command will return the current microscope accessory being used. In this case it returns "**Filter Wheel Accessory**".

Response:

A positive response is sent back immediately after the command is received.

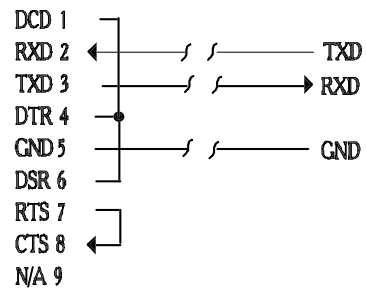
:A<CR>

Example:

WHO<cr>

Response: **:A Filter Wheel Accessory<cr>**

RS-232C Hardware Connections



DB9F
(IBM AT-Style Serial
Mating Connector)

RJ-11 MOD4 to
Remote Focus
Accessory

For warranty repair return the product to the warranty department of
Conix Research at:

Conix Research Inc.
857 28th Street
Springfield, OR 97477
(541) 747-8512

You should provide a written description of the problem with the unit.
Consumer must prepay all postage, shipping, insurance, and delivery costs
associated with the return of the product.

For more information refer to the Conix Research Limited Warranty Card
provided with this product.

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