

**Motorized Quad-Filter Accessory with RS-232C and Display
Conix Product #FLQDFL for Nikon TE200/300**

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Introduction

The Motorized Quad-Filter permits remote selection of filter blocks for TE 200/300 microscopes. The system consists of a Motorized attachment and a Control Module. The system permits remote manual filter block selection via the four push-buttons on the Control Module, or computer selection of a filter block using an RS-232C link. The system can be integrated into automated microscopy processes.

Features:

- Remote-Manual operation by push buttons on control module.
- Controllable by any computer with RS-232C communication capacity.
- Sample programs included which demonstrate control of the Motorized Quad Fluor by an IBM-compatible computer.
- Continuous display of filter block selection by illuminated LED.
- Clean room compatible.
- Aluminum case shields against RFI radiation from controller microprocessor and motor.

Compatible With The Following NIKON Microscopes:

- Nikon TE200
- Nikon TE300

Installation

Installing the filter blocks

WARNING:

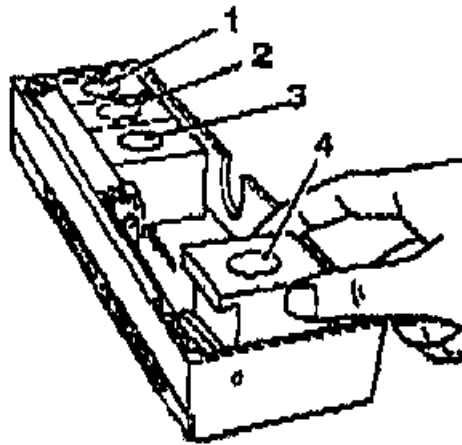
Always use four filter blocks (do not leave any of the filter slots empty)

Always keep four filter blocks in the cassette holder. If you leave any of the filter slots empty, the instant that the open position is moved into the optical path, light from the light source will reach the eyepiece unfiltered and the user's eyes will be exposed to harmful ultraviolet light, with blindness possibly resulting. (In addition, if there is an empty slot, inertia will cause the filter blocks to slide horizontally when changing filters, creating problems during microscopy.) If fewer than four filter blocks are required for microscopy, use diascopic filter blocks (DIA ILL) as dummies so that there are always four filter blocks installed.

Do not touch the surfaces of the filters.

- 1) Move the slider away from the end of the cassette holder.
- 2) Using the hexagonal driver, loosen the screw of the filter block clamp plate. (The clamp plate will drop down.)

- 3) Slide the filter block into the dovetail mount until it clicks into place.



- 4) Install the three remaining blocks in the same manner.
 - *Install the frequency used filter blocks at the ends of the dovetail mount in order to make replacement easier.
 - *If diascope illumination is going to be used as well, install one diascope filter block (DIA ILL).
 - *If fewer than four filter blocks are required for microscopy, use diascope filter blocks (DIA ILL) as dummies so that there are always four filter blocks installed.
- 5) Secure the filter block clamp plates back in the horizontal position. (The purpose of these clamp plates is to prevent the filter blocks from sliding horizontally. Make sure that the clamp plate is secured in the horizontal position.)

- 6) Slide the cassette holder into the microscope focusing mechanism. Slide it until it seats against its stop.
- 7) Using the hexagonal screwdriver, tighten the two clamp screws to secure the cassette holder. Attach the two short and long shrouds using the screws provided.

Replacing the filter blocks

- 1) Remove the long shroud from the focusing mechanism.
- 2) Using the hexagonal screwdriver, loosen the cassette holder clamp screws and pull out the cassette holder.
- 3) Move the slider as required to give access to the filter blocks. Using the hexagonal driver, loosen the screws of the filter block clamp plate.
- 4) Replace the filter blocks according to the procedures from step 3) to 5). "Installing the filter blocks."

Connect control and power cables.

- (1) Connect the cable from the Quad-Filter into the connector on the short cable extending from the control module.
- (2) If the Motorized Quad-Filter is to be controlled by a computer, connect the Control Module to the computer as described on page 10.
- (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.

Operation

LED Display.

The lighted LED indicates the current filter block selected. If no LED is lighted then the system is not at a valid location or the power is not on. The valid locations are encoded so if a user manually moves the position and does not come to a detent then no LED is Lighted.

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: **Quad<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:	Quad 2<cr>	(move to location 2)
response:	:A 2<cr>	(everything is OK, current)
command:	Quad <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

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

Change the QuadFluor location:

format: **Quadfluor X <cr>**
 or Quad X<cr>

This command will Move the Quadfilter 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 quadflur 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:

Quadfluor 1<cr> Move to location 1
:A 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

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 "**Quad Filter System Controller**".

Response:

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

:A<CR>

Example:

WHO<cr>

Response: **:A Quad Filter System Controller<cr>**

For warranty repair return the product to the warranty department of
Conix Research Inc. at the following location:

Conix Research Inc.
857 28TH
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 Inc. Limited Warranty
Card provided with this product.

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