OT-302D
DISPLAY MODULE

USERS MANUAL

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1.0 INTRODUCTION

The ON-TRAK OT-302D is a position display module for the On-Trak Photonics Inc. position sensing amplifiers. The microprocessor controlled display takes the analog voltage output from the position sensing amplifier and converts it to absolute position in millimeters or inches. The X and Y position output and SUM output is displayed on an LCD back lighted display.

2.0 SPECIFICATIONS

Input Voltage Range	
- Position X, Y	+/- 10V
- Sum	0V - 6V
Resolution	0.0001 inches / 0.0001 mm
Display update rate	10 times per second
Zero Offset (Offset Null)	Over entire PSD
Calibration Adjust	Software selectable
Input Connectors	BNC
Output	RS-232
Power Requirement	12V, 500mA AC Adapter
Dimensions	5.57 x 1.52 x 6.00 inches

3.0   FRONT PANEL FUNCTIONS

FRONT PANEL

Fast/Slow: Sets averaging time of OT-302D readout. Fast is 4x times the
                    Slow time.

Zero: Sets current reading as "zero"

                    X = 0.0000" and Y = 0.0000"

                    Or

                    X = 0.0000mm and Y = 0.0000mm

4.0   REAR PANEL FUNCTIONS

REAR PANEL

X IN: "X" input voltage from Position Sensing Amplifier

Y IN: "Y" input voltage from Position Sensing Amplifier

SUM: "SUM" input voltage from Position Sensing Amplifier

RS-232:   9-Pin RS-232

5.0 INITIAL SET-UP

1. Configure PSD and PSD amplifier.

   Configure the PSD and PSD amplifier according to the manufacturer's specifications. If using the OT-301 Position Sensing Amplifier, refer to the user's manual for the proper initial setup procedure.

2. Connect X, Y, and SUM inputs to the OT-302D.
3. Connect the OT-302D to power using the 12 VDC/500mA transformer (U.S.).
4. Plug in RS-232 Connection if using a computer.
5. Turn on power via the rear panel switch. The OT-302D will display the following message on power up:

   OT-302D V3.13
   ON-TRAK Photonics

   It will immediately display X and Y position, SUM voltage, and update speed.

6.0   MANUAL OPERATION

The OT-302D has two modes of operation; Measurement Mode and Configuration Mode.

Measurement Mode

This is the standard operating mode. Readings for PSD position are displayed continuously on the front panel. The OT-302D defaults to this condition upon power up.

The OT-302D displays X, Y, and SUM via the front panel. Averaging can be selected to be **FAST** or **SLOW**. The current reading may be set to be relative zero by pressing the **ZERO** button. The LED light indicates the **ZERO** function is active.

Configuration Mode

The configuration mode allows the user to select the user-defined options.

1. Enter the configuration mode by pressing both the **FAST/SLOW** and **ZERO** buttons simultaneously.

2. The first screen allows the user to set inches or mm. The **ZERO** switch toggles between inches and mm.

3. After selecting the measurement units, the next screen is accessed by pushing the **FAST/SLOW** button once. This screen allows the user to select the PSD size. By pushing the **ZERO** button, the user can select 2.0mm, 2.5mm, 4mm, 5mm, 10mm, 20mm, 30mm, and 45mm detector sizes. Additional size options may be set up via RS-232 using the I*NNN* command (Section 7).

4. The third screen allows the user to select the value for the SLOW averaging time. The **ZERO** button is activated to select a value from 1-9. Each count is 1.0 second. The FAST value defaults automatically to ¼ of the slow time.

    Example: a value selection of 4 would correspond to a 4.0 second SLOW averaging time and a 1.0 second FAST time.

5. Pushing the **FAST/SLOW** once more will put the instrument back into the measurement mode.

   Note: When using the OT-302D with the OT-301 Position Sensing Amplifier, it is important to operate the OT-301 in the CAL/ZERO OFF mode.

7.0 COMPUTER CONTROL

The OT-302D can be controlled via the RS-232 port.

Setup:

The OT-302D uses a standard 9 pin RS-232 cable. Using HyperTerminal or any standard communication software, the user will be able to communicate with the OT-302D using the following settings:

> 9600 baud
> 8 bits
> 1 stop bit
> no parity

Manual conventions:

- *N* represents a digit from '0' - '9'.
- <ENTER> represents the computer's "Enter" or "Return" key.

Commands

Commands must be lower case and end with <ENTER>. Command parameters are digits from '0' - '9'. The target responds with a '!' after a valid command or a '?' after an invalid command. Command parameters must be contain at least 1 digit, and may contain up to 5 digits. Command parameters are not validated, so parameters exceeding the specified range may create unintended problems.

a*NNN*
- Function: *NNN* specifies the averaging count from 1-255.
- Example: **a10<CR>** sets the averaging count to 1 second in the slow mode.
- Example: **a20<CR>** sets the averaging count to 2 seconds in the slow mode.
- Response: **!** or **?**.
- Factory default: **a20**.

b*NNNN*

- Function: *NNNN* specifies the baud rate.
- Example: **b4800 <CR>** sets the baud rate to 4800 baud.
- Response: **!** or **?**.
- Factory default: **b9615**.

c*N*

- Function: *N* enables and disables the front panel buttons: 0=enabled, 1=disabled.
- Example: **c1<CR>** disables the front panel buttons to prevent accidental activation during use with a computer.
- Response: **!** or **?**.
- Factory default: **c0**.

d*N*

- Function: *N* sets default selection status: 1=enabled, 0=disabled.
- Example: **d1<CR>** sets the OT-302D to automatically respond to commands without the need to select it with the "s" command. To assign ID#s to multiple instruments, contact the factory.
- Response: **!** or **?**.
- Factory default: **d1**.

e*N*

- Function: *N* specifies the communication port echo status: 0=off, 1=on. When on, the OT-302D echoes all com port characters received, and sends a <CR>, <LF> and ">" prompt following the **!** or **?** response to each command. "Off" status is most useful with direct computer control when the computer doesn't want to get back everything it sends and doesn't want a response other than **!** or **?**. However, **e1** can be useful to verify data and help prevent collisions by pacing the data sent.
- Example: **e1<CR>** turns echo on.
- Response: **!** or **?**.
- Factory default: **e1.**

f*N*

- Function: *N* specifies the fast or slow averaging mode: 0=slow, 1=fast. "Slow" is 4 times longer than the fast mode.
- Example: **f1<CR>** selects fast averaging.
- Response: **!** or **?**.
- Factory default: **f0**.

i*NNN*
- Function: *NNN* assigns and ID value for use with the "s" command. Valid numbers are 1-256.
- Example: **i1<CR>** sets the ID value to "1".
- Response: **!** or **?**.
- Factory default: **i1**.

j*NNNNN*
- Function: *NNNNN* sets the X axis calibration factor. Factory set.

k*NNNNNNNN*
- Function: *NNNNNNNN* sets the Y axis calibration factor. Factory set.

l*NNN*
- Function: *N* specifies 2 times the length of the PSD sensor in mm. This command may be used for standard and non-standard PSD lengths.
- Example: **l20<CR>** sets the sensor length as 10mm.
- Response: **!** or **?**.
- Factory default: **l20**

m*N*
- Function: *N* specifies measurement units. 0=inches, 1=mm.
- Example: **m1<CR>** set the readout to mm.
- Response: **!** or **?**
- Factory default: **m1**

n*N*
- Function: *N* sets the absolute SUM zero offset. Factory set.

o*N*
- Function: *N* specifies the relative offset status: 0=off, 1=on. When "on", the current position changes to 0.000 and the display then shows the distance from this "relative 0" position by subtracting the stored "relative 0" position from the actual position.
- Example: **o1<CR>** enables the offset.
- Response: **!** or **?**.
- Factory default: **o0**.

p*N*
- Function: *N* specifies the mode of data display: 0=off, 1=on. When "on", the OT-302D puts the serial data on a separate line on the computer monitor. When "off", data is continuously updated on the same line.
- Example: **p1<CR>** enables continuous position transmission on a separate line.
- Response: **!** or **?**.
- Factory default: **p0**.

q*N*
- Function: *N* specifies quiet mode: 0=off, 1=on. When "off", the OT-302D sends position data to the serial port. When "on", data is not transmitted.
- Example: **q0<CR>** enables continuous position transmission to serial port.
- Response: **!** or **?**.
- Factory default: **q0**.

r*NNN*
- Function: Requests the position of OT-302D.
- Example: **r1<CR>** requests the position of OT-302D.
- Response: The OT-302D sends it's current display as ASCII -1.999 to 1.999, "EEEE", or "----" terminated with only a <CR>, regardless of the 'e' command setting. If the target receives a 2nd **r** command before calculating a new position, it responds with ****<CR>.

v
- Function: Displays a software version message and current settings.
- Response: Two ASCII text lines. The first line shows the target's software version and terminates with a **<CR>** and **<LF>**. The second line shows the current command settings and terminates with **!** and as specified by the 'e' command setting.

w

- Function: Saves current settings in non-volatile memory which is retained even when the power is off. The last values saved are automatically restored when the target is turned on by applying power. <u>Unless saved with the **w** command, all commands are only effective until changed, or until the target is turned off by removing power</u>.
- Response: **!** or **?**

X + *NNNNN*
X - *NNNNN*

- Function: Sets X gain calibration for the current gain selection to *NNNNN*. This allows the user to calibrate the PSD with a precision stage to read exact translation values. The X reading is multiplied by the value and then divided by 10,000. x + sets calibration values for positive values. x – sets calibration for negative values.
- Example: **x+10100<CR>** multiplies the current reading by 10,100/10,000 (101%). Background illumination will typically have the effect of making the readings appear "shorter" than the actual value due to the PSD's attempt to integrate all the light on it's surface. As a result, calibrated measurements will require a factor > 100% to correct for this effect.
- Response: **!** or **?**.
- Factory default: **x+10000**

Y + *NNNNN*
Y - *NNNNN*

- Function: Sets Y gain calibration for the current gain selection to *NNNNN*. This allows the user to calibrate the PSD with a precision stage to read exact translation values. The Y reading is multiplied by the value and then divided by 10,000. y + sets calibration values for positive values. y – sets calibration for negative values.
- Example: **y+10100<CR>** multiplies the current reading by 10,100/10,000 (101%). Background illumination will typically have the effect of making the readings appear "shorter" than the actual value due to the PSD's attempt to integrate all the light on it's surface. As a result, calibrated measurements will require a factor > 100% to correct for this effect.
- Response: **!** or **?**.
- Factory default: **y+10000**

z*NNNNN*

- Function: *NNNNN* sets the SUM voltage calibration. Factory set.

7.0   WARRANTY

ON-TRAK Photonics, Inc. warrants its amplifiers to be free of defects in material and workmanship for a period of one (1) year from date of shipment. This warranty extends only to the original owner of the product and is limited to repair or replacement of any parts which are defective in design, workmanship or material used in the manufacture, provided such amplifier, in the judgement of ON-TRAK Photonics, Inc. has not been damaged by accident, misuse, neglect, alteration or improper installation, repair or testing.

This warranty is exclusive or in lieu of any warranty of merchantability, fitness for purpose or other warranty of quality, whether expressed or implied, and of all other liabilities of ON-TRAK Photonics, Inc. for damages, including consequential damages occurring out of or in connection with the delivery, use or performance of the ON-TRAK Photonics, Inc. amplifiers.

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