OPTRONIC LABORATORIES, INC.
Emphasizing Precision and Accuracy
Est. 1970

OL 16A/65A/83A
Programmable
DC Current Source

Manual No: M000248
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This Manual Applies to

OL 16A Instrument Serial Numbers XX205XXX and above
OL 65A Instrument Serial Numbers XX210XXX and above
OL 83A Instrument Serial Numbers XX217XXX and above

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COMMUNICATION PROTOCOL

RS-232C

The communication protocol is an interactive protocol that requires both controller and device to be satisfied with the communication transaction that occurred. The protocol requires a HOST controller (computer) and one or more devices (OL 16A/65A/83A Current Source).

All transactions must be initiated by the HOST. The HOST begins a transaction by transmitting an EOT (0xFF) onto the communications interface. This signals the devices that a transaction is pending and to prepare for it. The next byte transmitted is a DEVICE address.

> **Note:**
>
> No device address should be duplicated on the communications interface.

The address is a 7 bit address (0x00 - 0x7E) which provides two functions for the DEVICE and the HOST. The address can be used to signal the DEVICE that the host plans to transmit data to the DEVICE or the HOST can set BIT 7 of the address high to ask the DEVICE if they have any messages to transmit to the HOST. Two transaction types are supported: HOST sends data to the DEVICE and HOST receives data from the DEVICE. All data is seven bit ASCII.

EOT	=	0xff
ACK	=	0x06
NAK	=	0x15
STX	=	0x02
ETX	=	0x03
CHK	=	A 7 bit accumulative checksum.
ADD	=	DEVICE ADDRESS

The following respective events must occur to complete a successful transaction:

HOST sends data to the DEVICE:

Host sends	Device responds
EOT ADD	
	ACK (If DEVICE can receive data). NAK (If DEVICE can not receive data).
STX message ETX CHK	
	ACK (If checksum matches). NAK (If checksum fails).
Transfer is complete.	

HOST receives data from DEVICE:

Host sends	Device responds
EOT ADD|B7	
	ACK (If device has data to send). NAK (If device has nothing to send).
	STX message ETX CHK
ACK (If checksum matches) NAK (If not)	
Transfer is complete.	

RS-232C CONNECTOR PINOUT

On the rear panel of the OL 16A/65A/83A is a male, 9-pin, D-subminiature connector, serial port.

The OL 16A/65A/83A can be connected to a PC serial port with a standard RS-232C cable.

The pinout is as follows:

Pin 2:	Rx	Receive Data
Pin 3:	Tx	Transmit Data
Pin 5:	Gnd	Signal Ground

If the unit is equipped with a 25-pin, D-subminiature connector. The pinout is as follows:

Pin 2:	Rx	Receive Data
Pin 3:	Tx	Transmit Data
Pin 7:	Gnd	Signal Ground

COMMAND SET

Set Current Target

This command changes the lamp current target. If the value is above the target current limit for the presently selected lamp setup, the target will not change. The instrument will respond by returning the presently measured current and the system status.

```
Host                    Instrument

C CT  ---------------->
   <---------------- C CV SS
```

C - Is the single letter command for setting the current target.
CT - Is the value of the new current target (i.e. 1.234).
CV - Is the value of the presently measured output current.
SS - Is the hexadecimal ASCII representation of the system status byte.

Request Output Current Value

This command requests the OL 16A/65A/83A return the value of the lamp current.

```
Host                Instrument

  c ---------------->
  <------------ C CV SS
```

c - Is the single letter command for requesting the output current value.
CV - Is the value of the presently measured output current.
SS - Is the hexadecimal ASCII representation of the system status byte.

Set Voltage Target

This command changes the lamp voltage target. If the value is above the limits of the instrument, the target will not change. The instrument will respond by returning the presently measured voltage and the system status.

```
Host                Instrument

V VT  ---------------->
<---------------- V VV SS
```

V - Is the single letter command for setting the voltage target.
VT - Is the value of the new voltage target (i.e. 5.67).
VV - Is the value of the presently measured output voltage.
SS - Is the hexadecimal ASCII representation of the system status byte.

Request Output Voltage Value

This command requests the OL 16A/65A/83A to return the value of the lamp voltage.

```
Host                Instrument

v ----------------->
<----------------- v VV SS
```

v - Is the single letter command for requesting the output voltage value.
VV - Is the value of the presently measured output voltage.
SS - Is the hexadecimal ASCII representation of the system status byte.

Set Wattage Target

This command changes the lamp wattage target. If the value is above the limits of the instrument, the target will not change. The instrument will respond by returning the presently measured wattage value.

```
Host                Instrument

W WT -------------->
<----------------- W WV SS
```

W - Is the single letter command for setting the wattage target.
WT - Is the value of the new wattage target (i.e. 123.4).
WV - Is the value of the presently measured output wattage.
SS - Is the hexadecimal ASCII representation of the system status byte.

Request Output Wattage Value

This command requests the OL 16A/65A/83A to return the value of the presently measured lamp wattage.

```
Host                Instrument

w ----------------->
<----------------- w WV SS
```

w - Is the single letter command for requesting the output wattage value.
WV - Is the value of the presently measured output wattage.
SS - Is the hexadecimal ASCII representation of the system status byte.

Activate/Deactivate Lamp

This command turns the lamp on and off. The OL 16A/65A/83A will respond by returning the lamp status and system status.

```
Host                Instrument

B LS -------------->
<----------------- B LS SS
```

B - Is the single letter command for activating/deactivating the lamp.
LS - Is the value of the lamp state (0=off, 1=on).
SS - Is the hexadecimal ASCII representation of the system status byte.

Request Lamp State

This command requests the OL 16A/65A/83A to return the lamp state.

```
Host                Instrument

b ---------------->
<---------------- b LS SS
```

b - Is the single letter command for requesting the lamp state.
LS - Is the value of the lamp state (0=off, 1=on).
SS - Is the hexadecimal ASCII representation of the system status byte.

Request Target Value

This command requests the OL 16A/65A/83A to return the active lamp setup number, target value and target units.

```
Host                Instrument

t ---------------->
<---------------- t LN TV TU SS
```

t - Is the single letter command for requesting the target.
LN - Is the number of the active lamp setup.
TV - Is the value of the operating target.
TU - Is the units of the operating target (A, V or W).
SS - Is the hexadecimal ASCII representation of the system status byte.

Zero Voltage Monitor

This command zeroes the voltage monitor.

```
Host                Instrument

D ---------------->
<---------------- D SS
```

D - Is the single letter command for zeroing the voltage monitor.
SS - Is the hexadecimal ASCII representation of the system status byte.

Download Lamp Setup Information

This command allows downloading of the Lamp Setup Library information from the host computer.

```
            Host                 Instrument

        X LN DT DV ----------->
               <--------------- X LN DT DV SS
```

X - Is the single letter command for downloading lamp setup information.
LN - Is the number of the lamp setup being written to.
DT - Is the type of data being written (see table).
DV - Is the value of the data being written.
SS - Is the hexadecimal ASCII representation of the system status byte.

Type Number	String Format	Data Type
40	Floating Point	Lamp Hours Timer Value
50	Floating Point	Recalibration Interval (hours)
60	Character	Target Units (A, V, or W)
70	Floating Point	Target Value
80	Floating Point	Current Limit
90	Character	Lamp Description Text
95	Character	Wattage (L or H)

EXAMPLES:

X 02 90 A	Places an 'A' in the first character of the description of lamp setup #2.
X 02 70 5.000	Places the value 5.0 as the target value for lamp setup #2.
X 02 60 A	Sets the target units for lamp setup #2 to amps.
X 02 80 5.3	Sets the current limit for lamp #2 to 5.3 amps.

Upload Lamp Setup Information

This command requests uploading of Lamp Setup Library information from the OL 16A/65A/83A to the host computer.

```
            Host                 Instrument

        Y LN DT ---------->
              <------------- Y LN DT DV SS
```

Y - Is the single letter command for uploading lamp setup information.
LN - Is the number of the lamp setup being read.
DT - Is the type of data being read (see table).
DV - Is the value of the data being read.
SS - Is the hexadecimal ASCII representation of the system status byte.

Select Lamp Setup Number from Lamp Setup Library

This command followed by a space and an integer from 1 to 10 selects a lamp setup number from the lamp setup library.

```
Host                Instrument

S LN ------------->
   <--------------- S LN SS
```

S - Is the single letter command for selecting a lamp setup number.
LN - Is the number of the lamp setup being read.
SS - Is the hexadecimal ASCII representation of the system status byte.

Reset (Z)

Resets the communication buffers, etc..

```
Host                Instrument

Z ----------------->
<----------------- Z
```

SYSTEM STATUS BYTE

For every command, a hexadecimal ASCII representation of a system status byte is returned to the host as the last two bytes of the message. The system status byte is constructed as follows:

bit 7 Busy flag (The OL 16A/65A/83A is performing a function)
bit 6 Reserved
bit 5 Reserved
bit 4 Lamp Status (0 = off, 1 = on)
bit 3 Reserved
bit 2 Reserved
bit 1 Seeking Current (1 = current is ramping)
bit 0 Reserved