

AC40-FIBER OPTIC REPEATER/ADAPTER USER'S GUIDE

Form 526-001009 – October, 2000

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Welcome

Document Conventions

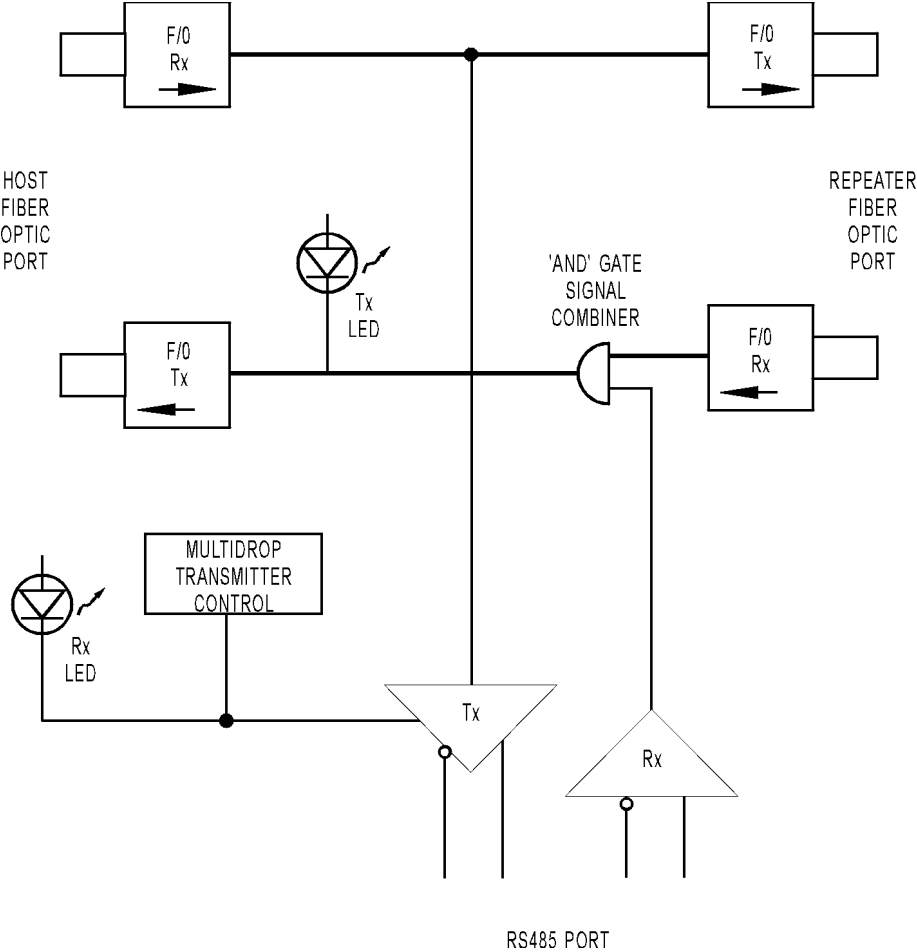
- **Bold** typeface indicates text to be typed. Unless otherwise noted, such text may be entered in upper or lower case. (Example: "At the DOS prompt, type **cd \windows.**")
- *Italic* typeface indicates emphasis and is used for book titles. (Example: "See the *OptoControl User's Guide* for details.")
- File names appear in all capital letters. (Example: "Open the file TEST1.TXT.")
- Key names appear in small capital letters. (Example: "Press **SHIFT.**")
- Key press combinations are indicated by plus signs between two or more key names. For example, **SHIFT+F1** is the result of holding down the **SHIFT** key, then pressing and releasing the **F1** key. Similarly, **CTRL+ALT+DELETE** is the result of pressing and holding the **CTRL** and **ALT** keys, then pressing and releasing the **DELETE** key.
- "Press" (or "click") means press and release when used in reference to a mouse button.
- Menu commands are sometimes referred to with the Menu→Command convention. For example, "Select File→Run" means to select the Run command from the File menu.
- Numbered lists indicate procedures to be followed sequentially. Bulleted lists (such as this one) provide general information.



Introduction

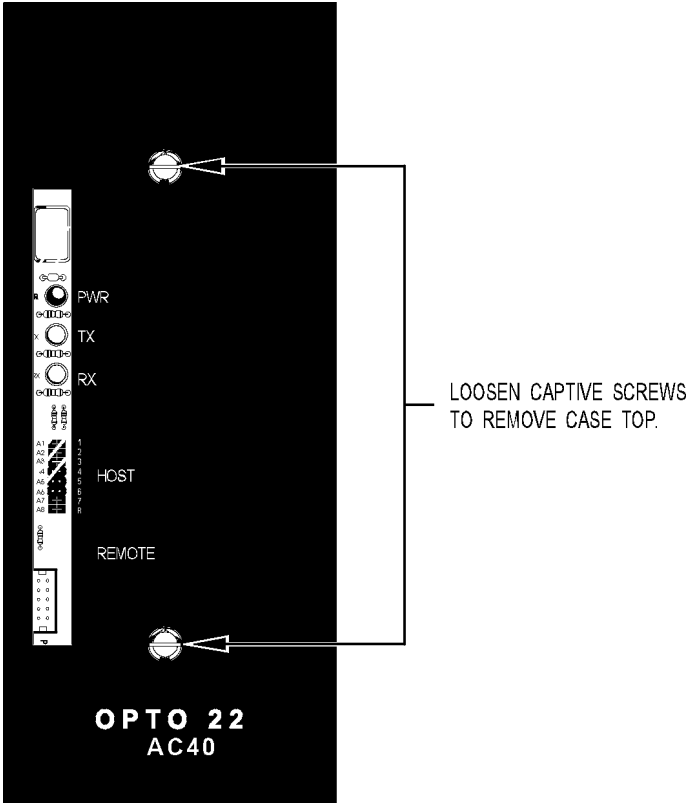
Industrial automation often requires reliable communications between equipment sites separated by long distances or harsh electrical environments. The AC40 fiber optic data link adapter satisfies the requirements of industrial communications by using light instead of conventional electrical signals. The fiber optic data link between two pieces of equipment is electrically isolated and completely immune to electrical noise.

The AC40 has three I/O ports; the RS-485 port, the host fiber port, and the repeater fiber port. When operating, the AC40 passes and amplifies all signals between the host and repeater fiber port. All signals from the host fiber port receiver are transmitted out the RS-485 port, and any signals received at the RS-485 port are transmitted out the host fiber port.



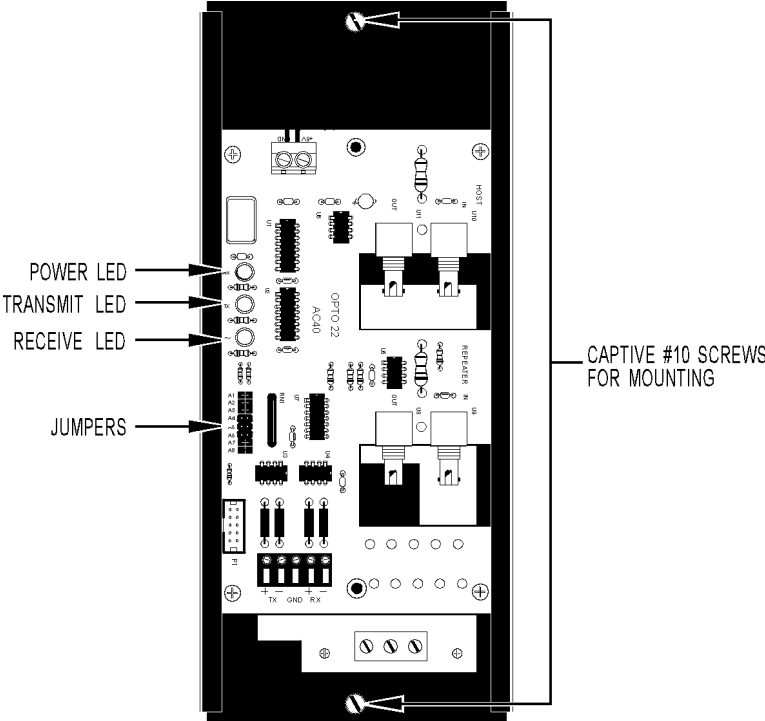
Disassembly

The AC40 must be disassembled to access the mounting hardware, power and communications connectors. The case is opened by turning the two captive screws on the top of the AC40 counter clockwise.



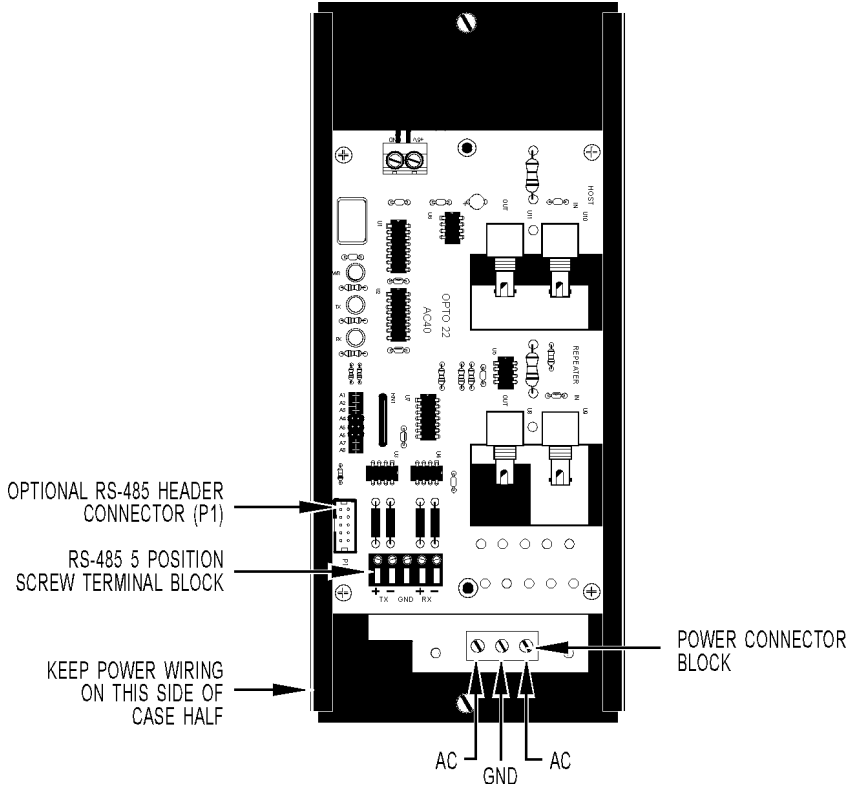
Mounting

The AC40 is normally mounted in the bottom left corner of a Mystic panel. The bottom case half has two captive #10 screws for mounting.



Power Wiring

The AC40 has 3 different power supply options. The AC40A has a 120 VAC power requirement; the AC40B has a 240 VAC power requirement; and the AC40C has a 10 - 28 VDC power requirement. The power wires are routed to the power connector block on the lower PC board. The power wiring should be run along the left side of the case half.

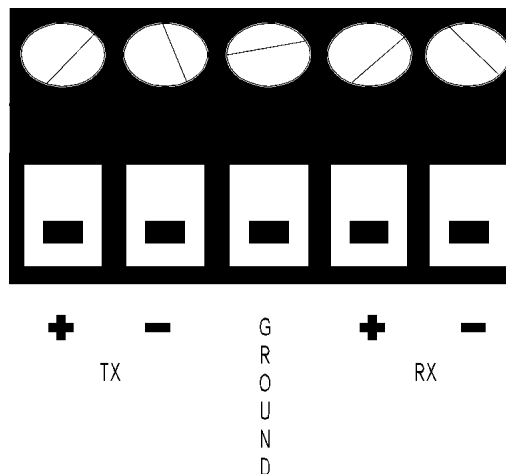


RS-485 Connection

The AC40 supports two connection methods for the RS-485 port. The primary connection is through the 5 position screw terminal block located on the lower edge of the elevated printed circuit board. The optional connection method is through the 10 position male header connector labeled P1. The optional connection method allows for easy hook-up to Mystic remote panels using the flat 10-pin twisted pair cable found in a G4RCOMMKIT.



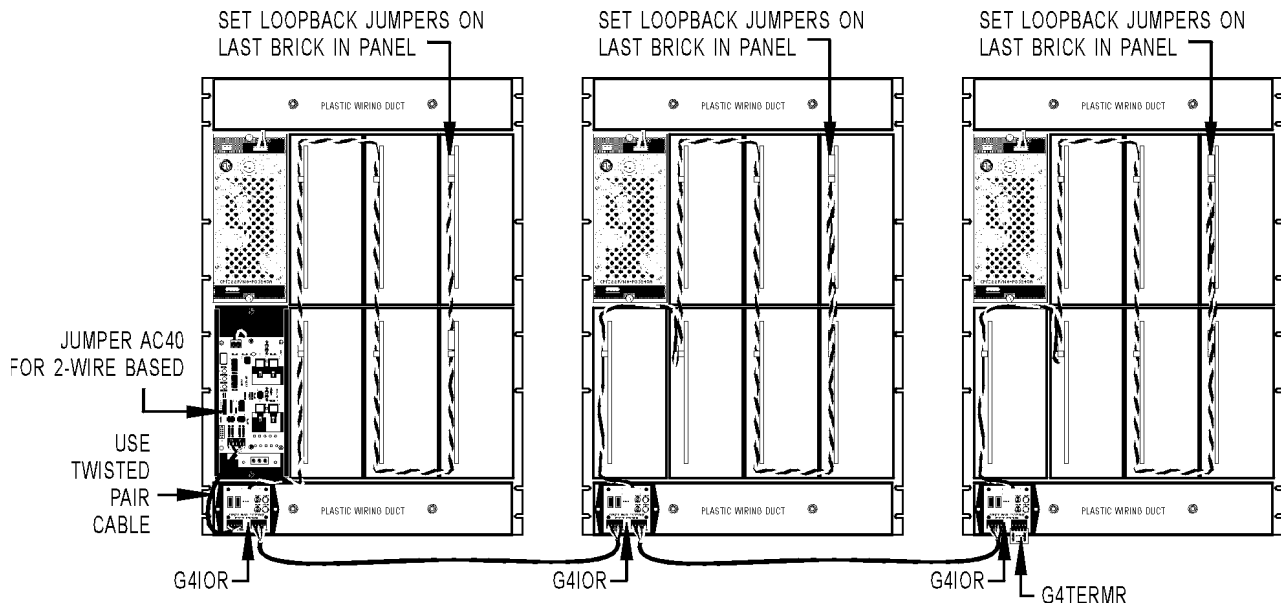
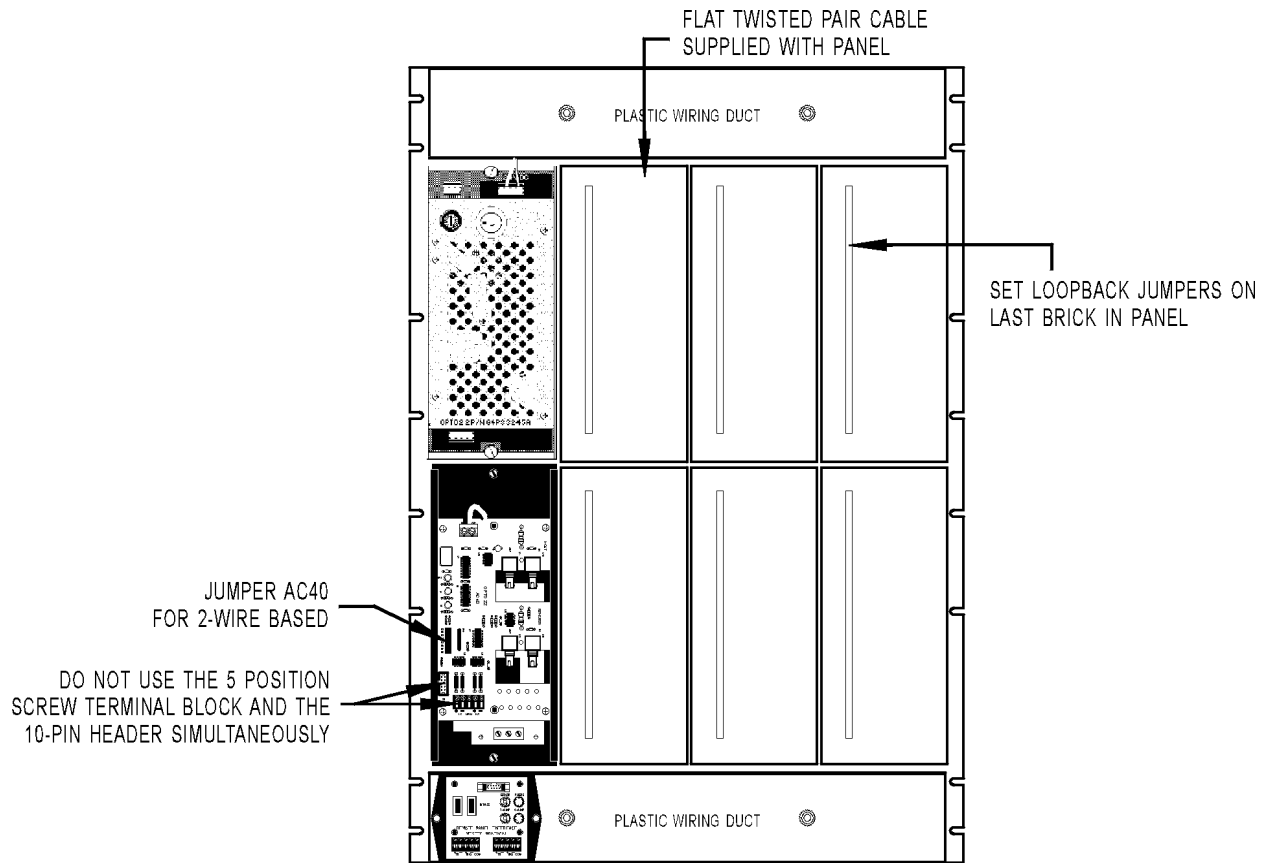
When connecting to the 5 position screw terminal block, the option of 2-wire or 4-wire hook-up is available. * The 10-pin header can only operate in 2-wire hook-up. When the 5 position screw terminal block is set to 2-wire operation, use the TX+ and TX- terminals.



NOTE: The AC40 does **not** support the interrupt capability of remote bricks.

* *Jumpering information is on page 14.*

RS-485 Wiring Examples



NOTE: When only one panel of remote bricks is attached to the AC40, use the 10-pin header.

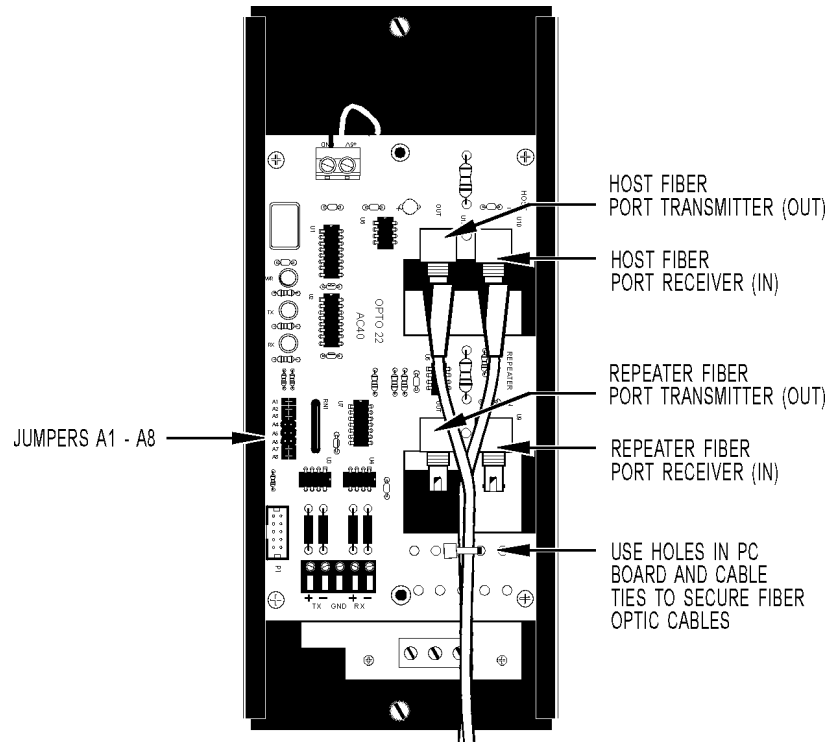
* *Jumpering information is on page 14.*

Fiber Optic Connection

The fiber optic connectors on the AC40 are 'ST' style female. The 'ST' male is inserted and the outer barrel rotated until the posts on the female connector lock in place. This connection is simple and reliable.

The AC40 is optimized to operate with 62.5 mm/125 mm fiber cable. It is possible to use other fiber diameters, however, the performance specifications fall off rapidly.

After the fiber connections are in place, use cable ties to secure the fiber cables.



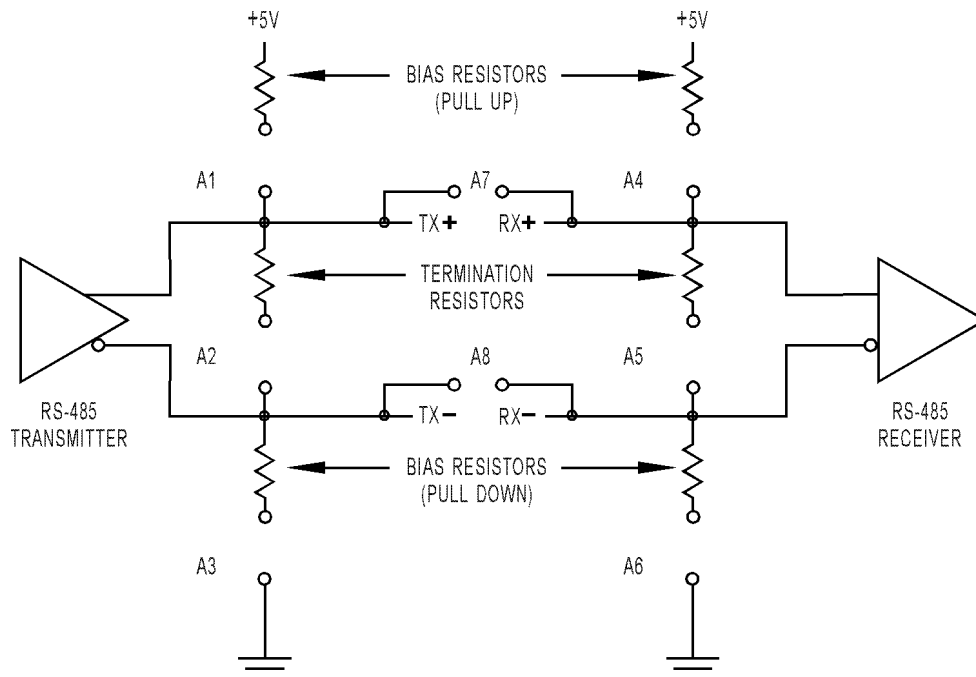
Jumpering

A group of 8 jumpers labeled A1 - A8 are located on the left-hand side of the upper printed circuit board in the AC40. The jumpers are inserted to configure the AC40 RS-485 port. Jumpers A1 - A6 select various possibilities for bias and termination of the RS-485 link. Jumpers A7 and A8 are used to select 2-wire or 4-wire mode.

Mode	Install Jumpers
2-wire Terminated/Not Biased	A2, A7, A8
2-wire Unterminated	A7, A8
2-wire Terminated/Biased	A1, A2, A3, A7, A8 (AC40 is shipped with these jumpers installed.)
4-wire Unterminated	No Jumpers
4-wire Terminated/Biased	A1, A2, A3, A4, A5, A6
4-wire Terminated/Not Biased	A2, A5

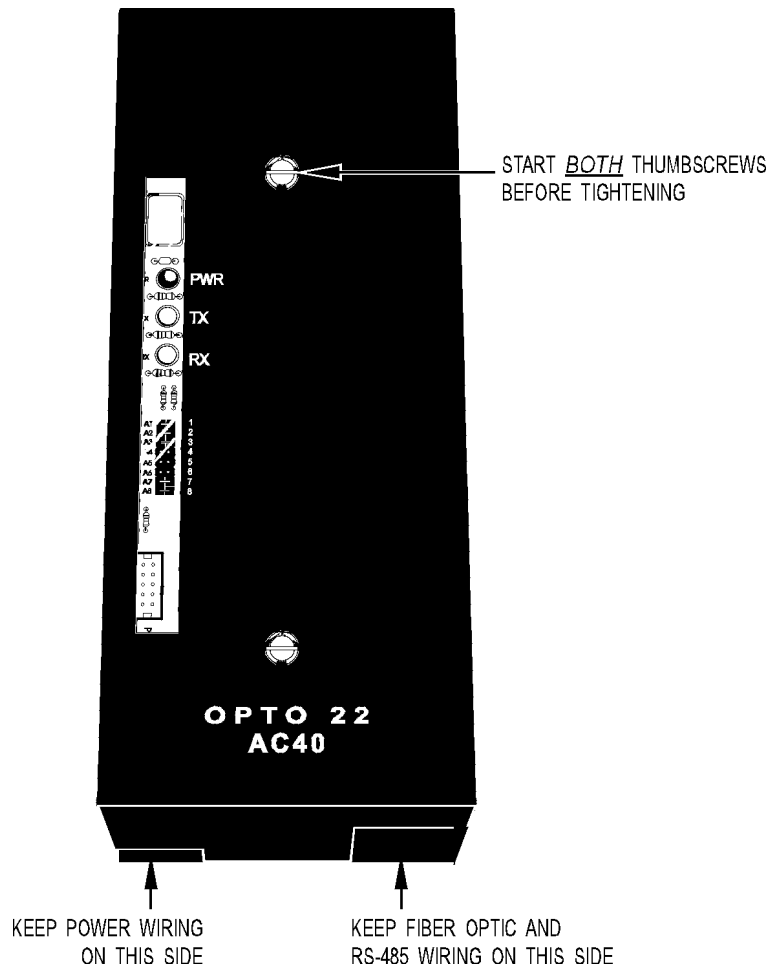
When you configure your AC40 RS-485 communications link, keep these facts in mind:

- RS-485 requires termination at both ends of the communications wiring.
- The link must be biased in one place only.
- Opto 22 remote Bricks have no bias or termination options.
- The G4TERMR terminator does not have bias options.
- When G4LC32 RS-485 serial ports are terminated, they are automatically biased.
- Biasing is usually done at the "HOST" end.



Reassembly

After all connections and jumpering is complete, the AC40 can be reassembled. It is important that all wires are routed so they will not be pinched by the case top. After case top has been placed on top of the case bottom, start both thumbscrews. Do not tighten the thumbscrews until both have been started! Tighten thumbscrews to finish assembly.



LED's/Diagnostics

When power is applied to the AC40, the green LED labeled PWR should glow. If it does not - check voltage and polarity of input power.

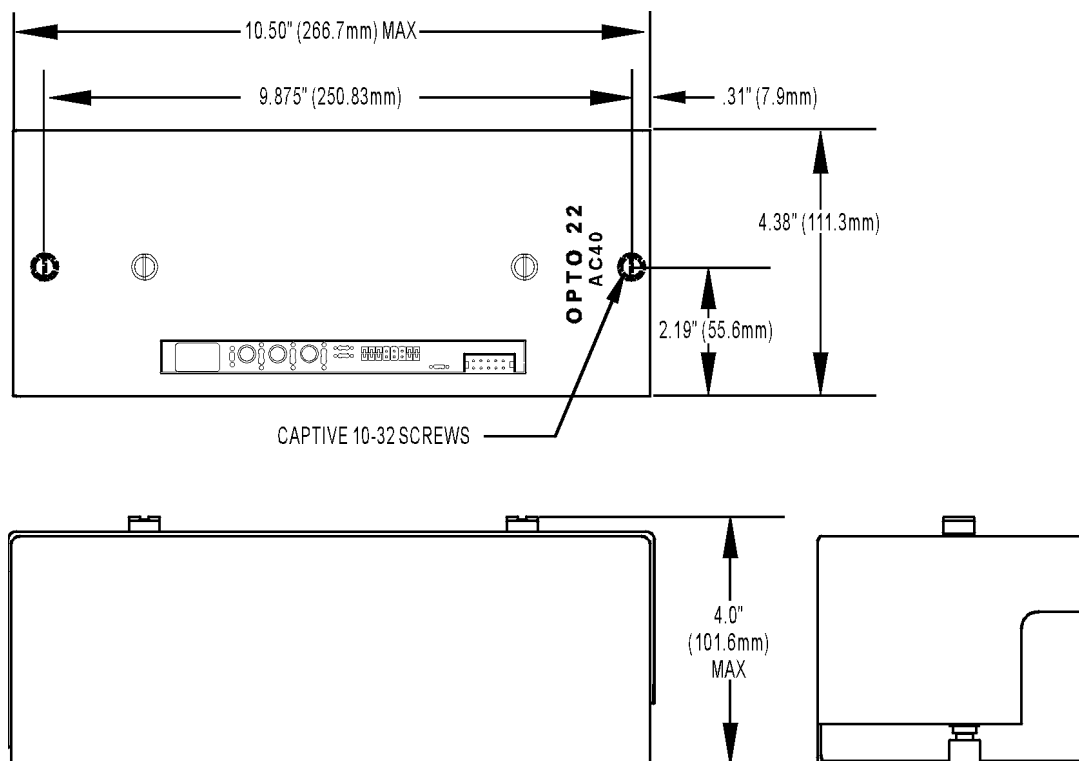
When the LED labeled RX is illuminated, data is being received from the host fiber port and transmitted down the RS-485 port and the repeater fiber port.

When the LED labeled TX is illuminated, data is being received from either the repeater fiber port or the RS-485 port and transmitted down the host fiber port.

The most common start-up problems on the AC40 are:

- Receive and Transmit fiber optic cables are swapped.
- The RS-485 port is incorrectly jumpered. Check:
 - (a) 2-wire or 4-wire option
 - (b) termination at both ends
 - (c) biasing at one place only
- The RS-485 port is incorrectly wired. Check:
 - (a) polarity of signals
 - (b) twisted pair cable must be used

Dimensions



Specifications

Ambient Temperature:	0° C - 70° C 95% relative humidity, non-condensing
Power: AC40B:	120 VAC ± 10 VAC 60 Hz 240 VAC ± 20 VAC 50 Hz 10 - 28 VDC - 750 mA
Fiber Optic: Recommended Fiber Size:	62.5/125 µm
Recommended Fiber: "ST" Style Connectors:	Belden Type 225812 (Duplex) Belden Type 225811 (Single)
Maximum Fiber Length:	3.5 kilometers
Transmitter Characteristics (All Typical) Optical Power Output: Numerical Aperture: Optical Port Diameter:	-12.0 dBm 0.31 150 µm
Receiver Characteristics (All Typical) Receiver Sensitivity:	-24.0 dBm 0.50 400 µm
RS-485: Maximum Cable Length:	4,000 feet
Recommended Cable Type (twisted pair):	100 ohms impedance 12.5 picofarads per foot
Termination Resistance:	220 ohms
Tri-state Biasing Resistance:	470 ohms

Features:

- * Asynchronous operation independent of baud rate, parity, or stop bits
- * Baud rates to 115.2K baud
- * Jumpers for optional termination and biasing
- * Up to 32 AC40s per fiber link

Cable and Connector Manufacturers

Belden Wire And Cable

P. O. Box 1980
Richmond, IN 47375
800/235-3361

Model: 62.5/125 Single - 225811
62.5/125 Duplex - 225812

AT&T Network Systems

505 No. 51st. Avenue
Phoenix, AZ 85043
800/344-0223

Hewlett-Packard

3003 Scott Blvd.
Santa Clara, CA 95054
408/988-7000

Distributor of Fiber Optic Cables, Connectors, and Accessories

Fibertron

1405 E. Orangethorpe Avenue
Fullerton, CA 92631
714/871-3344