

Universal Fiber Optic Line Driver Transceivers

**Protocol conversion
through one device —
plus the benefits
of fiber optics!**



FEATURES

- » Compatible with RS-232, RS-422, and RS-485 (2- or 4-wire).
- » Data rates up to 10 Mbps for RS-422 and RS-485.
- » Use in both point-to-point and multipoint networks.
- » Available in 850- and 1310-nm operating wavelength versions.
- » Internal circuitry performs all specified conversions.
- » Modes are easy to configure using DIP switches.
- » Use the RTS signal or data to enable the RS-485 transmitter.

OVERVIEW

Converting from one type of protocol to another shouldn't make extending data over fiber optic transmission systems more complicated. But spending the time and money to mount external RS-232, RS-422, or RS-485 converters alongside fiber transmitters and receivers certainly can.

To avoid the hassle, order a pair of standalone BLACK BOX® [Universal Fiber Optic Line Driver Transceivers](#). These economical and reliable devices perform the necessary protocol conversions so different types of equipment can talk to another—and they extend your data over fiber.

The transmitting transceiver converts all signals passing through it into pulses of light on its optical connectors' LED. Because the devices' internal circuitry reduces RS-232, RS-422, and RS-485 protocols to this common denominator, converting one protocol to another is simple. You get the input and output protocol that you need—automatically. The receiving transceiver outputs the light it receives in the selected protocol via a photodiode at its optical connector.

You can use the transceivers in simplex, half-duplex, and full duplex asynchronous applications for both point-to-point and multipoint data networks. For instance, you can set them up to work in a ring (or loop-type) data bus. In this mode, any location linked via the transceivers can receive or insert data into the ring/loop, but only one station at a time can insert data.

The [Universal Fiber Optic Line Driver Transceivers](#) can also perform RS-485 two-wire conversions to and from RS-232 or RS-422. To do this, they use the same two signal leads for both transmitting and receiving data, with each unit alternating between a transmit and

receive state. You can instruct the transceivers to switch this way either by sensing an external RTS (Request to Send) signal, or by having it internally sense the actual data being transmitted.

To set the transceivers either for external or internal operation, simply adjust their internal DIP switches. You only have to pay attention to the polarity of the different protocols and be sure that the software you're using on the overall system allows for turnaround times when switching between protocols, as well as for the number of times a master will "poll" the local unit before an error is detected.

Transceiver installation is simple because there are no operating controls on the units. Other than setting the protocol, speed, and operation mode with the internal DIP switches, you need only to connect the signal, power supply, and fiber optic cables between the transmitter and receiver transceiver units. The [Universal Fiber Optic Line Driver Transceivers'](#) operating defaults are RS-232 protocol, point-to-point, and low speed.

For diagnostic purposes, each [Universal Fiber Optic Line Driver Transceiver](#) has two LEDs that continuously monitor operation and one LED for power.

The TX (Transmit) and RX (Receive) LEDs light when the transmitted or received data is in the "high" state or are off when it's in the "low" state.

NOTE: RS-232 is always considered low speed.

NOTE: Must be used in pairs. Also, distance specifications list approximate distances only and are not guaranteed.

Why Buy From Black Box? Exceptional Value. Exceptional Tech Support. Period.

Recognize any of these situations?

- You wait more than 30 minutes to get through to a vendor's tech support.
- The so-called "tech" can't help you or gives you the wrong answer.
- You don't have a purchase order number and the tech refuses to help you.
- It's 9 p.m. and you need help, but your vendor's tech support line is closed.

According to a survey by *Data Communications* magazine, 90% of network managers surveyed say that getting the technical support they need is extremely important when choosing a vendor. But even though network managers pay anywhere from 10 to 20% of their overall purchase price for a basic service and support contract, the technical support and service they receive falls far short of their expectations—and certainly isn't worth what they paid.

At Black Box, we guarantee the best value and the best support. You can even consult our Technical Support Experts before you buy if you need help selecting just the right component for your application.

Don't waste time and money—call Black Box today.



MD650A-85:
top: front view;
bottom: rear view

TECH SPECS

Distance (Maximum) — MD650A-85: 2.4 mi. (3.9 km);
MD650A-13: 21 mi. (33.8 km)

Operating Wavelength — MD650A-85: Multimode 850 nm;
MD650A-13: Single-mode 1310 nm

Operation — Simplex, half-duplex, or full duplex; point-to-point or multipoint

Protocol — Asynchronous

Speed — RS-232 (low-speed): 0 to 200 kbps;
RS-422/485 (low-speed): 0 to 2.1 Mbps;
RS-422/485 (high-speed): 10 kbps to 10 Mbps

User Controls — (2) internal DIP switches: (1) 8-position Mode;
(1) 6-position Transmit/Receive

Interface — RS-232, RS-422, RS-485 (2- or 4-wire)

CE Approval — Yes

RoHS — Yes

Connectors — (1) terminal block, (1) pair of ST®

Indicators — (3) LEDs: (1) Power, (2) Operation: Transmit and Receive

Temperature Tolerance — Operating: -31 to +167° F (-35 to +75° C)

Power — 100–240 VAC, 50/60 Hz, 0.3 amp, 10–18 VDC at 150 mA peak

Size — 1.3"H x 3.5"W x 4"D (3.3 x 8.9 x 10.2 cm)

What's included

- ◆ (1) Universal Fiber Optic Line Driver Transceiver
- ◆ (1) Universal power supply
- ◆ (1) U.S. power cord
- ◆ (1) User's manual

NOTE: Must be used in pairs. Also, distance specifications list approximate distances only and are not guaranteed.

Table 1. Distance and budget range for 850- and 1310-nm Universal Fiber Optic Line Driver Transceivers.

Part Number	Wavelength	Loss Budget (dB)	Distance (miles [km])	Loss Budget (dB)	Distance (miles [km])
		Low Speed (0–200 kbps or 2.1 Mbps)	Low Speed (0–200 kbps or 2.1 Mbps)	High Speed (10 kbps–10 Mbps)	High Speed (10 kbps–10 Mbps)
MD650A-85	850-nm multimode	0–12	0–2.4 [0–3.9]	0–6	0–1.2 [0–1.9]
MD650A-13	1310-nm single-mode	0–15	0–21 [0–33.8]	0–8	0–12 [0–19.3]

NOTE: The RS-232 interface runs at low speed (0 to 200 kbps). The RS-422/485 interface operates at low speed (0 to 2.1 Mbps) or high speed (10 kbps to 10 Mbps).

Item	Code
Universal Fiber Optic Line Driver Transceivers	
850-nm Multimode	MD650A-85
1310-nm Single-Mode	MD650A-13
You may also need to order cable...	
Multimode, 62.5-Micron, Breakout-Style Fiber Optic Bulk Cable, PVC, Riser (OFNR/FT4), 2-Fiber, Custom Lengths	EXN1002A