BLACK BOX®
NETWORK SERVICES

Black Box Network Services • 464 Basingstoke Road • Reading, Berkshire, RG2 0BG • Tech Support: 0118 965 6000 • **www.blackbox.co.uk** • **e-mail: techhelp@blackbox.co.uk**

FIBRE OPTIC LINE DRIVERS (T1, T1/E1, T3, E3)
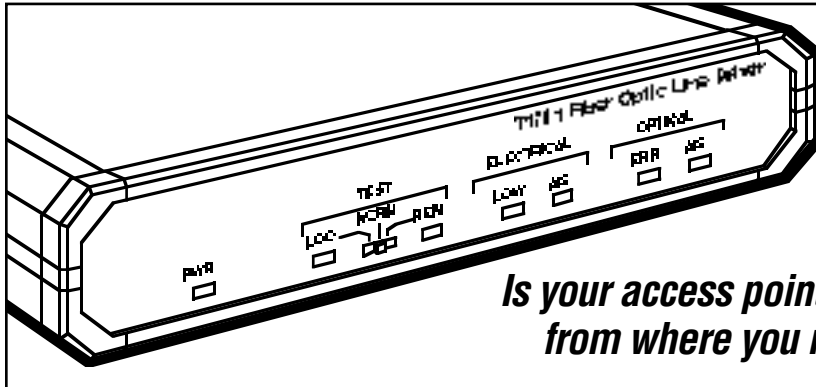
Is your access point for digital service painfully far from where you need it to be? Not a problem.

Key Features

▶ *Drive data at full T1, E1, T3, or E3 speed over fiber.*

▶ *Maximum distances up to 1.5 miles over multimode or 23.6 miles over single-mode!*

▶ *Optical link is immune to EMI/RFI, surges, etc.*

▶ *Available for 115-VAC, 230-VAC, or -48-VDC power. MT618A-ST-R3 and MT619A-ST-R2 have autosensing power supplies.*

▶ *Card models available.*

▶ *Perform local and remote loopback and dry-contact alarms.*

Would you like to put your high-speed computer or other DTE device in a different room from your T1, E1, T3, or E3 CSU/DSU? In a different building? A different campus? Or would you just like to make a connection at T1, E1, T3, or E3 speeds without handing your entire budget to a telco for a subscription to digital service?

Pairs of our Fibre Optic Line Drivers can pass data to each other at full speed across multimode or single-mode fibre optic cables. Not only does this solve device-placement problems, it does so with optical links that aren't susceptible to tapping, noise, and other hazards of electrical communication.

Models with MT650 and MT653 product code prefixes transmit and receive data on the 1300-nm wavelength into as much as 23.6 miles (38 km) of single-mode cable. MT651 models transmit and receive at 850 nm into as much as 1.5 miles (2.4 km) of multimode cable.

Most Fibre Optic Line Drivers have common ST® connectors.

The various models in standalone enclosures can take advantage of different types of site power. The MT650A-ST-R2 plugs into North American standard outlets that provide 115 VAC, the MT620AE-R2 plugs into European standard outlets that provide 230 VAC, and the MT653A-ST-D48-R2 can be attached to site power systems that provide -48 VDC (a connector kit is provided for terminating a power cord).

MT650C-R2 and MT651C are card versions that can be installed in our versatile RackNest 2/14 products. Each RackNest can hold up to 14 cards. We offer a wide variety of line-driver and short-haul modem cards for the RackNest. For more information, please refer to **FaxBack #19273**.

You can set a T1 or E1 line driver to use a 100-ohm balanced T1 interface, a 120-ohm balanced E1 interface, or a 75-ohm unbalanced E1 interface. On the standalone models, the balanced interfaces are expressed on a DB15 connector, while the unbalanced interface is on a pair of BNCs. On the card models, the balanced interfaces are expressed on the RackNest's 5-position terminal blocks, and you'll need a special adapter (call us) for the unbalanced interface.

All T1 or E1 line drivers feature dry-contact alarm circuitry that can alert you to problems on the T1/E1 link. The alarms are expressed on the same DB15 connector on the standalone models; they're on the RackNest's DB25 connectors for the card models. (Refer to **page 3** for a discussion of T1/E1 leads and dry-contact pinning.)

Even if you don't use the alarms, the line drivers have a full set of LEDs, as well as user-controlled local and remote loopback capability, for quickly diagnosing problems.

Our new MT618A-ST-R3 and MT619A-ST-R2 line drivers convert T3's super-fast 44.736 Mbps signals to fiber optic light pulses. The multimode unit, MT619A-ST-R2 has a range of 1.5 miles (2.4 km)—and most of the single-mode units have a range of 31 miles (49.9 km)! Both versions feature autosensing power supplies.

If you need to move data at T1 or E1 speeds, but you don't want to (or can't) use a T1/E1 line to do it, a pair of line drivers and a spool of fibre cable will—with no worries about data-line tapping, surges, or interference.
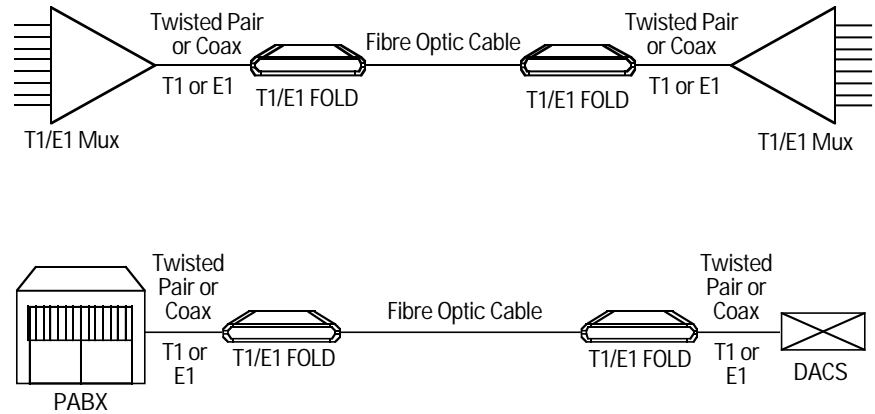
Specifications

Budget (Maximum):
MT650A-ST-R2, MT653A-ST-D48-R2, MT618A-ST-R3, MT620AE-R2, MT650C-R2: 22 dB over 9/125-µm single-mode fibre cable;
MT612A-ST, MT651A-ST, MT619A-ST-R2, MT651C: 20 dB over 62.5/125-µm multimode fibre cable

Compliance:
EMI/RFI: CE; FCC Part 15 Subpart B Class A, IC Class/classe A;
Safety: EN 60950, EN 41003

Data Rate (Maximum):
T1: 1.544 Mbps;
E1: 2.048 Mbps

Diagnostic: Dry-contact closure alarm on various DB15 pins (standalone models) or RackNest DB25 pins (card models) for signal or power loss; minimum switching current 1 A

Distance (Maximum):
MT618A-ST-R3: 23.6 mi. (38 km);
Other single-mode models: 31 mi. (49.9 km);
Multimode models: 1.5 mi. (2.4 km)

Dynamic Range: 28 dB

Output Power: -18 dBm

Overvoltage Protection:
AC/DC overvoltage circuits are connected through transformers to transmit and receive lines

Receiver Sensitivity:
For a BER of 10^{-9}:
MT650A-ST-R2, MT653A-ST-D48-R2, MT618A-ST-R3, MT620AE-R2, MT650C-R2: -40 dBm;
MT612A-ST, MT651A-ST, MT619A-ST-R2, MT651C: -38 dBm

Video Standards: VGA, SVGA, XGA, XGA-2

Zero Suppression: B8ZS when set to T1, HDB3 when set to E1

Interface:
Electronic: Either 100-ohm balanced T1, 120-ohm balanced E1, or 75-ohm unbalanced E1, user-selectable; with card models, unbalanced E1 requires special adapter—call Technical Support;
Optical:
MT650A-ST-R2, MT653A-ST-D48-R2, MT618A-ST-R3, MT620AE-R2, MT650C-R2: 1300-nm single-mode;
MT612A-ST, MT651A-ST, MT619A-ST-R2, MT651C: 850-nm multimode

User Controls:
(1) front-mounted slide switch for test mode;
All others mounted on main board (internal):
(1) jumper block for interface type;
(1) jumper and (3) DIP switches for grounding control and signal-loss handling

Connectors:
Standalone models (all rear-mounted):
For balanced T1 or E1 I/O and for dry-contact alarm: (1) DB15 F;
For unbalanced E1 I/O: (2) BNC F;
For fibre optic link: (2) ST® F;
For power:
MT653A-ST-D48-R2: (1) standard 3-pin F;
All other models: (1) IEC 320 M inlet;
Card models:
For fibre optic link: (2) front-mounted ST F;
Rear-mounted card-edge F linked to connectors on rear of RackNest 2/14:
For balanced T1/E1: (1) 5-position terminal block;
For dry-contact alarms: (1) DB25 F;
For unbalanced E1: Special plug-in adapter required—call Technical Support

Indicators: (6) or (7) front-mounted LEDs: Power, local loopback, remote loopback, and various error conditions

Temperature Tolerance:
32 to 122°F (0 to 50°C)

Humidity Tolerance:
Up to 90% noncondensing

Power:
MT618A-ST-R3, MT619A-ST-R2: 108–132 VAC/207–253 VAC, 47–63 Hz, autosensing, from AC source through included detachable input cord;
MT612A-ST, MT650A-ST-R2–MT651A-ST: 108–132 VAC, 47–63 Hz from AC source through included detachable input cord;
MT620AE-R2: 230 VAC, 50 Hz;
MT653A-ST-D48-R2: -48 VDC at 130 mA, nominal, from -48-VDC source through detachable cord (not included except for connector elements);
MT650C-R2, MT651C: From the RackNest 2/14 in which they're installed;
Consumption for all models: 6 W maximum

Size:
Standalone models: 1.75"H (1U) x 7.6"W x 9.6"D (4.4 x 19.3 x 24.4 cm);
Card models: 6.2"H x 0.9"W x 9"D (15.7 x 2.3 x 22.9 cm)

Weight:
Standalone models: 2.4 lb. (1.1 kg);
Card models: 0.8 lb. (0.4 kg)

Technically Speaking

The tables below show the pinouts of the connectors on the T1/E1 Fibre Optic Line Drivers that carry the T1/E1 and dry-contact alarm leads. The pinning shown for the T1/E1 signals on the DB15 connector of the standalone models is widely used, so if you're only using these signals, our standard cables should work.

The pinning of the dry-contact leads is proprietary. Their arrangement on DB15 is the same as that used by our earlier standalone fiber optic line drivers (MT610 through MT613), so if you already have cables built for those, they should still work. If you need cables incorporating these leads, please call us for a quote.

Balanced T1/E1 leads

Standalone (on DB15)	Card (on RackNest's 5-position terminal block)	Signal
N/A	Top terminal	Ground (optional, attach at one end only!)
Pin 1	Either TX terminal	Send Data Tip (Transmit Data A, input to fibre optic line driver)
Pin 9	Either TX terminal	Send Data Ring (Transmit Data B, input to fibre optic line driver)
Pin 3	Either RX terminal	Receive Path Tip (Receive Data A, output from fibre optic line driver)
Pin 11	Either RX terminal	Receive Path Ring (Receive Data B, output from fibre optic line driver)

Dry-contact alarm leads (optional)

Standalone (on DB15)	Card (on RackNest's DB25)	Alarm
Pins 8 and 7	Pins 10 and 22	Minor alarm (normally closed)
Pins 8 and 15	Pins 10 and 21	Minor alarm (normally open)
Pins 6 and 5	Pins 13 and 25	Major alarm (normally closed)
Pins 6 and 13	Pins 13 and 24	Minor alarm (normally open)

The complete package

AC-powered standalone models include a manual and a detachable power cord; **card models** include a manual.

The **DC-powered MT653A-ST-D48-R2 model** includes a manual and a DC power-supply connector kit. You'll have to assemble this connector and use it to terminate the DC power cord that will plug into the Fibre Optic Line Driver.

▼ *Ordering Information*

ITEM	CODE
T1 Fibre Optic Line Driver ST®, Standalone	
850-nm Multimode	MT612A-ST
T1/E1 Fibre Optic Line Driver ST, Standalone	
850-nm Multimode	MT651A-ST
1300-nm Single-Mode	MT650A-ST-R2
1300-nm Single-Mode, 48-VDC	MT653A-ST-D48-R2
T3 Fibre Optic Line Driver ST, Standalone	
850-nm Multimode	MT619A-ST-R2
1300-nm Single-Mode	MT618A-ST-R3
E3 Fibre Optic Line Driver, Standalone	
1300-nm Single-Mode, 230-VAC	MT620AE-R2
T1/E1 Fibre Optic Line Driver ST, Card	
850-nm Multimode	MT651C
1300-nm Single-Mode	MT650C-R2
To rackmount your cards, you will need…	
RackNest 2/14	
115-VAC, Single Power Supply	RM110A
115-VAC, Dual Power Supply	RM110A-2PS
230-VAC, Single Power Supply	RM110AE
For optimum performance, order…	
Multimode Duplex Fibre Optic Cable, Riser, ST-ST,	
Custom Lengths	EFN062-CC
Single-Mode Duplex Fibre Optic Cable, PVC, ST-ST,	
Custom Lengths	EFN5009
T1 Cable, DB15 Male/DB15 Male, Straight-Pinned,	
10-ft. (3-m)	ETNMS02-0010
T1 Cable, DB15 Male/RJ-48C Male, Straight-Pinned,	
10-ft. (3-m)	ETNMS03-0010