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**

SDSL AND SHDSL NETWORK EXTENDER KITS
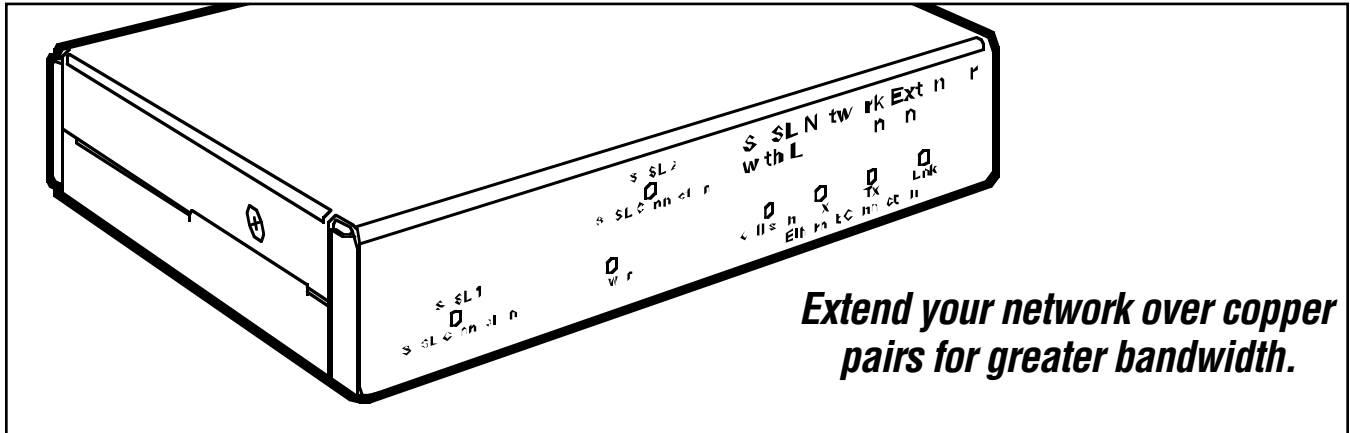
Extend your network over copper pairs for greater bandwidth.

Key Features

▶ *Selectable symmetrical data rates up to 4.6 Mbps for SDSL and up to 9.2 Mbps for SHDSL.*

▶ *Loop bonding multiplexes two or four unshielded twisted-pair lines into one for greater bandwidth.*

▶ *Automatic failover to single link if either fails.*

▶ *Transparent to your Ethernet network.*

▶ *Easy setup.*

▶ *No software required.*

▶ *Each kit includes both a provider unit and a subscriber unit.*

SDSL and SHDSL Network Extender Kits with Loop Bonding enable you to achieve high data throughput over multiple pairs of ordinary unconditioned twisted-pair cable.

The SDSL Network Extender Kit with Loop Bonding provides 4.6 Mbps of bandwidth—twice the 2.3-Mbps bandwidth of ordinary SDSL—by using two pairs of twisted-pair wire instead of a single copper-pair line. You can use the Extender Kit to extend your network point-to-point across a 4.6-Mbps SDSL connection up to 11,300 feet (3444.2 m).

The SHDSL Network Extender Kit with Loop Bonding more than doubles the 4.6 Mbps of SDSL by transmitting 2.3 Mbps across *four* pairs of twisted-pair wire. It can support speeds of up to 9.2 Mbps.

Two or four times the bandwidth

Ordinary SDSL over a single twisted pair provides up to 2.3 Mbps of bandwidth. Loop bonding technology (also called inverse multiplexing) combines

two separate 2.3-Mbps SDSL copper pairs to double your bandwidth. Our SHDSL extender takes loop bonding one step further and combines four pairs for a combined speed of 9.2 Mbps.

Loop bonding transparently increases line speeds where extra copper is available.

To achieve maximum throughput, loop bonding load-balances the data stream across both lines.

Reliable

The extender units feature automatic load balancing: if one copper pair fails, communications continue over the other copper pair. MAC filtering keeps local traffic off the SDSL or SHDSL link, so you can count on clear data transfers within your LAN.

Easy to install

Each Extender Kit includes a single-port provider unit and a single-port subscriber unit.

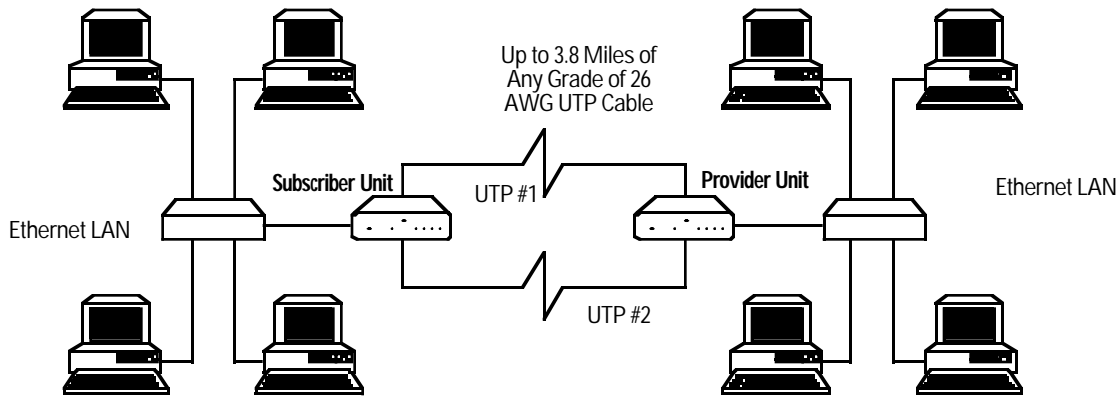Loop bonding requires no extra configuration. Just connect the units directly to any Ethernet

port on a LAN or PC, connect two copper pairs, and the units automatically communicate at the highest speeds possible on the subscriber end. To get the greatest distance, use the rear-panel DIP switches to adjust data rates. Setting each port to operate at 272 kbps, for example, gives you distances over 20,000 feet (6096 m). Even at maximum speeds, the extender units offer distances up to 11,300 feet (3444.2 m).

And because they're totally transparent to your network, the extenders don't affect the operation of your network devices.

A wide range of applications

These extenders are ideal for service providers, large-campus network administrators, or anywhere you want to connect two 10BASE-T networks.

10391

Typical-loop bonded SDSL application

Up to 3.8 Miles of Any Grade of 26 AWG UTP Cable

Ethernet LAN

Subscriber Unit

UTP #1

Provider Unit

Ethernet LAN

UTP #2

Use a second copper pair to double SDSL bandwidth.

Specifications

Bandwidth: LR0035A-KIT: Selectable up to 2.3 Mbps per SDSL port or up to 4.6 Mbps loop bonded (symmetrical); LR0040A-KIT: Selectable up to 2.3 Mbps per SHDSL port or up to 9.2 Mbps loop bonded (symmetrical)

Compliance: EMC: FCC Part 15; CSA/C108.8; EN55022; EN55024; Safety: UL® 1950, CSA C22.2 950, EN60950

Distance (Maximum): Over 26 AWG: LR0035A-KIT: 20,200 ft. (6157 m); LR0040A-KIT: 24,000 ft. (7315.2 m)

Standards: IEEE 802.3 Ethernet; ITU G.991.2 G.SHDSL

Interface: Network: IEEE 802.3 Ethernet 10BASE-T; SDSL & SHDSL: TC-PAM encoding

Connectors: LR0035A-KIT: (1) RJ-45 (network); (2) RJ-45 (SDSL); LR0035A-KIT: (1) RJ-45 (network); (4) Hybrid RJ-11/RJ-45 (SHDSL)

Temperature Tolerance: Operating: 32 to 122°F (0 to 50°C); Storage: -40 to +158°F (-40 to +70°C)

Humidity Tolerance: 5 to 95%, noncondensing

Altitude Tolerance: -200 to +16,500 ft. (-61 to +5,029.2 m)

Power: 100–125 VAC, 60 Hz, external wallmount;

Size: LR0035A-KIT: 1.25"H x 5.5"W x 4.5"D (3.2 x 14 x 11.4 cm); LR0040A-KIT: 1.25"H x 8.5"W x 4.75"D (3.2 x 21.6 x 12.1 cm)

Weight: LR0035A-KIT: 0.6 lb. (0.3 kg); LR0040A-KIT: 1 lb. (0.5 kg)

Loop Bonding

Loop bonding, also called inverse multiplexing, speeds up data transmission by dividing a data stream into multiple concurrent streams which are transmitted simultaneously through different channels. When the signals reach their destination, they're reconstructed back into the original data stream. This is the opposite of multiplexing, which combines two or more data streams into a single channel.

Loop bonding is generally used where data moves between networks across the "bottleneck" of a slower channel (for instance a DSL or T1 connection).

Loop bonding may be used to achieve near-network speeds over DSL connections. For example, you can use loop bonding to combine two 2.3-Mbps SDSL lines to provide up to 4.6 Mbps.

Loop bonding is often used to combine multiple T1 lines to achieve higher bandwidth at a lower cost than that of leasing a T3 line.

Frame relay and asynchronous transfer mode (ATM) are also frequently boosted with loop bonding to achieve higher throughput.

Package Contents

• (1) Dual-Port Provider Unit
• (1) Dual-Port Subscriber Unit
• Power Supplies
• Users' Manual

NOTE: The extenders are configured as an MDI-X (Hub). You may need a crossover cable (EVCRB85-0010, right) on one or both sides, depending on your network configuration.

Ordering Information

ITEM	CODE
SDSL Network Extender Kit with Loop Bonding	LR0035A-KIT
SHDSL Network Extender Kit with Loop Bonding	LR0040A-KIT

NOTE: The extenders are configured as an MDI-X (Hub). You may need a crossover cable (EVCRB85, below) on one or both sides, depending on your network configuration.

You may also need…

GigaBase® 350 CAT5e Patch Cable, 350-MHz, 4-Pair, PVC, Beige

Straight-Pinned	EVNSL85
Crossover	EVCRB85