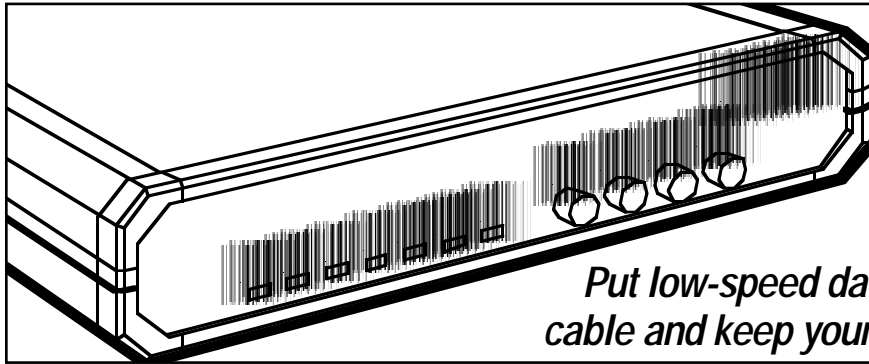


BLACK BOX[®]

NETWORK SERVICES

19.2-KBPS RS-232 LONG-HAUL MODEM



Put low-speed data on your own voice-band cable and keep your phones free for voice traffic.

Key Features

- ▶ **Data communication over 4-wire voice-grade lines.**
- ▶ **Distance up to 60 km (37.2 mi.) on unconditioned lines, depending on data rate.**
- ▶ **Distance up to 100 km (62 mi.) on conditioned lines, depending on line quality.**
- ▶ **Selectable data rates up to 19.2 kbps.**
- ▶ **Adaptive equalization, Trellis coding, and QAM modulation.**
- ▶ **Selectable word length, transmit level, carrier control, protocol, sync clock source, and more.**
- ▶ **Performs BERT and V.54 diagnostic loopbacks.**

When all you need to do is get some low-speed or low-priority data across campus or across town once in a while, why tie up your phones and multiply your phone bills? Just attach a pair of our 19.2-kbps RS-232 Long-Haul Modems (LHM-19.2s) to premise cabling you own that runs between your sites, and send data over that cable for free!

The LHM-19.2 is a 4-wire voice-band modem that operates in full duplex at speeds up to 19.2 kbps. At that speed, it's capable of transmitting across as much as 45 km (28 miles) of good unconditioned 19-AWG 4-wire cable. If you don't need to transmit faster than 9600 bps, the maximum distance rises to 60 km (37.2 miles). And over a good conditioned line, it can transmit as far as 100 km (62 miles)!

With runs that long, you'll need to be careful about environmental surges that might hit the line. Fortunately, each Long-Haul Modem is coupled to the line through isolation transformers which help protect against AC or DC overvoltages.

As for data errors, you don't have to worry about the LHM-19.2 being less reliable than standard phone-system modems. It uses an adaptive equalizer and Trellis-coded modulation, just like the best standard modems do, to get as close to error-free communication as possible.

The LHM-19.2 has a variety of user-selectable options. Besides the data rate, you can set its async word length (from 8 to 11 bits), transmit level (from 0 to -12 dBm in 3-dBm increments), and carrier control (always ON or controlled by RTS), among other things.

Communication between two LHM-19.2s over the 4-wire link is always synchronous. You can set the clock source as internal, external (from the attached device), or loop (looped back from the receive clock).

Communication with the attached RS-232 device can be set as either sync or async. When it's async, the LHM-19.2 performs V.14-compliant async-to-sync conversion.

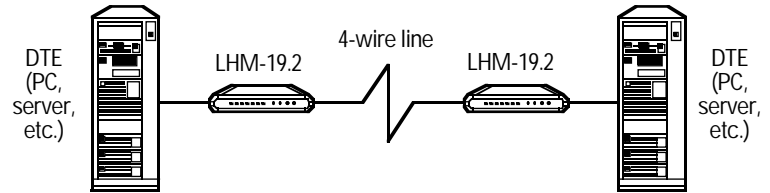
The LHM-19.2 has robust diagnostics, so it's often very easy to tell what's going on if the link ever goes down or goes wrong. For one thing, the LHM-19.2 performs continuous line tests and shows the results with its SQ LED.

It can also perform V.54 testing, including local analogue loopback and local and remote digital loopback. These tests can be controlled with the LHM-19.2's front-panel pushbuttons or by toggling the RS-232 LL and RL signals on Pins 18 and 21 of its device interface.

The LHM-19.2 supports an internal pseudo-random V.52 Bit Error Rate Test (BERT) pattern as well. When it monitors the BERT, the LHM-19.2 indicates signal quality with its SQ LED and (optionally) by manipulating the RS-232 SQD signal.

CAUTION: The LHM-19.2 can be attached to privately owned cable only. It should *never* be attached to the public switched telephone network.

The 19.2-kbps RS-232 Long Haul Modem is great for simple point-to-point links (right) and tail circuits, too (below).



Specifications

Compliance:

EMI/RFI: CE (EN55022, EN50082-1),
FCC Part 15 Subpart J Class A,
IC Class/classe A;
Electrical safety: CE (EN60950,
EN41003)

Cable Required:

Between ME380A units: 4-wire
twisted pair, 19 to 26 AWG;
Between ME380A and DTE:
EIA/TIA RS-232 cable with
DB25 male connector on
ME380A end

Interface:

To line: 4-wire telco style (do *not*
connect to PSTN);
To device: Serial EIA/TIA RS-232/
ITU V.24, DCE

Protocol:

To line: Synchronous;
To device: Synchronous or
asynchronous (user-selectable);
for line transmission, async
data is converted to sync using
ITU V.14 compliant methods

Clock Source: Either internal,
external from local device, or
recovered from remote LHM-19.2
(user-selectable)

Data Format: User-selectable for
any word length from 8 to 11 bits,
including 5, 6, 7, or 8 data bits;
even, odd, or no parity; and 1, 1.5,
or 2 stop bits

Data Rate: 1.2, 2.4, 4.8, 9.6, or
19.2 kbps (user-selectable)

Transmit Level: 0, -3, -6, -9, or
-12 dBm (user-selectable)

Transmit Impedance: 600 ohms or
"LOW" (user-selectable)

Receive Impedance: 600 ohms or
"HIGH" (user-selectable)

Return Loss: Greater than 15 dB

Carrier: Controlled by RTS or
constantly ON (user-selectable)

CTS Signal: ON only when modems
are synchronized

Encoding: 16-state, 8-dimensional
Trellis coding

Modulation: QAM with error
correction

Equalization: Adaptive

Synchronization Delay:

Startup: Up to 8 seconds;
Resync: Up to 5 seconds

Line Type: 4-wire, at least voice-
grade

Maximum Transmission Distance:
19-AWG unloaded lines: Up to 60
km (37.2 mi.) at up to 9.6 kbps
or up to 45 km (28 mi.) at up to
19.2 kbps;
Conditioned lines: Up to 100 km
(62 miles), depending on line
quality

User Controls:

- (4) Front-mounted pushbuttons:
DIG (local digital loopback),
ANA (local analog loopback),
REM (remote digital loopback),
and
PATT (bit error rate test);
- (10) Internal:
 - (1) Dial for data rate;
 - (1) Four-position DIP switch
for protocol, async word
length, and stop-bit
shortening;
 - (8) Jumpers:
Transmit clock source;
Carrier control;
Transmit level;
Transmit-line impedance;
Receive-line impedance;

User Controls (continued):

Internal jumpers (continued):
Enable/disable analog-
loopback command on
Pin 18;
Pin 21 signal (RL for remote
digital loopback or SQD
for signal quality);
Connect/disconnect signal
ground and chassis
ground

Diagnostics:

Continuous line-quality testing
(results indicated with SQ LED
and optionally with SQD
signal);
V.52 compliant bit error rate
testing with pseudo-random
bit patterns (results indicated
with SQ LED and optionally
with SQD signal);
V.54-compliant loopback tests:
Local analog loopback,
mechanically or electrically
user-controllable;
Local digital loopback,
mechanically user-
controllable;
Remote digital loopback,
mechanically or electrically
user-controllable

Indicators: (7) Front-mounted LEDs:
PWR (power), RTS, TD, RD, DCD,
TEST, and SQ; also indicates line
quality and BERT results with
SQD signal on Pin 21 if that
function is enabled

Connectors:

- (2) Rear-mounted:
(1) DB25 for cable to DTE;
- (1) 5-position terminal block for
4-wire modem-to-modem line,
including optional ground for
cable shield

Temperature Tolerance: 0 to 70°C
(32 to 158°F)

Humidity Tolerance: Up to 90%
noncondensing

Enclosure: High-impact plastic

Protection: AC/DC overvoltage-
protection circuits connected
through transformers to transmit
and receive lines

Fuse: 250 V, 250 mA slow-blow

Power: Directly from outlet through
detachable 1.5-m (5-ft.) line cord
and rear-mounted IEC 320 male
inlet;

Input: 115 VAC, 47 to 63 Hz, up to
250 mA;
Consumption: 5 watts typical

Size: 4.1H x 24.4W x 19.3D cm
(1.6"H x 9.6"W x 7.6"D)

Weight: 1.4 kg (3.1 lb.)

The complete package

- The LHM-19.2.
- Its power cord.
- A manual.

Ordering Information

ITEM	CODE
19.2-kbps RS-232 Long-Haul Modem	ME380A

You might also need...

Bulk 2-pair (4-wire) solid-core UTP cable (specify length)

Category 3 (will work)EYN712A

Category 5 (can be reused in higher-speed applications if your needs change).....EYN717A

Call Black Box Tech Support for help determining what type of device cables you'll need, as well as what your best options for AC-power backup and protection are.