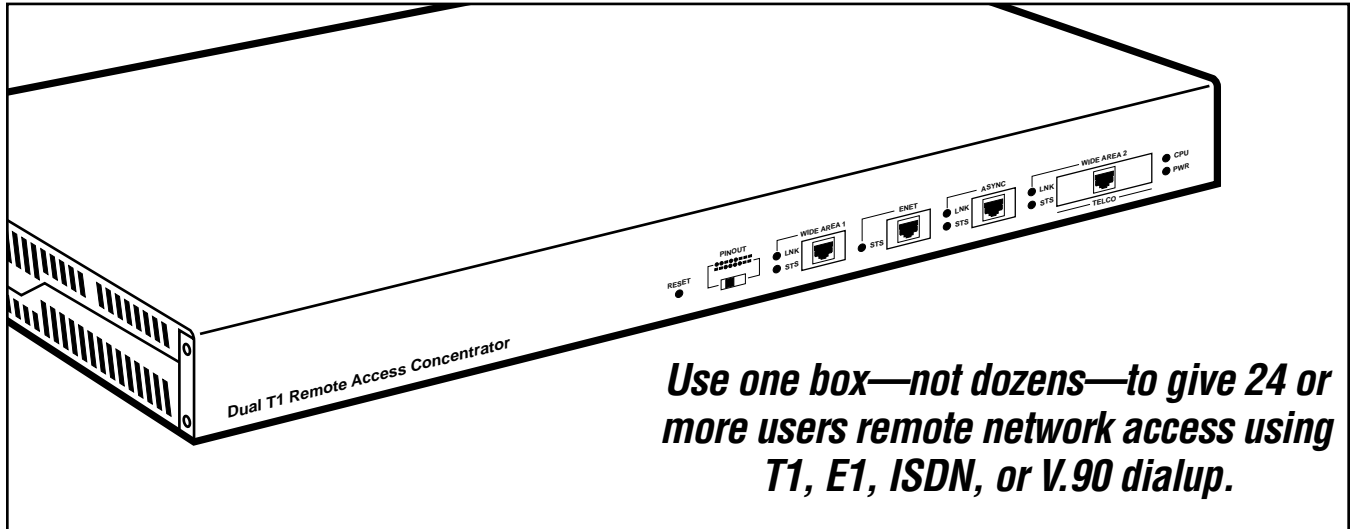


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# BLACK BOX<sup>®</sup>

## NETWORK SERVICES

### T1 AND E1 REMOTE ACCESS CONCENTRATORS



**Use one box—not dozens—to give 24 or more users remote network access using T1, E1, ISDN, or V.90 dialup.**

### Key Features

- ▶ **One or two T1 or E1 WAN ports accept dialup or ISDN traffic for up to 60 internal digital modems.**
- ▶ **Very broad support for standards, protocols, and switch types.**
- ▶ **Low (35-watt) power consumption and redundant power supplies.**
- ▶ **Only 1U high; rackmount kit included.**
- ▶ **Terminal-based configuration and basic operation.**

Racks and cabinets full of modems, NTUs, CSUs, DSUs—they're the last thing you need when you want to manage V.90 (56K) dialup or ISDN remote-user connections to your network. If you're ready to put all of those calls on one or two T1 or E1 pipes and manage them through a single device, consider our Remote Access Concentrators.

The T1 Concentrator is available with either one WAN port and 24 internal digital modems (our product code LRA3002A) or two WAN ports and 48 digital modems (LRA3000A). (Both T1 models have an integral CSU, so you don't need to attach an external one.) The E1 Concentrator is available with either one WAN port and 30 internal digital modems (LRA3001A) or two WAN ports and 60 digital modems

(LRA3003A). All models also have a 10BASE-T port and an RS-232 console port.

You can connect a computer running terminal emulation to the console port, or you can Telnet™ from anywhere, in order to manage the Concentrator with its firmware-resident Local Management utility. This utility includes:

- A Module Configuration menu for managing IP, PPP, and SNMP settings, passwords, authentication secrets, channel-associated signaling, downloads of firmware updates, and more;
- A Network Tools prompt for configuration, information-gathering, and diagnostic commands; and
- A Fault Records screen that will display copious information about recent faults.

Higher functions, including

accounting and certain types of authentication, are handled across the network through software. The Concentrator can work with a RADIUS server for this.

The Concentrator is highly flexible. It supports a large number of international EMI/RFI, safety, modem, and Internet standards; several SNMP MIBs; various protocols and switch types; and a wide variety of line, routing, and authentication options. (See **Specifications** on the next page.)

The Concentrator is thin enough to fit in 1U of rack space and comes with a rackmount kit. It creates very little heat because it uses, at most, only 35 watts of power. And it has two internal power supplies; it will keep operating even if one of them fails.



# Specifications

## Compliance:

### EMI/RFI:

USA: FCC (47CFR) Part 15  
Subpart J Class A;  
Canada: IC Class/classe A,  
CSA C108.8;  
EU: CE (EN 55022 class A,  
EN 50082:1-1992,  
89/336/EEC);  
Australia/New Zealand:  
AS/NZ 3548;  
Japan: VCCI V-3 93.01;  
PSTN connection: FCC Part 68/  
IC-03;

### Electrical safety:

USA: UL® 1950;  
Canada: CSA C22.2 No. 950;  
EU: IEC 950, EN 60950,  
73/23/EEC;  
Australia/New Zealand:  
TS 001

## Standards:

LAN: IEEE 802.3 Ethernet v. 2;

### Modem:

Main data interchange: ITU-T  
V.90, V.34, V.32 bis, V.32,  
V.22 bis, V.22 A/B, V.23, and  
V.21; proprietary K56flex™  
and V.34+; Bell 212A and  
103;

Error correction: ITU-T V.42  
LAP-M, MNP® 1 through 4  
and 10;

Data compression: ITU-T  
V.42 bis and MNP 5;

RFCs: 768 (UDP), 791 (IP), 793  
(TCP), 1157 (SNMP),  
1213 (MIB-II/UDP, DS0,  
SNMP), 1321 (MD5 Message  
Digest), 1332 (IPCP),  
1406 (DSX1 MIB), 1638 (BCP),  
1650 (Ethernet), 1661 (PPP),  
1676 (PPP/HDLC framing), 1696  
(modem MIB), 1757 (RMON),  
1877 (DNS and NBNS address  
negotiation), 1990 (MLP),  
1994 (PPP authentication/  
PPP-CHAP), 2011 (SNMP v2  
MIB for IP using SMI v2), 2013  
(SNMP v2 MIB for UDP using  
SMI v2), 2021 (RMON v2 for  
SMI v2), 2127 (ISDN), 2138  
(RADIUS authentication), 2139  
(RADIUS accounting), 2233  
(interfaces MIB);

MIBs: Modem MIB, MIB-II, DSX1  
MIB, DS0 MIB, SNMP MIBs,  
RMON MIBs, interfaces MIB

## Interfaces:

### WAN:

LRA3000A, LRA3002A: ISDN T1  
PRI (including CT1 if CAS is  
enabled) through integral  
CSU and digital modems;  
LRA3001A, LRA3003A: ISDN E1  
PRI (including R2 if CAS is  
enabled) through digital  
modems;  
LAN: 10BASE-T;  
Console: EIA/TIA RS-232  
(propriarily pinned on RJ-45)

### Protocols:

WAN: Unnumbered IP WAN,  
HDLC, ISDN, R2 (for E1) or RBS  
(for T1/CT1), digital modem,  
PPP, Multilink PPP, Async-  
PPP, Sync-PPP, PPP-IPCP,  
PPP-BCP, PPP trace;  
Console: Asynchronous

## T1 Characteristics (LRA3000A, LRA3002A):

ISDN PRI Signaling (switch  
types): N1-2, AT&T®  
4ESS/5ESS/Definity™;  
DMS500/250/100, SL100,  
INS1500 (Japan);  
Framing: D4/SF, ESF;  
Line coding: B8ZS;  
Channel-associated signaling:  
Robbed-bit signaling (RBS)  
including E&M Wink Start  
(B8ZS)

## E1 Characteristics (LRA3001A, LRA3003A):

ISDN PRI Signaling (switch  
types): ETSI - CTR4/NET5  
(Euro-ISDN), 1TR6 (Germany);  
TS014/TS038 (Australia/New  
Zealand); for other countries,  
call Black Box Technical  
Support;  
Framing: Multi-framing with  
CRC4, double framing;  
Line coding: HDB3;  
R2 channel-associated signaling:  
ITU, Mexico (Telmex™), Brazil,  
Indonesia, or India (for other  
countries, call Black Box Tech  
Support)

## Routing:

IP: Default route, static routes,  
RIP v1 and v2;  
All other routing protocols are  
supported for bridging only

## Authentication: RADIUS

authentication, PAP, CHAP, CLID,  
PPP Call Back (CBCP), basic  
IP-address pooling

## Accounting: RADIUS accounting

## Connection Management:

Modem-inactivity timer

## Device Management:

In-band: SNMP;  
Out-of-band: RS-232 console,  
Telnet™ server, TFTP client

## Number of Internal Modems:

LRA3000A: (48);  
LRA3001A: (30);  
LRA3002A: (24);  
LRA3003A: (60)

## User Controls:

All models: (1) Front-mounted  
recessed RESET switch;  
LRA3000A, LRA3002A only:  
(1) Front-mounted PINOUT  
switch (affects pinout of WIDE  
AREA 1 port);  
Firmware-resident terminal-  
based Local Management  
utility for configuration and  
system management;  
All advanced functions are  
software-controlled

## Indicators:

Front-mounted LEDs:  
(1) for main power, labeled  
PWR;  
(1) for self-test, labeled CPU;  
(2) for the console (ASYNC)  
port, labeled LNK and STS;  
(1) for the LAN (ENET) port,  
labeled STS;  
(2) for each WAN (WIDE  
AREA) port, labeled LNK  
and STS;  
All other indications are  
firmware- and software-based

## Connectors:

All front-mounted:  
(1) RJ-45 female console port,  
labeled ASYNC;  
(1) RJ-45 female LAN port,  
labeled ENET;  
(1) RJ-48C female WAN port,  
labeled WIDE AREA 1;  
LRA3000A, LRA3003A only:  
(1) RJ-48C female WAN port,  
labeled WIDE AREA 2

**MTBF:** 50,000 hours (calculated  
estimate)

## Temperature Tolerance:

Operating: 32 to 104°F (0 to 40°C);  
Storage: -22 to +194°F (-30 to  
+90°C)

**Humidity Tolerance:** 5 to 95%  
noncondensing

## Power:

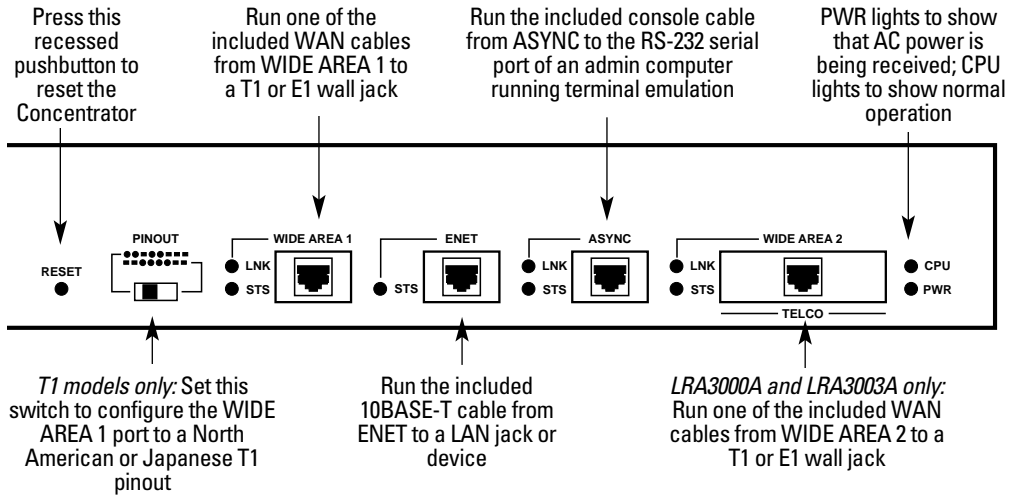
From utility-power (mains)  
outlet(s), through included  
detachable power cord(s),  
rear-mounted IEC 320 inlet(s),  
and internal transformer(s):  
Input: 100 to 125 VAC  
(~300 mA) or 200 to 240 VAC  
(~150 mA) at 50 or 60 Hz  
(autosensing);  
Current: Rated for 55 watts;  
Inlets: Dual (redundant)  
IEC 320 male;  
Consumption: 35 watts maximum

**Size:** 1.8"H (1U) x 15.5"W x 17"D  
(4.4 x 39.4 x 43.2 cm)

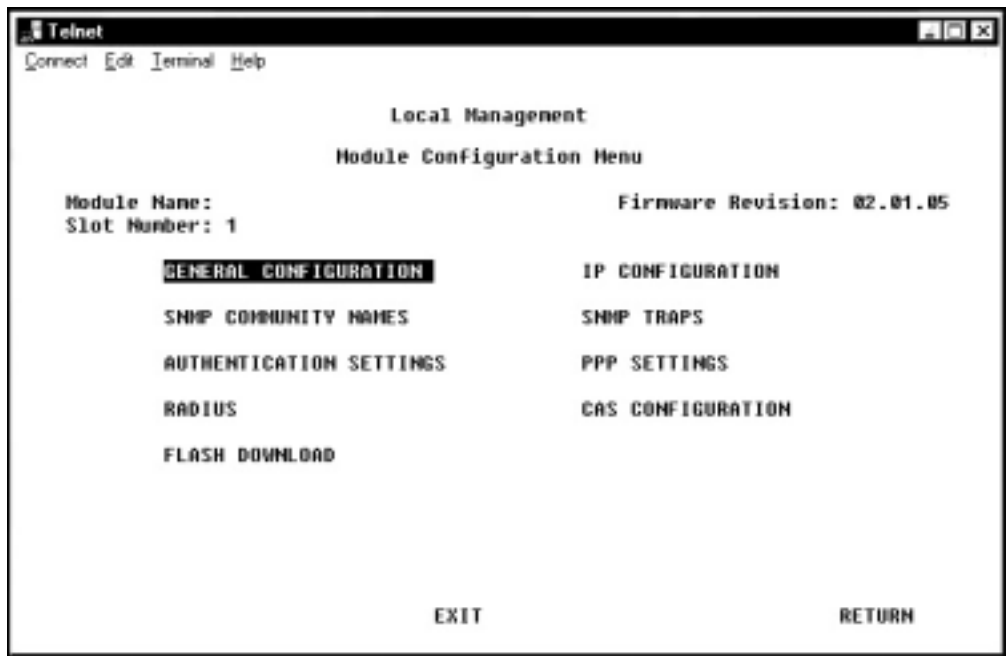
**Weight:** 13 lb. (5.9 kg)



**The Concentrator's indicators, data connectors, and physical controls are on its front panel.**

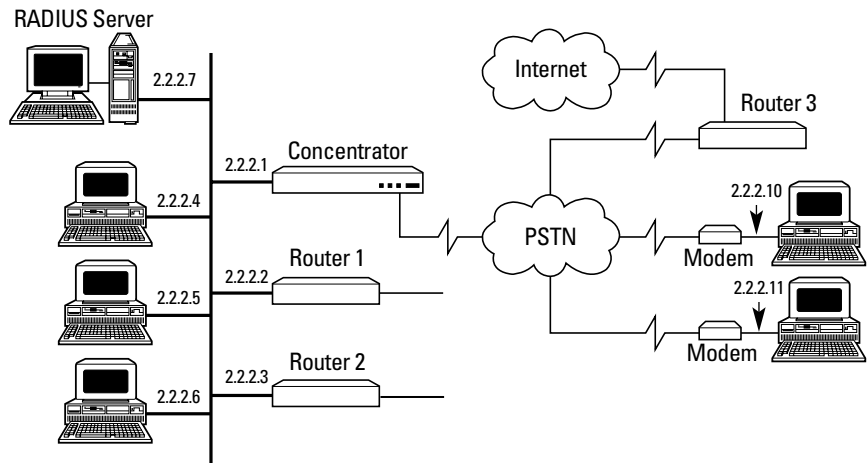


**Use the Concentrator's Local Management utility for all kinds of basic operation and configuration.**



NOTE: SNMP traps aren't supported yet, but will be in a future release of the Concentrator's firmware.

**It's not hard to integrate the Concentrator into any of a variety of networks. In this IP network, the Concentrator functions as the gateway to the Internet.**



## The complete Concentrator package

- The Concentrator itself.
- (1) Console cable for connections to the Concentrator's ASYNC port.
- (1) RJ-45 F to DB9 F adapter for use with the console cable.
- (1) or (2) Cross-pinned WAN cables for connections to the Concentrator's WIDE AREA ports.
- (1) Standard 10BASE-T cable for connections to the Concentrator's ENET (LAN) port.
- A grounding wrist strap for installers and maintenance people to wear, to prevent static discharges that might damage the Concentrator.
- (4) Adhesive rubber feet for placing the Concentrator on a desk, counter, etc.
- A rackmount kit for mounting the Concentrator in a 19" rack.
- (2) Power cords.
- (1) CD of HTML documentation.
- (1) Hardcopy "getting started" manual.

## What else you might need

- RADIUS software for management of authentication, accounting, and other high-level Concentrator functions.
- Terminal-emulation software for local configuration and low-level management of the Concentrator.
- Standard browser software for viewing the Concentrator's HTML documentation.
- A TFTP server for downloading firmware upgrades to the Concentrator.
- Uninterruptible power supply (UPS) and/or AC-power surge protectors.
- Data-line surge protectors.
- RJ-48C F to DB15 adapters for attaching the WAN cables to the DB15 WAN jacks present at some Canadian sites.
- A DB9 M to DB25 F adapter for attaching your console cable to a PC's DB25 M serial port.

## Ordering Information

ITEM	CODE
T1 Remote Access Concentrators	
(1) WAN Port, (24) V.90 Digital Modems.....	LRA3002A
(2) WAN Ports, (48) V.90 Digital Modems.....	LRA3000A
E1 Remote Access Concentrators	
(1) WAN Port, (30) V.90 Digital Modems.....	LRA3001A
(2) WAN Ports, (60) V.90 Digital Modems.....	LRA3003A
10/100BASE-T Data-Line Surge Protector.....	SP512A-R3
T1 and E1 Data-Line Surge Protector.....	SP513A-R2
RS-232 on RJ-45 Data-Line Surge Protector.....	SP522A-R2

*Call Black Box Technical Support for help in determining how best to back up and surge-protect the Concentrator's AC power.*

