P32mxi Broadband Access Device
Installation and Users Guide
0000004-001 Version 1.1a

Telsource Corporation
100 Passaic Avenue
Fairfield, NJ 07004

1. Regulatory Requirements

This section describes the regulatory requirements to which the P32mxi Broadband Access Device complies with.

1.1 FCC Requirements, Part 68

This equipment complies with Part 68 of the FCC rules. The label located on the bottom of the P32mxi Broadband Access Device contains the FCC registration number. You must provide this information to the telephone company if they request it. Table 1 contains the registration information:

FCC Registration Number	UNC USA-27074-DE-N
Service Center	Telsource Corporation 100 Passaic Ave. Fairfield, NJ 07004

Table 1 — FCC Registration Information

The USOC (Universal Service Order Code) registration jack, Facility Interface Codes (FIC) and service order codes associated with each private line application represents the type of service that will be provided by the telephone company are shown below in Table 2:

Service Type	FIC	Service Code	USOC Jack Connector
T1: S/F-AMI	04DU9-BN	6.0N	RJ48C
T1: S/F-B8ZS	04DU9-DN	6.0N	RJ48C
T1: ANSI ESF – AMI	04DU9-1KN	6.0N	RJ48C
T1: ANSI ESF – B8ZS	04DU9-1SN	6.0N	RJ48C
OPS	0L13C	9.0F	RJ21X/RJ14C
Loop Start	02LS2	9.0F	RJ21X/RJ14C
Ground Start	02GS2	9.0F	RJ21X/RJ14C
DID (Reverse battery)	02RV2.T	9.0F	RJ21X/RJ14C

Table 2 — Facility Interface Codes

The software contained in the P32mxi to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service.

Failure to upgrade the premises systems or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer(s) employees from gaining access to the network and to these codes.

ALLOWING THIS EQUIPMENT TO BE OPERATED IN SUCH A MANNER AS TO NOT PROVIDE FOR PROPER ANSWER SUPERVISION IS A VIOLATION OF PART 68 OF THE FCC(S) RULES.

PROPER ANSWER SUPERVISION IS WHEN:

A. This equipment returns answer supervision to the PSTN when DID calls are:

- ? Answered by the called station
- ? Answered by the attendant
- ? Routed to a recorded announcement that can be administered by the CPE user
- ? Routed to a dial prompt

B. This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:

- ? A call is unanswered
- ? A busy tone is received
- ? A reorder tone is received

Note: a RJ21X is the 25 pair connector denoted as "VF 1-24" on the P32mxi Broadband Access Device.

If the P32mxi Broadband Access Device causes harm to the telephone network, the telephone company will notify you in advance. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, and/or procedures that could effect the operation of the P32mxi Broadband Access Device. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications to maintain uninterrupted service.

If you experience trouble with the P32mxi Broadband Access Device, please contact your equipment vendor for repair and/or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that you remove the P32mxi Broadband Access Device from the network until the problem is resolved.

User serviceable parts inside the P32mxi Broadband Access Device should be accessed only by a qualified service professional. User repairs must not be attempted and doing so will void the user's warranty. Please contact your equipment vendor for repair/replacement instructions.

Do not install the P32mxi Broadband Access Device on public coin service provided by the telephone company.

Connection to a party line device is subject to state tariffs. (Contact your state public utilities commission for information.)

To avoid damage to the equipment caused by lightning and other electrical surges, it is recommended that the customer install an AC surge protector in the AC outlet to which the P32mxi Broadband Access Device is connected. Damage caused by lightning or electrical power surges is not covered under your warranty.

1.2 FCC Requirements, Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If the unit is not installed in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's expense.

1.3 National Electrical Code Requirements

The P32mxi Broadband Access Device is ETL certified and is in compliance with ANSI/UL Standard 1950 and CSA 22.2 No. 950.

1.4 Important Safety Instructions

CAUTION: **Observe The Following:**

- ? The 120VAC attachment-plug receptacle for the P32mxi Broadband Access Device is of a grounding type, and the equipment grounding conductors serving these receptacles are to be connected to earth ground at the service equipment.
- ? Never install telephone jacks in a wet location unless the jack is specifically designed for wet locations.
- ? Never touch non-insulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- ? Never install telephone wiring during a lightning storm.

WARNING: There could be both an AC and DC power connection to the unit. To prevent electric shock, be sure to unplug the **AC Power Cord**, **DC Battery power plug**, **25 pair Telco connector,** and **dual 8 pin VF Cables** before installing or performing maintenance on the P32mxi Broadband Access Device

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- ? Read and understand all instructions.
- ? Follow all warnings and instructions marked on the product.
- ? Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product or to people.
- ? Keep this product away from flammable/hazardous liquids or fumes. There is a potential of fire due to electrical shock.

? This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home or office, consult your dealer or local power company.

? Do not overload AC wall outlets and extension cords as this can result in the risk of fire or electric shock.

? To reduce the risk of electric shock, DO NOT disassemble this product. Call a qualified service professional when maintenance or repair work is required. Removing the cover may expose you to dangerous voltages and/or other risks. Incorrect re-assembly may cause electric shock when the product is subsequently used.

? Unplug this product from the AC wall outlet, DC/battery back up service, and remove the 25 pair Telco connector when referring service to qualified service personnel under the following conditions:

a. When the either the AC power supply cord, AC plug, or DC power cord is damaged or frayed.

b. If liquid has been spilled into the product

c. If the product has been exposed to rain or water.

d. If the product does not operate normally by following the operating instructions.

e. If the product has been dropped or the enclosure has been damaged.

f. If the product exhibits a distinct change in performance.

g. Before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning the external surface of the unit.

Refer to the installation chapter in this manual for a safe and proper installation procedure. All wiring external to this equipment should follow the current provision of the National Electrical Code.

2. Limited Warranty - P32mxi Broadband Access Device

Telsource Corporation warrants to the End User (AT&T's customer that has a prime contract with AT&T under which AT&T is to provide deliverables) that this Product is free from substantial defect in material and workmanship for the period of five years from date of shipment by Telsource Corporation (also known herein as Telsource).

LIMITATION OF WARRANTY AND LIMITATION OF REMEDIES

Manufacturer's liability is limited as follows: Telsource, at its option, will: (a) repair, replace or service, at Telsource's place of business, or on the customer premises or at other repair facilities, as Telsource may see fit, the Product or workmanship found defective; or (b) credit the Buyer for the Product in accordance with Telsource's depreciation policy. Refurbished materials may be used in the repair or to replace the Product. Products returned to Telsource for repair, replacement or credit will be shipped prepaid by the Buyer. Telsource will pay for return freight back to the Buyer via ground transportation. Telsource or its agent will have the right to inspect the product or workmanship and installation on Buyer's or Buyer's customer's premises if it so desires.

Correction of defects by repair, replacement, service or credit will be at Telsource's option and constitute fulfillment of all obligations to Buyer. Telsource assumes no liability with respect to defects in the Product caused by: a) modification, repair, installation, operation or maintenance of the Product by anyone other than Telsource or its agent, except as described in documentation; or b) the negligent or other improper use of the Product; or c) lightning, power surges, floods, acts of war or acts of God; or d) handling or transportation after the title of the Product passes to Buyer. This limited warranty does not cover any labor, maintenance, transportation or technical support nor does it protect you from down time. Telsource assumes no warranty liability or any other liability for any other equipment connected to the Product.

The limited warranties in this agreement replace all other warranties, express or implied, and all other obligations or liabilities of Telsource, including any warranties of merchantability and fitness for a particular purpose. All other warranties are disclaimed and excluded by Telsource. The remedies contained in this agreement will be the sole and exclusive remedies whether in contract, tort, negligence or otherwise. Telsource will not be liable for injuries and damages to persons or property resulting from any cause what-so-ever. These limitations apply to all services, software, and products during and after the warranty period. In no event shall Telsource Corporation, nor any of its directors, agents, employees, or subcontractors be liable to the customer for any direct, indirect, special, incidental, punitive, exemplary, contingent or consequential damages, lost profits, lost revenues, lost data, loss of use of equipment or loss of associated equipment, downtime costs, delays, cost of substituted facilities or any other commercial or personal losses arising out of or related to Products or Services or Contracts or Agreements provided by Telsource or the performance or breach thereof, even if Telsource has been advised of the possibility thereof, whether due to a breach of contract, negligence, strict liability in tort or any other reason. Telsource MAKES NO EXPRESS AND/OR IMPLIED WARRANTIES, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR OTHERWISE (EXCEPT AS TO TITLE) OTHER THAN THOSE EXPRESSLY SET FORTH ABOVE. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering, use of any card in a card shelf not manufactured by Telsource, use of cards not manufactured by Telsource in the card shelf or other causes not arising from defects in material and workmanship.

All Product returns require the assignment of an RMA (Return Material Authorization) number prior to Product return. Please call the Telsource customer service department for this number. Absolutely no responsibility will be taken for any Products returned without an RMA.

3. Description

3.1 What is the P32mxi Broadband Access Device ?

What exactly is the **P32mxi Broadband Access Device**? What does it do?

The P32mxi Broadband Access Device is an "intelligent" multiplexer used to provide up to 32 analog voice frequency access ports in the form of:

- *Subscriber-Side* (FXS)
- *Originator-Side* (FXO]
- *Dial Pulse Transport-Side* (DPT)
- *Dial Pulse Originate-Side* (DPO)

The P32mxi Broadband Access Device is also used to provide up to 2 network interface ports in the form of:

- Digital T1 circuits

The P32mxi Broadband Access Device supports T1 access to long distance carrier networks as well as local service providers, CLECs and Competitive Access Providers (CAPs).

The P32mxi Broadband Access Device supports T1 framing formats of D4 (SF), ESF and TR-08 mode I with either AMI or B8ZS line coding.

The basic system comes complete with 6 access slots for four port voice channel cards, one V.35 data port, and one access slot for a network interface card.

The expanded system comes with the basic system plus 2 access slots for four port channel cards, one access slot for a network interface card, an access slot for the ATM/Router card, and 3 access slots for future DSP enhancement cards.

The P32mxi Broadband Access Device supports standard POTS interfaces such as:

- 2-wire loop start
- 2-wire ground start
- high speed modem and fax connections

Additionally, the P32mxi Broadband Access Device can convert the following digital interfaces to POTS analog:

- E&M Immediate conversion to loop or ground start signaling
- E&M Wink conversion to loop or ground start signaling
- AT&T's MEGACOM™.

Figure 1 below shows a typical network configuration using the P32mxi Broadband Access Device Broadband Access Device:

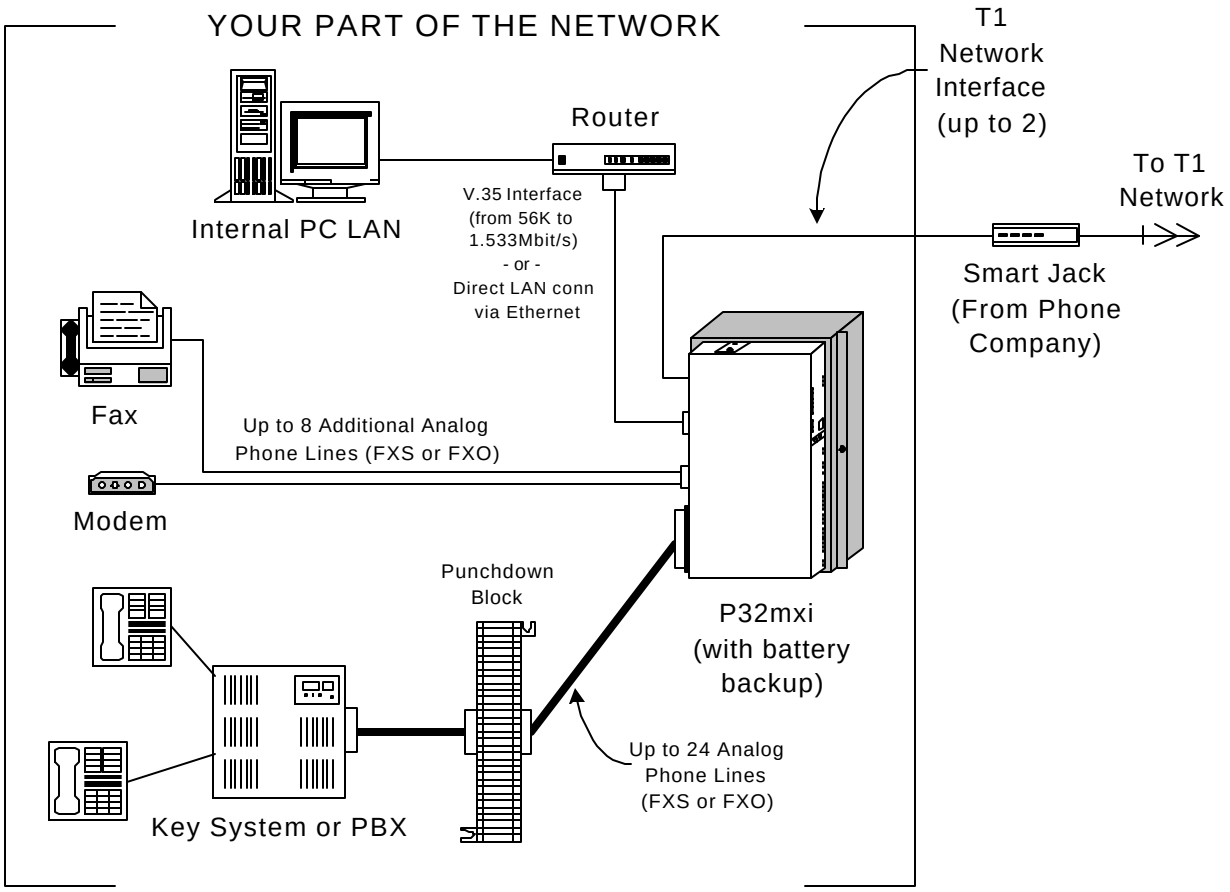

Figure 1 — Overall Network View

Typically, the P32mxi Broadband Access Device is programmed locally from the Craft (Serial RS-232C) port using the StarCAD 9000? Graphical User Interface (GUI). To perform remote maintenance and configuration (provisioning) operations, a standalone modem (not supplied) is used to connect the system to the telephone network. All configuration and set-up parameters are provisioned using a PC and the StarCAD 9000? program.

3.2 Features

The P32mxi Broadband Access Device features the following:

- Up to Thirty two (32) analog VF channels. Twenty-four (24) analog VF channels in the standard package and an additional 8 analog VF channels in the extended package.
- A single V.35 interface on a high density DB-26 connector as a standard feature.
- Triple Mode Power: Power the P32mxi Broadband Access Device from 120VAC, or –48VDC, or 120VAC with –48VDC backup. The P32mxi Broadband Access Device power supply contains an Integrated battery charge circuit for use with the BC-48 battery cabinet.
- Optional wall mounted battery cabinet to house batteries for –48VDC backup in the event of a power failure or outage condition. Wall mount battery case alignment bracket also available.
- Battery backup provides up to 8 hours of service even when under 50% traffic load.
- Integrated Ringing Generator with a low distortion 20 Hz sine wave output of 15 REN.
- Removable CSU with T1 Signaling and Line Code Conversion.
- Supports TR-TSY-000008 Mode I which is software selectable via the StarCAD 9000? program.
- Remotely configurable parameters using the StarCAD 9000? program.
- Remote management through SNMP.
- All system provisioning parameters (whether default or user-provisioned) are stored internally in non-volatile memory.
- Supports both AT&T's Performance Report Monitoring (PRM) and ANSI T1.403 Performance Reporting.
- Internal ATM/Router card for Voice Over IP compatibility.

3.3 Components

3.3.1 Part Numbers and Accessories

The following units and accessories are available from your dealer or distributor:

Model Number	Description	Part Number
MX620T	P32mxi Chassis	0200000-002
MX120	4 Port FXO/DPT card	0200013-001
MX220	4 Port FXS/DPO card	0200012-001
MX310	Versapath Expansion Board	0200005-001
MX540	ATM/Router Module	0200016-001
MX800	T1 Network Interface card	0200014-001
BC-48	Battery Cabinet	0200002-001
	Universal Mounting Bracket	1500017-001
	V.35 Data Cable	3500009-001
	Craft Port Cable Adapter	3500001-001
	Modem Cable Adapter	3500004-001
	Craft Port Cable, 7 feet long	3500003-001
	VF 8 pin Adapter Cable	3500011-001
	Battery, 12VDC, 7.7AH	TBD
	-48VDC Battery Connector	4000022-001
	Battery Cabinet Quick Mount Bracket	TBD

Table 3 — Part Ordering Guide

3.3.2 P32mxi Broadband Access Device Main Chassis

The P32mxi Broadband Access Device is a self contained voice and data multiplexer with 24 FXS analog channels and a V.35 port. Each voice port can connect to either an analog telephone set, a trunk port from a PBX, or a modem or fax.

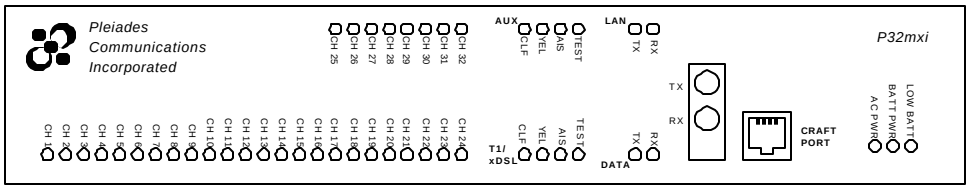

Figure 2 — P32mxi Broadband Access Device Front View

The front of the chassis has two bantam jacks for monitoring the transmit and receive signals for the primary T1 span. The Craft (Serial RS-232C) port is for configuration of the unit; it is used by a laptop or PC running the StarCAD 9000? software, or an external modem can be attached to allow for remote configuration.

Access to the analog voice channels 1 through 24 is via a 50 position female Telco connector labeled 'VF 1-24' located on the lower right rear of the chassis. A Velcro harness (attached to the unit) is used to secure the connection with the 25 pair cable. Extended analog voice channels 25 through 32 are accessible by removing two screws holding a plate near the AC power connector. Once the plate is removed two 8 pin connectors are revealed with a label of 'VF 25-32'.

As shown in Figure 3 below, the RJ48C modular jack for the T1 connection, the 120VAC power connector and a –48VDC power connector are located on the back of the P32mxi Broadband Access Device . The unit comes equipped with a 6-8 foot AC power cord. A –48VDC connector plug for connecting the system to a bulk power supply is available separately (see Table 3 –48V Battery Connector).

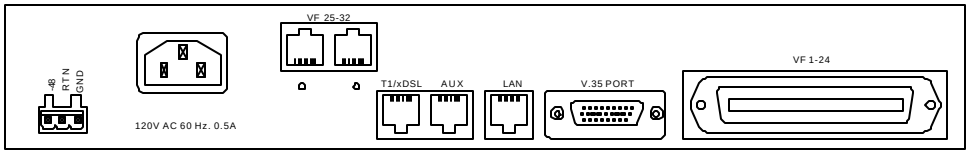

Figure 3 — P32mxi Broadband Access Device Rear View

3.3.3 LED Indicators

There are 47 LED indicators on the front panel; 32 are used to show the status of each analog voice channel, four show the status of the primary T1/xDSL, four show the status of the secondary T1/xDSL (AUX), two are for the V.35 Data Port, two are for the ATM/Router (LAN), and three show the power status.

3.3.4 RS-232C Craft Port

The Craft (Serial RS-232C) port on the P32mxi Broadband Access Device allows a serial modem or a RS-232 terminal to be connected to the unit. This connection allows the unit to be configured directly or remotely via a PC or laptop with the StarCAD 9000? program. Table 14 has a list of the serial configuration parameters.

The Craft Port is also used for a serial SNMP interface port utilizing the SLIP protocol.

3.3.5 Analog Voice Frequency (FXS/DPO & FXO/DPT) Channels

The analog VF channels interface the customer's phone (a standard POTS phone or a PBX/Key System) to the system, converting analog information into digital (PCM) data and signaling for transmission over the Network Interface. The circuits can be configured for either Loop or Ground Start on a per-channel basis. Also, both the Transmit and Receive gain is selectable from +1.0 dB to –8.0 dB in 0.1 dB steps. All parameters for the VF channels are set by the StarCAD 9000? program.

The individual channel LEDs indicate the following conditions:

LED State	Channel Status
Off	Channel is On-Hook
Very Fast Blinking	Channel is Ringing
Solid	Channel is Off-Hook
Individual Slow Blinking	Channel is in Ringing Overload*
All Channels Slow Blinking	Incorrect Network Interface Signaling

Table 4 — Analog Channel LED States

*Note: Ringing Overload is a condition that occurs when an analog channel has been in a constant ringing state for at least 5 seconds. When this occurs the P32mxi Broadband Access Device will remove the ringing voltage from the affected analog channel. This condition typically occurs when a digital signaling type is incorrect.

3.3.6 Network Interface Cards

3.3.6.1 T1 Network Interface card

This circuit is responsible for processing the T1 signal and reformatting the digitally encoded (PCM) voice, data and formatting the signaling into a form usable by both the analog voice and data channels.

The P32mxi Broadband Access Device can be configured to use T1 framing formats of D4 (SF), ESF, and TR-TSY-000008 Mode I. The P32mxi Broadband Access Device also has a built-in CSU for the T1 interface, or it can be set to a DSX interface. Line Build Out (LBO) can be set for 0, –7.5, –15, and –22.5 dB. T1 Performance statistics are collected by the P32mxi Broadband Access Device and can be viewed via the StarCAD 9000? program.

The T1 LEDs indicate the following conditions:

LED Indicators	Description	Color	Status
CLF	Carrier Line Fail ("Red" Alarm)	Off Red	Normal Operation/T1 Span is Up T1 span: 1) is receiving an incorrect framing format from what was configured, 2) is receiving > 1? 10^{-3} bit errors, or 3) is not detecting a valid T1 signal.
YEL	Yellow Alarm	Off Yellow	Normal Operation T1 is detecting a Yellow Alarm from the upstream T1 equipment.
AIS	AIS or "Blue" Alarm	Off Yellow	Normal Operation T1 is detecting an unframed all ones (AIS/Blue) signal from the upstream T1 equipment.
TEST	Test Mode Indicator	Off Green	Normal Operation T1 is in CSU loopback either from a remote command or via a command from the StarCAD 9000? program.

Table 5 — T1 LED States

3.3.7 V.35 Data Port

The V.35 Data Port supports either Nx56 or Nx64 Kbps of data. There is one 26-pin data port accessible from the back of the system.

Transmit (Tx) and Receive (Rx) LED indicators are displayed on the front of the system to help with troubleshooting Data Port related faults within the system.

Bandwidth for the V.35 Data Port is set via the StarCAD 9000? program.

3.3.8 Triple Mode Power Supply with Battery Backup/Integrated Ringing Generator

The power supply, included in the main chassis, has three modes of operation, 120VAC powered, –48VDC powered, and 120VAC with –48VDC backup with auto switch over from 120VAC to –48VDC in the event of a power failure.

The power supply also has an Integrated battery charger for use with BAT-HE12V7.7 –48VDC batteries. In addition to supplying power to the main and expansion boards, the power supply also provides the ringing voltage.

There are 3 LED indicators on the front panel of the main unit to check the function of the power supply (described in Table 6 below):

LED Indicators	Description	Color	Status
AC Power	AC Power LED	Green Off	Unit is under AC Power No AC Power, unit may be under DC power.
Batt Pwr	–48VDC Power LED	Green Off	Unit is under –48VDC Power Unit is under AC Power or there is no power to the unit.
Low Batt	Low Battery LED	Off Red	Normal Operation (or all power has failed) Unit is under DC power but the voltage has dropped below –44VDC. When the Red LED initially lights, the batteries have approximately 10 to 30 minutes of life left, depending on the load. The unit and LED will shut down when the voltage drops below –40 to –42VDC.

Table 6 — Power LED States

4. Installation

This section describes the installation procedures for the P32mxi Broadband Access Device .

CAUTION: **Observe The Following:**

- ? Never install telephone wiring during a lightning storm.
- ? Never install telephone jacks in a wet location unless the jack is specifically designed for wet locations.
- ? Never touch non-insulated telephone wires or terminals unless the telephone line is disconnected at the network interface.

WARNING: There could be both an AC and DC power connection to the unit. To prevent electric shock, be sure to unplug the **AC Power Cord**, **DC Battery power plug**, **25 pair Telco connector,** and **dual 8 pin VF Cables** before servicing.

4.1 Unpacking

Upon receipt of the unit, unpack and inspect all components of the P32mxi Broadband Access Device system.

1. Check the materials against the packing list, including quantity of item, type of item, and item serial number.
2. Report any discrepancies to the supplier.
3. Inspect materials for damage.
4. Report any damage to the shipper. The purchaser is responsible for making any freight claims with the shipper. You normally have 15 days to report any hidden damage. All external packaging damage should be noted on the freight bill upon receipt of the unit.
5. Retain packing material for future use, if required.

4.2 Site Location

The installation site should provide adequate ventilation, 120VAC or –48VDC power, and cable routing room. Allow a minimum of 3 inches of space above and below the unit for adequate air circulation.

The site should provide a stable operating environment and be clean and free from temperature extremes, humidity, shock, dust, dirt and vibration. This unit is meant for installation in an indoor environment. **Outdoor installation is not recommended and will void the warranty.**

4.3 Installing the Unit

CAUTION: Observe proper ESD procedures when handling any equipment and/or expansion cards.

There are no user serviceable parts in the P32mxi Broadband Access Device. The unit should only be opened to install expansion cards. This should only be done by authorized personnel.

WARNING: There could be both an AC and DC power connection to the unit. To prevent electric shock, be sure to unplug the **AC Power Cord**, **DC Battery power plug**, **25 pair Telco connector,** and **dual 8 pin VF Cables** before servicing.

4.3.1 Wall Mounting

The P32mxi Broadband Access Device installation kit includes two Universal Rack/Wall mount brackets to mount the P32mxi Broadband Access Device directly to the wall or to the BC-48 Battery Cabinet.

Refer to Figure 4 below. When mounting the unit on the wall (vertical position) the side of the unit with the AC power plug and fan exhaust grill should be at the top of the unit. Mounting the unit in this direction helps with keeping dust out of the unit.

NOTE: The P32mxi Broadband Access Device and BC-48 with batteries installed weighs approximately 35 pounds. Use fasteners that are appropriate for mounting heavy objects to the type of wall you are installing the unit on.

There are two methods to install the BC-48.

The first is to remove the batteries and use the holes in the back of the cabinet to securely attach the cabinet to the wall. Reinstall the batteries (a wiring diagram is provided on the inside cover of the battery cabinet) and mount the universal brackets on to the cover of the BC-48. Then mount the P32mxi Broadband Access Device to the BC-48.

The second method is to use the battery cabinet quick mount bracket (purchased separately). See the mounting instructions provided with the bracket.

Leave three inches (3”) of clearance above and below the unit for adequate airflow.

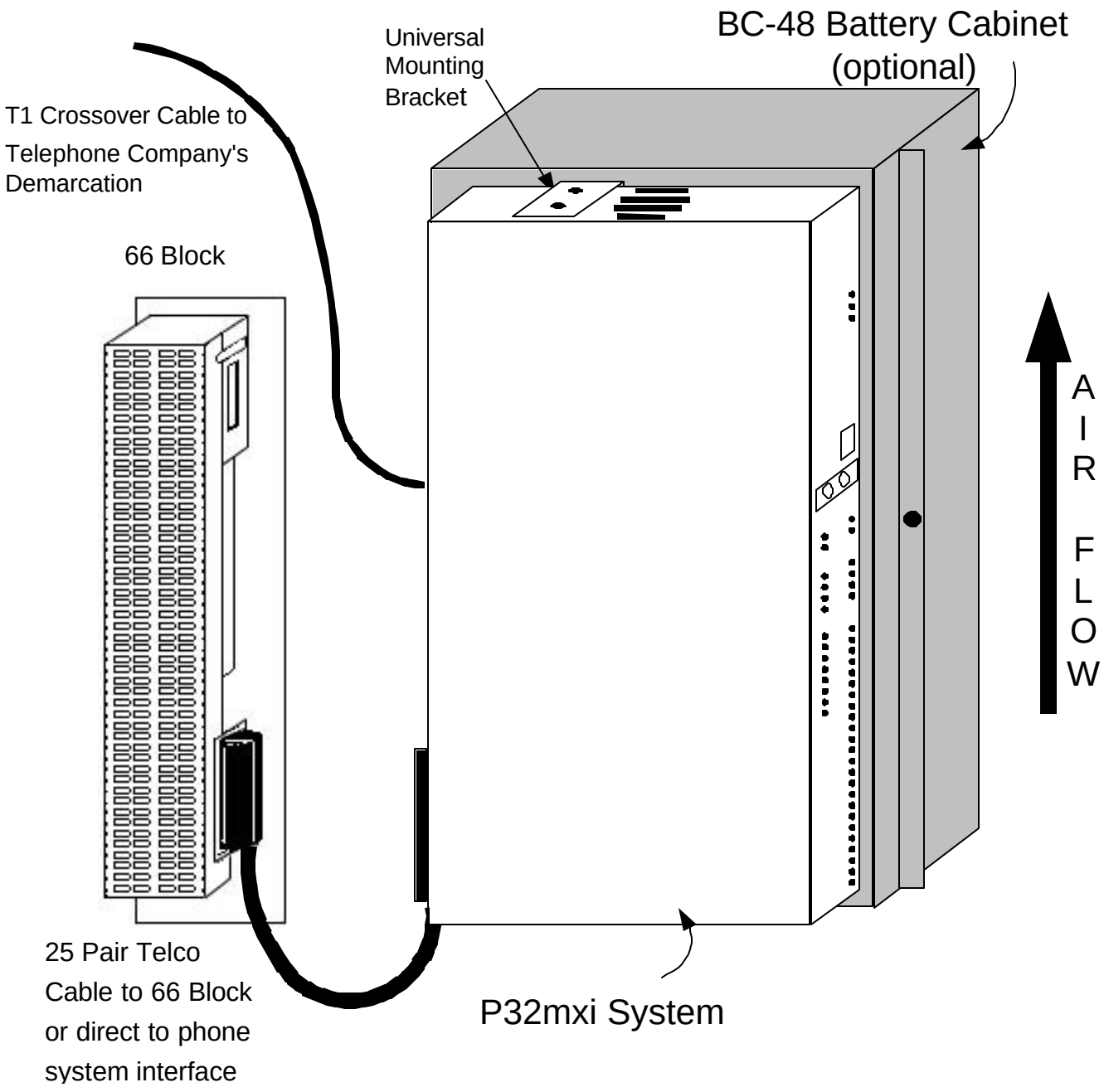

Figure 4 — Wall Mounting a P32mxi Broadband Access Device & BC-48 Battery Cabinet

4.3.2 Rack Mounting

The chassis may also be mounted in a 19" or 23" rack using the appropriate rack mount kit and screws appropriate for your specific rack. Leave three inches (3") of clearance on each side of the unit for adequate airflow. A heat riser can be used to duct excess heat away from the unit.

4.4 Cabling

The T1/xDSL tip and ring connector access to the P32mxi Broadband Access Device is located at the rear of the chassis. Refer to figure 5 for the T1/xDSL connector location.

4.4.1 Tip and Ring Access

4.4.1.1 VF Ports 1- 24

The tip and ring access is through a standard 50 pin D style (Telco) telephone wiring connector (25 pair Telco cable), wired as indicated in Table 7:

Channel	Ring Pos.	Tip Pos.	Channel	Ring Pos.	Tip Pos.
1	1	26	**13**	13	38
2	2	27	**14**	14	39
3	3	28	**15**	15	40
4	4	29	**16**	16	41
5	5	30	**17**	17	42
6	6	31	**18**	18	43
7	7	32	**19**	19	44
8	8	33	**20**	20	45
9	9	34	**21**	21	46
10	10	35	**22**	22	47
11	11	36	**23**	23	48
12	12	37	**24**	24	49

Table 7 — Tip & Ring Connector Wiring (1-24)

The last pair of wires (positions 25 [ring] and 50 [tip]) are connected to a dry alarm contact which will **open** if either the power fails or there is an internal failure. The dry alarm contact is rated for 100 Volts DC at 1 Ampere.

Connect one end of the tip and ring cable to the shelf with a RJ-21X (Male Connector) and connect the other end to a wiring jack (6-6 punch down block) for making cross connections to your telephones, PBXs, faxes and modems.

4.4.1.2 VF Ports 25 – 32

The tip and ring access to VF Ports 25 to 32 is through two 8pin connectors. The orientation of the dual 8 pin connectors is shown in Figure 6. The 8pin connector's physical pinout is the same as depicted in Figure 7 below. Table 8 describes the location of the tip/ring pairs with respect to the 8 pin connectors:

Figure 6 – VF Ports 25 to 32 Connector Orientation

Connector	Channel	Ring Pos.	Tip Pos.
1	**1**	5	4
1	**2**	6	3
1	**3**	7	2
1	**4**	8	1
2	**5**	5	4
2	**6**	6	3
2	**7**	7	2
2	**8**	8	1

Table 8 — Tip & Ring Connector Wiring (25 – 32)

NOTE: Tables 7 and 8 are the same for TR-TSY-000008 (TR-08/SLC-96) output. The P32mxi Broadband Access Device normalizes the D1D sequence of the channels (used in TR-08) internally from the D1D order of 1,13,2,14…to the normalized order of 1,2,3…. **Please note that this reordering is done internally by the P32mxi Broadband Access Device and will not be shown in the network diagram generated by the StarCAD 9000? program.**

4.4.2 T1 Cable

The unit needs a T1 or CAT 5 data cable with RJ45 plugs to connect the unit to the Telephone Company's DS1 Demarcation (RJ48X). Usually one end is plugged into the T1A port on the chassis and the other connected to the network.

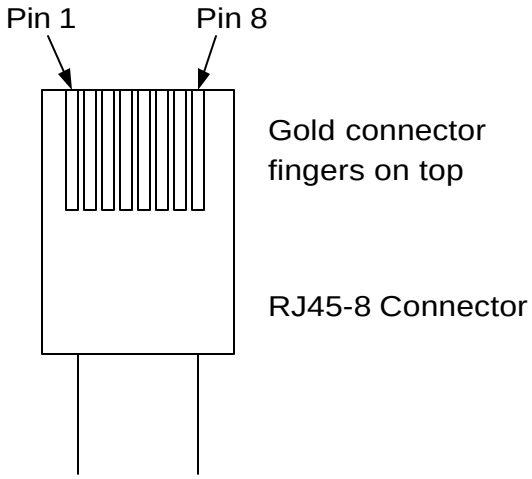

Figure 7 — T1, RJ45-8 Connector Pinout

The T1 cable connector is wired as indicated below:

Pin number	Signal	Signal Direction
1	Receive ring	From DS1 network
2	Receive tip	From DS1 network
3	No connection	
4	Transmit ring	To DS1 network
5	Transmit tip	To DS1 network
6	No connection	
7	Receive ground	
8	Transmit ground	

Table 9 — T1 Connector Wiring (T1 Crossover Cable)

4.4.3 V.35 Data Cable Connection

The V.35 cable (see Table 3 V.35 Data Cable) is wired as shown in Table 10 below:

Signal Name	Direction	Pin on DB-26 Subminiature	Pin on V.35 Winchester
Cable Shield		1	A
Send Data A	Input	2	P
Receive Data A	Output	3	R
RTS A	Input	4	C
CTS	Output	5	D
DCE Ready	Output	6	E
Signal Ground		7	B
RR	Output	8	F
Receive Timing B	Output	9	X
N.C.		10	
Terminal Timing B	Input	11	W
Send Timing B	Output	12	AA
N.C.		13	
Send Data B	Input	14	S
Send Timing A	Output	15	Y
Receive Data B	Output	16	T
Receive Timing A	Output	17	V
LL	Input	18	L
N.C.		19	
DTE Ready	Input	20	H
RL	Input	21	N
		22	
		23	
Terminal Timing A	Input	24	U
TM	Output	25	NN
		26	

Table 10 — V.35 Data Cable Connections

4.4.4 P32mxi Broadband Access Device RS-232C Connections

Located on the front of the chassis (see Figure 2) is an RS-232C Port labeled 'Craft Port' and configured as a DTE. This Craft Port is used to communicate with the P32mxi Broadband Access Device main board to do all configuration and maintenance functions. There are two methods used in communicating to the Craft port. The first is by direct connection to the 8 pin port, the second is via a modem.

4.4.4.1 Direct Craft Port Interface

An 8-pin RJ45 to DB9 converter headshell labeled 'CRAFT' and connectorized straight-through 8-pin flat cable are used for direct interface to the P32mxi Broadband Access Device's Craft Port. Both of these items are listed in Table 3 of this document.

The serial connections for the Craft Interface are shown in table 10 below:

8 pin Modular RJ45 Connector		DB9 Female Connector	
1	Data Carrier Detect	4	Data Terminal Ready
2	Receive Data ✍	3	Transmit Data
3	Transmit Data ✍	2	Receive Data
4	Data Terminal Ready	1	Data Carrier Detect
5	Signal Ground	5	Signal Ground
8	Clear To Send	8	Clear To Send

Table 11 — Cabling to Connect a PC to the Craft Port

4.4.4.2 Modem Interface

An 8-pin RJ45 to DB25 converter headshell labeled 'MODEM' and as above the same connectorized straight-through 8-pin flat cable are used for the modem interface to the P32mxi Broadband Access Device's Craft Port. Both of these items are listed in Table 3 of this document.

The serial connections for the Modem Interface are shown in table 11 below:

8 pin Modular RJ45 Connector		DB-25 Male Connector	
1	Data Carrier Detect	8	Data Carrier Detect
2	Receive Data ✍	3	Transmit Data
3	Transmit Data ✍	2	Receive Data
4	Data Terminal Ready	20	Data Terminal Ready
5	Signal Ground	7	Signal Ground
8	Clear To Send	5	Clear To Send*
		4	Request To Send*

*Clear to Send and Request to Send are tied together on the DB-25 side.

Table 12 — Cabling to Connect a Modem to the Craft Port

4.4.5 Power Connection

The P32mxi Broadband Access Device is designed to be connected to a grounded (three prong) 120 Volt, 60 Hz AC outlet. Be sure the outlet is grounded properly. Contact a qualified electrician or qualified electrical technician if there is any question about the outlet ground.

The P32mxi Broadband Access Device is rated at 0.8 Amp. The system can be connected to a –48VDC battery system via the –48VDC connector (see Table 3 –48V Battery Connector) or with the BC-48 Battery cabinet. Please refer to Figure 3 for the location of the –48V power interface.

Verify that the battery connector is properly oriented before installation. The locking tabs will fit into the cutout spaces just above the connector pins on the P32mxi Broadband Access Device chassis. The scalloped edge of the connector should align with the bottom of the P32mxi Broadband Access Device when installed correctly.

Note when installing the P32mxi Broadband Access Device powered by –48VDC, the power lead should be fused with a 2.0 Amp Fast Blow Fuse.

WARNING: If the –48VDC connector is not wired properly it will blow a fuse internal to the P32mxi Broadband Access Device which is NOT user serviceable!

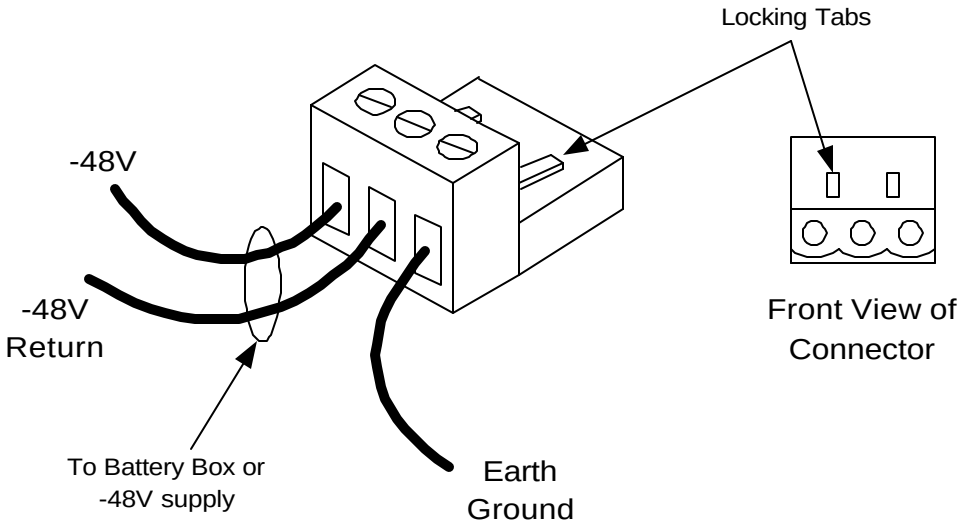

Figure 8 — –48VDC Battery Connector Pinout

4.4.5.1 Grounding

Proper grounding is essential for safety (lightning and AC power line transients) and proper signaling with an attached PBX. The unit is grounded through the third prong on the power cord, however, should a separate ground connection be desired (for example in a building with poor ground wiring), the unit may be connected to earth ground via the –48VDC connector block to one of the following:

a) A telco ground buss that is separately connected to a heavy ground rod or ground wire in the equipment room. This ground may be a metallic cold water pipe or a grounded electrical conduit. The telephone system to which the P32mxi Broadband Access Device is connected to should also be connected to this same ground.

b) The PBX or telephone system ground point. Attach an appropriately sized ground wire to the connector block. This ground on the –48VDC connector block should be used only when batteries or –48VDC is employed. All grounds should be earth grounds and should meet at a common point.

When using –48VDC alone be sure to tie the earth ground point on the –48VDC connector block to an earth ground using an appropriately sized wire.

4.4.5.2 Power Up

Once the unit has been mounted in a rack or to the wall and all wiring has been attached, power may be applied to the unit. Since the unit can sustain multiple power sources, each is addressed in the sections below.

4.4.5.2.1 120V AC Power

The AC power cord is first plugged into the power connector located on the chassis. Next the AC power cord is plugged into the 120VAC 60Hz wall socket. The unit will automatically power up.

If a BC-48 is to be used, first apply the AC power as instructed above, then connect the BC-48's –48VDC battery connector to the unit.

4.4.5.2.2 –48V DC Power

Connect –48VDC to the power connector as depicted in figure 8 above. Verify with a voltmeter that the –48V and –48V Return is connected properly to the DC power connector. Also verify that the wiring in the –48V DC connector's screw terminals is tightened properly. Remove the fuse. Insert the –48V DC connector into the unit. Replace the fuse. The unit will automatically power up.

5. Configuring the P32mxi Broadband Access Device

This section describes how to configure the P32mxi Broadband Access Device .

NOTE: **A PC with Windows 95, 98, NT 4.0+, 2000, or ME** is required to configure the P32mxi Broadband Access Device using the StarCAD 9000? Graphical User Interface. The PC is connected to the Craft Port on the front panel using the straight-through 8-pin connectorized cable (i.e. Table 3 Craft Port Cable) and the "Craft" headshell (see Table 3 Craft Port Cable Adapter) You may also configure the unit remotely by connecting a modem to the Craft Port (again see Table 3 Modem Cable Adapter [9-pin to 25-pin converter] and Craft Port Cable).

If you do not have access to a Windows 95/98/NT/2000/ME capable computer and wish to do simple configurations (i.e., no special crossconnections or data circuits), go to Section 5.4.

The P32mxi Broadband Access Device has a factory default configuration of:

- Network interface configured as:
  - T1 A (labeled T1/xDSL on rear of unit see figure 3)
  - T1 B is disabled (whether B T1 Network Interface card is installed or not)
  - D4 framing/AMI line coding
  - Digital signaling type is FX Loop Start
  - 0 dB CSU Line Build Out (which also works as a DSX level from 0 to 133 feet from the DSX termination)
  - Error Rate Threshold of 1?10^{-3} BPVs per second before declaring a Carrier Line Failure (CLF) Alarm.
- Analog VF ports configured as:
  - 1 FXS Card (four VF channels)
  - Loop Start
  - 0 dB Transmit Gain (towards the digital network), –6 dB Receive Gain (from the digital network)
- No Data Ports
- SNMP IP Address set to 0.0.0.0

If this configuration is sufficient for your network, no additional programming is required and you can use the P32mxi Broadband Access Device without running the StarCAD 9000? program.

Plan your configuration!

Once the configuration information is understood, plan your configuration set-up and save the Worksheet for future reference.

5.1 Channel Mapping

The P32mxi Broadband Access Device is subdivided into eight total channel card slots. Six of the eight channel card slots are located on the Standard configuration of the unit. The other 2 channel card slots are located within the Expanded configuration of the unit. Each channel card consists of four analog channels. Figure 13 shows how each channel card is partitioned and which analog voice channels are assigned to each VF slot.

VF Slot Number Standard	Analog Channel Numbers (on 25-pair connector)
1	1 – 4
2	5 – 8
3	9 – 12
4	13 – 16
5	17 – 20
6	21 – 24
VF Slot Number Expanded	**Analog Channel Numbers (on dual 8pin connectors)**
8	25 - 28
9	29 - 32

Note: VF Card Number 7 is allotted the V.35 Data Port

Table 13 — Channel Mapping Table

The StarCAD 9000? program allows you to selectively enable individual VF channel cards and their associated subchannels. When the V.35 Data Port is enabled you will need to turn off individual subchannels (or possibly an entire card) to cover the number of Data Timeslots you want to use.

As an example: Remember that there are only 24 timeslots using a single T1 circuit. The total number of analog voice channels and data timeslots allocated to the T1 circuit cannot exceed 24.

NOTE: The analog channel numbers describe above are the reference to the physical connection on the 25-pair Telco connector (1-24) and the dual 8 pin VF connectors (25-32). Using the StarCAD 9000? program you can reassign any physical channel to any timeslot on the Network Interface (i.e. T1 card).

5.2 Setting Up the StarCAD 9000? Program

Perform the following steps to install the StarCAD 9000? program:

1. Connect the cable provided with the P32mxi Broadband Access Device from your PC to the Craft port.
2. Insert the CD of the StarCAD 9000? Graphical User Interface into your CD drive.

3. Autorun should start the StarCAD 9000? setup wizard program. If autorun fails to initiate the setup wizard, from Windows Explorer select the CD Drive, and Run "StarCAD.exe". Follow the instructions given by the setup wizard. The setup wizard should automatically select the Windows Platform for which your PC operates.
4. From the Windows Start button, select Programs, select Telsource, and choose the StarCAD 9000? program.
5. The program will start and ask you if you have a modem connection or if you are connected directly through your serial port on your computer.
6. An example of setting up a P32mxi Broadband Access Device with the StarCAD 9000? program is provided in section 11 of this document. The example should provide the user enough data to begin using the StarCAD 9000? software.

5.3 Communicating Remotely with a Modem

To connect with a modem, choose the modem you are using from the pop up screens in the StarCAD 9000? program. If you don't see your specific modem type then choose "Generic." Also choose the COM port (i.e. your PC's Serial RS-232C port designation) your modem is associated with.

Set the modem connected to the P32mxi Broadband Access Device as follows:

Bit Rate	19200
Parity	None
Data Bits	8
Stop Bits	1
Flow control	None

Table 14 — Serial Configuration Parameters

A separate 25-pin headshell or custom cable is needed (see Table 3 and reference to the Modem Adapter Cable) to communicate with a modem. See section 4.4.4.2 of this document for the specific cabling pinout.

5.4 Using a Dumb Terminal with the P32mxi Broadband Access Device

If you do not have access to a Windows 95/98/NT/2000/ME equipped computer, you can still make simple configuration changes to the P32mxi Broadband Access Device. Using a serial communications package like Procomm? or with an ASCII terminal (VT100, etc.), connect to the Craft Port of the P32mxi Broadband Access Device using the cable provided with the unit. Enter <control-Z> by pressing the <control> key and the <Z> key at the same time.

A system message should appear.

Look in the list of modes on the following pages to find a configuration that matches your needs. At the command line prompt (the ">>" cursor), enter the command:

```
P M n
```

Where "n" is the mode number (from 0 to 27) listed in the table. "P M 0" is equivalent to the factory default provisioning for the system.

Note: The P M n configurations are only valid for Standard Configuration of the P32mxi Broadband Access Device Systems. All Expanded Configuration functionality will be disabled when the P M n commands are used.

Configuration Mode Quick List:

Modes 0 - 7 use D4/AMI. Modes 0-3 have no data circuits provisioned.
Modes 8 - 15 use ESF/AMI. Modes 8-11 have no data circuits provisioned.
Modes 16 - 25 use ESF/B8ZS. Modes 16-19 have no data circuits provisioned.
Mode 26 is TR-08 Mode I against a SLC-96.
Mode 27 is TR-08 Mode I against a 5ESS/DMS.

The following pages list each of the modes in detail. If the user has a setup which is close to one of the modes, yet not exact, the user may wish to select the mode, and modify it to their desire.

Note: The following modes are for T1 Span A setup. T1 Span B in each case is designated as Not Alarmed.

Mode #	Description
0	**D4/AMI, FXS Loop Start (DEFAULT CONFIGURATION)** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
1	**D4/AMI, FXS Ground Start** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Ground Start (network side connections) VF (phone) signaling is 24 FXS Ground Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
2	**D4/AMI, FXS Loop Start to E&M Immediate Conversion** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Immediate (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
3	**D4/AMI, FXS Loop Start to E&M Wink Conversion** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Wink (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
4	**D4/AMI, FXS Loop Start with 56K Data on TS 24** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 1 to 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
5	**D4/AMI, FXS Loop Start with 64K Data on TS 24** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
6	**D4/AMI, FXS Loop Start to E&M Immediate Conversion with 56K Data on TS 24** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
7	**D4/AMI, FXS Loop Start to E&M Immediate Conversion with 64K Data on TS 24** T1 is D4, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used

Mode #	Description
8	**ESF/AMI, FXS Loop Start** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
9	**ESF/AMI, FXS Ground Start** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Ground Start (network side connections) VF (phone) signaling is 24 FXS Ground Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
10	**ESF/AMI, FXS Loop Start to E&M Immediate Conversion** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Immediate (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
11	**ESF/AMI, FXS Loop Start to E&M Wink Conversion** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Wink (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
12	**ESF/AMI, FXS Loop Start with 56K Data on TS 24** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 1 to 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
13	**ESF/AMI, FXS Loop Start with 64K Data on TS 24** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
14	**ESF/AMI, FXS Loop Start to E&M Immediate Conversion with 56K Data on TS 24** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
15	**ESF/AMI, FXS Loop Start to E&M Immediate Conversion with 64K Data on TS 24** T1 is ESF, AMI, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used

Mode #	Description
16	**ESF/B8ZS, FXS Loop Start** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
17	**ESF/B8ZS, FXS Ground Start** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is FX Ground Start (network side connections) VF (phone) signaling is 24 FXS Ground Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
18	**ESF/B8ZS, FXS Loop Start to E&M Immediate Conversion** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Immediate (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
19	**ESF/B8ZS, FXS Loop Start to E&M Wink Conversion** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ T1 signaling is E&M Wink (network side connections) VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
20	**ESF/B8ZS, FXS Loop Start with 56K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 1 to 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
21	**ESF/B8ZS, FXS Loop Start with 64K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is FX Loop Start (network side connections) VF (phone) signaling is 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
22	**ESF/B8ZS, FXS Loop Start to E&M Immediate Conversion with 56K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
23	**ESF/B8ZS, FXS Loop Start to E&M Immediate Conversion with 64K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is 23 E&M Immediate (network side connections) VF (phone) signaling is FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used

Mode #	Description
24	**ESF/B8ZS, FXS Loop Start to E&M Wink Start Conversion with 56K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 56K mapped to T1 timeslot 24 T1 signaling is 23 E&M Wink Start (network side connections) VF (phone) signaling is 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
25	**ESF/B8ZS, FXS Loop Start to E&M Wink Start Conversion with 64K Data on TS 24** T1 is ESF, B8ZS, Loop Timed; RX Sensitivity = –30dB; Line Build Out = 0-133ft BPV alarm threshold is at $1X10^{-3}$ V.35 Data Circuit set as 64K mapped to T1 timeslot 24 T1 signaling is 23 E&M Wink Start (network side connections) VF (phone) signaling is 23 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB VF channel 24 is not used
26	**TR-08/No Zero Substitution (SLC-96 WP1 LIU), POTS** T1 is TR-08 Mode I, Span A, No Zero Substitution, Loop Timed, RX Sensitivity = –30dB; Line Build Out = 0-133ft ; BPV alarm threshold is at $1X10^{-3}$ T1 signaling is 24 TR-08 POTS VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB
27	**TR-08/B8ZS, POTS (use for 5ESS connections)** T1 is TR-08 Mode I, Span A, B8ZS, Loop Timed RX Sensitivity = –30dB; Line Build Out = 0-133ft ; BPV alarm threshold is at $1X10^{-3}$ T1 signaling is 24 TR-08 POTS VF (phone) signaling is 24 FXS Loop Start 600? , TX gain = -3.0dB, RX gain = -6.0dB

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6. Final Inspection Checklist and Turn Up

This section describes the steps for completing the installation of the P32mxi Broadband Access Device, including the Turn Up procedure. Using the following Final Inspection Checklist verify that all the procedures outlined in Sections 4 and 5 of this document are complete.

6.1 Final Inspection Checklist

Task Description	Completed	Refers to Section
Packing List Verified		4.1 Unpacking
Site Location Verified		4.2 Site Location
P32mxi Broadband Access Device Physically Mounted		4.3 Installing the Unit
BC-48 Battery Unit Mounted (Optional)		4.3 Installing the Unit
VF Cabling Verified		4.4.1 Tip and Ring Access (VF Port)
T1 Cabling Verified		4.4.2 T1 Cable
V.35 Cabling Verified (Optional)		4.4.3 V.35 Data Cable Connection
AC Power Cord Connected to Unit		4.4.7 Power Connection
DC Power Connected (Optional)		4.4.7 Power Connection
Grounding Connected		4.4.7.1 Grounding
P32mxi Broadband Access Device Unit Power Up		4.4.7.2 Power Up
P32mxi Broadband Access Device Configuration Worksheet Finished		5. Configuring the P32mxi Broadband Access Device
P32mxi Broadband Access Device Craft Port Connected To PC		4.4.4 P32mxi Broadband Access Device Craft Port RS-232C Connections
StarCAD 9000? Program Running		5.2 Setting Up the StarCAD 9000? Program
P32mxi Broadband Access Device Provisioning Complete		
Provisioning Downloaded to P32mxi Broadband Access Device Unit		

After completing the above checklist verify that the LEDs on the front of the P32mxi Broadband Access Device are as listed below. If the LEDs are not as described below, refer to the Section 10 Troubleshooting for assistance.

LED Description	Verified	Meaning:

P32mxi Broadband Access Device Unit's T1/xDSL LEDs not lit		The Network Interface (T1 A) is framed up with the connecting Network.
P32mxi Broadband Access Device Unit's AUX LEDs not lit		If installed the second Network Interface (T1 B) is also framed up to the connecting Network.
P32mxi Broadband Access Device Unit's Ch1-Ch24 LEDs not lit		The Network Interface's digital signaling is correct.
P32mxi Broadband Access Device Unit's Ch25-Ch32 LEDs not lit		If installed the channels associated with the Network Interface have the correct signaling.
P32mxi Broadband Access Device Unit's AC Pwr LED lit		If AC powered, the unit is operational.
P32mxi Broadband Access Device Unit's Batt Pwr LED lit		If DC powered, the unit is operational.

6.2 Example P32mxi Broadband Access Device Turn Up Procedure

This section describes the steps in connecting a P32mxi Broadband Access Device (basic system) for service.

6.2.1 Equipment Requirements

The following equipment will be needed to turn up the P32mxi Broadband Access Device for service:

2 - Telephone Butt-Sets (e.g. Harris Model TS22) or type 2500 Telephones

1 - 66 Punch down Block with Female Telco Connector Access (25pr)

1 - Male-Male Telco Cable

Optional Data Equipment Requirement(s):

1 - V.35 Data Cable adapter (See Table 3 Modem Cable Adapter)

6.2.2 Turn Up Procedure for Voice

Step 1. Connect one end of the Male- Male Cable to the 25 pair connector on the P32mxi Broadband Access Device Unit and the other end to the connector on the 66-block

Step 2. Connect one of the Telephone Butt Sets to Pair 1 of the 66 Block (or a provisioned pair [see your completed P32mxi Broadband Access Device Configuration Worksheet to verify which pairs are active]).

Step 3. Switch the Telephone Butt Set to the Off Hook setting.

Step 4. Verify Dial Tone and check to see if the P32mxi Broadband Access Device Ch LED corresponding to the pair the Butt Set is connected to is lit. If Dial Tone is not present or the P32mxi Broadband Access Device LED does not light, check your connections, then refer to Section 10 Troubleshooting of this document.

Step 5. Repeat Step 4 for remaining provisioned pairs.

Step 6. Connect the second Telephone Butt Set to an adjacent 66 Block Pair.

Step 7. Using the second Telephone Butt Set call the number of the first Telephone Butt Set.

Step 8. Verify ringing by listening to the first Telephone Butt Set.

Step 9. Switch the first Telephone Butt Set to the Off Hook Position and verify two way audio.

Step 10. Switch both Telephone Butt Sets to the On Hook Position.

Step 11. Using the first Telephone Butt Set call the number of the second Telephone Butt Set and repeat step 8 through 10 for all provisioned channels.

Step 12. If the VF channels 25 – 32 are installed and configured, use the VF 8 pin Adapter cable to verify each of the 8 channels. Use steps 2 through 10 above to verify these channels.

6.2.3 Turn Up Procedure for V.35 Data

This section describes the basics for connecting to the V.35 data port to an external data router.

Step 1. Connect the V.35 Data Cable cable's HD26 connector to the P32mxi Broadband Access Device 's V.35 Port.

Step 2. Connect the V.35 Data Cable cable's Winchester connector to the data router's serial interface cable.

Step 3. Refer to the router's installation manual for the serial interface setup.

Step 4. Using the router's installation manual verify that the serial interface is setup for the bandwidth, and data rate (Nx64K or Nx56K) specified in the P32mxi Broadband Access Device provisioning.

7. Servicing

The unit should ONLY be serviced by a qualified service professional when maintenance or repair work is required. Please contact your equipment provider, vendor, or distributor in the event that service is required.

To reduce the risk of electric shock, DO NOT disassemble this product. Removing the cover may expose you to dangerous voltages and/or other risks. Failure to properly re-assemble the unit may cause electric shock when the product is subsequently used.

WARNING: There could be both an AC and DC power connection to the unit. To prevent electric shock, be sure to unplug the **AC Power Cord**, **DC Battery power plug**, **25 pair Telco connector,** and **dual 8 pin VF Cables** before servicing.

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8. Affidavit for Connection of Customer Premise Equipment to the 1.544Mbps and/or Subrate Digital Services

For the work to be performed in the certified territory of:

Telco's Name:_____ State of:_____

County of:_____

I, _____, of_____
Name of Authorized Representative Company Name

_____ _____
Address Phone number

being duly sworn, state: I have responsibility for the operation and maintenance of the terminal equipment to be connected to _____1.544 Mbps and/or _____subrate digital services. The terminal equipment to be connected complies with Part 68 of the Commissions rules except for the encoded analog content and billing protection specifications. With respect to encoded analog content and billing protection:

- ? I attest that all operations associated with the establishment, maintenance and adjustment of the digital CPE with respect to encoded analog content and encoded billing information continuously complies with Part 68 of the FCC rules and regulations.
- ? The digital CPE doe not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.
- ? The encoded analog and billing protection is factory set and is not under control of the customer.

I attest that the operator(s) maintainer(s) of the digital CPE responsible for the establishment, maintenance and adjustment of the encoded analog content and billing information have (has) been trained to perform these functions by successfully completing one of the following: Circle all that apply:

a) A training course provided by the manufacturer/grantee of the equipment used to encode analog signals

b) A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals

c) An independent training course (e.g. trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signals; or

d) In lieu the of preceding training requirements, the operator(s) maintainer(s) is(are) under the control of a supervisor trained in accordance with _____above.

e) This section is not applicable since the equipment will only be installed in networks where the billing protection is provided by the service Central Office.

I agree to provide _____ with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____
Signature

_____
Title & Date

Subscribed and Sworn before me this _____day of _____, _____

_____
Notary Public

My Commission Expires:_____

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9. Troubleshooting

This section describes commonly observed problems with the P32mxi Broadband Access Device and lists possible solutions or root causes.

1. **All of the channel LEDs on the front of the system are blinking at a ½ second on/ ½ second off rate.**

   This is called "Ringing Timeout" and indicates that the system is receiving a continuous RINGING signaling pattern over the T1. Instead of just continually ringing the phone, the system cuts off the ringer and starts blinking if ringing signaling is received continuously for more than 5 seconds. It is normally caused when the P32mxi *Broadband Access Device is configured for FX-type signaling on the T1, but the signaling actually being sent over the T1 is E&M (Megacom). Check that the signaling coming from your Central Office is the same as what you programmed into the* P32mxi *Broadband Access Device .*

2. **The red "CLF" light is lit on the front of the P32mxi Broadband Access Device .**

   The "CLF" LED (Red Alarm) indicates that the T1 span is failed. The T1 can report that it is failed for a number of reasons:

   a. *The* P32mxi *Broadband Access Device T1 interface is not receiving a valid T1 signal from the network. This could be caused by a broken T1 cable, or that the T1 Transmit and Receive signals are not correct. In most networks getting their T1 from the local Telco, a Smart Jack is installed as the demarcation point between your network and the Telco. The connection between the Smart Jack and the* P32mxi *Broadband Access Device needs to be a "crossover" cable where pins 1 & 2 on one end of the cable need to go to pins 4 & 5 of the other end (and vice-versa).*

   b. *The T1 could be receiving an excessive amount of BPV or CRC errors.*

   c. *The T1 has been configured for the wrong framing format (D4 vs. ESF vs. TR-08). Note: Connecting a span configured for D4 to a TR-08 switch may clear the Red alarm but it will not have any working audio connections. Check the T1 framing format with the Central Office.*

3. **The green "Test" light is lit on the front of the P32mxi Broadband Access Device , but I didn't do anything to the unit.**

   The "Test" LED indicates that the unit is in either Local or Remote Loopback (caused through the **Maintenance** *menu in the StarCAD 9000? program), OR the unit is in a CSU Remote Loopback, which was caused by a command sent from the Central Office (or some type of test equipment connected to the T1).*

4. **When an analog channel goes off-hook I don't get dial tone from the Central Office.**

   a. *If the T1 span is failed, the* P32mxi *Broadband Access Device will not allow any audio to pass to/from the T1 circuit (because the span has been trunk conditioned). Taking the analog channel off-hook will not even turn on the channel LED if the span is failed.*

   b. *The StarCAD 9000? program shows that the* P32mxi *Broadband Access Device has six channel "cards" that can be selectively enabled/disabled. Make sure that the*

appropriate channel "card" for the analog channel has been enabled (see the Channel Mapping Table in Section 5). Also make sure that the associated channel has been enabled via the StarCAD 9000? program (see the **Channel Provisioning** *Wizard).*

c. Also check that the there isn't an open circuit between the phone and the P32mxi *Broadband Access Device .*

5. An analog channel is configured for Ground Start but won't draw dial tone.

Check for Tip/Ring reversal. Although Loop Start circuits are not sensitive to the polarity of the phone line, Ground Start needs Tip and Ring to be connected correctly.

Also check that the analog circuit was correctly configured for Ground Start in the StarCAD 9000? program.

6. **A newly configured Loop Start channel doesn't draw dial tone.**

a. Verify that the phone is connected to the correct channel.

*b. Verify that the correct provisioning has been sent to the system from the StarCAD 9000? program. Make sure that you pushed the "***Program System***" button in the* **Success** *Wizard window. If unsure, press the "***Load from System***" button and check that the provisioning was loaded correctly.*

c. If using a punch block between the P32mxi *Broadband Access Device and a Key System/PBX, make sure that the shorting (bridge) clips are installed in the correct position.*

7. **Every second (or so) the Yellow LED for the T1 span lights up then goes out.**

Check the T1 cable. A bad crimp on one leg of the T1 cable can cause this behavior.

This fault has been seen when an Ethernet cable has been used to connect the T1 span. Only half of the connection is being made (pins 1, 2 and 5 of the Ethernet cable are common to the T1 cable). The T1 connection uses the same 8-pin modular plugs as an Ethernet 10Base-T connection, so confusion can easily occur. T1 cables use pins 1,2, 4 and 5; Ethernet cables use pins 1, 2, 3, and 5.