NT1 ACE^4

User Manual

1200242L1:	**NT1 ACE^4**
336012VUR01:	**Power Supply 12 VDC/800 mA**

61200242L1-1A
September 2000

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
(256) 963-8000

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, hasic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons. The precautions are listed below.

1. Do not use this product near water (for example, near a bath tuh, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool).
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Avoid using a telephone (other than a cordless type) during an electrical storm. There may he a remote risk of electric shock from lightning.

4. Do not use the telephone to report a gas leak in the vicinity of the leak.
5. Use only the power cord, power supply, and/ or batteries indicated in the manual. Do not dispose of hatteries in a fire. They may explode. Check local codes for any special disposal instructions.
6. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
7. Use caution when installing or modifying telephone lines.

SAVE THESE INSTRUCTIONS.

AFFIDAVIT REQUIREMENTS FOR CONNECTION TO DIGITAL SERVICES

- An affidavit is required to be given to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voiceband analog signals and transmitted on the network.
- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the output of the device meets Part 68 encoded analog content or billing protection specifications.
- End user/ customer will be responsible to file an affidavit with the local exchange carrier when connecting unprotected CPE to a 1.544 Mbps or subrate digital services.
- Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirement for subrate services is waived.

AFFIDAVIT FOR CONNECTION OF CUSTOMER PREMISES EQUIPMENT TO 1.544 MBPS AND/OR SUBRATE DIGITAL SERVICES

For the work to be performed in the certified territory of

_____
(telco name)
State of _____
County of _____
I, _____(name),
_____(business address),
_____ (telephone 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 FCC 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 analog content and encoded billing protection information continuously complies with Part 68 of the FCC Rules and Regulations.
( ) The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.

( ) Tbe encoded analog content and billing protection is factory set and is not under the 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 has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):
( ) A. A training course provided by the manufacturer/ grantee of the equipment used to encode analog signals; or
( ) 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; or
( ) 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 of the preceding training requirements, the operator(s)/ maintainer(s) is (are) under the control of a supervisor trained in accordance with _____ (circle one) above.
I agree to provide _____ (telco's name) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____Signature
_____Title
_____ Date
Transcribed and sworn to before me
This _____ day of _____, 199___
_____
Notary Public
My commission expires:
_____

FCC INFORMATION

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

Canadian Standards Association

This device must be powered by a CSA approved power supply or a power supply meeting the requirements of CS03, Part I Section 1.4.2.

FCC regulations require that the following information be provided in this manual:

1. This equipment complies with Part 68 of the FCC rules. On the bottom of the equipment housing is a label that shows the FCC registration number for this equipment. If requested, provide this information to the telephone company.

2. If this equipment causes harm to the telephone network, the telephone company may temporarily discontinue service. If possible, advance notification is given; otherwise, notification is given as soon as possible. The telephone company will advise the customer of the right to file a complaint with the FCC.
3. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment; advance notification and the opportunity to maintain uninterrupted service is given.
4. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. The telephone company may require this equipment to he disconnected from the network until the prohlem is corrected, or it is certain the equipment is not malfunctioning.
5. This unit contains no user-serviceable parts.
6. An FCC compliant telephone cord with a modular plug is provided with this equipment. In addition, an FCC compliant cahle appropriate for the dial hackup option ordered is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using an FCC compatible modular jack, which is Part 68 compliant.

7. The following information may be required when applying to the local telephone company for leased line facilities.

Service Type	Digital Facility Interface Code	Service Order Code	Network Jacks
ISDN	02IS5	6.0N	RJ-49C

8. The FCC recommends that the AC outlet, to which equipment requiring AC power is to be installed, is provided with an AC surge arrester.

CANADIAN EMISSIONS REQUIREMENTS

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Class B prescrites dans la norme sur le materiel brouilleur: "Appareils Numeriques," NMB-003 edictee par le ministre des Communications.

CANADIAN EQUIPMENT LIMITATIONS

Notice: The Canadian Industry and Science Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified

connector assembly (telepbone extension cord). Compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or an electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telepbone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that tbe total of the Load Numbers of all devices does not exceed 100.

WARRANTY AND CUSTOMER SERVICE

ADTRAN will repair or replace this product within five years from the date of sbipment if it does not meet its published specifications or fails while in service. For detailed warranty, repair, and return information, refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure. Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

LIMITED PRODUCT WARRANTY

ADTRAN warrants that for five years from the date of sbipment to Customer, all products manufactured by ADTRAN will be free from defects in materials and workmanship. ADTRAN also warrants that products will conform to the applicable specifications and drawings for such products, as contained in the Product Manual or in ADTRAN's internal specifications and drawings for such products (whicb may or may not be reflected in the Product Manual). This warranty only applies if Customer gives ADTRAN written notice of defects during the warranty period. Upon sucb notice, ADTRAN will, at its option, either repair or replace the defective item. If ADTRAN is unable, in a reasonable time, to repair or replace any equipment to a condition as warranted, Customer is entitled to a full refund of the purchase price upon return of the equipment to ADTRAN. This warranty applies only to the original purchaser and is

not transferable without ADTRAN's express written permission. This warranty becomes null and void if Customer modifies or alters the equipment in any way, other than as specifically authorized by ADTRAN.

EXCEPT FOR THE LIMITEDWARRANTY DESCRIBED ABOVE, THE FOREGOING CONSTITUTES THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER AND THE EXCLUSIVE LIABILITY OF ADTRAN AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES (EXPRESSED OR IMPLIED). ADTRAN SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING (WITHOUT LIMITATION), ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THIS EXCLUSION MAY NOT APPLY TO CUSTOMER.

In no event will ADTRAN or its suppliers be liable to Customer for any incidental, special, punitive, exemplary or consequential damages experienced by either Customer or a third party (including, but not limited to, loss of data or information, loss of profits, or loss of use). ADTRAN is not liable for damages for any cause whatsoever (whether based in contract, tort, or otherwise) in excess of the amount paid for the item. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to Customer.

Table of Contents

Figures

Tables

NT1 ACE^4 User Manual

Unit Overview

The ADTRAN NT1 ACE^4 provides up to four basic rate interfaces between customer ISDN terminal equipment (S/T) and the basic rate ISDN network (U). Figure 1-1 is an illustration of the NT1 ACE^4.

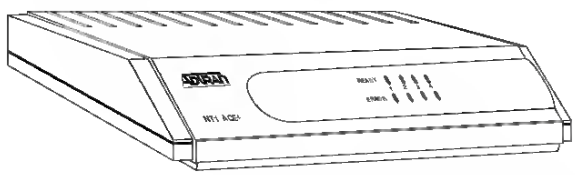

Figure 1-1. ADTRAN NT1 ACE^4

Figure 1-2 shows the interface connectors.

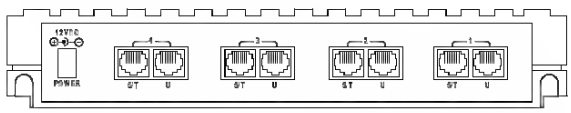

Figure 1-2. Interface Connectors

The four RJ-45 connectors labeled **U** connect to the ISDN network. The RJ-45 connectors labeled **S/T** connect to the terminal equipment.

NOTE *The U interface complies with ANSI T1.601 and ITU-T1.430 Recommendation Standard. The S/T interface complies with ANSI T1.605 and ETSI ETS 300012 Standard.*

The ADTRAN NT1 ACE^4 is a stand-alone unit and is powered by an external power supply (the ADTRAN power supply, part number 336012VUR01).

LED Indicators

Table 1-1 describes the status of the LEDs located on the front panel of the NT1 ACE^4. There is a **READY** and **ERROR** indicator for each port of the NT1 ACE^4.

Table 1-1. Status Indicators

LED	Color	Description
READY	Green	S/T and U interfaces are ready to place call.
ERROR	Red	S/T or U interface not ready.

If an **ERROR** indicator is illuminated, check the flash rate of the **READY** indicator to determine the source of the error. A faster 8 Hz flash rate (8 flashes per second) indicates a network problem. A slower 1 Hz flash rate (1 flash per second) indicates an S/ T interface problem.

If an **ERROR** indicator is not illuminated and the **READY** indicator is flashing, a network test is in progress. Network command tests cause a faster 8 Hz flash rate.

Inspection

After unpacking the NT1 ACE^4, carefully inspect it for shipping damage. If damage is suspected, file a claim immediately with the carrier and contact ADTRAN Technical Support. If possible, keep the original shipping container for use in shipping the NT1 ACE^4 for repair or for verification of damage during shipment.

Maintenance

The NT1 ACE^4 requires no routine maintenance to operate. In case of equipment malfunction, refer to the sections *Remote Testing* and *Repair and Return* below or remove the unit and replace it with another unit optioned in an identical manner.

Remote Testing

Network test features include a loopback test initiated at the central office. This test confirms network integrity to the NT1 ACE^4.

Repair and Return

Repairs should not be performed in the field. Repair services can be obtained by returning the unit to the ADTRAN

Customer and Product Service (CAPS) Department at the address listed in the back of this manual.

Connections

The NT1 ACE^4 is optioned for standard 100 ohm termination. Tables 1-2 and 1-3 give the connector pin assignments, and Figures 1-3 and 1-4 show the connectors.

Table 1-2. Network Connector Pin Assignments

Pin	Description
1	No connection
2	No connection
3	No connection
4	U-interface network connection
5	U-interface network connection
6	No connection
7	No connection
8	No connection

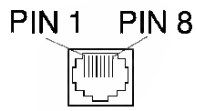

Figure 1-3. Network Connector (RJ-45)

Table 1-3. Local Bus Connector Pin Assignments

Pin	Description
1	No connection
2	No connection
3	S/T interface Receive Power Source 1 (Negative)
4	S/T interface Transmit Power Source 1 (Positive)
5	S/T interface Transmit Power Source 1 (Positive)
6	S/T interface Receive Power Source 1 (Negative)
7	No connection
8	No connection

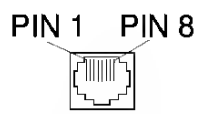

Figure 1-4. Local Bus Connector (RJ-45)

Powering with the NT1 ACE^4 Power Supply

The ADTRAN NT1 ACE^4 Power Supply, part number 336012VUR01, provides power to the NT1 ACE^4. To connect the NT1 ACE^4 to the external power supply, perform the following steps (see Figure 1-5).

1. Connect the power supply to the NT1 ACE^4 at the **POWER** jack located on the NT1 ACE^4 rear panel.
2. Plug the power supply into the nearest wall outlet supplying 120 VAC, 60 Hz.
3. On the NT1 ACE^4, verify that the **ERROR** indicators are illuminated. After approximately 15 seconds, the **READY** indicators should flash at a 1 Hz rate. Should any of the indicators fail to operate as stated, see the section *Troubleshooting* on page 8.

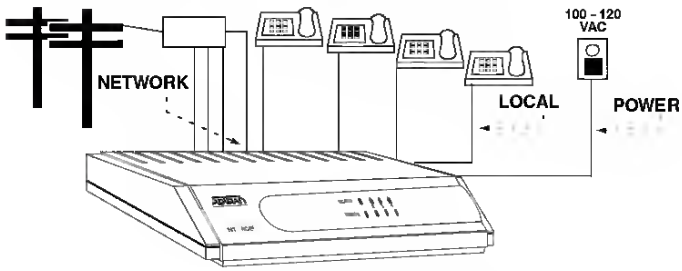

Figure 1-5. Power Supply Connection

Connecting the Terminal Equipment

After successfully powering up the NT1 ACE^4, the **ERROR** indicators should he on and the **READY** indicators should be flashing. Make sure that terminal equipment (TE) is properly terminated. Plug the TE into one of the S/ T connectors at the rear of the unit.

The **ERROR** indicators should extinguish a few seconds after power is applied to the TE. If the **ERROR** indicators fail to go out, see the section *Troubleshooting* on page 8.

As the **ERROR** indicators extinguish, the **READY** indicators should illuminate. There may he a slight delay between the appearance of the **READY** indicators and the TE's ability to place and receive calls, depending on the specific TE in use. If the **READY** indicators fail to illuminate or if you are unable to place or receive calls, see the section *Troubleshooting* on page 8.

Typical Configuration

This configuration allows you to connect up to four TEs at ranges up to 3000 feet from the NT1 ACE^4, as shown in Figure 1-6. A termination resistor should be centrally located to the TEs. The NT1 ACE^4 TERMINATION is set to 100 ohms. The TEs should be set to 100 ohms.

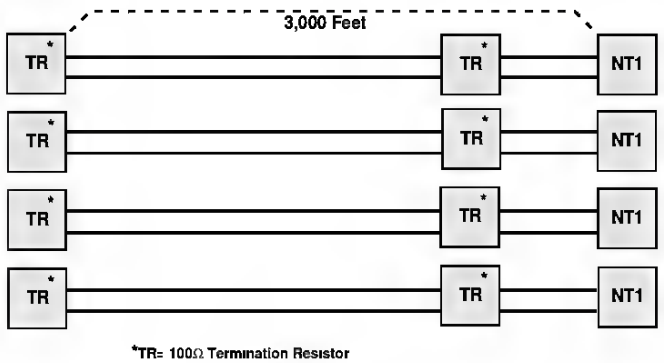

Figure 1-6. Typical Configuration

Troubleshooting

If your NT1 ACE^4 does not operate properly, please check the lists of symptoms and solutions below. For further assistance, please contact ADTRAN Technical Support at 888-4ADTRAN.

Symptom	Action
ERROR and **READY** indicators not illuminated.	• Verify power connection. • Check the power source for sufficient power. • Call ADTRAN Technical Support for assistance.

ERROR indicators illuminated; **READY** indicators flash at a faster 8 Hz rate.	Network activation failure: • Wall jack wiring is incorrect: Check wall jack. • Problem with ISDN line: Contact telephone company.
ERROR indicators illuminated; **READY** indicators flash at a slower 1 Hz rate.	Local bus failure: • TE not connected: Connect TE. • TE not receiving power from NT1: Consult TE documentation. • TE not terminated properly: Correct termination.
READY indicators do not illuminate.	• Problem with ISDN network: Contact telephone company. • ISDN line not plugged into **U** jack: Plug ISDN line into **U** jack.
Unable to make or receive a call.	• TE is not compatible with ISDN network: Contact telephone company. • TE ISDN parameters not configured properly: Reconfigure TE (SPIDs, LDNs, switch type, etc.).

Specifications

Network Interface (U)

Line	2-Wire (Tip and Ring)
Operating Mode	Full-Duplex
Data Rate	160 kbps total, 144 kbps to customer
Signal Format	2B1Q
Output Amplitude	2.5 volts, zero-to-peak
Tx Source Impedance	As per ANSI T1.601
Rx Source Impedance	As per ANSI T1.601
Receiver Sensitivity	As per ANSI T1.601

Customer Interface (S/T)

Line	4-Wire (Tx and Rx Pair)
Operating Mode	Full-Duplex
Data Rate	192 kbps total, 144 kbps to customer
Signal Format	Alternate Mark Inversion, 100% duty cycle
Output Amplitude	0.75 volt, zero-to-peak
Tx Source Impedance	As per ANSI T1.605
Rx Source Impedance	As per ANSI T1.605
Receiver Sensitivity	As per ANSI T1.605

Faceplate Indicators

ERROR	U-interface or S/T interface not ready
READY	Steady light - Network ready to place a call
	8 Hz (faster) flashing - U-interface not ready
	1 Hz (slower) flashing - S/T interface not ready

Network Compatibility

U-Interface	ISDN U
S/T-Interface	ISDN S/T

Mechanical

Size .....9.0" wide, 6.375" deep, 1.625" high
Weight .....1.5 lbs
Mounting .....Wall or desktop

Power

12 VDC.....3.3 W dissipation

Environment

Temperature.....0 to 50 °C (32 to 104 °F) operating
.....-20 to 70 °C (-4 to 158 °F) storage
Relative Humidity .....Up to 95%, non-condensing

Power Supply Specifications

Size .....2.5“wide, 3.0” long, 1.9" high
Weight .....1.5 lb
Power Input .....110 VAC, 60 Hz
Power Output .....10 W
Voltage 12 VDC/800mA

Technical Support and Warranty Information

Presales Inquiries and Applications Support
Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering	(800) 615-1176
Sales	(800) 827-0807

Post-Sale Support
Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support	(888) 4ADTRAN

Repair and Return
If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Customer and Product Service (CAPS) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department	(256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN Customer and Product Service
6767 Old Madison Pike
Progress Center/ Building #6 Suite 690
Huntsville, Alabama 35807 RMA # _____