

ECHO CANCELLER User Interface Guide (UIG)

1200384L1

Echo Cancellor

January 2001

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NOTE

Notes provide additional useful information.



CAUTION

Caution signify information that could prevent service interruption.

WARNING

Warnings provide information that could prevent damage to the equipment or endangerment to human life.

Safety Instructions

When using your telephone equipment, please follow these basic safety precautions to reduce the risk of fire, electrical shock, or personal injury:

1. Do not use this product near water, such as a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
2. Avoid using a telephone (other than a cordless-type) during an electrical storm. There is a remote risk of shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord, power supply, and/or batteries indicated in the manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for special disposal instructions.

Save These Important Safety Instructions

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

1. This equipment complies with Part 68 of the FCC rules. The required label is affixed to the bottom of the chassis.
2. An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68-compliant. See installation instructions for details.
3. If your telephone equipment (TA 850) causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this equipment (TA 850), please contact ADTRAN for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or until you are sure the equipment is not malfunctioning.
6. This unit contains no user-serviceable parts.
7. The FCC recommends that the AC outlet to which equipment requiring AC power is to be installed is provided with an AC surge arrester.
8. The following information may be required when applying to your local telephone company for leased line facilities.

For a T1 Port:

| Service Type | REN/SOC | FIC | USOC |
|---------------------------|---------|-----------|--------|
| 1.544 Mbps - SF | 6.0N | 04DU9-BN | RJ-48C |
| 1.544 Mbps - SF and B8ZS | 6.0N | 04DU9-DN | RJ-48C |
| 1.544 Mbps - ESF | 6.0N | 04DU9-1KN | RJ-48C |
| 1.544 Mbps - ESF and B8ZS | 6.0N | 04DU9-1SN | RJ-48C |

Federal Communications Commission (FCC) Statement

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 the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. 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 his own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

WARNING

Change 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 Equipment Limitations



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

Before installing this equipment, users should 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 (telephone extension cord). The customer should be aware that 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 waterpipe 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 telephone 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 equipment that the total of the LNs of all devices does not exceed 100.

The ringer equivalence number (REN) assigned to each terminal adapter is used to determine the total number of devices that may be connected to each circuit. The sum of the RENs from all devices in the circuit should not exceed a total of 5.0.

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 for filing an affidavit with the local exchange carrier when connecting unprotected customer premise equipment (CPE) to 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.
- The 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 _____, 2000

Notary Public

My commission expires:

Limited Product Warranty

ADTRAN warrants that for ten (10) years from the date of shipment 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 (which 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 such 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.

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Customer Service, Product Support Information, and Training

ADTRAN will replace or repair this product within five years from the date of shipment if the product does not meet its published specification, or if it fails while in service.

A return material authorization (RMA) is required prior to returning equipment to ADTRAN. For service, RMA requests, training, or more information, see the toll-free contact numbers given below.

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

The Custom Extended Services (ACES) program offers multiple types and levels of service plans which allow you to choose the kind of assistance you need. For questions, call the ACES Help Desk.

ACES Help Desk (888) 874-2237

Repair and Return

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Custom 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
Building #6 Suite 690
Huntsville, Alabama 35807y
RMA # _____

Training

The Enterprise Network (EN) Technical Training offers training on our most popular products. These courses include overviews on product features and functions while covering applications of ADTRAN's product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at your site. For more information about training, please contact your Territory Manager or the Enterprise Training Coordinator by phone at 800-615-1176 ext. 7500, by fax at 256-963-7941, or by email at training@adtran.com.

Training

(800) 615-1176, ext. 7500

ECHO CANCELLER USER INTERFACE GUIDE

This User Interface Guide is designed for use by network administrators and others who will configure and provision the system. It contains Echo Cancellor overview information, module installation instructions, and menus.

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1. ECHO CANCELLER OVERVIEW

The Echo Canceller Module adds ATM functionality to the TA 850 and is used exclusively with the T1 RCU. Voice over packet/cell applications require that Echo Cancellation techniques be applied to the voice traffic to achieve high quality voice. The Echo Canceller is used in ATM voice applications that require G.168 echo cancellation. This module cancels echo for up to 24 voice ports.

The T1 RCU must be using Voice Over ATM firmware to be able to use this module. Firmware can be updated by using XMODEM transfer protocol via the base unit's **CRAFT** port or by using TFTP from a network server. Refer to the T1 RCU VoATM User Interface Guide (document number 61200376L2-31A) for instructions on updating firmware.

The Echo Canceller (which installs in special slots A and B) is available with or without Adaptive Differential Pulse Code Modulation (ADPCM). ADPCM is a speech coding algorithm which uses fewer bits than the traditional Pulse Code Method (PCM), allowing you to get more calls into less space. The Echo Canceller with ADPCM performs 32 kbps ADPCM voice compression on up to 24 voice ports. ADPCM voice compression is per ITU-T G.721. An uncompressed 64 kbps PCM voice port requires roughly 77 kbps of WAN bandwidth (the bandwidth required above 64 kbps is overhead due to the ATM cell header). For a 1.536 Mbps T1 line, only 19 voice ports can be active simultaneously, with practically no bandwidth left over for data. A 32 kbps G.721 compressed voice port requires roughly 38.5 kbps. For a 1.536 Mbps T1 line, 24 voice ports can be active simultaneously (the maximum allowed by the TA 850). Even with 24 compressed voice ports active, approximately 611 kbps of bandwidth is still available for data.

The Echo Canceller provides the following functions:

- Performs echo cancellation per G.165 and G.168 for up to 24 voice ports
- Enables/disables echo cancellation on a per-port basis
- Provides per port G.164 2100 Hz or G.165 2100 Hz phase reversal tone detection
- Performs voice compression per G.721 for up to 24 voice ports (Echo Canceller with ADPCM only)
- Enables/disables ADPCM on a per-port basis (Echo Canceller with ADPCM only)

2. INSTALLING A MODULE

After installing the TA 850 Base Unit and connecting the required cables, you can install necessary modules.

WARNING Remove the 20 Hz fuse before exposing backplane or accessing channel units.



Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

Individual access modules insert from the front. A locking bar holds the modules in place for added security. Disengaging the captured screw allows removal of the locking bar. All wiring connections terminate on the backplane.

The following step/action table tells how to install a module.

| Instructions for Installing Module in the TA 850 | |
|--|---|
| Step | Action |
| 1 | Hold the module by the faceplate while supporting the bottom side. |
| 2 | Align the module edges to the guide grooves for the designated slot. |
| 3 | Insert the module until the edge connector seats firmly into the backplane. |
| 4 | Lock the unit in place by pushing in on the locking lever. |
| 5 | Connect the cables to the associated device(s). |

3. ECHO CANCELLER MENUS

After booting up, go to the **MODULES** menu (Figure 1).



Figure 1. Modules Menu

Press **Enter** to access the **MODULES/MODULES** menu (Figure 2). Arrow down to Slot 7 (**EC/ADPCM**) and over to the **MENU** column.

```

TA 850 RCU/Modules/Modules[7]/Provisioning
Modules
U.35 Setup

```

| Slot | Type | Menu | Alarm | Test | Status |
|------|----------|------|-------|------|--------|
| 0 | RCU | [+] | [+] | [+] | [+] |
| 1 | QUAD FXS | [+] | [n/a] | [+] | [+] |
| 2 | EMPTY | - | - | - | - |
| 3 | EMPTY | - | - | - | - |
| 4 | EMPTY | - | - | - | - |
| 5 | EMPTY | - | - | - | - |
| 6 | EMPTY | - | - | - | - |
| 7 | EC/ADPCM | [+] | - | - | - |

```

MODE: Channelbank SLOTS 1:FXS 2: 3: 4: 5: 6: NET: down
^Z=help 0:06

```

Figure 2. Modules/Modules Menu

Press **Enter**. The **PROVISIONING** menu (Figure 3) appears.

```

TA 850 RCU/Modules/Modules[7]/Provisioning
Provisioning

```

| | |
|----------------|-----|
| Echo Canceller | [+] |
| ADPCM | [+] |

```

MODE: Channelbank SLOTS 1:FXS 2: 3: 4: 5: 6: NET: down
^Z=help 0:08

```

Figure 3. Provisioning Menu

Arrow to **ECHO CANCELLER** and press **Enter** to view choices for this menu (**ENABLE** or **DISABLE**). Arrow to **ADPCM** and press **Enter** to access the **PROVISIONING/ADPCM** menu (Figure 4).



For the Echo Cancellor Module without ADPCM (1200384L1), make sure all ADPCM channels are disabled as shown in Figure 4.

| TA 850 RCU/Modules/Modules 7/7/Provisioning/ADPCM | | |
|---|------|---------|
| Echo Cancellor | Chan | Mode |
| ADPCM | 1 | Disable |
| | 2 | Disable |
| | 3 | Disable |
| | 4 | Disable |
| | 5 | Disable |
| | 6 | Disable |
| | 7 | Disable |
| | 8 | Disable |
| | 9 | Disable |
| | 10 | Disable |
| | 11 | Disable |
| | 12 | Disable |
| | 13 | Disable |
| | 14 | Disable |
| | 15 | Disable |
| | 16 | Disable |
| | 17 | Disable |
| | 18 | Disable |
| | 19 | Disable |
| | 20 | Disable |

MODE: Channel bank SLURS TRRS 2: 3: 4: 5: 6: N1: down
ADPCM Configuration Menu ^Z=help 0:11

Figure 4. Provisioning/ADPCM Menu