ADTRAN

ISU 128 Quick Start Guide

Part Number

1202029L2	115 VAC
1202029L3	115 VAC with V.34 modem
1202029L4	220 VAC
1202029L5	220 VAC with V.34 modem

Trademark Information

5ESS is a registered trademark of AT&T.
DMS-100 is a trademark of Northern Telecom.
ISU is a trademark of ADTRAN, Inc.

RBOC Contacts:

Verizon
1-800-483-4450

BellSouth
1-800-428-ISDN (4736)

Cincinnati Bell
513-566-3282

SBC
1-800-792-ISDN (4736)

Qwest
Residence & Home Office - 800-898-9675
Small Business - 800-603-6000

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

The following conventions are used in this manual.

NOTE	*Notes provide additional useful information.*

CAUTION	*Cautions signify information that could prevent service interruption.*

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

Important 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 near 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

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 voice band analog signal 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 specification.

- End use/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 service.

- Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirements for subrate services are 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 the 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 specification. 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 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 proceeding 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 in the preceding paragraph, if so requested.

_____ Signature

_____ Title

_____ Date

Subscribed and sworn to before me

This _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

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 and Ringer Equivalence Number (REN) for this equipment, if applicable. If required, this information must be given to the telephone company.

2. An FCC compliant telephone cord with a modular plug may be 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 FCC Part 68 compliant. See installation instructions for details.

3. 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.

4. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment. If this happens, the telephone company will provide advance notification and the opportunity to make the necessary modifications to maintain uninterrupted service.

5. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. If the equipment is causing harm to the network, the telephone company may request this equipment to be disconnected from the network until the problem is resolved or it is certain that 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.

**Federal Communications Commission Radio Frequency
Interference 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.

CAUTION	*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.*

Industry Canada Compliance Information

Notice: The Industry Canada label applied to the product (identified by the Industry Canada logo or the "IC:" in front of the certification/registration number) signifies that the Industry Canada technical specifications were met.

Notice: The Ringer Equivalence Number (REN) for this terminal equipment is supplied in the documentation or on the product labeling/markings. The REN assigned to each terminal device indicates the maximum number of terminals that can be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices should not exceed five (5).

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A 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 nuerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numeriques," NMB-003 edictee par le ministre des Communications.

Limited Product Warranty

ADTRAN warrants that for five (5) 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.

EXCEPT FOR THE LIMITED WARRANTY 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.

Customer Service, Product Support Information, and Training

ADTRAN will repair and return this product if within five years from the date of shipment the product does not meet its published specification or the product 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, use the contact information given below.

Repair and Return

If you determine that a repair is needed, please contact our Customer and Product Service (CAPS) department to have an RMA number issued. CAPS should also be contacted to obtain information regarding equipment currently in house or possible fees associated with repair.

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
901 Explorer Blvd. (East Tower)
Huntsville, Alabama 35806

RMA # _____

Pre-Sales Inquiries and Applications Support

Your reseller should serve as the first point of contact for support. If additional pre-sales support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, latest product documentation, application briefs, case studies, and a link to submit a question to an Applications Engineer. All of this, and more, is available at:

http://support.adtran.com

When needed, further pre-sales assistance is available by calling our Applications Engineering Department.

Applications Engineering   (800) 615-1176

Post-Sale Support

Your reseller should serve as the first point of contact for support. If additional support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, updated firmware releases, latest product documentation, service request ticket generation and trouble-shooting tools. All of this, and more, is available at:

http://support.adtran.com

When needed, further post-sales assistance is available by calling our Technical Support Center. Please have your unit serial number available when you call.

Technical Support   (888) 4ADTRAN

Installation and Maintenance Support

The ADTRAN Custom Extended Services (ACES) program offers multiple types and levels of installation and maintenance services which allow you to choose the kind of assistance you need. This support is available at:

<div align="center">

http://www.adtran.com/aces

</div>

For questions, call the ACES Help Desk.

ACES Help Desk	(888) 874-ACES (2237)

Training

The Enterprise Network (EN) Technical Training Department offers training on our most popular products. These courses include overviews on product features and functions while covering applications of ADTRAN's product lines. ADT-RAN 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.

Training Phone	(800) 615-1176, ext. 7500
Training Fax	(256) 963-6700
Training Email	training@adtran.com

ISU 128 Quick Start Guide

OVERVIEW

This Quick Start Guide is designed to assist in understanding ISU™ 128 parameters. These parameters are grouped as the Network options in the ISUs. DTE and Dial options are similar to those found in ordinary modems and DSUs. This guide provides:

•   Information required from the service provider
•   Network options flowchart
•   Step-by-step setup instructions
•   Troubleshooting guidelines for activating the ISDN line
•   Instructions for setting up the application

This guide is based on information gained through successful installation of over ten thousand ISUs.

TELCO-PROVIDED INFORMATION

The following items **must** be provided by the local telephone company for proper installation of an ADTRAN ISU:

•   Switch protocol
•   Line protocol
•   SPID numbers, if necessary
•   Local directory numbers, if necessary

ACTIVATING THE ISDN LINE

Use the following procedure to activate the ISDN line:

1. Configure for the proper switch protocol; see Figure 1. If line protocol is custom, select proper switch protocol: AT&T 5ESS, DSM-100, or NEC. If line protocol is National ISDN1, select National ISDN1 from the menu regardless of the switch protocol.

2. Enter the SPID number(s). SPID numbers are not required for point-to-point lines. See Figure 2.

3. Enter the seven-digit local directory number (LDN) associated with each SPID, beginning with LDN 1 (not required for point-to-point lines). See Figure 2.

4. Cycle ISU power (turn power switch off and on).

5. Connect ISDN lines to the appropriate ISU connectors.

The LCD displays the following sequence: **Self test passed, Link down, Link in sync, Getting TEI, Register SPID, Ready**.

3=Config	1=Netw. options	1=Dial Line	1=Switch Protocol	1=AT&T 5ESS
				2=DMS-100
		2=Leased Line	2=Call type	3=NATIONAL ISDN1
			3=Terminal ID	4=NEC Switch
	2=DTE options		4=Dial options	
	3=Protocol		5=Auto answer	
	4=Quick setup		6=Answer tone	
			7=Connect Timout	
			8=Call Screening	

Figure 1. Switch Protocol Menu

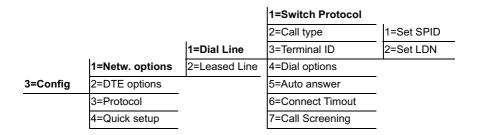| 3=Config | 1=Netw. options | 1=Dial Line | 1=Switch Protocol | |
			2=Call type	1=Set SPID
			3=Terminal ID	2=Set LDN
		2=Leased Line	4=Dial options	
	2=DTE options		5=Auto answer	
	3=Protocol		6=Connect Timout	
	4=Quick setup		7=Call Screening	

Figure 2. Terminal ID Menu

SETTING SPID NUMBERS ON THE ISU

A service profile identifier (SPID) number is normally the ISDN telephone number with a prefix and/or suffix.

Entering a SPID Number

Use the up and down arrows to select SPID#1 or SPID#2. Press **Enter** and use the keypad to enter the SPID number. Press **Enter** to save the SPID number.

Editing a SPID Number

Select the SPID number, and use the down arrow to backspace through the number string. Use the keypad to edit; press **Enter** to save.

Deleting a SPID Number

Select the SPID number; then backspace over the entire number. Press **Enter** to save.

SETTING LDNS ON THE ISU

A local directory number (LDN) is only need when two SPID numbers are provided. This is normally the *seven-digit* ISDN number. The method of entering, editing, and deleting LDNs is identical to that for SPIDs (explained previously).

IF THE ISU DOES NOT DISPLAY READY

After configuring the Network options and connecting the ISU to the ISDN line, if an error occurs during link activation, one of the messages shown in Table 1 is displayed.

Table 1. ISU 128 Status Messages

Message	Description	Common Causes
Link Down	No sync with ISDN line	NT1 installed between the ISU and telco jack. Problem in customer wiring. Problem in telco wiring from CO.
Getting TEI#1 or Getting TEI#2	Unable to negotiate TEI value with the ISDN switch	Line translation not set for dynamic TEI, ISDN line placed in busy-out/out-of-service condition in the ISDN switch.
Register SPID#1 or Register SPID#2	Incorrect or missing SPID	SPID number does not match the number programmed in the switch line translation. Switch protocol setting incorrect.

SPID Mismatch

A SPID mismatch is the most common type of problem. The SPID numbers are programmed manually by the telephone company, and number formats vary. Compare the SPID number format programmed in the ISU with the known formats provided in Table 2. If the problem is not obvious, contact the telco and request verification of the SPID against the actual line translation.

Table 2. SPID Formats

Switch Type	Platform	Version	Rev	Format
AT&T	AT&T 5ESS	Custom	5E6-9	01 + 7 digits + 0
National	AT&T 5ESS	NI-1	5E8	01 + 7 digits + 0
National	AT&T 5ESS NT1 DMS-100 Seimens EWSD	NI-2 NI-1 NI-1	5E9	10 digits + xx + yy
Northern	DMS-100	Custom		7 digits
Northern	DMS-100	Custom		7 digits + xx
Northern	DMS-100	Custom		10 digits
Northern	DMS-100	Custom		10 digits + x
Northern	DMS-100	Custom		10 digits + xx
xx is a suffix such as 0, 1, or last digit repeated. yy is a TID programmed at the end of the SPID in the ISU, in a separate menu option on the TPI 550 ISDN test sets, typically 00.				

Product Support

Since network parameters are programmed by the individual service providers, the Regional Bell Operating Companies (RBOCs) request that questions regarding the ISDN line provisioning be referred to their technical support centers. If the local service contact is unable to help, most service providers have a special ISDN support center; request this number. If the ISU still does not display READY, see the front pages of this manual for additional support information.

SETTING UP THE APPLICATION

Quick setup can be used for most applications to provide a general setup. Use the quick setup option matching the data rate desired. See Figure 3.

		1=Dial 56K sync	
		2=Dial 64K sync	
		3=Dial 112K sync	
		4=Dial 128K sync	1=Leased 128K
	1=Netw. options	5=TBD	2=Ldm 128K Master
3=Config	2=DTE options	6=V34 115.2 asyn	3=TBD
	3=Protocol	7=Dial 57.6 asyn	4=TBD
	4=Quick setup	8=Dial 115.2 asyn	5=TBD
		9=Fallback 57.6K	6=TBD
		0=More	7=Factory Setup

Figure 3. Quick Setup Options

Set the options unique to the application. Typically these are dial options, connector type, and DTR options.

Select the appropriate dial option. Most video applications use RS-366 dialing. Typical asynchronous file transfer/remote access applications use AT commands. V.25 bis dialing is sometimes used for bridge/router applications.
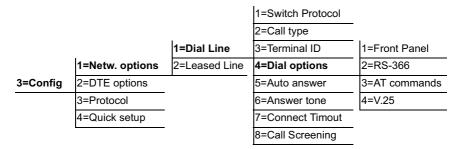
Figure 4 shows the available dial options.

3=Config			
1=Netw. options	**1=Dial Line**	1=Switch Protocol	
2=DTE options	2=Leased Line	2=Call type	
3=Protocol		3=Terminal ID	1=Front Panel
4=Quick setup		**4=Dial options**	2=RS-366
		5=Auto answer	3=AT commands
		6=Answer tone	4=V.25
		7=Connect Timout	
		8=Call Screening	

Figure 4. Dial Options Menu

Set the appropriate connector type to match the interface of the DTE. Figure 5 shows the available options for this setting.

3=Config			
1=Netw. options	**1=Asynchronous**	1=Bit Rate	1=RS-530
2=DTE options	2=Synchronous	**2=Connector Type**	2=V.35
3=Protocol		3=RTS Options	3=RS-232
4=Quick setup		4=CTS Options	
		5=CD Options	
		6=DTR Options	
		7=DSR Options	
		8=Flow Control	
		9=Data Format	

Figure 5. Connector Type Options

Set DTR options as needed for the application. For AT commands, RS-366, and V.25 bis dialing, the option is normally set to **Idle when Off**. If the dialing scheme dials a stored number on demand, set the option to **Dial #0 if On**. See Figure 6.

			1=Bit Rate	1=Ignore DTR
			2=Connector Type	2=Cmd when Off
			3=RTS Options	3=Idle when Off
			4=CTS Options	4=Off>On dial #0
	1=Netw. options	**1=Asynchronous**	5=CD Options	5=Dial #0 if On
3=Config	**2=DTE options**	2=Synchronous	**6=DTR Options**	6=Answer if On
	3=Protocol		7=DSR Options	7=Dial/Ans if On
	4=Quick setup		8=Flow Control	
			9=Data Format	

Figure 6. DTR Options