Total Access 238 8-Port SHDSL Ethernet Bridge–AC Installation and Maintenance Practice

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Revision History

Revision	Date	Description
A	August 2005	Initial release

Conventions

The following typographical conventions are used in this document:

This font indicates a cross-reference link. First-time references to tables and figures are shown in **this font**.

This font indicates screen menus, fields, and parameters.

THIS FONT indicates keyboard keys (ENTER, ESC, ALT). Keys that are to be pressed simultaneously are shown with a plus sign (ALT+X indicates that the ALT key and X key should be pressed at the same time).

This font indicates references to other documentation and is also used for emphasis.

This font indicates on-screen messages and prompts.

This font indicates text to be typed exactly as shown.

This font indicates silkscreen labels or other system label items.

This font is used for strong emphasis.

NOTE

Notes inform the user of additional but essential information or features.

CAUTION

Cautions inform the user of potential damage, malfunction, or disruption to equipment, software, or environment.

WARNING

Warnings inform the user of potential bodily pain, injury, or death.

Training

ADTRAN offers training courses on our 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 customer sites.

For inquiries concerning training, contact ADTRAN:

Training Phone: 800-615-1176, ext. 7500

Training Fax: 256-963-6700

Training Email: training@adtran.com

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Total Access 238 8-Port SHDSL Ethernet Bridge–AC

GENERAL

This practice provides installation and maintenance information for the ADTRAN Total Access 238 8-Port SHDSL Ethernet Bridge–AC powered version (Total Access 238). The Total Access 238 (P/N 1200630L2) is illustrated in **Figure 1**.
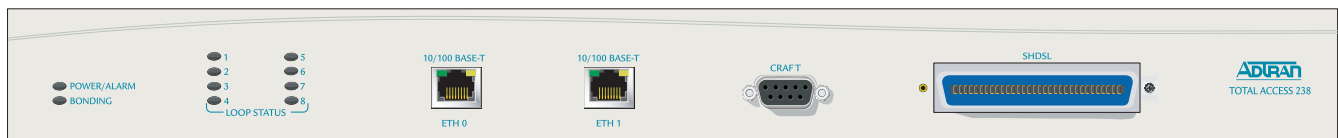
Figure 1. Total Access 238

DESCRIPTION

The ADTRAN Total Access 238 is a network terminating unit using Symmetric High-Bitrate Digital Subscriber Line (SHDSL) technology to transport data over eight copper loops. The Total Access 238 interfaces between the incoming IMA-bonded ITU G.991.2 (SHDSL) service and the customer's 10/100Base-T network for LAN-to-LAN bridging. **Figure 2** provides a functional block diagram for the Total Access 238.
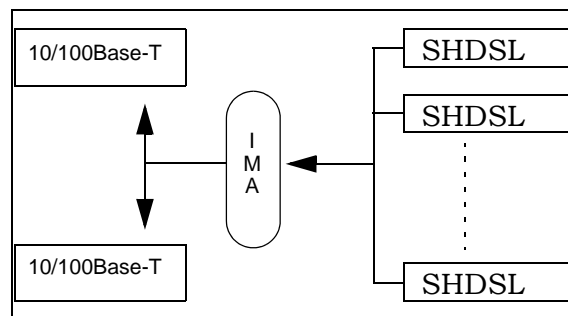
Figure 2. Total Access 238 Functional Overview

The Total Access 238 can be deployed in pairs (back-to-back) for a local campus application or to a Line Terminating Unit (LTU) located in a Central Office (CO), such as the Total Access 3000 16-Port SHDSL IMA Access Module (P/N 1181429L1) for traditional data service applications.

It can be locally or remotely provisioned, with local provisioning being accomplished through the V.28 **CRAFT** interface (DB-9) using a dumb terminal or PC with terminal emulation software. The Total Access 238 can be remotely provisioned by using the Embedded Operations Channel (EOC) or the Command Line Interface (CLI), and can initiate and respond to local and remote loopbacks on the network interfaces. The Total Access 238 can be powered from any AC power source ranging from 85 to 125 V at 60 Hz.

Features

Features of the Total Access 238 include the following:

- Compact design
- Versatile mounting arrangements
- Inclusion of mounting hardware
- Built-in fuse
- Multi-feature status LED

Compliance

Table 1 shows the compliance codes for the Total Access 238. The Total Access 238 is NRTL listed to the applicable UL standards, is UL 60950, GR-1089-CORE, and GR-63-CORE compliant. The Total Access 238 is to be installed in a restricted access location.

Table 1. Compliance Codes

Code	Input	Output
Power Code (PC)	C	–
Telecommunication Code (TC)	–	X
Installation Code (IC)	E	E

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ADTRAN could void the user's authority to operate this equipment.

APPLICATIONS

Two applications are possible with the Total Access 238:

- Campus Application
- DSLAM Application

Figure 3 shows a typical campus application. One Total Access 238 is configured as a Network Termination (NT) device, and the other Total Access 238 is configured as a Central Office Termination (COT) device. A copper pair connects each of the desired SHDSL lines between the two devices. The network connected to the 10/100Base-T connector of the NT device is bridged to the network connected to the 10/100Base-T connector of the COT device, thus forming a single Local Area Network (LAN).

For campus (back-to-back) applications, one Total Access 238 must be configured as an LTU. Refer to "Connecting via the CRAFT Interface" on page 11 for Command Line Interface (CLI) commands to provision a unit as an LTU.

Refer to the Command Line Interface Reference Guide, Document Number 61200630L1-35A for detailed information.
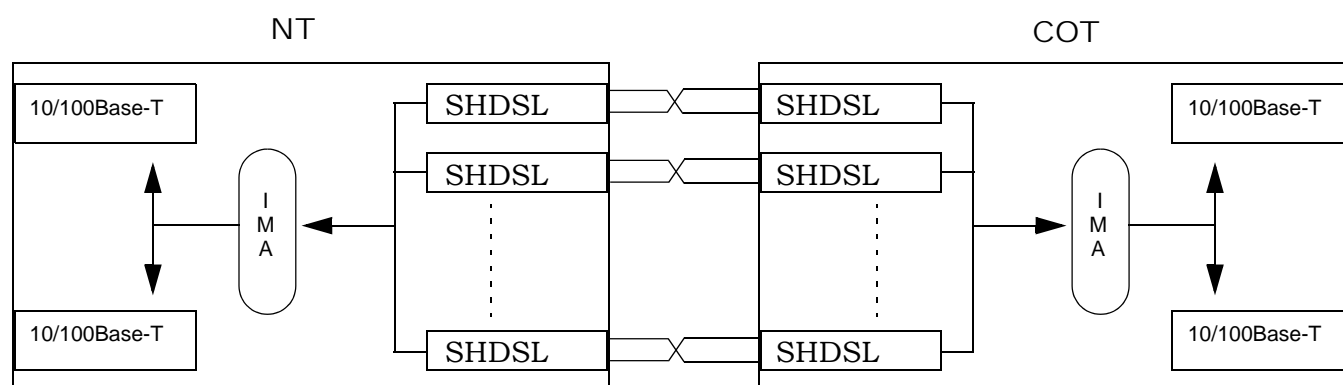
Figure 3. Typical Campus Application

CONNECTIONS

The Total Access 238 is a locally powered standalone unit. It provides a single IEC 320 power connector, eight ITU G.991.2 (SHDSL) single-pair interfaces via a 50-pin amphenol connector, two IEEE 802.3 (10/100Base-T) interfaces via RJ-45 connectors, and one V.28 control port via a DB-9 connector.

The Total Access 238 front panel is illustrated in **Figure 4** and the rear panel in **Figure 5**. Connection pinouts are listed in **Table 2** through **Table 5**.
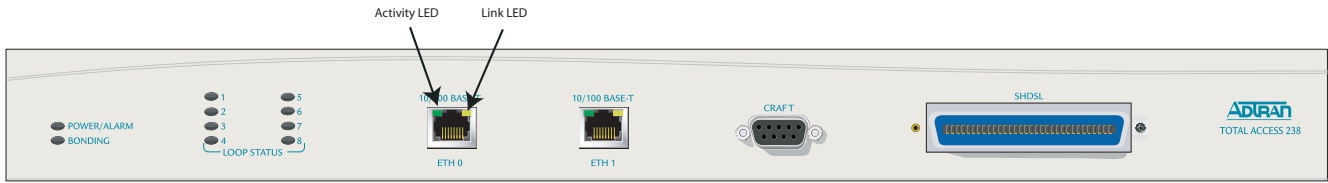
Figure 4. Total Access 238 Front Panel
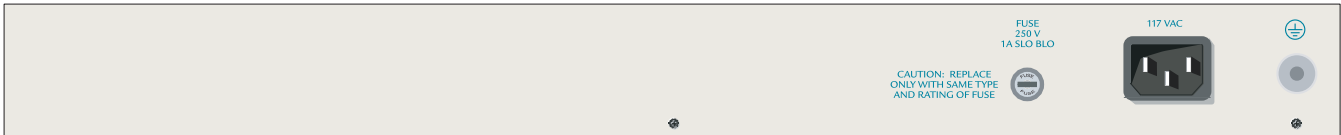
Figure 5. Total Access 238 Rear Panel (AC)

Table 2. CRAFT Pinout

Pin	Name	Description
1	DCD	Data Carrier Detect – Internally connected to DTR and DSR
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready – Internally connected to DCD and DSR
5	GND	Signal Ground
6	DSR	Data Set Ready – Internally connected to DCD and DTR
7	RTS	Ready To Send – Internally connected to CTS
8	CTS	Clear To Send – Internally connected to RTS
9	——	Unused

Table 3. 10/100Base-T Pinout

Pin	Name	Description
1	TX+	Transmit Data Positive
2	TX-	Transmit Data Negative
3	RX+	Receive Data Positive
4-5	——	Unused
6	RX-	Receive Data Negative
7-8	——	Unused

Note: These interfaces are designed for use as intra-building interfaces only

Table 4. SHDSL (Amphenol) Pinout

Pin	Name	Description
1	TIP1	Tip Loop 1
26	RING1	Ring Loop 1
2	TIP2	Tip Loop 2
27	RING2	Ring Loop 2
3	TIP3	Tip Loop 3
28	RING3	Ring Loop 3
4	TIP4	Tip Loop 4
29	RING4	Ring Loop 4
5	TIP5	Tip Loop 5
30	RING5	Ring Loop 5
6	TIP6	Tip Loop 6
31	RING6	Ring Loop 6
7	TIP7	Tip Loop 7
32	RING7	Ring Loop 7
8	TIP8	Tip Loop 8
33	RING8	Ring Loop 8
Other	———	Unused

Table 5. IEC (AC Power) Pinout

Pin	Name	Description
1	N	Neutral (–)
2	E	Earth Ground
3	L	Line (+)

INSTALLATION

C A U T I O N !

**SUBJECT TO ELECTROSTATIC DAMAGE
OR DECREASE IN RELIABILITY.**

HANDLING PRECAUTIONS REQUIRED.

After unpacking the System Name Total Access 238, inspect it for damage. If damage has occurred, file a claim with the carrier then contact ADTRAN Customer Service. Refer to "Appendix A, Warranty" for further information. If possible, keep the original shipping container for returning the unit for repair or for verification of shipping damage.

Shipping Contents

The contents include the following items:

- Total Access 238 8-Port SHDSL Ethernet Bridge–AC
- Total Access 238 8-Port SHDSL Ethernet Bridge–AC *Job Aid*

CAUTION

Electronic modules can be damaged by ESD. When 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.

CAUTION

To comply with GR-1089-CORE, Issue 3, this equipment MUST only be installed in a DC-C bonding and grounding environment. It may not be utilized in a DC-I (isolated) bonding and grounding environment.

Cables Required

- Ethernet cable
- SHDSL connection (via the 50-pin amphenol)

Mounting Options

The Total Access 238 is a 1U high, rack-mountable unit which can be installed in 19- or 23-inch equipment racks or in a wallmount configuration. Follow these steps to mount the Total Access 238 into a 19- or 23-inch rack:

Table 6. 19- or 23-inch Rackmount Installation

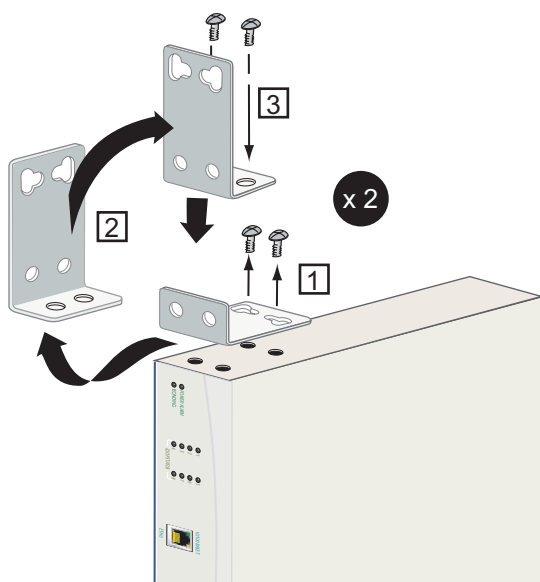| Step	Action
1.	23-inch Installations Only:
	Remove the mounting brackets. (The Total Access 238 ships with mounting brackets attached for a 19-inch rackmount installation.) Attach mounting brackets so that the smaller portion of the bracket attaches to the side of the chassis. (The longer portion of the bracket will be flush with the front of the chassis.) See **Figure 6**.
	To avoid damaging the unit, use only the screws included in the shipment when attaching mounting ears to the chassis.
2.	Position the Total Access 238 in a stationary equipment rack. This unit takes up 1 RU of space. To allow proper grounding, scrape the paint from the rack around the mounting holes where the Total Access 238 will be positioned.
3.	Hold the unit in position while the two mounting bolts are installed through the brackets and into the equipment rack. Use a #2 Phillip's screwdriver.
4.	Proceed to the steps given in "Supplying Power to the Unit" on page 10.

Figure 6. Repositioning the Brackets for 23-inch Racks

Table 7. Wallmount Installation

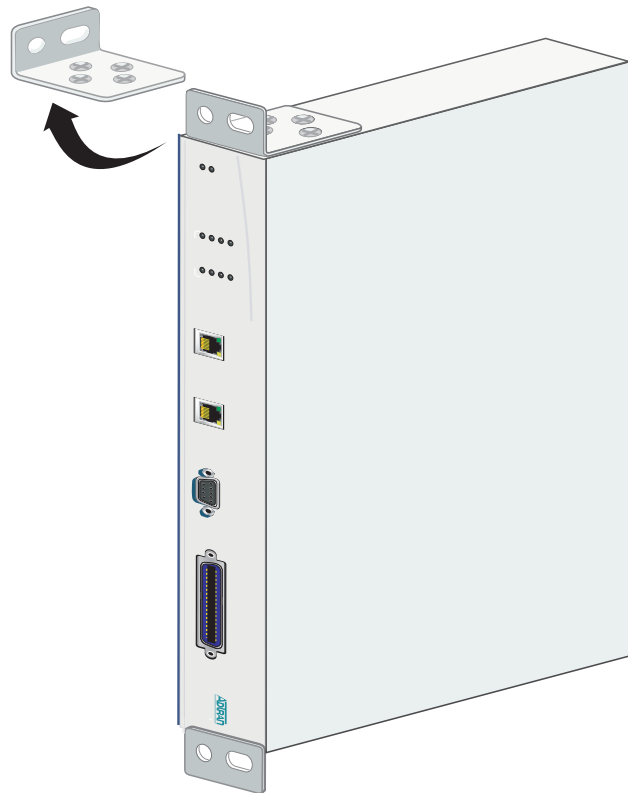| Step	Action
1.	Remove the mounting brackets. (The Total Access 238 ships with mounting brackets attached for a 19-inch rackmount installation.) Rotate them 90° so that the portion of the bracket with the mounting holes (shorter side) is flush with the bottom of the chassis, and reattach them to the chassis (see **Figure 7**).
	To avoid damaging the unit, use only the screws included in the shipment when attaching mounting ears to the chassis.
2.	Decide on a location for the Total Access 238. The unit needs to be mounted at or below eye-level so that the LEDs are viewable.
	IMPORTANT! Mount the chassis with LEDs facing to the side as shown in Figure 8 *on page 9 (not facing up or down).*
3.	Prepare the mounting surface by attaching a board (typically plywood, 3/4" to 1" thick) to a wall stud.
	IMPORTANT! Mounting to a stud ensures stability. Using sheetrock anchors may not provide sufficient long-term stability.
4.	Hold the unit in position. Use two 3/32" to 1/8" (1 1/2" or greater in length) wood screws through the brackets and into the mounted board.
5.	Proceed to the steps given in "Supplying Power to the Unit" on page 10.

Figure 7. Repositioning the Brackets for Wallmounting
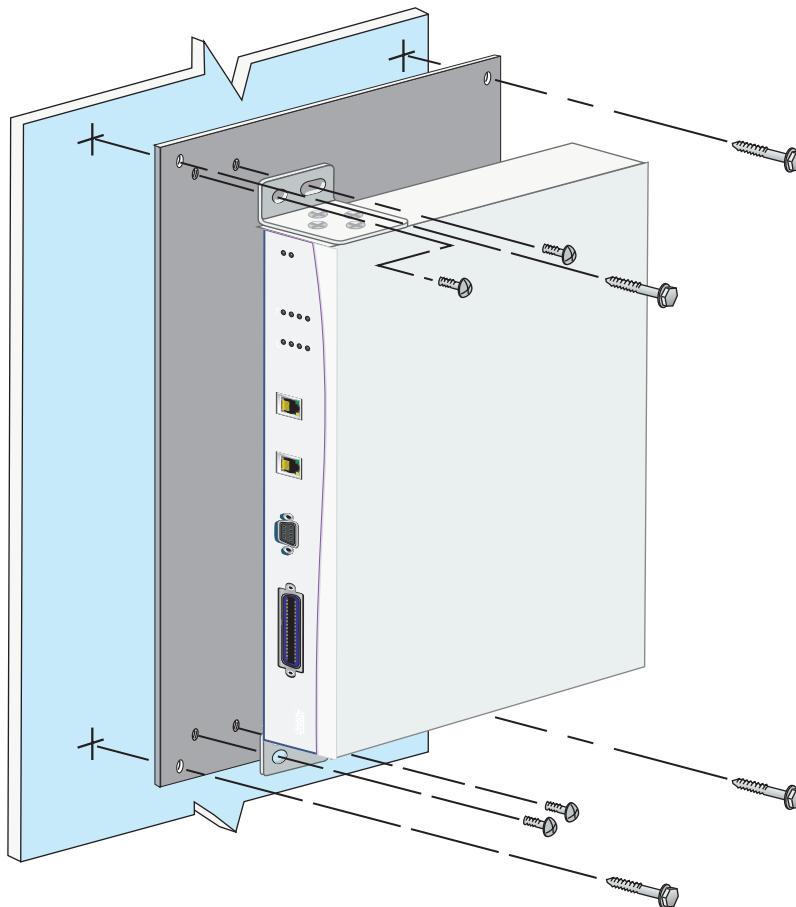
Figure 8. Wallmounting the Total Access 238

Grounding Instructions

> **CAUTION**
>
> An equipment grounding conductor that is not smaller in size than the ungrounded branch-circuit supply conductor is to be installed as part of the circuit that supplies the product or system.

The ground connector on the Total Access 238, AC-version, provides an additional ground reference (the third prong of the AC plug is also grounded) and MUST be connected to the "ground bus" or "ground wire" in an equipment room. 18 AWG or larger ground wire is recommended.

The following provides grounding instruction information from the Underwriters' Laboratory UL 60950 Standard for Safety of Information Technology Equipment Including Electrical Business Equipment, of December 2000.

An equipment grounding conductor that is not smaller in size than the ungrounded branch-circuit supply conductors is to be installed as part of the circuit that supplies the product or

system. Bare, covered, or insulated grounding conductors are acceptable. Individually covered or insulated equipment grounding conductors shall have a continuous outer finish that is either green, or green with one or more yellow stripes. The equipment grounding conductor is to be connected to ground at the service equipment.

The attachment-plug receptacles in the vicinity of the product or system are all to be of a grounding type, and the equipment grounding conductors serving these receptacles are to be connected to earth ground at the service equipment.

A supplementary equipment grounding conductor shall be installed between the product or system and ground that is in addition to the equipment grounding conductor in the power supply cord.

The supplementary equipment grounding conductor shall not be smaller in size than the ungrounded branch-circuit supply conductors. The supplementary equipment grounding conductor shall be connected to the product at the terminal provided, and shall be connected to ground in a manner that will retain the ground connection when the product is unplugged from the receptacle. The connection to ground of the supplementary equipment grounding conductor shall be in compliance with the rules for terminating bonding jumpers at Part K or Article 250 of the National Electrical Code, ANSI/NFPA 70. Termination of the supplementary equipment grounding conductor is permitted to be made to building steel, to a metal electrical raceway system, or to any grounded item that is permanently and reliably connected to the electrical service equipment ground.

The supplemental grounding conductor shall be connected to the equipment using a number 8 ring terminal and should be fastened to the grounding lug provided on the rear panel of the equipment. The ring terminal should be installed using the appropriate crimping tool (AMP P/N 59250 T-EAD Crimping Tool or equivalent.)

Supplying Power to the Unit

As shipped, the Total Access 238 is set to factory default conditions. After installing the unit, the Total Access 238 is ready for power-up. To apply power to the unit, ensure that it is properly connected to an appropriate power source.

CAUTION

Power to the Total Access 238 must be from a grounded 85 to 125 VAC, 60 Hz source. Verify that the power receptacle uses double-pole, neutral fusing.

FRONT PANEL OPERATION

Front panel mounted LEDs provide status information for the SHDSL loops, bonding operation, and the alarms. Ethernet activity LEDs, located on the Ethernet RJ-45 connectors, provide link status and traffic indications. All LED operations are listed in **Table 8**.

Table 8. LED Descriptions

LED	Status	Description
POWER/ALARM	Off	Main power off
	Green	No active alarm present on the system
	Red	Active alarm present on the system
BONDING	Green	IMA active and operating normally
	Yellow	IMA interface in test
	Red	IMA interface not active
LOOP STATUS	Green	Loop trained
	Yellow	Loop in test
	Red (solid)	Loop not trained
	Red (flashing)	Loop training
Ethernet Activity*	Off	No data traffic is being sent or received on the Ethernet interface
	Yellow (flashing)	Data traffic is being sent or received on the Ethernet interface
Ethernet Link*	Off	No active 10/100Base-T link
	Green	Active 10/100Base-T link is present

* Located on the Ethernet RJ-45 connector. See Figure 4 on page 4.

CONNECTING VIA THE CRAFT INTERFACE

The Total Access 238 management and provisioning features may be accessed by a CLI using the DB-9 **CRAFT** interface located on the front panel of the unit.

Follow these steps to establish CLI communication with the Total Access 238:

1. Connect to the **CRAFT** interface using a VT100 dumb terminal or PC with VT100 emulation software configured with the following parameters:

   - 9600 baud rate
   - 8 data bits
   - No parity
   - 1 stop bit
   - No flow control

2. Once connected, press ENTER to access the CLI.

3. Enter username and password at the login prompt.

- The default username is **admin**.
- The default password is **password**.

4. The TA238# prompt will display. Proceed with management activities.

CLI Command Primer

This subsection provides a preview of the Command Line Interface management structure. Refer to *Total Access 238 Command Line Interface Reference Guide*, document number 61220630L1-35A for detailed information.

General

At any point while entering a command, you can press ? to get help. If you press ? while entering a command, you will get all of the possible commands beginning with that key sequence.

An example of this follows:

TA238(config)#**i?** [the **i?** is input from the keyboard]

The response from the system would indicate the following:

`interface ip`

Press ? at any other place to display all possible commands that can be entered at that point.

TA238#**?**

The ? returns the following display:

```
configure         - Enter configuration mode
copy              - Copy files and configuration data
erase             - Erase configuration
logout            - Exit from the EXEC
ping              - Send echo messages
reload            - Perform a cold restart
show              - Show system information
write             - Write configuration to memory, network, or terminal
```

Change Default Login:

TA238#**configure**

TA238(config)#**login username "new username"** (place new name between the quotes)

TA238(config)#**login password "new password"**

SHDSL:

Configure the SHDSL interface using the following commands:

TA238#`configure`

TA238(config)#`interfaces shdsl`

TA238(config-shdsl)# (press **?** to see list of parameters)

To view the current SHDSL configuration:

TA238#`show interfaces shdsl config`

To see the status of a SHDSL link:

TA238#`show interfaces shdsl status link n` (where **n** is the number)

To see the performance history of a SHDSL link:

TA238#`show interfaces shdsl performance 15-minute link n`

TA238#`show interfaces shdsl performance 24-hour link n`

IMA

To configure the IMA group:

TA238#`configure`

TA238(config)#`interfaces ima`

TA238(config-ima)# (press **?** to see list of parameters)

To see the current IMA configuration:

TA238#`show interfaces ima config`

To see the status of the IMA group:

TA238#`show interfaces ima status group`

To see the status of an IMA link:

TA238#`show interfaces ima status link n` (where **n** is the number)

IP Address:

To configure the IP address:

TA238#`configure`

TA238(config)#`ip address "IP address" "subnet mask"`

Ethernet:

To configure the ethernet interfaces:

TA238#`configure`

TA238(config)#`interfaces ethernet n (where n is 0 or 1)`

TA238(config-eth0)# (press **?** to see list of parameters)

Current/Startup Configuration:

To view the current configuration:

> TA238#`show running-config`

To view the startup (saved) configuration:

> TA238#`show startup-config`

To save the current configuration:

> TA238#`write memory`

Firmware Upgrade:

To load new firmware:

> TA238#`reload`
> `Configuration built.`
> `Save System Configuration?[y/n]`**y**
> `Reboot the system? Continue?[y/n]`**y**
> `>>>>BOOT`

You should see the following menu:

> `Download Menu:`
>
> > `1) Begin XMODEM download now`
> > `2) Continue booting up`
> > `3) Change DTE rate to 9.6K Baud`
> > `4) Change DTE rate to 19.2K Baud`
> > `5) Change DTE rate to 38.4K Baud`
> > `6) Change DTE rate to 57.6K Baud`
> > `7) Change DTE rate to 115.2K Baud`

NOTE

If you wish to speed up the download, you can change the baud rate.

Press 1 to begin the download.

When the download is complete, return to this menu and select `Continue booting up.`

Initial Setup of Total Access 238

Setting up the Private Virtual Channels (PVC):

Command structure to provision PVCs is as follows. The keyboard input required is in **bold**.

> TA238# **config**
>
> TA238(config)# **interfaces ima**
>
> TA238(config-ima)# **pvc 0/32 (vpc/vci)**
>
> TA238(config-ima-vc0/32)# **encapsulation llc (or vc-mux)**
>
> TA238(config-ima-vc0/32)# **ubr+ (maximum cell rate)(minimum cell rate)**

Setting up for Campus Application:

To utilize two Total Access 238 units in a back-to-back Campus application, one unit must be configured as an LTU. Command structure to reconfigure to LTU is as follows:

> TA238# **config**
>
> TA238(config)# **interfaces shdsl**
>
> TA238(config-shdsl)# **termination ltu**

When ENTER is pressed, the system responds with the following prompt:

> **This change will cause a system reboot. Continue?[y/n]**

Pressing Y will reboot the unit and reconfigure for LTU.

MAINTENANCE

The Total Access 238 8-Port SHDSL Ethernet Bridge–AC does not require routine maintenance for normal operation.

If power is lost, check the fuse on the rear panel. Refer to "Replacing the Fuse" on page 16.

ADTRAN does not recommend that repairs be attempted in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to "Appendix A, Warranty" for further information.

Replacing the Fuse

WARNING

The AC power should be disconnected from the device when replacing the fuse. Failure to disconnect the AC power cord may result in injury or death from electric shock.

Complete the following steps in order to replace the fuse:

Table 9. Replacing the Fuse

Step	Action
1.	Disconnect the AC power cord.
2.	Insert a flat blade screwdriver into the fuse cover, turn the cover 1/3 turn counter clockwise, and remove fuse holder.
3.	Remove blown fuse.
4.	Insert new fuse into the fuse holder and insert fuse holder back into unit. *IMPORTANT! Replace the fuse only with the exact type and rating as removed from the fuse holder.*
5.	Insert a flat blade screwdriver into the fuse cover and apply moderate pressure while turning the cover 1/3 turn clockwise to lock in place.

SPECIFICATIONS

Specifications for the Total Access 238 are detailed in **Table 10**.

Table 10. Total Access 238 Specifications

Specification	Description
Interfaces	
Network:	10/100Base-T Octal SHDSL (50-pin amphenol)
Management:	EOC or **CRAFT** interface (using CLI)
Ethernet:	Full/half duplex 10/100 Mbps (10/100Base-T only) 1550 bytes frame size
DSL:	ANSI T1.417-2001 spectrum compliant Sealing current termination SHDSL rates to 5.676 Mbps
ATM:	UBR+QoS 3 PVCs LLC and VC mux Ethernet encapsulation
Data Protocols:	RFC 2684 bridging over ATM Inverse Multiplexing ATM
Power	
Voltage Requirement:	85 to 125 VAC, 60 Hz (120 VAC nominal)
Heat dissipation:	10 watts
Fusing:	1A, 250V, SLO-BLO, 3AG (user accessible)
Environmental	
Operating Temperature:	NEBS Operational Temperature testing performed from -5°C to +70°C NRTL Listed and CB Certified for continuous operation in ambient environments from -5°C to +50°C
Storage Temperature:	−20°C to +85°C
Relative Humidity:	95 % maximum @ 50°C, noncondensing
Compliance	
GR-63-CORE GR-1089-CORE FCC Part 15 UL 60950 NRTL Listed	
Physical	
Dimensions:	Height: 1.72 inches Width: 17.22 inches Depth: 9.75 inches
Weight:	< 1 pound
Part Number	
Total Access 238 8-Port SHDSL Ethernet Bridge–AC:	1200630L2

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Appendix A
Warranty

WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Refer to the following subsections for sales, support, Customer and Product Service (CAPS) requests, or further information.

ADTRAN Sales

Pricing/Availability:

800-827-0807

ADTRAN Technical Support

Pre-Sales Applications/Post-Sales Technical Assistance:

800-726-8663

Standard hours: Monday - Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade:

(256) 963-8722

Repair and Return Address

Contact CAPS prior to returning equipment to ADTRAN.

ADTRAN, Inc.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

ADTRAN

Carrier Networks Division
901 Explorer Blvd.
Huntsville, AL 35806