TA 850 SDSL RCU
User Interface Guide (UIG)

1200377L1 SDSL RCU

March 2001

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901 Explorer Boulevard
P.O. Box 140000
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Notes provide additional useful information.

Caution signify information that could prevent service interruption.

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

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Save These Important Safety Instructions

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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.

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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.*

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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.

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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

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ACES Help Desk	(888) 874-2237

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CAPS Department	(256) 963-8722

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ADTRAN Customer and Product Service
901 Explorer Blvd.
Huntsville, Alabama 35806
RMA # _____

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Training	(800) 615-1176, ext. 7500

SDSL RCU USER INTERFACE GUIDE

This section of the TA 850 User Manual is designed for use by network administrators and others who will configure and provision the system. It contains SDSL RCU Module overview information, information about navigating the VT 100 user interface, configuration information, and menu descriptions.

CONTENTS

FIGURES

1. SDSL RCU MODULE OVERVIEW

The SDSL Router Control Unit is a dual board assembly that includes an SDSL network interface, Nx56/64 V.35 interface, and built-in IP router. The SDSL RCU can provision, test, and provide status for any card in the channel bank. The faceplate has a DB-9 **CRAFT** port connection, and network, V.35, and Ethernet LEDs.

The SDSL RCU is only used in ATM applications. It supports vendor-specific SDSL protocols, ATM, and Copper-Mountain Frame Relay. Therefore, the SDSL RCU can interoperate with a variety of DSLAMs, including Lucent, Nortel, Copper Mountain, Nokia, and Alcatel. It also supports CopperCom, Jetstream, and Tollbridge Voice Gateways.

The SDSL RCU has built-in Echo Cancellation for up to 24 voice ports. Adaptive Differential Pulse Code Modulation (ADPCM) resources are also built-in for up to 16 ports.

To update firmware for the SDSL RCU, use XMODEM transfer protocol via the base unit's **CRAFT** port or use TFTP from a network server. (See *Appendix A. Updating TA 850 Firmware using XMODEM* on page 55 and *Appendix B. Updating TA 850 Firmware using TFTP* on page 59.)

Only the first two dipswitches on the RCU are used. With the first dip switch down (to the right of the unit if you are facing it), the unit boots up in a mode to update the firmware. With the second dip switch down, the unit factory defaults at startup.

The terminal menu is the access point to all other operations. Each terminal menu item has several functions and submenus that identify and provide access to specific operations and parameters. These menu selections are described later in this User Interface Guide.

See Appendix C for instructions about navigating the terminal menus.

2. VOICE OVER DSL OVERVIEW

Voice over DSL (VoDSL) refers to providing toll quality voice access to the Public Switched Telephone Network (PSTN) over twisted copper pair using DSL. Data can be combined with multiple voice lines over a single medium via DSL, thus yielding many advantages over traditional TDM technologies.

Traditional TDM technologies are limited by statically allocating bandwidth. DSL overcomes this by providing a large bandwidth and utilizing other technologies, such as ATM, to dynamically assign bandwidth as it is needed. Because of this, the user is able to add voice and data connections over a DSL line with flexibility and ease.

3. VOICE OVER ATM OVERVIEW

Voice over ATM is the technology used to transmit voice conversations over a data network using Asynchronous Transfer Mode (ATM). There are several potential benefits to moving voice over a data network using ATM. First, the small, fixed-length cells require lower processing overhead. Second, these small, fixed-length cells allow higher transmission speeds than traditional packet switching methods.

ATM allocates bandwidth on demand, making it suitable for high-speed connection of voice, data, and video services. Conventional networks carry data in a synchronous manner. Because empty slots are circulating even when the link is not needed, network capacity is wasted. ATM automatically adjusts the network capacity to meet the system needs.

4. VOICE OVER DSL APPLICATION

The TA 850 connects to a DSLAM via DSL and ATM. The SDSL RCU has a built in Echo Canceller that provides G.168 echo cancellation. The module can automatically detect ADPCM and enable it as needed.

Figure 1 shows a typical VoDSL application. The TA 850 connects to the ATM network, via a DSLAM, to provide both voice and high speed data from a single platform.

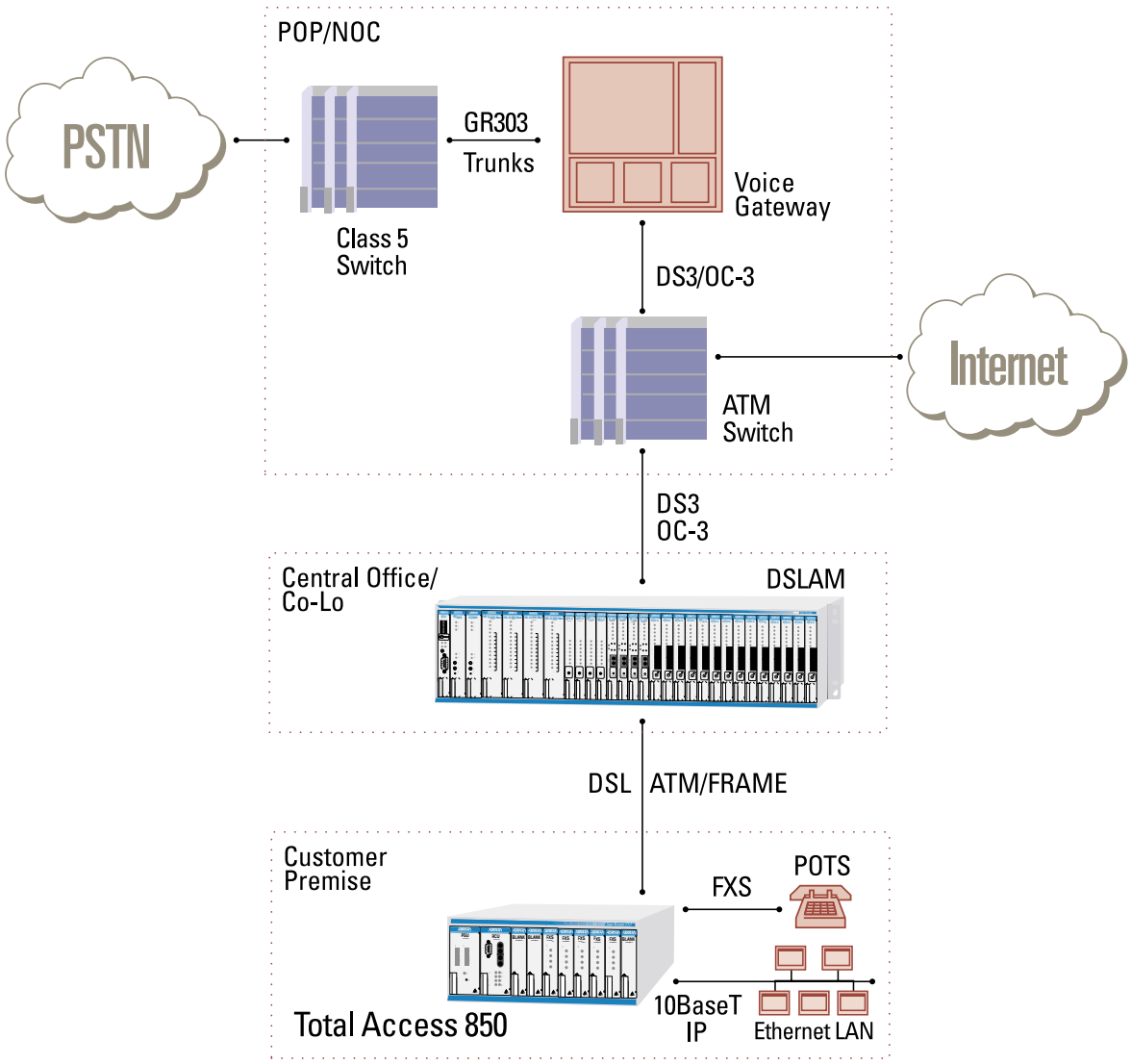

Figure 1. Voice over DSL

5. 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.*

CAUTION *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).

6. CONFIGURING THE TA 850

System Info

The **SYSTEM INFO** menu provides basic information about the unit as well as data fields for editing information. Figure 2 displays the submenus that are available when you select this menu item.

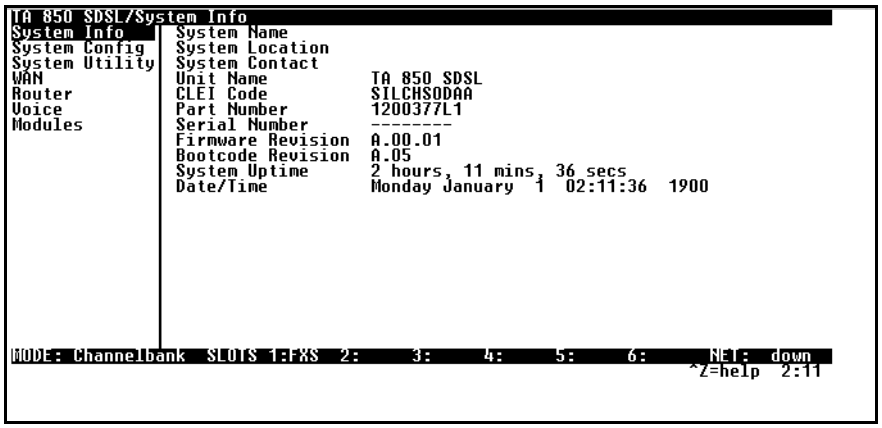

Figure 2. System Information Menu

>System Name

Provides a user-configurable text string for the name of the TA 850. This name can help you distinguish between different installations. You can enter up to 40 alpha-numeric characters in this field, including spaces and special characters (such as an underbar). This name will appear on the top line of all screens.

>System Location

Provides a user-configurable text string for the location of the TA 850. This field is to help you keep track of the actual physical location of the unit. You can enter up to 40 alphanumeric characters in this field, including spaces and special characters (such as an underbar).

>System Contact

Provides a user-configurable text string for a contact name. You can use this field to enter the name, phone number, or email address of a person responsible for the TA 850 system. You can enter up to 40 alpha-numeric characters in this field, including spaces and special characters (such as an underbar).

>Unit Name

Product-specific name for the controller card.

>CLEI Code

The CLEI code for the controller card.

> Part Number

ADTRAN part number for the controller card.

>Serial Number

Serial number of the controller card.

>Firmware Revision

Displays the current firmware revision level of the controller.

>Bootcode Revision

Displays the bootcode revision.

>System Uptime

Displays the length of time since the TA 850 system reboot.

>Date/Time

Displays the current date and time, including seconds. This field can be edited. Enter the time in 24-hour format (such as 23:00:00 for 11:00 pm). Enter the date in mm-dd-yyyy format (for example, 10-30-1998).

Each time you reset the system, this value resets to 0 days, 0 hours, 0 min and 0 secs.

System Config

Set up the TA 850 operational configuration from the **SYSTEM CONFIG** menu. Figure 3 shows the items included in this menu.

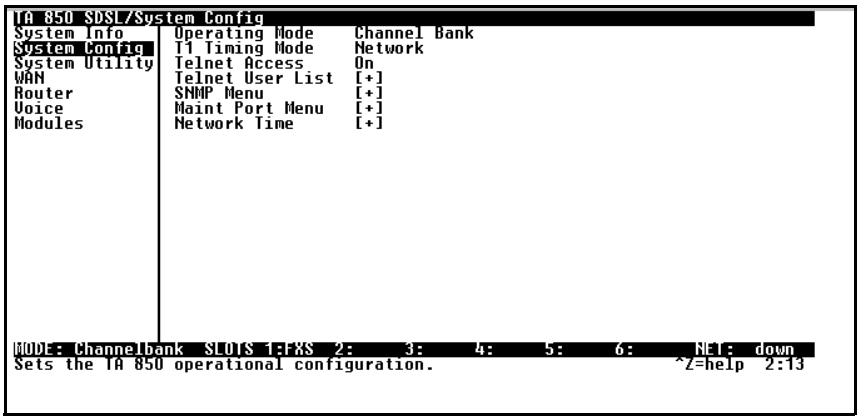

Figure 3. System Configuration Menu

>Telnet Access

Sets Telnet access to **ON** or **OFF**.

>Telnet User List

Up to four users can be configured for access to the TA 850. Each user can be assigned a security level and time out.

Name
A text string of the user name for this session.

Authen Method
The user can be authenticated in two ways:

PASSWORD	The Password field is used to authenticate the user.
RADIUS	The Radius client is used for authenticating the user.

Password
When the authenticating method is password, this text string is used for the password.

Idle Time (1-255)
This sets the amount of time you can be idle before you are automatically logged off.

Level
This is the security level granted to the user.

>SNMP Menu

The TA 850 is an SNMP agent. It can respond to Gets and Sets, and can generate traps. These two lists set up the manager, communities, and levels.

Access

When set to **OFF**, SNMP access is denied. When set to **ON** (def), the TA 850 will respond to SNMP managers based on the configuration.

Communities

This list is used to set up to eight SNMP communities names that the TA 850 will allow. Factory default sets the community "public" with "Get" privileges only.

Name

This is a text string for the community name.

Privilege

The access for this manager can be assigned three levels.

NONE	No access is allowed for this community or manager.
GET	Manager can only read items.
GET/SET	Manager can read and set items.

Manager IP

This is the IP address of SNMP manager. If set to 0.0.0.0, any SNMP manager can access the TA 850 for this community.

Traps

The TA 850 can generate SNMP traps. This list allows up to four managers to be listed to receive traps.

Manager Name

This is the text string describing the name of the entry. It is intended for easy reference and has no bearing on the SNMP trap function.

Manager IP

This is the IP address of the manager that is to receive the traps.

>Maint Port Menu

The TA 850's VT 100 **CRAFT** port can be accessed in two ways. One is a DB 9 located on the front, and the other is an RJ 48 located on the rear. The setup for these ports is under this menu. Only one of these access methods may be used at a time.

Password Protect
When set to **NO**, the maintenance port is not password protected. When **YES** (def), the TA 850 will prompt for a password upon startup.

Password
This is the text string that is used for comparison when password protecting the maintenance port. By default, no password is entered.

The security level for the maintenance port is always set to 0. This gives full access to all menus.

Passwords are case-sensitive.

Instructions for Changing Passwords	
Step	**Action**
1	Select the **PASSWORD** field—a new **PASSWORD** field displays.
2	Type the new password in the **ENTER** field.
3	Type the new password again in the **CONFIRM** field.
	*The password can contain up to 12 alphanumeric characters. You can also use spaces and special characters in the password.*

Baud Rate
This is the asynchronous rate that the maintenance port will run. The possible values are 300, 1200, 2400, 4800, 9600 (def)**,** 19200, 38400, 57600, and 115200.

Data Bits
This is the asynchronous bit rate that the maintenance port will run. The possible values are 7 or 8 (def) bits.

Parity
This is the asynchronous parity that the maintenance port will run. The possible values are **NONE** (def), **ODD,** or **EVEN**.

Stop Bits
This is the number of stop bits used for the maintenance port. The possible values are 1 (def), 1.5 or 2.

>Network Time

The TA 850 unit time can be entered manually from the **SYSTEM INFO** menu, or the unit can receive time from an NTP/SNTP server. The **NETWORK TIME** menu includes all parameters relating to how the unit communicates with the time server.

Server Type
The server type defines the port on which the TA 850 will listen to receive timing information from the time server.

NT Time
The TA 850 will receive time from an NT server running SNTP software on its TIME port.

SNTP
The TA 850 will receive time directly from an SNTP server.

Active
This network timing feature can be turned on and off. It determines whether the unit will request and receive time from a time server.

Time Zone
There are several time zones available for which the time may be displayed. All time zones are based off of Greenwich Mean Time (GMT).

Adjust for Daylight Saving
Since some areas of the world use Daylight Savings Time, the TA 850 is designed to adjust the time on the first Sunday in April and the last Sunday in October accordingly if this option is turned on.

Host Address
This is the IP address of the time server that the TA 850 will request and receive time from.

Refresh
This is the interval of time between each request the TA 850 sends out to the time server. A smaller refresh time guarantees that the unit receives the correct time from the server and corrects possible errors more quickly. This may be more taxing on the machine. A range of refresh times is available for the user to decide which is best for their unit.

Status
This displays the current status of the time negotiation process. If an error is displayed, check all connections and configurations to try to resolve the problem.

System Utility

Use the **SYSTEM UTILITY** menu to view and set the system parameters shown in Figure 4.

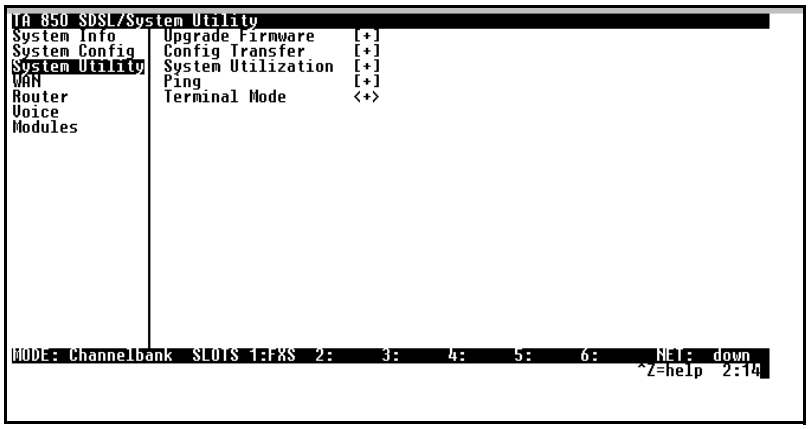

Figure 4. System Utility Menu

>Upgrade Firmware

Updates firmware when TA 850 enhancements are released. Two transfer methods are available for use in updating the TA 850 system controller.

Transfer Method

The two methods for upgrading are **XMODEM** and **TFTP.** (See *Appendix A. Updating TA 850 Firmware using XMODEM* on page 55 and *Appendix B. Updating TA 850 Firmware using TFTP* on page 59 for more information.) **TFTP** requires a TFTP server running somewhere on the network. The TA 850 starts a TFTP client function which gets the upgrade code from the TFTP server. Selecting **XMODEM** will load the upgrade code through the **CRAFT** port using any PC terminal emulator with xmodem capability.

TFTP Server Address

This is required when the transfer method is TFTP. It is the IP address or domain name (if DNS is configured) of the TFTP server.

TFTP Server Filename

This is required when the transfer method is TFTP. It is the case-sensitive file name which contains the upgrade code.

Transfer Status

This appears when TFTP is used. It displays the status of the transfer as it happens. Any error or success message will be displayed here.

Start Transfer

This activator is used when the configurable items in this menu are complete.

> NOTE
> *Before using* **START TRANSFER**, *the TA 850 should have a valid IP address, subnet mask, and default gateway (if required).*

Abort Transfer

Use this activator to cancel any TFTP transfer in progress.

>Config Transfer

Sends a file containing the TA 850 configuration to a PC connected to the **CRAFT** port using XMODEM protocol or to a file on a TFTP server using the TFTP protocol. See *Appendix A. Updating TA 850 Firmware using XMODEM* on page 55 and *Appendix B. Updating TA 850 Firmware using TFTP* on page 59 for details.

CONFIG TRANSFER also lets you save the TA 850 configuration as a backup file, so you can use the same configuration with multiple TA 850 units. In addition, **CONFIG TRANSFER** can retrieve a configuration file from a TFTP server.

To support these transfers, ADTRAN delivers a TFTP program with the TA 850 called *TFTP Server*. You can configure any PC running Microsoft Windows with this software, and store a configuration file.

> NOTE
> *Before using* **CONFIG TRANSFER**, *the TA 850 should have a valid IP address, subnet mask, and default gateway (if required).*

Only one configuration transfer session (upload or download) can be active at a time.

Transfer Method

Displays the method used to transfer the configuration file to or from a server. XMODEM and TFTP are supported.

Transfer Type

Only **BINARY** transfers are currently supported.

TFTP Server IP Address

Specifies the IP address of the TFTP server. Get this number from your system administrator.

TFTP Server Filename

Defines the name of the configuration file that you transfer to or retrieve from the TFTP server. The default name is **ta850.cfg**, but you can edit this name.

Current Transfer Status

Indicates the current status of the update.

Previous Transfer Status
Indicates the status of the previous update.

Load and Use Config
Retrieves the configuration file specified in the **TFTP SERVER FILENAME** field from the server. To start this command, enter **Y** to begin or enter **N** to cancel.

If you execute this command, the TA 850 retrieves the configuration file, reboots, then restarts using the new configuration.

Save Config Remotely
Saves the configuration file specified in **TFTP SERVER FILENAME** to the server identified in **TFTP SERVER IP ADDRESS**. To start this command, enter **Y** to begin or enter **N** to cancel.

Before using this command, you must have identified a valid TFTP server in **TFTP SERVER IP ADDRESS**.

>System Utilization

Performance
For internal use only.

Queues
For internal use only.

>Ping

Allows you to send pings (ICMP requests) to hosts. The following items are under this menu:

> NOTE *Only one ping session can be active at a time.*

Start/Stop
Activator to start and cancel a ping test.

Host Address
IP address or domain name (if DNS is configured) of device to receive the ping.

Size (40-1500)
Total size of the ping to send. Range is 40 (def) to 1500 bytes.

# of Packets
Total packets to send every 2 seconds. Setting this to **0** allows the client to ping continuously.

 # Transmits
Total packets sent (read only).

 # Receives
Total packets received (read only).

%Loss
Percentage loss based on ping returned from host (read only).

Configuring WAN Settings

>DSLAM Type

Set this to the type of DSLAM the TA 850 will be connecting to. The TA 850 supports the Copper Mountain CE 150, ADTRAN TA 3000, Nokia D50, and Lucent Stinger DSLAMs.

>Layer One Interface

This is the physical layer protocol used to connect the DSLAM to the TA 850.

>Layer Two Protocol

This is the data link layer protocol used to connect the DSLAM to the TA 850. This is selected appropriately for each DSLAM. The Layer 2 menus change according to this selection. If your DSLAM supports ATM, refer to *ATM Config* on page 26. For Frame Relay, refer to *Frame Relay* on page 27.

If the DSLAM Type is CopperMountain, refer to Appendix H. Routing in HDIA Mode on page 75 for information.

>ATM Config

Use the **WAN** menu (Figure 5) to access the **ATM CONFIG** menu.

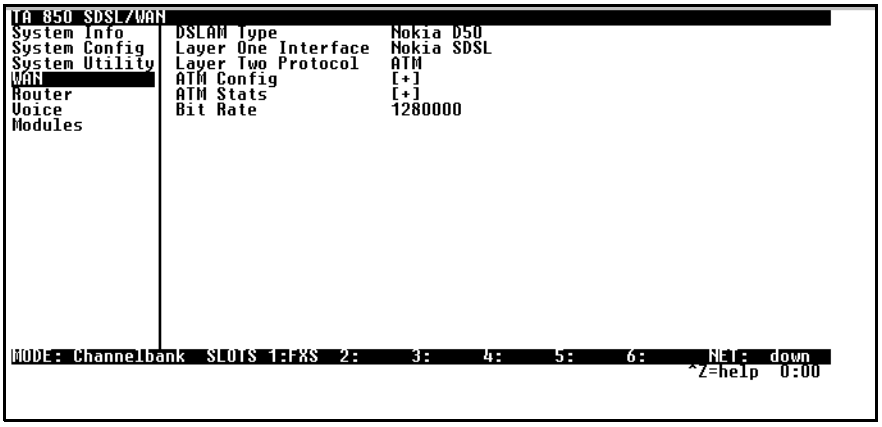

Figure 5. WAN Menu

Use the **ATM CONFIG** menu (Figure 6) to set the parameters listed below the figure.

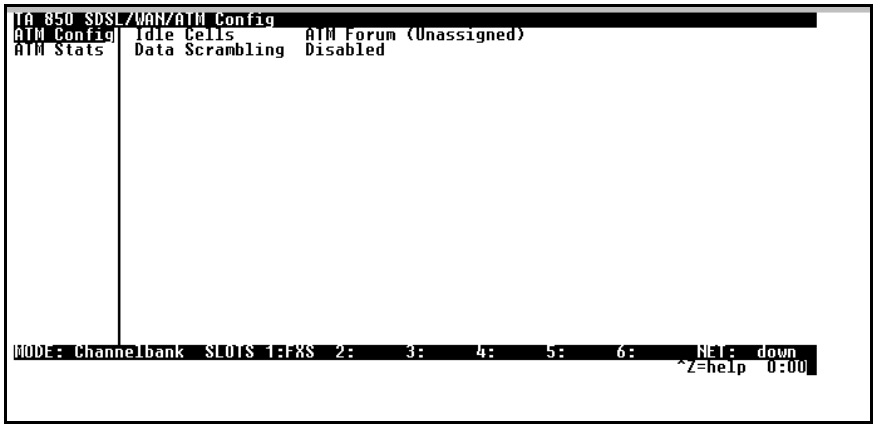

Figure 6. ATM Config Menu

Idle Cells

The **IDLE CELLS** format must be configured for either **ATM FORUM** or **ITU**. Configuring this setting incorrectly for a particular circuit will cause poor performance at the ATM layer.

This setting must match the configuration setting of the ATM switch or DSLAM at the other end of the circuit.

Data Scrambling

DATA SCRAMBLING can be **ENABLED** or **DISABLED** for cell traffic. Configuring this setting incorrectly for a particular circuit will cause poor performance.

This setting must match the configuration setting of the ATM switch or DSLAM at the other end of the circuit.

>Frame Relay

Frame Relay is a connection-oriented service requiring circuits to be configured by your carrier to establish a physical link between two or more locations. Multiple virtual circuits (which appear as virtual point-to-point links) can be run through the same physical connection.

There are two types of virtual circuits supported in Frame Relay: Permanent Virtual Circuits (PVC) and Switched Virtual Circuit (SVC). PVCs are like dedicated point-to-point private lines. Since the physical connection is always there in the form of a leased line, call setup and tear down is done by a carrier via a network management system. SVCs require setup and tear down and are generally not available from Frame Relay carriers. Virtually all Frame Relay communications are implemented using PVCs. The TA 850 supports PVCs only.

A number called the Data Link Connection Identifier (DLCI) identifies each virtual circuit within a shared physical channel.

Frame Relay/Maintenance Protocol

The Frame Relay maintenance protocol is used on the WAN port. The maintenance protocol is used to send link status and virtual circuit information between Frame Relay switches and other devices (such as routers) that communicate with them. Possible choices are listed below.

ANNEX D (def)	This is an ANSI standard and is the most commonly used standard in the US.
ANNEX A	This is the CCITT European standard.
LMI	This was developed by a vendor consortium and is also known as the “consortium” management interface specification. It is still used by some carriers in the U.S.

STATIC	This should be selected when there is no Frame Relay switch in the circuit. The DLCIs are assigned in the DLCI Mapping and must be the same for the device it will communicate with.

Frame Relay/Polling Frequency

This parameter is the interval that the TA 850 polls the Frame Relay switch using the maintenance protocol selected above. The TA 850 is required to poll the Frame Relay switch periodically to determine whether the link is active. The value is in seconds and ranges from 5 to 30 seconds with a default of 10 seconds.

Frame Relay/DLCI Mapping

This menu allows each DLCI to be mapped to a particular Frame Relay maintenance protocol. Each protocol parameter can be individually configured for each DLCI. By factory default, the DLCI map is empty. When empty and a maintenance protocol other than static is used, the TA 850 will poll the switch to determine which DLCIs are active. These active DLCIs will attempt to determine the IP and IPX addresses on the other end of the virtual circuit using Inverse ARP (IARP). If there is a response, the network learned will be added to the router tables and the virtual circuit will be treated as an unnumbered interface. Bridge connections are made using bridge group 1.

When more than one DLCI mapping is listed, the TA 850 will try to match the DLCIs learned from the Frame Relay switch with the DLCI values in the map. If there is a match, the protocols specified in the map are used. However, if an active DLCI is not in the list, it looks for an entry that has 0 in the DLCI field. This entry is considered the default entry to use when no match occurs. If this default entry is not present, the TA 850 falls back to using IARP (as discussed in the previous paragraph) to determine the protocols to use with that particular virtual circuit. If a static maintenance protocol is used, at least one DLCI mapping must be specified.

*To insert a new profile, press the **I** key when over the* **Num** *column. A new inserted profile will always be set up with the default parameters. To copy parameters from an old profile to this newly inserted profile, use the copy (**C**) and paste (**P**) keys. Entire configuration trees can be copied with this method.*

*To delete an unused profile, use the **D** key when the cursor is over the number in the* **Num** *column. Once deleted, the profile is gone permanently as soon as the DLCI Mapping is saved. Items may be deleted when* **DEL** *appears below the status bar.*

DLCI Mapping/Active

When this parameter is set to **Yes** (def), the mapping is used to determine the protocols used. If set to **No**, the TA 850 will ignore the virtual circuit with this DLCI.

DLCI Mapping/DLCI

This is the DLCI associated with this virtual circuit. This value can range from 16 to 1007.

DLCI Mapping/IP Map

This menu represents the IP protocol mapping that is to take place for this DLCI.

IP Map/Active
When this is set to **Yes** (def), the TA 850 will attempt to transport IP packets for this DLCI. A setting of **No** means that no IP traffic or route will be exchanged.

IP Map/IARP
When this is set to **Yes** (def), the TA 850 will send Inverse ARP packets to determine the IP address on the other end of the virtual circuit. If the IARP is responded to, a route is placed in the IP route table. A setting of **No** means that the route address is to be assigned statically using the **IP MAP/FAR-END IP ADDRESS** parameter. The TA 850 will always respond to Inverse ARP requests.

IP Map/Far-End IP Address
This is the IP address of the device on the other end of the virtual circuit. When this DLCI becomes active, the TA 850 will add a route in the IP routing table.

IP Map/IP Netmask
The IP network mask to apply to the **FAR-END IP ADDRESS** and **LINK IP ADDRESS** is specified here.

IP Map/Local IP Address
The virtual circuit may require an IP address to be specified at this DLCI interface. This is called a numbered interface. This address is used by the TA 850 to respond to Inverse ARP requests. If this IP address is left as 0.0.0.0, the link is treated as unnumbered and the TA 850 responds to the Inverse ARP with its Ethernet IP address.

IP Map/RIP

RIP /VERSION	The RIP protocol can be specified per DLCI. The possible selections are **Off** (default) (meaning no RIP packets are listened to or sent), **V1** (def) (which is RIP version 1) or **V2** (which is RIP version 2).
RIP/METHOD	This specifies the way the RIP protocol sends out its advertisements.
NONE (DEF)	All routes in the router table are advertised out this virtual circuit with no modification of the metrics.
SPLIT HORIZON (DEF)	Only routes not learned from this particular virtual circuit are advertised.
POISON REVERSE	All routes are advertised, but the routes learned from this port are "poisoned" with an infinite metric.
RIP/DIRECTION	This parameter specifies the direction at which RIP advertisements are sent and listened.
TX AND RX (DEF)	RIP advertisements are periodically transmitted and are listened to on this virtual circuit.
TX ONLY	RIP advertisements are periodically transmitted but are not listened to on this virtual circuit.
RX ONLY	RIP is not transmitted on this virtual circuit but they are listened to.

IP Map/NAT

The TA 850 can perform Network Address Translation over a PVC. Setting this option to **On** will cause the TA 850 to translate between the Ethernet addresses and the configured **LOCAL IP ADDRESS**. Only one PVC may be used for translation at one time. If more than one IP Map is configured for NAT, the first PVC which is activated becomes the NAT port.

DLCI Mapping/IPX Map

This menu represents the IPX protocol mapping that is to take place for this DLCI.

IPX Map/Active

When this is set to **Yes**, the TA 850 will attempt to transport IPX packets for this DLCI. A setting of **No** (def) means that no IPX traffic or route will be exchanged.

IPX Map/IARP

When this is set to **Yes**, the TA 850 will send Inverse ARP packets to determine the IPX network on the other end of the virtual circuit. If the IARP is responded to, a route is placed in the IPX route table. A setting of **No** (def) means that the IPX network is to be assigned to the link statically using the IPX Map/Link Network parameter. The TA 850 will always respond to Inverse ARP requests.

IPX Map/Link Network

This is the IPX network of the link or of the other device's LAN. When this DLCI becomes active, the TA 850 will add a route to this network in the IPX routing table. This address is also used by the TA 850

to respond to Inverse ARP requests. If this IPX address is left as 0, the link is treated as unnumbered and the TA 850 responds to the Inverse ARP with its Ethernet IPX address.

DLCI Mapping/Bridge Map

This menu is used to permit bridging of packets over this DLCI. Each DLCI or virtual circuit must be assigned a bridge group. The bridge group treats all virtual circuits as one circuit. Bridge packets destined to be transmitted out a particular bridge group are copied and transmitted individually out each DLCI in the bridge group. However, incoming bridge packets received from one DLCI are not retransmitted out the other DLCIs in the same bridge group. Any device in the bridge group must transmit to each DLCI. This requires a fully meshed circuit, meaning each device has a virtual circuit to each other.

Bridge Map/Active

When this is set to **Yes**, the TA 850 will bridge packets to and from this DLCI. Bridge packets are any packets that are not IP or IPX packets except when the router is turned off, in which case that particular router's protocol packets are bridged. A setting of **No** (def) means that no bridging will occur.

Bridge Map/Bridge Group

The bridge group that this DLCI is part of is specified here as **Group 1** (def) or **Group 2**. These groups correspond to the spanning tree protocols Bridge Group 1 and Bridge Group 2.

DLCI Mapping/Filter

The TA 850 can block packets in and out of a PVC port by use of the filters. They are set up in two steps: 1) define the types of packets that would be of interest in the **CONFIGURATION/SECURITY/FILTER DEFINES** menu, and 2) set up the filter type and combination of defines that will cause a packet block.

Filter/In from PVC

The packets which come into the TA 850 via this PVC can be filtered in three ways:

DISABLED (DEF)	Turns off packet input filtering. No incoming packets from this PVC are blocked.
BLOCK ALL	All incoming packets from this PVC are blocked except as defined in the **FILTERS/IN EXCEPTIONS** list.
FORWARD ALL	All incoming packets from this PVC are not blocked except as defined in the **FILTERS/IN EXCEPTIONS** list.

Filter/In Exceptions

This is a list of up to 32 filter entries which can be combined using the operations field. The operations are performed in the order they appear on the list.

ACTIVE	Turns this entry active when set to **On**.
TYPE	Selects the filter define list to reference:
MAC	from the **CONFIGURATION/SECURITY/FILTER DEFINES/MAC FILTER DEFINES** list.
PATTERN	from the **CONFIGURATION/SECURITY/FILTER DEFINES/PATTERN FILTER DEFINES** list.
IP	from the **CONFIGURATION/SECURITY/FILTER DEFINES/IP FILTER DEFINES** list.
IPX	from the **CONFIGURATION/SECURITY/FILTER DEFINES/IPX FILTER DEFINES** list.
FILTER LIST NAME	Selects between filters defined in the list.
NEXT OPER	The next operation to use to combine with the next filter in the list:
END	the last filter to combination.
AND	logically AND this filter with the next filter in the list
OR	logically OR this filter with the next filter in the list.

Filter/Out to PVC

The packets which transmit out this PVC from the TA 850 can be filtered in three ways:

DISABLED (def)	Turns off packet output filtering. No outgoing packets to this PVC are blocked.
BLOCK ALL	All outgoing packets to this PVC are blocked except as defined in the **FILTERS/OUT EXCEPTIONS** list.
FORWARD ALL	All outgoing packets to this PVC are not blocked except as defined in the **FILTERS/OUT EXCEPTIONS** list.

Filter/Out Exceptions

This is a list of up to 32 filter entries. The setup is exactly the same as the **FILTER/IN EXCEPTIONS** list.

Maintenance DLCI
The TA 850 can be configured from theWAN without having to preset a DLCI mapping or IP address. This value is the DLCI number used to open an IP session by theTA 850. Any IP packet arriving from the PVC is assumed to be for the TA 850's IP stack. The destination address in the packet is assigned as the PVC's local IP address. The source address is used to add a host route in the routing table. The default is 901, but any legal DLCI number can be used.

BECN Timeout
This value is expressed in milliseconds and represents the amount of time the TA 850 will stop transmitting over a PVC which received a packet with the BECN bit set. The default is 1.5 seconds.

>ATM Stats

Use the **WAN** menu (Figure 5 on page 26) to access the **ATM STATS** menu (Figure 7) and view the parameters listed below the figure.

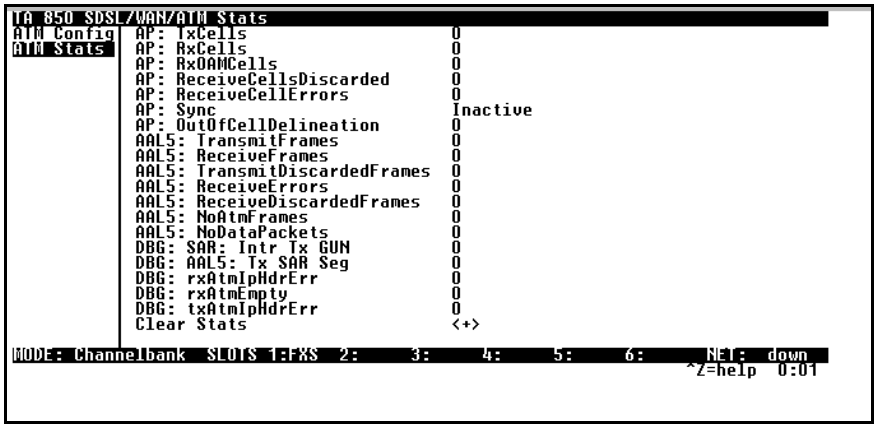

Figure 7. ATM Stats Menu

AP: Tx Cells
This is the number of cells transmitted.

AP: Rx Cells
This is the number of cells received.

AP: Rx OAM Cells
This is the number of OAM cells received

AP: Receive Cells Discarded
This is the number of cells received and discarded. An incrementing count in this field could indicate a configuration problem with the ATM layer.

AP: Receive Cell Errors
This is the number of cells received with an HEC error.

AP: Sync
This indicates cell delineation at the ATM layer.

AP: Out Of Cell Delineation
This indicates loss of cell delineation at the ATM layer.

AAL5: Transmit Frames
This is the number of AAL5 frames transmitted.

AAL5: Receive Frames
This is the number of AAL5 frames received.

AAL5: Transmit Discarded Frames
This is the number of AAL5 frames discarded.

AAL5: Receive Errors
This is the number of AAL5 errors received.

AAL5: Receive Discarded Frames
This is the number of AAL5 frames discarded.

AAL5: No ATM Frames
This is for internal use only.

AAL5: No Data Packets
This is for internal use only.

Clear Stats
This is used to clear the counters on this menu screen.

>DSL Rate Config

The rate at which the SDSL link has trained is displayed here. If the selected DSLAM does not support Autobaud, then the line rate should be entered here.

Configuring the Router – Configuration

Use the **ROUTER/CONFIGURATION** menu (Figure 8) to access the **GLOBAL**, **ETHERNET**, and **WAN** menus.

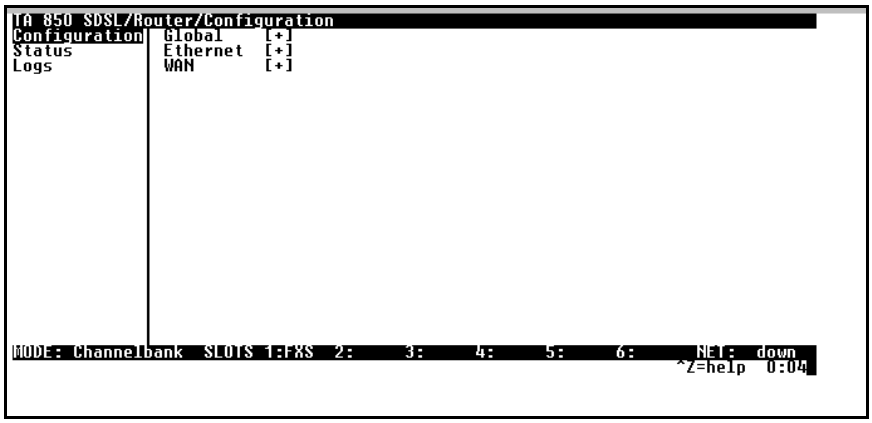

Figure 8. Router/Configuration Menu

>Global

Use the **GLOBAL** menu (Figure 9) to set up general router functions.

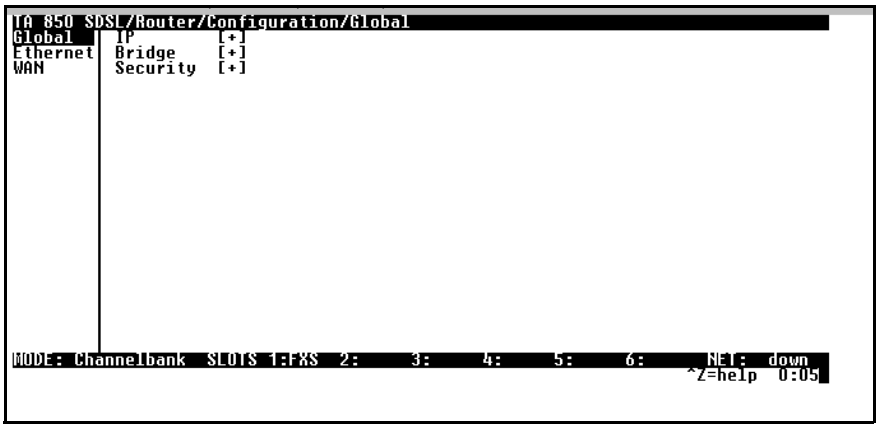

Figure 9. Global Menu

IP

This is used for general IP configuration.

Mode

This item controls how the 850 handles IP routes. When this option is set to **ON** (def), the 850 will advertise and listen to routes from other IP routers. If **OFF**, the route table is still used, but only static routes are used for routing IP packets and only the Ethernet port is used. IP packets can be sent over the WAN, but only when bridged.

Static Routes

Use this menu to enter static routes to other networks.

ACTIVE	Adds this static route entry to the IP routing table when set to **YES** and removes it (if it was previously added) if set to **NO** (def).
IP ADDRESS	The IP address of the host or network address of the device being routed to.
SUBNET MASK	Determines the bits in the previous IP address that are used. *If this is to be a host route, it must be set to all ones* (255.255.255.255).
GATEWAY	The IP address of the router to receive the forwarded IP packet.
HOPS	The number of router hops required to get to the network or host. Maximum distance is 15 hops.
PRIVATE	When set to **NO**, the TA 850 will advertise this static route using RIP. Setting to **YES** means that the route is kept private.

DHCP Server

DHCP MODE	When set to **ON**, the TA 850 acts as a DHCP server and will dynamically assign IP, network mask, default gateway, and DNS addresses to any device which transmits a broadcast DHCP request. The addresses assigned are based on the TA 850's own IP address and will be within the same network.
DHCP RENEWAL TIME	The number of hours that the DHCP server should allow the device before it is required to send a new DHCP request. The default is 15 hours, and 0 represents an infinite lease.

Domain Names

Enter the 850's domain name and the primary and secondary DNS servers in this menu.

DOMAIN NAME	Text string used to represent the domain name used by the TA 850.
PRIMARY DNS	First server to which domain name requests are sent.
SECONDARY DNS	Server used as a backup, in case the primary address does not respond to the request.
PRIMARY NBNS/WINS	Server to which NT domain name requests are sent.
SECONDARY NBNS/WINS	Server used when there is no response from the primary server.

UDP Relay

This menu configures the 850 to act as a UDP relay agent for applications requiring a response from UDP hosts that are not on the same network segment as their clients.

Mode

When this option is set to **ON**, the TA 850 will act as a relay agent.

UDP Relay List

Up to four relay destination servers can be specified in this list.

RELAY ADDRESS	This is the IP address of the server that will receive the relay packet.
UDP PORT TYPE	
STANDARD (def)	The following standard UDP protocols are relayed when set: DHCP, TFTP, DNS, NTP (Network Time Protocol, port 123, NBNS (NetBios Name Server, port 137), NBDG (NetBIOS Datagram, port 138), and BootP.
SPECIFIED	When set, the UDP port (1 to 65535) can be specified in the UDP Port columns (up to three per server).
UDP PORT 1, 2, 3	Used for specifying UDP ports to be relayed. These fields only apply when **UDP PORT TYPE** is set to **SPECIFIED**.

Bridge

The **BRIDGE** menu is used to set up the bridge parameters for the 850. The bridging function runs at the Media Access Control (MAC) level which allows any protocol packets that run over Ethernet to be forwarded. Bridging can run concurrently with IP. However, when IP routing is active, IP packets (which include ARP packets) are not bridged.

Mode

This is used to enable the bridge function.

Address Table

The 850 automatically maintains a table of MAC addresses detected and associates those addresses with the LAN or WAN port from which they were received.

AGING	The maximum time an idle MAC address remains in the table before being removed. The value is in minutes.
FORWARD POLICY	When this parameter is set to **UNKNOWN** (def), any bridge packet with a destination MAC address that is not in the bridge table is forwarded to all other ports. When set to **KNOWN**, the packet with the unknown destination MAC address is dropped and is not forwarded.

Security

Authentication

The method used for authenticating the PPP peer is selected here. The possible values are listed below.

NONE	No attempt is made to authenticate the PPP peer.
RADIUS	The TA 850 will act as a RADIUS client and authenticate the PPP peer using the RADIUS server. The Radius server parameters must be set up properly for this to work.
PPP	The PPP profile is used to authenticate the PPP peer.

Radius Server

The parameters for the RADIUS server are configured in this menu. The RADIUS server can be used for authenticating a PPP peer (if defined under **SECURITY/AUTHENTICATION**) and for Telnet server sessions.

PRIMARY SERVER	This is the IP address of the first RADIUS server that the TA 850 should attempt to communicate with when authenticating a PPP peer.
SECONDARY SERVER	This is the IP address of the back-up RADIUS server that the TA 850 should attempt to communicate with when the primary server does not respond.
UDP PORT	This is the UDP port that the TA 850 should use when communicating with the RADIUS server. The default is 1645, which is the commonly used port.
SECRET	The RADIUS server and TA 850 share this text string. It is used by the RADIUS sever to authenticate the TA 850, the RADIUS client. The factory default is not to use a secret.
RETRY COUNT (1-10)	This is the number of times the TA 850 should send a request packet to the RADIUS server without a response before giving up. If the number of attempts to communicate with the primary server is equal to the retry count, the secondary server (if defined) is tried. If the secondary server does not respond within the retry count, the PPP peer (or Telnet session) is not authenticated and is dropped. The default is 5.

Filter Defines

NOTE *The* **FILTER DEFINES** *option if for Frame Relay only.*

The TA 850 can filter packets based on certain parameters within the packet. The method used by the TA 850 allows the highest flexibility for defining filters and assigning them to a PVC. The filters are set up in two steps: (1) defining the packet types, and (2) adding them to a list under the PVC. This menu is used to define the individual filter defines based on packet type.

Filter Defines /MAC Filter Defines

The MAC filter is applied to bridge packets only. Bridge packets which are forwarded by the bridge functionality of the TA 850 are defined here. Up to 32 MAC defines can be specified.

NAME	Identifies the filter entry.
SRC ADDR	48-bit MAC source address used for comparison. (hexadecimal format)
SRC MASK	Bits in the MAC source address which are compared. (hexadecimal format)
DEST ADDR	48-bit MAC destination address used for comparison. (hexadecimal format)
DEST MASK	Bits in the MAC destination address used for comparison. (hexadecimal format)
MAC TYPE	16-bit MAC type field used for comparison. (hexadecimal format)
TYPE MSK	Bits in the MAC type field used for comparison. (hexadecimal format)

Filter Defines /Pattern Filter Defines

The pattern filter is applied to bridge packets only. That is any packet which is forwarded by the bridge functionality of the TA 850. Up to 32 pattern defines can be specified.

NAME	Identifies the filter entry.
OFFSET	Offset from beginning of packet of where to start the pattern comparison.
PATTERN	64 bits used for comparison. (hexadecimal format)
MASK	Bits in the pattern to be compared. (hexadecimal format)

Filter Defines /IP Filter Defines

The IP filter defines apply to any IP packet, whether it is routed or bridged. Up to 32 IP defines can be specified.

NAME	Identifies the filter entry.
IP SRC	IP address compared to the source address. (dotted decimal format)
SRC MASK	Bits which are used in the source comparison. (dotted decimal format)
IP DEST	IP address compared to the destination address. (dotted decimal format)
DEST MASK	Bits which are used in the destination comparison. (dotted decimal format)
SRC PORT	IP source port number used for comparison Range: 0 to 65535. (decimal format)
SRC PORT CMPR	Type of comparison that is performed. = means ports equal to **not** = means port not equal to > means port greater than < means port less than **None** - means the source port is not compared
DST PORT	IP destination port number used for comparison Range: 0 to 65535. (decimal format)
DST PORT CMPR	Type of comparison that is performed = means ports equal to **not** = means port not equal to > means port greater than < means port less than **None -** means the destination port is not compared
PROTO	Protocol used for comparison. Range: 0 to 255. (decimal format)

PROTO CMPR	Type of comparison that is performed
	= means protocols equal to
	not = means protocols not equal to
	> means protocols greater than
	< means protocols less than
	None means the protocol is not compared
TCP EST	**Yes -** only when TCP established
	No - only when TCP not established
	Ignore - ignore TCP flags

>Ethernet

Use the **ETHERNET** menu (Figure 10) to configure the Ethernet port on the 850.

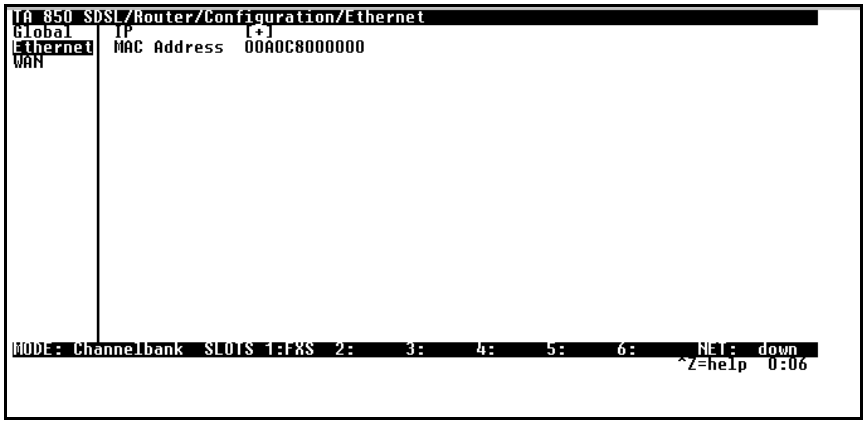

Figure 10. Ethernet Menu

IP

This is used to setup the IP addresses for the LAN on the 850

IP Address

The IP address assigned to the 850's Ethernet port is set here. This address must be unique within the network.

Subnet Mask

This is the IP network mask that is to be applied to the 850's Ethernet port.

Default Gateway

The default gateway is used by the 850 to send IP packets whose destination address is not found in the route table.

RIP

Use this menu to enable RIP on the LAN interface.

MODE	Enables or disables RIP.
PROTOCOL	Specifies the RIP protocol. Choices are **V1** (def) (which is RIP version 1) or **V2** (RIP version 2).
METHOD	Specifies the way the RIP protocol sends out its advertisements. Choices are given below.
NONE	All routes in the router table are advertised with no modification of the metrics.
SPLIT HORIZON	Only routes not learned from this circuit are advertised.
POISON REVERSE (def)	All routes are advertised, but the routes learned from this port are “poisoned” with an infinite metric.
DIRECTION	Allows the direction at which RIP advertisements are sent and listened to be specified.
TX AND RX (def)	RIP advertisements are periodically transmitted and are listened to on this port.
TX ONLY	RIP advertisements are periodically transmitted but are not listened to on this port.
RX ONLY	RIP advertisements are not transmitted on this port, but are listened.
V2 SECRET	Enter the secret used by RIP version 2 here.

Proxy ARP

This feature allows the network portion of a group of addresses to be shared among several physical network segments. The ARP protocol provides a way for devices to create a mapping between physical addresses and logical IP addresses. Proxy ARP makes use of this mapping feature by instructing a router to answer ARP requests as a "proxy" for the IP addresses behind one of its ports. The device which sent the ARP request will then correctly assume that it can reach the requested IP address by sending packets to the physical address that was returned. This technique effectively hides the fact that a network has been (further) subnetted. If this option is set to **YES**, when an ARP request is received on the Ethernet port the address is looked up in the IP routing table. If the forwarding port is not on the Ethernet port and the route is not the default route, the 850 will answer the request with its own hardware address.

MAC Address

This is a read-only MAC address programmed at ADTRAN.

>WAN

Use the **WAN** menu (Figure 11) to configure WAN settings on the 850.

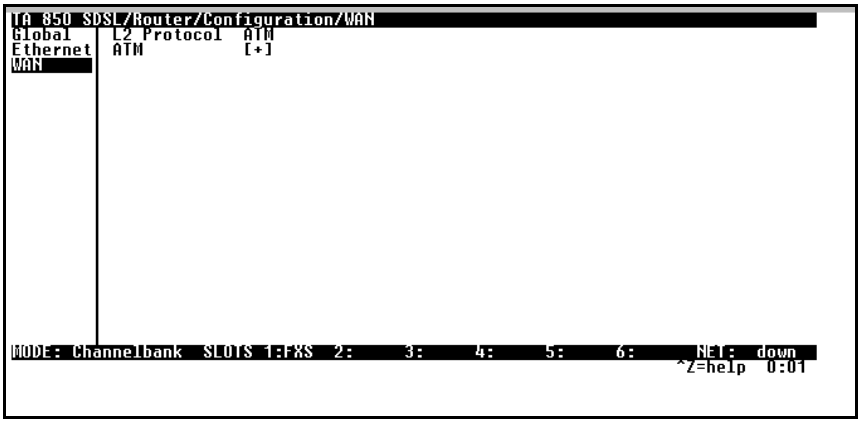

Figure 11. WAN Menu

L2 Protocol

Displays the current L2 protocol -ATM (Read Only).

ATM

Use the ATM menu to setup Data PVCs for the router.

Description

This is the text description for the PVC.

VPI

ATM virtual port identifier.

VCI

This is the ATM virtual channel identifier.

Protocol

This is the protocol supported on the PVC.

RFC1483 IP

Use this selection to support IP on this DLCI.

Active

This selection enables IP on this PVC.

Far - End IP Address

This is the address of the NEXT hop router on this interface.

IP netmask

This is the network mask used for this interface.

Local IP Address

This is the IP address for this PVC.

NAT

Use this menu to set up and use Network Address Translation on this interface.

NETWORK ADDRESS PORT TRANSLATION — By enabling port translation, IP packets are modified as they pass through this interface. During transmission, private addresses are translated into a single public (NAPT) IP address. Incoming packets are translated from the public to private address based on the protocol port numbers. Once enabled, you must set up NAT for use.

PUBLIC IP ADDRESS MODE — The port translation requires at least a single real IP address for translating. This value can use the IP assigned to the interface (or assigned via layer 2 protocol like PPP), obtained using DHCP client, or statically specified on this menu. If the address cannot be learned, then it must be specified in order for the translation to work.

TRANSLATION TABLE — Add translation entries to "fine tune" special protocols or specify private addresses.

- **PUBLIC ADDRESS MODE** — The public IP address used for this translation entry can be the NAPT IP address assigned to the link or can be specified. You specify an address to direct packets with certain protocols to different servers.
- **PROTOCOL** — The upper layer protocol that is to be monitored for translation. For TCP and UDP, a port number must also be specified.
- **PUBLIC PORT MODE** — The public destination port associated with this entry can be specified to add more control over certain types of traffic. The default, **ANY PORT**, covers all port types.
- **PRIVATE ADDRESS MODE** — The private IP address can be specified to steer certain protocols and ports to specific servers in the private network. Likewise, internal hosts can be steered to certain servers on the public network. A new request from the public network matching this entry's public parameters will be dropped if this mode is set to **ANY INTERNAL**.
- **PRIVATE PORT MODE** — The private destination port associated with this entry can be specified to add more control over certain types of traffic. Leave as **ANY PORT** to cover all port types.
- **TRANSLATE BODY** — By default, the application payload in the packet is scanned for occurrences of the private/public IP address in binary or ASCII form. Set this to **NO** for applications where this will cause problems.

NAT VIEW — Shows the protocols that are actively being translated.

NAPT ADDRESS	Represents the public address that is being used as the NAPT address.
ENTRY COUNT	The number of entries in the NAT table.
ENTRY OVERFLOW COUNT	A count of the dropped entries due to low memory.

RIP

Use this menu to enable RIP on the WAN interface. (See *RIP* on page 42 for description of options.)

RFC 1483 Bridge

This is used to enable bridge mode on this PVC.

Configuring the Router – Status

Use the **ROUTER/STATUS** menu to view and set the parameters shown in Figure 12. The **ROUTER/STATUS** screens give the user useful information for debugging the current routes in the 850.

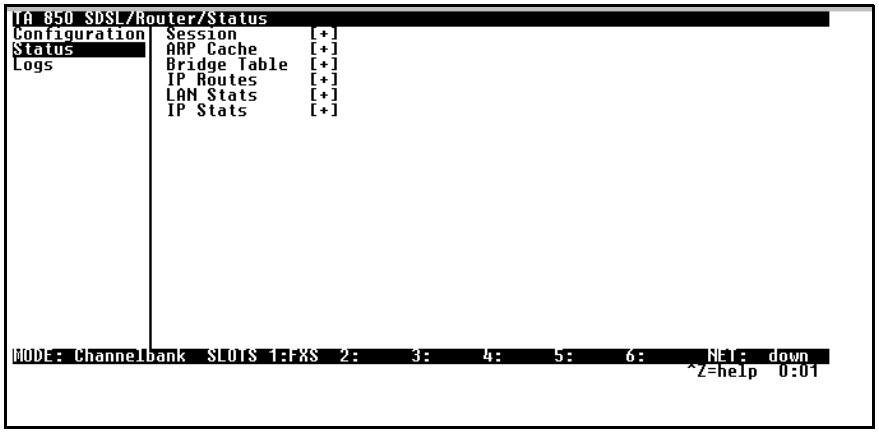

Figure 12. Router/Status Menu

>Session

This menu maintains statistics about the active ATM PVCs.

>ARP cache

This is a listing of the currently connected Ethernet port on the LAN.

>Bridge Table

This shows the detected MAC addresses and the interface to which they are associated.

>IP Routes

This shows the current routes in the 850 and their use.

>LAN Stats

This shows traffic over the LAN interface.

>IP Stats

This shows IP traffic through the 850.

Configuring the Router – Logs

The Logs menu (Figure 13) contains logs displaying important information about the running condition of the TA 850. The logs can be set to capture diagnostics of error conditions only by way of a log level. The levels are divided up as follows:

level 0 - Fatal event (causes reset)
level 1 - Critical event
level 2 - Error event
level 3 - Warning event
level 4 - Notify event
level 5 - Informational event
level 6 - Debugging event

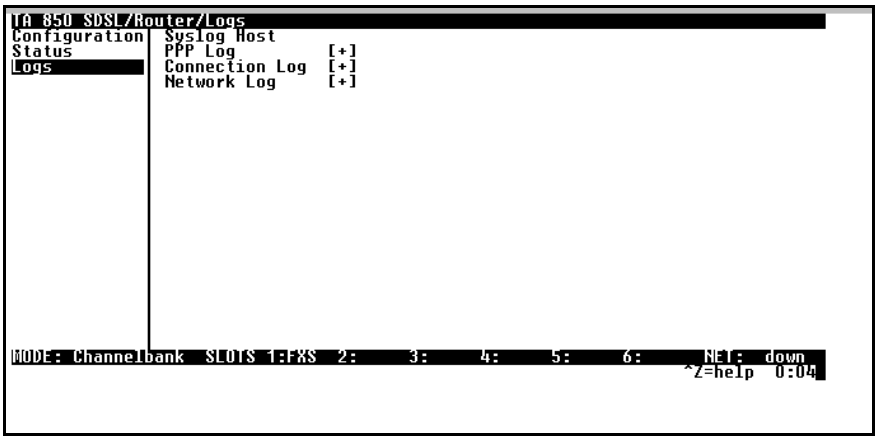

Figure 13. Router/Logs Menu

Sys log Host

Set this to the IP address or domain name (if DNS configured) of the sys log host device. All log events are sent to this device.

PPP Log

Information pertaining to the PPP negotiation and authentication is logged in the PPP log.

Connection Log

Information pertaining to the call placement and answering is logged in the Connection log.

Network Log

Information pertaining to routing protocols is placed in this log.

Each log (PPP log, Connection log, and Network log) contains the following elements.

Active
When set to **YES** (def), PPP events below or equal the log level are logged into the log.

Wrap
When set to **YES** (def), new PPP events will overwrite old PPP events when the log is full. All logging will stop when the log is full and set to **NO**.

Level
In order to log events, they must be at or below this level. Range is 0 to 6. The default is 3.

View
This menu displays the log list. The fields are as follows:

DATE/TIME	Date and time event occurred.
LEVEL	Level associated with this event (0-6).
MESSAGE	Text message for this event. If message is too long to fit on the line, another event appears below it continuing the message.

Clear
This clears the log when activated.

Configuring Voice Support – Config

Use the **VOICE/CONFIG** menu to view and set the parameters shown in Figure 14.

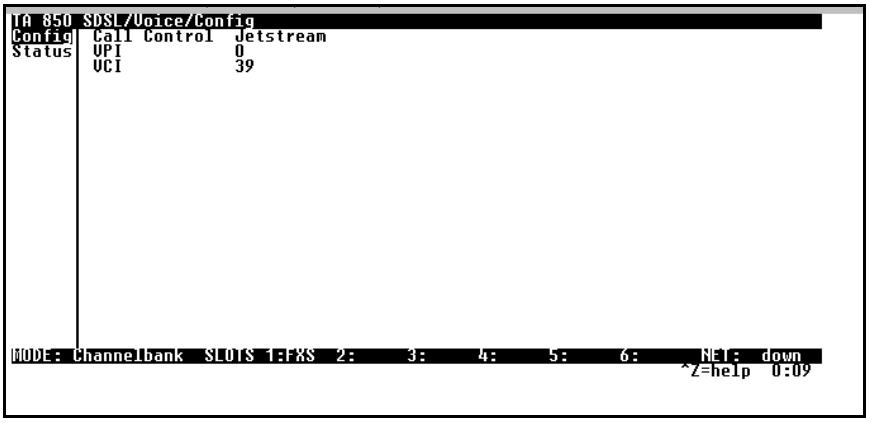

Figure 14. Voice/Config Menu

>Call Control

The **CALL CONTROL** setting is used to configure the correct Voice Gateway protocol for voice signaling control between the TA 850 and the configured Gateway. The **CALL CONTROL** setting must be configured correctly before the voice circuits will work correctly. The TA 850 supports Jetstream, Tollbridge, and CopperCom Voice Gateways.

>VPI

The **VPI** setting is used to configure the TA 850 virtual path setting used to communicate with the configured Voice Gateway.

>VCI

The **VCI** setting is used to configure the TA 850 virtual circuit setting used to communicate with the configured Voice Gateway.

Configuring Voice Support – Status

Use the **VOICE/STATUS** menu to view and set the parameters shown in Figure 15.

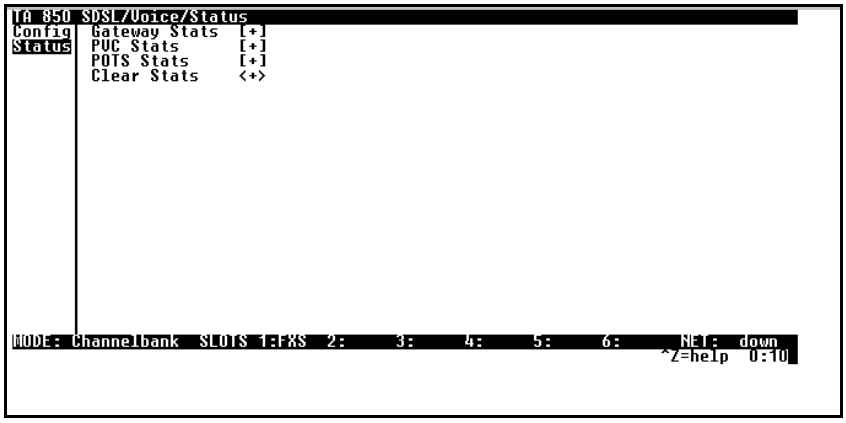

Figure 15. Voice/Status Menu

>Gateway Stats

The **GATEWAY STATS** menu shows the current state of the communication link between the TA 850 and the Voice Gateway. The Gateway Link is indicated as **UP** or **DOWN**. A count of management messages is indicated along with the number of active calls in progress.

>PVC Stats

The **PVC STATS** menu shows the current state of the virtual circuit used between the Voice Gateway and the TA 850 IAD for voice signaling and voice payload delivery.

>POTS Stats

The **POTS STATS** menu shows real-time indication status of each voice port on the TA 850. From this menu, on a per port basis, the user can determine which ports are active/inactive. Several statistics at this menu are used only for internal ADTRAN development. Task, Inserts, and Drops indicators are for internal use only.

>Clear Stats

The **CLEAR STATS** menu can be used to clear the counters used for Voice Status menus.

Managing the Modules – Modules

Use the **MODULES** menu to view and set the parameters shown in Figure 16.

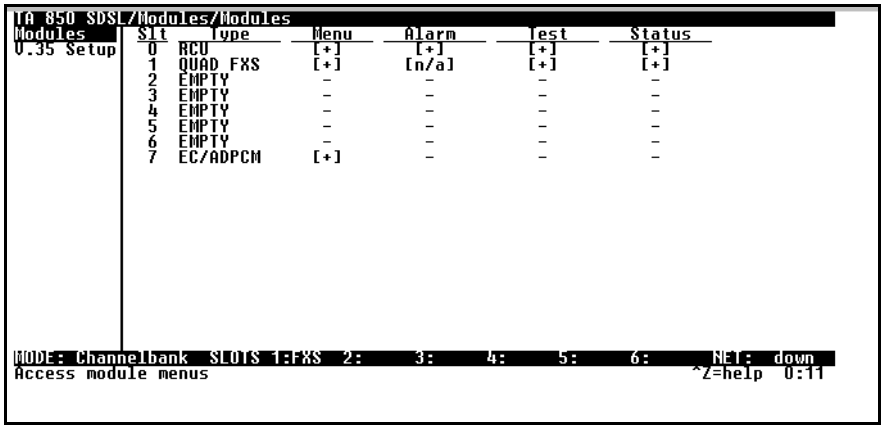

Figure 16. Modules Menu

>Modules Table

The **MODULES** table indicates the type and slot number of each module installed in the TA 850 and is used to manage these modules.

The table contains **MENU**, **ALARM**, **TEST**, and **STATUS** indicators/menus customized for each module.

Managing the Modules – V.35 Setup

Use the **V.35 SETUP** menu to view and set the parameters shown in Figure 17.

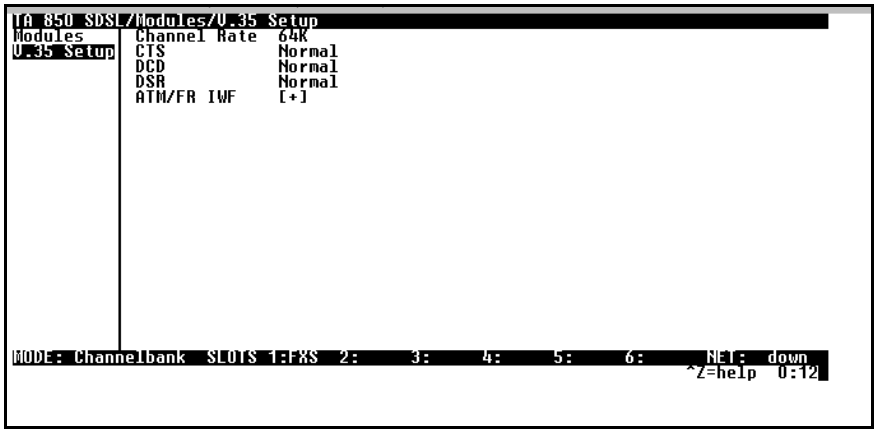

Figure 17. V.35 Setup Menu

CHANNEL RATE and **EIA** settings are supported via this menu option. For all typical applications, these settings are left in their default states.

>ATM/FR IWF

This menu contains the setup and status for the ATM/Frame Relay interworking functions.

Mode

The **MODE** setting configures the V.35 port for FRF5 or FRF8 operation, depending upon the application being supported.

FRF5

This is also known as Network Interworking. Use this mode for Frame Relay over ATM.

FRF8

This is also known as Service Interworking. In this mode, the TA 850 performs a translation between Frame Relay and ATM protocols.

Configuration

The **CONFIGURATION** menu is used to support the configuration of Frame-to-ATM interworking, signaling formats, timeout values, and PVC settings.

The following settings are used for FRF5.

LAN FR MAINT PROTOCOL — Frame Relay maintenance or signaling protocol between local V.35 port and the attached DTE port, support ANSI Annex A, CCITT Q933 Annex D, CISCO LMI or Static (no signaling).

LAN FR POLL TIMEOUT T392 (5-30) — T392 for signaling protocol, typical value 15. No meaning if Maint Protocol is Static.

FRN PORT CONFIG — Logical Frame Relay ports over ATM. Up to 4 ports are supported with each port supporting up to 4 DLCI mappings. Go to **NUM** field. Typing "i" or "I" will insert another entry, and typing "d" or "D" will delete one entry.

- **NAME** — To identify your port.
- **ATM VPI** — Specifies the virtual path over which this logical port is running.
- **ATM VCI** — Specifies the virtual circuit over which this logical port is running.
- **DE MAP** — Frame Relay to ATM demapping; default value (Frn Only, ATM 0) suggested.
- **CLPI MAP** — ATM to Frame Relay CLPI map; default value (Frn Only) suggested.
- **D/C** — Set D/C field in the header to 0 or 1.
- **HEADER** — Header format; only 2 bytes supported now.
- **MAINT PROTOCOL** — Maintenance or signaling protocol over this logical Frame Relay port. Support Annex A, Annex D, CISCO LMI or Static.
- **MUX MODE** — Many DLCIs or one DLCI mapping over this port.
- **DLCI MAP** — Actual DLCI mappings.
  - **ACTIVE** — Always active, not configurable.
  - **LAN DLCI** — The DLCI configured over local V.35 Frame Relay port.
  - **NET DLCI** — The DLCI configured over the WAN side logical Frame Relay port.

The following settings are used for FRF8.

LAN FR MAINT PROTOCOL	Frame Relay maintenance or signaling protocol between local V.35 port and the attached DTE port, support ANSI Annex A, CCITT Q933 Annex D, CISCO LMI or Static (no signaling).
LAN FR POLL TIMEOUT T392 (5-30)	T392 for signaling protocol, typical value 15. No meaning if Maint Protocol is Static.
FR/ATM PVC MAPPING	Up to 4 mappings are supported.
FR DLCI	Frame Relay DLCI on V.35 port.
ATM VPI	Specifies the virtual path to which DLCI is mapped.
ATM VCI	Specifies the virtual circuit to which DLCI is mapped.
TRANSLATE	Translate or transparent mode between Frame Relay frames and ATM cells.
DE MAP	Map Frame Relay DE bit to ATM CLPI bit, Always 0, Always 1 or Convert each other.
FECN MAP	Map Frame Relay FECN bit toATM EFCI bit, Always 0, Always 1 or Convert each other.

Appendix A. Updating TA 850 Firmware using XMODEM

The TA 850 supports firmware updating using XMODEM transfer protocol via the base unit's **CRAFT** port. XMODEM is found in the VT 100 terminal emulation application in the ADTRAN Utilities package and in most PC VT 100 communications software packages.

NOTE

Make certain that the communications software package being used has flow control turned off.

Before beginning this procedure, you must obtain the appropriate update file from ADTRAN Technical Support at **(888) 4ADTRAN (423-8726)**.

An XMODEM download can be initiated by enabling the appropriate dip switch or by using the console menus. The following materials are required.

- VT 100 terminal or PC with VT 100 terminal emulation software
- XMODEM software

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

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.

Updating Firmware via the Dip Switch

Perform the Steps Below in the Order Listed

1. Using a VT 100 terminal emulation communication software package which contains XMODEM protocol support, log in to TA 850. Set the transmit rate of the emulation software to 9600 baud.

2. Remove the RCU module from the chassis and flip the SW1 dip switch to down or open (to the right of the unit if you are facing it).

The dip switch is red and is located at the top edge of the card.

Only the first two dipswitches on the RCU are used. With the first dip switch down (to the right of the unit if you are facing it), the unit boots up in a mode to update the firmware. With the second dip switch down, the unit factory defaults at startup.

3. Press Enter until a menu appears.

To shorten transmit time, select the option from the menu to change the transmit rate to 115.2 baud or the highest rate supported by the terminal emulation software. If this transmit rate is changed, change emulation software properties to match this rate and disconnect and connect again. Press **Enter** *again until the menu appears.*

4. Choose option 1, BEGIN XMODEM DOWNLOAD NOW, from the menu to start the XMODEM file download.

5. Press Y at the START FLASH DOWNLOAD NOW prompt to continue with the XMODEM file transfer.

When TA 850 is ready to receive the XMODEM upload, the menu screen will display **Transmit Flash . . . download file now***. If this does not appear, please review the steps above for possible configuration errors.*

6. From the terminal emulation software, begin the XMODEM upload by using the appropriate command sequence. (If necessary, refer to terminal emulation software documentation for help. Also, when specifying the filename, ensure that the file transferred is the one provided by ADTRAN. Otherwise, the update will not complete successfully.)

Because XMODEM data is being transferred in-band through the menu interface, the VT 100 menus of TA 850 will be inoperable from the **CRAFT** *port.*

7. **When the update has successfully completed, TRANSFER COMPLETE appears in the terminal window. If an error occurs during the update, an error message will display in the terminal window. If this occurs, return to Step 3 and attempt the update again. If the same error occurs, contact ADTRAN Technical Support.**

8. **After the TRANSFER COMPLETE message has been displayed, pull the RCU card again and return dip switch SW1 to the closed or off position. Reinsert the RCU module.**

9. **Change the emulation software properties to 9600 baud. Disconnect and connect to the unit at this transmit rate and continue configuring the unit as normal.**

NOTE *It is suggested that a factory default be conducted after the unit is updated with new firmware.*

Updating Firmware via the Console Menus

1. **Using a VT 100 terminal emulation communication software package which contains XMODEM protocol support, log in to TA 850.**

2. **Select SYSTEM UTILITY/UPDATE FIRMWARE.**

3. **Select XMODEM for TRANSFER METHOD.**

4. **Press Enter on START TRANSFER <+>.**

5. **When prompted, press Y to erase flash.**

NOTE *When TA 850 is ready to receive the XMODEM upload, the menu screen will clear and display* **Transmit Flash . . . download file now**. *If this does not appear, please review the steps above for possible configuration errors.*

6. **From the terminal emulation software, begin the XMODEM upload by using the appropriate command sequence. (If necessary, refer to terminal emulation software documentation for help. Also, when specifying the filename, ensure that the file transferred is the one provided by ADTRAN. Otherwise, the update will not complete successfully.)**

NOTE *Because XMODEM data is being transferred in-band through the menu interface, the VT 100 menus of TA 850 will be inoperable from the* **CRAFT** *port.*

7. When the update has successfully completed, TRANSFER COMPLETE displays in TRANSFER STATUS. The module restarts immediately and resumes operation. If an error occurs during the update, an error message will display in the TRANSFER STATUS field. If this occurs, return to Step 3 and attempt the update again. If the same error occurs, contact ADTRAN Technical Support.

Appendix B. Updating TA 850 Firmware using TFTP

TA 850 supports firmware updates via the IP network using TFTP from a network server. The network server must be capable of supporting TFTP server requests from the TFTP client within the TA 850.

You must have a level 2 password to perform updates to the TA 850. Please consult the TA 850 administrator if this password is not known.

You must obtain the appropriate update file from ADTRAN Technical Support at **(888) 4ADTRAN (423-8726)**.

You must copy the update file provided by ADTRAN to a network server that supports TFTP server requests. Record both the IP address of the server and the full path location of the update file to be downloaded.

The following materials are required.

- A PC with a Telnet client software
- A TFTP Server accessible on the local network (a TFTP Server is provided as part of the ADTRAN Utilities software)

WARNING *To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.*

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.

Perform Steps Below in the Order Listed

1. **Using a Telnet program, log in to TA 850.**
2. **Select SYSTEM UTILITY / UPDATE FIRMWARE.**
3. **Select TFTP for TRANSFER METHOD.**
4. **Enter into TFTP SERVER IP ADDRESS, the IP address of the network server that was recorded earlier.**
5. **Enter into TFTP SERVER FILENAME, the full path name and filename of the update file that was recorded earlier.**
6. **Select START TRANSFER <+> to start the update process. Enter Y to confirm the transfer and to set up the module to receive the TFTP upload.**

During the TFTP upload process, various status messages display in **CURRENT UPDATE STATUS** *to indicate progress. The table below describes these messages.*

When the update has successfully completed, **TRANSFER COMPLETE** displays in **TRANSFER STATUS**. The TA 850 restarts immediately and resumes operation.

If an error occurs during the update, an error message will display in the **TRANSFER STATUS** field. If this occurs, return to Step 3 and attempt the update again. If the same error occurs, contact ADTRAN Technical Support.

During the TFTP upload, various status messages display to indicate progress. The following table describes these messages.

Message	Meaning
Contacting Server	Indicates communication with the TFTP network server is trying to be established with the specified server address in the TFTP Server IP Address field.
Beginning TFTP Transfer	Indicates communication with the TFTP network server has been established and the update file is being transferred between TA 850 and the TFTP network server.
Completed	Indicates the TA 850 product successfully received the update file.

Message	Meaning
Error: File Not Found	Indicates the TFTP network server was unable to locate the specified file name or path in the TFTP Server File-name field.
Error: Access Violation	Indicates the TFTP network server denied TA 850 access to the given update file name and path. Please verify appropriate user rights are selected for the specified path.
Error: Illegal Operation	An unknown operation was detected by TA 850 when transferring the update file from the TFTP network server.
Error: User Aborted	Indicates the user selected **CANCEL UPDATE** to abort reception of the update file from the TFTP network server.

Appendix C. Navigating the Terminal Menus

Terminal Menu Window

The TA 850 uses a multilevel menu structure that contains both menu items and data fields. All menu items and data fields display in the terminal menu window, through which you have complete control of the TA 850 (see Figure 18).

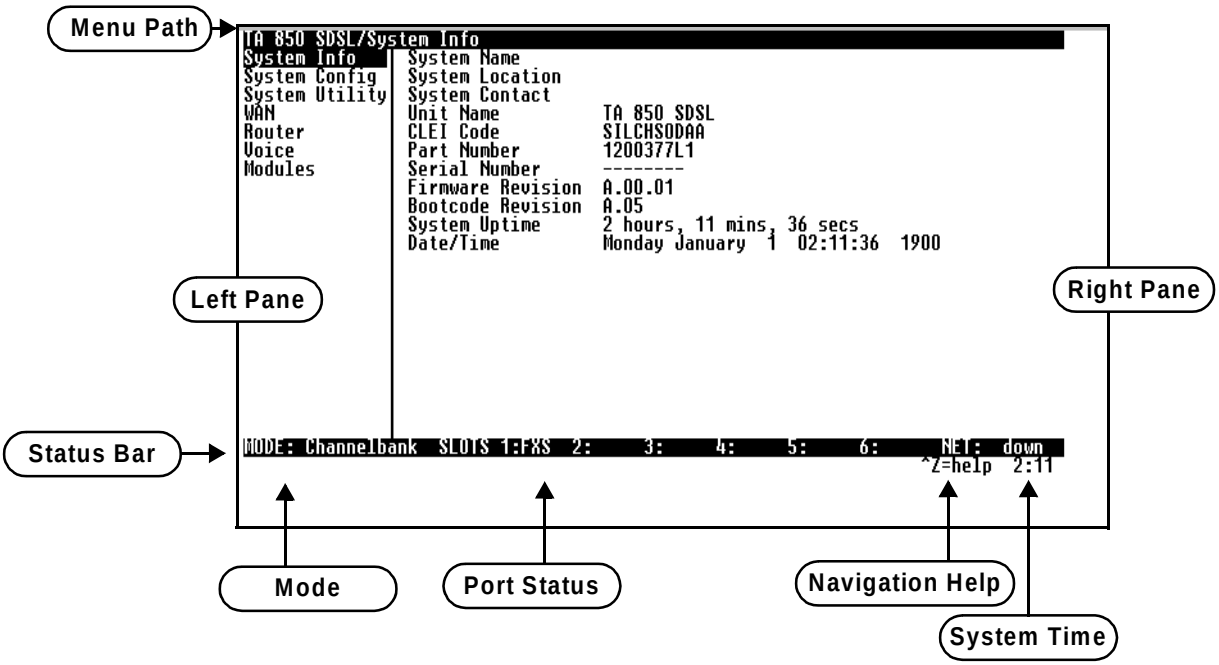

Figure 18. Top-level Terminal Menu Window

Menu Path

The first line of the terminal menu window (the menu path) shows the session's current position (path) in the menu structure. For example, Figure 18 shows the top-level menu with the cursor on the **SYSTEM INFO** submenu; therefore, the menu path reads **TA 850/SYSTEM INFO.**

> **NOTE** **CTRL-W** *must be invoked to save configuration changes to non-volatile memory.*

Window Panes

When you first start a terminal menu session, the terminal menu window is divided into left and right panes. The left pane shows the list of available submenus, while the right pane shows the contents of the currently selected submenu.

Window Pane Navigation

Use the following chart to assist you in moving between and within the two window panes.

To move...	Press one of these keys...
From left pane to right pane	**Tab** **Enter** **Right arrow**
From right pane to left pane	**Tab** **Escape** **Left arrow**
Within each pane	**Up arrow** **Down arrow** **Left arrow** **Right arrow**

Right Window Pane Notation

The right window pane shows the contents of the currently selected menu. These contents can include both submenu items and data fields. Some submenus contain additional submenus and some data fields contain additional data fields. The following chart explains the notation used to identify these additional items.

This notation...	Means that...
[+]	More items are available when selected.
[DATA]	More items are available when selected.
<+>	An action is to be taken, such as activating a test.
Highlighted menu item	You can enter data in this field.
Underlined field	The field contains read-only information.

Additional Terminal Menu Window Features

Mode	Describes the mode of the TA 850 base unit (system).
Port Status	Indicates the types of modules installed in ports 1—6.
Navigation Help	Lists characters used for navigating the terminal menu (**Ctrl-Z**). See also *Moving through the Menus* below.
System Time	Displays current time. See *Date/Time* on page 17 for details on editing the time.

Navigating Using the Keyboard Keys

You can use various keystrokes to move through the terminal menus, to manage a terminal menu session, and to configure the system. Press **Ctrl-Z** to activate a pop-up screen listing the navigation keystrokes.

Moving through the Menus

To do this...	Press this key...
Return to the home screen.	**H**
Jump between two menu items. Press **J** while the cursor is located on a menu item, and you jump back to the main screen. Go to another menu item, press **J**, and you jump back to the screen that was displayed the first time you pressed **J.** Press **J** when you want to jump between these items.	**J**
Select items.	**Arrows**
Edit a selected menu item.	**Enter**
Cancel an edit.	**Escape**
Close pop-up help screens.	**Escape**
Move between the left and right panes.	**Tab or Arrows**
Move to the top of a screen.	**A**
Move to the bottom of a screen.	**Z**
Ascend one menu level.	**Backspace**

Session Management Keystrokes

To do this...	Press this...
Log out of a session.	**Ctrl-L**
Invalidate the password entry and return to the login screen.	**Ctrl-S**
Refresh the screen. To save time, only the portion of the screen that has changed is refreshed. This option should be necessary only if the display picks up incorrect characters.	**Ctrl-R**

Configuration Keystrokes

To do this...	Press this key...
Restore factory default settings. This setting restores the factory defaults based on the location of the cursor. If the cursor is on a module line (in the **MODULES** menu), then only the selected module is updated to factory defaults.	**F**
Copy selected items to the clipboard. The amount of information you can copy depends on the cursor location when you press **C**: • If the cursor is over an editable field, only that item is copied. • If the cursor is over the index number of a list, then all of the items in the row of the list are copied. For example, if the cursor is over the **SLOT #** field in the **MODULES** screen, all of the information associated with the slot is copied.	**C**
Paste the item stored in the clipboard, if the information is compatible. You must confirm all pastes—except those to a single editable field.	**P**
Increment the value of certain types of fields by one when you paste information into those fields.	**>**
Decrement the value of certain types of fields by one when you paste information into those fields.	**<**
Insert a new list item. For example, add a new item to the **DLCI MAPPING** by pressing **I** while the cursor is over an index number.	**I**
Delete a list item. For example, delete an item from the **DLCI MAPPING** by pressing **D** while the cursor is over the index number.	**D**

Getting Help

The bottom line of the terminal menu window contains context-sensitive help information. When the cursor is positioned over a set of configuration items, a help message displays (when available) providing a description of the item. When more detailed help is available for a particular item, **^A** displays at the bottom of the window. At this point, if you press **Ctrl-A,** a pop-up help screen displays with information about the item.

Press **Ctrl-Z** to activate the help screen that displays the available keystrokes you can use to navigate the terminal menus.

Appendix D. Voice Gateway Quick Start Procedure (Voice Turn up)

A typical VoDSL application (see Figure 19) uses a TA 850 connected to an ATM network. For voice applications, a Voice Gateway is needed to interface with the PSTN. Jetstream, Tollbridge, and CopperCom are popular Gateway types.

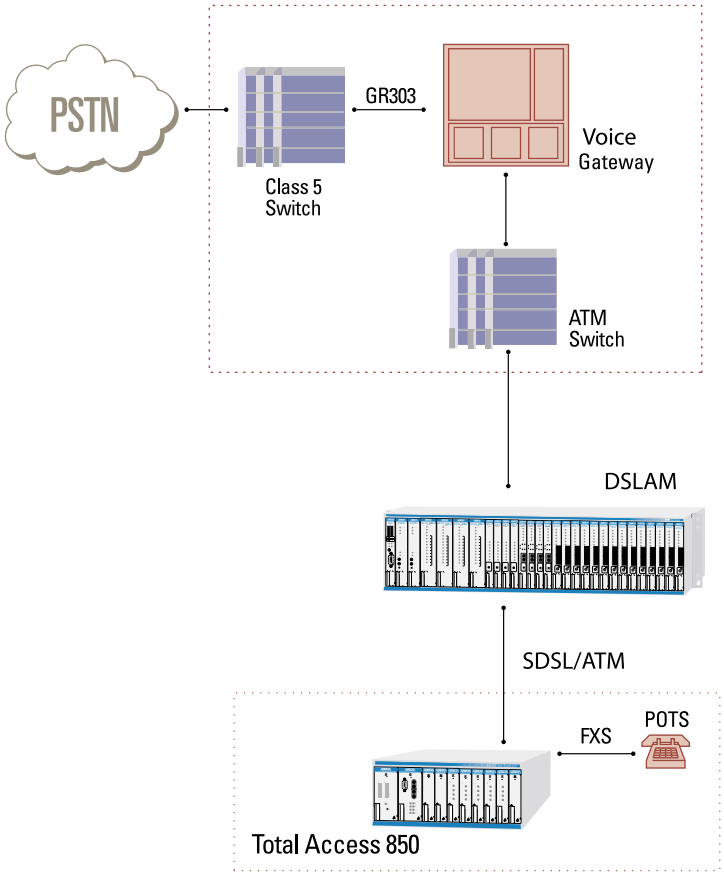

Figure 19. Application Diagram

To configure a TA 850 for use with the Voice Gateway, you need to know the VPI and VCI to be used on the ATM network. You also need to know the format for Idle Cells and whether Data Scrambling is used on this ATM network. The following procedure will help you navigate the TA 850 menus for configuring the necessary elements for VoDSL with a Voice Gateway.

Voice Turn Up	
Step	**Action**
1	From the TA 850 main menu, select the **WAN** menu. (Here you set up the ATM network.)
2	Select the **ATM CONFIG** menu.
3	Enter the **IDLE CELLS** format for your network.
4	Set **DATA SCRAMBLING** appropriately for your network.
5	Back all the way out to the top level TA 850 menu, and then select the **VOICE** menu. (From this menu, the appropriate Voice information for working with the Voice Gateway is entered.)
6	Select **CONFIG**, and from the **CONFIG** menu, enter the Gateway type under **CALL CONTROL** and enter the VPI and VCI values for communicating with that Gateway. For this application, **CALL CONTROL** should be set to the Gateway type and the VPI and VCI values should be set appropriately for your network.
7	To verify correct setup, use the **STATUS** menu (under the **VOICE** menu) to look at the current status of the voice connection. Under **STATUS**, you can view the **GATEWAY STATS** and information about the voice PVC along with information about the POTs ports available on the Gateway. The **GATEWAY STATS** menu should show the Gateway Link is up (if everything is configured correctly).

Appendix E. RFC1483 Quick Start (IP Routing)

The TA 850 allows for complete integration of voice and data delivery from one compact platform (see Figure 20). Once you have completed the voice turn up procedure from the previous example, adding data to the circuit requires some additional setup.

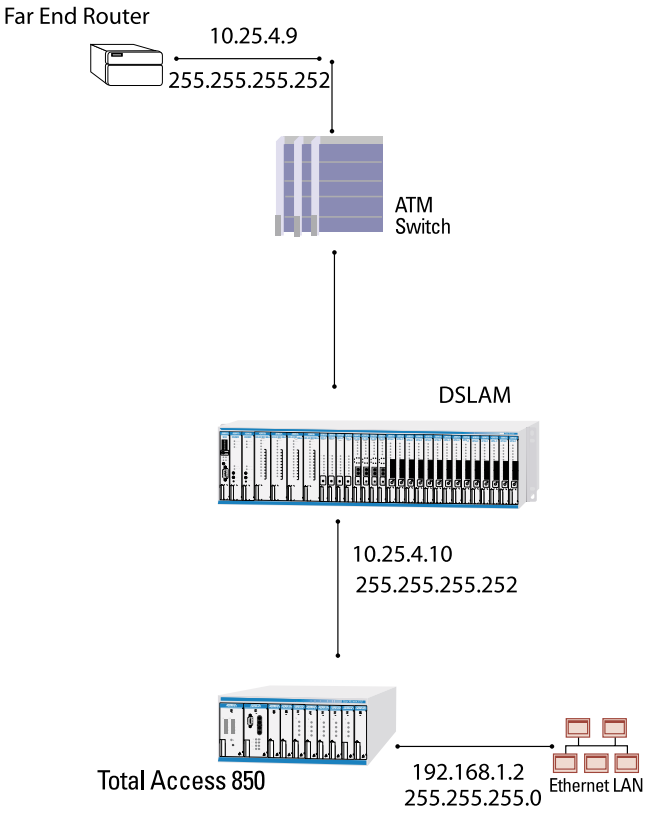

Figure 20. Application Diagram

To configure a TA 850 for IP routing, you need to know the VPI and VCI values for the data circuit on your network. You also need the IP address of the next hop router in the circuit.

The table on the next page shows how to configure the TA 850 for IP Routing.

.

IP Routing	
Step	**Action**
1	From the TA 850 main menu, select the **WAN** menu. (Here you set up the ATM network.)
2	Select the **ATM CONFIG** menu.
3	Enter the **IDLE CELLS** format for your network.
4	Set **DATA SCRAMBLING** appropriately for your network.
5	Back all the way out to the top level TA 850 menu, and then select the **ROUTER** menu.
6	Select **CONFIGURATION**. From the **CONFIGURATION** menu, you will set up addresses for your LAN and WAN. For basic IP routing, use all the default values from the **GLOBAL** menu.
7	From the **ETHERNET** menu, enter the **IP** menu to enter your LAN configuration.
8	Enter your LAN **IP ADDRESS**, **SUBNET MASK**, and **DEFAULT GATEWAY** information. For this example, the **IP ADDRESS** is 192.168.1.2, the **SUBNET MASK** is 255.255.255.0, and the **DEFAULT GATEWAY** is 10.25.4.10.
9	Arrow back to the main **ROUTER CONFIGURATION** menu, and select the **WAN** menu and then the **ATM** menu. (Here you will enter your data PVC information.)
10	Create a new PVC by entering the menu. Enter your VPI and VCI values.
11	From the **RFC1483 IP** menu, enter your WAN information. For this example, the **FAR END IP ADDRESS** is 10.25.4.9, the **IP NETMASK** is 255.255.255.252, and the **LOCAL IP ADDRESS** is 10.25.4.10.
12	Arrow back to the top level TA 850 menu to activate your changes.

Appendix F. RFC1483 Quick Start (IP Routing with NAT)

To illustrate the use of NAT, consider the example from Appendix C. To set up a single public address that will be used to access the public network, you will use the **NAT** menu on the **WAN/ATM/RFC1483 IP** menu.

IP Routing with NAT	
Step	**Action**
1	From the **NAT** menu, set **NETWORK ADDRESS PORT TRANSLATION** to **ENABLED**. (This will enable translation and allow you to enter the NAT options.)
2	Set **PUBLIC IP ADDRESS MODE** to **SPECIFIED** so you can enter your public address. During transmission, private addresses are translated into this public (NAPT) address.
	You will also need to set up the Translation Table to do translation on the body of the packets for certain protocols, such as FTP, to work correctly.
3	From the **TRANSLATION TABLE** menu, create a new entry by arrowing into the table.
4	For **PUBLIC ADDRESS MODE**, select **NAPT ADDRESS** to use the previously specified public address.
5	For **PROTOCOL**, select **TCP**.
6	Make sure that **TRANSLATE BODY** is set to **YES**.

Appendix G. RFC1483 Quick Start (Bridging)

The TA 850 allows for complete integration of voice and data delivery from one compact platform. Once you have completed the voice turn up procedure from the previous example, adding data to the circuit requires some additional setup.

To configure a TA 850 for Bridging, you need to know the VPI and VCI values for the data circuit on your network.

Bridging	
Step	**Action**
1	From the TA 850 main menu, select the **WAN** menu. (Here you set up the ATM network.)
2	Select the **ATM CONFIG** menu.
3	Enter the **IDLE CELLS** format for your network.
4	Set **DATA SCRAMBLING** appropriately for your network.
5	Back all the way out to the top level TA 850 menu, and then select the **ROUTER** menu.
6	Enter the **CONFIGURATION** menu. From this menu, you will set up addresses for your LAN and WAN. For basic IP routing, use all the default values from the **GLOBAL** menu.
7	From the **ETHERNET** menu, enter the **IP** menu to enter your LAN configuration.
8	Enter your LAN **IP ADDRESS** and **SUBNET MASK**. For this example, the **IP ADDRESS** is 192.168.1.2 and the **SUBNET MASK** is 255.255.255.0.
9	Arrow back to the main **ROUTER CONFIGURATION** menu, and select the **WAN** menu and then the **ATM** menu. (Here you will enter your data PVC information.)
10	Create a new PVC by entering the menu. Enter your VPI and VCI values.
11	Disable IP on the **RFC1483 IP** menu and enable Bridging on the **RFC1483 BRIDGE** menu. (This enables the TA 850 as a bridge.)
12	Arrow back to the top level TA 850 menu to activate your changes. All packets that come in on the Ethernet will be forwarded on the WAN.

Appendix H. Routing in HDIA Mode

The TA 850 allows for complete integration of voice and data delivery from one compact platform. The CopperMountain DSLAM uses Frame Relay instead of ATM as their Layer 2 protocol. Once you have completed the Layer 1 configuration from the previous examples, you must configure the Layer 2 protocol. Refer to Figure 21 on page 76 as you complete the steps below.

Frame Relay Setup	
Step	**Action**
1	From the **IAD/WAN/FRAME RELAY CONFIG** menu, select **MAINTENANCE PROTOCOL.** Set **MAINTENANCE PROTOCOL** to **STATIC.**
2	From the **IAD/WAN/FRAME RELAY CONFIG** menu, select **DLCI MAPPING**.
3	On the **DLCI MAPPING** menu, **DLCI 528** should be selected. Right arrow to the **IP MAP** menu.
4	On the **IP MAP** menu, set up the following: Set **ACTIVE** to **YES W/BRIDGE ENCAPSULATION.** Set **IARP** to **YES.** Set **FAR-END IP ADDRESS** to the next hop router on the ATM interface connected to the Copper Mountain for this DSL line (10.100.2.145 in Figure 21). Set **IP NETMASK** appropriately for this interface. Set **LOCAL IP ADDRESS** to the Copper Mountain IP address for this line (10.100.2.148 in Figure 21).
5	On the **NAT** menu, set up the following: Set **NETWORK ADDRESS PORTTRANSLATION** to **ENABLED.** Set **PUBLIC IP ADDRESS MODE** to **SPECIFIED.** Set **PUBLIC IP ADDRESS** the same as **LOCAL IP ADDRESS** above. From the **TRANSLATION TABLE**, set up the following (create entries so that the appropriate protocols are translated): Right arrow to create an entry. Keep the defaults to enable TCP translation. Press **I** over the 1 in the first entry to create entry 2. Change the Protocol to ICMP for this entry. Continue creating entries as appropriate for each application.
6	Arrow back (left arrow) to the **IAD/WAN/FRAME RELAY CONFIG/DLCI MAPPING** menu.
7	From the **BRIDGE MAP** menu**,** set **ACTIVE** to **NO.**
8	Arrow back to the **IAD/ROUTER** menu. Select **CONFIGURATION**.

Frame Relay Setup	
9	On the **GLOBAL** menu, set up the following: Select **IP.** Set **MODE** to **ON.** Select **DHCP SERVER.** Set **DHCP MODE** to **ON.** From **DOMAIN NAMES**, set up the following: Set **PRIMARY DNS** appropriately (172.22.48.47 in Figure 21). Set **SECONDARY DNS** appropriately (172.22.48.1 in Figure 21). Select **BRIDGE.** Set **MODE** to **OFF.**
10	Arrow back to the **ETHERNET** menu, and set up the following: Select **IP.** Set **IP ADDRESS** appropriately for your LAN (10.0.0.1 in Figure 21). Set **SUBNET MASK** appropriately**.** Set **DEFAULT GATEWAY** to the ATM router connected to the Copper Mountain (10.100.2.145 in Figure 21).

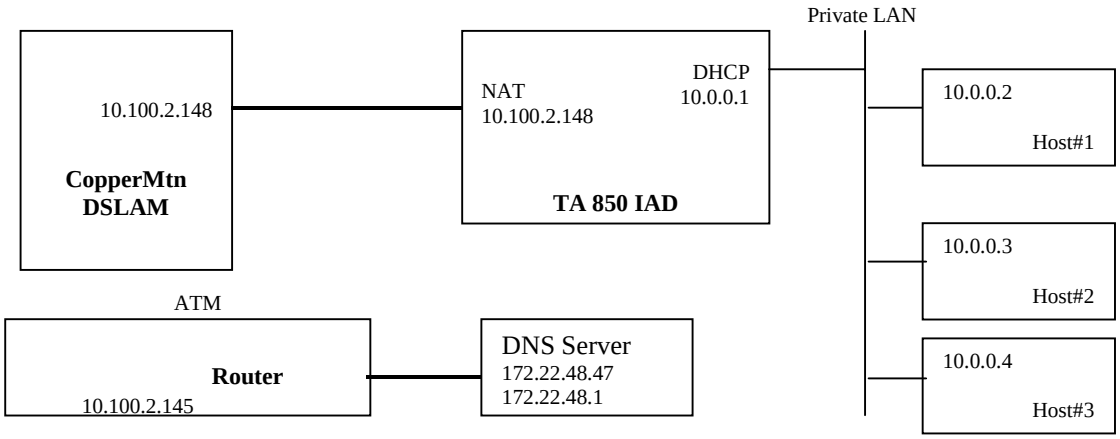

Figure 21. Routing with Copper Mountain