Section 61180008L1-5B
Issue 2, September 2002
CLEI Code L1: VAC1E40J_ _
CLEI Code L2: VAC1E4NJ_ _
CLEI Code L3: VAC1T4NJ_ _

Total Access® 1500 SCU
Installation and Maintenance

CONTENTS

FIGURES

TABLES

1. GENERAL

This practice provides installation and operation procedures for an ADTRAN Total Access 1500 System Controller Unit (SCU), common modules List 1, List 2, and List 3. **Figure 1** shows the Total Access 1500 SCU, List 1, List 2, and List 3.

The SCU comes in the following three configurations:

- List 1 – No Mechanized Loop Test (MLT) capability.
- List 2 – Central Office Terminal MLT
- List 3 – Remote Terminal MLT

Revision History

This is the second release of this document. This version includes updates describing TL1 over X.25 and TCP/IP.

Features

The Total Access 1500 SCU, P/Ns 1180008L1, 1180008L2, and 1180008L3, includes the following features:

- Control all common equipment and access modules

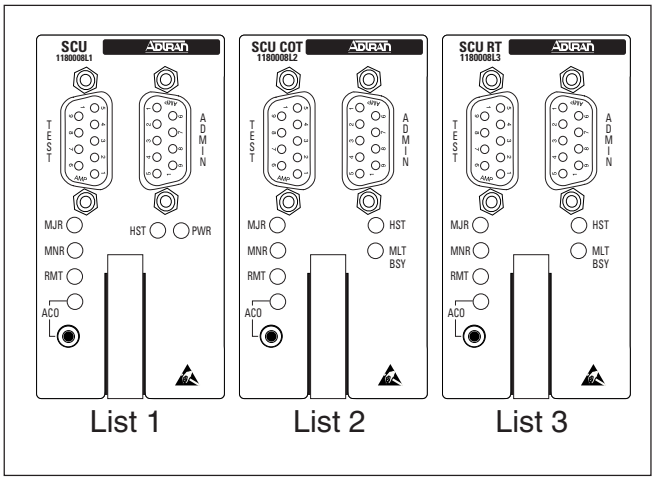


Figure 1. Total Access 1500 SCU

- Mechanized Loop Test (MLT) capability (L2 and L3 used together only)
- Provide VT100 craft interface via front panel DB-9 connector
- Alarm Cut Off (ACO) pushbutton
- Bank status indicators
- Test equipment timing output
- Meet NEBS Level 3 and UL 1950 requirements
- Provides alarm status to NMA and/or SNMP
- Provides internal PAD for X.25 network
- Software can be upgraded while in field without affecting service
- Operates in Host or Client mode for RS-485 chaining applications
- Supports TL1 over TCP/IP or X.25
- Supports menu access over Telnet
- L2 and L3 monitor primary and secondary power feeds. L1 does not monitor power feeds.

General Description

The Total Access 1500 SCU is a common module, plug-in unit designed for the Total Access 1500. The SCU provides all control functions for the Total Access 1500 common units and all the individual access modules. The SCU manages all network related functions and communicates externally

through RS-232, RS-485, and Ethernet interfaces. The SCU manages the Mechanized Loop Test (MLT) feature and controls the activation/deactivation relays.

Compliance

Table 1 shows the Compliance Codes for the Total Access 1500 SCU. The SCU complies with the requirements covered under UL 1950 and is intended to be installed in Restricted Access Areas only and in equipment with a Type "B" or "E" enclosure.

NOTE

At this point in the installation, power should not be applied to the Total Access 1500 shelf.

Table 1. Compliance Codes

Code	Input	Output
Power Code (PC)	C	C
Telecommunication Code (TC)	-	X
Installation Code (IC)	A	-

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.

2. INSTALLATION

CAUTION!

SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.

HANDLING PRECAUTIONS REQUIRED.

After unpacking the unit, inspect it for damage. If damaged, file a claim with the carrier. Then contact ADTRAN Customer Service. Refer to the *Warranty and Customer Service* section of this practice.

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.

The Total Access 1500 SCU plugs directly into the SCU slot in the common module area of the Total Access 1500 chassis.

WARNING

The Total Access 1500 SCU can only be inserted into the third slot of the shelf. Attempting to insert the SCU in any other slot may damage the SCU and/or the backplane.

To Install the Total Access 1500 SCU, perform the following steps:

1. Pull the latch/ejector on the bottom of the SCU front panel from its closed position.
2. Hold the unit by the front panel while supporting the bottom side.
2. Align the card edges to the guide grooves for the SCU slot.
3. Gently, but firmly, push the SCU into the third slot on the shelf. Simultaneous thumb pressure at the top and bottom of the SCU will ensure a good seat of the SCU pins into the backplane connector.
4. Lock the unit in place by pressing down the locking lever.

All power, ground and administrative wiring should now be completed on the Total Access 1500 shelf, and an SCU should be installed in the shelf. The next procedure is to apply power to the shelf with an SCU in place, and ensure that the SCU properly powers up and successfully completes its power-on self-test routine. To verify that the SCU completes its self-test routine perform the following steps:

1. Insert a fuse into the fuse and alarm panel serving either the A or B power feeds to the Total Access 1500 shelf. The fuse should be selected with an amperage appropriate for the intended use of the Total Access shelf.
2. Verify that the SCU power-on self-test routine is successfully completed. The LEDs will all simultaneously flash, then the ACO, HST, and MLT BSY LEDs will flash four times staying on the last time. Once these LEDs turn off, the front panel will represent the true status of the SCU. This may take more than 1 minute.

3. This constitutes a complete and successful power-on test.

NOTE

Once successfully powered up, if only A or B power is supplied, the SCU will reflect a MIN alarm for A (or B) power failure.

3. OPERATION

Power

The Total Access backplane delivers two -48 VDC buses to the SCU. The SCU operates with both or either -48 VDC buses active.

Front Panel Indicators

See **Table 2** for a description of front panel LEDs and buttons.

User Interface

Since the SCU is the user access point to the shelf and its access modules, it must support a number of user physical interfaces and service the shelf's communication buses. The SCU supports a craft port, X.25 port, and an Ethernet port.

Craft Port

The SCU provides an RS-232 serial asynchronous craft access port. Physical access is attained by connecting a male-ended DB-9 cable to the female DB-9 connector on the SCU front panel. This port can operate at various baud rates and is limited to 8-bit asynchronous data with no parity, one stop bit. Minimal 3-wire functionality (pins 2, 3, and 5) is also accommodated. This port operates as a DCE; pin assignments are detailed in **Table 3**.

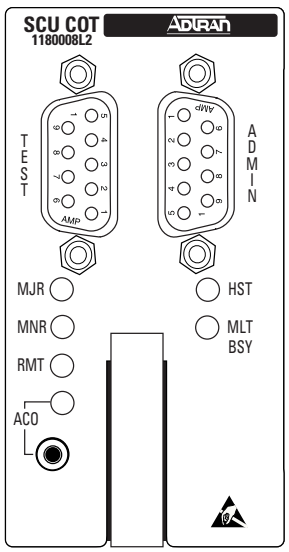
Table 3. DCE Pin Assignments

Pin Number	Function
2	Transmit Data from DCE
3	Receive Data into DCE
4	DTR (Data Terminal Ready)
5	Signal Ground

X.25 Port

The SCU supports synchronous RS-232 compatible serial interface to be used in conjunction with an X.25 network. The unit includes PAD functions onboard so an external PAD is not required for operation with the X.25 network. Physical access uses a 25-pin female DB-25 connector (J34) on the rear of the Total Access 1500 shelf. The X.25 connector pin assignments are detailed in **Table 4**.

Table 2. Front Panel Description



LED	Color	Description
MJR	Off Red	No Major alarm condition detected. Major alarm active (Red Alarm)
MNR	Off Yellow	No Minor alarm condition detected. Minor alarm active (Yellow Alarm)
RMT	Off Yellow	No Remote or Auxiliary alarm condition detected. Remote or Auxiliary alarm active
ACO	Off Green	ACO switch not activated ACO switch activated
HST	Off Green	SCU is client for cluster group SCU is host for cluster group
MLT BSY	Off Green	No MLT test is active MLT test is active
Switch	**Description**	
ACO Switch	Press to disable any audible alarms only. Any active visual alarms will remain active.	

Table 4. X.25 Pin Assignments

Pin Number	Function
1	Frame Ground (FG)
2	Tramsmit Data (TD) from DTE
3	Receive Data (RD) into DTE
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground (SG)
8	Data Carrier Detect (DCD)
15	Tramsmit Clock
17	Receive Clock
20	Data Terminal Ready (DTR)
22	Ring Indicator (RI)

This port operates as a DTE and is configured for the following settings:

- 1-way in or 2-way operation
- Up to four SVCs
- Up to 64 kbps (synchronous)
- Packet size: 128 bytes
- Packet window: 2
- n2 retry limit: 3
- T1 ACK timer: 20 seconds
- T3 time out: 3 seconds
- k window size: 2

Ethernet Port

The SCU provides an SNMP interface via a standard Ethernet 10BaseT connector (J33) located on the backplane of the Total Access 1500 shelf.

Connect and Logon to System

There are two ways to connect and logon to the system: via the VT100 craft/admin interface or a Telnet session.

Total Access shelf management and provisioning is facilitated by a series of intuitive menus that are accessible on a computer screen. These menus are available through either a VT100 terminal session or a Telnet session.

VT100 Terminal

To connect either a terminal or a PC emulating a terminal to the craft port:

1. Set the parameters of the VT100 terminal to:
   - 9600 baud rate

   NOTE

   The SCU craft port is defaulted to 9600 but has additional available baud rate of 38400.

   - 8 data bits
   - No parity
   - 1 stop bit
   - No flow control
2. When connecting a terminal to the craft port and the terminal has a parallel setting, disable it and use serial. When connecting a PC emulating a VT100 terminal to the craft port, set the PC for direct connect (as opposed to dial-up connection).
3. When you are using the front craft port, use a serial cable with a male DB-9 connector on the Total Access end.
4. Plug the male end of the data cable into the Total Access shelf. Make connection to the VT100 terminal as appropriate for your equipment.
5. To logon to the Total Access system, press any key. When password Authentication is enabled, the cursor will be placed at the Account Name field, waiting for an Account Name to be input.

   NOTE

   The default account name is “user” and the default password is “password”.

6. At the Account Name field, input the Account Name for the Total Access shelf, then press ENTER. The cursor will be placed at the Password field, waiting for a Password.
7. At the Password field, enter the Password for the Total Access System, and press ENTER.
8. Upon entering the correct password, the Total Access main menu is presented on the screen. The Total Access menu system can now be accessed.

Telnet
The SCU will support four concurrent Telnet sessions. Telnet is supported via the Ethernet interface.

To use Telnet to communicate with the SCU, use the following steps:

1. Set the proper IP Address for the connection method of choice via the provisioning menu. For this procedure, refer to the following page of this practice.
2. Connect to the Ethernet Interface on the backplane of the Total Access 1500 shelf.
3. A successful Telnet connection is established when the following appears on the screen:
   /* enter 'MENUS;' to obtain menus (characters will not echo) */
   OK 0
   <
4. A TL1 session may be activated at this time or to logon to the Total Access Menu System, enter 'MENUS;'. If Password authentication is enabled, enter the Account Name for the Total Access shelf, and press ENTER. The cursor will then be placed at the Password field, waiting for a password.
5. At the Password field, enter the Password for the Total Access System, and press ENTER.
6. Upon entering the correct password, the Total Access main menu is presented on the screen. This signifies a successful logon.

Provision the Ethernet Interface Settings
If the Total Access 1500 shelf is to be connected to an Ethernet network for Telnet, TFTP or SNMP Management, the IP Address, Subnet Mask, and Default Gateway must be set for the shelf to communicate with the network.

To set the IP Address, Subnet Mask, and Gateway:
1. From the System Controller main menu, select option 5, Management Configuration, and press ENTER.
2. From the Management Configuration menu, select option 1, IP Address, and press ENTER.

NOTE
The IP Address, Subnet Mask and Gateway are in the form XXX.XXX.XXX.XXX, with the XXX's representing 1, 2 or 3 digit decimal numbers from 0 to 255.

3. Enter a valid IP address, and press ENTER.
4. From the Managemen Configuration menu, select option 2, IP Subnet Mask, and press ENTER.
5. Enter a valid Subnet Mask, and press ENTER.
6. From the Management Configuration menu, select option 3, IP Default Gateway, and press ENTER.
7. Enter a valid Default Gateway, and press ENTER.
8. From the Management Configuration menu, select option 4, Telnet Port Number, and press ENTER.
9. Enter the port to connect to when performing TL1 over TCP/IP. This is set to 2000 as a default.

Menuing System
The ADTRAN Total Access SCU provides a menuing system for the Total Access shelf. All system-related menus are controlled by the SCU as well as some of the access modules menus. Other access modules have their own user menu structure supported by the module.

Menu Structure
The menu structure for the SCU is a layered menu tree. Each menu level consists of submenus and/or menu items. Some menu items are restricted to certain user accounts. The SCU supports Read-Write and Read-Only accounts. Each of these accounts may also be given Test or Admin privileges. The Admin privileges allow the user to change all provisionable settings as well as network configuration settings that are not accessible to Read-Write and Read-Only accounts. Examples include SNMP provisioning, TL1 provisioning, Date/Time settings, password administration, and software downloads. The Read-Write account allows the standard provisioning settings to be changed. The Read-Only account allows

the user to view all provisioning settings, alarms, and statistics. An account with Test privileges will also allow the account to perform tests. **Figure 2** illustrates the menu structure of the SCU.

Submenus are elements that move the user down to the next menu level. Menu items are elements which allow the user to make changes to the current SCU settings. There are two different types of menu items: read-only and read-write.

A read-only menu item displays information that can not be changed, such as the status of the SCU. A read-write menu item displays information that when selected can be changed, such as the baud rate of the admin port.

Intersystem Communication (RS-485)

The ADTRAN Total Access 1500 SCU supports communication with other Total Access 1500 systems over a shared, twisted-pair, half-duplex, RS-485 link. The SCU from each system is connected in parallel on this bus. Pin A should be connected to pin A, and Pin B should be connected to Pin B, so each shelf is in parallel. One SCU acts as the master controller and all others function as slaves. Physical access is attained by way of wire-wrap posts (P12) on the rear of the Total Access 1500 Shelf. Up to 32 shelves may be clustered together via the RS-485 bus.

To set up RS-485 chaining, perform the following:

1. Give the first SCU in the chain a unique Target ID (TID).
2. Enable RS-485 Interface.
3. Set Interbank Communication Mode to Host.
4. Give the next SCU in the chain a unique Target ID (TID).
5. Enable RS-485 Interface.
6. Set Interbank Communication Mode to Client.

Repeat steps 4-6 until up to 32 shelves have been chained.

Setting the Target ID (TID)

A unique Target ID (TID) must be given to each shelf of a chained RS-485 cluster. To set the Target ID (TID) in the Total Access 1500 SCU, perform the following:

1. Logon to the system.
2. From the Total Access 1500 main menu, select option 1, System Controller, and press ENTER.
3. From the System Controller menu, select option 2, Provisioning, and press ENTER.
4. From the Provisioning menu, select option 6, Target ID (TID), and press ENTER.
5. Enter the appropriate Target ID and press ENTER.

NOTE

The Target ID (TID) may consist of up to 20 characters. The first character must be a letter. The remaining characters minus the last character may be alphanumeric or a hyphen. The last character must be alphanumeric.

An example of a Target ID (TID) follows:

HTVLALEXD01

Where:

HTVL	designates the city
AL	designates the state
EX	identifies the Central office or remote terminal
D	identifies the equipment type ("D" is administrative equipment)
01	identifies the piece of equipment of that type at the CO

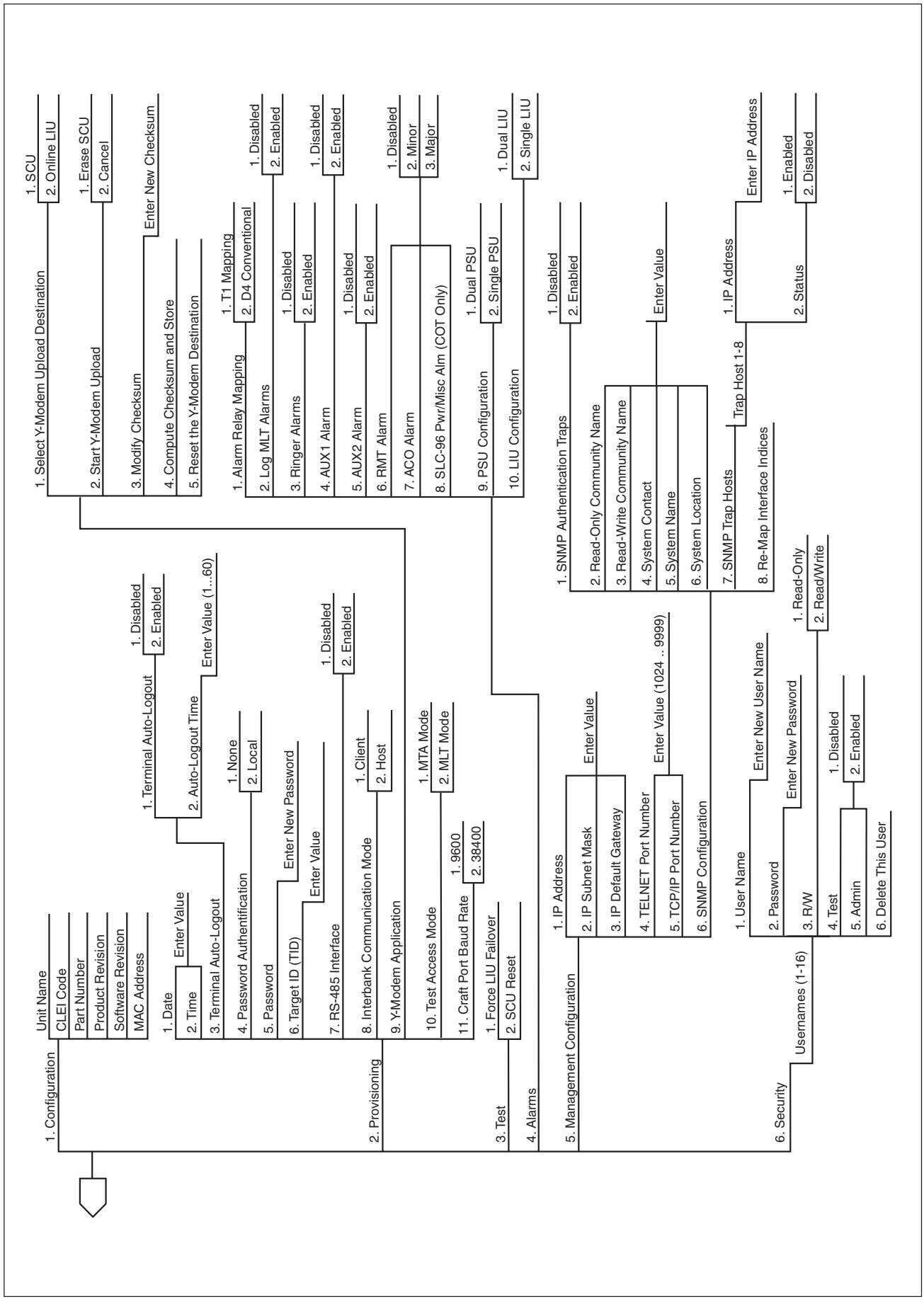


Figure 2. System Controller Menu Tree

Alarm Processing

The SCU monitors the status of each line card and provides necessary alarm processing to determine the overall alarm state of the system.

Alarm Outputs

The SCU determines alarm states and reports these results via onboard alarm interfaces and through active user access channels. Each onboard alarm interface consists of Form-C relay contacts to provide Common (COM), Normally Open (NO), and Normally Closed (NC) functionality. Physical access to the relay contacts is attained by way of wire-wrap posts per alarm function. These posts are located on the rear panel of the Total Access 1500 shelf. The following alarm outputs are supported:

Alarm	Wire-wrap Header
• Major Audible	MAJ-A
• Minor Audible	MIN-A
• Major Visual	MAJ-V
• Minor Visual	MIN-V

The SCU provides front panel LEDs (See Table 2) to indicate the status of the shelf and Alarm Cut Off (ACO) state.

Alarm Inputs

The SCU supports external alarm, status, or control inputs. Circuitry on the SCU accepts a -48V signal as an active state. Physical access to these inputs is attained by way of two wire-wrap posts per input function located on the rear panel of the Total Access 1500 shelf. The following alarm inputs are supported:

Alarm	Wire-wrap Header
• Auxiliary 1	AUX 1
• Auxiliary 2	AUX 2
• Alarm Cut Off	AUX 3
• Remote	AUX 4

NOTE

The front panel mounted ACO switch is used to cut off an alarm.

Configuring Alarms

To configure alarms the user will need to perform the following:

1. Logon to the system.
2. From the Total Access 1500 main menu, select option 1, System Controller, and press ENTER.
3. From the System Controller menu, select option 4, Alarms, and press ENTER.
4. Provision the alarms as desired.

The following items may be configured:

- Alarm Relay Mapping – allows the user to select T1 or D4 alarm relay mapping
- Log MLT Alarms – enables/disables the logging of MLT alarms
- Ringer Alarms – enables/disables ringer alarms
- AUX1 Alarm – enables/disables AUX1 alarm input
- AUX2 Alarm – enables/disables AUX2 alarm input
- RMT Alarm – enables/disables RMT alarm input
- Primary Power Alarm – enables/disables alarm condition associated with having primary power feed removed
- Secondary Power Alarm – enables/disables alarm condition associated with having secondary power feed removed
- PSU Configuration – choose single or dual PSU according to whether redundant equipment is installed in the Total Access 1500 chassis
- LIU Configuration – choose single or dual LIU according to whether redundant equipment is installed in the Total Access 1500 chassis

4. MAINTENANCE

The SCU requires no routine maintenance to operate properly. Conduct tests and maintenance for the specific plug-ins in accordance with the recommendations and procedures prescribed by the manufacturer of each specific plug-in. ADTRAN cautions against performing major repairs in the field.

Repair services may be obtained by returning the defective unit to the ADTRAN Customer Service RMA Department. Refer to *Warranty and Customer Service* section for more information.

5. PRODUCT SPECIFICATIONS

Product specifications for the ADTRAN Total Access SCU are detailed in **Table 5**.

Table 5. Detailed SCU Specifications

General	
Front Panel:	Craft Interface, DB-9 Connector (female)
LEDs:	MJR MNR RMT HST MLT BSY ACO
Switches:	ACO Pushbutton Switch
Ethernet:	10BaseT
Shelf life for non-volatile memory storage:	10 years minimum
Power	
Current Draw:	0.088 A maximum @ -48 V
Physical	
Dimensions:	3.125 in. H x 1.54 in. W x 10.1 in. D
Weight:	< 1 lb.
Environment	
Operating Temperature (Standard):	-40ºC to +65ºC
Storage Temperature:	-40ºC to +85ºC
Relative Humidity:	95% maximum @ 50ºC, noncondensing
Heat Dissipation:	4.24 watts maximum
Compliance	
UL 1950 NEBS Level 3 GR-1089-CORE	
Part Number	
Total Access 1500 System Controller Unit (SCU) Common Module	1180008L1

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten (10) years from the date of shipment if it does not meet its published specifications or fails while in service. Refer to ADTRAN *U.S. and Canada Carrier Networks Equipment Warranty,* Document 60000087-10.

Contact Customer and Product Service (CAPS) prior to returning equipment to ADTRAN.

For service, CAPS requests, or further information, contact one of the following numbers:

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

ADTRAN, Inc.
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901 Explorer Boulevard
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