



# **IMUX-56/64 Module User Manual**

**Part Number 1200262L1**



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### Federal Communications Commission Radio Frequency Interference Statement:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of the is 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.

**WARNING**

*Changes 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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## IMUX-56/64 MODULE OVERVIEW

The IMUX-56/64 Module combines with other ATLAS components to provide a flexible disaster recovery system in the ATLAS Integrated Access System. The IMUX-56/64 Module, which occupies a single slot in the ATLAS chassis, supports multiple, independent BONDING sessions with each session having the potential to use a different bandwidth. The IMUX-56/64 Module can use either 56Kbps or 64Kbps data lines (i.e., channels) for any given BONDING session. The IMUX-56/64 Module can establish a BONDING session using as few as 2 or as many as 32 channels. Figure 1-1 shows an example application of the IMUX-56/64 Module.

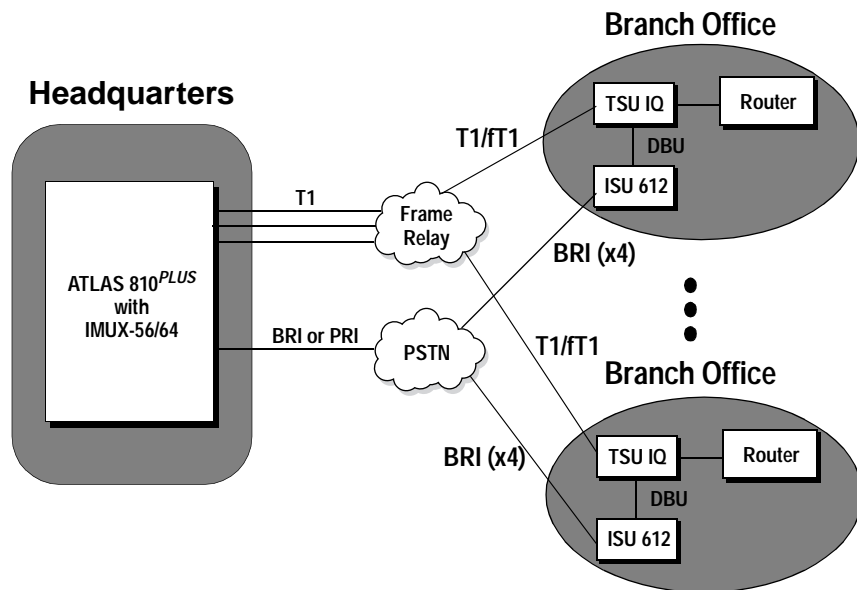


Figure 1-1. ATLAS Remote Access Application

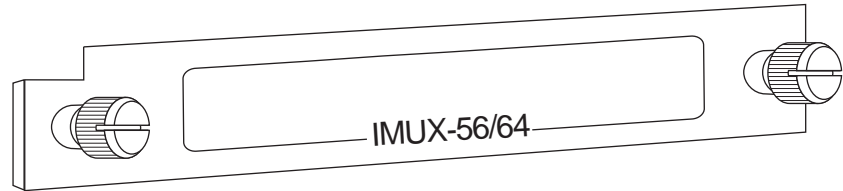
## CONFIGURING AN ENDPOINT TO USE BONDING

How an endpoint is configured to use BONDING is unique to each type of endpoint. Typically, it will be a reference to the number of DS0s, with mention of BONDING in the help line. See the ATLAS 800 or 800<sup>PLUS</sup> manuals for more information on endpoint configuration. Information may also be



## PHYSICAL DESCRIPTION

The IMUX-56/64 Module has no external interfaces. Both the network and DTE interfaces are provided on other ATLAS components. Information is passed to and from the IMUX-56/64 Module via ATLAS' internal bussing scheme. Figure 1-3 illustrates the IMUX-56/64 Module card as seen from the rear panel.



**Figure 1-3. IMUX-56/64 Module**



## UNPACK AND INSPECT

Carefully inspect the IMUX-56/64 Module for shipping damages. If damage is suspected, file a claim immediately with the carrier and then contact ADTRAN Technical Support. If possible, keep the original shipping container for use in returning the IMUX-56/64 Module for repair or for verification of shipping damage.

## Contents of ADTRAN Shipment

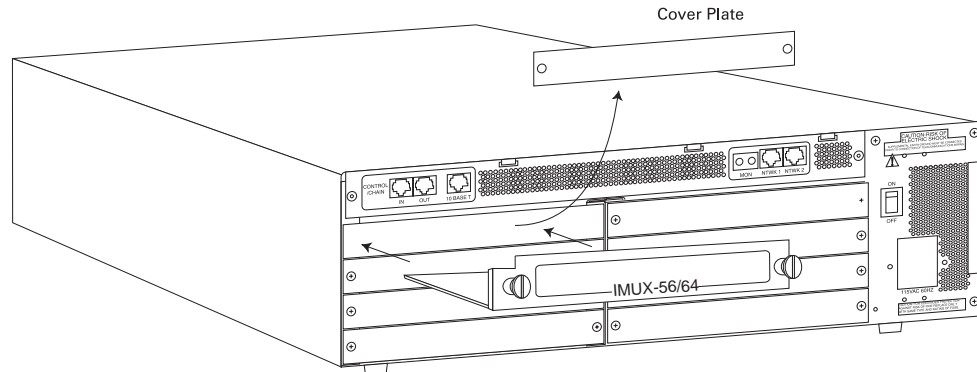
The following items are included in the ADTRAN shipment:

- IMUX-56/64 Module
- IMUX-56/64 Module *User Manual* (insert into main *ATLAS User Manual*)

## INSTALLING THE IMUX-56/64 MODULE

The installation procedure is described below, and Figure 2-1 shows the proper placement of the option module.

Instructions for Installing the IMUX-56/64 Module	
Step	Action
1	Remove the cover plate (corresponding to the slot into which the IMUX-56/64 Module will be installed) from the ATLAS chassis rear panel.
2	Slide the IMUX-56/64 Module into the ATLAS chassis until the module is positioned firmly against the front of the ATLAS unit.
3	Fasten the thumbscrews at both edges of the option module.
4	Complete installation of remaining modules and Base Unit as specified in the <i>Installation</i> chapter of the <i>ATLAS User Manual</i> .



**Figure 2-1. Installing the IMUX-56/64 Module**

## POWER-UP AND INITIALIZATION

When the IMUX-56/64 Module is inserted into the ATLAS chassis, the front panel **STATUS** indicator blinks red, yellow, and green for a time. Previously configured settings for the IMUX-56/64 Module are automatically restored upon power-up. When the IMUX-56/64 Module is ready for operation, the **STATUS** indicator remains solid green. At this time, a system self-test can be invoked, as described in *ATLAS User Manual*.



**NOTE**

*This startup sequence may take up to ten seconds.*

## Failed Self-Test

The terminal menu self-test log records self-test failures for the IMUX-56/64 Module.

## WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment if the product does not meet its published specification, or if it fails while in service. For detailed warranty, repair, and return information, refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure (see the last page of this manual for pertinent information).

A return material authorization (RMA) is required prior to returning equipment to ADTRAN. For service, RMA requests, or more information, see the last page of this manual for the toll-free contact number.



## OVERVIEW

You can configure and control the IMUX-56/64 Module from several sources, as shown in Table 3-1. The ATLAS User Manual provides detailed instructions on operating each of the supported management approaches. The remainder of this chapter describes the menu items available for managing the IMUX-56/64 Module using the terminal menu.

**Table 3-1. Management Methods for the IMUX-56/64 Module**

Source	Purpose
ATLAS Front Panel	For minimal configuration and status support
Terminal Menu	For detailed configuration, status, and diagnostics
Simple Network Management Protocol (SNMP)	For reporting alarm conditions and system status (no configuration)

*You must have the appropriate password level to edit items using the terminal menu. (See the section **Access Passwords** in the ATLAS User Manual for detailed information on working with passwords.)*



**NOTE**

***Security level 1** users can view and edit every available field. **Security level 5** users can view any field, but they cannot edit. Each menu description in this section indicates the required password level required for write and read access.*

## TERMINAL MENU STRUCTURE

ATLAS uses hierarchical menus to access all of its features. The top-most menu level leads to submenus which are grouped by functionality. All submenu options display in the VT-100 terminal window.

You can use the **Modules** terminal menu to configure and control the IMUX-56/64 Module. The **Modules** menu option, **Type**, shows the IMUX-56/64 Module as **IMUX** (see Figure 3-2). The following sections describe the **Modules** menu and its submenus.



equipment, it may be necessary to change this time so that it matches TXADD01.

TXADD01 Timer	Write security: 3; Read security: 5 Specifies the length of time both endpoints wait for additional calls to be connected at the end of negotiation before deciding that the BONDING call has failed. The factory default setting is sufficient for most calls to connect, although when dialing overseas it may be necessary to lengthen this timer to allow for slower call routing.
TXDEQ Timer	Write security: 3; Read security: 5 Specifies the length of time both endpoints attempt to equalize the network delay between the bearer channels before deciding the BONDING call has failed.
TANULL Timer	Write security: 3; Read security: 5 Specifies the length of time the answering endpoint attempts to detect the BONDING negotiation pattern from the originating endpoint before deciding the BONDING call has failed. It may be necessary to shorten this timer if the DTE equipment using the BONDING module also has timer constraints for completing non-BONDING parameter negotiation.
TCID Timer	Write security: 3; Read security: 5 Specifies the length of time both endpoints attempt to negotiate an agreeable value for bearer channels and channel capacities before deciding the BONDING call has failed.
Call Stagger	Write security: 3; Read security: 5 Specifies the amount of delay between placing calls for outgoing BONDING sessions. Table 3-2 defines the call stagger values.

**Table 3-2. Call Stagger Values**

Display value	Meaning
<b>No Stagger</b>	There is no delay between the call dialing of a BONDING session.
<b>500 ms</b>	Wait approximately ½ second between the call dialing of a BONDING session.
<b>1 sec</b>	Wait approximately 1 second between the call dialing of a BONDING session.
<b>2 sec</b>	Wait approximately 2 seconds between the call dialing of a BONDING session.



**State** Read security: 5  
Displays whether the module is online or offline. Even though a module is physically installed, it must be marked *Online* for it to be considered an available resource. Marking an installed module *Offline* may be useful in system troubleshooting. If you choose *Offline*, the module will not be in alarm condition, but will display *Offline*.



*Only if State reads Online, can the ATLAS use an installed module for any data bandwidth.*

**Status** Read security: 5  
Displays status information on the IMUX-56/64 Module. Table 3-3 describes status messages that may appear and their meanings.

**Rev** Read security: 5  
(Hardware Revision) Displays the hardware revision of the IMUX-56/64 Module.

**Table 3-3. Status Messages**

Message	Meaning	Comments
<b>Online</b>	The module is enabled and is responding to the system controller's status polls.	This is the normal response of the system.
<b>No Response</b>	The module is enabled but is not responding to the system controller's status polls.	This response indicates either a problem in the system or the module is not installed.
<b>Empty</b>	The system controller has not detected the presence of a module in the option slot, nor has a module been manually enabled for this option slot.	
<b>Offline</b>	The module is installed but has been taken Offline by a user.	The module is still responding to controller polls.
<b>Offline / No Response</b>	The module is installed but has been taken Offline by a user. The module is not responding to polls.	This response indicates either a problem in the system or the module is not installed.
<b>Not Ready</b>	The module is installed and performing startup initialization.	The initialization of the IMUX-56/64 should take less than 10 seconds.



**Status**

Read security: 5

Displays the Status submenus for BONDING resources available on both BONDING engines on the IMUX-56/64 Module (see Figure 3-4).

The list entries **Engine 1** and **Engine 2** in the status list display the BONDING resources available for incoming and outgoing BONDING calls on the separate BONDING engines.

Info	Status	NumBChannels	Data Rate	Bonded Ep
Engine 1	Idle	0	-	-
Engine 2	Idle	8	-	-
1	BONDING	24	1536k <64k>	1.1
2	Negotiating	1/8	512k <64k>	1.3
3	BONDING	24	1536k <64k>	1.2

SYS:ALRM CSU:ONLN 1:ONLN 2: -- 3: -- 4: -- 5:ONLN 6: -- 7: -- 8: -- ^2=help 20:48

Figure 3-4. IMUX-56/64 Module Status Menu

**Status**

Read security: 5

Indicates the current status of a particular BONDING session. Table 3-4 defines the possible status display values.

Table 3-4. BONDING Status Display Values

Display Value	Meaning
<b>Idle</b>	Indicates the number of Idle BONDING resources for a particular BONDING engine.
<b>Reserved</b>	BONDING resources reserved for a BONDING session that is in the process of coming up.
<b>Negotiating</b>	A single channel is connected and negotiating the BONDING call for a particular BONDING session.
<b>Add Channels</b>	The initial BONDING negotiation was successful, and the IMUX-56/64 Module is in the process of adding channels to the BONDING session.
<b>BONDING</b>	The remaining channels were brought up successfully, and the BONDING session is now ready to pass data.
<b>Terminated</b>	The BONDING session has been terminated for some reason and is in the process of freeing BONDING resources.





## Factory Restore

Individual IMUX-56/64 Modules do not have independent configurations; there is one configuration for all IMUX-56/64 Modules in an ATLAS. This configuration can be returned to factory default by pressing **F** while the cursor is positioned over the BONDING Config submenu, found in the System Config menu.

Factory defaulting an individual IMUX-56/64 Module will not affect the configuration.

## System Self-Test

System Self-test, a submenu of the ATLAS main menu item System Utility, executes both the IMUX-56/64 Module internal test and the ATLAS internal test. The results of the self-test are displayed in the self-test log.

The unit continuously updates the display on the self-test log screen until all test results are shown. For additional information on self-test, see the *ATLAS User Manual*.



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# Product Support Information

## Presales Inquiries and Applications Support

Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering (800) 615-1176

Sales (800) 827-0807

## Post-Sales 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

## Repair and Return

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Customer and Product Service (CAPS) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department (256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN Customer and Product Service  
6767 Old Madison Pike  
Progress Center  
Building #6 Suite 690  
Huntsville, Alabama 35807

RMA # \_\_\_\_\_

