ADTRAN

Async-232 Module
USER MANUAL

Part Number 1200182L1

ADTRAN

FFEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

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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Chapter 1 # Introduction

ASYNC-232 MODULE OVERVIEW

The Async-232 Module combines with other ATLAS components to provide solutions for a variety of wide area networking applications. Providing sixteen asynchronous EIA-232 DTE ports, the Async-232 Module serves as the interface to terminal servers and other DTE equipment. Each port of the Async-232 Module can be configured to operate at any standard asynchronous rate up to 115.2 Kbps. For remote access applications, ATLAS receives incoming analog or ISDN-based signals from remote users, concentrated onto T1 or primary rate ISDN circuits. These calls are processed and directed to the Async-232 Module via ATLAS' internal bussing system. As with all ATLAS components, configuration can be accomplished through a variety of mechanisms, including Telnet or VT-100 emulation. SNMP management is supported for alarm and event reporting.

Functional Description

The Async-232 Module installs into any available option slot in the ATLAS chassis. The ATLAS front panel displays the status of the module itself, as well as the circuits to which it interfaces. In addition, the terminal menu gives further status information, allows you to configure the Async-232 Module, and downloads application software.

Features

The following list describes the Async-232 Module features:

- Sixteen asynchronous interfaces at speeds up to 115.2 Kbps
- Incoming and outgoing analog modem and ISDN call support when used in conjunction with the ATLAS Modem-16 Module
- AT command set
- DTR dialing
- Performance monitoring including the following:
    - DTE signals
    - I/O statistics
    - Call status and statistics
- Hot swappable

ASYNC-232 MODULE SPECIFICATIONS

Each port of the Async-232 Module conforms to the specifications given in Table 1-1.

Table 1-1. Async-232 Specifications

Specification	Description
Maximum Line Rate	115.2 Kbps
Tests	Power-on self-test Loopback System self test
Connectors	DB25 via two DB78 to DB25 adapter cables (provided with the unit) Interface EIA-232 DCE

Physical Description

Two DB78 to octal DB25 cables make the physical connection. A label below each of the DB78 connectors denotes which eight ports terminate into a particular DB78 connector.
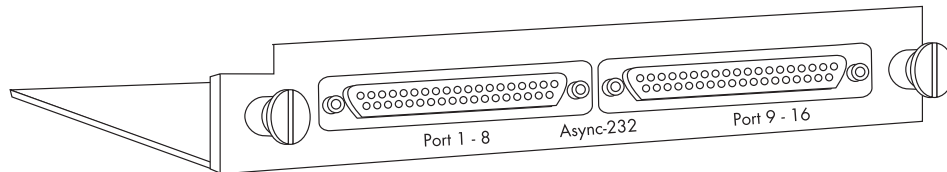
Figure 1-1. Async-232 Module

Installation

UNPACK AND INSPECT

Carefully unpack and inspect the Async-232 Module for any shipping damages. If you suspect damage has occurred, immediately file a claim with the carrier and then contact ADTRAN Technical Support. If possible, keep the original shipping container for returning the Async-232 Module for repair or for verification of shipping damage.

Contents of ADTRAN Shipments

The ADTRAN Async-232 Module shipment includes the following items:

- Async-232 Module
- *Async-232 Module User Manual* (Insert into the main *ATLAS Manual*.)
- Two DB78 to Octal DB25 Cables

INSTALLING THE ASYNC-232 MODULE

The Async-232 Module plugs into any available option slot. Figure 2-1 depicts the action required for proper placement of the Async-232 Module, as described here:

1. Remove the cover plate from the option slot into which the Async-232 Module will be installed (located on the ATLAS chassis rear panel).
2. Slide the Async-232 Module into the option slot until the module is firmly positioned against the front of the ATLAS chassis.
3. Fasten the thumbscrews at both edges of the Async-232 Module.
4. Connect the DB78 end of the cable to the Async-232 Module, and connect the DB25 connector to the associated devices.
5. Complete installation of the remaining modules and base unit, if necessary, as specified in the *Installation* chapter of the *ATLAS User Manual.*
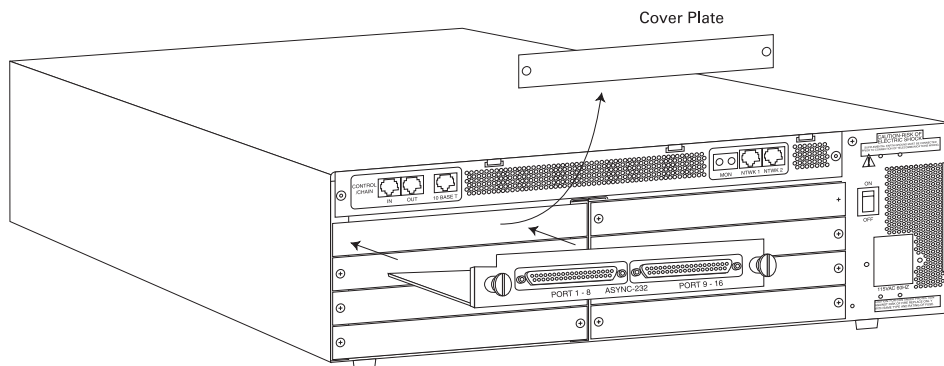
Figure 2-1. Installing the Async-232 Module

WIRING

Each Async-232 Module port provides a single DB25 DCE connector. The connector pinout is given in Table 2-1.

Table 2-1. DB25 Connection Pinout

Pin	Name	Description
1	Shield	Shielded ground connection
2	TXD	Transmit data from DTE
3	RXD	Receive data to DTE
4	RTS	Request to send from DTE
5	CTS	Clear to send to DTE
6	DSR	Data set ready to DTE
7	GND	Ground
8	DCD	Data carrier detect to DTE
9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25	Unused	n/a
20	DTR	Data terminal ready from DTE
22	RI	Ring indicator to DTE

POWER-UP AND INITIALIZATION

When the Async-232 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 Async-232 Module are automatically restored upon power-up. When the Async-232 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.*

Failed Self-Test

If the self-test fails, both the LCD on the ATLAS front panel and the terminal menu report this event. The LCD displays an error message reporting the failure, and the terminal menu self-test log records the same error message. See the *ATLAS User Manual* for details. Appendix C, *Failure Messages*, of this document lists the specific failure messages.

Operational Alarms

The front panel LEDs and the red ALARM LED illuminate when an alarm condition is detected.

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.

Chapter 3   Operation

OVERVIEW

You can configure and control the Async-232 Module from a variety of sources, as shown in Table 3-1.

Table 3-1. Managing the Async-232 Module

Source	Purpose
ATLAS front panel	Minimal configuration and status reporting
Terminal menu	Detailed configuration, status reporting, and diagnostics
Simple Network Management Protocol (SNMP)	Reports alarm conditions and system status (no configuration)

The VT-100 terminal is attached to the control port of the ATLAS Base Unit, and a Telnet session is established through the Ethernet port of the ATLAS Base Unit. Chapter 3 of the *ATLAS User Manual* provides detailed instructions on the operation of each of the management approaches listed in Table 3-1.

The remainder of this chapter describes the menu items available when managing the Async-232 Module via the terminal menu.

TERMINAL MENU STRUCTURE

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

NOTE *Refer to the **ATLAS User Manual** for detailed instructions on how to navigate through the terminal menu.*

MENU ACCESS

The ATLAS System Controller automatically detects the presence of the Async-232 Module when it is installed into the Base Unit. To access the Modules Menu options, use the keyboard arrow keys to scroll to the Modules menu and press **Enter**. Then, for example, to view the Menu submenu for the ASYNC-16, use the keyboard arrow keys to move to the row *ASYNC-16* and the column *Menu*; then

press **Enter** on the keyboard. The following paragraphs describe all **Modules** menu and submenu options.

NOTE *Refer to the* ATLAS User Manual *for detailed instructions on how to navigate through the terminal menu.*

ASYNC-232 MENU DESCRIPTION

The following paragraphs (Slt (slot), Type, Menu, Alarm, Test, State, Status, and Rev (revision)) describe the **Modules** menu options (see Figure 3-1).


```
ATLAS 800/Modules
System Info     Slt   Type    Menu    Alarm    Test    State      Status       Rev
System Status    0   Sys Ctrl  [+]    [OK]     [OFF]   ONLINE   Online           J
System Config    1   UBRI-8    [+]    [n/a]    [n/a]   ONLINE   No Response      -
System Utility   2   T1/PRI-4  [+]    [n/a]    [n/a]   ONLINE   No Response      -
Modules          3   U35Nx-4   [+]    [n/a]    [n/a]   ONLINE   No Response      -
Dedicated Maps   4   EMPTY                             ONLINE   Empty            -
Dial Plan        5   M56K-16   [+]     OK       OFF    ONLINE   Online           A
                 6   ASYNC-16  [+]    [OK]     [OFF]   ONLINE   Online           A
                 7   EMPTY                             ONLINE   Empty            -
                 8   EMPTY                             ONLINE   Empty            -



SYS: OK   CSU:ONLN    1:ALRM 2:ALRM 3:ALRM 4: --   5: OK   6: OK   7: --   8: --
Access module menus                                              ^Z=help   3:27_
```

Figure 3-1. Modules Menu

Slt (Slot)
Read security: 5
Displays the number of all the available slots in the ATLAS chassis. Slot 0 refers to the ATLAS base unit. This field is read-only.

Type
Write security: 3; Read security: 5
Displays the module type installed in the slot or the module type you plan to install in the slot. If an Async-232 Module is installed, the Type field automatically defaults to Async-16. You can use this field to preconfigure a system before installing modules by specifying the module that you want to install into each slot.

NOTE *If a module is installed, the module type automatically displays the name of the installed module, and it cannot be set to any other option.*

Menu
Read security: 5
Displays additional status and configuration menus for the selected module. (To access the submenus for this item, use the arrow keys to scroll to the Menu column for the module you want to edit, and press **Enter**.)

Alarm
Read security: 5
Displays whether there is an alarm condition on the Async-232 Module. Press
Enter in this field to activate the Alarm menu.

Test
Read security: 5
Displays whether the Async-232 Module is executing a test. Press **Enter** in this
field to activate the Test menu.

State
Read security: 5
Displays whether the module is online or offline. Even though a module is phys-
ically installed, its status must be marked Online for it to be considered an avail-
able 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.

NOTE *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 Async-232 Module. Table 3-2 describes status
messages, and their meanings, that may appear.

Rev (Hardware Revision)
Read security: 5
Read-only field that displays the hardware revision of the Async-232 Module.

Table 3-2. Async-232 Module Status Messages

Message	Meaning	Comments
Online	The module is enabled and is responding to the system controller's status polls.	This is the normal response of the system.
No Response	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.
Empty	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.	
Offline	The module is installed but has been taken Offline by a user.	The module is still responding to controller polls.
Offline / No Response	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.

ASYNC-232 MODULE SUBMENUS

Figure 3-2 shows the Menu options available for the Async-232 Module. The following paragraphs describe these options. (Some submenu headings are abbreviated in the Terminal menu when displayed in column mode.)

```
ATLAS 800/Modules[6]/ASYNC-16 Menus
ASYNC-16 Menus  Info            [+]
Module Alarms   Signal Status   [+]
Test Activity   I/O Stats       [+]
                Session Status  [+]
                Configuration   [+]
                Test            [+]




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

Figure 3-2. Menus Panel

Info

Read security: 5
The Async-232 **Info** submenu lists information about the installed module. These fields are read-only (see Figure 3-3).

```
ATLAS 800/Modules[6]/ASYNC-16 Menus/Info
Info            Part Number      1200.182L1
Signal Status   Serial Number
I/O Stats       Board Revision   D
Session Status  Firmware Revision 0.32
Configuration
Test





SYS: OK    CSU:ONLN     1:ALRM 2:ALRM 3:ALRM 4: --   5: OK   6: OK   7: --   8: --
Module Information                                     ^Z=help  3:42_
```

Figure 3-3. Info Submenu Panel

Part Number
Read security: 5
Displays the part number of the module in a read-only field.

Serial Number
Read security: 5
Displays the Async-232 Module's serial number in a read-only field.

Board Revision
Read security: 5
Displays the printed circuit board revision of the Async-232 Module in a read-only field.

Firmware Revision
Read security: 5
Displays the revision of the coprocessor firmware on the module in a read-only field.

Signal Status

Read security: 5
Signal Status fields show the status of key data terminal equipment (DTE) interface signals for all ports (see Figure 3-4). All ports on the serial card are data communications equipment (DCE) interfaces. These read-only fields monitor the DTE signals.

```
ATLAS 800/Modules[6]/ASYNC-16 Menus/Signal Status
Info                 Port            DTE Signals
Signal Status         1    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
I/O Stats             2    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
Session Status        3    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
Configuration         4    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
Test                  5    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                      6    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                      7    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                      8    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                      9    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     10    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     11    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     12    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     13    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     14    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     15    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]
                     16    DTR[-] DSR[*] RTS[-] DCD[-] RI[-]


SYS: OK    CSU:ONLN     1:ALRM 2:ALRM 3:ALRM 4: --   5: OK  6: OK  7: --  8: --
                                                                   ^Z=help  3:45
```

Figure 3-4. Signal Status Submenu Panel

DTR
Read security: 5
Data Terminal Ready from the DTE.

DSR
Read security: 5
Data Set Ready to the DTE.

RTS
Read security: 5
Request To Send from the DTE.

NOTE
For software or no flow control, Clear to Send (CTS) is always asserted. For hardware flow control, it is asserted/de-asserted as needed and is not available for display.

DCD
Read security: 5
Data Carrier Detect to the DTE.

RI
Read security: 5
Ring Indicate to the DTE.

I/O Status

I/O Status fields show statistics for all ports on the module (see Figure 3-5). Statistics may be reset on a per-port basis. In all fields, the RX direction refers to data flow from the Async-232 Module ports towards the DTE. The TX direction refers to data flow from the DTE towards the Async-232 Module ports. Statistics are kept since the last powerup or reset statistic command. Descriptions of the available statistics and control fields follow.

```
ATLAS 800/Modules[1]/ASYNC-16 Menus/I/O Stats
Info             Port TX-Bytes RX-Bytes Overruns PrtyErrs FrmErrs Rst Stats
Signal Status      1        0        0        0        0       0    <+>
I/O Stats          2        0        0        0        0       0    <+>
Session Status     3        0        0        0        0       0    <+>
Configuration      4        0        0        0        0       0    <+>
Test               5        0        0        0        0       0    <+>
                   6        0        0        0        0       0    <+>
                   7        0        0        0        0       0    <+>
                   8        0        0        0        0       0    <+>
                   9        0        0        0        0       0    <+>
                  10        0        0        0        0       0    <+>
                  11        0        0        0        0       0    <+>
                  12        0        0        0        0       0    <+>
                  13        0        0        0        0       0    <+>
                  14        0        0        0        0       0    <+>
                  15        0        0        0        0       0    <+>
                  16        0        0        0        0       0    <+>


SYS: OK    CSU:ONLN    1:WARN 2: --   3: --   4: --   5: OK  6: --   7: --   8: --
                                                              ^Z=help  1:54_
```

Figure 3-5. I/O Status Submenu Panel

TX-Bytes
Read security: 5
Displays the number of bytes received from the DTE.

RX-Bytes
Read security: 5
Displays the number of bytes transmitted to the DTE.

Overruns
Read security: 5
Displays the number of receiver overruns encountered on the port from the DTE. A receiver overrun occurs when the DTE performs data transmission too fast for the ATLAS port to keep up, therefore causing data to be loss. An overrun may indicate the need to turn on hardware flow control.

Prty Errs (Parity Errors)
Read security: 5
Displays the number of received characters with parity errors from the DTE.

FrmErrs (Framing Errors)
Read security: 5
Displays the number of framing errors detected from the DTE.

PPP CRC Errors
Read security: 5
Displays the number of PPP frames with invalid CRC values received from the DTE in ISDN Async-to-Sync PPP mode. (To display this menu, position the cursor over I/O Statistics. Then move the cursor to the port for which you want statistics, and press **Enter**.)

Rst Stats (Reset Statistics)
Write security: 5; Read security: 5
Resets all the statistics for a specific port.

Session Status

Session Status fields display the status of any dial-in or dial-out call for all ports of the Async-232 Module (see Figure 3-6). Descriptions of the available fields follow.

```
ATLAS 800/Modules[6]/ASYNC-16 Menus/Session Status
Info             Prt ____Mode____  Call Dir _Rsc_ __Last Disconnect__ Hangup
Signal Status     1  Idle          Idle      None  None                <+>
I/O Stats         2  Idle          Idle      None  None                <+>
Session Status    3  Idle          Idle      None  None                <+>
Configuration     4  Idle          Idle      None  None                <+>
Test              5  Idle          Idle      None  None                <+>
                  6  Idle          Idle      None  None                <+>
                  7  Idle          Idle      None  None                <+>
                  8  Idle          Idle      None  None                <+>
                  9  Idle          Idle      None  None                <+>
                 10  Idle          Idle      None  None                <+>
                 11  Idle          Idle      None  None                <+>
                 12  Idle          Idle      None  None                <+>
                 13  Idle          Idle      None  None                <+>
                 14  Idle          Idle      None  None                <+>
                 15  Idle          Idle      None  None                <+>
                 16  Idle          Idle      None  None                <+>



SYS: OK    CSU:ONLN    1:ALRM 2:ALRM 3:ALRM 4: --  5: OK  6: OK  7: --  8: --
                                                          ^Z=help  3:56_
```

Figure 3-6. Session Statistics Panel

Mode
Read security: 5
This read-only field displays the current mode of the call by displaying one of the thirteen following messages:

Unassigned
The port has not yet been assigned in the Dial Plan configuration for the system unit. It is not available for either dial-in or dial-out calls. (See Appendix A, *Dial Plan Interface Configuration*, for information on how to assign an Async-232 module in the Dial Plan.)

Idle
The port has been assigned in the Dial Plan and is available for dial-in or dial-out calls depending on the configuration of the port. A call is not active on the port.

Ring
An incoming call has been routed to the Async-232 module port. The call has not yet been answered and the call type is not known.

Modem Ringing
An incoming analog call has been routed to the port but has not yet been answered.

ISDN Ringing
An incoming ISDN call has been routed to the port but has not yet been answered.

Modem Answer
An analog modem has been allocated and is being used to answer a dial-in call.

ISDN PPP Answer
An ISDN resource has been allocated and is being used to answer a dial-in ISDN call.

Modem Dial
An analog modem has been allocated and is being used to dial an outgoing call.

ISDN PPP Dial
An ISDN resource has been allocated and is being used to dial an outgoing ISDN call.

ISDN Scanning Protocol
An ISDN resource has been used to answer an incoming ISDN call, and the port is attempting to detect the protocol in use.

Modem Connected
A dial-in or dial-out analog call is connected.

ISDN PPP Connected
A dial-in or dial-out ISDN PPP call is connected.

Loopback
The port has been placed in DTE Local Loopback mode.

Call Dir (Call Direction)
Read security: 5
Displays the call direction, as follows:

Idle
No call

Incoming
Answered call was received on the module port.

Outgoing
An outgoing call originated from the module port.

Rsc (Resource Allocated)
Read security: 5
Indicates the slot number and device number of an allocated analog modem or ISDN resource. The resource type is indicated in the Mode field.

Last Disconnect (Last Disconnect Reason)
Read security: 5
Displays a string indicating the reason the last call was disconnected from the port. Disconnect reason messages may also be logged in the ATLAS Event Log or remotely via Syslog by setting the Async-232 severity threshold to Normal or lower. The following fifteen status messages may be present:

None
No call is active on the port.

Modem/ISDN Never Connected
The allocated resource never connected for a dial-out call.

Modem/ISDN Link Dropped
A previously connected call has been hung up by the locally allocated analog modem or ISDN resource.

Endpoint Released
The Dial Plan configuration that was present for the port has been deleted and the active call was disconnected.

DTR Dropped
DTR from the DTE went inactive, indicating that the current call should be hung-up.

Port Config Changed
Either the DTE Bit Rate or Flow Control method was changed in the port configuration while a call was active.

DTE Issued AT Disc
An ATH hang up command was received from the DTE.

Console Dropped Call
Call was hung-up using the terminal menu drop call activator field.

Remote Dropped Call
The remote analog modem or ISDN resource hung-up an active call.

No Modem/ISDN Available
An analog modem or ISDN resource from another option module could not be allocated to handle an incoming or outgoing call.

Keypress Aborted Dial
An attempt to dial-out using ATD command was aborted due to a received key from the DTE while waiting to connect.

No Dial Plan Entry
An attempt to dial-out using the port was made before it was assigned in the Dial Plan.

Call Rejected - Busy
The Dial Plan configuration could not find a resource within ATLAS that
would accept the call.

No Such Number
The Dial Plan configuration could not route the dialed number.

Call Error
The Dial Plan configuration returned an error for the dialed call attempt.

Hangup
Read security: 5
Allows forced disconnection of an active call on the port. A dialog box asks you to
confirm your decision to hang up (see Figure 3-7).

```
┌─Confirm (y/n)──────────────────────────────────────────────┐
│                                                             │
│ ** WARNING **  This will hang up any current call for this port │
└─────────────────────────────────────────────────────────────┘
```

Figure 3-7. Hangup Confirmation Dialog Box

Configuration

Read security: 5
This submenu configures the Async-232 Module ports (see Figure 3-8). Once
selected, configuration options immediately take effect. All fields are read and
write, although the availability of some fields depends on options chosen in other
fields. The Async-232 Module port data format assumes 8 data bits, no parity, and
1 stop bit (8N1).

```
ATLAS 800/Modules[6]/ASYNC-16 Menus/Configuration
Info            Prt Port Name BitRate Flow Ctr Call Dir In Ctrl  Dialout   Modem
Signal Status    1  Async6/1   57.6k  Hardware In & Out DTR-DCD [DTR/MDM]   [+]
I/O Stats        2  Async6/2   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
Session Status   3  Async6/3   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
Configuration    4  Async6/4   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
Test             5  Async6/5   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                 6  Async6/6   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                 7  Async6/7   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                 8  Async6/8   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                 9  Async6/9   57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                10  Async6/10  57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                11  Async6/11  57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                12  Async6/12  57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                13  Async6/13  57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                14  Async6/14  57.6k  Hardware In & Out DTR-DCD [AT/MDM]    [+]
                15  Async6/15  57.6k  Hardware In & Out AT Cmds [AT/ISDN]   [+]
                16  Async6/16 115.2k  Hardware In Only  AT Cmds            [+]



SYS: OK    CSU:ONLN     1:ALRM 2:ALRM 3:ALRM 4: --   5: OK   6: OK   7: --   8: --
                                                                   ^Z=help  4:00
```

Figure 3-8. Configuration Submenu Panel

Some fields may be modified using either the Terminal menu interface or AT com-
mands. Terminal menu values always represent the stored NVRAM profile for
the port, and the current profile represents any changes made to the stored profile
via AT commands.

The **&V** AT command displays the current and stored profile for AT parameters.
When a field is modified using AT commands, the value set with the AT com-
mand overrides the menu setting for the session.   This value is not displayed in
the Terminal menu until the session profile is written to non-volatile memory

(NVRAM) using **&W**. (If the profile is not written, it is assumed that the device does not wish the session profile to be preserved between ATLAS system restarts.)

If a new call is made and a different modem allocated, the new modem is initialized with the port's current profile. When a change is made to a field in the terminal menu, the new value updates both the stored and current profile. (See Appendix B, *AT Commands*.)

Port Name
Write security: 3; Read security: 5
Any alphanumeric name up to 16 characters can be entered to uniquely identify each port on the Async-232 Module.

DTE Bit Rate
Write security: 3; Read security: 5
Selects the bit rate used at the connector between the Async-232 Module port and the DTE. Changing this field hangs up a connected call and requires confirmation. Selectable values range from 300 to 115.2 Kbps. Higher bit rates normally require hardware flow control.

NOTE *The selected bit rate must match the speed configured on the DTE. The Async-232 Module does not support Autobaud.*

Flow Ctr (Flow Control)
Write security: 3; Read security: 5
Selects the port flow control method. The chosen method must match the method used by the DTE device attached to the port. Changing this field hangs up a connected call and requires confirmation. Flow control methods include Hardware, Software, and None.

Hardware
Hardware flow control monitors RTS from the DTE and controls CTS to indicate flow control status. Hardware flow control should be used in all cases except when it is not supported by the attached DTE.

Software
Software flow control uses XON and XOFF characters in the data stream to control flow.

None
No flow control selected for this port.

Call Dir (Call Direction)
Write security: 3; Read security: 5
Call Direction options include *In Only, Out Only,* and *In & Out*.

In Only
Connected DTE only answers incoming calls through this port.

Out Only
Connected DTE only initiates outgoing calls through this port.

In & Out
Connected DTE answers incoming calls and initiates outgoing calls through this port.

In Ctrl (Incoming Call Control)
Write security: 3; Read security: 5
Selects the method by which incoming calls are indicated to and controlled by the DTE. Options include *DTR-DCD* and *AT Cmds*.

DTR-DCD
An activated data carrier detect (DCD) signal indicates that an incoming call is answered from the Async-232 Module port. Upon call hang-up, the DCD becomes inactive. The data terminal ready (DTR) signal must be active from the DTE for an incoming call to be answered. If the port is part of a group assigned in the Dial Plan, then the first idle port with DTR active will answer the call. If the DTE drives DTR inactive, the Async-232 Module port hangs up an active call.

AT Cmds (AT Commands)
AT commands and responses indicate and control calls. AT commands also support port and allocated modem or ISDN resource configuration. A con-nected call may be hung up by issuing the escape-to command mode sequence (+++) and ATH. DCD is still sourced and DTR monitored as above.

Calls are automatically answered by default. If required, auto-answer can be disabled and the DTE can manually answer incoming calls. Simply, set this field to *AT Cmds* and issue ATS0=0 from the DTE.   The Async-232 Module port toggles the RI signal and issues RING message strings when it detects an incoming call. The DTE may answer the call by sending an ATA command (see Appendix B, *AT Commands*).

Dialout (Dialout Cfg)
Write security: 3; Read security: 5
Includes all options that affect dialing outgoing calls. The record field indicates the values of the key dialout subfields.

AT/MDM
Indicates that AT dialing of a modem is selected.

DTR/MDM
Indicates that DTR dialing of a modem is selected.

AT/ISDN
Indicates that AT dialing of an ISDN resource is selected.

DTR/ISDN
Indicates that DTR dialing of an ISDN resource is selected.

Dialout Method
Write security: 3; Read security: 5
Selects the method by which outgoing calls may be initiated by the DTE.

DTR Dial
When DTR is enabled by the DTE and a number has been entered in the DTR Dial Number field, an outgoing call attempt is made. The call is hung up

when DTR is dropped. If the call does not connect, the call will continue to be retried as long as DTR remains active.

AT Dial

When enabled, AT commands may be used to dial outgoing calls. Port and allocated modem or ISDN resource configuration is also supported via AT commands.   The DTR signal must be active from the DTE to dial out. The call is hung up when DTR is dropped or when the escape-to command mode sequence (+++) and ATH are issued. When the call is connected, the Async-232 Module port enables DCD.

DTR Dial Number

This field is only active when outgoing calls are enabled and Dialout Method is set to DTR Dial. If a phone number is entered here, it will be dialed when DTR goes active.

Callout Protocol

This field determines what type of resource will be allocated and the data protocol that will be used for an outgoing call attempt for the port. The following selections are available:

Analog Modem	An outgoing call attempts to allocate a modem resource and make an analog call. Asynchronous data is passed unmodified between the Async-232 Module port and the allocated modem. The analog modem resource is freed when the call is hungup.
ISDN PPP	An outgoing call attempts to allocate an ISDN resource and make a digital call. Both ends of the call must be using PPP as the protocol to communicate across the link. The Async-232 Module port performs PPP Async-to-Sync conversion between the asynchronous DCE port and the synchronous ISDN link. This conversion is the standard method of transporting PPP frames available in ISDN Terminal Adapters from ADTRAN and other manufacturers. The PPP Async-to-Sync protocol complies with the Internet Engineering Task Force (IETF) RFC 1662. For the ISDN call to be routed outside ATLAS, a PRI or BRI interface must be connected to the system and be correctly configured.

Out ISDN Call Type

When Callout Protocol has been set to ISDN PPP, this field determines what type of ISDN call will be made when a call is attempted. The value must match the network services provisioned for the PRI or BRI interface that the call will be carried on. This field is not present and ignored when the Callout Protocol is Analog Modem.

Data 64K   Directs the call control software to request an unrestricted 64 Kbps circuit. The default call type for ISDN service is Data 64 Kbps.

Data 56K   Directs the call control software to request a 64 Kbps data circuit that is rate-adapted to 56 Kbps. It is intended for use in circumstances where interoperability with Switched 56 service is desired.

Audio   Directs the call control software to request a 3.1 kHz audio circuit as the bearer capability for outgoing calls. The Audio option is used with an ISDN line configured for voice service. In some areas audio service is less expensive than data service. Selecting an Audio call type guarantees a digital end-to-end ISDN connection.

Speech   Speech directs the call control software to request a Mu-law speech circuit as the bearer capability for outgoing calls. The Speech option is used with an ISDN line configured for voice service. In some areas voice service is less expensive than data service. A Speech call type does not guarantee an end-to-end digital connection with some local and long distance carriers.

Modem

Write security: 3; Read security: 5

Configures an allocated modem for incoming and outgoing analog modem calls. Selected options are issued to the modem when it is allocated to answer an incoming call or initiate an outgoing call. Some options imply a negotiation with the remote modem.   These modem options may also be specified through the AT command interface if enabled.

Highest Bit Rate	Selects the highest bit rate the allocated modem will attempt to connect with to the remote modem. Modulation scheme is automatically selected based on the connection speed.
Lowest Bit Rate	Selects the lowest bit rate the allocated modem will attempt to connect with to the remote modem. If the lowest bit rate or higher cannot be negotiated with the remote modem, the call is disconnected. Modulation scheme is automatically selected based on the connection speed.
Error Correction	
Disabled	No error correction is requested. If the remote modem refuses to support the option, the call is disconnected. Although no error correction is used, this mode still allows speed matching, data buffering, and flow control.
Auto-Reliable Link Mode	Modem will attempt to negotiate LAPM, MNP, or no error correction with the remote modem. This is the default setting.
Force LAPM Mode	Modem will attempt to negotiate LAPM error correction with the remote modem. If it cannot, the call is disconnected.
Force MNP Mode	Modem will attempt to negotiate MNP error correction with the remote modem. If it cannot, the call is disconnected.
Data Compression	Error correction must be enabled to use data compression; data compression is automatically disabled if error correction is disabled.
Disabled	Both MNP5 and V.42bis data compression methods are disabled.
MNP5	MNP5 data compression is enabled.
V.42bis	V.42bis data compression is enabled.
V.42bis and MNP5	Both MNP5 and V.42bis data compression are enabled. This is the default setting.

Test

Read security: 5
Controls activation of individual port tests.

NOTE *The execution of port tests disrupts normal data flow in the port being tested.*

DTE Local Loopback
Write security: 4; Read security: 5
Loopback can be Enabled or Disabled for a port with this field. When Enabled, all data received from the DTE by the Async-232 Module port is transmitted back to the DTE. Loopback state is not saved in the module configuration; and, if the card is hot swapped or the ATLAS system restarted, loopback is disabled on all ports. It is not necessary to have a Dial Plan entry for a port to enable loopback.

Dial Plan Interface Configuration

INTERFACE CONFIGURATION

The Interface Configuration option for the Dial Plan menu sets configuration parameters for the end point. These parameters vary by the type of port selected. The following section describes the configuration options available for the Async-232 Module. The Dial Plan menus are only accessible when using terminal mode. To access these options, select Dial Plan from the top level menu. An Async-232 port or range of ports must be assigned in the Dial Plan before it may be used to answer incoming or initiate outgoing calls.
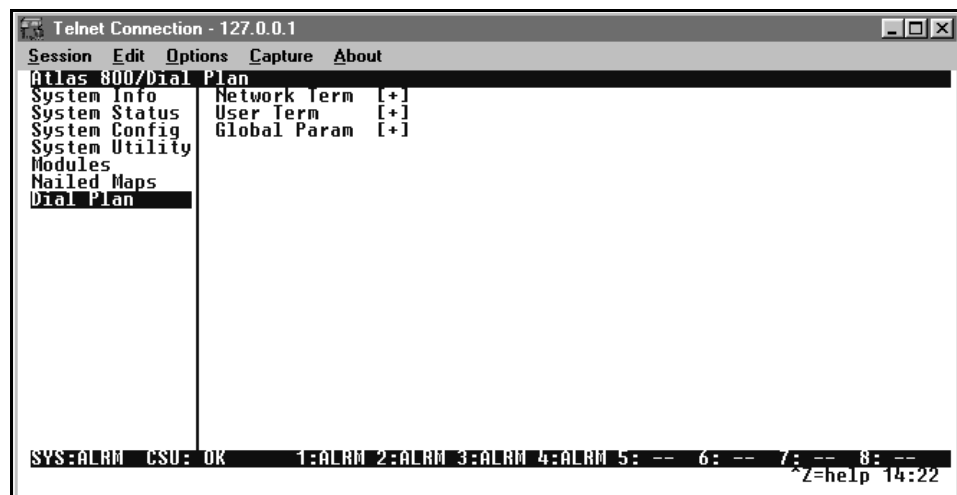
Figure A-1. Dial Plan Menus

ASYNC-232 MODULE INTERFACE CONFIGURATION

This section describes the Interface Configuration settings for the Async-232 Module when using the Dial Plan User Termination menus. See the Dial Plan Menu documentation in the *ATLAS User Manual* for information on general configuration of User Termination options.

NOTE

The Async-232 Module can only serve as a User Termination end point.

When you are working in the User Termination section of the Dial Plan menu and the Slot is defined as an Async-232 Module, the following Interface Configuration options are available:

Ports Available
Indicates which of the Async-232 Module's 16 ports have already been defined in another switched end point (indicated by "s"). Ports which are defined in the current switched end point are indicated with "!". Available ports are indicated by a single digit number representing the last digit of the port number.

Number of Ports
Defines to ATLAS how many of the ports are available to answer calls to the number(s) defined in the Incoming Number Accept list. You can enter numbers 1 through 16. The ports are contiguous, beginning with the Port number selected and continuing through the number of ports selected.

Example:
If the port selected (as part of the Slot/Port selection) is 8, and the Number of Ports selected is 8, then ports 8 through 15 are enabled to receive calls to the numbers listed under the Incoming Call Accept list (see Figure A-2).

```
ATLAS 800/Dial Plan/User Term
Network Term   #   Slot/Svc    Port/Link  Sig  In#Accept   Out#Rej    Ifce Config
User Term      1   1)ASYNC-16  1)Async1/        [963-0001]     [+]       [port 1]
Global Param   2   1)ASYNC-16  2)Async1/        [963-0002]     [+]       [port 2]
               3   1)ASYNC-16  3)Async1/        [963-0003]     [+]       [port 3]
               4   1)ASYNC-16  4)Async1/        [963-0004]     [+]       [port 4]
               5   1)ASYNC-16  5)Async1/        [963-0005]     [+]       [port 5]
               6   1)ASYNC-16  6)Async1/        [963-0006]     [+]       [port 6]
               7   1)ASYNC-16  8)Async1/        [963-0008]     [+]      [ports 8-15]




SYS: OK   CSU:ONLN     1:WARN 2: --  3: --  4: --  5: OK  6: --  7: --  8: --
Termination of connections to user equipment                      ^Z=help  1:55_
```

Figure A-2. Sample Dial Plan

Source ID
Identifies a unique ID type for this end point. This field simplifies the creation of a Dial Plan in applications where the criteria for switching calls to a certain end point is a function of which end point originated the call.

• Source IDs can range from 0 to 9.

• Default value = 0. The default ID for all end points is 0 (zero). With default values, all calls are routed based on dialed numbers only.

• Multiple end points can have the same Source ID.

• When creating the Call Accept list, specify a Source ID(s) as well as a dialed number or range of dialed numbers to accept.

Example:
An application requires that all calls originating from Port 1 of the Async-232 Module in Slot 1 be switched to Port 4 of that same module. Assign a unique

Source ID (e.g., 7) to Port 1 of the module, and then configure Port 4 to accept calls from the unique Source ID (7) only.

AT Commands

OVERVIEW

Configuring an Async-232 Module port for AT commands enables in-band call dialing and answering over the DTE interface using asynchronous AT commands. AT commands can be used to configure the port as well as establish and end a call. AT commands and response messages may be separately enabled for incoming and outgoing calls. For incoming calls, set the **In Call Control** field to **AT Cmds**. For outgoing calls, set the **Dialout Method** field to **AT Dial**. Either option or both must be enabled to issue AT commands to the port.

USING AT COMMANDS

Before a call is established or answered, the port accepts AT commands for configuration, status reporting, and dialing. After a call is established or answered and the Data Carrier Detect (DCD) signal is driven active, the port enters data mode.

To exit data mode and enter command mode, the DTE must transmit a proper escape sequence to the Async-232 Module port. A specified minimum time delay must occur between the last data character and the first escape sequence character as well as the last escape character and the next data character to enter command mode. This is the guard time delay, and it can be changed by writing a value to the S12 register. The default value for the guard time is one second. For a valid escape sequence to occur, the DTE must transmit the escape code character three times in succession with delay between each character being less than the guard time. The default escape sequence is +++. The escape character may be changed or escape to command mode disabled using the S2 register. Recognition of escape to command mode is automatically disabled if AT command mode is not enabled.

NOTE

If the Async-232 Module port is connected to a DTE that echoes all received characters, perhaps as part of a text menu interface, it may be useful to change the escape character or turn it off to prevent entering command mode based on an escape sequence received from a remote modem.

Once command mode is entered, AT commands can be transmitted to the port to configure options, check device status, or hang-up the call with the ATH command. To return online to data-mode from command mode, enter ATO. All command lines must begin with the AT characters in capital or lower case letters and end with a carriage return (ASCII decimal 13.) Before the terminating character is transmitted, the command line can be edited by using the backspace character

(ASCII decimal 8) to correct errors. The maximum length for a command line is 40 characters. The command line may contain a single command or a series of commands after the AT attention code. When a series of commands are used, the individual commands may be separated with spaces for readability.

USING AT COMMAND SET S-REGISTERS

Part of the Async-232 Module port configuration can be viewed or changed with S-registers. See the **S-Register List** section for a description of supported S-registers.

Reading S-Registers

Type **ATS,** followed by the number of the S-register to be read, followed by a question mar, and press **Enter** to read an S-register value. Key S-register values are also displayed in response to the &V profile view command. For example: **ATS0?**

Changing S-Registers

To change the value of an S-register, type **ATS,** followed by the number of the S-register to be changed, an equal sign, the numeric value to be assigned to the register, and press **Enter**. For example: **ATS0=1**

Originating a Call Using the AT Command Processor

To dial a number using the DTE terminal and AT commands type **ATD** and the telephone number on one line and press **Enter**. For example: **ATD5551212**

If the call is successful, a CONNECT response message is returned to the DTE. If not, the reason for the call failure is printed as an AT response message. If more information regarding the call failure is available, it is displayed in the Last Disconnect Reason field in the Session Status terminal menu screen or optionally in the event log. The Last Disconnect Reason may also be viewed using the **ATI5** AT command.

To end an active call, press the break in key sequence (+++) or redefined key sequence, then type **ATH** and press **Enter** to hang-up the line. The call will also be hung up if the DTE drops the DTR signal for at least 50 milliseconds.

AT COMMAND LIST

Following is a list of the supported AT commands and their functions.

Modem and Port Control

ATS	Access S-register
ATA	Answer if autoanswer mode not enabled (see S0 register description)
AT	Attention
ATH	Hangup in command escape mode
A/	Repeat last command
ATZ	Reset. Hang up call if active and reset profile to current NVRAM settings.
ATO	Return online after command escape

Profile Configuration Control and Command Help

Command values with menu equivalents will not be changed based on AT command changes unless the profile is stored for the port (&W).

&V2	Display AT command list help
&V	Display this port's active and stored profiles
&F	Restore factory default profile for port (does not save settings to NVRAM)
&W	Save current profile for this port to NVRAM

Dial Commands

Dial commands, their functions, and examples are given in Table B-1.

Table B-1. Dial Commands

Command	Function	Example
ATDdialnum	Dial out. Precedes the dial string. Protocol and call type set in configuration menus.	ATDT5551212
ATDdialnum#P	Dial out using specified protocol which overrides configuration menu settings. P=1 selects Analog Mode, P=2 selects ISDN PPP.	ATDT5551212#1
ATDdial string#P#C	Dial out using specified protocol and ISDN digital call type. P=2 as above selects ISDN PPP C=1 selects Data 64K C=2 selects Data 56K C=3 selects Audio 3.1KHz C=4 selects Speech	ATDT5551212#2#3

ATDT and ATDP prefixes result in the same dialing behavior as ATD.

Command Echo

E0   Enable command echo

E1   Disable command echo

Unit Identification

I0   Identify Hardware

I1   Identify Firmware

I5   Display Last Disconnect Reason

I6   Display the slot and port number

Speaker Options

L   Speaker volume (speaker option accepted but ignored)

M   Speaker enable (speaker option accepted but ignored)

Response Messages

Q0   Response messages enabled (default)

Q1   Response messages disabled

Result Code Format

V0   Numeric result code form

V1   Verbose result code form (default)

Extended Result Codes

X0   Simple CONNECT message

X1   CONNECT with DTE Bit Rate message (default)

Data Compression Control

%C0   No Compression

%C1   MNP5

%C2   V.42bis

%C3   V.42bis and MNP5 (default)

Error Correction Control

\N0   Disabled

\N1   Disabled

\N2   Auto reliable link mode (default)

\N3   Auto reliable link mode (default)

\N4   Force LAPM mode

\N5   Force MNP mode

Highest Modem Connect Bit Rate

%B0   300 bps max

%B1   1200 bps max

%B2   2400 bps max

%B3   4800 bps max

%B4   7200 bps max

%B5   9600 bps max

%B6   12000 bps max

%B7   14400 bps max

%B8   16800 bps max

%B9   19200 bps max

%B10   21600 bps max

%B11   24000 bps max

%B12   26400 bps max

%B13   28800 bps max

%B14   31200 bps max

%B15   33600 bps max

%B31   K56 Flex Rates (default) Modems determine connect bit rates.

Lowest Modem Connect Bit Rate

%L0   300 bps min (default)

%L1   1200 bps min

%L2   2400 bps min

%L14   31200 bps min

%L15   33600 bps min

DTE Port Flow Control Menu Override

Causes any existing call to be hung up. Like any of the other AT command values, this change will not be reflected in the controller menus or saved to NVRAM until the modem configuration is saved (&W).

\Q0   No flow control

\Q1   Software flow control (XON-XOFF)

\Q2   Invalid (returns ERROR)

\Q3   Hardware flow control (RTS-CTS) (default)

S-Register List

S0 Auto Answer

Determines if the port automatically answers an incoming call:

0 = Disable Auto Answer (Port does not answer call)

1 = Enable Auto Answer (Port answers all calls) (default)

S2 Command Escape Character

Determines which key or character defines the escape command. The standard escape character is a + sign (ASCII value of 43 decimal). To change the character, set S2 to the desired ASCII value in the range of 0 to 255. If S2 is set to a character greater than 127, attempts to escape to command mode are ignored.

S12 Escape Sequence Guard Time

Determines the minimum delay required before and after entering the escape command and the maximum delay between escape characters for the port to recognize and execute the command. It is specified in 0.2 second increments, and defaults to 50, setting the guard time to 1 second. If it is set to 0, then no guard time is required to escape to command mode; any timed sequence of three escape characters will immediately cause command escape.

Failure Messages

Module Failure

If the Async-232 Module fails to power on correctly, the board status under module menus indicates **Not Ready** or **No Response**.

> **NOTE** *The board status indicates **Not Ready** for a few seconds after insertion while booting.*

FLASH Invalid

If the Async-232 module processor detects that the module firmware is corrupt, the Alarm status under the module menus will indicate [FLASH].

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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-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

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 35806

RMA # _____