

DIVA T/A ISDN Modem Reference Guide



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What is ISDN?

While you've heard of ISDN, there's a good chance you're unsure whether you need it - or even what, exactly, it is. Even though ISDN is globally available, it's so new that understanding it may require a little investigation.

In simple terms, ISDN is a replacement for plain old telephone service, which was never designed to meet the needs of the information age. ISDN uses the same wiring that currently serves homes and businesses. You get ISDN service from the same companies who provide telephone service, and you use it to connect telephones, computers, and fax machines. The difference is that you get much faster, much more dependable connections for voice, data, fax, and even video - all through a single line.

International ISDN standards were established about 10 years ago. Since then, telephone companies throughout the world have raced to upgrade their equipment to ISDN standards. As ISDN service availability has spread, many millions of computer users have turned to ISDN, and new users are coming on board even faster.

ISDN stands for Integrated Services Digital Network

"Integrated Services" refers to ISDN's ability to deliver two simultaneous connections, in any combination of data, voice, video, and fax, over a single line. Multiple devices can be attached to the line, and used as needed. That means an ISDN line can take care of most people's complete communications needs, without forcing the purchase of multiple analog phone lines at a much higher transmission rate.

The "Digital" in ISDN refers to its purely digital transmission, as opposed to the analog transmission of plain old telephone service. If you're using a modem for Internet access at this moment, your Internet service provider's modem has converted this site's digital content to analog signals before sending it to you, and your modem converts those signals back to digital when receiving (the same thing happens with every keystroke and mouse click you transmit). When you connect with ISDN, there is no analog conversion. ISDN transmits data digitally, resulting in a very clear transmission quality. There is none of the static and noise of analog transmissions that can slow transmission speed.

"Network" refers to the fact that ISDN is not simply a point-to-point solution like a leased line. ISDN networks extend from the local telephone exchange to the remote user and include all of the telecommunications and switching equipment in between. When you have ISDN, you can make connections throughout the world to other ISDN equipment. If your ISDN equipment includes analog capabilities, you can also connect to analog modems, fax machines, and telephones, even though they may be connected to plain old telephone service.

Benefits

While ISDN accommodates telephones and fax machines, its most popular advantage is in computer applications. You can plug an ISDN adapter into a phone jack, like you would an analog modem, and get a much faster connection with no "line noise." The most common ISDN service, Basic Rate Interface (BRI), provides two 64 Kbps channels per line. When the two channels are bonded in a single connection, you get a speed of 128 Kbps, which is about four times the actual top speed of the fastest analog modems. Compression can increase throughput to around 250 Kbps.

Telecommuters, for example, benefit immensely from ISDN. Whether you access the corporate LAN in the evenings or maintain a full-time, remote home office, ISDN is the next best thing to being there. E-mail, database access, and file transfers improve dramatically, making it seem like you're locally attached to the LAN.

Internet access is another great application for ISDN. Compared with even the fastest modem access, ISDN makes Web graphics appear almost immediately, and can reduce download times by over 75%. ISDN can even provide advantages over shared, higher-bandwidth office connections; PC Magazine advises that an ISDN connection can deliver better performance than a T1 shared among users on a LAN. And in many markets, it's actually cheaper than an isolated analog business line.

Such large-scale file transfer applications as medical imaging, insurance and law enforcement imaging, and the preparation of printed materials are additional arenas where ISDN proves highly beneficial. With the dramatic reduction in file transfer time, ISDN makes even multi-megabyte files available to recipients within minutes, not hours.

Videoconferencing is an emerging ISDN application that's growing fast in popularity and ISDN is currently the only practical way of making it happen.

ISDN Communication Channels

In the ISDN interface, a number of communication channels are carried over a digital line. These communication channels can vary by the type of information they transmit and by the transmission speed they support. The number and type of channels used may vary.

The communication channels can be of the following types:

- B-Channel - 64 Kbps
- D-Channel - 16 or 64 Kbps
- H-Channel - 384, 1536, or 1920 Kbps (not yet commercially available)

Different combinations of these channels are used to support different types of usage (e.g., basic, primary and broadband).

B-Channel

The B-channel is a user (bearer) channel that carries a subscriber's digital traffic (e.g. digitized video, voice, audio, or digital data, or perhaps a mixture). The bandwidth of this channel is 64 Kbps. The control signals used to set up the connection, however, are not sent over the B-channel. The call establishment is done on the D-channel using common-channel signaling. This concept will be discussed shortly.

Two kinds of connections can be established over a B-channel:

- Circuit-Switched
- Packet-Switched

Circuit-switched connections are ideal for voice traffic for several reasons. Voice data is "delay-sensitive," meaning that it must not be delayed, and that it must be received in the order in which it was transmitted. There is a call set-up time that is characteristic of circuit-switched connections. This time lag is quite acceptable when measured against the length of a typical telephone call.

In a packet-switched data network or PSDN, data to be transmitted is broken up into individual units called packets that are then routed from sender to receiver. The sender/receiver can be any type of terminal, printer, computer or other device that supports an interface to the network.

D-Channel

The primary function of the D-channel is to carry common-channel signaling information to manage and control circuit-switched calls on B-channels.

The D-channel can also be used for packet-switching or low-speed telemetry when it is not involved in control signaling. Message signaling takes priority over data packet-switching.

The D-channel functions at 16 Kbps for Basic Rate Interface or 64 Kbps for Primary Rate Interface. The speed is dependent on the end-user's interface.

H-Channel

The H-channel is used for high-speed user data traffic at bit rates higher than 64Kbps. Examples of services which require these higher rates are fast facsimile, teleconferencing, and video. An H-channel user can subdivide the channel using TDM to meet specific requirements.

Connecting to ISDN - BRI and PRI

There are two types of access interfaces to the ISDN: Basic Rate Access (also referred to as Basic Rate Interface (BRI)) and Primary Rate Access (also referred to as Primary Rate Interface (PRI)).

Basic Rate Access

Basic Rate Interface or Access consists of two B-channels operating at 64 Kbps and one D-channel operating at 16 Kbps. It is also commonly referred to as 2B+D.

Primary Rate Access

The primary rate interface is designed for users with large capacity requirements.

There is no single transmission rate defined for primary rate access. In North America and Japan, for example, primary rate interface is based upon the T1 rate (defined in detail shortly) of 1.544 Mbps. In Europe, by comparison, the rate is 2.048 Mbps.

What is Multilink PPP?

Multilink PPP combines two 64 Kbps ISDN channels to provide a maximum transmission speed of 128 Kbps. The DIVA T/A serves as an intermediary between its host workstation and the remote device to which data is being transmitted. All the protocol processing required for the negotiation of a Multilink PPP connection is performed on the DIVA T/A itself. The PC forwards asynchronous PPP packets to the DIVA T/A which, in turn, converts the packets for synchronous transmission and negotiates the various authentications required to establish the Multilink PPP connection with the target system over ISDN lines. This allows for the more efficient use of the ISDN line without requiring any changes to the PPP stack currently loaded on your PC.

DIVA T/A supports COM port rates of up to 230.4 kbps. However, some computer COM ports are limited to 115.2 kbps. If you want to use your DIV AT/A at its maximum speed, install a "fast COM port" card (UART 16650 based).

What is BACP/BOD?

DIVA T/A supports the Bandwidth Allocation Control Protocol (BACP) and Bandwidth on Demand (BOD). BACP/BOD refers to the ability of a system to allocate and remove links in a multilink connection in order to lower or increase its bandwidth.

BACP/BOD monitors the flow of traffic across your ISDN connection. When the traffic on the first B-channel reaches a threshold level for a defined period of time (either because of deteriorating line conditions or increased traffic), the second B-channel is automatically added. The second B-channel is kept active as long as traffic remains above the threshold level. When the traffic drops below the threshold level, the second B-channel is dropped.

When used in conjunction with AO/DI, the D channel flow of data is evaluated and compared to the threshold in order to add or remove the first B channel.

Since BACP/BOD automatically adds and drops the second B-channel in response to traffic peaks and declines, the process is completely transparent.

BACP/BOD is an excellent way to reduce communications charges in situations where your demand for ISDN bandwidth fluctuates.

What is DBA?

DIVA T/A also supports Dynamic Bandwidth Allocation (DBA), known also as Call Bumping. DBA automatically drops one B-channel to allow an incoming or outgoing telephone, fax or modem call. When the voice call is over, DBA automatically re-establishes the multilink session by reconnecting the second B-channel, if the throughput requires it. It is recommended that you use DBA with BACP/BOD so that you can have greater flexibility when using the DIVA T/A.

Note: If an analog device is used on the server side of the connection, DBA will not restore a channel that has been bumped.

What is Always On / Dynamic ISDN (AO/DI)?

AO/DI is only available if you have subscribed to it, your ISDN service provider supports it, and you are using Multilink PPP. AO/DI uses the ISDN D-channel X-25 packet service to maintain an "always on" connection between you and your Service Provider. Low bandwidth requirements can be met using this constant connection, such as sending and receiving e-mail, credit card verification, etc.

If additional bandwidth is required (to download a large file, for example), AO/DI, in conjunction with Bandwidth on Demand (BOD), automatically adds B-channels of 64 Kbps each, for a total of 128 Kbps when both B-channels are in use. When the additional bandwidth is no longer required, one or both B-channels are dropped, leaving the D-channel connection in place.

AO/DI enhances ISDN use in a number of ways:

- AO/DI can quickly and automatically adjust to the voice and data needs of end-users. For example, if both B-channels are bonded in a data connection, and an incoming call is received, one of the B-channels is automatically freed up for the telephone call. If a fax call also comes in, the remaining B-channel may be allocated to the fax call. The data connection continues on the D-channel until a B-channel is available, if needed.
- As B-channels are invoked only when additional bandwidth is needed, connection costs are significantly reduced.

What is Data Compression?

To establish communications over a PPP link, each end of the connection must first send packets to configure and test the data link. After the link has been established, optional facilities may be negotiated as needed. One such facility is data compression. A wide variety of compression methods may be negotiated, although typically only one method is used for both directions of the link.

Data compression is a process where the effective throughput is increased by encoding data in such a way that fewer bits are required to represent it. For example, a text file might be compressed by representing common words with single characters; thus if the word "the" is represented by the character "@", it will be transmitted three times faster. Popular compression algorithms typically reduce the size of the data by 50%, effectively doubling the rate at which it is transmitted.

The Compression Control Protocol (CCP) works with MLPPP and is responsible for configuring, enabling, and disabling data compression algorithms on both ends of the point-to-point link. PC Compression negotiation takes precedence over the DIVA T/A negotiation for performance considerations (for example, the PC compression may reduce the number of bytes that go through the serial interface, the PC has the quicker CPU, etc.). The DIVA T/A compression negotiation, however, will assume control should no compression be detected or the initial negotiation fail. No user configuration is required to enable the DIVA T/A's compression functionality. Compression algorithms currently supported by the DIVA T/A include Stacker LZS (Hi/fn), MPPC (Microsoft), and Ascend.

Locating AT Commands

To make it easier for you to locate a command, this guide has organized commands in two ways.

- A list of **AT Commands grouped into categories** can be found on [page 16](#).
- An **alphabetical list of commands** is available on [page 17](#).

AT Command Syntax Conventions

When issuing AT commands, you must abide by the following syntax conventions:

- A command line consists of a prefix, body, and terminator. Each command line must begin with "AT" (except A/).
- AT commands must be terminated by a carriage return (except A/).
- Commands entered in upper or lower case are accepted (except mini-monitor commands, which must be entered only in lower case).
- The body is a string of commands restricted to printable ASCII characters (032 - 126).
- Space (ASCII 032) and control characters other than CR (ASCII 013) and BS (ASCII 010) in the command string are ignored.
- A command line may be aborted at any time by entering <Ctrl-X> (ASCII 024).
- Carriage returns are programmable through register S3.
- The default terminator is the ASCII <CR> character. Characters that precede the AT prefix are ignored.
- The DIVA T/A recognizes the backspace character. When echo is enabled, a backspace or delete is echoed as a backspace character followed by a space character, and another backspace. The code for the backspace character is programmable through register S5. Values equal to 0, greater than 32, or the carriage return character value, cannot be used for the backspace character.
- The AT sequence may be followed by any command sequence, except for the following: ATZ, ATD, ATA, AT@MENU, AT>H, AT>VC, AT>VD, AT>VT, and AT>Z. Commands following these are ignored.
- Execution of commands ATD and ATA, either as a result of a direct command or a re-execute command, will be aborted if another character is entered before completion of the handshake.
- The maximum number of characters on any command line is 80 (including "A" and "T").
- If a syntax error is found in a command, the remainder of the line will be ignored and an ERROR code will be returned.
- Missing decimal parameters (n) are assumed as 0.
- Most commands entered with parameters out of range will not be accepted and the ERROR response will be returned to the DTE.

- The next command will only be accepted by the DIVA T/A once the previous command has been fully executed.

AT Command Groups

The AT commands in this guide are grouped according to their functions. For an alphabetical list of all commands, see [page 17](#).

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Alphabetical List of Supported AT Commands

The following tables summarize, in alphabetical order, the AT Commands supported by the DIVA T/A. Go to the specified page number for more information on a particular command.

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Note: Command descriptions preceded by the word “static” indicates a static parameter. Changes made to static parameters do not take effect immediately (as opposed to “dynamic” parameters, where changes take effect the moment they are made). To implement a change to a static parameter, use the AT&Wn command; the changes will be implemented when you restart your system.

A list of command groups can be found on [page 16](#).

AT! Commands

AT!An	Directory Number/Port Assignment (static)	31
AT!C1=n	ISDN Switch Type (static)	32
AT!C4=n	Enable/Disable Non-initializing mode for primary B-channel (North America only) (static)	32
AT!C5=n	Enable/Disable Non-initializing mode for second B-channel (North America only) (static)	32
AT!C6=n	ISDN SPID Number for primary B-channel (North America only) (static)	32
AT!C7=n	ISDN SPID Number for second B-channel (North America only) (static)	32
AT!D1=n	Specify Default DTE Speed.	32
AT!D2=n	Specify Default Databits length	32
AT!D3=n	Specify Default Parity	33
AT!D4=n	Specify Default Number of Stopbits.	33
AT!E0=n	V.120 N201 Tx (Maximum Transmit Frame Size)	42
AT!E1=n	V.120 N201 Rx (Maximum Receive Frame Size)	42
AT!E2=n	V.120 Multiframe Mode	42
AT!E3=n	V.120 K Window Size	42
AT!E4=n	V.120 T200 (Retransmission Timer)	42
AT!E5=n	V.120 N200 (Maximum Retry Count)	43
AT!E6=n	V.120 T203 (Link Integrity Timer)	43
AT!E7=n	V.120 Idle Timer	43
AT!Ln	Set ISDN Encoding Law	33
AT!N1=n	ISDN Directory Number Assignments for 1st B-channel and 1st Phone port (static)	33
AT!N2=n	ISDN Directory Number Assignments for 2nd B-channel and 2nd Phone port (static)	34
AT!N3=n	ISDN Subaddress for 1st B-channel (static)	34
AT!N4=n	ISDN Subaddress for 2nd B-channel (static)	34
AT!N5=n	ISDN Directory Number for Data Ports (International only) (static)	34
AT!N6=n	ISDN Subaddress for Data Ports (International only) (static)	34
AT!On	Outgoing Call Type	35
AT!T1=n	Incoming Call Assignment, First Directory Number	39
AT!T2=n	Incoming Call Assignment, Second Directory Number	39
AT!V0=n	V.110 Configuration Override (International version only)	44
AT!V1=n	V.110 Stream Rate (International version only)	44
AT!V2=n	V.110 Character Length (International version only)	44

AT!V3=n	V.110 Parity (International version only)	44
AT!V4=n	V.110 Stop Bits (International version only)	44
AT!V5=n	V.110 Flow Control (International version only)	44
AT!X1=n	Specifies the X.25 version you are using.	49
AT!X2=n	Specifies the X.25 DTE address.	49
AT!X3=n	Specifies the X.25 facilities that are to be included each time a call is made.	49
AT!X4=n	Specifies the local ISDN prefixes to be used.	49
AT!X5=n	Specifies the X.25 default window size.	49
AT!X6=n	Specifies the X.25 maximum window size	50
AT!X7=n	Specifies the X.25 default packet size	50
AT!X8=n	Specifies the X.25 maximum packet size	50
AT!X9=n	Specifies the Terminal Endpoint Identifier used for X.25 over the D-channel.	50
AT!X10=n	Specifies the delay before opening 1st B-channel	50
AT!X11=n	Specifies the 1st B-channel Opening Threshold	50
AT!X12=n	Specifies the 1st B-channel Closing Threshold	50
AT!X13=n	With BACP disabled, specifies the 2nd B-channel Retry Delay.	47
AT!X13=n	With BACP enabled, specifies the delay before opening 2nd B-channel.	51
AT!X14=n	Specifies the 2nd B-channel Opening Threshold	51
AT!X15=n	Specifies the 2nd B-channel Closing Threshold	51
AT!X16=n	Strips the area code from phone numbers.	51
AT!X17=n	Specifies the X.25 transmit queue threshold.	51
AT!X18	Set Normal Mode for Bandwidth on Demand.	52
AT!X19	Set Economy Mode for Bandwidth on Demand.	52
AT!X20	Set Performance Mode for Bandwidth on Demand.	52
AT!X21=n	Specifies the Lowest Logical Connection Number.	52
AT!X22=n	Specifies whether the AO/DI feature is enabled or disabled.	52
AT!X25=n	Specifies how many Logical Connection Numbers (LCN) are used.	53
AT!X26=n	Specifies the contents of the user data field in the X.25 Call Request packet.	53
AT!X56=n	Delay between 64K data call failure and 56K data call attempt.	35

AT% Commands

AT%A2=n	Protocol Control (static)	40
AT%A4=n	ISDN Communication Speed	40
AT%A95=c	Incoming Data Call Answer	40
AT%M1=n	Local Endpoint Discriminator Class	46
AT%M2=n	Remote Endpoint Discriminator Class	46
AT%M3=n	Local Endpoint Discriminator Address	46
AT%M4=n	Remote Endpoint Discriminator Address	46
AT%P5=n	Enable Bandwidth Allocation Control Protocol / Bandwidth on Demand	46
AT%P6=n	Set Initial Billing Interval Timer	46
AT%P7=n	Set Billing Interval Timer	46
AT%P8=n	Dynamic Bandwidth Allocation	47
AT%P9=n	Second B-channel Connection Retries	47
AT%P10=n	Enable/disable PPP Echo-Requests	47

AT& Commands

AT&Cn	Data Carrier Detect	36
AT&Dn	Data Terminal Ready	37
AT&E	Loading Factory Profile	45
AT&Kn	Flow Control	37
AT&Sn	Data Set Ready	37
AT&V	View Current and Stored Profile	45
AT&Wn	Save Current to Stored Profile	45
AT&Yn	Designate Stored Profile n as the Powerup Profile	45
AT&Zn=v	Store Telephone Number(s)	40

AT* Commands

AT*An=v	Abbreviated Ring Control (North America only)	59
AT*Bn=v	ISDN Bearer Capability (static)	59
AT*Cn	Analog Device Caller ID Delivery (static)	59
AT*Dn=v	Internal Dial Access (Calling Features) (static)	59
AT*En=v	Analog Device port Incoming/Outgoing Call Selection	59
AT*Fn	Analog Device Ring Frequency (static)	60
AT*Kn=v	Analog Device Calling Features (North America only) (static)	60
AT*M=v	Visual Message Waiting Indicator Refresh Time (North America only)	60
AT*Pn	Analog Device Country Specific Parameters (static)	60
AT*Rn=v	Analog Device Ring Type (static)	60
AT*Sn=v	Disable Calling Features (Analog Device) (static)	61
AT*Vn=v	Disable/Enable VoiceMail (North America only) (static)	61
AT*Wn=v	Call Waiting Support (International version only).	61

AT> Commands

AT>?	Last AT Command Result Explained	29
AT>E	Restores All Profiles to Factory Settings	45
AT>FC	Reset Current Profile	45
AT>Hs	View Help Information	29
AT>VC	View Current Profile	45
AT>VCC	View Call and COM Port Parameters	45
AT>VCD	View Dynamic Parameters	45
AT>VCP	View Protocol Parameters	45
AT>VCS	View Static Parameters	45
AT>VD	View Link And Connection Status Information	29
AT>VDC	View Connection Status	29
AT>VDD	Initialization Status Display (North America Only)	29
AT>VDL	View Link States	29
AT>VPn	View Stored Profile n	45
AT>VT	View Stored Phone Numbers	29
AT>VX	View X.25 Status (AO/DI)	29
AT>Z	Restart the DIVA T/A	45

AT@ Commands

AT@DATE?	Current Date	29
AT@DATE=	Set Date	29
AT@MENU	Activate VT100 Configuration Tool	29
AT@TIME?	Current Time	29
AT@TIME=	Set Time	29

Other AT Commands

AT?	View Last Accessed S Switch	57
AT=n	Last accessed S-Register to Value n	57
ATA	Answer Calls	40
A/	Re-execute Previous Command	30
ATDn	Dial a Number	41
ATEn	Local Echo	36
ATH	Hang up a Call	41
ATIn	View Product Information	29
ATO	Return Online	29
ATQn	Quiet Result Codes	36
ATSn	Establishes S-Registers n as the selected register	57
ATSn=v	S-Register n to Value v	57
ATSn?	Value of S-Register n	57
ATVn	Result Code Format	36
ATWn	Connect Message Control	36
ATXn	Extended Results Code	37
ATZn	Restart the DIVA T/A	45

S-Registers

S0	Auto-Answer	57
S1	View Ring Count	57
S2	Escape Character	57
S3	Carriage Return Character	57
S4	Line Feed Character	57
S5	Back Space Character	57
S25	Data Terminal Ready Detection Delay	58

AT\$ (Utility) Commands

AT\$CP=n	Enable/Disable Compression	54
AT\$EX	View Exprintf buffer	54
AT\$In	On Demand SPID Testing (North America only)	54
AT\$IG	SPID Guessing (North America only)	54
AT\$Rn	Action on fatal error	54
AT\$SL	Stop LAPD Trace	54
AT\$SM	Stop Mail Trace	54
AT\$SP	Stop PPP Trace	54
AT\$SQ	Stop Q.931 Trace	54
AT\$SX	Stop X.25 trace (AO/DI)	54
AT\$VCn	Set AT command trace	54
AT\$VI	View Initial Profile	54
AT\$VL	Start or View a LAPD Trace	55
AT\$VM	Start or View a Mail Trace	55
AT\$VP	Start or View a PPP Trace	55
AT\$VQ	Start or View a Q.931 Trace	55
AT\$VU	Internal T/A access command	55
AT\$VX	Start AO/DI trace	56
AT\$Y	Enter Mini Monitor on Next Reset	56
AT\$Z	Soft Reset device and Enter Mini-Monitor	56

Mini-monitor Commands

These command are only available when you are in Mini-monitor mode; they are not available when you are in command mode. The commands AT\$Y or AT\$Z will enter the Mini-monitor; see [page 27](#) for more information. These commands are all case sensitive.

at@dump	Dump Memory	62
at@d1	DRAM test	62
at@d2	Flash test	62
at@d3	ISDN internal loop back test	62
at@d4	ISDN external loop back test	62
at>F	Restore Profiles to Original Settings	62
at@load	Simulate a fault	62
at@load	Load New Firmware	62
at@md arg	Display memory	62
at@msg	Display Cause for Entering Monitor	62
at@quit	Exit the Mini-monitor mode.	62

General AT Commands

The following table describes the general AT commands available to the DIVA T/A.

ATIn	<p>View Product Information. Displays information about your DIVA T/A.</p> <p>n=0 Displays hardware code for the DIVA T/A.</p> <p>n=1 Displays software checksum.</p> <p>n=2 Reports "OK".</p> <p>n=3 Displays software version.</p> <p>n=4 Displays capability string.</p> <p>n=6 Displays data pump chipset version.</p> <p>n=8 Displays Eicon Technology DIVA T/A.</p> <p>n=9 Display the external COM port plug and play ID of the DIVA T/A.</p> <p>n=20 Displays product number.</p> <p>n=100 Displays list of supported countries (phone).</p>
ATO	<p>Return Online. In the online data mode, the DIVA T/A is ready to send and receive data, providing you are connected. Normally, the DIVA T/A remains in this mode until your computer sends the data mode escape sequence (+++) or until the call is terminated.</p> <p>Note: This command can only be used when the DIVA T/A is in the online escape mode.</p>
AT@DATE=	<p>Set Date. Sets the date on the DIVA T/A. This command is useful when the DIVA T/A sends the call ID to a telephone with Call Display (North America only).</p>
AT@DATE?	<p>Current Date. Displays the current date of the system. The format is mm-dd-yy.</p>
AT@TIME=	<p>Set Time. Sets the time on the DIVA T/A. This command is useful when the DIVA T/A sends the call ID to a telephone with Call Display. The format is hh:mm:ss.</p>
AT@TIME?	<p>Current Time. Displays the current time of the system. The format is hh:mm:ss.</p>
AT@MENU	<p>Activate VT100 Configuration Tool. The AT@MENU command activates the DIVA T/A VT100 Configuration tool for configuring basic ISDN parameters.</p>
AT>Hs	<p>View Help Information. Displays full or partial help for any AT command, where s specifies which AT command help is requested.</p>
AT>VD	<p>View Connection and Link Status Information. This command displays link and connection status for troubleshooting problems. Your Eicon Technology Customer Services representative may ask you to display this information.</p>
AT>VDC	<p>View Connection Status. Displays the connection status.</p>
AT>VDD	<p>Initialization Status Display (North America only). Displays information about the detection progress, the initialization of the logical channels, as well as auxiliary information.</p>
AT>VDL	<p>View Link States. Displays the link states.</p>
AT>VT	<p>View Stored Telephone Numbers. You can display a list of all stored telephone numbers currently saved on your DIVA T/A.</p>
AT>VX	<p>View X.25 Status (AO/DI). Displays the status of the X.25 connection.</p>
AT>?	<p>Last AT Command Result Explained. The AT>? Command reports the result of the last AT command issued. This command is useful for debugging long strings of AT commands and for determining which command was rejected and why.</p>

A/	Re-execute Previous Command. Re-executes all the commands in the command buffer. This command is mainly used to place another call (using the ATD dial command) that failed to connect due to a busy line, no answer, or a wrong number. This command is not preceded by AT nor followed by Enter.
+++	Escape Sequence. The escape sequence is used to return to the command state from data state. To issue the escape sequence, wait a moment, enter the escape character three consecutive times (+++), then wait another moment. Its value is stored in S-Register 2. The default value of the escape character as stored in S-Register 2 is '+'.

ISDN Configuration Commands

The following table describes the ISDN Configuration Commands.

AT!An	<p>Directory Number/Port Assignment. This command specifies which ports answer to which directory numbers. There are six ports available on the DIVA T/A: Phone 1, Phone 2, Voice to PC 1, Voice to PC 2, Data 1, and Data 2.</p> <p>Determining the value for <i>n</i> Use the binary table below. If a bit is set to 0, the corresponding port answers Directory Number 1. If set to 1, the corresponding port answers Directory Number 2. Convert the binary to decimal and use the result in the AT!An command.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Bit 5</td> <td>Bit 4</td> <td>Bit 3</td> <td>Bit 2</td> <td>Bit 1</td> <td>Bit 0</td> </tr> <tr> <td>Phone Port 1</td> <td>Phone Port 2</td> <td>Voice to PC 1</td> <td>Voice to PC 2</td> <td>Data 1</td> <td>Data 2</td> </tr> </table> <p>For example, to have Phone Port 1 and Data 1 answer to Directory Number 2 (and the others to answer to Directory Number 1), create the binary form from the table (100010), then convert to decimal (34). The command would be AT!A34.</p> <p>Directory numbers are specified using the AT!N1 (for directory number 1) and AT!N2 (for directory number 2). A unique number can also be assigned to the data ports using AT!N5. If AT!N5 is set, the assignments for the two data ports using the AT!An command are ignored, but the Phone Port and Voice to PC assignments are kept.</p> <p><u>Values for n:</u></p> <p>A complete list of values for <i>n</i> is shown below. Ports are considered assigned to Directory Number 1 unless specified as being assigned to Directory Number 2.</p> <p>Abbreviations: Ph=Phone, VPC=Voice to PC, D=Data, DN=Directory Number.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">n</th> <th style="text-align: left;">Assigned to D2</th> <th style="text-align: left;">n</th> <th style="text-align: left;">Assigned to D2</th> <th style="text-align: left;">n</th> <th style="text-align: left;">Assigned to D2</th> </tr> </thead> <tbody> <tr><td>0</td><td>None (all to DN1)</td><td>22</td><td>Ph2, VPC2, D1</td><td>44</td><td>Ph1, VPC1, VPC2</td></tr> <tr><td>1</td><td>D2</td><td>23</td><td>Ph2, VPC2, D1, D2</td><td>45</td><td>Ph1, VPC1, VPC2, D2</td></tr> <tr><td>2</td><td>D1</td><td>24</td><td>Ph2, VPC1</td><td>46</td><td>Ph1, VPC1, VPC2, D1</td></tr> <tr><td>3</td><td>D1, D2</td><td>25</td><td>Ph2, VPC1, D2</td><td>47</td><td>Ph1, VPC1, VPC2, D1, D2</td></tr> <tr><td>4</td><td>VPC2</td><td>26</td><td>Ph2, VPC1, D1</td><td>48</td><td>Ph1, Ph2</td></tr> <tr><td>5</td><td>VPC2, D2</td><td>27</td><td>Ph2, VPC1, D1, D2</td><td>49</td><td>Ph1, Ph2, D2</td></tr> <tr><td>6</td><td>VPC2, D1</td><td>28</td><td>Ph2, VPC1, VPC2</td><td>50</td><td>Ph1, Ph2, D1</td></tr> <tr><td>7</td><td>VPC2, D1, D2</td><td>29</td><td>Ph2, VPC1, VPC2, D2</td><td>51</td><td>Ph1, Ph2, D1, D2</td></tr> <tr><td>8</td><td>VPC1</td><td>30</td><td>Ph2, VPC1, VPC2, D1</td><td>52</td><td>Ph1, Ph2, VPC2</td></tr> <tr><td>9</td><td>VPC1, D2</td><td>31</td><td>Ph2, VPC1, VPC2, D1, D2</td><td>53</td><td>Ph1, Ph2, VPC2, D2</td></tr> <tr><td>10</td><td>VPC1, D1</td><td>32</td><td>Ph1</td><td>54</td><td>Ph1, Ph2, VPC2, D1</td></tr> <tr><td>11</td><td>VPC1, D1, D2</td><td>33</td><td>Ph1, D2</td><td>55</td><td>Ph1, Ph2, VPC2, D1, D2</td></tr> <tr><td>12</td><td>VPC1, VPC2</td><td>34</td><td>Ph1, D1</td><td>56</td><td>Ph1, Ph2, VPC1</td></tr> <tr><td>13</td><td>VPC1, VPC2, D2</td><td>35</td><td>Ph1, D1, D2</td><td>57</td><td>Ph1, Ph2, VPC1, D2</td></tr> <tr><td>14</td><td>VPC1, VPC2, D1</td><td>36</td><td>Ph1, VPC2</td><td>58</td><td>Ph1, Ph2, VPC1, D1</td></tr> <tr><td>15</td><td>VPC1, VPC2, D1, D2</td><td>37</td><td>Ph1, VPC2, D2</td><td>59</td><td>Ph1, Ph2, VPC1, D1, D2</td></tr> <tr><td>16</td><td>Ph2</td><td>38</td><td>Ph1, VPC2, D1</td><td>60</td><td>Ph1, Ph2, VPC1, VPC2</td></tr> <tr><td>17</td><td>Ph2, D2</td><td>39</td><td>Ph1, VPC2, D1, D2</td><td>61</td><td>Ph1, Ph2, VPC1, VPC2, D2</td></tr> <tr><td>18</td><td>Ph2, D1</td><td>40</td><td>Ph1, VPC1</td><td>62</td><td>Ph1, Ph2, VPC1, VPC2, D1</td></tr> <tr><td>19</td><td>Ph2, D1, D2</td><td>41</td><td>Ph1, VPC1, D2</td><td>63</td><td>All assigned to D2; none assigned to D1</td></tr> <tr><td>20</td><td>Ph2, VPC2</td><td>42</td><td>Ph1, VPC1, D1</td><td></td><td></td></tr> <tr><td>21</td><td>Ph2, VPC2, D2</td><td>43</td><td>Ph1, VPC1, D1, D2</td><td></td><td></td></tr> </tbody> </table> <p><u>Defaults:</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: left;"><i>Directory Number 1</i></th> <th style="text-align: left;"><i>Directory Number 2</i></th> </tr> </thead> <tbody> <tr> <td>North America: n=21</td> <td>Ph1, VPC1, D1</td> <td>Ph2, VPC2, D2</td> </tr> <tr> <td>International: n=16</td> <td>Ph1, VPC1, VPC2, D1, D2</td> <td>Ph2</td> </tr> </tbody> </table>	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Phone Port 1	Phone Port 2	Voice to PC 1	Voice to PC 2	Data 1	Data 2	n	Assigned to D2	n	Assigned to D2	n	Assigned to D2	0	None (all to DN1)	22	Ph2, VPC2, D1	44	Ph1, VPC1, VPC2	1	D2	23	Ph2, VPC2, D1, D2	45	Ph1, VPC1, VPC2, D2	2	D1	24	Ph2, VPC1	46	Ph1, VPC1, VPC2, D1	3	D1, D2	25	Ph2, VPC1, D2	47	Ph1, VPC1, VPC2, D1, D2	4	VPC2	26	Ph2, VPC1, D1	48	Ph1, Ph2	5	VPC2, D2	27	Ph2, VPC1, D1, D2	49	Ph1, Ph2, D2	6	VPC2, D1	28	Ph2, VPC1, VPC2	50	Ph1, Ph2, D1	7	VPC2, D1, D2	29	Ph2, VPC1, VPC2, D2	51	Ph1, Ph2, D1, D2	8	VPC1	30	Ph2, VPC1, VPC2, D1	52	Ph1, Ph2, VPC2	9	VPC1, D2	31	Ph2, VPC1, VPC2, D1, D2	53	Ph1, Ph2, VPC2, D2	10	VPC1, D1	32	Ph1	54	Ph1, Ph2, VPC2, D1	11	VPC1, D1, D2	33	Ph1, D2	55	Ph1, Ph2, VPC2, D1, D2	12	VPC1, VPC2	34	Ph1, D1	56	Ph1, Ph2, VPC1	13	VPC1, VPC2, D2	35	Ph1, D1, D2	57	Ph1, Ph2, VPC1, D2	14	VPC1, VPC2, D1	36	Ph1, VPC2	58	Ph1, Ph2, VPC1, D1	15	VPC1, VPC2, D1, D2	37	Ph1, VPC2, D2	59	Ph1, Ph2, VPC1, D1, D2	16	Ph2	38	Ph1, VPC2, D1	60	Ph1, Ph2, VPC1, VPC2	17	Ph2, D2	39	Ph1, VPC2, D1, D2	61	Ph1, Ph2, VPC1, VPC2, D2	18	Ph2, D1	40	Ph1, VPC1	62	Ph1, Ph2, VPC1, VPC2, D1	19	Ph2, D1, D2	41	Ph1, VPC1, D2	63	All assigned to D2; none assigned to D1	20	Ph2, VPC2	42	Ph1, VPC1, D1			21	Ph2, VPC2, D2	43	Ph1, VPC1, D1, D2				<i>Directory Number 1</i>	<i>Directory Number 2</i>	North America: n=21	Ph1, VPC1, D1	Ph2, VPC2, D2	International: n=16	Ph1, VPC1, VPC2, D1, D2	Ph2
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AT!C1=n	<p>ISDN Switch Type. Specifies the ISDN Switch Type.</p> <p>For North American Firmware:</p> <p>n=0 National ISDN n=1 AT&T 5ESS Custom n=9 Auto-detect switch type (default for North America). The DIVA T/A automatically determines the correct switch type to be used (National ISDN or AT&T 5ESS Custom).</p> <p>For International Firmware:</p> <p>n=2 EuroISDN (default). n=3 Australia - Microlink (TPH1962/TS013). n=4 INS-Net64 (Japan). n=5 China ISDN. n=6 Singapore n=11 Australia - OnRamp (Telstra's ETSI service)</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!C4=n	<p>Enable/Disable Non-Initializing mode (first B-channel) (North American only). Specifies whether the first B-channel is set to Non-Initializing mode.</p> <p>n=0 Disable Non-initializing mode (default). n=1 Enable Non-initializing mode.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!C5=n	<p>Enable/Disable Non-Initializing mode (second B-channel) (North American only). Specifies whether the second B-channel is set to Non-Initializing mode.</p> <p>n=0 Disable Non-initializing mode (default). n=1 Enable Non-initializing mode</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!C6=n	<p>SPID Number for 1st B-channel (North American only). The SPID (Service Profile Identifier) as assigned by your local telephone company. This number is a unique ID which identifies an ISDN terminal to the local ISDN switch.</p> <p>Default: null string.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!C7=n	<p>SPID Number for 2nd B-channel (North America only). The SPID (Service Profile Identifier) as assigned by your local telephone company. This number is a unique ID which identifies an ISDN terminal to the local ISDN switch.</p> <p>Default: null string.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!D1=n	<p>Default DTE Speed. Specifies the speed of the DTE, when the DTE characteristics cannot be determined by AutoBauding (AT has not been typed since power up).</p> <p>Values: 1200, 2400, 3600, 4800, 7200, 9600, 12000, 14400, 19200, 24000, 28800, 38400, 57600, 64000, 115200 or 230400.</p> <p>Default: 115200.</p>
AT!D2=n	<p>Default Databits Length. Specifies the length of the Databits, when the DTE characteristics cannot be determined by AutoBauding (AT has not been typed since power up).</p> <p>Values: 7, 8.</p> <p>Default: 8.</p>

AT!D3=n	<p>Default Parity. Specifies the parity to be used, when the DTE characteristics cannot be determined by AutoBauding (AT has not been typed since power up).</p> <p>n=0 None (default). n=1 Even. n=2 Odd.</p>
AT!D4=n	<p>Default Stopbits. Specifies the number of Stopbits to be used, when the DTE characteristics cannot be determined by AutoBauding (AT has not been typed since power up).</p> <p>Values: 1, 2. Default:1</p>
AT!Ln	<p>Set ISDN Encoding Law. Specifies the type of encoding law for ISDN voice calls.</p> <p>n=0 If the switch type is EuroISDN or TPH, A law will be used; if the switch type is INS-Net64, NI-1, or 5ESS, μ law will be used (default). n=1 μ law. n=2 A law.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT!N1=n	<p>ISDN Directory Number Assignments for 1st B-channel and 1st Phone port. This command assigns one ISDN directory number to the 1st B-channel and up to two numbers to the 1st Phone port. The 1st B-channel only responds to the first number specified in the command, while the 1st Phone port responds to either number. Numbers are separated by a semicolon (;).</p> <p>Example: Sending the command <code>AT!N1=5551234;5551235</code> to the DIV AT/A assigns the number 5551234 to the 1st B-channel, and the numbers 5551234 and 5551235 to the 1st Phone port. If a data call is placed to 5551234, the 1st B-channel will answer. If a data call is placed to 5551235, the 1st B-channel will not answer. However, the 1st Phone port will answer analog calls placed to either number.</p> <p>For outgoing calls, both data and analog, the DIV AT/A uses the first of these two numbers to identify itself.</p> <p>Note: In North America, you may only assign one number to the phone port. Valid digits: 0-9, *, and #. Maximum: 20 (North America), 40 (International). Default: null string. Note: This parameter does not take effect until you restart your DIV AT/A.</p>

AT!N2=n	<p>ISDN Directory Number Assignments for 2nd B-channel and 2nd Phone port. This command assigns one ISDN directory number to the 2nd B-channel and up to two numbers to the 2nd Phone port. The 2nd B-channel only responds to the first number specified in the command, while the 2nd Phone port responds to either number. Numbers are separated by a semicolon (;).</p> <p>Example: Sending the command <code>AT!N2=5551234;5551235</code> to the DIVA T/A assigns the number 5551234 to the 2nd B-channel, and the numbers 5551234 and 5551235 to the 2nd Phone port. If a data call is placed to 5551234, the 2nd B-channel will answer. If a data call is placed to 5551235, the 2nd B-channel will not answer. However, the 2nd Phone port will answer analog calls placed to either number.</p> <p>For outgoing calls, both data and analog, the DIVA T/A uses the first of these two numbers to identify itself.</p> <p>Note: In North America, you may only assign one number to the phone port. Valid digits: 0-9, *, and #. Maximum: 20 (North America), 40 (International). Default: null string. Note: This parameter does not take effect until you restart your DIVA T/A.</p>
AT!N3=n	<p>ISDN Subaddress for 1st B-channel. The ISDN subaddress is used to further identify the terminal on the ISDN basic rate interface. In cases where two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.</p> <p>Valid digits: 0-9, *, and #. Maximum: 20. Default: null string (this is an optional value). Note: This parameter does not take effect until you restart your DIVA T/A.</p>
AT!N4=n	<p>ISDN Subaddress for 2nd B-channel. The ISDN subaddress is used to further identify the terminal on the ISDN basic rate interface. In cases where two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.</p> <p>Valid digits: 0-9, *, and #. Maximum: 20. Default: null string (this is an optional value). Note: This parameter does not take effect until you restart your DIVA T/A.</p>
AT!N5=n	<p>ISDN Directory Number for Data Ports (International only). This command assigns a unique directory number to be answered by data ports. Once set, the data ports will respond to this directory number only, ignoring assignments set via AT!N1, AT!N2, and AT!A.</p> <p>Valid digits: 0-9, *, and #. Maximum: 20. Default: null string (this is an optional value). Note: This parameter does not take effect until you restart your DIVA T/A.</p>
AT!N6=n	<p>ISDN Subaddress for Data Ports (International only). This command assigns a subaddress to be used with the directory number assigned with AT!N5. The ISDN subaddress is used to further identify the terminal on the ISDN basic rate interface. If AT!N5 is reset to null (AT!N5=), this parameter is set to null as well.</p> <p>Valid digits: 0-9, *, and #. Maximum: 20. Default: null string (this is an optional value). Note: This parameter does not take effect until you restart your DIVA T/A.</p>

AT!On	<p>Outgoing Call Type. Specifies the default call type for outgoing calls when a user enters an ATD command without a special modifier. Use of a modifier overrides this parameter.</p> <p>n=0 Data call using protocol set in AT%A2=n (default). n=3 Data over voice bearer capability call (North America only) n=4 Transparent over voice (Audio) (reserved for RVSCOM). n=5 Transparent over voice (speech) (reserved for RVSCOM).</p> <p>The n=4 and n=5 options (transparent over voice) send and receive voice data unmodified to and from the ISDN B channel and the DIVA T/A. When no data is being transferred, the protocol fills the outgoing ISDN line with 'voice silence' bit patterns. For more details, refer to the RVSCOM documentation.</p>
AT!X56=n	<p>Delay between 64K data call failure and 56K data call attempt. If a 64K data call fails due to network congestion or if a service or option was not available or not implemented, a 56K data connection is automatically attempted. This command specifies the delay, in seconds, before the 56K attempt is made.</p> <p>Values: 0-10 (wait n seconds before retry); 254 (use pre-configured values depending on region); 255 (do not attempt 56k data call retry).</p> <p>Default: Australia & Japan, no retry (n=255); all other regions, immediate retry (n=254).</p>

COM Port Configuration Commands

The following AT commands pertain to the COM port configuration.

AT&Cn	Data Carrier Detect. This command controls the Data Carrier Detect (DCD) output. n=0 DCD always enabled. n=1 DCD tracks connection (default).
ATEn	Local Echo. The E command enables or disables command echo on your computer. If you do not see commands entered on your screen, enable command echo. If you see double characters, disable command echo. n=0 Disables local echo. n=1 Enables local echo (default).
ATQn	Quiet Result Codes. This command enables or disables the sending of result codes to the DTE. n=0 Enables result codes to the DTE (default). n=1 Disables result codes to the DTE.
ATVn	Result Code Format. You can set your DIVA T/A to display messages as digits or words. Word responses are preferable since they are more meaningful. n=0 Result codes are sent to the DIVA T/A as numbers (short form). n=1 Result codes are sent to the DIVA T/A as full words (long form/verbose) (default).
ATWn	Connect Message Control. This command controls the format of connection messages. n=0 Upon connection, the DIVA T/A reports the DTE speed only; for example, CONNECT 19200 (default). n=1 Upon connection, the DIVA T/A reports the DCE speed, the protocol, and the DTE speed. n=2 Upon connection, the DIVA T/A reports the DCE speed; for example, CONNECT 64000.

ATXn	<p>Extended Result Codes. This command selects which subset of the result messages will be used by the DIVA T/A to inform the DTE of the results from commands.</p> <p>n=0 Provide basic result codes: sends only OK, CONNECT, RING, NO CARRIER, ERROR, and NO ANSWER.</p> <p>n=1 Provide basic result codes and appropriate connection speed (e.g., CONNECT 2400, CONNECT 19200).</p> <p>n=2 Provide basic result codes, connection speed, and DIALTONE detection.</p> <p>n=3 Provide basic result codes, connection speed, and BUSY signal detection.</p> <p>n=4 Sends all messages (default).</p> <p>n=5 Displays the calling number as follows: RING FROM: calling (if the remote number is not known the message UNKNOWN is displayed)</p> <p>n=6 Displays information about the call. The following format is used: RING [(cip)] called [;calling] Where <i>(cip)</i> is CAPI 2.0 compatible information profile. It is only displayed if available. When displayed it always appears in parenthesis. Where <i>called</i> is the called number. It is always displayed. Where <i>;calling</i> is the number that is calling. It is only displayed if available. When displayed it is always preceded by a semi colon “;”</p>
AT&Dn	<p>Data Terminal Ready. Controls interpretation of the Data Terminal Ready (DTR) input.</p> <p>n=0 Ignore status of DTR signal.</p> <p>n=1 Monitor DTR signal: when an on-to-off transition of DTR signal occurs, enter the command state. Return to the online state when the ATO command is issued.</p> <p>n=2 Monitor DTR signal: when an on-to-off transition of DTR signal occurs, hang up and enter the command state (default).</p> <p>n=3 Monitor DTR signal: when an on-to-off transition of DTR signal occurs, hang up and reset.</p> <p>n=9 Monitor DTR signal: when an off-to-on transition of DTR signal occurs, automatically dial the stored telephone number 0.</p> <p>n=11 Monitor DTR signal: when the DTR goes up, dial pre-stored number. Hang up connection when DTR goes down. (Combination of AT&D2 and AT&D9).</p>
AT&Kn	<p>Flow Control. Enables and disables flow control so that data is stopped and restarted when buffer space becomes available.</p> <p>n=0 Disables flow control.</p> <p>n=3 Enables RTS/CTS flow control (default).</p> <p>n=4 Enables XON/XOFF flow control.</p> <p>n=6 Enables RTS/CTS and XON/XOFF flow control.</p>
AT&Sn	<p>Data Set Ready. Data Set Ready (DSR) controls the behavior of the DSR output.</p> <p>n=0 DSR always on (default).</p> <p>n=1 DSR always on after protocol is connected.</p>

AT\Vn	<p>Connect Message Control. This command controls the format of connection messages.</p> <p>n=0 Upon connection, the DIVA T/A reports the DTE speed only (default). For example, CONNECT 19200.</p> <p>n=1 Upon connection, the DIVA T/A reports the DCE speed. For example, CONNECT 64000.</p>
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Call Control Commands

The following table describes the Call Control Commands.

AT!T1=n	<p>Incoming Call Assignment (first directory number). Specifies the type of incoming ISDN calls that DIVA T/A can accept on the first directory number.</p> <p>n=0 Only available on DIVA T/A models that have an analog device port. Specifies that all analog device voice calls (e.g. telephone, fax/modem over ISDN) are directed to your analog device port.</p> <p>This option does not permit you to receive ISDN data calls. If you want to receive ISDN data calls, make sure that one Directory Number has n=1 as the Incoming Call Type.</p> <p>n=1 Default for models with analog device port.</p> <p><i>With Analog Device Port:</i> Specifies that all regular ISDN data calls are directed to your PC, and that all analog device calls (e.g. ordinary phone calls, or fax/modem over ISDN calls) are directed to your analog device port</p> <p><i>Without Analog Device Port:</i> Specifies that all regular ISDN data calls are directed to your PC. This option does not permit you to receive analog calls.</p> <p>n=8 Reserved for use by RVS-COM. Do not set.</p> <p>n=9 Reserved for use by RVS-COM. Do not set.</p> <p>These last two settings are automatically altered when a FAX application issues a +FCLASS command. This ensures incoming and outgoing calls are compatible with the necessary fax class.</p>
AT!T2=n	<p>Incoming Call Assignment (second directory number). Specifies the type of incoming ISDN calls that DIVA T/A can accept on the secondary directory number.</p> <p>n=0 Only available on DIVA T/A models that have an analog device port. Specifies that all analog device voice calls (e.g. telephone, fax/modem over ISDN) are directed to your analog device port.</p> <p>This option does not permit you to receive ISDN data calls. If you want to receive ISDN data calls, make sure that one Directory Number has n=1 as the Incoming Call Type.</p> <p>n=1 <i>With Analog Device Port:</i> Specifies that all regular ISDN data calls are directed to your PC, and that all analog device calls (e.g. ordinary phone calls, or fax/modem over ISDN calls) are directed to your analog device port.</p> <p><i>Without Analog Device Port:</i> Specifies that all regular ISDN data calls are directed to your PC. This option does not permit you to receive analog calls.</p> <p>n=8 Reserved for use by RVS-COM. Do not set.</p> <p>n=9 Reserved for use by RVS-COM. Do not set.</p> <p>These last two settings are automatically altered when a FAX application issues a +FCLASS command. This ensures incoming and outgoing calls are compatible with the necessary fax class.</p>

AT%A2=n	<p>Protocol Control. Specifies the protocol you want to use for your ISDN connection.</p> <p>n=0 HDLC-Transparent mode n=2 V.120 rate adaption protocol. n=4 V.110 rate adaption protocol (international version only) n=95 PPP asynchronous to synchronous conversion (International default). n=96 Multilink PPP connection (North American default).</p> <p>Notes:</p> <ul style="list-style-type: none"> • Both PPP and Multilink PPP require that a PPP communications stack be installed on your computer. • Both the DIVA T/A and the remote device must be set to the same protocol. • If your workstation is configured as a Windows for Workgroups Remote Access Service (RAS) client, you must configure the V.120 rate adaption protocol on the DIVA T/A workstation and the remote device (RAS Server ISDN adapter). • When using Multilink PPP for incoming calls, only SPAP or PAP authentication are supported. • (Windows NT only) In order to support incoming calls with Windows NT RAS Server, you must enable the parameter "Allow clear text authentication" in the RAS Server setup. Refer to the RAS online help on how to configure this parameter. • This parameter is static. Changes do not take effect until you restart your DIVA T/A.
AT%A4=n	<p>ISDN Communication Speed. Specifies the ISDN communication speed (56 or 64 Kbps) at which the DIVA T/A will try to connect to the remote station. The speed only applies to calls initiated by your DIVA T/A.</p> <p>n=0 Connect at 64 Kbps (default). n=1 Connect at 56 Kbps.</p>
AT%A95=c	<p>Incoming Data Call Answer. Sets how incoming data calls are handled (accepted or rejected).</p> <p>c=E All incoming data calls can be accepted either by the DIVA T/A (ATS0=1) or by the application (default). c=D All incoming data calls are rejected upon receipt.</p>
AT&Zn=v	<p>Store Telephone Number. Stores a telephone number v in memory location n. Each number consists of the telephone number (up to 25 characters) and an optional subaddress (up to 20 characters), separated by a period. Valid characters include the digits 0 to 9 as well as *, #, space, hyphen, and parenthesis.</p> <p>Range for n: 0-9, so up to ten telephone numbers may be stored.</p> <p>Note: The maximum number of dialed digits (that is, the numbers 0-9 and symbols # and *) is 20 in North America and 40 for International. If you need to dial a number longer than 25 digits, use the ATDn command (see page 41).</p>
ATA	<p>Answer Calls. Instructs the DIVA T/A to accept an incoming call.</p>

<p>ATDn</p>	<p>Dial a Number. Directs the DIVA T/A to dial the specified number, attempt to establish a connection, and go online.</p> <p>Punctuation characters may be used for clarity, with parentheses, hyphens, spaces, and periods being ignored. Also, the "P", "T", "W", "@", and "R" dial modifiers used by modems are ignored since they are not relevant to ISDN.</p> <p>The "~" and "&" characters are used to dial two numbers within the same dialing string.</p> <p>The following modifiers can be used:</p> <p>L Re-dial last number. S=n Dial the number stored in the directory n (n=0-9). M Establish a Modem over ISDN call. N Establish a data connection. I Establish a 56K ISDN data connection. V Establish an ISDN DATA over VOICE connection (North America only). ; Any character following this parameter is treated as an AT command (entered in the command mode) .</p> <p>The maximum number of dialed digits is 20 for North America and 40 for International. The symbols # and * are counted as digits; punctuation (parentheses, hyphens, spaces, and periods) and alphabetical digits (P, T, W, @, or R) are ignored.</p> <p>When dialing multiple numbers using "~" or "&" with MultiLink PPP, each dialed number can also have up to 20 digits in North America and 40 for International.</p>
<p>ATH</p>	<p>Hang up a Call. To disconnect and hang up a call. If the DIVA T/A is currently online, the connection is terminated.</p>

V.120 Configuration Commands

The following AT commands pertain to V.120 configuration on your DIVA T/A.

AT!E0=n	<p>V.120 N201 Tx (Maximum Transmit Frame Size). N201 Tx (Maximum Transmit Frame Size) determines the maximum number of octets in an information field to be transmitted to the remote V.120 device.</p> <p>Range: 16 to 260. Default: 260.</p> <p>Note: If a larger frame needs to be transmitted, the DIVA T/A segments it into V.120 fragments and expects the remote device to perform reassembly.</p>
AT!E1=n	<p>V.120 N201 Rx (Maximum Receive Frame Size). N201 Rx (Maximum Receive Frame Size) determines the maximum number of octets in an information field to be received from the remote V.120 device.</p> <p>Range: 16 to 260. Default: 260.</p>
AT!E2=n	<p>V.120 Multiframe Mode. The V.120 protocol supports two different transfer modes described below:</p> <p>n=E Multiframe mode is enabled (default). This mode provides acknowledged transfers by using Information (I) and acknowledgment (RR/RNR) frames, and provides error correction and recovery procedures. The link verification procedure is provided by exchanging SABME and UA frames.</p> <p>n=D Unacknowledged mode is enabled. This mode uses Unnumbered Information (UI) frames. The link verification procedure is provided by exchanging XID frames. The unacknowledged mode is less robust than multiframe mode.</p> <p>Note: The DIVA T/A may automatically switch to the other mode if the link verification frames issued from the remote device do not match the configured mode on the local device. The DIVA T/A always prefers the multiframe mode.</p>
AT!E3=n	<p>V.120 K Window Size. Applicable to the multiframe mode only. K (Window Size) determines the maximum number of sequential data frames that may be outstanding (not acknowledged) at any given time.</p> <p>Range: 1 to 127 frames. Default: 7.</p>
AT!E4=n	<p>V.120 T200 (Retransmission Timer). Applicable to the multiframe mode only. T200 (Retransmission Timer) is the maximum time allowed to determine if a transmitted frame was received by the remote device, prior to its retransmission. The unit of measurement is 1/10 of a second.</p> <p>Range: 1 to 255. Default: 15 (equal to 1.5 seconds).</p> <p>The value specified for T200 (Retransmission Timer) must be less than the value specified for T203 (Link Integrity Timer) (see "AT!E6=n" on page 43). Otherwise, the default values are used.</p>

AT!E5=n	<p>V.120 N200 (Maximum Retry Count). Applicable to the multiframe mode only. N200 (Maximum Retry Count) is a system parameter which identifies the maximum number of retransmissions of a frame due to T200 expiring. When the maximum number of retransmissions is reached, the recovery process is started which may cause call disconnection.</p> <p>Range: 1 to 10. Default: 3.</p>
AT!E6=n	<p>V.120 T203 (Link Integrity Timer). Applicable to the multiframe mode only. T203 (Link Integrity Timer) is the maximum time allowed without frames (including data and control) being exchanged. Its purpose is to verify that the remote device is still online and operational. When the Link Integrity Timer expires, recovery procedures are started which may cause the disconnection of the current call.</p> <p>The unit of measurement is seconds.</p> <p>Range: 1 to 255. Default: 30.</p> <p>The value specified for T200 (Retransmission Timer) (see "AT!E4=n" on page 42) must be less than the value specified for T203 (Link Integrity Timer). Otherwise, the default values are used.</p>
AT!E7=n	<p>V.120 Idle Timer. Idle Timer refers to the maximum time without the exchange of data frames between the local and the remote devices and before the automatic termination of the connection. Its purpose is to reduce communications costs while data is not being transferred for a period of time (operates in both the multiframe and unacknowledgement modes). When Idle Timer expires, this immediately initiates the disconnection of calls. Setting a zero value disables Idle Timer.</p> <p>The unit of measurement is minutes.</p> <p>Range: 0 to 10000. Default: 1440 (24 hours).</p>

V.110 Configuration Commands

Use the following AT commands to specify the V.110 configuration on your DIVA T/A (International version only).

AT!V0=n	V.110 Configuration Override. Specifies whether the DIVA T/A uses the COM port setting to configure V.110 or overrides them with user settings. n=0 Use the default settings. n=1 Override the COM port settings as per AT!V1, AT!V2, AT!V3, AT!V4, and AT!V5 (default).
AT!V1=n	V.110 Stream Rate. Specifies the V.110 Stream Rate Values: 1200, 2400, 4800, 9600, 19200 (default).
AT!V2=n	V.110 Character Length. Specifies the character length. Values: 7, 8 (default).
AT!V3=n	V.110 Parity. Specifies the parity used for V.110. n=0 None (default). n=1 Even. n=2 Odd. n=3 One. n=4 Zero.
AT!V4=n	V.110 Stop Bits. Specifies the Stop Bits used for V.110. Values: 1 (default), 2.
AT!V5=n	V.110 Flow Control. Specifies the Flow Control method to be used for V.110. n=0 None. n=1 Receive only (default). n=2 Transmit only. n=3 Receive and transmit.

Profile Commands

The following table describes the profile commands:

AT&F	Use Factory Settings in Current Profile. Restores and loads all settings in the current profile with the original factory settings. Previously configured ISDN commands, stored telephone numbers, and the rate adaption control values are retained; all other settings are replaced.
AT&V	View Current and Stored Profiles. Displays the current and stored profiles as well as stored telephone numbers in your DIVA T/A.
AT&Wn	Save Settings as Profile n. Writes storable parameters of current profile in memory as stored profile n. Use when you are satisfied with your current configuration settings and want to save them to a specific stored profile n.
AT&Yn	Set Powerup Profile. Designates stored profile n as the powerup profile. Use to load your desired stored profile the next time your DIVA T/A is powered up.
AT>F	Use Factory Settings in All Profiles. Restores all stored profiles and the current profile to the original factory settings. Reverts the powerup profile to number 0. Use when you need to reset the device to its original factory settings. Warning: All previous user-defined settings are lost.
AT>FC	Reset Current Profile and Telephone Numbers. Resets the current profile and telephone numbers to the default factory settings.
AT>VC	View Current Profile. Presents a screen display of the current profile settings on your DIVA T/A.
AT>VCC	View Call and COM Port Parameters. Displays the Call and COM Port dynamic parameters.
AT>VCD	View Dynamic Parameters. Displays all dynamic parameters (Call, COM, V.120, V.110, PPP, MLPPP).
AT>VCP	View Protocol Parameters. Displays the protocol parameters (V.120, V.110, PPP, MLPPP).
AT>VCS	View Static Parameters. Displays all static parameters (ISDN, Rate Adaptation).
AT>VPn	View Stored Profile. Presents a screen display of the desired stored profile, where n is the number of the stored profile (0,1,2) you want to view.
AT>Z	Restart DIVA T/A Using Powerup Profile. Restarts your DIVA T/A using the powerup profile. Use anytime you want to load the powerup profile.
ATZn	Restart DIVA T/A Using Profile n. Restarts your DIVA T/A using stored profile n. Use after changing a static parameter.

Multilink PPP Commands

The following table describes the MLPPP configuration commands.

AT%M1=n	Local Endpoint Discriminator Class. The value for 'n' specifies the Local Endpoint Discriminator Class. If you specify n=1 (class 1), the Local Endpoint Discriminator Address (specified with AT%M3=n) must be an even number. For a list of classes, see " Endpoint Discriminator Class/Address " on page 48.
AT%M2=n	Remote Endpoint Discriminator Class. The value for 'n' specifies the Remote Endpoint Discriminator Class. For a list of classes, see " Endpoint Discriminator Class/Address " on page 48.
AT%M3=n	Local Endpoint Discriminator Address. The value for 'n' specifies the Local Endpoint Discriminator Address. For a description of permitted addresses, see " Endpoint Discriminator Class/Address " on page 48.
AT%M4=n	Remote Endpoint Discriminator Address. The value for 'n' specifies the Remote Endpoint Discriminator Address. For a description of permitted addresses, see " Endpoint Discriminator Class/Address " on page 48.
AT%P5=n	Bandwidth Allocation Control Protocol (BACP) / Bandwidth on Demand (BOD). This command specifies whether BACP/BOD is enabled or disabled. When enabled, the DIVA T/A will drop to one B channel (reducing costs) when throughput drops below 64K. The DIVA T/A first attempts to negotiate BACP; if this is unsuccessful, the DIVA T/A falls back to BOD. n=0 Disable (default). n=1 Enable. Note: You can use this parameter only if the DIVA T/A has been configured for MLPPP.
AT%P6=n	Set Initial Billing Interval Timer. Sets the timer (in seconds) to match the amount of time your ISDN provider allocates as the first time interval. Note: If the value is set to 0, the timer is not used. Setting this value to 0, also effectively sets AT%P7 to 0. Range: 0 to 65535. Default: 60 seconds.
AT%P7=n	Set Billing Interval Timer. Sets the timer (in seconds) to match the amount of time your ISDN provider designates as the minimum chargeable unit for all subsequent billing. Note: If the value is set to 0, the timer is not used. Range: 0 to 65535. Default: 60 seconds.

AT%P8=n	<p>Dynamic Bandwidth Allocation (only available on models equipped with analog device ports). Specifies whether Dynamic Bandwidth Allocation (also known as Call Bumping) is enabled or disabled. When enabled, the DIVA T/A will automatically assign one of the two B channels (both used for data) to an incoming or outgoing analog device call (voice). When the call is completed, the DIVA T/A automatically reassigns the second B-channel to the data connection.</p> <p>n=0 Disable. n=1 Enable (default).</p> <p>Note: When BACP/BOD is enabled, the 2nd B channel is assigned as a data connection only if throughput is above 64KPS. Note also that you can use this parameter only if the DIVA T/A has been configured for MLPPP.</p>
AT%P9=n	<p>Second B-channel Connection Retries. Specifies the number of times the DIVA T/A tries to connect to the second B-channel when BOD is disabled.</p> <p>Range: 0-255. Note that when the ISDN Switch Type is set to Singapore (AT!C1=6), the range is 0-10.</p> <p>Default: 3.</p>
AT%P10=n	<p>Enable/Disable PPP Echo-Request. Specifies whether PPP Echo-Request is enabled or disabled. Certain services, such as IBM Global Services, require that PPP Echo-Request be disabled.</p> <p>n=1 Enable (default). n=0 Disable</p>
AT!X13=n	<p>Second B-channel Retry Delay (with BACP disabled). Specifies the number of seconds the DIVA T/A waits before it re-attempts to connect to the second B-channel.</p> <p>Range: 0-65535.</p> <p>Default: 5 seconds. Note that if the ISDN Switch Type is set to Singapore (AT!C1=6) then the default is 60 seconds.</p> <p>Note: The description above applies only if BACP is disabled; for a description of AT!X13=n when BACP is enabled, see page 51.</p>

Endpoint Discriminator Class/Address

The following table describes the list of classes and permitted addresses for certain MultiLink PPP commands.

Class	Description	Address Format
0	Null Class	No address is used.
1	Locally Assigned Address	Uses a hexadecimal format with a maximum length of 40 characters. Valid characters: "0-9, a-f". The number of digits must be even (ex. AT%M3=b3c665ac11).
2	Internet Protocol (IP) Address	Uses a numerical format with a maximum length of 15 characters. Valid characters: "0-9" (ex. AT%M4=192.219.23.100).
3	IEEE 802.1 Globally Assigned MAC Address	Uses a hexadecimal format with an exact length of 12 characters. Valid characters: "0-9, a-f" (ex. AT%M3=b3c665ac1fff).
4	PPP Magic-Number Block	Uses a hexadecimal format with a maximum length of 40 characters, and the length must be a multiple of 8. Valid characters: "0-9, a-f" (ex. AT%M3=b3c665acffff0001).
5	Public Switched Network Directory Number	Uses a normal telephone number with a maximum length of 15. Valid characters are "0-9, *, #".
255	Accept Any Remote Endpoint Discriminator	No address is used. This class is valid only for remote endpoint discriminators (EPDs), and is used to accept any remote EPDs received that are all part of the same bundle.

Always On / Dynamic ISDN AT Commands

The following table describes the Always On / Dynamic ISDN AT commands.

AT!X1=n	<p>X.25 Version. Specifies the X.25 version you are using. There are two X.25 CCITT recommendations available for selection, 1984 and 1988. This information is provided by your Service Provider and should match the X.25 recommendation supported on the switch you are connecting to.</p> <p>n=0 1984 (default). n=1 1988.</p>
AT!X2=n	<p>X.25 DTE Address. Specifies the X.25 DTE address. An X.25 DTE Address identifies a node on an X.25 network. Every X.25 node has an X.25 address. Your Service provider assigns this value at subscription time.</p> <p>This number is your 7, 10, or 11 digit X.25 Directory number (11=with leading 1). For example, if 214-111-1234 is your DN, the following combinations are possible:</p> <p>AT!X2=1111234 AT!X2=2141111234 AT!X2=12141111234</p> <p>Maximum Length: 5 digits; digits can be from 0-9 inclusive. Default: none.</p>
AT!X3=n	<p>X.25 Facilities. Specifies the X.25 facilities that are to be included each time a call is made.</p> <p>X.25 facilities are optional network services that let you perform tasks such as reversing charges on your calls, accessing a Close User Group, or specifying a Network User Identification (NUI).</p> <p>Enter facilities as hexadecimal octets (eight-bit bytes).</p> <p>For example, if your X.25 long distance provider is AT&T (AT&T=3134), you should specify AT!X3=443134. To specify a Throughput Class of 9600, enter AT!X3=02AA (or in Canada enter AT!X3=02aa420707430707).</p> <p>Maximum Length = 28 characters; characters can be any combination of numbers from 0 to 9, and letters from A to F (lower and upper case). Default: none.</p>
AT!X4=n	<p>Local ISDN Prefixes. Specifies the local ISDN prefixes to be used on phone numbers received with BACP enabled.</p> <p>For example, AT!X4=9 will place a 9 in front of the number you are dialing for situations where you need to dial 9 for an outside line (PBX). AT!X4=1 will place a 1 in front of the number in situations where you are making a long distance call. Default: none.</p> <p>Max Length: 9 characters. Characters can be numbers in the range 0 to 9, or the * and # symbols.</p>
AT!X5=n	<p>X.25 Default Window Size. Specifies the X.25 default window size. This is the window size used if no window size is specified in the X.25 Facilities field when a call is made.</p> <p>Default: 2.</p> <p>Window sizes of 1 to 7 are standard. A value of 0 is not allowed.</p>

AT!X6=n	<p>X.25 Maximum Window Size. Specifies the X.25 maximum window size. It is sometimes desirable to have a large window size. This is particularly true for satellite networks that have significant transmission delays.</p> <p>Maximum window size can never be exceeded. If a larger window size is requested when the call is established (through X.25 Facilities field), it is negotiated downward so that the maximum window size is respected.</p> <p>Default: 7.</p> <p>Use a value that is greater than or equal to the default window size.</p>
AT!X7=n	<p>X.25 Default Packet Size. Specifies the X.25 default packet size. This packet size is used if no packet size is specified in the X.25 facilities field when a call is made.</p> <p>Values: 16, 32, 64, 128, 256, 512, 1024, 2048, 4096.</p> <p>Default: 128.</p>
AT!X8=n	<p>X.25 Maximum Packet Size. Specifies the X.25 maximum packet size. Maximum packet size can never be exceeded. If a larger packet size is requested when the call is established, it will be negotiated downward so that the maximum packet size is respected.</p> <p>Use a value that is greater than or equal to the default packet size.</p> <p>Values: 16, 32, 64, 128, 256, 512, 1024, 2048, 4096.</p> <p>Default: 256.</p>
AT!X9=n	<p>Terminal Endpoint Identifier (TEI). Specifies the TEI used for X.25 over the D-channel. Your service provider assigns this value. Possible values are 0 to 63 inclusive.</p> <p>Default: 21.</p>
AT!X10=n	<p>Delay Before Opening 1st B-channel. Specifies the amount of time (in seconds) the throughput on your D-channel must exceed the Opening Threshold (AT!X11=n) before the 1st B-channel is added to the AO/DI connection.</p> <p>For example, if you specify 5 seconds, and the Opening Threshold is 70% (AT!X11=70), once the throughput on the D-channel reaches 70%, there will be a delay of 5 seconds before the 1st B-channel is added to the AO/DI connection. If the throughput drops below 70% during the 5 seconds, the 1st B-channel will not be added to the connection.</p> <p>Range: 0 to 65535.</p> <p>Default: 5 seconds.</p>
AT!X11=n	<p>1st B-channel Opening Threshold. Specifies the threshold (percentage) that the throughput on your D-channel must exceed before the 1st B-channel is added to the AO/DI connection.</p> <p>Range: 0 to 100.</p> <p>Default: 70.</p>
AT!X12=n	<p>1st B-channel Closing Threshold. Specifies the threshold (percentage) that the throughput on your B-channel must be below before the 1st B-channel is dropped from the AO/DI connection.</p> <p>Range: 0 to 100.</p> <p>Default: 40.</p>

AT!X13=n	<p>Delay Before Opening 2nd B-channel (with BACP enabled). Specifies the amount of time (in seconds) the throughput on your 1st B-channel must exceed the Opening Threshold (AT!X14=n) before the 2nd B-channel is added to the AO/DI connection.</p> <p>For example, if you specify 5 seconds, and the Opening Threshold is 70% (AT!X14=70), once the throughput on the 1st B-channel reaches 70%, there will be a delay of 5 seconds before the 2nd B-channel is added to the AO/DI connection. If the throughput drops below 70% during the 5 seconds, the 2nd B-channel will not be added to the connection.</p> <p>Range: 0 to 65535.</p> <p>Default: 5 seconds. Note that if the ISDN Switch Type is set to Singapore (AT!C1=6) then the default is 60 seconds.</p> <p>Note: The description above applies only if BACP is enabled; for a description of AT!X13=n when BACP is disabled, see page 47.</p>
AT!X14=n	<p>2nd B-channel Opening Threshold. Specifies the threshold (percentage) that the throughput on your 1st B-channel must exceed before the 2nd B-channel is added to the AO/DI connection.</p> <p>Range: 0 to 100.</p> <p>Default: 70.</p>
AT!X15=n	<p>2nd B-channel Closing Threshold. Specifies the threshold (percentage) that the throughput on your 2nd B-channel connection must be below before the 2nd B-channel is dropped from the AO/DI connection.</p> <p>Range: 0 to 100.</p> <p>Default: 40.</p>
AT!X16=n	<p>Strips Area Code from Numbers. Tells BACP to drop the area code from phone numbers received from the remote peer.</p> <p>For example, if you are dialing a number with the same area code, if you specify AT!X16=1, the area code is dropped from the number.</p> <p>n=0 Off (default). n=1 On.</p>
AT!X17=n	<p>Specify X.25 Transmit Queue Threshold. When the queued data goes over this limit, for the period of time specified with AT!X10, the 1st B-channel will be added to the AO/DI connection.</p> <p>For example, if 1000 bytes are queued in the X.25 link, the 1st B-channel connection will be opened after the delay specified by AT!X10.</p> <p>Range: 0 to 65535</p> <p>Default: 1000 bytes.</p>

AT!X18	<p>Set Normal Mode for Bandwidth on Demand. Sets the Bandwidth on Demand thresholds and delays to pre-configured values. 'Normal Mode' is equivalent to the default values for each setting, and is defined as follows:</p> <p>AT!X10=5 Sets 'Delay before Opening 1st B-channel' to 5 seconds. AT!X11=70 Sets '1st B-channel Opening Threshold' to 70 seconds. AT!X12=40 Sets '1st B-channel Closing Threshold' to 40 seconds. AT!X13=5 Sets 'Delay before Opening 2nd B-channel' to 5 seconds. AT!X14=70 Sets '2nd B-channel Opening Threshold' to 70 seconds. AT!X15=40 Sets '2nd B-channel Closing Threshold' to 40 seconds. AT!X17=1000 Sets the 'X.25 Transmit Queue Threshold' to 1000 bytes.</p>
AT!X19	<p>Set Economy Mode for Bandwidth on Demand. Sets the Bandwidth on Demand thresholds and delays to pre-configured values. 'Economy Mode' is defined as follows:</p> <p>AT!X10=20 Sets 'Delay before Opening 1st B-channel' to 20 seconds. AT!X11=80 Sets '1st B-channel Opening Threshold' to 80 seconds. AT!X12=60 Sets '1st B-channel Closing Threshold' to 60 seconds. AT!X13=60 Sets 'Delay before Opening 2nd B-channel' to 60 seconds. AT!X14=60 Sets '2nd B-channel Opening Threshold' to 60 seconds. AT!X15=80 Sets '2nd B-channel Closing Threshold' to 80 seconds. AT!X17=2000 Sets the 'X.25 Transmit Queue Threshold' to 2000 bytes.</p>
AT!X20	<p>Set Performance Mode for Bandwidth on Demand. Sets the Bandwidth on Demand thresholds and delays to preconfigured values. 'Performance Mode' is defined as follows:</p> <p>AT!X10=1 Sets 'Delay before Opening 1st B-channel' to 1 second. AT!X11=50 Sets '1st B-channel Opening Threshold' to 50 seconds. AT!X12=20 Sets '1st B-channel Closing Threshold' to 20 seconds. AT!X13=1 Sets 'Delay before Opening 2nd B-channel' to 1 second. AT!X14=60 Sets '2nd B-channel Opening Threshold' to 60 seconds. AT!X15=80 Sets '2nd B-channel Closing Threshold' to 80 seconds. AT!X17=500 Sets the 'X.25 Transmit Queue Threshold' to 500 bytes.</p>
AT!X21=n	<p>Specify Lowest X.25 Logical Connection Number. Specifies the lowest LCN that X.25 will use for establishing the AO/DI connection.</p> <p>Range: 1 to 4095. If you specify more than 1 LCN (using AT!X25), the upper limit of the range is 4095 minus the number of LCNs. For example if AT!X25=4, then the upper limit of the range is 4095-4 = 4091.</p> <p>Default: 1.</p>
AT!X22=n	<p>Enable/Disable AO/DI. Specifies whether the AO/DI feature is enabled or disabled.</p> <p>n=0 Off (default). n=1 On.</p>

AT!X25=n	Specify Number of Logical Connection Numbers. Note that the number of Logical Connection numbers affects the range of AT!X21. See AT!X21. Range: 1-4. Default: 1.
AT!X26=n	Specify Type of User Data for X.25 Call Request Packet. Specifies the type of user data for X.25 call requests. Normally, the value of this parameter should be left to the default CF (PPP over X.25). If your switch doesn't recognize CF, you won't be able to connect; if this is the case you should set the value to nothing (AT!X26=). Default: CF (PPP over X.25).

Utility Commands

The following table describes the Utility Commands.

AT\$CP=n	<p>Enable / disable compression.</p> <p>n=0 Disable n=1 Enable (default)</p>
AT\$EX	<p>View Internal ExPrintf log buffer.</p>
AT\$In	<p>On Demand SPID Testing (North America only). Lets you test SPIDs on demand.</p> <p>n=<SPID Number> Tests the specified SPID. To perform this test you must be connected to National ISDN or AT&T 5ESS Custom interface. The test is only supported if neither logical channel is initialized (either with a SPID or in NIT mode). If required, clear the SPID and disable NIT mode for both channels, then reset the device. You can then run two SPID tests (further tests will be rejected).</p> <p>n=<blank> Retrieves any AutoSPID data downloaded during location detection. Note that this command does not initiate the AutoSPID procedure; it simply retrieves historical data. The following string of information is displayed: [SPID number, Directory Number, call type, error code] Call type is indicted by the following codes: v=voice, d=data, p=packet. Note: If AutoSPID cannot detect Directory Numbers and call types, these fields will be empty. If an AutoSPID download has not been performed, no information will be retrieved.</p>
AT\$IG	<p>SPID guessing (North America only). Specifies that the DIVA T/A should attempt SPID guessing. When the command is entered, the DIVA T/A will attempt to guess the SPID for each B-channel. If SPID initialization is successful, the SPID number is displayed and saved automatically.</p> <p>If a datalink problem is encountered during SPID guessing, the guessing is aborted and the message "No Carrier" is displayed.</p>
AT\$Rn	<p>Fatal Error Reset.</p> <p>n=0 Do not reset on software fatal error, stay in the monitor (default) n=1 Reset unit on software fatal error</p> <p>Note: Use the AT&W command to save the parameter permanently.</p>
AT\$SL	<p>Stop LAPD Trace.</p>
AT\$SM	<p>Stop Mail Trace.</p>
AT\$SP	<p>Stop PPP Trace.</p>
AT\$SQ	<p>Stop Q931 Trace.</p>
AT\$SX	<p>Stop AO/DI X.25 Trace.</p>
AT\$VCn	<p>Set an AT cmd Trace.</p>
AT\$VI	<p>View initial Profile. Displays the profile used at start up.</p>

AT\$VL	<p>Start or display the Result of a LAPD trace</p> <p>You can specify the total size of the trace buffer and the length of each trace entry. Use the following syntax:</p> <p>AT\$VL [trace size, entry length], where trace size and entry length are specified in hexadecimal values.</p> <p>For example, to specify a trace size of 32K and an entry length of 256 bytes, enter: AT\$VL 8000, 100.</p> <p>If you do not specify trace size and length, the default values are used. The default trace size is 16K, the default entry length is 128 bytes.</p>
AT\$VM	<p>Controls the internal Mail Trace. Your Eicon Technology Customer Services representative may ask you to use this command.</p> <p>Format is:</p> <p>AT\$VM [total size, entry_size, filter] (parameters are optional)</p> <p>Example:</p> <p>AT\$VM starts mail trace with default size of 16K, entry_size of 64 bytes, no filter</p> <p>AT\$VM -p to pause the mail trace</p> <p>AT\$VM -r to reset the mail trace</p> <p>AT\$VM -s to restart the mail trace</p>
AT\$VP	<p>Start or Display the Result of a PPP trace.</p> <p>You can specify the total size of the trace buffer and the length of the each trace entry. Use the following syntax:</p> <p>AT\$VP [trace size, entry length], where trace size and entry length are specified in hexadecimal values.</p> <p>For example, to specify a trace size of 32K and an entry length of 256 bytes, enter: AT\$VP 8000, 100.</p> <p>If you do not specify trace size and length, the default values are used. The default trace size is 16K, the default entry length is 128 bytes</p>
AT\$VQ	<p>Start or Display the Result of a Q931 trace.</p> <p>You can specify the total size of the trace buffer and the length of the each trace entry. Use the following syntax:</p> <p>AT\$VQ [trace size, entry length], where trace size and entry length are specified in hexadecimal values.</p> <p>For example, to specify a trace size of 32K and an entry length of 256 bytes, enter: AT\$VQ 8000, 100.</p> <p>If you do not specify trace size and length, the default values are used. The default trace size is 16K, the default entry length is 128 bytes.</p>
AT\$VU	<p>Internal TA access command reserved for VU.</p>

AT\$VX	<p>Start an AO/DI X.25 Trace.</p> <p>You can specify the total size of the trace buffer and the length of the each trace entry. Use the following syntax:</p> <p>AT\$VX [trace size, entry length], where trace size and entry length are specified in hexadecimal values.</p> <p>For example, to specify a trace size of 32K and an entry length of 256 bytes, enter: AT\$VX 8000, 100.</p> <p>If you do not specify trace size and length, the default values are used. The default trace size is 16K, the default entry length is 128 bytes.</p>
AT\$Y	<p>Enter the monitor on the next reset.</p>
AT\$Z	<p>Soft reset the unit and enter the monitor.</p>

S-Register Commands

The following five commands apply to S-Registers, which are described further below.

ATSn=v	S-Register n to Value v. Sets S-Register n to the value v.
ATSn	Establishes S-Register n as the Selected Register. Sets S-Register n as the last register accessed, where n is the number identifying the S-Register. For example, ATSn establishes S7 as the last accessed register.
ATSn?	Reports the Value of S-Register n. Reports the last value stored into S-Register n. If n is omitted, the last S-Register is accessed.
AT=n	Last Accessed S-Register to Value v. Use this command to set the last accessed S-Register to the new value n.
AT?	View Last Accessed S-Register. Displays the contents of the "selected" S-Register. The "selected" S-Register is the last S-Register that was accessed using an S-Register command, or selected with the ATSn command.

S Register Parameters

Register	Description
S0	Enable/Disable Auto-answer. Specifies whether auto answer is enabled or disabled. Setting a value other than "0" instructs the DIVA T/A to auto-answer after n rings. A value of "0" instructs the DIVA T/A to disable the auto-answer mode. Type: Storable. v=0 No auto answer (default). v=1-255 Answers after this number of rings
S1	View Ring Count. Specifies number of rings. Default: 0. Type: Non-Storable. Note: This register is reset to 0 if 8 seconds elapse since receipt of the previous ring.
S2	Escape Sequence Character. Specifies the character used to escape from the data mode and return to the AT command mode. Range: 0 to 255. Type: Storable. Default: ASCII 043, translates into the "+" character.
S3	Carriage Return Character. Specifies the character that the AT command processor uses to detect the end of a command line in both the receive and transmit directions. Range: 0 to 127. Type: Non-Storable. Default: ASCII 013 which translates into the carriage return character.
S4	Line Feed Character. Specifies the character that the AT command processor uses to indicate the end of each status message. Range: 0 to 127. Type: Non-Storable. Default: ASCII 010 line feed.
S5	Backspace Character. Specifies the backspace character used for command line editing. Default: ASCII 008 (backspace). Type: Non-Storable.

Register	Description
S25	<p>Data Terminal Ready Detection Delay. Specifies the duration that the Data Terminal Ready (DTR) status must either be raised or dropped before being recognized by the DIVA T/A. This delay helps ensure that the DIVA T/A does not interpret a random glitch as a DTR raise or drop.</p> <p>This register affects the AT&Dn command, which controls interpretation of the Data Terminal Ready (DTR) input (see page 37). Essentially, detection by AT&Dn will be delayed according to the S25 register setting.</p> <p>Range: 0-255, in tenths of a second. For example, if set to 5, the duration is five-tenths of a second, or 50 milliseconds.</p> <p>Default: 0. Type: Storable.</p>

Analog Device Commands

The following table describes the analog device commands. These commands are only available on units with the optional analog device ports.

AT*An=v	<p>Abbreviated Ring Control (North America only). Specifies whether Visual Message Waiting's abbreviated ring is enabled or disabled.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disabled. v=1 Enabled (default).</p>
AT*Bn=v	<p>ISDN Bearer Capability. Specifies the bearer capability for ISDN calls on the analog device interface.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Outgoing analog device calls use Speech encoding (default). v=1 Outgoing analog device calls use Audio 3.1Khz encoding. This setting is recommended for modem/fax calls.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT*Cn	<p>Analog Device Caller ID Delivery. Specifies whether analog device caller ID delivery is enabled or disabled (North America only). When enabled telephones with Call Display will display incoming call information.</p> <p>n=0 Disable analog device caller ID delivery. n=1 Enable analog device caller ID delivery (default).</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT*Dn=v	<p>Internal Dial Access. Controls the internal dial access for supplementary services.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disable internal dial access. This setting is recommended for modem/fax calls. v=1 Enable internal dial access (default).</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>
AT*En=v	<p>Enable/disable Incoming and Outgoing Calls. Specifies the type of calls (outgoing and incoming) permitted on an Analog Port. Each Analog port can be set independently.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disable port. v=1 Outgoing calls only. v=2 Incoming calls only. v=3 Incoming and outgoing calls (default).</p>

AT*Fn	<p>Analog Device Ring Frequency. Specifies the analog device ring frequency. When n=0, the ring frequency is determined by the country/region selected with the AT*Pn command.</p> <p>n=0 Ring frequency determined by region (AT*Pn) (default). n=1 20 Hz. n=2 25 Hz. n=3 40 Hz. n=4 50 Hz.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>																																				
AT*Kn=v	<p>Analog Device Calling Features (North America only). Specifies the feature key for analog device calling features.</p> <p>n=1 Conference Call n=3 Call Drop n=5 Message Waiting Indicator</p> <p>v=Any value in the range 0-65535 (the defaults are: Conference Call=60, Call Transfer=61, Call Drop=62, Message Waiting Indicator=63)</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>																																				
AT*M=v	<p>Visual Message Indicator Refresh Time (North America only). Specifies how frequently DIVA T/A should refresh the Visual Message Indicator. Setting v=0 disables Visual Message Indicator feature.</p> <p>Range of v= 1 to 60 (specify the time in minutes) Default: 30.</p> <p>It is recommended that this setting not be set to below 30 minutes.</p>																																				
AT*Pn	<p>Analog Device Country Specific Parameters. Specifies the country for which certain parameters (ring pattern, ring frequency, pulse pattern, gains) are implemented.</p> <table border="0"> <tr> <td>n=0 United States (default in North America)</td> <td>n=8 Sweden</td> <td>n=20 Portugal</td> </tr> <tr> <td>n=1 International (default outside North America)</td> <td>n=9 Ireland</td> <td>n=21 China</td> </tr> <tr> <td>n=2 United Kingdom</td> <td>n=10 Denmark</td> <td>n=22 Australia</td> </tr> <tr> <td>n=3 Belgium</td> <td>n=11 Italy</td> <td>n=23 Hong Kong</td> </tr> <tr> <td>n=4 France</td> <td>n=12 Norway</td> <td>n=24 Singapore</td> </tr> <tr> <td>n=5 Germany</td> <td>n=13 Switzerland</td> <td>n=25 Canada</td> </tr> <tr> <td>n=6 Netherlands</td> <td>n=14 Austria</td> <td>n=26 India</td> </tr> <tr> <td>n=7 Spain</td> <td>n=15 Cyprus</td> <td>n=27 Japan</td> </tr> <tr> <td></td> <td>n=16 Finland</td> <td>n=28 South Africa</td> </tr> <tr> <td></td> <td>n=17 Greece</td> <td>n=29 United Arab Emirates (UAE)</td> </tr> <tr> <td></td> <td>n=18 Iceland</td> <td></td> </tr> <tr> <td></td> <td>n=19 Luxembourg</td> <td></td> </tr> </table> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>	n=0 United States (default in North America)	n=8 Sweden	n=20 Portugal	n=1 International (default outside North America)	n=9 Ireland	n=21 China	n=2 United Kingdom	n=10 Denmark	n=22 Australia	n=3 Belgium	n=11 Italy	n=23 Hong Kong	n=4 France	n=12 Norway	n=24 Singapore	n=5 Germany	n=13 Switzerland	n=25 Canada	n=6 Netherlands	n=14 Austria	n=26 India	n=7 Spain	n=15 Cyprus	n=27 Japan		n=16 Finland	n=28 South Africa		n=17 Greece	n=29 United Arab Emirates (UAE)		n=18 Iceland			n=19 Luxembourg	
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n=5 Germany	n=13 Switzerland	n=25 Canada																																			
n=6 Netherlands	n=14 Austria	n=26 India																																			
n=7 Spain	n=15 Cyprus	n=27 Japan																																			
	n=16 Finland	n=28 South Africa																																			
	n=17 Greece	n=29 United Arab Emirates (UAE)																																			
	n=18 Iceland																																				
	n=19 Luxembourg																																				
AT*Rn=v	<p>Analog Device Alternate Ring. Specifies whether normal or distinctive ring is used.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Normal Ring (default). v=1 Distinctive Ring.</p> <p>Note: This parameter does not take effect until you restart your DIV AT/A.</p>																																				

<p>AT*Sn=v</p>	<p>Disable Analog Device Calling Features. Specifies whether supplementary service is to be disabled.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disable. Recommended for modem/fax calls. v=1 Enable with default values (default).</p> <p>The following two options are for advanced users only. v=5 Enable using same terminal endpoint identifier as data port. v=9 Enable using separate terminal endpoint identifier.</p> <p>Note: This parameter does not take effect until you restart your DIVA T/A.</p>
<p>AT*Vn=v</p>	<p>Enable/Disable VoiceMail (North America Only). Specifies whether VoiceMail is enabled or disabled.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disable (default). v=1 Enable.</p> <p>Notes:</p> <ul style="list-style-type: none"> • If v=0 is selected and voice mail is detected, DIVA T/A automatically enables VoiceMail. • If the SPID corresponding to an analog device port changes, the parameter will automatically be reset to 0. Also, if the DIVA T/A is reset to factory profile, the parameter is reset to 0. • This parameter does not take effect until you restart your DIVA T/A.
<p>AT*Wn=v</p>	<p>Call Waiting Support (International version only). Specifies whether support for call waiting is enabled.</p> <p>n=1 Analog device port 1 (PHONE 1). n=2 Analog device port 2 (PHONE 2). v=0 Disable. v=1 Enable (default).</p>

Mini-monitor Commands

The following commands relate to the Mini-monitor. They are all case sensitive.

Your Eicon Technology Customer Services representative may ask you to use these commands.

at@dump	Dump Memory. Produces a memory dump using XMODEM. Note: This command needs a terminal emulation program that supports XMODEM.
at@d1	DRAM test.
at@d2	Flash test.
at@d3	ISDN internal loop back test.
at@d4	ISDN external loop back test.
at@fail	Simulate a fault.
at@load	Load New Firmware. Note: This command needs a terminal emulation program that supports XMODEM or 1K-XMODEM.
at@md arg	Display memory (arg= "address:size").
at@msg	Display cause for entering the monitor.
at@quit	Exit the Mini-monitor.
at>F	Restore All Profiles to Original Factory Settings. Reverts the powerup profile to number 0. Warning: All previous user-defined settings are lost.

AT Command Result Codes

This section provides the result codes, also known as status messages, that are displayed after an AT command is issued.

Result codes can be displayed as a word message (long-form English) or as a number code (short-form numeric response). Word messages are preceded and terminated by the sequence <CR> <LF>. Numeric codes are terminated by <CR> only. The Result Code Format command (ATVn) determines short- or long-form usage.

General Purpose Codes

Some number codes can be associated with more than one text string, depending on the format selected by ATXn.

Code	Word Message(s)	Description
0	OK	The DIVA T/A has successfully executed your command
2	RING	Incoming ringing is detected on the line
	RING FROM: Calling	Calling number displayed
	RING(cip) called;calling	Called, and calling number displayed
3	NO CARRIER	Attempt to establish a connection failed Connection ended
4	ERROR	Syntax of command is incorrect Unable to execute command Command does not exist Entered command is outside permitted range
+F4	+FCERROR	
6	NO DIALTONE NO CARRIER	ISDN not initialized
7	BUSY NO CARRIER	Remote user busy
8	NO ANSWER	Remote user not responding
33	FAX	Fax call
35	DATA	Data call

AT Result Codes - Connection Indicators

The following codes give you information about your connection. The word "CONNECT" in a message can relate to either DCE speed or DTE speed, depending on the selection made with ATXn. The word "CARRIER" always relates to DCE speed.

DCE Speed means different things for different applications. For Digital calls, it is the bitrate obtained by summing all ISDN B-channels available to the protocol. For a V.110 call, it is the V.110 user rate and not the intermediate rate of the B-channel. For Modem over ISDN, it is the speed of the V.34 carrier.

DTE Speed is the speed used between the PC and the T/A (default configured or last speed detected by the auto-bauding process). Some non-standard speeds (e.g. using certain divisors on a PC 8250 or 16550 UART) are not detected by the DIVA T/A and will not be correctly reported.

Code	Word Message
1	CONNECT
5	CONNECT 1200
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
13	CONNECT 7200
14	CONNECT 12000
15	CONNECT 14400
16	CONNECT 19200
17	CONNECT 38400
18	CONNECT 57600
19	CONNECT 64000
20	CONNECT 115200
21	CONNECT 230400
23	CONNECT 512000
40	CARRIER 300 CONNECT 300
41	CARRIER 600 CONNECT 600
46	CARRIER 1200 CONNECT 1200
47	CARRIER 2400 CONNECT 2400
48	CARRIER 4800 CONNECT 4800
49	CARRIER 7200 CONNECT 7200
50	CARRIER 9600 CONNECT 9600
51	CARRIER 12000 CONNECT 12000
52	CARRIER 14400 CONNECT 14400
53	CARRIER 16800 CONNECT 16800

Code	Word Message
54	CARRIER 19200 CONNECT 19200
55	CARRIER 21600 CONNECT 21600
56	CARRIER 24000 CONNECT 24000
57	CARRIER 56000 CONNECT 56000
58	CARRIER 28800 CONNECT 28800
59	CARRIER 64000 CONNECT 64000
60	CARRIER 128000 CONNECT 128000
61	CARRIER 26400 CONNECT 26400
62	CARRIER 31200 CONNECT 31200
63	CARRIER 33600 CONNECT 33600
64	CARRIER 75T/1200R CONNECT 75T/1200R
65	CARRIER 1200T/75R CONNECT 1200T/75R
66	CARRIER 112000 CONNECT 112000
67	CARRIER 38400 CONNECT 38400
70	PROTOCOL: NONE
73	PROTOCOL: V42
79	PROTOCOL: MNP REL
80	PROTOCOL: MNP ALT
83	PROTOCOL: V120
84	PROTOCOL: V110
85	PROTOCOL: PPPC
86	PROTOCOL: MLPPP
89	PROTOCOL: TRV
90	PROTOCOL: TRANSPARENT MODE

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