



BLACK BOX Catalogue Ltd
The Source for Connectivity



MDU903
MDU904

**AT COMMAND SET FOR
DATA-LINK 33.6 MODEM AND
INDUSTRIAL DATA-LINK
33.6 MODEM**



TECHNICAL: (0118) 931 2233
SALES: (0118) 965 5100
FAX: (0118) 931 1727
ADDRESS: 15 Cradock Road, Reading, Berkshire RG2 0JT
WEB: www.blackbox.co.uk



 AT Command Reference. MDU903, MDU904

Thank You for purchasing a Black Box modem product. This manual is designed to be used with any of the Black Box modems, dial-up or leased line with dial back-up. Not all commands may be applicable to the model you are using, such as defining the leased line operating mode when you are using a dial-up only model.

The AJ Modems are typically operated using the industry-standard AT command set. The AT commands for these modems have been expanded beyond the standard set in order to incorporate the many additional features that are included in these modems. AT commands are issued to the modem in Command Mode. The modem is in Command Mode when it is disconnected from the phone line. This is sometimes referred to as the Idle Mode.

An asynchronous communication program eliminates the need to learn the modem commands. All AT commands, except A/ and the escape code (+++) begin with the letters AT, meaning "attention". Several commands may share a line as a single string of commands, but only one AT prefix is required, at the beginning of the line. Each command consists of the following elements:

The two character sequence **AT**

Acommand (ie; ATZ)

Acommand parameter (optional) (ie; AT%B1)

A carriage return

Example:

To enter the command 'Answer', type **ATA** and <ENTER>.

When entering AT commands, it is not necessary to type the number "0". If the n value is left blank the modem assumes a "0".

Some commands do not have parameters. Any missing parameter in a command is assigned the value zero, which may be a valid parameter for the command. The sequence followed by AT command causes the modem to enter a command state. That is, AT without a command serves as a wake up code and an "OK" appears on the screen. The modem queues commands in a 40-character command line. The command line beginning with AT can have several commands. A separator is **not** required between the commands. The command line format is:

AT command (parameter)...

(enter)

Example: ATE0Q1&D&WZ<cr>

In this example we turn Command Echo ([E0](#)) off, we turn Quiet ([Q1](#)) on, force (ignore) DTR on ([&D](#)), save the changes to memory location 0 ([&W](#)), and reset the modem ([Z](#)), all with a single string of characters.



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When a carriage return is received, which terminates the command line, the commands are performed in the order in which they are sent to the modem. If more than 40 characters are sent to the modem, an error occurs and all command must be re-entered.

Most applications only need to use a small portion of the AT command set, the following paragraphs discuss how to perform the most common day-to-day modem functions utilizing the AT commands.

After a command is entered, the modem sends a message, or result code, to the terminal screen. Most commands are acknowledged by "OK". The modem can be arranged to send the result code in words or as digits with the Word/Digit ATVn command. The most common result codes are:

WORD CODE	DIGIT CODE	MEANING
OK	0	Command line executed without error
CONNECT	1	Connection established
RING	2	Ring signal detected on the line.

One of the most important commands to remember is "AT&S". This command will instruct the modem to output the Configuration Status Display (or profile), which shows how the modem is currently configured.

General and Setup

AT - Attention Code

Sr=n - Set Register

Z - Reset (Recall User Configuration)

*Hn - Busy Out

&Fn - Factory Configuration Load

&Wn - Write Active Configuration to Non-Volatile Memory

%Mn - Load Non-Volatile Memory Bank

%T - Store Time and Date

@Ln - Load Default Options

Data Format and Rate

&Mn - Async/Sync Mode Select

@An - Auto Baud Rate Detect

@Bn - Data Bits

@Cn - Constant DTE Rate

@Dn - DTE Speed

@Fn - Online Speed Change

@Mn - Modem Speed

@Pn - DTE Parity



@S_n - DTE Stop Bits

Dialing and Answering

A - Answer

D - Dial Command

DS_n - Dial Stored Telephone Number

H_n - Hook Switch Control

L_n - Speaker Volume

M_n - Speaker Control

O_n - Return to the Online State

P - Pulse Dial

R - Originate Call in Answer Mode

S_n - Dial Stored Number

T - Touchtone Dial

&G_n - Guard Tone Selection

&J_n - A/A1 - MI/MIC Select

&P_n - Pulse Dial Make/Break Ratio Select

&Q_n - Signal Quality Redial

&Z_n - Store Phone Number

%A_n - Adaptive Dial

%B_n - Any Character Abort

@V_n - Dialer Selection

EIA Control

&C_n - CD EIA Control

&D_n - DTR EIA Control

&R_n - RTS/RTR EIA Control

&X_n - Synchronous Transmit Clock Source

%C_n - CTS EIA Control

%D_n - DSR EIA Control

%EA_n - EIA Control of LAL (Local Analog Loopback)

%ER_n - EIA Control of RDL (Remote Digital Loopback)



[%ESn](#) - EIA Speed Control

[*RPn](#) - RTS Polarity

[*Sn](#) - DSR and CD Control During Call Back

Error Correction and Data Compression

[\\$\\$\\$](#) - Switch to LAPM/MNP Link

[S9](#) - Status Display Example

[*An](#) - Adaptive Packet Size

[*Bn](#) - Block/Stream Mode

[*En](#) - Enable or Disable Compression

[*Gn](#) - LAPM/MNP Error Alarm

[*Mn](#) - Operating Modes

[*On](#) - Originate LAPM/MNP Link

[*Pn](#) - Maximum Packet Size

[*RS](#) - Reset Error Statistics

[*Tn](#) - Select Protocol - V.42(LAPM) or MNP

[*U](#) - Accept LAPM/MNP Link

[*Y](#) - Switch to LAPM/MNP Link

[*Z](#) - Switch to Normal Link from MNP

Flow Control

[*Dn](#) - Command Mode at Transmit Break

[*KAN](#) - Clear Transmit Buffer at Transmit Break

[*KBn](#) - Clear Transmit Buffer at Receive Break

[*KCN](#) - Clear Receive Buffer at Transmit Break

[*KDN](#) - Clear Receive Buffer at Receive Break

[*KT](#) - Break Type

[*LBn](#) - Local Overflow Bell

[*LGN](#) - Generate Local Flow Control

[*LRn](#) - Respond to Local Flow Control



*RB_n - Remote Overflow Bell

*RF_n - Filter Receive Flow Control

*RG_n - Generate Remote Flow Control

*RK_n - Pass Receive Break

*RR_n - Respond to Remote Flow Control

*XF_n - Filter Transmit Flow Control

*XK_n - Pass Transmit Break

&B - DTE Buffer Size

Leased Line and Dial Back up

&L_n - Leased Line or Dial-Up Select

%L_n - Leased Line Lookback

%O_n - Leased Line - Originate or Answer

%U_n - Auto Dial Back Up

%V_n - Auto Dial Back Up Alarm

%WD_n - Weekday Window

%WE_n - Weekend Window

%XL_n - Leased Line Transmit Level

%Y_n - Window End Disconnect

Online Operations

B_n - Bell/ITU-4 Protocol Compatibility

Y_n - Long Space Disconnect

%F_n - Auto Fall Back

%H_n - V.22 bis and V.21/103 "HUNT" Operations

%I_n - Inactivity Timer

%Q_n - Loss of Carrier Redial

%R_n - Automatic Retrain

%XD_n - Dial Line Transmit Level

@T_n - Trellis Encoding



[@Xn](#) - Transmit Equalizer

Security

[&A](#) - Answer Back Storage

[%PO:s](#) - Store Operator Password

[%PS:s](#) - Store Supervisor Password

[%SAn](#) - Answer Password Security

[%SBn](#) - Second Password Prompt in Call Back

[%SCn](#) - "AT" Command Security

[%SDn](#) - Remote Configuration Security

[%SLn](#) - Password Upper/Lower Case Sensitivity

[%SPn](#) - Prompt Security

[%STn](#) - Password Attempts Allowed

[%SWn](#) - Non-Volatile Write Security

Test

[Cn](#) - Transmit Carrier Control

[In](#) - Request Product Firmware Revision & ROM Checksum

[&Tn](#) - Test Mode Selection

[@Hn](#) - On/Off Hook in LAL

[@Rn](#) - Respond to RDL Request

Visual Responses

[En](#) - Command Echo

[Qn](#) - Quiet Command (Enable Responses)

[Sr?](#) - Read "S"-Register

[Vn](#) - Result Codes as Word or Digit

[Xn](#) - Extended or Basic Result Code Set

[&N](#) - Display Phone Number List

[&Sn](#) - Status Display

[*Cn](#) - Connect Message Output Control



*Nn - Modem/DTE Speed in Connect Message

*Vn - Extended Result Codes

A - Answer (ATA)

The A command causes the modem to go off-hook immediately, answer an incoming telephone call, and wait for a carrier signal. The modem does not wait for a ring signal before answering. The Answer command must be the last command on a command line. Only commands preceding the Answer command will be executed; the modem ignores commands following the A command. This command can be used in conjunction with the Dial (D) command to switch from voice to data communication. For example, one user enters the A command to Answer the call while the other enters the D command to originate communication between the modems.

This command should not be used for auto answer. For auto-answer, set S0 to a number greater than zero. DTR must be on for the modem to answer automatically.

B - Bell/CCITT Protocol Compatibility (Format: ATBn)

The B command sets the modem for Bell or CCITT protocol.

n = 0 - (Default) CCITT protocol (V.22 mode 2 or V.22 bis) is selected

n = 1 - Bell protocol (103, 212A or 201) is selected.

At 0-300 bps ATB0 selects V.21 and ATB1 selects Bell 103

At 1200 bps ATB0 selects CCITT V.22, mode 2 ATB1 selects Bell 212A

At 2400 bps ATB0 and ATB1 select CCITT V.22 bis except in 4-wire leased line the mode may be V.22 bis, V.27 or Bell 201

At >2400 bps ATB0 and ATB1 not used

NOTE: Data rate is determined by the communication data rate at which last AT command was issued.

C - Transmit Carrier Control (Format: ATCn)

The Cn command allows you to turn the transmit carrier off for test purposes.

n = 0 - Carrier transmit OFF

n = 1 - (Default) Carrier transmit ON

D - Dial Command (Format: ATDn)

The Dial command causes the modem to go off-hook and automatically originate a telephone call.

P - Pulse Dial

R - Reverse Mode



Sn - Dial Stored Number

T - Touch Tone Dial (Default)

W - Wait for Dial Tone

@ - Wait for Quiet Answer

% - Abort current call and proceed to the next phone number. %n represents a string composed of dial modifiers and telephone number digits. Allowable digits include 0-9 and the symbols that are listed below for reference. Most of the dial modifiers can be inserted before, after, or within the telephone number. The exception is the Reverse mode modifier (R) which must follow the telephone number.

! - Flash

, - Pause

; - Return to Command State

X - Dial in auto reliable mode, LAPM/MNP or non LAPM/MNP

Y - Dial in exclusive mode, LAPM/MNP only

Z - Dial in normal mode, no LAPM/MNP

\$Name - Dial by name - Dials number stored at location where the stored name matches the name entered after the \$ symbol.

Note: The X, Y, and Z commands override the current configuration setting, but only for this connection. Parentheses, hyphens, and spaces entered in dial strings for readability are ignored by the modem. The modem will dial the telephone number as instructed by the dial modifiers and wait for a carrier from the remote modem.

Entering ATD with no dial string or dial modifiers causes the modem to go off-hook in the originate mode without dialing a telephone number. This can be used in conjunction with the A (Answer) command to switch a voice call to data. See the note following the Answer command.

DS - Dial Stored Telephone Number (Format: ATDSn)

The ATDSn command dials the stored telephone number specified by n where n is 0 to 99. If a configuration number was specified when the telephone number was saved, then that configuration will be loaded before the telephone number is dialed.

Note: When telephone numbers are dialed from memory the redials as defined by register S55 will proceed. The default is 0.

E - Command Echo (Format: ATEn)



The En command will determine whether the modem will echo commands back to the local DTE.

n = 0 - Echo off



n = 1 - (Default) Echo on

H - Hook Switch Control (Format: ATHn)

The Hn command instructs the modem to connect to or disconnect from the telephone line.

n = 0 - On hook (hang up)

n = 1 - Off hook

I - Request Product Firmware Revision & ROM Checksum (Format: ATIn)

ATIn requests a product firmware revision from the modem runs a memory test or requests the product type and EPROM part number.

n = 0 - Requests product firmware revision

n = 1 - Requests firmware checksum

n = 2 - Tests firmware checksum and report s"OK" if correct.

n = 3 - Requests the product type and the EPROM part number.

n = 4 - Requests library information.

n = 5 - Requests manufacturing feature list.

n = 6 - Requests programmable device ID's.

n = 7 - Requests power-up self-test results.

n = 8 - Requests power-up configuration.

Note: For n= 0 the product firmware revision is displayed as "288nn" where nn is a 2-digit code which indicates the current revision level of the firmware. The initial release will be "28800".

L - Speaker Volume (Format: ATLn)

ATLn controls the volume of the speaker.

n = 0 - Low volume

n = 1 - Low volume

n = 2 - (Default) Medium volume

n = 3 - High volume

M - Speaker Control (Format: ATMn)

ATMn controls when and if the speaker is turned on.



n = 0 - Speaker disabled

n = 1 - (Default) Speaker off when carrier received

n = 2 - Speaker always on

n = 3 - Speaker off when carrier received and when dialing.

O - Return to the Online State (Format: ATOn)

ATOn will command the modem to return on-line in the command or remote configuration mode. This command is usually used after the modem has been taken off-line by the +++ command.

n = 0 - Return on-line

n = 1 - Return on-line with retrain for V.34, V.32 ter, V.32 bis, V.32 and V.22 bis operation (depending on model)

n = 2 - Fallback to next lower speed

n = 3 - Fallforward to next higher speed

Note: Option 2 and 3 will function only if on-line speed change has been enabled (AT@F1).

P - Pulse Dial (Format: ATP)

The P command instructs the modem to pulse dial subsequent digits of a telephone number. The P can be inserted at any point in a telephone number, causing the modem to switch from touchtones to pulses during dialing.

Note: When the modem is first powered on, it is set for touchtone dialing. The Pulse command can be entered alone (ATP) to switch the default to pulse dialing until the next modem reset or touchtone command.

Q - Quiet Command (Enable Responses) (Format: ATQ)

The Q command determines if result codes are sent to the screen by the modem when commands are executed. When the modem is connected to a computer it is frequently necessary to use n = 1.

n = 0 - (Default) Messages or result codes are displayed.

n = 1 - Messages or result codes are not displayed.

n = 2 - Messages or result codes are displayed in originate mode, but not in answer mode.

Note: This command determines if messages are sent; the V command determines whether English messages or numeric result codes are sent to the screen.

R - Originate Call in Answer Mode (Format: ATR)

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The R command enables you to call a modem that is capable of originating, not answering calls. After dialing, the modem sends the answer tone to the remote modem.



Note: The R command must be the last dial string character.

Note: When the R command is used, no call progress reports are sent to the DTE. When the R command is issued, the modem sends the answer tone, even if it receives a busy signal.

Sr? - Read "S" Register (Format: ATSr?)

The Sr? command reads the value assigned to modem register r. The value of the register, n (n=0-255), is sent to a program or displayed on the screen.

Where "r" is a number between 0 and the highest S-Register in the modem.

Sr=n - Set Resgister (Format: ATSr=n)

The Sr=n command assigns a value n (n=0-255) to register r. The S-registers are registers that hold modem configuration parameters. Descriptions of the S-registers are in Section XX.

Where "r" is the S Register number and n is a number between 0 and 255.

S - Dial Stored Number (Format: ATSn)

The Sn command instructs the modem to dial the telephone number stored previously in memory location n with the AT&Zn command.

T - Touchtone Dial (Format: ATDTn)

The T command instructs the modem to dial subsequent digits of a telephone number with touchtones. The T can be inserted at any point in a telephone number, causing the modem to switch from pulses to touchtones during dialing.

Where n represents the digits of the phone number.

Note: When the modem is powered on, it is set for touchtone dialing.

Note: The T command can be entered alone (ATT) to switch the modem to touchtone dialing prior to entering a dial string.

V - Result Codes as Word or Digit (Format: ATVn)

This command determines whether the modem sends the result codes to the DTE in words or as digit codes. Unless the results are being returned to a program that requires digit responses, use of word codes is recommended.

n = 0 - Selects digit codes

n = 1 - (Default) Selects word codes

X - Extended or Basic Result Code Set (Format: ATXn)



The X command allows the selection of extended sets of result codes or the basic set. The selection of the result code set also determines if the modem "blind dials" or if it listens for a dial tone before dialing. Two other command settings determine some of the result codes that will be displayed. If *Vn is set to n=1 then the LAPM or MNP functions are indicated after the data rate. This indication of LAPM/V42BIS/MNP/MNP5 is related only to the modem-to-modem communication link. If *Vn is set to n=0 then only the speed is indicated. If *Nn is set to n=0 the indicated speed is the modem data rate and the maximum is 28,800 bps. If *Nn is set to n=1 the indicated speed is the DTE data rate. A listing of RESULT CODES follows with n definitions for the ATXn command.

n = 0 - Selects basic set. Result codes 0-4 are returned by the modem. The modem blind dials after going off-hook for the period set by S-register 6 (default=2 sec.).

n = 1 - Selects extended set. Result codes 0-5 and 10, 11, 12, 20 and 21 are returned. The modem blind dials as with n=0.

n = 2 - Selects extended set with dial tone detection. Result codes 0-6, and 10, 11, 12, 20 and 21 are returned by the modem. If a dial tone is not detected within 5 seconds after the modem goes off-hook, the result code "NO DIALTONE" (6) is sent to the DTE.

n = 3 - Selects extended set with busy detection. Result codes 0-5, and 7, 10, 11, 12, 20 and 21 are returned by the modem. The modem blind dials as with n=0. If a busy signal is received after dialing, the modem returns the result code, "BUSY" (7) to the DTE.

n = 4 - (Default) Selects extended result code set with dial tone detection and busy signal detection. All the result codes listed below that are applicable are returned by the modem. The modem listens for a dial tone; if a dial tone is not detected within 12 seconds after the modem goes off-hook, it issues a "NO DIAL TONE" (6) result code. If a dial tone is detected, the modem will dial. A busy signal prior to dialing causes the modem to go on-hook.



	RESULT CODES:	
Numeric	"AT" Dialer	V.25 bis Dialer
0	OK	VAL
1	CONNECT	CNX
2	RING	INC
3	NO CARRIER	---
4	ERROR	INV
5	CONNECT 1200	CNX 1200
6	NO DIAL TONE	CFI ND
	BUSY	CFI ET
8	NO ANSWER	CFI NT
9	CONNECT 7200	CNX 7200
10	CONNECT 2400	CNX 2400
11	CONNECT 4800	CNX 4800
12	CONNECT 9600	CNX 9600
13	CONNECT 12000	CNX 12000
14	CONNECT 14400	CNX 14400
15	DELAYED	DLC
16	NUMBER FORBIDDEN	CFI FC
17	NUMBER NOT STORED	CFI NS
18	MODEM BUSY	CFI CB
19	ABORT CFI	AB
20	CONNECT 19200	CNX 19200
21	CONNECT 38400	CNX 38400
22	CONNECT 57600	CNX 57600
23	CONNECT 115200	CNX 115200
24	CONNECT 16800	CNX 16800
25	CONNECT 24000	CNX 24000
26	CONNECT 28800	CNX 28800
27	ERROR	CNX
28	ERROR	INV CU
29	ERROR	INV MS
30	ERROR	INV PS
31	ERROR	INV PV
32	NO CARRIER	CFI RT
33	BLACKLIST FULL	CFI BF
34	CONNECT 1200T/75R	CNX 1200T/75R
35	CONNECT 75T/1200R	CNX 75T/1200R
36	FLASH	FLASH
37	CONNECT 21600	CNX 21600
38	CONNECT 26400	CNX 26400
40	CONNECT 300	CNX 300/MNP
41	CONNECT 7200/MNP	CNX 7200/MNP



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42	CONNECT 1200/MNP	CNX 1200/MNP
43	CONNECT 2400/MNP	CNX 2400/MNP
44	CONNECT 4800/MNP	CNX 4800/MNP
45	CONNECT 9600/MNP	CNX 9600/MNP
46	CONNECT 12000/MNP	CNX 12000/MNP
47	CONNECT 14400/MNP	CNX 14400/MNP
48	CONNECT 19200/MNP	CNX 19200/MNP
49	CONNECT 38400/MNP	CNX 38400/MNP
50	CONNECT 300/MNP5	CNX 300/MNP5
51	CONNECT 7200/MNP5	CNX 7200/MNP5
52	CONNECT 1200/MNP5	CNX 1200/MNP5
53	CONNECT 2400/MNP5	CNX 2400/MNP5
54	CONNECT 4800/MNP5	CNX 4800/MNP5
55	CONNECT 9600/MNP5	CNX 9600/MNP5
56	CONNECT 12000/MNP5	CNX 12000/MNP5
57	CONNECT 14400/MNP5	CNX 14400/MNP5
58	CONNECT 19200/MNP5	CNX 19200/MNP5
59	CONNECT 38400/MNP5	CNX 38400/MNP5
60	CONNECT 300/LAPM	CNX 300/LAPM
61	CONNECT 7200/LAPM	CNX 7200/LAPM
62	CONNECT 1200/LAPM	CNX 1200/LAPM
63	CONNECT 2400/LAPM	CNX 2400/LAPM
64	CONNECT 4800/LAPM	CNX 4800/LAPM
65	CONNECT 9600/LAPM	CNX 9600/LAPM
66	CONNECT 12000/LAPM	CNX 12000/LAPM
67	CONNECT 14400/LAPM	CNX 14400/LAPM
68	CONNECT 19200/LAPM	CNX 19200/LAPM
69	CONNECT 38400/LAPM	CNX 38400/LAPM
70	CONNECT 300/V42BIS	CNX 300/V42BIS
71	CONNECT 7200/V42BIS	CNX 7200/V42BIS
72	CONNECT 1200/V42BIS	CNX 1200/V42BIS
73	CONNECT 2400/V42BIS	CNX 2400/V42BIS
74	CONNECT 4800/V42BIS	CNX 4800/V42BIS
75	CONNECT 9600/V42BIS	CNX 9600/V42BIS
76	CONNECT 12000/V42BIS	CNX 12000/V42BIS
77	CONNECT 14400/V42BIS	CNX 14400/V42BIS
78	CONNECT 19200/V42BIS	CNX 19200/V42BIS
79	CONNECT 38400/V42BIS	CNX 38400/V42BIS
80	CONNECT 57600/MNP	CNX 57600/MNP
81	CONNECT 115200/MNP	CNX 115200/MNP
82	CONNECT 57600/MNP5	CNX 57600/MNP5
83	CONNECT 115200/MNP5	CNX 115200/MNP5
84	CONNECT 57600/LAPM	CNX 57600/LAPM
85	CONNECT 115200/LAPM	CNX 115200/LAPM
86	CONNECT 57600/V42BIS	CNX 57600/V42BIS



87	CONNECT 115200/V42BIS	CNX115200/V42BIS
88	CONNECT 16800/MNP	CNX 16800/MNP
89	CONNECT 24000/MNP	CNX 24000/MNP
90	CONNECT 28800/MNP	CNX 28800/MNP
91	CONNECT 16800/MNP5	CNX 16800/MNP5
92	CONNECT 24000/MNP5	CNX 24000/MNP5
93	CONNECT 28800/MNP5	CNX 28800/MNP5
94	CONNECT 16800/LAPM	CNX 16800/LAPM
95	CONNECT 24000/LAPM	CNX 24000/LAPM
96	CONNECT 28800/LAPM	CNX 28800/LAPM
97	CONNECT 16800/V42BIS	CNX 16800/V42BIS
98	CONNECT 24000/V42BIS	CNX 24000/V42BIS
99	CONNECT 28800/V42BIS	CNX 28800/V42BIS
100	CONNECT 21600/MNP	CNX 21600/MNP
101	CONNECT 26400/MNP	CNX 26400/MNP
102	CONNECT 21600/MNP5	CNX 21600/MNP5
103	CONNECT 26400/MNP5	CNX 26400/MNP5
104	CONNECT 21600/LAPM	CNX 21600/LAPM
105	CONNECT 26400/LAPM	CNX 26400/LAPM
106	CONNECT 21600/V42BIS	CNX 21600/V42BIS
107	CONNECT 26400/V42BIS	CNX 26400/V42BIS

*Note: All result codes with a data rate above indicate a LAPM, V42BIS, MNP or MNP5 link is established if the *V1 command is active. Also, if V1 is active result codes 17 and 19 are returned for n=1,2,3 or 4.*

*Note: If *V0 is the set condition, all result codes with a data rate will appear without the LAPM, V42BIS, MNP or MNP5 indication, and result codes 17 and 19 will not appear.*

Y - Long Space Disconnect (Format: ATYn)

The Y command enables the long space disconnect feature. When enabled, the modem will disconnect from the telephone line (go on-hook) after receiving a continuous BREAK from the remote modem for 1.6 seconds. The modem will also send a continuous BREAK to the remote modem for 4 seconds prior to going on-hook.

n = 0 - (Default) Long space disconnect disabled

n = 1 - Long space disconnect enabled

Z - Reset (Recall User Configuration) (Format: ATZ)

This command resets the modem, setting all commands, S-registers, and configuration switches to the configuration profile stored in non-volatile memory with the AT&W command. The modem performs the ROM, RAM, and non-volatile tests, sending the OK result code if it passes, or ERROR if a



problem is detected. The modem is left in command mode. See S19 register definition in Section 7.

Note: Resetting the modem clears the command buffer, so commands after the Z in the command line are ignored, and a subsequent A/ command will be invalid.

\$\$\$ - Switch to LAPM/MNP Link (Format: \$\$\$)

The \$\$\$ command causes the modem to switch immediately to LAPM/MNP operation. You do not have to return to command mode to issue this command. To use this command, data must not be on the line for a minimum of one second before and after the \$\$\$ entry.

Example: Current Status: CONNECT 28800

Enter: (1 second pause) \$\$\$ (1 second pause)

New Status: CONNECT 28800/V42bis

&A - Answer Back Storage (Format: AT&A)

The &A command is used to store (and enable) the answerback code. The answerback feature is designed to provide security for calling into a host computer. If the answering modem sends an ENQ code, the Anderson Jacobson Modem sends the stored answer back sequence. If the answer back matches the answerback stored at the host, access is allowed; if it does not match, the answering modem disconnects the line. When an answerback is stored, the Multimode Modems will send the answerback in response to an ENQ code or send an ENQ code and wait for the answer back, depending on whether the modem is originating or answering the call.

FORMAT: AT&A:ssssssssssss:ssssssssssss

where sss..sss represents the answer back sequence being stored. The answer back sequence can contain up to 12 alphanumeric characters. When storing the answer back sequence the string must be entered twice on the command line to ensure that the sequence is saved correctly. Any ASCII character except the backspace or carriage return can be used.

Note: Storing an answer back sequence enables the answer back function. If the modem is used in answer mode, the originate modem must have the answer back sequence or it will be disconnected.

&B - DTE Buffer Size (Format: T&Bn)

This command determines the buffer size.

$n = 0$ - 256 bytes

$n = 1$ - 1K bytes (Default)

$n = 2$ - 2K bytes



$n = 3$ - 4K bytes

&C - CD EIA Control (Format: AT&Cn)

This command allows the CD (Carrier Detect) signal to be forced on to the connected DTE.

$n = 0$ - CD signal forced on (except when disconnecting - see S41 definition in Section 7)

$n = 1$ - (Default) CD off in command mode. CD off during modem handshake. CD turns on when carrier is detected.

$n = 2$ - CD off in command mode. CD off during modem handshake. CD turns on when modem can pass full duplex data.

$n = 3$ - CD follows DTR in command mode. CD off during modem handshake. CD turns on when carrier is detected.

$n = 4$ - CD follows DTR in command mode. CD off during modem handshake. CD turns on when modem can pass full duplex data.

Note: If $n=2$ or 4 then CD will not turn on until after all security processing and MNP negotiations have been completed.

&D - DTR EIA Control (Format: AT&Dn)

This command determines how the modem responds to the presence or absence of a DTR (Data Terminal Ready) signal from the DTE.

$n = 0$ - DTR EIA signal forced on

$n = 1$ - CCITT 108/1 operation. Modem auto dials stored number when off-to-on DTR transition occurs. Modem disconnects when on-to-off DTR transition occurs.

$n = 2$ - (Default) CCITT 108/2 operation. DTR EIA signal must be present to originate or answer a call. Modem disconnects when on-to-off DTR transition occurs.

&F - Factory Configuration Load (Format: AT&Fn)

This command causes the modem to load the factory configuration (default settings) into the modem registers, putting the modem into a known operating state.

$n = 0$ - 4 configuration number (see specific model Installation & Operation Manual)

&G - Guard Tone Selection (Format: AT&Gn)

This command selects guard tones to be generated by the answering modem when answering a call as required by the CCITT recommendation to prevent



disconnection by European central offices. Guard tones are not used in the U.S. except to answer calls from some other countries. This command is operational only when operating in the CCITT V.22 bis and V.22 modes.

n = 0 - (Default) No guard tones are generated

n = 1 - 550 Hz tone generated

n = 2 - 1800 Hz tone generated

&J - A/A1 - MI/MIC Select (Format: AT&Jn)

This command tells the modem which kind of telephone jack is used to make the telephone line connection.

n = 0 - (Default) selects RJ-11 jack operation.

n = 1 - not used

n = 2 - Selects RJ-11 jack for MI/MIC operation. An external momentary closure of the MI/MIC leads causes the modem to connect to the phone line and operate in the originate mode.

Note: Not available on the 28.8K or faster models.

&L - Leased Line or Dial-Up Select (Format: AT&Ln)

This command selects leased line or dial-up telephone connection.

n = 0 - (Default) Selects a dial-up connection

n = 1 - Selects a 2-Wire leased line connection

n = 2 - Selects a 4-Wire leased line connection

n = 3 - Selects UADBU connection without leased line

Connection can be established with synchronous or asynchronous operation.

&M - Async/Sync Mode Select (Format: AT&Mn)

The &M command selects asynchronous or synchronous mode of operation during data communications.

n = 0 - (Default) Selects asynchronous operation when on-line.

n = 1 - Selects synchronous operation for data mode. If the DTE constantly sends data to the modem during Idle Mode, set the appropriate jumper switch to the "DUMB" position to prevent the modem from possibly falsely detecting an AT command in the data stream.

&N - Display Phone Number List (Format: AT&N)



The AT&N command displays the phone number list. The information is entered into the phone number list with the AT&Zn command.

&P - Pulse Dial Make/Break Ratio Select (Format: AT&Pn)

This command allows the selection of the ratio of the make to break (off-hook to on-hook) interval used for pulse dialing. The British Commonwealth countries require a different ratio than the one standard in the U.S.

n = 0 - (Default) 39% make; 61% break (U.S. setting)

n = 1 - 33% make; 67% break (British Commonwealth setting)

&Q - Signal Quality Redial (Format: AT&Qn)

This command controls the automatic redial feature. The user can specify the required level of signal quality beyond which a redial will proceed to obtain an improved dial connection.

n = 0 - (Default) signal quality redial feature disabled.

n = 1 - Redial if signal quality is less than or equal to 8.

n = 2 - Redial if signal quality is less than or equal to 7.

The number of redials, 0 through 8, is determined by the setting of S-register S55 (default S55=0).

&R - RTS/RTR EIA Control (Format: AT&Rn)

The &Rn command controls the interaction of the RTS (Request-To-Send) and CTS (Clear-To-Send) signals.

n = 0 - (Default) RTS/RTR is forced on.

n = 1 - RTS/RTR is supplied by the DTE. The RTS input can control the CTS output.- see AT%Cn command.

n = 2 - RTS/RTR is supplied by the DTE. The RTS input can control the CTS output -see AT%Cn command. When RTS is off, the remote modem will turn CD off to simulate a half-duplex connection as defined in CCITT V.13.

&S - Status Display (Format: AT&Sn)

This command displays the current configuration of the modem. The AT&S command with no n (or n=0) will display the full ten pages of status (see Table 3.1) with the next page obtained each time the carriage return key (enter) is pressed. This sequence is aborted by pressing any other key. For the display of a specific page, the page number is entered as n.

n = 0 - Display each page of configuration (n=1 to n=12)

n = 1 - Visual display and interface signal configurations



- n = 2 - Dialing, answering and online configurations
- n = 3 - Format/data rate and leased line configurations
- n = 4 - Flow control and break handling
- n = 5 - LAPM/MNP error correction and action commands
- n = 6 - Security information
- n = 7 - Action commands
- n = 8 - Connect status display
- n = 9 - LAPM/MNP error correction statistics
- n = 10 - Test commands
- n = 11 - Leased Line Statistics
- n = 12 - Dial Line Statistics

&S9 - Status Display Example (Format: AT&S9)

An example of the AT&S9 status display is shown below

```
TRANSMIT RECEIVE
53113 SECONDS
21250216 21250478 CHARACTERS
15362453 15362634 BYTES
60011 60011 DATA FRAMES
3 0 DUP DATA FRAMES (RNR FRAMES for LAPM operation)
19972 20000 DATA ACK FRAMES (RR FRAMES for LAPM operation)
1 0 ERRORS (REJ FRAMES for LAPM operation)
0 0 ATTN FRAMES
0 0 ATTN ACK FRAMES
256 DATA BYTES CURRENT MAXIMUM PER FRAME
256 DATA BYTES ABSOLUTE MAXIMUM PER FRAME
CLASS 5, WINDOW SIZE 8
OK
Or for a LAPM error correction connection the last line is:
LAPM, WINDOW SIZE 15 (TRANSMIT), 15 (RECEIVE)
Or for a V.42 bis compression connection the last line is:
V.42 BIS: BOTH DIRECTIONS, DICTIONARY SIZE 1024, STRING LENGTH 32
```

&T - Test Mode Selection (Format: AT&Tn)

The &Tn command selects from the wide range of testing options provided by the modem. Selections range from the simple LAL (Analog Loopback) test to the complex RDLB (Remote Digital Loopback) test with self test generator and comparator. The ALB/LAL and RDL/RDLB tests are not operative at 300 bps.

- n = 0 - Terminates test mode; returns modem to command mode
- n = 1 - ALB/LAL (Local Analog Loopback)



- n = 2 - (Factory use only)
- n = 3 - Initiate LDL/DLB (Local Digital Loopback)
- n = 4 - Enable response to RDL/RDLB remote requests
- n = 5 - Disable response to RDL/RDLB remote requests
- n = 6 - Initiate RDL (Remote Digital Loopback)
- n = 7 - Initiate RDL with self test generator and comparator that reports number of errors and issues audible responses
- n = 8 - Initiate LAL/ALB with self-test
- n = 9 - Initiate LAPM RDL with self-test
- n = 10 - Test Flash memory

Register S18 is a test timer which can be used in conjunction with any active test mode command to cause the modem to exit from test mode after the number of seconds (1-255) specified in the register. If the register is set to 0, the test timer will not expire, and the modem will not exit test mode until the test is manually terminated.

&W - Write Active Configuration to Non-Volatile Memory (Format: AT&Wn)

The &Wn command stores a new user-specified configuration in non-volatile memory. The new configuration is based on the current settings of the S-registers. This new configuration will be active if it is associated with a number to be dialed or is activated by the %Mn command.

- n = 0 - 4 for the user configurations %M0 thru %M4 and
- n = 5 - 9 for the factory configurations &F0 thru &F4

&X - Synchronous Transmit Clock Source (Format: AT&Xn)

The &Xn command determines the source of the synchronous transmit clock. The transmit clock output of the modem is on pin 15 of the RS-232 connector.

- n = 0 - (Default) causes the modem to generate the transmit signal timing and apply it to pin 15 of the RS-232 connector.
- n = 1 - Transmit signal timing is provided by the DTE on pin 24 of the RS-232 connector.
- n = 2 - Transmit signal timing is derived from the carrier signal received from the remote modem (slave operation) and applied to pin 15 of the RS-232 connector.

&Z - Store Phone Number (Format: AT&Zn)



This command is used to store the phone numbers and associated information into non-volatile memory at location "n" for n = 0 through 99.

AT&Zn:NAME:PASSWORD:PHONE:LINK:CNF:ATTR

Also see Chapter 3 of the specific model Installation & Operating Manual. Phone numbers in memory are displayed with the AT&N command.

%A - Adaptive Dial (Format: AT%An)

This command allows the modem to determine if pulse or tone dialing is required.

n = 0 - (Default) Disabled

n = 1 - Enabled

%B - Any Character Abort (Format: AT%Bn)

This command, if enabled, will cause the modem to abort a call if any character is received from the terminal after the dialing command, but before the modem has connected. When the modem is connected to a host computer system it is frequently necessary to use n = 0.

n = 0 - Disabled

n = 1 - (Default) Enabled

%C - CTS EIA Control (Format: AT%Cn)

The %C command controls the CTS signal. Normally, CTS is ON only when a connection is established. This command enables you to force CTS ON when the modem is on-hook if the DTE must have CTS high to send commands.

n = 0 - CTS signal forced on always (except when disconnecting - see definition of S41 in Section 7).

n = 1 - CTS off in command mode. CTS off during modem handshake. CTS follows RTS after modem can transmit data.

n = 2 - CTS follows RTS in command mode. CTS turns off during modem handshake. CTS follows RTS after modem can transmit data.

n = 3 - (Default) CTS follows DTR in command mode. CTS turns off during modem handshake. CTS follows RTS after modem can transmit data. CTS will not follow RTS when online if the RTR option is enabled by the AT*LR2 command.

%D - DSR EIA Control (Format: AT%Dn)

The %D command controls the operation of the DSR signal.



n = 0 - DSR forced on always (except when disconnecting - see S41 in Section 7).

n = 1 - DSR off when modem is idle. DSR turns on when modem goes off hook.

n = 2 - (Default) DSR off when modem is idle. DSR turns on when answer tone is detected or generated. If no answer tone is detected then DSR will turn on when training starts.

n = 3 - DSR off when modem is idle. DSR turns on when training starts.

n = 4 - DSR off when modem is idle. DSR turns on when carrier is detected.

n = 5 - DSR off when modem is idle. DSR turns on when modem can pass full duplex data.

%EA - EIA Control of LAL (Local Analog Loopback) (Format: AT%En)

This command allows the modem to perform the local analog loopback test when EIA pin 18 or pin 25 is raised depending on the dipswitch settings.

n = 0 - (Default) Disabled

n = 1 - Enabled

%ER - EIA Control of RDL (Remote Digital Loopback) (Format: AT%ERn)

This command allows the modem to perform the remote digital loopback test when EIA pin 11 or 21 is raised depending on the dipswitch settings.

n = 0 - (Default) Disabled

n = 1 - Enabled

%ES - EIA Speed Control (Format: AT%ESn)

When enabled this command allows the modem to respond to a speed change input on pin 23 of the RS-232 interface depending on the dipswitch settings. For example, for pin 23 high = 9600 bps operation and pin 23 low = 4800 bps operation. This assumes the DTE speed was saved as 9600 bps. If the DTE speed saved was 2400 bps then pin 23 high = 2400 bps and pin 23 low = 1200 bps.

n = 0 - (Default) Disabled

n = 1 - Enabled

%F - Auto Fall Back (Format: AT%Fn)

This command is used to enable the auto fall back option. If signal quality is bad the modem will, for example, automatically fall back from 28,800 bps operation to 26,400 bps.

n = 0 - Disabled

n = 1 - (Default) Enabled

%H - V.22 bis and V.21/103 "HUNT" Operations (Format: AT%Hn)

This command allows the user to enable or disable the V.22 bis and V.21/103 "hunt" operations.

n = 0 - Disabled

n = 1 - (Default) Enables the V.22 bis hunt operation

n = 2 - Enables V.21/103 (300 bps) hunt operation

n = 3 - Enables V.22 bis and V.21/103 (300 bps) hunt operations

%I - Inactivity Timer (Format: AT%In)

This command allows the inactivity timer to be disabled or to relate to the transmit data, the receive data or to both. The inactivity time is specified by S32 in minutes. If S32 is 0 then the inactivity timer is disabled (also disabled by AT%I0).

n = 0 - (Default) Disabled

n = 1 - Transmit data inactivity timer enabled. The modem will automatically disconnect if the transmit data is inactive for the time specified by S32.

n = 2 - Receive data inactivity timer enabled. The modem will automatically disconnect if the receive data is inactive for the time specified by S32.

n = 3 - Transmit and receive data inactivity timer enabled. The modem will automatically disconnect if both transmit and receive data are inactive for time specified by S32.

%L - Leased Line Lookback (Format: AT%Ln)

This command controls the leased line lookback feature. When the modem is operating on a dial backup connection, this command determines if the recovery of the leased line is checked periodically.

n = 0 - (Default) Disabled

n = 1 - Enabled

%M - Load Non-Volatile Memory Bank (Format: AT%Mn)



This command loads into active memory one of the user configurations stored by the &Wn command.

n = 0 - 4 (User configuration number)

%O - Leased Line - Originate or Answer (Format: AT%On)

This command is used to define the leased line mode of operation as originate or answer.

n = 0 - Leased line answer mode

n = 1 - (Default) Leased line originate mode

The S0 register applies only to operation on the dial network.

%PO:s - Store Operator Password (Format: AT%PO:sx:sx)

The "%PO" command stores a new operator password in non-volatile memory. The operator password is a user-defined string used to control access to the modem. The password can be up to 12 characters in length. When storing a new operator password the string must be entered twice on the command line to ensure that the password is saved correctly. For example:

```
AT%PO:MAGIC:MAGIC
```

would define the operator password to be the word "MAGIC".

The command: AT%PO would clear the currently stored operator password.

%PS:s - Store Supervisor Password (Format: AT%PS:sx:sx)

The "%PS" command stores a new supervisor password in non-volatile memory. The supervisor password is a user-defined string used to control access to the modem. The password can be up to 12 characters in length. When storing a new supervisor password the string must be entered twice on the command line to ensure that the password is saved correctly. For example:

```
AT%PS:MAGIC:MAGIC
```

would define the supervisor password to be the word "MAGIC". The command: AT%PS would clear the currently stored supervisor password.

%Q - Loss of Carrier (CD) Redial (Format: AT%Qn)

This command is used in originate dial applications only. When enabled, if CD is lost for any reason other than a normal disconnect sequence, the modem will redial the last dialed phone number.

n = 0 - (Default) Disabled

n = 1 - Enabled



%R - Automatic Retrain (Format: AT%Rn)

This command allows the modem to automatically retrain if the signal degrades.

n = 0 - Disabled

n = 1 - (Default) Enabled

%SA - Answer Password Security (Format: AT%SA n)

This command enables or disables answer password security. If enabled then the answering modem will prompt the remote modem for a password each time a call is answered. The password entered by the remote user will be compared to the "PASSWORD" information stored in non-volatile memory. If the "PASSWORD" found has a "N" attribute then the connection is completed. If the "PASSWORD" found has a "C" attribute then the answering modem goes on hook and calls back the originating modem.

n = 0 - (Default) Disabled

n = 1 - Password Only

n = 2 Name and Password

%SB - Second Password Prompt in Call Back (Format: AT%SBn)

This command allows the user to select the added security of requiring the second entry of the password during a call back or the automatic modem password security operation.

n = 0 - (Default) Second prompt for password in call back security disabled.

n = 1 - Second prompt for password in call back security enabled.

%SC - "AT" Command Security (Format: AT%SCn)

This command enables or disables "AT" command security. If enabled the modem will not except any "AT" commands until a password has been entered.

n = 0 - (Default) Disabled

n = 1 - Enabled

%SD - Remote Configuration Security (Format: AT%SDn)

When enabled, the modem will prompt the remote user for the supervisor password before allowing any remote "AT" commands.

n = 0 - (Default) Disabled



n = 1 - Enabled

%SL - Password Upper/Lower Case Sensitivity (Format: AT%SLn)

When enabled, the modem will check for Upper/Lower case character stored in the "NAME" and "PASSWORD" of the phone lists. When disabled, (default) all of the characters will be converted to upper case.

n = 0 - (Default) Password case sensitivity disabled. The modem will treat "ABC" and "abc" identically.

n = 1 - Password case sensitivity enabled. The modem will treat "ABC" and "abc" as different (names/passwords).

%SP - Prompt Security (Format: AT%SPn)

When enabled, the modem will send the words "Name:" and/or "Password:" to the remote user. When disabled, the prompts will not be sent, but still expect the password response from the remote user.

n = 0 - Prompts for name and/or password disabled. This option applies to answer and down line load security. The modem will wait for a name and/or password to be entered without sending a prompt.

n = 1 - (Default) Prompts for name and/or password enabled

%SSn Rack Control (Format: AT%SSn)

n = 0 - (Default) Disables security between shelf Controller and modem (when used in a Rack System).

n = 1 - Enables security between shelf Controller and modem when used in a Rack System. Controller must know modems Supervisor password.

%ST - Password Attempts Allowed (Format: AT%STn)

This command allows the user to specify how many attempts will be allowed when the modem is prompting for a password. This command applies to operator, supervisor, name-code access and call back password entries.

n = 0 - (Default) 1 attempt for correct password entry

n = 1 - 3 attempts for correct password entry

%SW - Non-Volatile Write Security (Format: AT%SWn)

This command enables or disables non-volatile write security. If enabled the modem will not allow any commands that write to non-volatile memory until the supervisor password has been entered. See the description of security operation below.

n = 0 - (Default) Disabled



n = 1 - Enabled

The commands that write to non-volatile memory are:

&A store answerback

&Wn write configuration to non-volatile

&Z store phone number

%PO store operator password

%PS store supervisor password

%SAn answer password security

%SBn second password prompt in call back security

%SCn "AT" command security

%SDn remote configuration security

%SLn case sensitivity

%STn password attempts allowed

%SPn prompts

%SWn non-volatile write security

%T - Store Time and Date (XXXX-FX or -FL only) (Format: AT%T)

This command is used to set the real time clock chip. The format of the command is:

AT%Thh:mm:ss:mm-dd-yy

The time and date can be entered on the same command line or individually. For example:

AT%T14:15:30:04-28-88

AT%T14:15:30

AT%T04-28-88

%U - Auto Dial Back Up (Format: AT%Un)

This command enables or disables the auto dial back up feature for the leased line models. If the option is enabled and the lease line fails, the modem will automatically dial the number stored in non-volatile memory with the "A" attribute.

n = 0 - (Default) Disabled

%V - Auto Dial Back Up Alarm (Format: AT%Vn)

This command enables or disables the speaker "beep" alarm that indicates a leased line has failed and a dial back up call is activated.

n = 0 - Disabled

n = 1 - (Default) Enabled

%WD - Weekday Window (Format: AT%WDn)

This command determines if UADBU is enabled inside or outside the defined time window on weekdays.

n = 0 - (Default) Dial back up is enabled outside the window on weekdays.

n = 1 - Dial back up is enabled inside the window on weekdays.

%WE - Weekend Window (Format: AT%WEn)

This command determines if UADBU is enabled inside or outside the defined time window on weekends.

n = 0 - (Default) Dial back up is enabled outside the window on weekends.

n = 1 - Dial back up is enabled inside the window on weekends.

%XD - Dial Line Transmit Level (Format: AT%XDn)

This command sets the modem transmit level on the switched network. In the United States it is not allowed to transmit at a level higher than -9 dBm on the dial network. In the domestic product n = 5 through n = 8, i.e. -10 dBm to -16 dBm, are allowed. The default is n = 5.

n = 5 - 8

The value of n is the transmit level in 2 dBm steps. 8 indicates a transmit level of 16 dBm.

%XL - Leased Line Transmit Level (XXXX-FX or FL only) (Format: AT%XLn)

This command sets the transmit level for leased lines. In the United States the highest permitted level on telephone company supplied lines is 0 dBm. This is the default setting; n = 0. In some applications a lower level may be desirable.

n = 0 - 8

The value of n is the transmit level in 2 dBm steps. 8 indicates a transmit level of -16 dBm.



%Y - End of Window (1445/1945-FX only) (Format: AT%Yn)

This command determines if the UADBU connection is continued at the end of the defined time window.

n = 0 - (Default) Modem dial back up connection is continued at the end of the window

n = 1 - Modem dial back up connection is dropped at the end of the window

***A** - Adaptive Packet Size (Format: AT*An)

This command allows the size of LAPM/MNP packets to be automatically adapted to the quality of the connection. If the connection is poor (many retransmissions are required) the packet size is reduced to improve the overall throughput. If the connection is good (no retransmissions) the packet size is increased. The default is enabled (packet size adaptive).

n = 0 - Disabled

n = 1 - (Default) Enabled

***B** - Block/Stream Mode (Format: AT*Bn)

This command sets block or stream mode LAPM/MNP links. The default is 0 (Stream).

n = 0 - (Default) Stream

n = 1 - Block

***C** - Connect Message Output Control (Format: AT*Cn)

This command allows the user to define when the "Connect" message is sent.

n = 0 - (Default) "Connect" message when the carrier is detected.

n = 1 - "Connect" message sent when the modem can pass full duplex data.

If n = 1 the "connect" message is not sent until all security operations and the LAPM/MNP negotiations have been completed.

***D** - Command Mode at Transmit Break (Format: AT*Dn)

If enabled, this command causes the local modem to enter "AT" command mode when a break is sent by the local DTE. The modem will respond with an OK and accept "AT" commands. An ATO command is used to return online.

n = 0 - (Default) Disabled

n = 1 - Enable



***E - Data Compression (Format: AT*En)**

This command enables or disables data compression when a LAPM/MNP link is established. If AT*E1 is set, the default state, then the modem will operate with data compression when it originates or answers a call with either a LAPM or MNP link. If AT*E0 is set compression is disabled. Most users will benefit from keeping the default setting of AT*E1 and using the data compression facility when operating with LAPM or MNP connections. If the data stream consists mainly of binary information, then the throughput will be increased by turning the compression off with AT*E0.

n = 0 - Disabled

n = 1 - (Default) Enabled (V.42 bis compression for a LAPM link, or MNP Class 5 compression for a MNP link.)

***G - LAPM/MNP Error Alarm (Format: AT*Gn)**

This command allows the operator to disable the alarm signal for a LAPM/MNP detected error.

n = 0 - (Default) Disables the LAPM/MNP error alarm

n = 1 - Enables the LAPM/MNP error alarm

***H Busy-Out (Format: AT*Hn)**

n = 0 - Disabled (Default)

n = 1 - Enabled

S-register 20 (S-20) is used to specify the number of unanswered rings allowed or the number of consecutive bad answer hand-shakes before the modem "busy-out" condition is set.

For example:

```
ATS0=1*H1S20=5&W
```

will configure the modem to answer after the first ring, enable the "busy-out", and set the unanswered ring threshold to 5 rings.

***KA - Clear Transmit Buffer at Transmit Break (Format: AT*KAn)**

When this option is enabled, the local modem transmit buffer is cleared when a break is sent by the local DTE.

n = 0 - (Default) Disabled

n = 1 - Enabled

***KB - Clear Transmit Buffer at Receive Break (Format: AT*KBn)**

When this option is enabled, the local modem transmit buffer is cleared when a break is received from the remote modem.

n = 0 - (Default) Disabled

n = 1 - Enabled

***KC** - Clear Receive Buffer at Transmit Break (Format: AT*KCn)

When this option is enabled the local modem receive buffer is cleared when a break is sent by the local DTE.

n = 0 - (Default) Disabled

n = 1 - Enabled

***KD** - Clear Receive Buffer at Receive Break (Format: AT*KDn)

When this option is enabled, the local modem receive buffer is cleared when a break is received from the remote modem.

n = 0 - (Default) Disabled

n = 1 - Enabled

***KT** - Break Type (Format: AT*KTn)

This command allows the user to determine the type of LAPM/MNP break that is applied.

n = 0 - (Default) Normal

n = 1 - Destructive

***LB** - Local Overflow Bell (Format: AT*LBn)

This command enables the modem to send a bell character to the local DTE when its transmit buffer overflows and cannot buffer the last character sent from the local DTE. This is useful when the local DTE does not respond to flow control and sends data faster than it can be transmitted to the remote modem.

n = 0 - (Default) Disabled

n = 1 - Enabled

***LG** - Generate Local Flow Control (Format: AT*LGn)

This command sets the type of flow control recognized by the local DTE. The local modem buffers data to be transmitted to the remote modem from the local DTE. If the local modem transmit buffer fills, the local modem must be able to stop the local DTE from sending data. Flow control to the DTE should



be enabled if the DTE baud rate is higher than the data rate of the modem or if error correction (LAPM/MNP) is active.

n = 0 - No flow control

n = 1 - XON/XOFF. If the local modem transmit buffer is nearly full, an XOFF character is sent to the local DTE. The local DTE must stop sending data to the local modem until an XON character is received from the local modem.

n = 2 - (Default) CTS EIA signal. If the local modem transmit buffer is nearly full, the local modem will turn the CTS EIA signal off. The local DTE must stop sending data to the local modem until the local modem turns the CTS EIA signal on.

*LR - Respond to Local Flow Control (Format: AT*LRn)

This command sets the type of flow control used by the local DTE to control data coming from the modem. If flow control is enabled, the local modem buffers data received from the remote modem and sends it to the local DTE only if the local DTE is ready. The default is no flow control.

n = 0 - (Default) No flow control

n = 1 - XON/XOFF. When an XOFF character is received from the local DTE, the modem will stop sending data to the local DTE until an XON character is received from the local DTE.

n = 2 - RTS/RTR EIA signal. In this mode the RTS EIA signal is used as an RTR (Request to Receive) signal. When the local DTE turns the RTS EIA signal off, the modem will stop sending data to the local DTE until the local DTE turns the RTS EIA signal on.

*M - Operating Modes (Format: AT*Mn)

This command determines the LAPM/MNP operating mode. It can be set for no error correction (direct mode) or for one of several error correction modes .

n = 0 - Direct Mode

n = 1 - (Default) Normal Mode. After the carrier is detected, an uncorrected and uncompressed link is established. Flow control, break handling and constant DTE rate options apply. If the LAPM/MNP character sequence (\$\$\$) is received from either the DTE or the remote modem, a LAPM/MNP link will be attempted.

n = 2 - Automatic Mode.

When answering: After the carrier is detected, the modem waits for a special LAPM sequence from the remote mode, and if not received in the S87 time set it then waits for the MNP packet. If a MNP packet is received within 3 seconds, the MNP corrected link is established. If non-MNP data is received from the remote modem, or any character is sent by the DTE, or 3 seconds



elapse, an uncorrected link is established (normal mode). This mode should be used when an auto-answer modem can receive calls from LAPM/MNP and non-error correction type modems.

When originating: After the carrier is detected, the modem attempts to establish a LAPM corrected link and if not successful it then attempts a MNP connection. If the remote modem fails to respond, or if any character is sent by the DTE, an uncorrected link is established (normal mode).

CAUTION: When the answering non-error correction type modem passes the initial sequence or the MNP frame from the originating modem to a computer system it is likely to be unintelligible data to the system and provoke an undesired computer response. For such situations it may be necessary to not attempt to originate an error correction type call to the non-error correction type modem, or to incorporate some action by the computer system to ignore the initial modem data bits.

n = 3 - Exclusive Mode. This is the same as automatic mode (n=2), except that the modem hangs up if a LAPM/MNP link is not established.

*Note: If the *M0 command is used, then there will be no response to the escape code ("+++") and no response to flow control.*

*N - Modem/DTE Speed in Connect Message (Format: AT*Nn)

This command allows the operator to select the modem speed or the DTE speed to be reported in the connect message.

n = 0 - (Default) Connect message reports the modem speed

n = 1 - Connect message reports the DTE speed

*O - Originate LAPM/MNP Link (Format: AT*O)

The *O command instructs the modem to originate a LAPM/MNP link with the remote modem immediately. LAPM/MNP link negotiation begins immediately. The AT*O command must be used in conjunction with the *U (Accept LAPM/MNP Link) command at the remote modem.

*P - Maximum Packet Size (Format: AT*Pn)

This command sets the maximum packet size in bytes for stream mode LAPM/MNP links. The default is n=3 (256 bytes).

n = 0 - 64 bytes

n = 1 - 128 bytes

n = 2 - 192 bytes

n = 3 - (Default) 256 bytes



***RB - Remote Overflow Bell (Format: AT*RBn)**

This command enables the modem to send a bell character to the remote modem when its receive buffer overflows and cannot buffer the last character received from the remote modem. This option is useful when the remote modem (or remote DTE) does not respond to flow control and sends data faster than it can be received by the local DTE.

n = 0 - (Default) Disabled

n = 1 - Enabled

***RF - Filter Receive Flow Control (Format: AT*RFn)**

This command determines if XON/XOFF type flow control characters, received from the remote modem, are passed through to the local DTE. This option should be disabled when the local DTE responds to flow control and modem flow control is disabled. The default condition is for XON/XOFF to be passed through.

n = 0 - (Default) Disabled XON/XOFF passed through

n = 1 - Enabled - XON/XOFF not passed through

*Note: This option can be enabled only when the "Respond to Remote Flow Control" option is enabled by the AT*RR1 command.*

***RG - Generate Remote Flow Control (Format: AT*RGn)**

This command determines the type of flow control recognized by the remote modem. The local modem buffers data received from the remote modem to be sent to the local DTE. If the local modem receive buffer becomes full, the local modem must be able to stop the remote modem from sending data. The default is no flow control. This option is ignored if error correction (MNP) is active.

n = 0 - (Default) No flow control

n = 1 - XON/XOFF. If the local modem receive buffer is nearly full, an XOFF character is sent to the remote modem. The remote modem must stop sending data to the local modem until it receives an XON character from the local modem.

***RK - Pass Receive Break (Format: AT*RKn)**

This command determines how breaks received from the remote modem are handled by the local modem. The default is to pass the break immediately to the local DTE.

n = 0 - Break disabled. Breaks received from the remote modem are not sent to the local DTE.

n = 1 - (Default) Receive break immediately. Breaks received from the remote modem are sent to the local DTE immediately. Any data in the



receive buffer is sent to the local DTE following the break unless the Clear Transmit Buffer at Receive Break option is enabled with the AT*KD1 command.

n = 2 - Receive break after data. Breaks received from the remote modem are sent to the local DTE after any data in the receive buffer has been sent. If S-Register 65 is enabled or the AT*KD1 command has been issued, the break is sent immediately and the receive buffer is cleared.

*RP - RTS Polarity (Format: AT*RPn)

The *RP command defines what RTS means in RTS/CTS flow control. The meaning of CTS is standard: when CTS is inactive, the DTE should not transmit to the modem. RTS is used in two different ways.

In most DTEs, the default state of RTS is high. RTS is considered a "CTS to the DCE", and RTS high allows the modem to send data to the DTE. In this case, RTS high means XON, and RTS low means XOFF. This is the default setting for this command.

Alternatively, RTS can be used to indicate that the DTE wants to transmit. In such cases, RTS high means that the DCE should be quiet, or XOFF.

n = 0 - (Default) RTS high allows modem to send data to the DTE

n = 1 - RTS high means modem should not send data to the DTE

*RR - Respond to Remote Flow Control (Format: AT*RRn)

This command sets the type of flow control used by the remote modem to control data coming from the local modem. If flow control is enabled, the local modem buffers data transmitted by the local DTE and sends it to the remote modem only if the remote modem is ready. The default is no flow control. This command is ignored if error correction (MNP) is active.

n = 0 - (Default) No flow control

n = 1 - XON/XOFF. When an XOFF character is received from the remote modem, the local modem will stop sending data to the remote modem until an XON character is received from the remote modem.

*RS - Reset Error Statistics (Format: AT*RS)

The *RS command will immediately reset the error statistics. The command is typically used to clear the statistics after a call has been completed and the data reviewed. It also is used to reset the statistics to zero during a call.

*S - DSR and CD Control During Call Back (Format: AT*Sn)

This command controls the operation of the DSR and CD EIA during the callback security operation.



n = 0 - (Default) DSR and CD turn off during a callback operation

n = 1 - DSR and CD are held on during a callback operation

***T - Select Protocol - V.42(LAPM) or MNP (Format: AT*Tn)**

The *T command allows the operator to specify the protocol to be used or allow the modem to automatically operate in the V.42(LAPM) mode or switch to MNP to respond to the remote modem.

n = 1 - MNP only

n = 2 - LAPM only

n = 3 - (Default) LAPM/MNP automatic

***U - Accept LAPM/MNP Link (Format: AT*U)**

The *U command instructs the modem to accept a LAPM/MNP link originated immediately by the remote modem. LAPM/MNP link negotiation begins immediately. The *U command must be used in conjunction with the *O (Originate a LAPM/MNP Link) command at the other (remote) modem.

***V - Extended Result Codes (Format: AT*Vn)**

The *V command determines if extended messages are sent to the DTE to indicate that a V.42 LAPM or MNP link has been established. If extended messages are enabled, the speed and the LAPM or V.42 bis, or MNP or MNP5 link message are included after the connect speed. The speed is the modem speed if *Nn is set to n=0 or the DTE speed if the *Nn is set to n=1. Additional speeds than shown in the examples below may occur - see the Xn Command.

n = 0 - (Default) Normal results codes.

n = 1 - Extended result codes as below:

Examples:

For LAPM (error correction) Connection:		
CODE	"AT" Dialer	V.25 bis Dialer
63	CONNECT 2400/LAPM	CNX 2400/LAPM
65	CONNECT 9600/LAPM	CNX 9600/LAPM
For LAPM with V.42 bis (error correction and data compression) Connection:		
73	CONNECT 2400/V42BIS	CNX 2400/V42BIS
75	CONNECT 9600/V42BIS	CNX 9600/V42BIS
For MNP 5 (error correction and data compression) Connection:		
53	CONNECT 2400/MNP5	CNX 2400/MNP5
55	CONNECT 9600/MNP5	CNX 9600/MNP5

***XF - Filter Transmit Flow Control (Format: AT*XFn)**



This command determines whether XON/OFF type flow control characters, sent by the local DTE, are passed through to the remote modem. This option should be disabled when the local DTE generates its own flow control and modem flow control is disabled. The default is for XON/XOFF to be passed through.

n = 0 - (Default) Disabled. XON/XOFF passes through

n = 1 - Enabled. XON/XOFF not passed through

*Note: This option can be enabled only when the "Respond to Local Flow Control" option for XON/XOFF is enabled by the AT*LR1 command.*

*XK - Pass Transmit Break (Format: AT*XKn)

This command determines how breaks sent by the local DTE are handled by the local modem. The default is to send breaks from the local DTE to the remote modem immediately.

n = 0 - Break disabled. Breaks sent by the local DTE are not sent to the remote.

n = 1 - (Default) Transmit break immediately. Breaks sent by the local DTE are sent to the remote modem immediately. Any data in the transmit buffer will be sent following the break unless the AT*KA1 command has been issued (Clear transmit buffer at receive break).

n = 2 - Transmit break after data. Breaks sent by the local DTE are sent to the remote modem after any data in the transmit buffer has been sent. If the AT*KA1 command has been issued, the break is sent immediately and the transmit buffer is cleared.

*Y - Switch to LAPM/MNP Link (Format: AT*Y)

The *Y command causes the modem to switch immediately to a LAPM/MNP operation and attempt to establish a LAPM/MNP link with the remote modem. The escape code (+++) must be entered first to return to command mode. This command must be given to both modems.

Example:

Current Status: CONNECT 28800

Enter: +++ (Escape code) then **AT*Y<CR>**

New Status: CONNECT 28800/LAPM

*Z - Switch to Normal Link from MNP (Format: AT*Z)

The *Z command causes the modem to switch from MNP operations to normal (non-error correcting) operation. The escape code (+++) must be entered first to return to command mode.



The *Z command does not operate when the modem is operating with the V.42 LAPM protocol.

Example:

Current Status: CONNECT 28800/MNP5

Enter: +++ (Escape code) then **AT*Z<CR>**

New Status: CONNECT 28800

@A - Auto Baud Rate Detect (Format: AT@An)

The command enables or disables the automatic baud rate "AT" detection. If enabled the modem will automatically detect the baud rate, number of data bits and parity of the DTE up to 38400 bps. For higher rates see Section 6.4.112. Auto baud should be disabled when operating at DTE speeds above 38400, or if there is random data on the serial port. If the DTE and/or operator has control of data sent to the port and will only send intentional dial commands, then the auto baud feature can be used.

n = 0 - Disabled

n = 1 - (Default) Enabled for DTE and modem speed

n = 2 - Enabled for DTE speed only

@B - Data Bits (Format: AT@Bn)

This command sets the number of data bits per character. The automatic baud rate detection must be disabled (AT@A0) to set the character size.

n = 5 - 5 bit character

n = 6 - 6 bit character

n = 7 - 7 bit character

n = 8 - (Default) 8 bit character

@C - Constant DTE Rate (Format: AT@Cn)

This command enables or disables the constant DTE feature. If enabled the modem will always pass data to the DTE at the speed of the last "AT" command regardless of the connect speed. If disabled the modem will always pass data to the DTE at the same rate as the connect speed.

n = 0 - Disabled

n = 1 - (Default) Enabled

@D - DTE Speed (Format: AT@Dn)

This command allows the DTE rate to be fixed at a user specified value and is required when operating at 57600 or 115200 bps (see Section 6.4.109). The



modem will automatically detect the speed and parity of the DTE up to 38400. To set the modem speed at 57600 or 115200, do the following:

With the terminal at 38400 or lower, type "AT@D12" for 57600 or "AT@D13" for 115200. Wait for "OK" indicating that the modem DTE speed is either 57600 or 115200. Then type "AT <cr>". The modem should respond "OK" and will be selected in the DTE speed.

To fix the DTE rate at a specific value up to 38400 use the following chart.

n = 0 - 300 bps

n = 1 - 1200 bps

n = 2 - 2400 bps

n = 3 - 4800 bps

n = 4 - 9600 bps (Default for 9600 bps models)

n = 5 - not used

n = 6 - not used

n = 7 - 19200 bps (Default for 14.4K & 19.2K models)

n = 8 - 38400 bps (Default for 28.8K & 33.6K models)

n = 9-11 - Reserved for factory use

n = 12- 57600 bps

n = 13 - 115200 bps

If you want the modem to automatically be set at 57600 or 115200 after power up, the following commands should be entered with either the 57600 or 115200 DTE speed:

AT@A0: Auto baud off

AT&W: Save to non-volatile memory

@F - Online Speed Change (Format: AT@Fn)

This command enables or disables the online speed change (fall back or fall up) feature. This feature must be enabled before the modem will respond to a request for a speed change from the remote modem. @Fn must be enabled for the "ATO2" and "ATO3" commands to function.

n = 0 - (Default) Disabled

n = 1 - Enabled



@H - On/Off Hook in LAL (Format: AT@Hn)

This command allows the operator to select the on hook or off hook condition when in the local analog loopback test (LAL).

n = 0 - (Default) On hook in LAL

n = 1 - Off hook in LAL

@L - Load Default Options (Format: AT@Ln)

This command allows the operator to select when the default options should be loaded.

n = 0 - (Default) Load default options at reset (ATZ or power-up)

n = 1 - Load default options at call disconnect

@M - Modem Speed (Format: AT@Mn)

This command allows the modem connect speed to be fixed at a user specified value. The automatic baud rate detection must be disabled (AT@A0) or enabled for the DTE only (AT@A2).

n = 0 - 300 bps

n = 1 - 1200 bps

n = 2 - 2400 bps

n = 3 - 4800 bps

n = 4 - 9600 bps

n = 5 - 12000 bps

n = 6 - (Default for 1445/1446) 14400 bps

n = 7 - 16800 bps

n = 8 - (Default for 1945/1946/1953) 19200 bps

n = 9 - 7200 bps

n = 10 - Tx:75/Rx:1200 bps for V.23 operation

n = 11 - Tx:1200/Rx:75 bps for V.23 operation

n = 12 - 21,600 bps

n = 13 - 24,000 bps

n = 14 - 26,400 bps

n = 15 - 28,800 bps (default for 28.8K Models)



n = 16 - 31,200 bps

n = 17 - 33,600 bps (default for 33.6K Models)

Note: For V.23 operation issue the AT@A2 command and then AT@M10 or AT@M11 to select the Tx/Rx speeds.

@P - DTE Parity (Format: AT@Pn)

This command allows the DTE parity to be fixed at a user specified value. The automatic baud rate detection must be disabled (AT@A0) to set the DTE parity.

n = 0 - (Default) None

n = 1 - Not used

n = 2 - Not used

n = 3 - Not used

n = 4 - Even

n = 5 - Odd

n = 6 - Space

n = 7 - Mark

@R - Respond to RDL Request (Format: AT@Rn)

This command enables or disables the modems response to a remote digital loop request.

n = 0 - Disabled

n = 1 - (Default) Enabled

@S - DTE Stop Bits (Format: AT@Sn)

This command allows the number of DTE stop bits to be fixed at a user specified value. The automatic baud rate detection must be disabled (AT@A0) to set the number of stop bits.

n = 1 - (Default) 1 stop bit

n = 2 - 2 stop bits

@T - Trellis Encoding (Format: AT@Tn)

This command enables or disables the trellis encoding feature for V.32 and V.32 bis operation

n = 0 - Disables trellis encoding



n = 1 - (Default) Enables trellis encoding

@V - Dialer Selection (Format: AT@Vn)

This command provides for the selection of the dialer operation.

n = 0 - Enables "Dumb Mode"

n = 1 - (Default) Enables the AT asynchronous dialer

n = 2 - Enables the V.25 bis asynchronous dialer

n = 3 - Enables the V.25 bis HDLC synchronous dialer

n = 4 - Enables the V.25 bis BISYNC synchronous dialer

@X - Transmit Equalizer (Format: AT@Xn)

This command allows the compromise equalizer for the transmitted signal to be enabled or disabled.

n = 0 - (Default) Disables the compromise equalizer

n = 1 - Enables the compromise equalizer

The international command set for modem control is defined by the CCITT and termed V.25bis. Some countries require V.25bis to be the only means of controlling a modem, and some require the modem to respond to V.25bis commands but allow other command sets to be used. For controlling a modem by synchronous commands, there is no other serious contender for a de facto standard. The V.25bis command set has very limited capacity to control a modem except for the basic dialing functions. For most modem settings, the AT command set will be found more useful and provides for easier configuration of the modem options.

NOTE: The V.25 bis EIA signalling must be configured using either AT commands or the front panel. The AT commands to enable V.25 bis signalling are:

AT &C2

AT %C3

AT %D2

This configuration will allow the DSR, CD and CTS EIA signals to function as specified in the V.25 bis specification.

COMMANDS	FUNCTION
CIC	Connect the Current Incoming Call
CRN d..d	Dial the Number "d..d"
CRS n	Dial the Number at Location "n"
DIC	Disregard the Current Incoming Call
GAT	Switch to the "AT Command Mode"
PRN n; d..d	Stores the Number d..d at Location n



PRN n	Clears Stored number at Location n
RLN	List the Stored Numbers

RESPONSE	FUNCTION
CFI xx	Call Failure Indication
CNX ssss	Connect Speed (xxxx bps)
INC	Incoming Call -Ringing
INV xx	Invalid Command
LSN n; d..d	Lists Stored Number n in Response to RLN Command
VAL	Valid Command

COMMANDS - Details

CIC - Connect Incoming Call (Format: CIC)

This command causes the modem to connect to the incoming call.

CRN - Dial a Call CRN d..d

This command causes the modem to dial the number d..d.

Dials the number, "d..d".



DTMF digits	0-9, *, #
Wait for dial tone	:
Pause	<
Switch to pulse dial	P
Switch to DTMF dial	T
Flash	&

NOTE: Space and "." can be used as formatting characters.

CRS - Dial a Stored Number CRS n

This command dials a number at the stored location n, where n is from 0 to 99.

DIC - Disregard Incoming Call DIC

This command directs the modem to disregard the current incoming call.

GAT - Switch to AT Mode GAT

This command causes the modem to switch to the use of the AT commands.

PRN - Store/Clear Number PRN n;d..d

This command causes the modem to store or clear the number.

Stores the number "d..d" at location n, where n is from 0 to 99. Numbers will be stored with no name or link information. The attribute will be set to "D". If non-volatile security has been enabled, this command will always produce an invalid response.

PRN n;

If the d..d is not included then the modem clears the stored number at location n.

RLN - List Stored Numbers RLN

This command requests the list of stored numbers.

RESPONSES:

CFI - Call Failure Indication CFI xx

This response indicates a call failure with the reason indicated by a code in the xx position.

where **xx** = :

NS - Number Not Stored. ("CRSn" command was issued for an empty location.)



AB - Aborted Call. A call request command was aborted before completion, caused by typing any character, dropping DTR or the abort timer expired.

ET - Engaged Tone (busy).

ND - No Dial tone.

CNX - Connect Speed Indication CNX ssss

This response indicates the modem connect speed in bps. If an error correction or a data compression link is established then /LAPM, /V42BIS, /MNP or MNP5 is appended as applicable to the connection speed.

where ssss =:

1200, 2400, 4800, 9600, 12000, 14400, 16800, 19200, 21400, 24000, 26400, 28800, 31200, or 33600.

INC - Incoming Call INC

This response indicates an incoming call is present (ringing).

INV - Invalid Command INV xx

This is an indication of an invalid command as defined by xx.

where xx =:

CU - Command Unknown. The command received was not a valid V.25 bis command.

PV - Parameter Value. The command received contained an invalid parameter value; i.e., illegal character in dial string or out of range number index.

If "CU" or "PV" is not present, then the command received was invalid for an unspecified reason. This can occur if a "DIC" or "CIC" command is received when an incoming call is not present, or if the "PRN" command is used when non-volatile security has been enabled.

LSN - List of Stored Numbers LSN n; d..d

This indication is in response to the RLN command.

VAL - Valid Command VAL

This response indicates a valid command was issued



The S-Registers are used to set the numerous operating parameters of the modem. There are many parameters of operation that may be varied to satisfy the many possible data communications applications. Many of these parameters are stored and remain operative until changed. Some hold data for a given situation and the data is erased when reset or power is lost. Use of the bit-mapped registers requires familiarity with the format and logic involved. If a bit-mapped register is changed in error with the ATSr=n command, the AT&Fn command will restore all of the registers of the configuration to factory settings. The values in TABLE 7.1 give the decimal value <nn> or the hexadecimal code when a "h" is indicated <xxh> for the S-Registers. When the S-Registers are read by the ATSr? command the response will be a decimal value. If an S-Register is changed by the ATSr=n command, the n is a decimal value. On the following pages many S-Registers are shown in the binary "bits" notation for bit-mapped options. If the binary bits are converted to their decimal equivalent, this

will be the decimal value shown in response to the ATSr? command. Several S-Registers have been assigned that are not used, or are reserved, and are not applicable to these modems. This detail is noted when appropriate. The two tables that follow provide listings of the S-Registers in numeric order and then by functional groups. A third table is provided that lists all S-Registers with further details.

S-REGISTER SUMMARY

Reg. # Default Description

- S0 <1> - Ring to answer on
- S1 <0> - Ring counter
- S2 <2Bh> - Escape code character (+)
- S3 <0Dh> - Carriage return character (not stored)
- S4 <0Ah> - Line feed character (not stored)
- S5 <08h> - Backspace character (not stored)
- S6 <2> - Wait for dial tone (seconds)
- S7 <60> - Wait for carrier (seconds)
- S8 <2> - Comma pause time (seconds)
- S9 <6> - Carrier detect response time (0.1 seconds)
- S10 <20> - Carrier loss detect time (0.1 seconds)
- S11 - Not used
- S12 <50> - Escape code guard time (0.02 seconds)
- S13 - Not used
- S14 <8Ah> - Bit-mapped options register
- S15 - Not used
- S16 <0> - Test options register
- S17 - Not used
- S18 <0> - Test timer (seconds)



- S19 <00h> - Bit-mapped power up test status
- S20 - Not used
- S21 <10h> - Bit-mapped options register
- S22 <76h> - Bit-mapped options register

- S23 <11h> - Bit-mapped options register
- S24 - Not used
- S25 <0> - Sync delay to DTR (seconds)
- S26 <0> - RTS to CTS delay (0.01 seconds)
- S27 <00h> - Bit-mapped options register
- S28 <28h> - Bit-mapped options register
- S29 <03h> - Bit-mapped options register
- S30 - Reserved
- S31 <40> - Wait for retrain (seconds)
- S32 <0> - Inactivity timer (minutes)
- S33 <88h> - Bit-mapped options register
- S34 <80h> - Bit-mapped options register
- S35 <01h> - Bit-mapped options register
- S36 <08h> - Bit-mapped options register
- S37 - Reserved
- S38 <1Ah> - Downline load character (^Z)
- S39 <05h> - Bit-mapped options register
- S40 <03h> - Answer hunt sequence
- S41 <1> - Drop EIA signals on disconnect (0.1 seconds)
- S42 <00h> - Bit-mapped options register
- S43 <00h> - Bit-mapped options register
- S44 <40h> - Bit-mapped options register
- S45 <05h> - Bit-mapped options register
- S46 <0> - Transmit break width



S47 <0> - Receive break width

S48 <3> - Attention break width

S49 <E3h> - Bit-mapped options register



- S50 <24h> - Corrected mode character ("\$\$")
- S51 <04h> - Bit-mapped options register
- S52 <0Dh> - MNP abort character (255 = any character)
- S53 <00h> - Data pump bit-mapped options register
- S54 <14h> - Bit mapped options register
- S55 <0> - Redials
- S56 <0> - Leased line lookback timer (minutes) (0 = constant)
- S57 <0> - Bit-mapped options register
- S58 - Reserved
- S59 - Not used
- S60 <44h> - Bit-mapped options register
- S61 <07h> - BELL character sent to remote
- S62 <11h> - XON character sent to remote
- S63 <13h> - XOFF character sent to remote
- S64 <11h> - XON character received from DTE
- S65 <13h> - XOFF character received from DTE
- S66 <07h> - BELL character sent to DTE
- S67 <11h> - XON character sent to DTE
- S68 <13h> - XOFF character sent to DTE
- S69 <11h> - XON character received from remote
- S70 <13h> - XOFF character received from remote
- S71 <2Ah> - Parity error character ("*")
- S72 <00h> - Weekday dial backup window start time (hour)
- S73 <00h> - Weekday dial backup window end time (hour)
- S74 <00h> - Weekend dial backup window start time (hour)
- S75 <00h> - Weekend dial backup window end time (hour)
- S76 <00h> - Bit-mapped options register
- S77 - Reserved
- S78 - Not used



- S79 - Reserved
- S80 - Reserved
- S81 - Not used
- S82 <3> - Requested MNP class (2=async, 3=sync)
- S83 <8> - Requested MNP window size
- S84 <03h> - Bit-mapped class 4 options
- S85 <01h> - Bit-mapped class 5 options
- S86 <06h> - Bit-mapped LAPM options
- S87 <15> - LAPM detection phase time (0.01 seconds)
- S88 - Reserved
- S89 - Reserved
- S90 - Not used
- S91 - Not used
- S92 - Not used
- S93 - Not used
- S94 - Not used
- S95 - Not used
- S96 - Not used
- S97 - Not used
- S98 - Reserved
- S99 - Reserved
- S100 - Product type code (not stored)
- S101 - Product version number (not stored)
- S102 - Bit mapped status register (not stored)
- S103 - MNMS side channel address (not stored)
- S104 - Signal quality (not stored)
- S105 - Receive level (not stored)
- S106 - Bit mapped EIA input status (not stored)
- S107 - Bit mapped EIA output status (not stored)



S108 - Bit mapped modem status (not stored)

S109 - Cause of Last Disconnect

S110 - Not used

S111 - Not used

S112 - Not used

S113 - Not used

S114 - Number of Retrans (dial applications only)

S115 - Not used

S116 - Not used

S117 - Not used

S118 - Not used

S119 - Not used

S-REGISTERS IN FUNCTIONAL GROUPS

Answer Response

S0 Rings to answer

S1 Ring counter

Automatic Dial Back Up (UADBU) (Leased Line models)

S72 Weekday window start time

S73 Weekday window end time

S74 Weekend window start time

S75 Weekend window end time

S76 Weekday/weekend window type and disconnect

Character Definitions

S2 Escape code

S3 Carriage return

S4 Line feed

S5 Backspace

S38 Downline load

S50 Corrected mode

S52 MNP abort

S61 BELL sent to remote

S62 XON sent to remote

S63 XOFF sent to remote

S64 XON received from DTE

S65 XOFF received from DTE

S66 BELL sent to DTE

S67 XON sent to DTE

S68 XOFF sent to DTE

S69 XON received from remote

S70 XOFF received from remote

S71 Parity error

Dialing Characteristics

S14 Dialer enable/disable; Tone/Pulse dial

S22 Blind dial; Pulse dial ratio

S34 Dialer type (AT, V.25bis async/sync)

S36 Adaptive dialing

S55 Retrans



S57 Bad SQ for redial

Displays

S14 Echo; Result code type
 S22 Call progress; Result code set
 S34 Result codes enabled
 S35 Connect message DCE/DTE
 S44 Normal/Extended result codes

EIA Control

S21 DTR; CD
 S28 RTS/RTR; DSR; CD
 S29 CTS; Connect message; DSR/CD during call back
 S51 RTR polarity

EIA Status

S106 EIA input
 S107 EIA output

Flow Control and Break Handling

S42 Respond to local/remote
 S43 Generate local/remote
 S44 Local/remote bell; Transmit/receive filter; Command mode with transmit/receive break
 S45 Pass through break; Clear buffers at break

LAPM/MNP Control

S49 V.42/LAPM/MNP; Stream/Block mode; Block size; Adaptive packet size
 S51 MNP break type; Error alarm
 S82 MNP class
 S83 MNP window size
 S84 Large stream buffers; Optimized frame
 S85 Compression
 S86 Error correction protocol

Modem Operations

S14 Leased line mode
 S21 A/A1-MI/MIC; Long space disconnect
 S22 Speaker control
 S23 Guard tones
 S27 Asnc/Sync; Dial-up/leased line; Clock source; CCITT/Bell modes
 S34 S-Register values at disconnect
 S35 Automatic retrain
 S36 Any character abort; Inactivity type
 S39 Transmit levels
 S40 Answer "hunt" sequence
 S53 Compromise equalizer; Overspeed
 S54 Auto fall back

Modem Network Management System

S102 Smart channel status
 S103 Smart channel address

Modem Status

S104 Signal quality
 S105 Receive level
 S108 Modem status

Product ID

S100 Product type
 S101 Product version number

Speed, Data Format

S23 DTE parity and stop bits
 S33 DTE character length; DSP word length
 S34 DCE follows DTE/fixed; AT baud rate detection
 S35 EIA control of speed; Online speed change enabled
 S49 Constant DTE speed
 S60 DCE speed/DTE speed

Test Status



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- S16 ALB, DLB, RDL, DTMF
- S19 Power-up
- S23 Respond to RDL request
- S35 EIA control of RDL
- S36 On/Off hook in ALB; EIA control of ALB

Time Intervals

- S6 Wait for dial tone
- S7 Wait for carrier
- S8 Comma pause time
- S9 Carrier detect time
- S10 Carrier loss detect time
- S12 Escape guard time
- S18 Test timer
- S25 Sync delay to DTR
- S26 RTS to CTS delay
- S31 Wait for retrain
- S32 Inactivity
- S41 EIA drop time
- S46 Transmit break width
- S47 Receive break width
- S48 Attention break width
- S56 Leased line lookback
- S87 LAPM detection phase

S-REGISTER DETAILS

- S0 Rings to answer on (Default, S0 = 1 auto-answer enabled)
- S1 Ring counter (read only)
- S2 Escape code character (Default "+")
- S3 Carriage return character (Default "CR")
This register is not stored in non-volatile memory.
- S4 Line feed character (Default "LF")
This register is not stored in non-volatile memory.
- S5 Backspace character (Default "BS")
This register is not stored in non-volatile memory.
- S6 Wait for dial tone time (seconds) (Default 2)
- S7 Wait for carrier time (seconds) (Default 60)
- S8 Comma pause time (seconds) (Default 2)
- S9 Carrier detect time (0.1 seconds) (Default 6)
- S10 Carrier loss detect time (0.1 seconds) (Default 20)
- S11 Not used
- S12 Escape guard time (0.02 seconds) (Default 50)
- S13 Not used

NOTE: The asterisk * used in these tables indicate the default setting of the S-Register described.

S14 Echo; Numeric/Word Results; Dialer; Leased Line Orig/Answer

BIT 0		Not used
BIT 1		0 = No Echo
	*	1 = Echo on
BIT 2		Not used
BIT 3		0 = Numeric result codes
	*	1 = Word result codes
BIT 4	*	0 = Dialer enabled
		1 = Dialer disabled
BIT 5	*	0 = Tone dial
		1 = Pulse dial
BIT 6		Not used
BIT 7		0 = Leased line answer mode



	*	1 = Leased line originate mode
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S15 Not used

S16 Test Status

BIT 0	*	0 = ALB/LAL disabled 1 = Local analog loopback enabled
BIT 1	*	0 = DTMF test disabled 1 = DTMF test enabled
BIT 2	*	0 = DLB/LDL disabled 1 = Local digital loopback enabled
BIT 3	*	0 = RDL not running 1 = Remote digital loopback in progress (initiated by remote modem)
BIT 4	*	0 = RDL not requested 1 = Initiate a remote digital loopback request sequence
BIT 5	*	0 = RDL and test pattern not requested 1 = Initiate RDL, send test message and count errors
BIT 6	*	0 = ALB and test pattern disabled 1 = Analog loopback with self-test
BIT 7	*	0 = LAPM RDL and test pattern disabled 1 = LAPM RDL and test pattern enabled

S17 Not used

S18 Test timer (1-255 seconds) (Default of 0 is continuous test, manual termination required)

S19 Power-up Test Results

BIT 0		0 = Code EPROM checksum OK 1 = Code EPROM checksum bad
BIT 1		0 = RAM OK 1 = RAM bad
BIT 2		0 = Non-volatile memory checksum OK 1 = Non-volatile memory checksum bad
BIT 3		0 = Analog Loopback self test passed 1 = Analog Loopback self test failed
BITS 7,6,5,4		Not defined

S20 Not used

S21 A/A1-MI/MIC; DTR; CD; Long Space

BIT 1,0	*	0,0 = A/A1 and MI/MIC disabled 0,1 = A/A1 enabled 1,0 = MI/MIC enabled
BIT 2		Not used
BIT 4,3		0,0 = DTR forced on 0,1 = CCITT 108/1 operation. Modem auto dials stored number when off-to-on DTR transition occurs. Modem disconnects when on-to-off DTR



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		transition occurs.
	*	1,0 = CCITT 108/2 operation. DTR EIA signal must be present to originate or answer a call. Modem disconnects when on-to-off DTR transition occurs.
BIT 6,5		Not used
BIT 7	*	0 = Long space disconnect disabled
		1 = Long space disconnect enabled

S22 Volume; Blind Dial; Call Progress; Result Code Set; Pulse Dial Ratio

BIT 1,0		0,0 = Low speaker volume
		0,1 = Low speaker volume
	*	1,0 = Medium speaker volume
		1,1 = High speaker volume
BIT 3,2		0,0 = Speaker disabled
	*	0,1 = Speaker on until carrier detected
		1,0 = Speaker always on
		1,1 = Speaker off during dialing, then on until carrier detected
BIT 4		0 = Blind dial
	*	1 = Wait for dial tone
BIT 5		0 = Call progress disabled (busy & ringback)
	*	1 = Call progress enabled (busy & ringback)
BIT 6		0 = Minimum result code set (0-4)
	*	1 = Full result code set
BIT 7	*	0 = 39/61 Pulse dial ratio
		1 = 33/67 Pulse dial ratio

S23 Response to RDL; DTE Parity and Stop Bits; Guard Tones

BIT 0		0 = No response to RDL request
	*	1 = Respond to RDL request
BIT 3,2,1		DTE Parity
	*	0,0,0 = No parity
		0,0,1 through 0,1,1 = Reserved
		1,0,0 = Even
		1,0,1 = Odd
		1,1,0 = Space
		1,1,1 = Mark
BIT 5,4		DTE Stop Bits
		0,0 = Reserved
	*	0,1 = 1 stop bit
		1,0 = 2 stop bits
		0,0 = Reserved
BIT 7,6	*	0,0 = Guard tones disabled
		0,1 = 550 Hz guard tone
		1,0 = 1800 Hz guard tone

S24 Not used

S25 Sync delay to DTR (seconds) (Default 0)

S26 RTS to CTS delay (0.01 seconds) (Default 0)

S27 Async/Sync; Dial up/Leased Line; Clock Source; CCITT/Bell

BIT 1,0	*	0,0 = Asynchronous
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		0,1 = Synchronous modem
		1,0 and 1,1 = Synchronous modem
BIT 3,2	*	0,0 = Dial-up operation
		0,1 = 2-Wire lease line
		1,0 = 4-Wire lease line
		1,1 = Not defined
BIT 5,4		Synchronous only
	*	0,0 = Modem sources TX clock (EIA pin 15)
		0,1 = DTE sources TX clock (EIA pin 24)
		1,0 = Derive clock from receive carrier
		1,1 = Not defined
BIT 6	*	0 = CCITT V.22 bis, V.22, V.21
		1 = Bell 212A, 103
BIT 7		Not used

S28 RTS/RTR; DSR; CD

BIT 1,0	*	0,0 = RTS/RTR forced on
		0,1 = RTS/RTR supplied by DTE
		1,0 and 1,1 = Not used
BIT 4,3,2		0,0,0 = DSR always on (except when disconnecting).
		0,0,1 = DSR off when modem is idle. DSR turns on when modem goes off hook.
	*	0,1,0 = DSR off when modem is idle. DSR turns on when answer tone detected or generated.
		0,1,1 = DSR off when modem is idle. DSR turns on when training starts.
		1,0,0 = DSR off when modem is idle. DSR turns on when carrier is detected.
		1,0,1 = DSR off when modem is idle. DSR turns on when modem can pass full duplex data.
		1,1,0 and 1,1,1 = Not used
BIT 7,6,5		0,0,0 = CD always on (except when disconnecting).
	*	0,0,1 = CD off in command mode. CD off during modem handshake. CD turns on when carrier is detected.
		0,1,0 = CD off in command mode. CD off during modem handshake. CD turns on when modem can pass full duplex data.
		0,1,1 = CD follows DTR in command mode. CD off during modem handshake. CD on when carrier is detected.
		1,0,0 = CD follows DTR in command mode. CD off during handshake. CD turns on when



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	modem can pass full duplex data.
	1,0,1 through 1,1,1 = Not used.

S29 CTS; Connect Message Timing; DSR and CD During Call Back

BIT 2,1,0		0,0,0 = CTS always on (except when disconnecting).
		0,0,1 = CTS off in command mode. CTS off during modem handshake. CTS follows RTS after modem can transmit data.
		0,1,0 = CTS follows RTS in command mode. CTS turns off during modem handshake. CTS follows RTS after modem can transmit data.
	*	0,1,1 = CTS follows DTR in command mode. CTS turns off during modem handshake. CTS follows RTS after modem can transmit data.
		1,0,0 through 1,1,1 = Not used.
BIT 4,3	*	0,0 = "CONNECT" message sent when carrier detected.
		0,1 = "CONNECT" message sent when modem can pass full duplex data.
		1,0 = Not used.
		1,1 = Not used.
BIT 5	*	0 = DSR and CD drop during call back.
		1 = DSR and CD held on during call back.
BIT 7,6		Not used.

S30 Reserved.

S31 Wait for retrain (seconds) (Default 40).

S32 Inactivity timer (Default 0) (1 to 255 minutes selectable)

S33 DTE Character Length; DSP Word Length

BIT 3,2,1,0		DTE Character Length
		0,0,0,0 through 0,1,0,0 = Reserved
		0,1,0,1 = 5 bits
		0,1,1,0 = 6 bits
		0,1,1,1 = 7 bits
	*	1,0,0,0 = 8 bits
		1,0,0,1 through 1,1,1,1 = Reserved
BIT 7,6,5,4		DSP Word Length
		0,0,0,0 through 0,1,0,0 = Reserved
		0,1,0,1 = 5 bits
		0,1,1,0 = 6 bits
		0,1,1,1 = 7 bits
	*	1,0,0,0 = 8 bits
		1,0,0,1 = 9 bits
		1,0,1,0 through 1,1,1,1 = Reserved

S34 AT/V.25 bis Dialer; S-Register at Disconnect; Automatic/Fixed Modem Speed; Result Codes; AT Baud Rate Detection



BIT 2,1,0	*	0,0,0 = AT dialer
		0,0,1 = V.25 bis dialer (async)
		0,1,0 = V.25 bis dialer (HDLC)
		0,1,1 = V.25 bis dialer (bisync)
		1,0,0 through 1,1,1 = Reserved
BIT 3	*	0 = Retain current S-register values on disconnect
		1 = Reload default S-register values on disconnect
BIT 4	*	0 = Modem speed automatic (follows DTE baud rate)
		1 = Modem speed fixed (AT autobaud disabled)
BIT 6,5	*	0,0 = Result codes enabled
		0,1 = Result codes disabled
		1,0 = Result codes enabled in originate mode; disabled in answer mode
BIT 7		0 = AT baud rate detection disabled
	*	1 = AT baud rate detection enabled

S35 Automatic Retrain; EIA Control of RDL and Speed; Online Speed Change; Connect Message Speed

BIT 0		0 = Automatic retrain disabled
	*	1 = Automatic retrain enabled
BIT 1,2,3		Not used.
BIT 4	*	0 = EIA control of RDL disabled
		1 = EIA control of RDL enabled
BIT 5	*	0 = EIA control of speed disabled
		1 = EIA control of speed enabled
BIT 6	*	0 = Online speed change disabled
		1 = Online speed change enabled
BIT 7	*	0 = Connect message speed reflects DCE speed
		1 = Connect message speed reflects DTE speed

S36 ALB Controls; Adaptive Dialing; Any Character Abort; Inactivity Control

BIT 0	*	0 = EIA control of ALB disabled
		1 = EIA control of ALB enabled
BIT 1	*	0 = On hook in ALB.
		1 = Off hook in ALB (busy out modem).
BIT 2	*	0 = Adaptive dialing disabled
		1 = Adaptive dialing enabled
BIT 3		0 = Any character abort disabled
	*	1 = Any character abort enabled
BIT 5,4	*	0,0 = Inactivity timer disabled
		0,1 = Transmitter inactivity timer enabled
		1,0 = Receiver inactivity timer enabled
		1,1 = Transmitter and receiver inactivity timers enabled



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BIT 7,6	Not used
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S37 Reserved

S38 Downline load character (Default "^Z")

S39 Transmit Levels

BIT 3,2,1,0	Dial transmit level
	0,0,0,0 through 0,1,0,0 = Reserved
	* 0,1,0,1 = -10 dBm
	0,1,1,0 = -12 dBm
	0,1,1,1 = -14 dBm
	1,0,0,0 = -16 dBm
	1,0,0,1 through 1,1,1,1 = Not used
BIT 7,6,5,4	Leased line transmit level
	* 0,0,0,0 = 0 dBm
	0,0,0,1 = -2 dBm
	0,0,1,0 = -4 dBm
	0,0,1,1 = -6 dBm
	0,1,0,0 = -8 dBm
	0,1,0,1 = -10 dBm
	0,1,1,0 = -12 dBm
	0,1,1,1 = -14 dBm
	1,0,0,0 = -16 dBm
	1,0,0,1 through 1,1,1,1 = Not used

S40 Answer "Hunt" Sequence

BIT 0	Not used
BIT 1	* 0 = V.21 hunt disabled
	1 = V.21 hunt enabled
BIT 7,6,5,4,3,2	Reserved

S41 EIA drop time (0.1 seconds) (Default 1)

S42 Response to Flow Control

BIT 3,2,1,0	Respond to local flow control
	* 0,0,0,0 = No flow control
	0,0,0,1 = XON/XOFF
	0,0,1,0 = RTR EIA signal
	0,0,1,1 through 1,1,1,1 = Reserved
BIT 7,6,5,4	Respond to remote flow control
	* 0,0,0,0 = No flow control
	0,0,0,1 = XON/XOFF
	0,0,1,0 through 1,1,1,1 = Reserved

S43 Generate Flow Control

BIT 3,2,1,0	Generate local flow control
	* 0,0,0,0 = No flow control
	0,0,0,1 = XON/XOFF
	0,0,1,0 = CTS EIA signal
	0,0,1,1 through 1,1,1,1 = Reserved
BIT	Generate remote flow control



7,6,5,4		
	*	0,0,0,0 = No flow control
		0,0,0,1 = XON/XOFF
		0,0,1,0 through 1,1,1,1 = Reserved

S44 Bell Control; Pass/Filter Flow Control; Command Mode on Break; Normal/Extended Result Codes

BIT 0	*	0 = Local overflow bell disabled
		1 = Local overflow bell enabled
BIT 1	*	0 = Remote overflow bell disabled
		1 = Remote overflow bell enabled
BIT 2	*	0 = Pass transmit flow control characters
		1 = Filter transmit flow control characters
BIT 3	*	0 = Pass receive flow control characters
		1 = Filter receive flow control characters
BIT 4	*	0 = Command mode on transmit break disabled
		1 = Command mode on transmit break enabled
BIT 5	*	0 = Remote command mode on receive break disabled
		1 = Remote command mode on receive break enabled
BIT 6		0 = Normal result codes
	*	1 = Extended result codes
BIT 7		Reserved

S45 Pass Through Break; Clear Buffers on Break

BIT 1,0		Pass through transmit break
		0,0 = Break disabled
	*	0,1 = Transmit break immediately
		1,0 = Buffer break
		1,1 = Not defined
BIT 3,2		Pass through receive break
		0,0 = Break disabled
	*	0,1 = Receive break immediately
		1,0 = Buffer break
		1,1 = Not defined
BIT 4	*	0 = Clear transmit buffer on transmit break disabled
		1 = Clear transmit buffer on transmit break enabled
BIT 5	*	0 = Clear transmit buffer on receive break disabled
		1 = Clear transmit buffer on receive break enabled
BIT 6	*	0 = Clear receive buffer on transmit break disabled
		1 = Clear receive buffer on transmit break enabled



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BIT 7	*	0 = Clear receive buffer on receive break disabled
		1 = Clear receive buffer on receive break enabled

S46 Transmit break width (0.1 seconds) (Default 0)

S47 Receive break width (0.1 seconds) (Default 0)

S48 Attention break width (0.1 seconds) (Default 3)

S49 Constant DTE Rate; LAPM/MNP Controls

BIT 0		0 = Constant DTE rate disabled
	*	1 = Constant DTE rate enabled
BIT 3,2,1		Operating Mode
		0,0,0 = Transparent mode
	*	0,0,1 = Normal mode
		0,1,0 = Automatic mode
		0,1,1 = Exclusive mode
		1,0,0 through 1,1,1 = Reserved
BIT 4	*	0 = Stream mode
		1 = Block mode
BIT 6,5		Block Size
		0,0 = 64 bytes
		0,1 = 128 bytes
		1,0 = 192 bytes
	*	1,1 = 256 bytes
BIT 7		0 = Adaptive packet size disabled
	*	1 = Adaptive packet size enabled

S50 Corrected mode character (Default = "\$")

S51 RTR Polarity; MNP Break and Error Alarm

BIT 0	*	0 = RTR polarity (high = OK to receive)
		1 = RTR polarity (low = OK to receive)
BIT 1		MNP break type
	*	0 = Normal
		1 = Destructive
BIT 2		0 = MNP error alarm disabled
	*	1 = MNP error alarm enabled
BIT 7,6,5,4,3		Not used

S52 MNP abort character (Default "CR")

S53 Compromise Equalizer; Extended Overspeed

BIT 0	*	0 = Compromise equalizer disabled
		1 = Compromise equalizer enabled
BIT 1	*	0 = Extended overspeed disabled
		1 = Extended overspeed enabled
BIT 3,2		Not used

S54 Auto Fall Back

BIT 0	*	0 = Autodial back up disabled
		1 = Autodial back up enabled
BIT 1	*	0 = Leased line lookback disabled
		1 = Leased line lookback enabled
BIT 2		0 = Dial back up alarm disabled



	*	1 = Dial back up alarm enabled
BIT 3		Not used
BIT 4		Reserved
BIT 5	*	0 = No auto fall back
		1 = Auto fall back
BIT 7,6		Not used

S55 Redials (Default 0) (maximum allowed is 8)

S56 Leased line lookback timer (minutes) (0 = constant lookback)

S57 Bad SQ Redials

BIT 1,0	*	0,0 = Bad SQ redial disabled
		0,1 = Redial if SQ 8
		1,0 = Redial if SQ 7
		1,1 = Not defined
BIT 7,6,5,4,3,2		Not used

S58 Reserved

S59 Not used

S60 DCE and DTE Speeds

BIT 3,2,1,0		DCE Speed
		0,0,0,0 = 300
		0,0,0,1 = 1200
	*	0,0,1,0 = 2400
		0,0,1,1 through 1,1,1,1 = Reserved
BIT 7,6,5,4		DTE Speed
		0,0,0,0 = 300
		0,0,0,1 = 1200
	*	0,0,1,0 = 2400
		0,0,1,1 = 4800
		0,1,0,0 = 9600
		0,1,0,1 and 0,1,1,0 = Reserved
		0,1,1,1 = 19200
		1,0,0,0 = 38400
		1,0,0,1 through 1,1,1,1 Not used

S61 BELL character sent to remote (Default "BELL")

S62 XON character sent to remote (Default "XON")

S63 XOFF character sent to remote (Default "XOFF")

S64 XON character received from DTE (Default "XON")

S65 XOFF character received from DTE (Default "XOFF")

S66 BELL character sent to DTE (Default "BELL")

S67 XON character sent to DTE (Default "XON")

S68 XOFF character sent to DTE (Default "XOFF")

S69 XON character received from remote (Default "XON")

S70 XOFF character received from remote (Default "XOFF")

S71 Parity error character (Default "**")

S72 Weekday dial back up window start time (hour)

S73 Weekday dial back up window end time (hour)

S74 Weekend dial back up window start time (hour)

S75 Weekend dial back up window end time (hour)

S76 Autodial Back Up Window Type and Disconnect

BIT 0		Autodial Back Up Weekday Window Type
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	*	0 = Autodial back up disabled in window
		1 = Autodial back up enabled in window
BIT 1		Autodial Back Up Weekend Window Type
	*	0 = Autodial back up disabled in window
		1 = Autodial back up enabled in window
BIT 2		Automatic Back Up Window Disconnect
	*	0 = Back up connection not disconnected
		1 = Back up disconnects at window end time
BIT 7,6,5,4,3		Not used

S77 Reserved

S78 Not used

S79 Reserved

S80 Reserved (used in security status display)

S81 Not used

S82 Requested MNP class (2=async, 3=sync)

S83 Requested MNP window size

S84 Large Stream Buffers; Optimized Frame

BIT 0		Large stream mode buffers
		0 = Disabled
	*	1 = Enabled
BIT 1		Optimized frame formats
		0 = Disabled
	*	1 = Enabled
BIT 7,6,5,4,3,2		Not used

S85 Compression

BIT 0		0 = Compression (Class 5) disabled
	*	1 = Compression (Class 5) enabled
BIT 7,6,5,4,3,2,1		Not used

S86 LAPM/MNP Protocol

BIT 0		Not used
BIT 2,1		Protocol select
		0,0 = Reserved
		0,1 = MNP only
		1,0 = LAPM only
	*	1,1 = MNP and LAPM (automatic)
BIT 7,6,5,4,3		Not used

S87 LAPM detection phase time (0.01 seconds) (Default 75)

S88 Reserved

S89 Reserved

S90 through S97 Not used

S98 and S99 Reserved



S100 Product Type Code

1 =	9651-1MV (TMS DSP version)
2 =	9651-1MV (Rockwell version)
3 =	9653-1MV
4 =	2443-1MV
5 =	2443-1MV (Pac Bell)
6 =	9653-MM1
7 =	9653-MM2
9 =	9651-MM1
10 =	9651-MM2
12 =	9632-MM1
13 =	9632-MM2
	0, 8, 11 and 14 through 255 = Reserved

This register is not stored in non-volatile memory.
S101 Product version number (0-255).

This register is not stored in non-volatile memory.
S102 MNMS Status

BIT 0	0 = MNMS Smart Channel H/W not installed
	1 = MNMS Smart Channel H/W installed
BIT 1	0 = MNMS Smart Channel not active
	1 = MNMS Smart Channel active
BIT 2	Reserved
BIT 3	0 = MNMS Smart Channel OK
	1 = MNMS Smart Channel failed
BIT 7,6,5,4	Not used

This register is not stored in non-volatile memory.
S103 Smart Channel Address (30h thru 3Fh are valid addresses)

* FFh - Smart Channel not active.

This register is not stored in non-volatile memory.
S104 Signal Quality

This register is not stored in non-volatile memory.
S105 Receive Level

This register is not stored in non-volatile memory.
S106 EIA Input Status

BIT 0	0 = DTR OFF (pin 20)
	1 = DTR ON (pin 20)
BIT 1	0 = RTS OFF (pin 4)
	1 = RTS ON (pin 4)
BIT 2	0 = Dial Control OFF (pin 14))
	1 = Dial Control ON (pin 14)
BIT 3	0 = Speed Control OFF (pin 23)
	1 = Speed Control ON (pin 23)
BIT 4	0 = ALB Control OFF (pin 18 or 25)
	1 = ALB Control ON (pin 18 or 25)
BIT 5	0 = RDL Control OFF (pin 11 or 21)
	1 = RDL Control ON (pin 11 or 21)
BIT 7,6	Not used



	This register is not stored in non-volatile memory.
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S107 EIA Output Status

BIT 0	0 = DSR OFF (pin 6)
	1 = DSR ON (pin 6)
BIT 1	0 = CD OFF (pin 8)
	1 = CD ON (pin 8)
BIT 2	0 = CTS OFF (pin 5))
	1 = CTS ON (pin 5)
BIT 3	0 = Dial Indicator OFF (pin 12 or 19)
	1 = Dial Indicator ON (pin 12 or 19)
BIT 4	0 = Speed Indicator OFF (pin 12 or 23)
	1 = Speed Indicator ON (pin 12 or 23)
BIT 5	0 = Signal Quality OFF (pin 11 or 21)
	1 = Signal Quality ON (pin 11 or 21)
BIT 6	0 = Test Indicator OFF (pin 25)
	1 = Test Indicator ON (pin 25)
BIT 7	0 = Ring Indicator OFF (pin 22)
	1 = Ring Indicator ON (pin 22)

This register is not stored in non-volatile memory.

S108 Modem Status

BIT 0	0 = ON Hook
	1 = OFF Hook
BIT 1	0 = MI/MIC Input OFF
	1 = MI/MIC Input ON
BIT 2	0 = A/A1 Relay OPEN
	1 = A/A1 Relay CLOSED
BIT 3	0 = MNP INACTIVE
	1 = MNP ACTIVE
BIT 4	0 = OFFLINE
	1 = ONLINE
BIT 5	0 = Answer Mode
	1 = Originate Mode
BIT 6	0 = Dial Backup Connection INACTIVE
	1 = Dial Backup Connection ACTIVE
BIT 7	0 = Smart Channel Mode INACTIVE
	1 = Smart Channel Mode ACTIVE

This register is not stored in non-volatile memory.

S109 Cause of Last Disconnect (dial applications only)

This register holds a code value which corresponds to a description explaining the reason for the last disconnect. To extract this information, and prior to establishing the next call, type:

ATS109?

The modem will return a two digit value. Compare this value with the chart below.

Value	Description
0	Normal disconnect, no error occurred.
1	MNP protocol level not standard (LD sent)
2	Bad MNP negotiation parameter (LD sent)
3	Bad frame number in LA frame (LD sent)
4	LN frame sent 12 times without ack (LD sent)



5	LT frame sent 12 times without ack (LD sent)
6	LD frame sent (unspecified reason)
7	DISC frame sent (unspecified reason)
8	BRK sent 12 times without ack (DISC sent)
9	LAPM status inquiry sent 10 times without response
10	DM response (F=0) received
11	FRMR received
12	LAPM negotiation failure - codewords < 512
13	N(R) error
14	No response to XID frame
15	No response to SABME
16	No response to DISC
17	LD received
18	DM command received (F=1)
19	Bad codeword received (empty location)
20	STEP-UP received when already maximum codeword size
21	Reserved command code received
22	LAPM negotiation failure - string length > 250
23	LAPM negotiation failure - string length < 6
24	LAPM negotiation failure - block size < 8
25	Bad N(R) in I frame (FRMR sent)
26	Bad N(R) in RR frame (FRMR sent)
27	Bad N(R) in RNR frame (FRMR sent)
28	Bad N(R) in REJ frame (FRMR sent)
29	SREJ frame received (FRMR sent)

Value	Description
30	Undefined supervisory frame received (FRMR sent)
31	TEST frame received when not supported (FRMR sent)
32	Undefined unnumbered frame received (FRMR sent)
33	LAPM answer back failure
34	Any character abort
35	DISC frame received
100	Answer handshake failed to complete
101	Answer handshake failed to complete
102	DTR lost
103	Security violation - bad password after ^Z^Z^Z
104	Bad answerback
105	Time out waiting for answerback
106	Time out waiting for answer password
107	Bad answer password
108	Carrier lost (bad signal quality)
109	Retrain failure (handshake stuck)



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110	Echo correlator lockup
111	Receive level change > 6 dB
112	Dialing failed - bad number link
113	Dialing failed - illegal state
114	Dial handshake failed to complete

S110 through S113 Not used

S114 Number of Retrans (dial applications only)

This register holds a code value which corresponds to the number of times the modem retrained during the last connected session. To extract this information, and prior to the establishment of the next call, type:

ATS114?

The modem will return a three digit value. This value represents the actual number of times the modem retrained during the last session.

S115 through S119 Not used

