



HIGH SPEED MODEM
User Manual



**High Speed
Modem
User
Manual**

FCC PART 68 INSTRUCTIONS

I. FCC REQUIREMENTS:

1. The Federal Communication Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be on party lines or coin lines.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give notice of the changes. You will be advised of your right to file a compile with the FCC.
4. If the telephone company requests information on what equipment is connected to their line, inform them of:
 - a) The telephone number this unit is connected to.
 - b) The ringer equivalence number.
 - c) The USOC jack required.
 - d) The FCC Registration number.

Item 'b' and 'd' are indicated on the label.

The ringer equivalence (REN) is used to determine how many devices can be connected to your telephone line. In most area, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

II. SERVICE REQUIREMENTS

In the event of equipment malfunction, all repairs should be performed by our Company or an authorized agent. It is the responsibility of users requiring service to report the for service to our Company or to one of our authorized agents.

FCC PART 15, SUBPART B INSTRUCTIONS

Warning: Changes or modification to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits for designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encourage to try to correct the interference by one or more of the following measures:

- ◇ Reorient or relocate the receiving antenna.
- ◇ Increase the separation between the equipment and receiver.
- ◇ Connect the equipment into an outlet on a circuit different from that to which the receiver is needed.
- ◇ Consult the dealer or an experienced radio/TV technician for help.

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QUICK START

AT Commands for Speakerphone Mode

To initiate a call with the speakerphone, the following commands must be issued:

AT#CLS=8

AT#VLS=6 (Selects the speakerphone)

It is recommended to set the VRN command to 0 with the following command:

AT#VRN=0

This disables ringback detection before reporting the VCON message.

ATDT<number>

The modem then responds with:

VCON

Additional DTMF (for example in a voice mail application) can be entered by sending:

AT#VTS=<digit>

When DTMF digits are sent, it is recommended to change the default value of the tone length to 100ms using the command #VBT:

AT#VBT=1

The call can be transferred (PBX function) by entering the flash dial modifier (AT#VTS=!).

The call is terminated with:

ATH

AT Commands for DSVD Mode

DSVD operation could be originated before or after modem connection.

Before Modem Connection:

AT-SSE=1 (Enable DSVD mode)

AT#VLS=0 (DSVD Data State with Handset)

ATDT<number>

Either side picks up the handset, another modem will beep.

(If AT#VLS=6 is selected where DSVD Data State is connected with Half Duplex Speaker & Microphone, speakers and microphones on two parties will be activated immediately after the connection.)

ATH (Terminate the call)

After Modem Connection:

+++ (On-line Command Mode)

AT-SSE=1 (Enable DSVD mode)

AT#VLS=0 (DSVD Data State with Handset)

ATO (Return to On-line)

Either side picks up the handset, another modem will beep.

(If AT#VLS=6 is selected where DSVD Data State is connected with Half Duplex Speaker & Microphone, speakers and microphones on the two parties will be activated immediately after the connection.)

ATH (Terminate the call)

INTRODUCTION

Go through the Fundamentals Chapter if you are new to modem or new to controlling the modem directly using the modem built-in commands.

Before you use the FUNDAMENTALS Chapter, you should have already

- *set up your modem according to the instructions in the setup booklet that came with your modem*
- *installed and configured your communications program into your PC*

When you've done with this chapter, you may start studying the descriptions of each command in the COMMANDS Chapter and the functions of each S-register in the S-REGISTERS Chapter.

Further more, the FUNCTIONAL DESCRIPTION Chapter gives you a brief understanding on the modem operation. Which contains modem to modem compatibility, related commands for reliable mode connections , diagnostics to the modem, digital interface form and to the DTE

If you need information on installing your modem or any information on features specific to your particular model, go to the setup booklet that came with your modem.

NOTE: ONLY DATA MODEM RELATED COMMANDS AND CONTROLS ARE DESCRIBED IN THIS REFERENCE. PLEASE REFER TO THE FAX COMMUNICATION OR VOICE SOFTWARE THAT CAME WITH YOUR PARTICULAR MODEL IF FAX OR VOICE FUNCTIONS ARE INCLUDED.

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FUNDAMENTALS

We communicate with the Modem by issuing commands. Some software handles these commands almost invisibly, but it's still an good idea to learn some basic commands yourself. Not every command and resulting function is covered in this section, only enough to get you started. The complete features and commands are explained fully in later chapters.

2.1 Before you start ...

If the modem has not been installed on your system, please set up your modem according to the instructions in the setup booklet that came with your modem.

This FUNDAMENTALS CHAPTER assumes that you are familiar with the basic operation of your system. For example, you should know:

- *how to send ASCII to the serial port directly form your keyboard, or*
- *how to send ASCII to the serial port by using sophisticated communications program, suchas Telex, Crosstalk, Procomm, Mircophone II*

If you need more information in either of these areas, you should refer to the documentation that came with your system or sophisticated communications program.

2.2 Command Guidelines

- *The High Speed Modem has an onboard micro-controller which configures the modem's hardware for various tasks, such as auto-calling a remote station, auto-answering an incoming call, exchanging data between local terminal and remote terminal, error correction and data compression. All controls are performed by issuing a command to the controller. Communications software is required for sending commands to the modem. The "AT" command set requires the DTE to act as a dumb terminal to communicate with the modem. Although most of the personal computers looks like a CRT data terminal, it must specifically programmed by basic data communications software to operate like a dumb terminal. This involves sending data entered from the keyboard to the asynchronous communication port and displaying the data received from the communication port on the screen.*

LINE PREFIX All command lines must begin with the AT code except +++ (escape) and A/ (repeat). The AT code can be entered in either upper (AT) or lower (at) case characters.

BACKSPACE KEY deletes the character at the current cursor position with the exception of the line prefix 'AT'

SPACE characters may separate commands/instructions on a single command line which improve readability of multiple commands. Space characters are ignored by the command interpreter.

CARRIAGE RETURN terminates commands were entered. If this character is absnter from the command line, the entire line will be ignored.

MISSING PARAMETER evaluates to zero. For example, M alone is the same as M0.

FUNDAMENTALS

COMMAND BUFFER capacity is 40 characters. If the entered command line overflows the buffer, the entire commands are ignored and the modem sends the "ERROR" message. Each command line remains in the command buffer until AT prefix is entered, after entering to the On - line mode or power to the unit is isolated.

COMMAND STRINGS a series of commands to the modem can be grouped on a single line ; as long as it does not exceed 40 characters. Spaces do not count in the total of 40. A series of commands that may look complex, but actually quite simple. Building a command string is like spelling a long word one letter at a time.

Example:



AT Z X4 DP 1851

In sequence, this string reads: attention code, restore the active configuration profile, enable dial tone and busy signal detection, pulse dialing, number to be dialed.

RESULT CODES will be responded by modem on completion of execution to a command line, either in words or digits as selected.



AT

the command.



OK

the verbal result code, or



0

the numeric result code.

RESET - The Z command has the same effect as a power up. It resets all the features of the modem to the values contained in the active configuration profile in the non volatile memory. The Z command, when accomplished, returns the result code, OK.

2.3 Basic Dialing Commands

- *The modem performs as an electrical dialer which capable to dial in pulse, tone or mixture frms. The dialing string composed of dial digits and dial modifiers can be directly entered from the keyboard or from the communications software dialing directory. In normal calling operation, modem will wait for a recognized dial tone before dialing. Once the dialing string has been completely dialed, the modem will wait for answer tone sent from the remote modem. The call will be terminated if,*
 - » *the dial tone has not been detected within 2 seconds before dialing a "NO DIAL.TONE" will be sent or,*
 - » *remote modem answer tone is not present or can not be recognized within 30 seconds after dialing, a "NO CARRIER" will be sent or,*
 - » *a busy signal is detected after dialing, a "BUSY" message will be sent.*

The D command causes a telephone number to be dialed.

- 1) All dialing commands begin with the command prefix , AT.



AT
= Attention

- 2) The dialing command is D. Add D to AT.



AT D
= Attention/Dial

- 3) The command for a pulse dial phone is P. If you use a pulse dial phone, add P to ATD.



AT D P
= Attention/Dial/Pulse

- 4) If you use a Touch Tone phone line, add T to AT D. T is the command for Touch Tone (push button) phone.



AT D T
=Attention/Dial/Touch Tone

- 5) Now, add the telephone number -- for this example, 004 890-966.



AT D P 004 890 966
Example for Pulse dialing. = Attention/Dial/Pulse/Number



AT D T 004 890 966
Example for Touch Tone dialing. = Attention/Dial/Tone/Number

Spaces, hyphens or parentheses in the dial string which follow the D command which do not have meaning in terms of the dial function are ignored by the modem.

- 6) Place the call - by press the Carriage Return key [ENTER].

From now on, examples in this manual do not include[ENTER] at the end of each command line. You have to press [ENTER] to complete all commands.



AT D T 004 890 966 [ENTER]

- *A dynamic speaker allows user to monitor the progress of a call, such as the dialing tone, ringing, busy tone and even a voice. The volume and On-Off switch of the speaker can be programmed in various applications.*

FUNDAMENTALS

In this example, the modem has an internal speaker, you will hear the call being dialed and you can listen for the connection. If the call is not answered in 30 seconds, the modem will break the connection and send the result code "ON CARRIER" to the screen.



NO CARRIER

When modem's call is answered by the other modem, a valid carrier is detected within the time-out interval, the modem sends a result code string which depends upon the communications rate of the connection and the result code option selected.

Possible result codes for non-protocol connections including: CONNECT 19200, CONNECT 57600 ... etc.

When the modems connect, the modem moves from the Command Mode into the On-line Mode. On-line mode lets you exchange data across the telephone line with a modem at a remote location. **DO NOT SEND COMMANDS WHEN YOUR MODEM IS IN THE ON-LINE MODE** as your modem assumes everything it receives from your keyboard is data and sends it across the telephone line to the remote side.

7) Escape from the On-line Mode

Once a connection is established, the modem assumes the on-line state, no commands can be issued. To return to the On-line Command mode, without disconnecting from the telephone line, use the escape code. The escape code is +++ (three consecutive plus characters not followed by a carriage return).

(On-line Mode)



+++



OK

(The modem is now in the On-line Command mode)

The modem acknowledge the transition to the command state by returning the OK result code.

8) Re-enter to the On-line Mode from On-line Command mode

The O command directs the modem to return to On-line Mode. No commands can be executed after the O command (except the escape code), so be sure to make it the last character of the command string.

(On-line Command Mode)



ATO



CONNECT 57600

(The modem returned to the On-line Mode)

(9) Disconnecting a connection

At the end of a call, put the modem in On-line Command Mode (using the Escape Code),

(On-line Mode)



+++

(On-line Command mode)



OK

Enter the Hang-up Command "AT H0" in On-line command state.

Your modem then hangs up the call, sends an OK response, and returns to Command Mode.



AT H0



OK

Note: Serial interface signal DTR option also can be used for disconnecting a call and escape the modem from on-line mode. See DTR options in Commands Chapter for detailed description.

2.4 Answering the Calls

- *The modem, when set for automatic answer an incoming call, goes off hook if the "RING" count equals to the contents of "Ring to Answer" register(S0). It remains silent for 2 seconds billing delay interval before transmitting the answer tones. Afterward modem to modem identification and handshaking will proceed at a speed and operating mode acceptable to both DTE's at each end of the link.*

The key to enable modem to auto-answering incoming calls by setting the S-Register (Software Register) S0 to a non zero decimal value(1 to 255). The S0, when initially powered on, is set to zero as a default. If the factory default has not been changed to zero then you can either set the modem to auto-answer calls with the S command we will discuss here, or you can change the Automatic answer option saved in NVRAM (non volatile memory) by using &W command.

The Sr=n command always overrides the default condition of NVRAM. Let us use the Sr=n command to assign the value of S0.



AT S0=1

= Answers incoming calls after the first ring.

or,



AT S0=5

= Answers incoming calls after the fifth ring.

2.4.1 Answer a HOMEFAX2 call

- *The HOMEFAX 2 (Duplex Ringing) is a special network service provided by Hongkong Telecom, where your home line (Directory A) is assigned with an additional number (Directory B). Each directory number has its own ringing cadence. The two different ringing indicators can therefore be used to identify different call types, voice/fax or data, etc.*

The modem incorporates the feature of the HOMEFAX II ringing detection, the &I1 command turns the modem answers only the Duplex "B" type ringing and the default setting of &I0 answers both normal and Duplex "B" type ringings. The setting of Duplex "B" ringing detection only could be reset to normal by entering AT&I0 command. See AT&In Ringing Type of the Commands Chapter for details.



AT&I1

Modem answer to the Duplex B type ringing ONLY.

IMPORTANT : The AT&I1 command makes the modem blind to any incoming ringing other than Duplex "B" (Homefax II) type ringing cadence. Ensure that the HOMEFAX II service was installed to the telephone line used by the modem, otherwise the modem's answer function is eliminated. *For more information of the HOMEFAX II service, please call Hongkong Telecom Hotline 1800 or your local telephone company.*



AT&I0

Modem answer to both the normal and Duplex "A" and "B" type ringing. (Default)

2.5 Auto-Answer Process

When the telephone rings, the modem counts the rings and answers the call on the ring assigned to the S0. And then it sends a carrier signal to the originating modem and waits for it to return a signal.

If no carrier signal is detected within a certain time period (content of S7), modem will hang-up , return to command mode and send the "NO CARRIER" message.

If the carrier from the originating modem is detected, then the modem sends a "CONNECT" message on completion of the modem to modem handshake and goes to the On-line Mode.

2.6 Disable Auto-Answering

Disable the modem to answer call automatically by setting the S0 to zero.

- *When S0= 0, the modem sends a "RING" message each time the telephone rings, even though it does not answer the call.*



AT S0=0

2.7 Store a Phone Number in Non-volatile Memory

Up to 30 symbols (dial digits and dial modifiers) may be stored in the NVRAM by using the &Z command.



AT &Z0= T 852 , 489 0966

= Attention/Store dialing string/Tone dial/Number852/Wait for 2 Seconds/ 4890966

2.8 Dial Stored Number

The stored number can be dialed by issuing the following command:



AT DS=0

= Attention/Dial/Dial String #0

If the above paragraph example has been followed, the modem Tone Dial 852 and then wait for 2 seconds and continue to dial 4890966. See the [S] dial modifier section **THE DIALING COMMANDS** in the **COMMANDS CHAPTER** for dialing the strings 1, 2 and 3.

2.9 Establish a Reliable Connection - QUICK START

a) Originate Mode

1) Set your DTE communication speed to the highest possible speed (9600bps for 2400 model , 38600bps for 9600 model, 57600bps for 14400 model or 115200bps for higher speed models) and set the DTE using RTS/CTS hardware flow control.

2) Issue AT&F command to the modem. The &F command fetches the factory default settings as the current operational setting, it is recommended that the default conditions be used when first starting to use the sophisticated features of the modem. The default conditions have been selected to provide effortless use of the modem.

3) Originate Mode - Dial another V42bis or MNP5 modem using ATD command.

4) The modem will attempt to make a highest possible negotiation with the remote modem and the message "CONNECT" should appear within 6-10 seconds upon remote modem answered the call.

b) Auto-Answer Mode

1) Perform procedure steps 1 through 2 of section 2.9.1.

2) See Section 2.4 to enable the modem to auto-answer a call.

3) Wait for a call made by a V42bis or MNP5 modem from remote.

4) A "RING" message should appear when the modem is being called and then the modem will attempt to make a highest possible negotiation with the remote modem and the message "CONNECT XXXX" should appear within 6-10 seconds upon the modem answered the call.

2.10 Software Configuration

a) Setup Strings

1) Auto negotiate data compression and error correction: AT&F (factory default) or ATN3%C3. In this mode, the modem prefers LAP-M over MNP 4, and V.42bis over MNP5. If error correction is not negotiated, the modem will connect in normal mode.

2) Force V.42bis data compression with LAP-M error correction : ATN4%C2

3) Force V.42bis data compression with MNP4 error correction: ATN5%C2

4) Force MNP 5 data compression with MNP4 error correction: ATN5%C1

Note: With the 2), 3) and 4) setup strings above, if the remote is unable to negotiate the desired mode, the modem will disconnect and respond with "NO CARRIER".

b) Common configuration

Configuration to sophisticated communication programmes such as Mirror, PCanywhere, Close-Up, Telix, Crosstalk, Procomm, Mircopone II. e.g..

Modem Type Selection : HAYES V-Series xxxx

DTE Speed Setting : 57600bps (or 115200bps if V.FC models)

Flow Control Option : CTS/RTS (Hardware Flow Control)

Other Flow control options (DSR/DTR, XON/XOFF) has to be turned OFF.

COMMANDS

3.1 BASIC COMMANDS

A/	Re-execute command.
A	Go off-hook and attempt to answer a call.
B0	Select V.22 connection at 1200 bps.
B1	Select Bell 212A connection at 1200 bps.
C1	Return OK message.
Dn	Dial Modifier.
E0	Turn off command echo.
E1	Turn on command echo.
H0	Initiate a hang-up sequence.
H1	If on-hook, go off-hook and enter command modem
I0	Report product code.
I1	Report checksum.
I2	Computer checksum and report OK.
I3	Report firmware revision, model, and interface type.
I4	Report response programmed by an OEM.
I5	Report the country code parameter.
I6	Report modem data pump model and code revision.
I7	Report the DAA code (world-class models only).
L0	Set low speaker volume.
L1	Set low speaker volume.
L2	Set medium speaker volume.
L3	Set high speaker volume.
M0	Turn speaker off.
M1	Turn speaker on during handshaking and turn speaker off while receiving carrier.
M2	Turn speaker on during handshaking and while receiving carrier.
M3	Turn speaker off during dialing and receiving carrier and turn speaker on during answering.
N0	Turn off automode detection.
N1	Turn on automode detection.
O0	Go on-line.
O1	Go on-line and initiate a retrain sequence.
P	Force pulse dialing.
Q0	Allow result codes to DTE.
Q1	Inhibit result codes to DTE.
Sn	Select S-Register as default/
Sn?	Return the value of S-Register n.
=v	Set default S-Register to value v.
?	Return the value of default S-Register.
T	Force DTMF dialing.
V0	Report short form (ters) result codes.
V1	Report long form (verbose) result codes.
W0	Report DTE speed in EC mode.
W1	Report line speed, EC protocol and DTE speed.
W2	Report DCE speed in EC mode.
X0	Report basic call progress result codes, i.e., OK, CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER and ERROR.

COMMANDS

X1	Report basic call progress result codes and connections speeds (OK, CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER, CONNECT XXXX, and ERROR.
X2	Report basic call progress result codes and connections speeds, i.e., OK, CONNECT, RING, NO CARRIER (also, for busy, if enabled, and dial tone not detected), NO ANSWER CONNECT XXXX, and ERROR.
X3	Report basic call progress result codes and connection rate, i.e., OK, CONNECT, RING, NO CARRIER, NO ANSWER, CONNECT XXXX, BUSY, and ERROR.
X4	Report all call progress result codes and connection rate, i.e., OK, CONNECT, RING, NO CARRIER, NO ANSWER CONNECT XXXX, BUSY, NO DIAL TONE and ERROR.
Y0	Disable long space disconnect before on-hook.
Y1	Enable long space disconnect before on-hook.
Z0	Restore stored profile 0 after warm reset.
Z1	Restore stored profile 1 after warm reset.
&C0	Force RLSD active regardless of the carrier state.
&C1	Allow RLSD to follow the carrier state.
&D0	Interpret DTR on-to-off transition per &Qn: &Q0, &Q5, &Q6 The modem ignores DTR. &Q1, &Q3 The modem hangs up. &Q2, &Q3 The modem hangs up.
&D1	Interpret DTR on-to-off transition per &Qn: &Q0, &Q1, &Q4, &Q5, &Q6 Asynchronous escape. &Q2, &Q3 The modem hangs up.
&D2	Interpret DTR on-to-off transition per &Qn: &Q0 thru &Q6 The modem hangs up.
&D3	Interpret DTR on-to-off transition per &Qn: &Q0, &Q1, &Q4, &Q5, &Q6 The modem performs soft reset. &Q2, &Q3 The modem hangs up.
&F0	Restore factory configuration 0.
&F1	Restore factory configuration 1.
&G0	Disable guard tone.
&G1	Disable guard tone.
&G2	Enable 1800 Hz guard tone.
&J0	Set S-Register response only for compatibility.
&J1	Set S-Register response only for compatibility.
&K0	Disable DTE/DCE flow control.
&K3	Enable RTS/CTS DTE/DCE flow control.
&K4	Enable XON/XOFF DTE/DCE flow control.
&K5	Enable transparent XON/XOFF flow control.
&K6	Enable both RTS/CTS and XON/XOFF flow control.
&L0	Select dial up line operation.
&M0	Select direct asynchronous mode.
&P0	Set 10 pps pulse dial with 39%/61% make/break.
&P1	Set 10 pps pulse dial with 33%/67% make/break.
&P2	Set 20 pps pulse dial with 39%/61% make/break.
&P3	Set 20 pps pulse dial with 33%/67% make/break.
&Q0	Select direct asynchronous mode.
&Q4	Select Hayes AutoSync mode.
&Q5	Modem negotiates an error corrected link.
&Q6	Select asynchronous operation in normal mode.
&R0	CTS tracks RTS (async) or acts per V.25 (sync).
&R1	CTS is always active.

&S0	DSR is always active.
&S1	DSR acts per V.25.
&T0	Terminate any test in progress.
&T1	Initiate local analog loopback.
&T2	Returns ERROR result code.
&T3	Initiate local digital loopback.
&T4	Allow remote digital loopback.
&T5	Disallow remote digital loopback request.
&T6	Request an RDL without self-test.
&T7	Request an RDL with self-test.
&T8	Initiate local analog loop with self-test.
&V	Display current configurations.
&W0	Store the active profile in NVRAM profile 0.
&W1	Store the active profile in NVRAM profile 1.
&Y0	Recall stored profile 0 upon power up.
&Y1	Recall stored profile 1 upon power up.
&Zn=x	Store dial string x (to 35) to location n (0 to 3).
%E0	Disable line quality monitor and auto retrain.
%E1	Enable line quality monitor and auto retrain.
%E2	Enable line quality monitor and fallback/fall forward.
%L	Return received line signal level.
%Q	Report the line signal quality.
%TTn	PTT certification test signals.
/Kn	Controls break handling during three states: When modem receives a break from the DTE:
/K0,2,4	Enter on-line command mode, no break sent to the remote modem.
/K1	Clear buffers and send break to remote modem.
/K3	Send break to remote modem immediately.
/K5	Send break to remote modem in sequence with transmitted data. When modem receives \B in on-line command state:
/K0,1	Clear buffers and send break to remote modem.
/K2,3	Send break to remote modem immediately.
/K4,5	Send break to remote modem in sequence with transmitted data. When modem receives break from the remote modem:
/K0,1	Clear data buffers and send break to DTE.
/K2,3	Send a break immediately to DTE.
/K4,5	Send a break with received data to the DTE.
/N0	Select normal speed buffered mode.
/N2	Select reliable link mode.
/N3	Select auto reliable mode.
/N4	Force LAPM mode.
/N5	Force MNP mode.
+MS	Select modulation
**0	Download to flash memory at last sensed speed.
**1	Download to flash memory at 38.4kbps.
**2	Download to flash memory at 57.6kbps.
-SDR=0	Disable Distinctive Ring.
-SDR=1	Enable Distinctive Ring Type 1.
-SDR=2	Enable Distinctive Ring Type 2.
-SDR=3	Enable Distinctive Ring Type 1 & 2.
-SDR=4	Enable Distinctive Ring Type 3.
-SDR=5	Enable Distinctive Ring Type 1 & 3.
-SDR=6	Enable Distinctive Ring Type 2 & 3.
-SDR=7	Enable Distinctive Ring Type 1, 2 & 3.

3.2 AT+ COMMAND (For V.34 Models Only)

3.2.1 +MS - Select Modulation

This extended-format command selects the modulation, optionally enables or disables automode, and optionally specifies the lowest and highest connection rates using one to four subparameters. The command format is :

+MS=<mod>[,<automode>][,<min_rate>]]<CR>

For 14400 bps and lower speeds, Nn command and S37 registers can alternatively be used, in which case the +MS subparameters will be modified to reflect the Nn and S37=x settings. Use of the Nn and S37=x commands is not recommended but is provided for compatibility with existing communication software. S37 is not updated by the +MS command.

Subparameters not entered (enter a comma only or <CR> to skip the last subparameter) remain at their current values.

3.2.1.1 Reporting Selected Options

The modem can send a string of information to the DTE consisting of supported options using the following command: +MS=?

The response is:

+MS:(list of supported <mod> values), (list of supported <automode> values) (list of supported <min_rate> values), (list of supported <Max_rate> values)

For example,

+MS:(0,1,2,3,9,10,11,64,69,74),(0,1) (300-33600), (300-33600) (336 model)

+MS:(0,1,2,3,9,10,11,64,69,74),(0,1) (300-28800), (300-28800) (288 model)

+MS:(0,1,2,3,9,10,64,69),(0,1) (300-14400), (300-14400) (144 model)

3.2.1.2 Reporting Supported Options

The modem can send a string of information to the DTE consisting of selected options using the following command: +MS?

The response is:

+MS:<mod>,<automode>,<min_rate>,<max_rate>

For example,

+MS:11,1,300,33600 (shows default values, 336 model)

+MS:11,1,300,28800 (shows default values, 288 model)

+MS:10,1,300,14400 (shows default values, 144 model)

3.2.1.3 Subparameters Definitions

<mod>:

A decimal number which specifies the preferred modulation (automode enabled) or the modulation (automode disabled) to use in originating or answering a connection. The options are:

<mod>=0 possible rate at V.21 300 bps

<mod>=1 possible rate at V.22 1200 bps

<mod>=2 possible rate at V.22 bis 2400 or 1200 bps

<mod>=3 possible rate at V.23

<mod>=9 possible rate at V.32 9600 or 4800 bps

<mod>=10 possible rate at V.32 bis 14400, 12000, 9600, 7200, or 4800bps
 <mode>=11 possible rate at V.34 33600,31200,28800,26400,24000,21600,
 19200,16800,14400,12000,9600,7200,4800 or 2400 bps (Default)
 <mod>=64 possible rate at Bell 103 300 bps
 <mod>=69 possible rate at Bell 212 1200 bps
 <mod>=74 possible rate at V.FC 28800, 26400, 24000, 21600, 19200,16800, or
 14400 bps

<automode>:

Optional value of 1 or 0 which enables or disables automatic modulation negotiation using V.8 or V.32 bit Annex A. The options are:

<automode>=0

Automode disable, that is fixed modulation.

If <max_rate> is within the rates supported by the selected modulation specified by <mod>, the selected rate is that specified by <max_rate>. For example, to select V.32 4800 bps fixed rate, issued:

+MS=9,0,1200,4800

If <max_rate> is greater than the highest rate supported by the selected modulation specified by <mod>, the starting rate is the highest rate supported by the selected modulation. For example, to select V.32 9600 or 4800 bps, issue:

+MS=9,0,2400,14400

To emulate issuance of the N0S37=x command sequence to select fixed mode operation, specify the <max_rate> and <min_rate> both to be the same requested speed, and <mod> to be the modulation for that speed. For example, to select V.34 16800 bps fixed mode (no comparable S37 command), issue:

+MS=11,0,16800,16800

To select V.32 bis 1200 bps fixed mode which is the same as N0S37=10, issue:

+MS=9,0,12000,12000

<automode>=1 (Default)

Automode enabled using V.8 or V.32 Annex A. The modem will automatically selected speed and modulation. The modem connects at the highest possible rate in accordance with V.8, or V.32 bis Annex A if V.8 is not supported by the remote modem.

If <max_rate> is greater than the highest rate supported by the modulation specified by <mod>, the modem automodes down from the highest rate of the selected modulation. For example, to select automoding down from V.32 bis V.32 bis 14400 bps, issue:

+MS=10,1,1200,24000

To emulate issuance of the N1S37=x sequence command, specify the modulation and the rate to start automoding down from using <mod> and <max_rate>, respectively. Set <min_rate> to 300 to allow automoding all the way down to V.21 300 bps. For example, to select automoding starting at V.34 16800 bps (no comparable S37 command), issue:

+MS=11,1,300,16800

To select automode starting at V.32 bis 12000 bps (same as N1S37=10), issue:

+MS =9,1,300,12000

<min_rate>,<max_rate>

These are optional decimal numbers with default at 300 and 14400 which specifies the lowest and highest rate respectively at which the modem may establish a connection.

3.3 AT Commands for MediaLink and DSVD Operation

MediaLink and DSVD are two technologies that allow simultaneous voice and data operation through a modem on a single telephone line. MediaLink and DSVD implementations differ in the manner that voice and modem data are combined. Voice and data channels are combined in the analog domain for MediaLink and in the digital domain for DSVD. The following Unique Products will support either DSVD, MediaLink, or both implementations:

DIGIPHONE 34F and DIGIPHONE 34Fi feature DSVD.
VAXi 34sp and VOY 34sp feature MediaLink.
DIGIPHONE 34sp and DIGIPHONE 34sp feature DSVD and MediaLink.

This addendum describes the AT commands which allow control of MediaLink/DSVD operation. Establishing a MediaLink or DSVD connection is analogous to establishing a regular data modem call using normal dialing (ATD) and answering (ATA) procedures. The products are also capable of transitioning from a regular phone conversation into MediaLink or DSVD modes. A handset, headset, or microphone/speaker can be used for voice communication during MediaLink and DSVD modes. Examples of establishing a connection with MediaLink/DSVD features are shown at the end of this addendum.

3.3.1 MediaLink and DSVD Commands

AT-SMS = x, y, z, t (SVD Mode Select)

- x: SVD mode select
 - 0 - Data only (Default)
 - 1 - DSVD
 - 2 - MediaLink
- y: Minimum voice + data speed (bps) for MediaLink mode

4800 (default)
7200
9600
12000
14400 (14.4kbps models do not support values above 14400)
16800
21600
24000
26400
28800

z: Maximum voice + data speed (bps) for MediaLink mode
4800
7200
9600
12000
14400 (default)
16800
21600
24000
26400
28800 (default and maximum value)

- t: Symbol rate fro MediaLink mode
- 0 - Auto Selection (Default)
- 1 - 2400 bits/symbol
- 2 - 2743 bits/symbol
- 3 - 2800 bits/symbol
- 4 - 3000 bits/symbol
- 5 - 3200 bits/symbol
- 6 - 3429 bits/symbol

Symbol rate should be set for auto selection (default) and the modems will negotiate for maximum symbol rate during connection time. The other symbol rate selections are for test purposes.

Note: The y,z,t parameters are optional and only required if the user wishes to have the flexibility to control connection speeds. For example, AT-SMS=2 will be sufficient to enable MediaLink.

- AT#VLS=** x (Voice Link Select)
- Used to select interface for DSVD or MediaLink audio
 - 0 - Telephone handset (Default)
 - 5 - Headset
 - 6 - Speakerphone

The AT#VLS setting is to e issued anytime prior to establishing a DSVD or MediaLink connection.

3.3.2 DSVD Commands

- AT-SSE=x** (DSVD Control)
- x: 0 - Disable DSVD (Default)
 - 1 - Enable DSVD

DSVD mode can be enabled by either AT-SSE=1 or AT-SMS=1, and disabled by either AT-SSE=0 or AT-SMS=0. A product supporting MediaLink but not DSVD mode will report ERROR in response to this command.

3.3.3 MediaLink AT Commands

The following commands are applicable only for products featuring MediaLink mode. The command will have no effect in DSVD mode. Products that support DSVD but not MediaLink mode will report ERROR in response to these commands.

- AT-SMC=x** (MediaLink Control)
- x: 0 - Data burst disabled
 - 1 - Data burst enabled (Default)

Enabling data burst (default) will keep the audio channel open only when there is energy detected on the handset or headset. When silence is detected in data burst mode the modems will upshift in speed for higher throughput. Disabling data burst mode will keep the audio channel open at all times during the MediaLink connection.

- AT-SQS=x, y** (MediaLink Modulation Selection)

- x: 0 - V.61
- 1 - V.61+ (Default)
- 2 - V.34Q (Default)

This mode is not supported on the 14.4kbps models and respond with ERROR.

COMMANDS

- y: 0 - Automode disable
- 1 - Automode enable (Default)

The AT-SQS parameters should remain at default unless a particular modulation is preferred.

Example 1:

Establish a MediaLink data connection between two modems:

Original Modem		Answer Modem		Comments
DTE	DCE	DTE	DCE	
AT&F		AT&F		Reset modems
	OK		OK	
AT-SMS=2		AT-SMS=2		Enable MediaLink
	OK		OK	
ATDTxxxx				Originate modem dials remote modem
			RING	
		ATA		DTE responds to RING by answering
	CONNECT 14400		CONNECT 14400	MediaLink is established and users can pick up handset to converse

Example 2:

Switch from normal handset conversation to MediaLink data connection between two modems:

Original Modem		Answer Modem		Comments
DTE	DCE	DTE	DCE	
				Users establish handset conversation and both handsets are off-hook.
AT&F		AT&F		Reset modems
	OK		OK	
AT-SMS=2		AT-SMS=2		Enable MediaLink
	OK		OK	
ATD				Originate modem initiates data negotiation but doesn't really dial
			RING	
		ATA		DTE responds to RING by answering
	CONNECT 28800		CONNECT 28800	MediaLink is established and users can resume conversation

Note: The transition from handset conversation to MediaLink mode can take up to 8 seconds. The handset will be silenced during the negotiation period.

S REGISTERS

The S registers are described in detail in this chapter and summarized in Table 4-1 along with their default values. Registers denoted with an "*" in Table 4-1 may be stored in one of the two user profiles by entering the AT&Wn command. One of these profiles may be loaded at any time by using the ATZn command.

4.1 FACTORY DEFAULTS

The factory default values are stored in ROM and are loaded into the active configuration at power up or by the ATZn command. In addition, the designed default profile is subsequently loaded, and may change some of the factory default values. The designed default profile can be changed by entering the AT&Yn command where n is one of the two possible user profiles.

S-REGISTERS

All of the factory default values may be loaded at any time by entering the AT&F command.

Table 4-1 S Register Summary

Register	Function	Range	Unit	Save	Default
S0	Number of Rings till Auto-Answer	0-255	Rings	Y	0
S1	Ring Counter	0-255	Rings	N	0
S2	Escape Character	0-255	ASCII	*	43
S3	Carriage Return Character	0-127	ASCII	N	13
S4	Line Feed Character	0-127	ASCII	N	10
S5	Back Space Character	0-255	ASCII	N	8
S6	Wait For Blind Dialing	2-255	s	Y	2,
S7	Wait For Carrier After Dial	1-255	s	Y	50,
S8	Pause Time For Dial Delay	0-255	s	Y	2,
S9	Carrier Detect Response Time	1-255	0.1s	Y	6,
S10	Lost Carrier To Hang Up Delay	1-255	0.1s	Y	14,
S11	DTMF Tone Duration	50-255	0.001s	Y	95
S12	Escape Code Guard Time	0-255	0.02S	Y	50
S14	Bit Mapped Options			Y	138
S16	Bit Mapped Test Options			N	0
S18	Test Timer			Y	0
S21	Bit Mapped Options			Y	52
S22	Bit Mapped Options			Y	117
S23	Bit Mapped Options			Y	63
S25	Delay To DTR	0-255	s or 0.01s		5
S26	RTS To CTS Delay Interval	0-255	0.01s	N	1
S27	Bit Mapped Options			Y	73
S28	General Bit-Mapped Options			Y	0
S29	Flash Dial Modifier Time	0-255	0.01s	N	0
S30	Disconnect Inactivity Timer	0-255	10s	N	0
S31	General Bit-Mapped Options			Y	2
S32	XON Character	0-255	ASCII	N	17(11H)
S33	XOFF Character	0-255	ASCII	N	19(13h)
S36	LAPM Failure Control			Y	7
S37	Line Connection Speed			Y	0
S38	Delay Before Forced Disconnect	0-255	s	Y	20
S39	Flow Control			Y	3
S40	General Bit-Mapped Option			Y	105
S41	General Bit-Mapped Option			Y	3
S46	Data Compression Control			Y	138
S48	V.42 Negotiation Control			Y	7
S82	LAPM Break Handling				128
S86	Connection Failure Reason Code	0-255			0
S95	Result Code Messages Control			Y	0

Y = Register value may be stored in one of two user profiles with the AT&Wn command.

