

**IP568x**  
**56Kbps Data/Fax/Voice Modem Chip Set**

**User's Manual**  
**AT Command Set**

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## **Introduction**

This is a high performance ITU-V.90 56Kbps modem; Computer can make connection with remote terminal, send a fax and be a telephone answer machine by this modem. In data mode, this modem provides ITU V.90, V.34, V.32bis, V.32, V.22bis, V.22, V.23, V.21 and bell212A/103 connection protocol speed from 300bps to 56Kbps. This modem also provides MNP class 5 and V.42bis compression method during data transmission. In Fax mode, this modem can send and receive Fax in 14.4Kbps that is compatible to ITU-V.17 standard. Fax function is follow ITU Group 3 fax standard. More detail information, please refer to user's manual of communication software and AT command set.

## **Packing information**

1. User's manual
2. Communication Software
3. RJ-11 telephone cable
4. 3.5 inch Disk (Win95/98 Driver & INF files)
5. Ear Phone and Mic Phone

## **Hardware Installation**

### Starting the Installation

1. Turn off your computer and unplug its power cable.
2. Unplug your computer before removing the top or you could hurt yourself and damage the equipment.
3. Remove the computer cover according to the directions in the computer manual.
4. Choose a PCI slot.
5. Remove the rear panel metal bracket that corresponds to the slot you plan to use.
6. Hold the modem over the expansion slot. Place the modem into the slot and push it down so that it is firmly seated.
7. Replace the computer cover.
8. Plug one end of the supplied phone cable into line jack on the modem metal bracket, the other into a modular phone wall jack.
9. You can connect a phone to your modem by plugging the phone modular plug into the modem's phone jack. With this arrangement you can use your telephone normally when the modem isn't being used.
11. Turn on the computer.

## **Windows 95/98 installation**

If your computer uses Windows 95, plug and play? Both Windows 95 and your computer support plug & Play. Plug and Play lets you plug in a device such as your modem and then use it immediately.

- To finish your Windows 95 installation, follow these steps
1. Turn on your computer if it not already on. If the New Hardware Found dialog box appears, you need to install a modem driver file, as explained in steps 2. If the New Hardware Found box does NOT appear, Windows 95 already has a driver for your Modem. Skip ahead to step 6.
  2. Insert the Disk that is provided by hardware manufacture into floppy drive A (or B).
  3. Chose Driver source is in floppy drive A (or B).
  4. Click on OK. Windows 95 automatically copies the modem driver to your hard disk and uses it.
  5. Eject the disk and store it in a safe place.
  6. Your modem is now installed. Now install the fax and data software that came with your modem, as explained in your modem manual.

## **AT Commands Reference**

AT commands are issued to DTE to control the modem's operation. AT commands can only be entered while the modem is in command mode. Except for the A/ command and the +++ escape command, all commands must be prefixed with the attention code AT. For instance, the "A" command (below) would be entered as: "ATA<CR>". Without the AT prefix, the command line cannot be executed. For example: The format for entering AT commands is "ATXn" where X is the AT command, and n is the specific value for that command. More than one command can be placed on a single line and (if desired) separated with spaces for readability. Once the carriage return (Enter) key is pressed, the command line is executed. A line with no carriage return is ignored. Any command issued is acknowledged with a response in either text or numeric values known as result codes. In the following, all commands, command-values and result code recognized by the modem are shown; any entries other than those shown cause the ERROR result code. The modem accepts either upper or lower case characters in the command line and ignores any spaces within or between commands. Typing errors can be corrected with the Backspace key. Exceptions are noted in the description of specific commands.

### **+++AT Escape Sequence**

The escape sequence allows the modem to exit data mode and enter online command mode. While in online command mode, you may communicate directly to your modem using AT commands. You may return to data mode by issuing the ATO command.

## Section 1. Data Mode Command

### A/ Executes Last Command

When modem receives this command, modem executes the last command string entered. Do not conclude it by pressing "Enter".

### A Answer Command

This command instructs the modem to go off-hook and answer an incoming call.

### Bn Communication Standard Setting

This command determines ITU-T vs. Bell standard.

**B0\*** Selects ITU-T V.22 mode when the modem is at 1200 bits/s. (Default)

**B1** Selects Bell 212A when the modem is at 1200 bits/s.

### Result Codes:

**OK** : n = 0, 1

**ERROR** : Otherwise

### Dn Dial

This command instructs the modem to begin the dialing sequence. A dial string can be up to 40 characters long. Any digit or symbol (0-9, \*, #, A, B, C, D) could be dialed as touch-tone digits. The following may be used as dial string modifiers:

**P** Pulse dialing.

**T\*** Touch tone dialing (Default).

**W** Wait for second dial tone.

**@** Wait for quiet answer. Wait for five seconds of silence after dialing the number.

**!** Hook flash.

**,** Pause during dialing.

**;** Return to command mode.

**^** Enable data calling tone transmission.

**S = n** Dial a telephone number previously stored using the &Zn = x command (see the &Zn = x command for further information). The range of n is 0,1,2.

### En Echo Command

ATEn command controls whether or not the characters entered from your computer keyboard are echoed back to your monitor while the modem is in command mode.

**E0** Disables echo to the computer.

**E1\*** Enables echo to the computer (Default).

### Result Codes:

**OK**: n = 0, 1

**ERROR**: Otherwise

### Hn Hook Control

This command instructs the modem to go on-hook to disconnect a call, or off-hook to make the phone line busy.

**H0\*** Modem goes on-hook (Default).

**H1** Modem goes off-hook.

### Result Codes:

**OK**: n = 0, 1

**ERROR**: Otherwise

### In Request Identification Information

This command displays specific product information about the modem.

**I0** Returns product ID code.

**I1** Display Firmware version and checksum on the DTE.

**I2** Customer Used.

**I3** Returns fix ID information for application software identification. "IP568x Data/Fax/Voice 56K Modem"

**I4** Returns firmware version for data pump.

**I5** Returns country code.

**I6** Blacklist times

**I7** Display Firmware version and date on the DTE

**I8** Display Firmware version and date for data pump

**I9** Return Software Speakerphone or Hardware speakerphone

**I10** Checksum

### Result Codes:

n = 0, 1, 2, 3, 4, 5,6,7,8,9,10

**ERROR**: Otherwise

### Ln Monitor Speaker Volume

This command sets speaker volume to low, medium, or high.

**L0** Select low volume.

**L1** Select low volume.

**L2\*** Select medium volume. (Default)

**L3** Select high volume.

### Result Codes:

**OK** n = 0, 1, 2, 3

**ERROR** Otherwise

### Mn Monitor Speaker Mode

This command turns the speaker on or off.

**M0** The speaker is off.

**M1\*** The speaker is on until the modem detects the carrier signal. (Default)

**M2** The speaker is always on when modem is off-hook.

**M3** The speaker is on until the carrier is detected, except while dialing.

### Result Codes:

**OK** n = 0, 1, 2, 3

**ERROR** Otherwise

### Nn Modulation Selection

This command controls whether or not the local modem performs a negotiated handshake at connection time with the remote modem when the communication speed of the two modems is different.

**N0** When originating or answering, this is for handshake only at the communication standard specified by AT\*In.

**N1\*** During handshake, Highest speed is specified by AT\*In. Depend on line quality fallback to a lower speed may occur. (Default)

### Result Codes:

**OK** n = 0, 1

**ERROR** Otherwise

**On Return Online to Data Mode**

- OO\*** Exit online command mode and return to data mode (see AT Escape Sequence, +++AT). (Default)
- O1** This command issues a retrain before returning to online data mode.
- O2** This command issues a rate re-negotiation before returning to online data mode.

**Result Codes:**

**OK** n = 0, 1, 2  
**ERROR** Otherwise

**P Select Pulse Dialing**

This command configures the modem for pulse (non-touch-tone) dialing.

**Result Codes: OK****Qn Result Code Control**

Result codes are informational messages sent from the modem and displayed on your monitor.

- QO\*** Enables modem to send result codes to the DTE. (Default)
- Q1** Disables modem from sending result codes.

**Result Codes:**

**OK** n = 0, 1  
**ERROR** Otherwise

**T Select Tone Dialing**

This command instructs the modem to send DTMF tones while dialing.

**Result Codes: OK****Vn DCE Response Format**

This command controls whether result codes are displayed as words or their numeric equivalents.

- V0** Displays result codes as numeric.
- V1\*** Displays result codes as text. (Default)

**Result Codes:**

**OK** n = 0, 1  
**ERROR** Otherwise

**Wn Result Code Option**

- W0** Display "CONNECT DCE speed" without V42/MNP extended.
- W1** Display "CONNECT DTE speed" without V42/MNP extended.
- W2\*** Display "CONNECT DCE speed" with V42/MNP extended. (Default)
- W3** Display "CONNECT DTE speed" with V42/MNP extended.

**Result Codes:**

**OK** n = 0, 1, 2, 3  
**ERROR** Otherwise

**Xn Result Code Selection and Call Progress detection**

This command enables tone detection options during dialing procedure. As these functions are chosen, the modem chip set result codes are also affected. Therefore, this command is frequently used to control the modem chip set responses and dial tone detection.

**X0/X** Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, and NO ANSWER result codes. Blind dialing is enabled/disabled by country parameters. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported. If dial tone detection is enforced or selected and dial tone is not detected, NO CARRIER will be reported instead of NO DIAL TONE. (Default)

**X1** Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER, and CONNECT XXXX(XXXX=rate). Blind dialing is enabled/disabled by country parameters. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported instead of BUSY. If dial tone detection is enforced or selected and dial tone is not elected, NO CARRIER will be reported instead of NO DIAL TONE.

**X2** Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIAL TONE, NO ANSWER, and CONNECT XXXX. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported instead of BUSY.

**X3** Enables monitoring of busy tones; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER, and CONNECT XXXX. Blind dialing is enabled/disabled by country parameters. If dial tone detection is enforced and dial tone is not detected, NO CARRIER will be reported.

**X4\*** Enables monitoring of busy tones; send all messages. (Default)

**Result Codes:**

**OK** n = 0, 1, 2, 3, 4  
**ERROR** Otherwise

**Zn Recall Stored Profile**

This command instructs the modem chip set to go on-hook and restore the profile saved by the last &W command.

**Z0\*** Reset modem and retrieve active configuration profile from stored profile 0. (Default)

**Z1** Reset modem and retrieve active configuration profile from stored profile 1.

**Result Codes:**

**OK** n = 0, 1

**ERROR** Otherwise

**&Cn Data Carrier Detect (DCD) Control**

Data carrier detect is a signal from the modem to your computer indicating that the carrier signal is being received from a remote modem. DCD normally turns off when the modem no longer detects the carrier signal.

**&C0** The state of the carrier from the remote modem is ignored. DCD circuit is always on.

**&C1\*** DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected. (Default)

**Result Codes:**

**OK** n = 0, 1

**ERROR** Otherwise

**&Dn DTR Control (Data Terminal Ready)**

This command interprets how the modem responds to the state of the DTR signal and changes to the DTR signal.

**&D0** Ignore.

**&D1** If the DTR signal is not detected while in online data mode, the modem enters command mode, issues OK result code, and remains connected.

**&D2\*** If the DTR signal is not detected while in online data mode, the modem disconnects. (Default)

**&D3** Monitor DTR signal when an on-to-off transition occurs, the modem performs a soft reset as if the ATZ command was received.

**Result Codes:**

**OK** n = 0, 1, 2, 3

**ERROR** Otherwise

**&F Load Factory Settings**

This command loads the configuration stored and programmed at the factory. This operation replaces all of the command options and the S-register settings in the active configuration with factory values.

**&Gn V.22bis Guard Tone Control**

This command determines guard tone frequency and is only used in V.22 and V.22bis mode. This option is not used in North America and is for international use only.

**&G0\*** Guard tone disabled. (Default)

**&G1** Sets guard tone to 550 Hz.

**&G2** Sets guard tone to 1800 Hz.

**Result Codes:**

**OK** n = 0, 1, 2

**ERROR** Otherwise

**&Kn Local Flow Control Selection**

**&K0** Disable flow control.

**&K1** Reserved.

**&K2** Reserved.

**&K3\*** Enable RTS/CTS flow control. (Default)

**&K4** Enable XON/XOFF flow control.

**&K5** Enable Transparent XON/XOFF flow control.

**Result Codes:**

**OK** n = 0,1,2,3,4,5

**ERROR** Otherwise

**&Pn Pulse Dial Make-to-Break Ratio Selection**

**&P0** 39/61 make-to-break ratio (10 pps).

**&P1** 33/67 make-to-break ratio (10 pps).

**&P2** 39/61 make-to-break ratio (20 pps)

**&P3** 33/67 make-to-break ratio (20 pps)

(The number of "n" is decided by your PTT requirement.)

**Result Codes:**

**OK** n = 0,1,2,3

**ERROR** Otherwise

**&Rn Clear To Send Signal Select**

**&R0** Modem turns on the Clear To Send signal when it detects the Request To Send (RTS) signal.

**&R1\*** Modem turns on Clear To Send signal. (Default)

**Result Codes:**

**OK** n = 0, 1

**ERROR** Otherwise

**&Sn Data Set Ready (DSR) Option**

This command selects DSR action.

**&S0\*** DSR always ON. (Default)

**&S1** DSR comes on when establishing a connection and goes off when the connection ends.

**Result Codes:**

**OK** n = 0, 1

**ERROR** Otherwise

**&Un Protocol Selection**

**&U0\*** Select V.PCM (Default)

**&U1** Select V.34Bis/V.34

**&U2** Select V.32Bis/V.22Bis

**&U3** Select Bell 103 300bps

**&U4** Select V21 300bps

**&U5** Select V23

**Result Codes:**

**OK** n = 0,1,1,2,3,4,5

**ERROR** Otherwise

**&V View Active Configuration and Stored Profile**

This command is used to display the active profiles.

**Result Codes: OK**

**&Wn Store Current Configuration**

This command stores certain command options and S-register values into the modem nonvolatile memory. The ATZ command or a power up reset of the modem restores this profile.

**&W0\*** Stores active configuration profile in configuration profile 0. (Default)

**&W1** Stores active configuration profile in configuration profile 1.

**Result Codes:**

**OK** n = 0,1

**ERROR** Otherwise

**&Yn Select Stored Profile for Power On or Reset**

This command does not change the behavior of the modem but is included for compatibility with applications that issue the &Y0 command

**&Y0\*** Select stored profile 0. (Default)

**&Y1** Select stored profile 1.

**Result Codes:**

**OK** n = 0,1

**ERROR** Otherwise

**&Zn = x Store Telephone Number**

This command is used to store up to three dialing strings in the modem nonvolatile memory for later dialing. The format for the command is &Zn = stored number where n is the location 0? to which the number should be written. The dial string may contain up to 31 characters. The ATDS = n command dials using the string stored in location n.

**Result Codes:**

**OK** n = 0, 1, 2

**ERROR** Otherwise

**\*In Connect Speed Selection**

\*I0 Selects connect speed 1200bps

\*I1 Selects connect speed 2400bps

\*I2 Selects connect speed 4800bps

\*I3 selects connect speed 7200bps

\*I4 Selects connect speed 9600bps

\*I5 Selects connect speed 12000bps

\*I6 Selects connect speed 14400bps

\*I7 Selects connect speed 16800bps

\*I8 Selects connect speed 19200bps

\*I9 Selects connect speed 21600bps

\*I10 Selects connect speed 24000bps

\*I11 Selects connect speed 26400bps

\*I12 Selects connect speed 28800bps

\*I13 Selects connect speed 31200bps

\*I14\* Selects connect speed 33600bps (Default)  
select V.pcm

\*I1 Selects connect speed 28000bps

\*I2 Selects connect speed 29333bps

\*I3 selects connect speed 30666bps

\*I4 Selects connect speed 32000bps

\*I5 Selects connect speed 33333bps

\*I6 Selects connect speed 34666bps

\*I7 Selects connect speed 36000bps

\*I8 Selects connect speed 37333bps

\*I9 Selects connect speed 38666bps

\*I10 Selects connect speed 40000bps

\*I11 Selects connect speed 41333bps

\*I12 Selects connect speed 42666bps

\*I13 Selects connect speed 44000bps

\*I14 Selects connect speed 45333bps

\*I15 Selects connect speed 46666bps

\*I16 Selects connect speed 48000bps

\*I17 Selects connect speed 49333bps

\*I18 Selects connect speed 50666bps

\*I19 Selects connect speed 52000bps

\*I20 Selects connect speed 53333bps

\*I21 Selects connect speed 54666bps

\*I22\* Selects connect speed 56000bps (Default)

**Result Codes:**

**OK**

**ERROR** Otherwise

**\*Gn User Abort Selection**

\*G0\* Enables key abort feature (Default)

\*G1 Disables key abort feature

**Result Codes:**

**OK** n = 0,1

**ERROR** Otherwise

**\*Hn Auto Retrain Selection**

\*H0 Disables auto retrain

\*H1\* Enables auto retrain (Default)

**Result Codes:**

**OK** n = 0,1

**ERROR** Otherwise

**\*NCnn Country select**

This command provides customers chose the country for phone line regulation.

\*NC40 Australia  
 \*NC1 Austria  
 \*NC2 Belgium  
 \*NC3 Denmark  
 \*NC4 Finland  
 \*NC5 France  
 \*NC6 Germany  
 \*NC17 Greece  
 \*NC10 Netherlands  
 \*NC28 Iceland  
 \*NC7 Ireland  
 \*NC8 Italy  
 \*NC29 Liechtenstein  
 \*NC9 Luxembourg  
 \*NC43 Japan  
 \*NC26 Namibia  
 \*NC11 Norway  
 \*NC12 Portugal  
 \*NC27 South Africa  
 \*NC13 Spain  
 \*NC14 Sweden  
 \*NC15 Switzerland  
 \*NC16 UK  
 \*NC18 India  
 \*NC19 Czech Republic  
 \*NC20 Taiwan  
 \*NC24 Poland  
 \*NC25 Russia  
 \*NC22 United States  
 \*NC36 CTR 21 600 ohm  
 \*NC37 CTR 21 Complex Impedance

**Result Codes:**

**OK**  
**ERROR** Otherwise

**\*Tn Trellis Coding Selection**

\*T0 Disables Trellis coding  
 \*T1\* Enables Trellis coding (Default)

**Result Codes:**

**OK** n = 0,1  
**ERROR** Otherwise

**\*On Transmission Level Selection**

\*O0\* Selects output level -11dBm (Default)  
 \*O1 Selects output level -12dBm  
 \*O2 Selects output level -13dBm  
 \*O3 Selects output level -14dBm  
 \*O4 Selects output level -15dBm  
 \*O5 Selects output level -16dBm  
 \*O6 Selects output level -17dBm  
 \*O7 Selects output level -18dBm  
 \*O8 Selects output level -19dBm  
 \*O9 Selects output level -20dBm  
 \*O10 Selects output level -21dBm  
 \*O11 Selects output level -22dBm  
 \*O12 Selects output level -23dBm  
 \*O13 Selects output level -24dBm  
 \*O14 Selects output level -25dBm  
 \*O15 Selects output level -26dBm

**Result Codes:**

**OK** n = 0 - 15

**ERROR** Otherwise

**\Nn Error Control Mode Selection**

This command determines the type of error control used by the modem when sending or receiving data.

**\N0** Normal mode.  
**\N1** Direct mode.  
**\N2** MNP or disconnect mode. The modem attempts to connect using MNP 2-4 error control procedures. If this fails, the modem disconnects. This is also known as MNP reliable mode.  
**\N3** MNP, or buffer.  
 The modem attempts to connect using MNP 2-4 error control procedures. If this fails, the modem will connect in Normal modem  
**\N4** V.42 without ODP & ADP phase detection, MNP or buffer.  
**\N5\*** V.42 with ODP & ADP phase detection, MNP, or buffer (default).  
 The modem attempts to connect in V.42 error control mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem connects in buffer mode and continues operation. This is also known as V.42/ MNP auto reliable mode.  
**\N6** V.42 without ODP & ADP phase detection or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the call will be disconnected.  
**\N7** V.42 with ODP & ADP phase detection or disconnect.

**Result Codes:**

**OK** n = 0, 1, 2, 3, 4, 5, 6,7  
**ERROR** Otherwise

**\Nn Protocol Result Code**

**\V0\*** Disable protocol result code appended to DCE speed. (Default)  
**\V1** Enable protocol result code appended to DCE speed.

**Result Codes:**

**OK** n = 0, 1  
**ERROR** Otherwise

**%Cn Data Compression Control**

This command determines the operation of V.42bis and MNP class 5 data compression. Online changes do not take effect until a disconnection occurs first.

**%C0** V.42bis/ MNP 5 disabled. No data compression.  
**%C1\*** V.42bis/ MNP 5 enabled. Data compression enabled (Default).

**Result Codes:**

**OK** n = 0, 1  
**ERROR** Otherwise

**%Dn Blacklisting Control**

**%D0** Disable blacklisting.  
**%D1\*** Enable blacklisting. (Default)

**Result Codes:**

**OK** n = 0, 1  
**ERROR** Otherwise

**Section 2. Result Code**

Long Form	Short Form	n value in ATXn				
		0	1	2	3	4
OK	0	x	x	x	x	x
CONNECT	1	x	x	x	x	x
RING	2	x	x	x	x	x
NO CARRIER	3	x	x	x	x	x
ERROR	4	x	x	x	x	x
CONNECT 1200	5		x	x	x	x
NO DIALTONE	6			x		x
BUSY	7				x	x
NO ANSWER	8				x	x
CONNECT 300	9		x	x	x	x
CONNECT 2400	10		x	x	x	x
CONNECT 4800	11		x	x	x	x
CONNECT 9600	12		x	x	x	x
CONNECT 7200	13		x	x	x	x
CONNECT 12000	14		x	x	x	x
CONNECT 14400	20		x	x	x	x
CONNECT 19200	21		x	x	x	x
CONNECT 38400	22		x	x	x	x
CONNECT 57600	23		x	x	x	x
CONNECT 115200	24		x	x	x	x
CONNECT 1200TX/75RX	25		x	x	x	x
CONNECT 75TX/1200RX	26		x	x	x	x
CONNECT BELL 300	28		x	x	x	x
CONNECT V21	29		x	x	x	x

( Display DCE speeds by ATW0 and ATW2 )

CONNECT 16800	15		x	x	x	x
CONNECT 19200	16		x	x	x	x
CONNECT 21600	17		x	x	x	x
CONNECT 24000	21		x	x	x	x
CONNECT 26400	30		x	x	x	x
CONNECT 28800	31		x	x	x	x
CONNECT 31200	32		x	x	x	x
CONNECT 33600	33		x	x	x	x

(V.90 mode)

CONNECT 28000	34		x	x	x	x
CONNECT 29333	35		x	x	x	x
CONNECT 30666	36		x	x	x	x
CONNECT 32000	37		x	x	x	x
CONNECT 33333	38		x	x	x	x
CONNECT 34666	39		x	x	x	x
CONNECT 36000	40		x	x	x	x
CONNECT 37333	41		x	x	x	x
CONNECT 38666	42		x	x	x	x
CONNECT 40000	43		x	x	x	x
CONNECT 41333	44		x	x	x	x
CONNECT 42666	45		x	x	x	x
CONNECT 44000	46		x	x	x	x
CONNECT 45333	47		x	x	x	x
CONNECT 46666	48		x	x	x	x
CONNECT 48000	49		x	x	x	x
CONNECT 49333	50		x	x	x	x
CONNECT 50666	51		x	x	x	x
CONNECT 52000	52		x	x	x	x
CONNECT 53333	53		x	x	x	x
CONNECT 54666	54		x	x	x	x
CONNECT 56000	55		x	x	x	x

**Section 3. S Registers Definitions**

S registers generally affect how the AT commands perform. Contents of the registers can be displayed or modified when the modem is in command mode.

To display the value of an S register: TYPE: ATSn?, where n is the register number.

PRESS: Enter To modify the value of an S register:

TYPE: ATSn = r where n is the register number, and r is the new register value.

PRESS: Enter

**S0 Auto Answer Ring Number**

This register determines the number of rings the modem will count before automatically answering a call. 0 (zero) is that asks modem don't do automatically answer at all. When disabled, the modem can only answer with an ATA command.

Range: 0-255

Default: 0

Units: rings

**S1 Ring Counter**

This register, ring counter, is read only. The value of S1 is incremented with each ring. If no rings occur over a 6 second interval, this register is cleared.

Range: 0-255

Default: 0

Units: rings

**S2 AT Escape Character (User Defined)**

This register determines the ASCII valued used for an escape sequence. The default is the "+" character. The escape sequence allows the modem to exit data mode and enter command mode. Values greater than 127 disable the escape sequence.

Range: 0-255

Default: 43

Units: ASCII

**S3 Command Line Termination Character (User Defined)**

This register determines the ASCII values as the carriage return character. This character is used to end command lines and result codes.

Range: 0-127, ASCII decimal

Default: 13 (carriage return)

Units: ASCII

**S4 Response Formatting Character (User Defined)**

This register determines the ASCII value used as the line feed character. The modem uses a line feed character in command mode when it responds to the computer.

Range: 0-127, ASCII decimal

Default: 10 (line feed)

Units: ASCII

**S5 Command Line Editing Character (User Defined)**

This register sets the character recognized as a backspace and pertains to asynchronous only.

Range: 0-127, ASCII decimal

Default: 8 (backspace)

Units: ASCII



**S6 Wait Before Dialing**

This register sets the length of time, in seconds, that the modem must wait (pause) after going off-hook before dialing the first digit. The modem always pauses for a minimum of two seconds, even if the value of S6 is less than two seconds. Waiting for dial tone call progress features (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some ATX options according to country restrictions.

Range: 3-7  
 Default: 6  
 Units: seconds

**S7 Connection Completion Timeout**

This register sets the time, in seconds, that the modem must wait before hanging up because carrier is not detected. The timer is started when the modem finishes dialing (originate), or goes off-hook (answer). In originate mode, the timer is reset upon detection of an answer tone if allowed by country restriction. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

Range: 1-255  
 Default: 60  
 Units: seconds

**S8 Comma Dial Modifier Time**

This register sets the time, in seconds, that the modem must pause when it encounters a comma (,) in the dial command string.

Range: 1-255  
 Default: 2  
 Units: seconds

**S9 Carrier Detect Response Time**

Register S9 sets the time the remote modem's carrier signal must be present for the local modem to recognize it. This feature ensures that your modem does not mistake a busy signal, ring, or voice for the carrier signal. The value of this register is in tenths of a second. The default value is 600 ms, although you can change it from 1 to 255. For example, entering a value 13 means that the remote modem's carrier signal must be present for 1.3 seconds for the local modem to recognize it. Setting this value higher increases the chances the modem will not mistakenly identify the carrier signal.

Range: 1-255  
 Default: 6  
 Units: 0.1 seconds

**S10 Automatic Disconnect Delay after Carrier Loss**

This register sets the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier loss without causing the local modem to disconnect. The actual interval the modem waits before disconnecting is the value in register S10.

Range: 1-255  
 Default: 14  
 Units: 0.1 seconds

**S11 DTMF Dialing Speed**

This register determines the dialing speed which is prefixed for each country.

Range: 50-255  
 Default: 95

Units: 0.001 seconds

**S12 Escape Guard Time**

This register sets the value (in 20 ms increments) for the required pause after the escape sequence (default 1 s).

Range: 0-255  
 Default: 50  
 Units: 0.02 seconds

**S13 Pulse Dialing Control**

This register determines pulse dialing is disabled or enabled.

ATS13=0 Disable Pulse Dialing  
 ATS13=1 Enable Pulse Dialing

Range: 0-1

**S14 Bit-mapped Register**

Bit-mapped register S14 lets you control modem echo, responses, dialing method, and the original or answer mode.

Bit Function

- 0=0 Do not echo command (E0)
  - 1 Echo command (E1) – default
- 1 Reserved
- 2 Mapping to ATQn
- 3=0 Numeric responses (V0)
  - 1 Verbose (Verbal) Responses (V1) – default
- 4,5=Mapping to AT&P
- 6=0 Use touch-tone dialing method (T) – default
  - 1 Use pulse dialing method (P)
- 7=0 Answer incoming calls (A)
  - 1 Originate calls (D) – default

**S21 Bit-mapped Register**

Bit-mapped register S21 lets you control certain data communication control signals.

Bit Function

- 0,1= x Undefined
- 2= Mapping to AT&R
- 3,4=0 Modem ignores the DTR signal (&D0)
  - 1 Modem enters command mode after ON-to-OFF DTR transition (&D1)
  - 2 Modem hangs up after ON-to-OFF DTR transition (&D2) – default
  - 3 Modem resets after ON-to-OFF DTR transition (&D3)
- 5=0 CD signal always on (&C0)
  - 1 CD signal on when a remote carrier signal is present (&C1) – default
- 6=0 AT&S=0
  - 1 AT&S=1

**S22 Bit mapped Register**

Bit-mapped register S22 lets you control internal speaker and the modem responses.

Bit	Function
0,1=0	Speaker volume off (L0)
1	Low speaker volume (L1)
2	Medium speaker volume (L2) – default
3	Loud speaker volume (L3)
2,3=0	Speaker off (M0)
1	Speaker on until carrier detected (M1) – default
2	Speaker always on (M2)
3	Speaker on until carrier detected but off during dialing (M3)
4,5,6=0	Hayes Smart modem compatibility (X0)
1	Include CONNECT XXX responses (X1)
2	Same as 4 plus dial tone detection (X2)
3	Same as 4 plus BUSY response and blind dialing (X3)
4	Same as 6 plus dial tone detection (X4) – default
7=0	Undefined

**S23 Bit-mapped Register**

Bit	Function
0,1,2,3=0	0-300bps DTE data rate
1	1200bps DTE data rate
2	2400bps DTE data rate
3	4800bps DTE data rate
4	9600bps DTE data rate
5	14400bps DTE data rate
6	19200bps DTE data rate
7	34800bps DTE data rate
8	57600bps DTE data rate
9	115200bps DTE data rate
4,5=0	Use even parity
1	Use none parity
2	Use odd parity
3	Use mark parity
6,7=0	Mapping to AT&G

**S25 Data Terminal Ready Delay**

When Modem is on-line, it will ignore a Data Terminal Ready signal lasting less than the value of this register. In this mode, the values for this register are 0 to 255 in hundredths of a second, and the default value is 0.05 seconds. If you will be entering synchronous mode after dialing asynchronously, this register determines how long the modem waits before looking for the Data Terminal Ready signal. This lets you detach the asynchronous terminal and connect a synchronous terminal while remaining in the Data Mode. The default value is 5.  
Range: 0-255  
Default: 5  
Units: 0.01 seconds

**S26 Request To Send-to-Clear To Send Delay**

This register affects synchronous operation only and applies only when you are using the &R0 command. This register determines how long the modem waits to turn on the Clear To Send signal after a Request To Send OFF-to-ON transition in 10 ms increment. The default value is 1.  
Range: 0-255  
Default: 1  
Units: 0.01 seconds

**S29**

Bit	Value	Function
0-4		Mapping to AT*1
5-7		Mapping to AT&U

**S30 Inactivity Timer**

S30 specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. This function is only applicable to buffer mode.  
Range: 0-255  
Default: 0 (Disable)  
Units: minutes

**S45 Timer to Control Sleep Mode**

This command displays the number of seconds of inactivity (no characters sent from the DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of zero prevents standby mode.

**Note:** If a number between 1 and 4 is entered for this register, it will set the value to 5, and the inactivity before standby will be 5 s. This is done for compatibility with previous products which allowed time-outs down to 1 s.  
Range: 0, 5-255  
Default: 10

**S95**

Bit	Value	Function
0,1		Mapping to AT\Wn
2		Mapping to AT\V
3		Mapping to AT\N
4-7		Mapping to AT*O

**S96 Local Phone Status**

This register tells the status of the Local Phone. It is read only.  
0 = local phone on-hook  
1 = local phone off-hook

**S97**

Bit	Value	Function
0-2		Mapping to AT\Nn
7		Mapping to AT%Cn

**S98**

Bit	Value	Function
0,1		Mapping to AT*H
2		Mapping to AT*G
3		Mapping to AT*T
4-6		Mapping to AT&K

**S99 Energy detection threshold**

This register can use in Call Progress Mode (CPM) mode, for dial tone detection threshold. This register determines the detection threshold for Call Progress (CPM) tones. The default value is 16.

**Range :** 0-255

## Section 4. Class 1 FAX Commands

The modem chip set supports FAX commands conforming to EIA standard 578. These commands are given here with short descriptions; complete explanations are given in the standard, available from the Electronic Industry Association.

### FAX Command Set Summary

<b>+FCLASS?</b>	Service class indication
<b>+FCLASS = ?</b>	Service class capabilities
<b>+FCLASS = n</b>	Service class selection (n=0,1,8)
<b>+FTM = &lt;m&gt;</b>	Transmit FAX data
<b>+FRM = &lt;m&gt;</b>	Receive FAX data
<b>+FTH = &lt;m&gt;</b>	Transmit HDLC data
<b>+FRH = &lt;m&gt;</b>	Receive HDLC data
<b>+FTM = ?</b>	Check transmit FAX modulation
<b>+FRM = ?</b>	Check receive FAX modulation
<b>+FTH = ?</b>	Check transmit HDLC data modulation
<b>+FRH = ?</b>	Check receive HDLC data modulation
<b>+FMI = ?</b>	Check manufacturer identification
<b>+FMM = ?</b>	Check product identification
<b>+FMR = ?</b>	Check version/revision information
<b>+FLO = ?</b>	Select Flow Control specified
<b>+FPR = ?</b>	Select Serial Port Rate

### +FCLASS? Service Class Indication

This command causes the modem to display the current setting. The modem can operate either as a class 0 data modem or a class 1 FAX modem.

Responses: 0 :data mode  
1 if in FAX class 1  
8 if in voice mode

### +FCLASS = ? Service Class Capabilities

This command causes the modem to display the classes it supports.

Typical responses:  
+FCLASS = ? 0, 1, 8

### +FCLASS = n Service Class Selection

This command sets the modem for class n operation, where n is either a 0,1 or 8.

Parameters: 0, 1, 8

Default: 0

Command options:

+FCLASS = 0 Select data mode.  
+FCLASS = 1 Select facsimile class 1.  
+FCLASS = 8 Select voice mode.

### +FTM = <m> Transmit FAX Data

This command causes the modem to transmit data at the modulation specified by <m>. The following table shows the values you can enter for this command and the meaning of those values.

+FTM = 24	V.27ter 2400
+FTM = 48	V.27ter 4800
+FTM = 72	V.29 7200
+FTM = 96	V.29 9600
+FTM = 73	V.17 7200
+FTM = 74	V.17 (short train) 7200
+FTM = 97	V.17 9600
+FTM = 98	V.17 (short train) 9600
+FTM = 121	V.17 12000
+FTM = 122	V.17 (short train) 12000
+FTM = 145	V.17 14400

+FTM = 146 V.17 (short train) 14400

### +FRM = <m> Receive FAX Data

This command causes the modem to receive data at the modulation specified by <m>.

+FRM = 24	V.27ter 2400
+FRM = 48	V.27ter 4800
+FRM = 72	V.29 7200
+FRM = 96	V.29 9600
+FRM = 73	V.17 7200
+FRM = 74	V.17 (short train) 7200
+FRM = 97	V.17 9600
+FRM = 98	V.17 (short train) 9600
+FRM = 121	V.17 12000
+FRM = 122	V.17 (short train) 12000
+FRM = 145	V.17 14400
+FRM = 146	V.17 (short train) 14400

### +FTH = <m> Transmit HDLC Data

This command causes the modem to transmit data framed in the HDLC protocol at the modulation specified by <m>.

+FTH = 3 V.21 Channel2 300

### +FRH = <m> Receive HDLC Data

This command causes the modem to receive data framed in the HDLC protocol at the modulation specified by <m>.

+FRH = 3 V.21 Channel2 300

### +FLO = <V> Flow Control Select

+FLO=0 Xon/Xoff and RTS/CTS flow control Turned off  
+FLO=1 Xon/Xoff flow control  
+FLO=2\* RTS/CTS flow control

### +FPR = <V> Serial Port Rate

Please refer **AT+VPR** command

## Section 5. Voice Commands

<b>+VIP</b>	Initial voice parameter
<b>+VCID=&lt;pmode&gt;</b>	Caller ID pmode=0:Disable Caller ID pmode=1: Enable ,formatted caller report pmode=2:Enable ,unformatted caller report
<b>+VCID?</b>	Report current parameter
<b>+VCID=?</b>	Queries the range that DCE support
<b>+VDR</b>	Enable the distinctive ring feature
<b>+VDR?</b>	Report current parameter
<b>+VDR=?</b>	Queries the range that DCE support
<b>+VGT</b>	Setup playback gain
<b>+VGT?</b>	Report current parameter
<b>+VGT=?</b>	Queries the range that DCE support
<b>+VGR</b>	Setup record gain
<b>+VGR?</b>	Report current parameter
<b>+VGR=?</b>	Queries the range that DCE support
<b>+FMI?</b>	Report manufacturer ID
<b>+FMM?</b>	Report product information
<b>+FMR?</b>	Report product revision
<b>+VIT</b>	Enable inactive timer
<b>+VIT?</b>	Report current parameter
<b>+VIT=?</b>	Queries the range that DCE support
<b>+VTD</b>	Set the default duration for DTMF/tone

generation in 10ms increments  
**+VTD?** Report current parameter  
**+VTD=?** Queries the range that DCE support  
**+VSD=<sds,sdi>**  
 sds=128 Normal level of sensitivity(-40dbm)  
 sds>= 128 More aggressive ;ex. sds=129  
 is -39dbm  
 sds<= 128 Less aggressive :ex sds=127  
 is -40dbm  
 sdi :Specify the amount of time the modem will  
 report silence to DTE  
**+VSD?** Report current parameter  
**+VSD=?** Queries the range that DCE support  
**+VTS** DTMF and tone generation  
**+VTS=?** Queries the range that DCE support  
 ex1: AT+VTS=1 play DTMF 1 with a duration by the  
 +VTD command  
 ex2: AT+VTS=2 play DTMF 2 with a duration by the  
 +VTD command  
 ex3: AT+VTS=[1000,1300,50] play tone pair 1000Hz  
 and 1300hz with a duration of 50ms  
 ex4: AT+VTS=[\*,6] play DTMF \* with a duration of  
 60ms  
 ex5: AT+VTS=9 play DTMF 9 with a duration by the  
 +VTD command  
**+VTX** Enter voice playback mode  
**+VRX** Enter voice record mode  
**+VSM=<cml>,<vsr>**  
 cml=128 , select linear 8bit PCM  
 vsr =xx, Sample rate is always 8000  
**+VSM?** Report current parameter  
**+VSM=?** Queries the range that DCE support  
**+VPR=<rate>** DTE/DCE rate will be equal 2400\*rate , but  
 auto-baud if rate=0  
**+VPR?** Report current parameter  
**+VPR=?** Queries the range that DCE support  
**+VLS=<pmode>**  
 pmode=0: DCE on-hook, local phone connected  
 to Telco.  
 pmode=1: DCE off-hook, DCE connected to Telco  
 pmode=2: DCE off-hook, local phone connected  
 to DCE  
 pmode=3: DCE off-hook, local phone connected  
 to Telco, DCE to local phone  
 pmode=4: Speaker connected to DCE,DCE  
 on-hook(playback message)  
 pmode=5: Speaker connected to DEC, DCE  
 off-hook(call screening)  
 pmode=6: Microphone connected to DCE, DCE  
 on-hook (Record greeting)  
 pmode=7: Microphone and speaker connected ,  
 DCE off-hook (speakerphone)

## Section 6. AT%TTn Commands

**%tt0=0** erase %TT command

**%tt2=A,B,C,D** Tx v34 signal parameter

**A:** baudrate (parameter range:0-5)

**B:** data rate (parameter range:1-9 if a=0)  
 (parameter range:2-11 if a=1)  
 (parameter range:2-11 if a=2)  
 (parameter range:2-12 if a=3)  
 (parameter range:2-13 if a=4)  
 (parameter range:2-14 if a=5)

**C:** Min/Exp (parameter range:0-1)

**D:** Preemphasise (parameter range:0-9)

example:

at%tt2=5,14,1,8

**%tt3=0** : DTMF '0'

**%tt3=1** : DTMF '1'

**%tt3=2** : DTMF '2'

**%tt3=3** : DTMF '3'

**%tt3=4** : DTMF '4'

**%tt3=5** : DTMF '5'

**%tt3=6** : DTMF '6'

**%tt3=7** : DTMF '7'

**%tt3=8** : DTMF '8'

**%tt3=9** : DTMF '9'

**%tt3=10** : DTMF 'A'

**%tt3=11** : DTMF 'B'

**%tt3=12** : DTMF 'C'

**%tt3=13** : DTMF 'D'

**%tt3=14** : DTMF '\*'

**%tt3=15** : DTMF '#'

**%tt3=16** : V32 9600

**%tt3=17** : V32 14400

**%tt3=18** : 2100HZ ANSWER TONE

**%tt3=19** : 1300HZ CALLING TONE

**%tt3=20** : 1100HZ CALLING TONE

**%tt3=21** :

**%tt3=22** : Silence

**%tt4=0** : V21 Org tx mark

**%tt4=1** : V21 Org tx space

**%tt4=2** : V21 Ans tx mark

**%tt4=3** : V21 Ans tx space

**%tt4=4** : V23 Org tx mark

**%tt4=5** : V23 Org tx space

**%tt4=6** : V23 Ans tx mark

**%tt4=7** : V23 Ans tx space

**%tt4=8** : V22 org

**%tt4=9** : V22bis org

**%tt4=10** : V22 ans (tx guard tone if &g1 or &g2)

**%tt4=11** : V22bis ans (tx guard tone if &g1 or &g2)

**%tt5=0** : V27ter 2400

**%tt5=1** : V27ter 4800

**%tt5=2** : V29 7200

**%tt5=3** : V29 9600

**%tt5=4** : V17 7200 short train

**%tt5=5** : V17 7200 long train

**%tt5=6** : V17 9600 short train

**%tt5=7** : V17 9600 long train

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%tt5=8 : V17 12000 short train  
%tt5=9 : V17 12000 long train  
%tt5=10 : V17 14400 short train  
%tt5=11 : V17 14400 long train