AOpen Fax/Modem Series

Thank you for choosing AOpen Fax/Modem. This file will guide you for installation and AT commands.

AOpen FM56-ITU/2 Manual

AOpen FM56-ITU/2 AT Commands

FM56-ITU/2 Manual

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FM56-ITU/2 AT Commands

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1 Introduction

Congratulations on purchasing a state-of-the-art fax/modem! Your Fax/Modem incorporates the latest technological advancement for you to electronically communicate with other computers, information networks, fax machines or other fax/modems. It embraces most of the industry and commercially popular standards to ensure compatibility with most equipment and application programs. The voice capability renders a wide range of application possibilities from a simple telephone-answering device to a sophisticated voice-mail system. The SVD feature allows you to talk and transmit data at the same time.

This manual includes instructions on installing, connecting and setting your Fax/Modem. A section on diagnostics using loopback test is also included to help you isolate problems that may occur anywhere from the computer interface to the modem at the remote site.

2 Feature

- Line rate of 56 Kbps for download (FM56 series model only)
- ITU-T V.90 specifications for operation at speed of 56,000 bps.
- MNP10 dynamic data rate fallback and forward on the run.
- Software controlled speaker volume.
- Software selectable flow control.
- Voice option for voice mail application.
- SVD for simultaneous voice and data. (Optional)
- Uses 16550/A compatible enhanced UART for sustained   DTE speed of 115,200 bps.
- Zero-Voltage Modem wake-up function
- Cooperate with the sound card setting in your computer. (Optional)

3.1 PC Card Connection

FM56-ITU/2
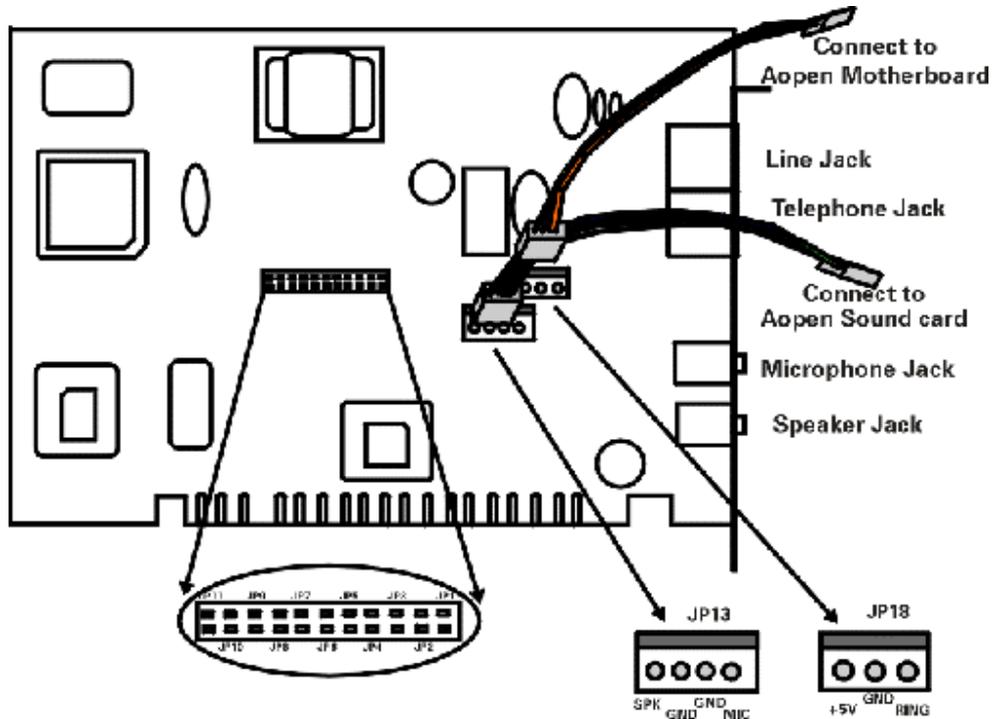
JP13 :   Sound Interface Pin Define (Optional)
                For connecting to AOpen Audio Card.

JP18 :   Ring Wake Up Interface Pin Define (Optional)
                For connecting to AOpen Mother Board.

COM Port Setting

Port	HEX ADDRESS	JP1	JP2
COM 1	3F8 to 3FF	On	On
COM 2	2F8 to 2FF	On	Off
COM 3	3E8 to 3EF	Off	On
COM4 (Default)	2E8 to 2EF	Off	Off

IRQ Setting (Default: IRQ 3)

JP	3	4	5	6	7	8	9	10	11
IRQ	3	4	5	7	9	10	11	12	15

3.2 PC Card Bracket Connection
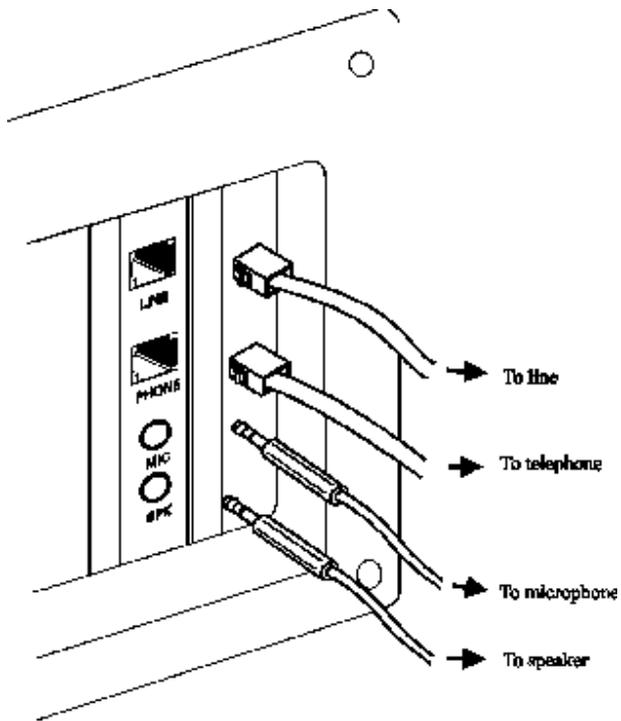
4.1 Checking Your Components

Unpack your fax/modem and make sure you have the following items:

- The fax/modem.
- A modular telephone cable to connect your fax/modem to the telephone line.
- Communication software.
- Two cables link JP13 and JP18 to sound card and mother board

When you open your package, make sure all of the above items are included and not damaged. If you see that any components are damaged, please notify your dealer immediately.

4.2 What Else You Need

To complete your data communication system, you will need the following items:

Other communication software, if needed.
An active telephone line and telephone set (if you need to use a telephone with your modem).
An available ISA card slot in the personal computer.
For voice function, a microphone and a speaker for voice recording and playing (voice function can also be performed by handset of telephone set connected to fax/modem).

4.3 Installing The PC Card Fax/Modem

The following instructions explain how to install the fax/modem into a PC computer. If you will be installing the fax/modem into a different computer, refer to the manual that came with your computer or contact your computer dealer for instructions.

1. Your fax/modem is factory set at COM4 and IRQ 3.   This setting should work in most cases.   To set the fax/modem to other COM port and IRQ combinations, refer to Section 3.1 of this manual.

    NOTE:
    In PC environment, two serial devices configured to use the same COM port or IRQ may conflict. Existing multi- I/O card usually occupies COM1 and COM2 using IRQ4 and IRQ3 respectively. For maximum flexibility, your fax/modem supports several IRQs. However, IRQs other than 3 and 4 should be used only if you have no other choice. Not all PCs and DOS programs support higher IRQs. Check with your PC dealer or PC manual for more information.

2. Turn off the computer. No power must be applied to your computer when you install the internal fax/modem, or the computer could be damaged.
3. Make sure you can freely access the back of the personal computer. Remove the computer cover.
4. Select any available half-card slot into which you can install the internal fax/modem.
5. Unscrew and remove the slot cover.
6. Hold the internal fax/modem above the slot you have selected, and carefully slide the fax/modem into the slot, applying even pressure to both ends of the fax/modem. Stop inserting the fax/modem when its gold-plated edge connector is aligned and fully seated into the base of the computer.
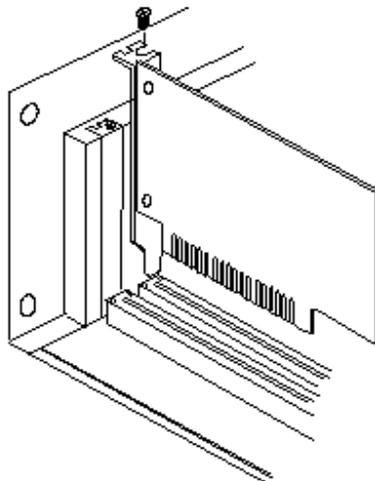
7. Connect the sound card cable with JP13 and the sound card.(Optional)
8. Connect the wake up ring cable with JP18 and the mother board.(Optional)
9. Use the screw that was holding the slot cover to secure the fax/modem in the slot.
1. Use the cover-mounting screws to secure the computer cover. This completes the hardware installation of your fax/modem.

4.4 Connecting To The Telephone Line

Use the following procedure to connect your fax/modem to the telephone line:

1. Locate an available RJ-11 modular jack telephone outlet.
2. Take one end of the modular cord supplied with the fax/modem and plug it into the **LINE** modular jack on the back of the fax/modem.
3. Plug the other end of the modular cord into the modular jack on the wall outlet, as you would any modular telephone.

4.5 Connecting To You Telephone Set

Your fax/modem also conveniently provides a second modular jack that lets you connect your telephone to the same telephone line that the fax/modem is using.   This lets you manually dial data calls or make voice calls when you are not using your fax/modem. Also if you do not have speaker phone and microphone, handset of telephone set can function as an input/output device for voice to verify the connection.

Use the following procedure to connect your telephone to your fax/modem:

1. Connect the telephone's modular cord into the PHONE jack on the back of your fax/modem.
2. Lift your telephone's handset and listen for a dial tone.

4.6 Verifying Your Connection

Start a communication program and place the computer into terminal mode.
Refer to your computer manual to find out the appropriate command to do so.

Then use the following procedure to verify your installation:

1. Type

AT[Enter]

If your system is operating properly, your fax/modem sends an OK response
to your screen and waits for your next command.

2. Use your communication software to prepare your
    computer to dial a call. Then type

ATDx *phone number***[Enter]**

where   **x** is equal to **T** for touch-tone or **P** for pulse
dialing. The *phone number* is your telephone number.

For example, if your fax/modem is connected to the telephone
line 555-2121 and touch-tone dialing is supported in your area,
type

ATDT 5552121[Enter].

3. You should hear the busy signal and receive a **BUSY**
    response because the fax/modem is calling itself.

4.7   Connecting Microphone And Speaker

You could either use a handset connected to the fax/modem, or connect a microphone and a speaker for voice recording and playback, or connect cable of Jumper 13 with sound card in your PC (optional, refer to sound card user's guide). Also, you may enable the ring wake up function by connecting the cable of Jumper 18 to motherboard. (the function is optional, see the PC user's manual for more detail)

NOTE:
Any commercially available microphone is usable.
For the speaker, any 8 ohm speaker rated around 1Watt can be driven directly by the audio output. An amplifier is required if you need a higher output volume.

1. Connect the microphone to the mini-phone jack marked **MIC**.
2. Connect the speaker to the mini-phone jack marked **SPK**.

NOTE:
Take care of the pin setting and cable setting direction (JP13 and JP18) for your Fax/Modem card, Sound card and Motherboard.

4.8 Voice Function Alternatives

1. AOpen Sound Card (recommanded)
   Simply connect the cable from modem to AOpen Sound Card. User can get all the voice function including message playing and recording through sound cards.
2. Telephone Handset
   If there is a telephone set connected to modem. User can get all the voice function including message playing and recording through telephone handset.
3. SpeakerPhone and MicroPhone
   Connect SpeakerPhone and MicroPhone to modem. User can also get voice performance.

NOTE:
Any commercially available microphone is usable.
For the speaker, any 8 ohm speaker rated around 1 Watt can be driven directly by the audio output. An amplifier is required if you need a higher output volume.

4.9 Configuring Internal Modem With Windows3.1/95/98/2000/NT

Windows 3.1:
1. From the **Main** group choose **Control Panel** icon.
2. Double click on **Ports**.
3. Double click on the COM port that the modem is using.
4. Click on **Advanced** button.
5. Set the base I/O address according to the following table:

COM Port	Base I/O Address
1	03F8
2	02F8
3	03E8
4	02E8

Set the interrupt line to match modem's setting.
6. Click **OK** to save and Windows will prompt you to restart the PC.

Windows 95:
1. From the **My Computer** window, click on **Control Panel**.
2. Go to **System**, **Device Manager**. Check the COM ports listed under **Ports**. If the COM port the modem is using is listed, go to step 5. Click Cancel to close the System Properties window.
3. Click on the **Add New Hardware** to detect the card.
4. Click the Detail button when the **Add New Hardware** Wizard finishes its detection. A successful hardware installation and detection should add a Communication Port. Click the **Finish** button to complete the **Add New Hardware**.
5. Click the **Modems** icon to let the modem wizard search for the new modem. Windows will query the new modem as 'Standard Modem'. Click **Change** button and then **Have Disk** button. Insert the driver diskette and press Enter.
6. Select the proper model to finish the installation. After completing the installation, you can check if the fax/modem was properly installed by using the following procedure:

1. From **My Computer**, double click **Control Panel**.
2. Double click **Modems**.
3. Select **Diagnostics** tab.
4. Choose the COM port where the newly installed modem device is. Click on **More Info** If the **Command and Response** box displays results from **ATI1** to **AT+FCLA...**, it indicates that your fax/modem is set up properly.

Windows 2000:
1. Go to **Control Panel**. Click **System**. Choose **Hardware**, and **Device Manager**, then **Ports**.
2. If the COM port that the modem is using is not listed, and enter the correct Base I/O Port address and Interrupt Request Line.
Set the base I/O address according to the following table:

COM Port	Base I/O Address
1	03F8
2	02F8
3	03E8
4	02E8

3. Otherwise if the COM port is already listed. Click **Phone and Modem Options**.
4. Choose **Modems** tab and click **Add**.
5. When you see "Install New Modem" box and choose "Don't detect my modem, I will select it form a list". Click **Next**.
6. Highlight the port you want to install the modem on. **Click Next**.
7. When you see "Install New Modem" box and choose **Have Disk**.
8. Choose **Browse** to indicate the correct path.
9. Select D:\Drivers\Win2K\Fm56-ITU-2. (D is your CD-ROM) Then click on **Open**.
10. When you see the correct path and then click on **OK**.
11. Select the model of your modem and then click on **Next**.
12. Select the ports you want to install the modem and then click on **Next**.
13. If you want to continue installation and then click on **Yes**.
14. Windows has finished the installation and then click on **Finish**.

Windows NT4.0:
1. Go to **Control Panel**. Click on **Ports**.
2. If the COM port, click on **Add**. Enter the correct Base I/O Port address and Interrupt Request Line.
Set the base I/O address according to the following table:

COM Port	Base I/O Address
1	03F8
2	02F8
3	03E8
4	02E8

3. If the COM port is already listed, highlight that COM port, click on **Settings**, **Advanced** button, and select the proper base I/O address and Interrupt line to match the modem's setting. Click OK to save.

Refer to Step#5 in the above Win95 section to finish installing the modem.

4.10 Tips On Configuring Your Communication Software

Your fax/modem uses the most up-to-date industry and commercially popular standards to ensure functional compatibility with most communication software. During initial set-up of the communication software, it will normally prompt you to define the type of fax/modem you are using. Following is a general guideline to the device type you should choose.

NOTE:
The device type only defines the protocol by which your software will communicate with your fax/modem and does not set nor limit the speed.

1. For modem device type, choose 'Hayes V.32' or 'Hayes Compatible 2400 Baud' modem.
2. For the baud rate. Choose any speed between 38,400 to 115,200.Your fax/modem will automatically adjust to the best transmission speed after successfully connecting with a remote fax/modem.
3. Many communication software uses the modem response (see Ch 7) to control program flow.   Make sure that the software is set to recognize a **CONNECT 28800** response. If this does not work, set the program to simply recognize just the **CONNECT** response without any baud rate information.
4. There are three flow control mode: none, hardware (CTS/RTS) or software (XON/XOFF). Set your software to use either hardware or software flow control. If set to none, the communication software will not be able to detect a buffer overflow and result in transmission errors.
5. For fax device type, choose '**TR29 Class 1**'.
6. For fax speed, choose 'automatic' or 'fastest speed'. Your fax/modem will automatically adjust to be best transmission speed after successfully connecting with a remote fax machine or another fax/modem.
7. Make sure that you have correctly set all the other parameters required by the soft ware to operate successfully.
     Refer to the manual that came with your communication software for details.

   You are now ready to do fax/modem communication !

4.11 Tips on Configuring SVD

Add "-SMS=2" to the modem string in communication programs to enable the SVD function. For complete SVD commands, please refer to the AT command file on the driver disk.

5 Executing Commands

If you will be using a communication software program to make data calls, you will probably not need to type commands, because your software program will handle these tasks for you. Similarly, you will probably not see the responses because your software program may intercept them. However, if you perform data activities directly with your fax/modem, you will find the format for typing fax/modem commands and fax/ modem response helpful.

Using commands, you can have your fax/modem perform a variety of activities, such as dialing or answering a data call or sending a fax. In order to send commands to your fax/modem, you must access the modem in a terminal mode which is provided by most communication software. To enter a command line, type:

ATccpp**[Enter]**

where **AT** must precede every command line (except when you type the A/ command).

cc   any of the commands available, described in succeeding sections.
pp   any parameters that is required by the command.

If you make a mistake while typing a command, press the Backspace key to delete the error.

To make a command line easy to read, you can insert spaces parentheses, hyphens, and other punctuation in your command line. For example:

AT M3 DT 9, 1(818)555-1234

Your fax/modem ignores spaces and punctuation marks when executing a command line, but these characters apply to the 40 characters limit.

A command line can contain up to 39 characters. If you want to type more than 39 characters on a command line, type a regular command line (up to 39 characters long) and end it with a semicolon as the last character. When you press Enter, your fax/modem executes the commands and returns to command mode, so you can type your next command line.

For your convenience, the last command line you execute remains stored in the modem's memory until you type a new command line and press the Enter key.   If you want to re-execute the last command, type
A/

The **A/** command need not be prefixed by the 'AT' characters or ended with

the [Enter] key.

NOTE:
The fax/modem command and response set are described in the text file, AT_CMD.TXT, in the fax/modem Windows95 driver diskette. You can use DOS EDIT or any suitable editor to view this file.

If a command requires a parameter such as 0 and 1, the parameter is identified as n in the left column and described in the right column of the **AT_CMD.TXT** file.

IMPORTANT:
Each command, except for '+++' and 'A/', must be preceded by 'AT' and executed when you press the [Enter] key. To review the format used to send fax/modem commands, refer to Section of this manual.

6 S-Registers

Your fax/modem has S-registers that affect various operating characteristics. The registers let you obtain information about the fax/modem, and let you test the fax/modem. Each S-Register has a factory-set value, which you can read or change to fit your particular requirements. A complete list of S-Register is provided in the **COMMAND.TXT** file on the driver diskette.

6.1 Reading An S-Register Value

6.2 changing An S-Register Value

6.1 Reading An S-Register Value

1. To read the current value of an S-Register, type:

ATSr?[Enter]

where   r   is an S-Register number.

The fax/modem responds with decimal value of the S-Register, in three-digit format, followed by **OK**.

2.   To read values from more than one S-Register, type:

ATSr?Sr?[Enter]

where   r   specify the different S-Register numbers.

For example, to read the value of Register **S0** (number of rings before answering) and **S1** (incoming ring count), type:

ATS0?S1?[Enter]

6.2 changing An S-Register Value

To change an S-Register value, type

ATSr=n[Enter]

where r   is the S-register number.
 n   is the value you want to assign to that S-register.

7 Response Sets

When you send a command to your fax/modem, it sends a response to your computer. For example, if you type **AT[Enter]**, the fax/modem should respond with **OK**. The fax/modem gives out different responses for the different tasks that it performs. Communication software use these responses to control the flow of the program. The responses that are intercepted by the communication program are normally not displayed on your computer screen. This section describes the fax/modem responses returned by the fax/modem when you communicate directly with the fax/modem.

There are five X response sets: 0, 1, 2, 3 and 4. They define certain dialing characteristics and how the fax/modem handles dial tones and busy signals, as described in the following sections. The response classifications are designed to meet the requirements for various types of operation and application. You can select an X response set by using the Xn command as described in Section .

Aside from the X response sets, extended responses are also available that shows the carrier speed, compression method and the error-correction protocol as described in the following table. You can enable the extended responses by using the Wn command as described in Section .

Fax/modem responses can appear as words or numbers. Your fax/modem is set up to return word responses. Word responses are followed by a carriage return and line feed. If your fax/modem is operating under an application that handles character strings inefficiently or cannot handle them at all, you can use the V0 command to switch to numeric fax/modem responses. Numeric responses are followed by a carriage return only.

If you do not want to receive fax/modem responses at all, you can use **Q1** command to disable them.

The following table lists and describes the available response codes, where x means that result word/code is available:

WORD	CODE	n Value in ATXn Command				
		0	1	2	3	4
OK	00	x	x	x	x	x
CONNECT	01	x	x	x	x	x
RING	02	x	x	x	x	x
NO CARRIER	03	x	x	x	x	x
ERROR	04	x	x	x	x	x
CONNECT 1200	05		x	x	x	x
NO DIALTONE	06			x	x	x
BUSY	07				x	x
NO ANSWER	08	x	x	x	x	x

CONNECT 600	09		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	15		x	x	x	x
CONNECT 19200	16		x	x	x	x
CONNECT 38400	17		x	x	x	x
CONNECT 57600	18		x	x	x	x
CONNECT 115200	19		x	x	x	x
CONNECT 230400	20	x	x	x	x	x
CONNECT 75TX / 1200RX	22		x	x	x	x
CONNECT 1200TX / 75RX	23		x	x	x	x
DELAYED	24					x
BLACKLISTED	32					x
FAX	33	x	x	x	x	x
DATA	35	x	x	x	x	x
CARRIER 300	40	x	x	x	x	x
CARRIER 1200/75	44	x	x	x	x	x
CARRIER 75/1200	45	x	x	x	x	x
CARRIER 1200	46	x	x	x	x	x
CARRIER 2400	47	x	x	x	x	x
CARRIER 4800	48	x	x	x	x	x
CARRIER 7200	49	x	x	x	x	x
CARRIER 9600	50	x	x	x	x	x
CARRIER 12000	51	x	x	x	x	x
CARRIER 14400	52	x	x	x	x	x
CARRIER 16800	53	x	x	x	x	x
CARRIER 19200	54	x	x	x	x	x
CARRIER 21600	55	x	x	x	x	x
CARRIER 24000	56	x	x	x	x	x
CARRIER 26400	57	x	x	x	x	x
CARRIER 28800	58	x	x	x	x	x
CONNECT 16800	59		x	x	x	x
CONNECT 21600	61		x	x	x	x
CONNECT 24000	62		x	x	x	x
CONNECT 26400	63		x	x	x	x
CONNECT 28800	64		x	x	x	x
COMPRESSION: CLASS 5	66		x	x	x	x
x						
COMPRESSION: V.42bis	67	x	x	x	x	x
COMPRESSION: NONE	69	x	x	x	x	x
PROTOCOL: NONE	70	x	x	x	x	x
PROTOCOL: LAMP	77	x	x	x	x	x
CARRIER 31200	78	x	x	x	x	x
CARRIER 33600	79	x	x	x	x	x

Response	Code	X0	X1	X2	X3	X4
PROTOCOL: ALT	80	x	x	x	x	x
PROTOCOL: ALT-CELLULAR	81	x	x	x	x	x
CONNECT 33600	84		x	x	x	x
CONNECT 31200	91		x	x	x	x
CARRIER 32000	150	x	x	x	x	x
CARRIER 34000	151	x	x	x	x	x
CARRIER 36000	152	x	x	x	x	x
CARRIER 38000	153	x	x	x	x	x
CARRIER 40000	154	x	x	x	x	x
CARRIER 42000	155	x	x	x	x	x
CARRIER 44000	156	x	x	x	x	x
CARRIER 46000	157	x	x	x	x	x
CARRIER 48000	158	x	x	x	x	x
CARRIER 50000	159	x	x	x	x	x
CARRIER 52000	160	x	x	x	x	x
CARRIER 54000	161	x	x	x	x	x
CARRIER 56000	162	x	x	x	x	x
CONNECT 32000	165	x	x	x	x	x
CONNECT 34000	166	x	x	x	x	x
CONNECT 36000	167	x	x	x	x	x
CONNECT 38000	168	x	x	x	x	x
CONNECT 40000	169	x	x	x	x	x
CONNECT 42000	170	x	x	x	x	x
CONNECT 44000	171	x	x	x	x	x
CONNECT 46000	172	x	x	x	x	x
CONNECT 48000	173	x	x	x	x	x
CONNECT 50000	174	x	x	x	x	x
CONNECT 52000	175	x	x	x	x	x
CONNECT 54000	176	x	x	x	x	x
CONNECT 56000	177	x	x	x	x	x
FCERROR	+FC					

Following are descriptions of the different sets of fax/modem responses:

X0   The **X0** response set consists of the first five responses as well as the **NO ANSWER** response.

X1   The **X1** response set consists of the first five responses as well as **NO ANSWER** and all **CONNECT** xxx responses.

X2   The **X2** response set consists of first seven responses as well as the **NO ANSWER** and all **CONNECT** xxx responses.

X3   The **X3** response set consists of the first five responses as well as the **BUSY, NO ANSWER** and all **CONNECT** xxx responses.

X4   The **X4** response set is the factory-default response set. It consists of all the responses.

W0 Extended responses is disabled. With **W0**, all **CONNECT** responses reports the DTE speed.

W1 The modem will send **CARRIER** and **PROTOCOL** responses. The **CONNECT** response shows the DTE speed.

W2 The modem will send **CARRIER** and **PROTOCOL** responses. The **CONNECT** response shows the DCE speed rather than the DTE speed.

8 Specifications

MODEM OPERATION

Line Rate   0.3, 1.2, 2.4, 4.8, 7.2, 9.6, 12, 14.4, 16.8,
                19.2, 21.6, 24, 26.4, 28.8, 31.2, 33.6,
                56 Kbps (for 56K model only)

DTE Rate   115200 bps maximum

Operation   Half or full-duplex over 2-wire dial-up
                line, asynchronous

Linking   Auto dial/answer, auto bauding, MNP10
                auto fall-back/forward

Flow Control RTS/CTS, XON/XOFF (software
                selectable)

Compatibility Bell 103; 212A, ITU-T V.21; V.22; V.23;
                V.22bis; V.32; V.32bis; V.34; K56flex (56K model only)

Error Correction   ITU-T V.42, MNP4 (auto-match)

Data Compression   ITU-T V.42bis, MNP5 (auto-match)

Receive Sensitivity   -38 dBm

Command Set Hayes AT and Escape sequence

Memory   2 configuration profiles, 4 sets by 34 digit
                telephone number

Diagnostics   Power on self-test, V.54 loop test

FAX OPERATION

Speed   14400 bps

Compatibility Group 3 with T.30 protocol over ITU-T
                V.17; V.21 ch2; V.27ter; V.29

Command Set TR-29 Class 1

VOICE OPERATION

Operation
  PVS   Telephone answering machine (TAM),
                voice mail system, Simultaneuos Voice and Data (SVD)
  Sampling Rate   7.2 Khz using 2, 3 or 4 bits ADPCM;
                11.025 Khz linear PCM

GENERAL

Configuration COM1/2/3/4, IRQ3/4/5/7/9/10/11/12/15

Line Interface 2 x RJ-11 for line and telephone

DTE Interface 16550/A compatible UART with 16 byte
                double-buffered FIFO; PC, PC/XT bus

Voice Interface   2 x mini phone jack for microphone input
                and audio output

Ambient Temp.   0 to 50

Relative Humidity   10 to 95% non-condensing

Dimensions   1.6w x 10.7h x 17.0d cm

A.1 FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are 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 encouraged to try to correct the interference by one or more of the following measures:

- Reorient of 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 connected.
- Consult the dealer or an experienced radio / TV technician for help.

This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance. This statement can be deleted if unit was not tested with shielded cables.

The manufacture is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference that may cause undesired operation.

A.2 FCC Requirement

This equipment complies with Part 68 of the FCC Rules. On the base unit of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be given to telephone company.

The REN is useful in determining the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all area, the sum of the REN's of all devices connected to one line should not exceed five (5). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If your equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complain with the FCC. Your telephone company may make changes in its facilities, equipments, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

The equipment may not be used on coin service by the telephone company. Connection to party lines is subject to state tariffs.

Appendix B: Default Profiles

SETTING	DEFAULT	NVRAM
Auto-answer	Disabled	Yes
Backspace character	08	No
Bell / CCITT compatibility at 1200 bps	Bell 212A	Yes
Busy signal detect	Enabled	Yes
Carriage return character	13	No
Line feed character	10	No
Data Set Ready option	Always on	Yes
Data Terminal Ready option	&D2	Yes
Data Terminal Ready pulse width	0.5 seconds	Yes
Echo option	On	Yes
Escape character definition	43 (+++)	Yes
Guard tones	Disabled	Yes
Long space disconnect	Disabled	Yes
Parity	None	Yes
Pulse make / break ratio	39/61	Yes
Responses	Word	Yes
Response enable	All	Yes
RTS-to-CTS delay	10 milliseconds	Yes
Speaker status	On until DCD	Yes
Speaker volume	Low	Yes
Test timer setting	0 second	Yes
Wait for carrier after dialing	50 seconds	Yes
Wait for dial tone	2 seconds	No
Wait for dial tone before dialing	Enabled	Yes
Dial delay pause time	2 seconds	Yes
Wait before accepting carrier detect	0.6 seconds	Yes
Wait before disconnecting after carrier loss	1.4 seconds	Yes
DTMF tone duration and spacing	95 milliseconds	Yes
Flash (!) dial modifier time	0.7 seconds	No
PSTN attenuation level	-10 dBm	No
Fax attenuation level	-10 dBm	No

1. Hayes Compatible AT Command Set

COMMAND   DESCRIPTION

+++   Escape to command mode
            Upon on-line mode, it will remain the connection and switch the
            modem to command mode. The character of "Escape
            command" is defined by S-Register "S2".

ATA   Answer command
            The modem will go off-hook and attempt to answer incoming call.

A/   Repeat last command

ATBn   Select CCITT or BELL Mode, where n = 0 or 1
            n=0 CCITT Mode
            n=1 BELL Mode (Default)

ATDstring Dial command, where "string" is the combination of the
            following parameters and modifiers:
            0 - 9   Dial Digit
            *   The "star" digit on tone dialing mode
            #   The "gate" digit on tone dialing mode

            Dial modifiers:
            P   Pulse dial.
            T   Tone dial.
            W   Wait for dial tone.
            ,   Pause.
            !   Flash.
            ;   Command append.
            S=n   Dial a stored number.

ATEn   Command Echo
            The modem enables or disables the echo of character to the DTE
            according to the parameter supplied. The parameter value, if valid, is
            written to S14 bit 1.
            ATE0   Do not echo commands
            ATE1   Echo commands (Default)

ATHn   Disconnect (Hang-Up)
            This command initiates a hang up sequence.
            ATH0   The modem will release the line if the modem is

currentlyon-line, and will terminate any test (AT&T) that is in progress. Country specific, modulation specific, and error correction protocol specific(S38) processing is handled outside of the H0 command.

ATH1   If on-hook, the modem will go off-hook and enter command mode. For US models, the modem will remain off-hook. For W-class models, the modem will return on-hook after a period of time determined by S7.

ATIn   Identification

The modem reports to the DTE the requested result according to the command parameter.

ATI0   Reports product code(e.g.,"33600").
ATI1   Reports a precomputed checksum (normally "255").
ATI2   Reports "OK".
ATI3   Reports firmware revision (VX.XXX)
ATI4   Reports OEM defined identifier string
ATI5   Reports Country Code parameter
ATI6   Reports modem data pump model and internal code revision e.g.,RC288DPi Rev CE).
ATI7   Reports "255"

ATLn   Speaker Volume Controls

The modem sets the speaker volume control according to the parameter

supplied. The parameter value, if valid, is written to S22 bits 0 and 1.

ATL0   Low volume.
ATL1   Low volume (Default).
ATL2   Medium volume.
ATL3   High volume.

ATMn   Speaker Control

This command selects when the speaker will be on or off. The prameter value, if valid, is written to S22 bits 2 and 3.

ATM0   Speaker is always off.
ATM1   Speaker is on during call establishment, but off when receiving carrier.(Default.)
ATM2   Speaker is always on.
ATM3   Speaker is off when receiving carrier and during dialing, but on during answering.

ATNn   Automode Enable

This command enables or disables Automode detection(see+MS

command).

The parameter value, if valid, is written to S31 bit1.

ATN0   Automode detection is disabled(equivalent to setting the +MS

<automode>subparameter to 0). A subsequent handshake will be

conducted according to the contents of S37 or, if S37 is zero, according to the most recently sensed DTE speed.

ATN1   Automode detection is enabled (equivalent to setting the +MS <automode>

subparameter to 1). A subsequent handshake will be conducted according

the automode algorithm supported by the modem, e.g., according to the

contents of S37 or, if S37 is zero, starting at 28800 bps V.34 (RC288). This

command is also equivalent to F0 (RC144). (Default.)

ATOn   Return to On-Line Data Mode

This command determines how the modem will enter the on-ling data mode. If the modem is in the off-line command mode (no connection), ERROR is reported.

ATO0   Enters on-line data mode without a retrain. Handling is determined by the Call Establishment task. Generally, if a connection exists, this command connects the DTE back to the remote modem after an escape(+++).

ATO1   Enters on-line data mode with a retrain before returning to on-line data mode.

ATP   Set Pulse Dial Default

This command forces pulse dialing until the next T dial modifier or T command is received. It also sets S14 bit 5.

As soon as a dial command is executed which explicitly specifies the dialing mode for that particular call (e.g.,ATDT...), this command is overridden so that all future dialing will be tone dialed.

This command may not be permitted in some countries.

ATQn   Quiet Results Codes Control

The command enables or disables the sending of result codes to the DTE

according to the parameter supplied. The parameter value, if valid, is written to S14 bit 2.

ATQ0   Enables result codes to the DTE (Default.)

ATQ1   Disables result codes to the DTE.

ATSn   Read/Write S-Register
        The modem selects an S-Register, performs an S-Register read or
write function, or reports the value of an S-Register.
        Sn   Establishes S-Register n as the last register accessed.
        Sn=v   Sets S-Register n to the value v.
        Sn=?   Repotrs the value of S-Register n.
        The parameter n can be omitted, in which case the last S-Register
accessed will be assumed. The S can be omitted for AT=and AT?, in which case
the S-Register accessed will be assumed.
        For example:
        ATS7   establishes S7 as the last accessed register.
        AT=40   sets the contents of the last register accessed to 40.
        ATS=20 sets the contents of the last register accessed to 20.
        If the number "n" is beyond the range of the S-Registers available,
        the modem will return the ERROR message. The value "V"is
"MOD"ed with 256. If the result is outside the range permitted for a given
S-Register the values will still be stored, but functionally the lower and higher
limits will be observed. Input and output are always indecimal format. Note that
some S Registers are read-only.

        In some cases, writing to the S-Register will appear to be accepted
but the value will not actually be written.
        Due to country restrictions, some commands will be acceptd, but the
value may be limited and replaced by a maximum or minimum value.

ATT   Set Tone Dial Default
        This command forces DTMF dialing until the next P dial modifier or P
command is
        received.The modem will set an S-Register bit to indicate that all
subsequent dialing should be conducted in tone mode. Note that the DP
command will override this command.
        It also clears S14 bit 5. This command may not be permitted in some
countries.

ATVn   Result Code Form
        This command selects the sending of short-form or long-form result
codes to the DTE. The parameter, if valid, is written to S14 bit 3.
        ATV0   Enables short-form(terse)result codes. Line feed is not
issued before a short-form
                        result code.
        ATV1   Enables long-form (verbose) result codes.(Default)

ATWn   Connect Message Control
        This command controls the format of CONNECT messages. The
parameter value, if valid,

is written to S31 bits 2 and 3. Note that the Wn command can be overridden by register
S95 bits(see S95 description).

ATW0   Upon connection, the modem reports only the DTE speed(e.g.,CONNECT 57600).
Subsequent responses are disabled.(Default)

ATW1   Upon connection, the modem reports the line speed, the error correction protocol, and the DTE speed, respectively. Subsequent responses are disabled.

ATW2   Upon connection, the modem reports the DCE speed(e.g.,CONNECT 28800). Subsequent responses are disabled.

ATXn   Extended Result Codes

This command selects which subset of the result messages will be used by the modem to inform the DTE of the results of commands.

Blind dialing is enabled or disabled by country parameters. If the user wishes to enforce fail tone detection, a "W" can be placed in the dial string (see D command). Note that the information below is based upon the default implementation of the X results table. Table 3-1 indicates the messages which are enabled for each X value.

If the modem is in facsimile mode(+FCLASS=1 or 2), the only message sent to indicate a connection is CONNECT without a speed indication.

ATX0   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 not 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. The vale 000b is written to S22 bits 6, 5, and 4, respectively.

ATX1   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 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 detected, NO CARRIER will be reported instead of NO DIAL TONE. The value 100b is written to S22 bits 6, 5, and 4, respectively.

ATX2   Disables monitoring of busy tones unless forced otherwise by country requirements;send only OK,CONNECT,RING,NO CARRIER, ERROR, NO DIALTONE, NO ANSWER, and CONNECT XXXX. 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 detected, NO DIAL TONE will be reported instead of NO CARRIER. The value 101b is written to S22 bits 6, 5, and 4, respectively.

ATX3 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. The value 110b is written to S22 bits 6, 5, and 4, respectively.

ATX4 Enables monitoring of busy tones; send all messages. The value 111b is written to S22 bits 6,5,and 4,respectively.(Default)

ATYn Long Space Disconnect
This command enables/disables the generation and response to long space disconnect.
The parameter value, if valid, is written to S21 bit 7.
ATY0 Disables long space disconnect.(default)
ATY1 Enables long space disconnect. In non-error correction mode, the modem will send a long space of four seconds prior to going on-hock. In error correction mode, the modem will respond to the receipt of a long space (i.e., a break signal greater than 1.6 seconds)by going on-hook.

ATZn Soft Reset and Restore Profile
The modem performs a soft reset and restores(recalls)the configuration profile according to the parameter supplied. If no parameter is specified, zero is assumed.
ATZ0 Soft reset and restore stored profile 0.
ATZ1 Soft reset and restore stored profile 1.

AT&Cn RLSD(DCD) Option
The modem controls the RLSO output in accordance with the parameter supplied. The parameter value, if valid, is written to S21 bit 5.
AT&C0 RLSD remains ON at all times.
AT&C1 RLSD follows the state of the carrier.(Default.)

AT&Dn DTR Option
This command interprets the ON to OFF transition of the DTR signal from the DTE in accordance with the parameter supplied. The parameter value, if valid, is written to S21 bits 3 and 4. Also, see S25.
AT&D0 DTR drop is interpreted according to the current &Qn setting as follows:
&Q0,&Q5,&Q6 DTR is ignored(assumed ON).Allows operation with DTEs which do not provide DTR.
&Q1,&Q4 DTR drop causes the modem to hang up. Auto-answer is not affected.
&Q2,&Q3 DTR drop causes the modem to hang up. Auto-answer is inhibited.

AT&D1   DTR drop is interpreted according to the current & Qn setting as follows:

&Q0,&Q1,&Q4,&Q5,&Q6   DTR drop is interpreted by the modem as if the asynchronous escape sequence had been entered. The modem returns to asynchronous command state without disconnecting.

&Q2,&Q3   DTR drop causes the modem to hang up. Auto-answer is inhibited.

AT&D2   DTR drop is interpreted according to the current & Qn setting as follows:

&Q0,&Q1,&Q4,&Q5,&Q6   DTR drop causes the modem to perform a soft reset as if the Z command were received. The &Y setting determines which profile is loaded.

&Q2,&Q3   DTR drop causes the modem to hang up.Auto-answer is inhibited.

AT&Fn   Restore Factory Configuration (Profile)

The modem loads the factory default configuration (profile).The factory defaults are identified for each command and in the S-Register descriptions. A configuration profile consists of a subset of S-Registers.

AT&F0   Restore factory configuration 0.
AT&F1   Restore factory configuration 1.

AT&Gn   Select Guard Tone

The modem generates the guard tone selected by this command according

to the parameter supplied (DPSK modulation modes only). The parameter value, if valid,

is written to S23 bits 6 and 7.
AT&G0   Disables guard tone. (Default)
AT&G1   Disables guard tone.
AT&G2   Selects 1800 Hz guard tone.

AT&Kn   Flow control

This command defines the DTE/DCE (terminal/model)flow control mechanism.

The parameter value, if valid, is written to S39 bits 0,1,and 2.
AT&K0   Disables flow control.
AT&K3   Enables RTS/CTS flow control.(Default for data modem modes.)
AT&K4   Enables XON/XOFF flow control.
AT&K5   Enables transparent XON/XOFF flow control.
AT&K6   Enables both RTS/CTS and XON/XOFF flow control. (Default for fax modem modes.)

AT&Mn   Asynchronous/Synchronous Mode Selection (External Models Only)
        AT&M0   Selects direct asynchronous operation. Note that the command sequence &M0\N0 selects normal buffered mode, but the command sequence \N0&M0 selects direct mode. This is because the \N0 command is analogous to the &Q6 command. The value 000b is written to S27 bits 3,1,and 0, respectively.(See &Q).
        AT&M1   Selects synchronous connect mode with async off-line command mode. The value 001b is written to S27 bits 3,1,and 0, respectively. (Serial interface operation only.)
        AT&M2   Selects synchronous connect mode with async off-line command mode. Same as &M1 except that &M2 enables DTR dialing of directory slot 0. The modem will disconnect if DTR is OFF for more than the period in S25 (in units of hundredths of a second) the data connection will be synchronous. The value 010b is written to S27 bits 3, 1, and 0, respectively.
                (Serial interface operation only.)
        AT&M3   Selects synchronous connect mode. This mode allows DTR to act as a talk/data switch. The call is manually initiated while DTR is inactive. When DTR becomes active, the handshake proceeds in originate or answer mode according to S 14 bit 7.The value 010b is written to S27 bits 3, 1, and 0, respectively. (Serial interface operation only.)

AT&Pn   Select Pulse Dial Make/Break Ratio
        This command determines the make/break ratio used during pulse dialing. The default is country-dependent. The parameter value, if valid, is written to S28 bits 3 and 4.

        AT&P0   Selects 39%-61% make/break ratio at 10 pps.(Default)
        AT&P1   Selects 33%-67% make/break ratio at 10 pps.
        AT&P2   Selects 39%-61% make/break ratio at 20 pps.
        AT&P3   Selects 33%-67% make/break ratio at 20 pps.

AT&Qn   Sync/Async mode (external models only)
        This command is an extension of the &M command and is used to control the connection modes permitted. It is used in conjunction with S36 and S48. (Also, see \N)
        AT&Q0   Selects direct asynchronous operation. The value 000b is written to S27 bits 3, 1, and 0, respectively. (See &M0)
        AT&Q1   Selects synchronous connect mode with async off-line command mode. The value 001b is written to S27 bits 3,1,and 0, respectively. (See &M1)
        AT&Q2   Selects synchronous connect mode with async off-line command mode and enables DTR dialing of directory 0. The value 010b is written to S27 bits 3,1, and 0, respectively. (See &M2)
        AT&Q3   Selects synchronous connect mode with async off-line command mode and enables DTR to act as Talk/Data switch. The value 011b is written to S27 bits 3,1 ,and 0, respectively. (See &M3)

AT&Q4   Selects AutoSync operation.The value 100b is written to S27 bits 3, 1, and 0, respectively AutoSync operation, when used in conjunction with the Hayes Synchronous Interface (HSI) capability in the DTE, provides synchronous communication capability from an asynchronous terminal.

Starting AutoSync. Set registers S19, S20, and S26 to the desired values before selecting AutoSync operation with &Q4.After the CONNECT message is issued, the modem waits the period message of time specified by S25 before examining DTR. If DTR is on, the modem enters the synchronous operating state; if DTR is off, the modem terminates the line connection and returns to the asynchronous command state.

Stopping AutoSync.AutoSync operation is stopped upon loss of carrier or the on-to-off transition of DTR. Loss of carrier will cause the modem to return to the asynchronous command state.An on-to-off transition of DTR will cause the modem to return to the synchronous command state and either not terminate the line connection (&D1 active) or terminate the line connection (any other &Dn command active).

AT&Q5   The modem will try to negotiate an error-corrected link. The modem can be configured using S36 to determine whether a failure will result in the modem returning on-hook or will result in fallback to an asynchronous connection. The value 101b is written to S27 bits 3,1,and 0,respectively.(Default)

AT&Q6   Selects asynchronous operation in normal mode (speed buffering). The value 110b is written to S27 bits 3,1,and 0, respectively.

AT&Rn   RTS/CTS Option

This selects how the modem controls CTS. CTS operation is modified if hardware flow control is selected (see &K command). The parameter value, if valid, is written to S21 bit 2.

AT&R0   In sync mode. CTS tracks the state of RTS. The RTS-to-CTS delay is defined by S26. In async mode. CTS acts according toV.25bis handshake.

AT&R1   In sync mode, CTS is always ON (RTS transition are ignored).

In async mode. CTS will only drop if required by flow control.(Default)

AT&Sn   DSR Override

AT&S0   DSR will remain ON at all times.(Default)

AT&S1   DSR will become active after answer tone has been detected and inactive after the carrier has been lost.

AT&Tn   Test and Diagnostics

The modem will perform selected test and diagnostic functions according to the parameter supplied. A test can be run only when in an asynchronous operation in non-error-correction mode (normal or direct mode).

To terminate a test in progress, the escape sequence must be entered first, except for parameters 7 and 8. If S18 is non-zero, a test will terminate automatically after the time specified by S18 and display the Ok message.

AT&T0   Terminates test in progress.Clears S16.
AT&T1   Initiates local analog loopback,V.54 Loop 3,Sets S16 bit 0.
            If a connection exists when this command is issued, the modem hangs up.
            The CONNECT XXXX message is displayed upon the start of the test.
AT&T2   Returns ERROR.
AT&T3   Initiates local digital loopback,V.54 loop 2.Sets S16 bit 2.
            If no connection exists, ERROR is returned. Sets S16 bit 4 when the test is in progress.
AT&T4   Enables digital loopback acknowledgment for remote request, i.e., an RDL request from a remote modem is allowed. Sets S23 bit 0. (Default)
AT&T5   Disables digital loopback acknowledgment for remote request, i.e., an RDL request from a remote modem is denied. Clears S23 bit 0.
AT&T6   Requests a remote digital loopback(RDL), V.54 Loop2, without self test.
            If no connection exists,ERROR is returned. Sets S16 bit 4 when the test is in progress. The CONNECT XXXX message is displayed upon the start of the tests.
AT&T7   Requests a remote digital loopback(RDL), V.54 Loop 2, with self test.(In self test, a test pattern is looped back and checked by the modem.)
            If no connection exists, ERROR is returned. When the test is terminated either via expiration of S18, or via the &T0 or H command, the number of detected errors is reported to the DTE. Sets S16 bit 5 when the test is in progress.
AT&T8   Initiates local analog loopback, V.54 Loop3, with self test. (In self test, a test pattern is looped back and checked bythe modem.) If a connection exists, the modem hangs up before the test is initiated. When the test is terminated either via expiration of S18, or via the &T0 or H command, the number of detected errors is reported to the DTE. Sets S16 bit 6 when the test is in progress.This command may not be available in some countries due to PTT restrictions.

AT&V   Display Current Configuration and Stored Profile
            Reports the current (active) configuration, the stored(user) profiles, and the four stored telephone numbers. The stored profiles and telephone numbers are not displayed if the NVERAM is not installed or is not operational as detected by the NVRAM test during reset processing.
AT&V1   Display Last Connection Statistics
            Displays the last connection statistics in the following format (shown with typical results):
            TERMINATION REASON.......... LINK DISCONNECT or LOCAL

REQUEST

        LAST TX data rate........... 33600 BPS
        HIGHEST TX data rate........ 33600 BPS
        LAST RX data rate........... 28800 BPS
        HIGHEST RX data rate........ 28800 BPS
        Error correction PROTOCOL... LAPM
        Data COMPRESSION............ V42Bis
        Line QUALITY................ 030
        Highest SPX RX state........ 068
        Highest SPX TX state........ 067

AT&Wn   Store Current Configuration
        AT&W0   Store the current configuration as profile 0.
        AT&W1   Store the current configuration as profile 1.

At&Yn   Designate a Default Reset Profile
        Selects which user profile will be used after a hardware reset.
        AT&Y0   The modem will use profile 0.
        AT&Y1   The modem will use profile 1.

AT&Zn   Store Telephone Numbers
        The modem can store up to four telephone numbers and each
telephone number dial string can contain up to   34 digits.
        AT&Zn=x n=0 to 3 and x=dial string. (Require 256-byte NVRAM.)

AT%En   Enable/Disable Line Quality Monitor And Auto-Retrain or
Fallback/Fall Forward

        Controls whether or not the modem will automatically monitor the line
quality and request a retrain (%E1) or fall back when line quality is insufficient or
fall forward when line quality is sufficient (%E2). Applies to dial-up line only. The
parameter value, if valid, is written to S41 bits 2 and 6. If enabled,the modem
attempts to retrain for a maximum of 30 seconds.
        AT%E0   Disable line quality monitor and auto-retrain. AT%E1
Enable line quality monitor and auto-retrain. AT%E2   Enable line quality monitor
and fallback/fall forward.(Default)

AT%L   Line signal Level
        Returns a value which indicates the received signal level.The value
returned is a direct indication (DAA dependent) of the receive level at the MDP,
not at the telephone line connector.
        For example, 009=-9dBm, 043=-43 dBm, and so on.

AT%7   Plug and Play Serial Number
        AT%7<8 hex numbers><same 8 hex numbers><cr> - Sets Plug and Play

Serial Number
Sets and stores eight serial numbers in hex format used for serial Plug and Play and for ISA Plug and Play which use the Rockwell 11575 Plug and Play device.
Example:
AT%7<8 hex numbers><same 8 hex numbers>

AT%8   Plug and Play Vendor ID and Product Number
Sets and stores Vendor ID and product number for serial Plug and Play and for ISA Plug and
Play which use the Rockwell 11575 Plug and Play device.
Example:
AT%8<3 ASCII characters><4 hex numbers><same 3 ASCII characters><same 4 hex numbers><cr>

AT%Q   Line Signal Quality
Reports the line signal quality (DAA dependent). Returns the higher order byte of the
EQM value. Based on the EQM value, retrain or fallback/fall forward may be initiated
if enabled by %E1 or % E2.

AT\Gn   Modem-to-Modem Flow Control (XON/OFF)
In non-error correction mode, the modem enables or disables the generation or recognition of modem-to-modem XON/XOFF flow control according to the parameter supplied. The parameter value, if valid, is written to S41 bit 3. In error correction mode, the setting of modem-to-modem XON/XOFF flow control is ignored.however,the serial port flow control settings(AT&K) remain active during a reliable link. Due to the buffering system used in the modem, modem-to-modem flow control is normally disabled.
AT&\G0 Disables modem-to-modem XON/XOFF flow control.(Default)
AT&\G1 Enables modem-to-modem XON/XOFF flow control.

AT\Kn   Break Control
Controls the response of the modem to a break received from the DTE or the remote modem or the \B command according to the parameter supplied. The parameter value, if valid, is written to S40 bits 3, 4, and 5. The response is different in three separate states.
The first state is where the modem receives a break from the DTE when the modem is operation in data transfer mode:
AT\K0   Enter on-line command mode, no break sent to the remote modem.
AT\K1   Clear data buffers and send break to remote modem.
AT\K2   Same as \K0.
AT\k3   Send break to remote modem immediately.
AT\K4   Same as \K0.

AT\K5   Send break to remote modem in sequence with transmitted data. (Default)

The second case is where the modem is in the on-line command statewaiting for AT commands during a data connection, and the \B is received in order to send a break to the remote modem:
AT\K0   Clear data buffers and send break to remote modem.
AT\K1   Clear data buffers and send break to remote modem. (Same as \K0)
AT\K2   Send break to remote modem immediately.
AT\K3   Send break to remote modem immediately.(Same as \K2)
AT\K4   Send break to remote modem in sequence with data.
AT\K5   Send break to remote modem in sequence with data .(Same as \K4, Default)

The third case is where a break is received from a remote modem during a non-error corrected connection:
AT\K0   Clears data buffers and sends break to the DTE.
AT\K1   Clears data buffers and sends break to the DTE.(Same as \K0)
AT\K2   Send a break immediately to DTE.
AT\K3   Send a break immediately to DTE.(Same as \K2)
AT\K4   Send a break in sequence with received data to DTE.
AT\K5   Send a break in sequence with received data to DTE.(Same as \K4, Default)

AT\Nn   Operating Mode
This command controls the preferred error correcting mode to be negotiated in a subsequent data connection.This command is affected by the OEM firmware configuration.

AT\N0   Selects normal speed buffered mode (disables error-correction mode, Forces &Q6)
AT\N1   Serial interface selected - Selects direct mode and is equivalent to &M0,&Q0 mode of operation. (Forces &Q0)
        Parallel interface selected - Same as \N0.
AT\N2   Selects reliable(error-correction)mode. The modem will first attempt a LAPM connection and then an MNP connection. Failure to make a reliable connection results in the modem hanging up. (Forces &Q5, S36=4, and S48=7)
AT\N3   Selects auto reliable mode. This operates the same as \N2 except failure to make a reliable connection results in the modem falling back to the speed buffered normal mode. (Forces &Q5, S36=7, and S48=7)
AT\N4   Selects LAPM error-correction mode. Failure to make an LAPM   error-correction connection results in the modem hanging up. (Forces &Q5 and S48=0) Note:The-K1 command can override the \N4 command.
AT\N5   Selects MNP error-correction mode. Failure to make an

MNP error-correction connection results in the modem hanging up. (Forces &Q5, S36=4, and S48=128)

AT\Vn   Single Line Connect Message Enable
        The single line connect message format can be enabled or disabled by the \Vn command as follows:
        AT\V0   Connect messages are controlled by the command settings X, W, and S95.
        AT\V1   Connect messages are displayed in the single line format described below subject to the command settings V (Verbose) and Q (Quiet). In Non-Verbose mode (V0), single line connect messages are disabled and a single numeric result code is generated for CONNECT DTE.
        When single line connect messages are enabled, there are no CARRIER, PROTOCOL, or COMPRESSION messages apart from the fields described below.

        The single line connect message format is:
        CONNECT <DTE Speed></Modulation></Protocol></Compression></Line Speed>/<Voice and Data>
            Where:
                <DTE Speed   = DTE speed, e.g., 57600.
                Modulation   = "V.32"for V.32 or V.32bis modulations.
"V   "V.34"* for V.34 modulations.
                                        Note: Modulation is omitted for all other modulations.
                Protocol   = "NONE" for no protocol.
"A   "ALT" for Microcom Network Protocol.
"L   "LAPM" for LAP-M protocol.
                Compression   = "CLASS5" for Microcom MNP5 compression.
                "V   "V42BIS" for V.42bis compression.
                                        Note: Compression is omitted if protocol is NONE.
                Line Speed   = Asymmetric rates are displayed as /rate:TX/rate:RX, e.g., /1200
                                        TX/75 RX.
                                        Symmetric rates are displayed as a single DCE rate, e.g., 14400.
                Voice and Data = Blank for Data mode only.
"S   "SVD" for AudioSpan analog simultaneous audio/voice and data.
"D   "SVD" for G.729A or DigiTalk digital simultaneous voice and data.

AT+MS Commands   Select Modulation

This extended-format command selects the modulation and, optionally, enables or disables automode, specifies the lowest and highest connection rates, selects m-Law or A-Law codes type, and enables or disables robbed bit signaling generation (server modem) or detection (client modem) using one to five subparameters.

The command format is:

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

Notes:
1.   For 14400 bps and lower speeds, the Nn command and S37 register can alternatively be used, in which case the +MS subparameters will 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 AT+MS command.)
2.   Subparameters not entered (enter a comma only or <CR> to skip the last subparameter) remain at their current values.

Reporting Selected Options
The modem can send a string of information to the DTE consisting of selected options using the following command:

AT+MS?

The response is:
+MS: <mod>,<automode>,<min_rate>,<max_rate>,<x_law>,<rb_signaling>
For example,
AT+MS: 56,1,300,56000,0,0 [RC56 default values]
AT+MS: 11,1,300,33600,0,0 [RC336 default values]
AT+MS: 10,1,300,14400,0,0 [RC144 default values]

Reporting Supported Options
The modem can send a string of information to the DTE consisting of supported options
using the following command:

AT+MS=?

The response is:
AT+MS: (list of supported <mod> values), (list of supported <automode> values), (list of supported <min_rate> values),(list of supported <max_rate> values), (list of supported <x_law> values), (list of supported <rb_signaling> values)
For example,
AT+MS: (0,1,2,3,9,10,11,56, 64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1) [RC56]
AT+MS:

(0,1,2,3,9,10,11,64,69),(0,1),(300-33600),(300-33600),(0,1),(0,1) [RC336]

AT+MS:

(0,1,2,3,9,10,64,69),(0,1),(300-14400),(300-14400),(0,1),(0,1) [RC144]

Subparameter Definitions

1. <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>	Modulation	Possible Rates (bps)	Notes
0	V.21	300	
1	V.22	1200	
2	V.22 bis	2400 or 1200	
3	V.23	1200	See Note 2
9	V.32	9600 or 4800	
10	V.32 bis	14400, 12000, 9600, 7200, or 4800	Default for RC144
11	V.34	33600, 31200, 28800, 26400, 24000, 21600,19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400	Default for RC56/RC336/RC288 [RC56/RC336/RC288 only]
56	K56flex	56000, 54000, 52000, 50000, 48000, 46000,44000, 42000, 40000, 38000, 36000, 34000, 32000	[R56 only]
64	Bell103	300	
69	Bell 212	1200	

Notes:

1. See optional <automode>, <min_rate>, and <max_rate> subparameters.

2. For V.23, originating modes transmit at 75 bps and receive at 1200 bps; answering modes transmit at 1200 bps and receive at 75 bps. The rate is always specified as 1200 bps.

The modem may also automatically switch to another modulation (automode), subject to the following constraints:

a. The modem may not be able to automatically switch from the current modulation (specified by <mod>) to some other modulation. For example, there is no standard way to automode from Bell 103 to V.23.

b. The DTE may disable automode operation (see <automode> below).

c. The DTE may constrain the range of modulations available by specifying the lowest and highest rates (see<min_rate> and <max_rate> below).

2. <automode> is an optional numeric value which enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. The options are:

<automode> Option Selected Notes

0 Automode disabled

1 Automode enabled using V.8 bis/V.8 or V.32 Annex A Default

The default value is 1, which enables automode. Note, however, there are modulations for which there is no automatic negotiation, e.g., Bell 212 (<mod> = 69).

For <automode> = 0 (automode disabled, i.e., fixed modulation):

a. If <max_rate> is within the rates supported by the selected modulation, the selected

rate is that specified by<max_rate>. For example:

AT+MS=10,0,1200,4800 selects V.32 bis 4800 bps fixed rate.

b. If <max_rate> is greater than the highest speed supported by the modulation

specified by <mod>, the starting rate is the highest rate supported by the selected modulation. For example:

AT+MS=10,0,2400,14400 selects V.32 bis 14400, 12000, 9600, 7200, or 4800 bps.

c. 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:

AT+MS=11,0,16800,16800 selects V.34 16800 bps fixed mode (no comparable S37 command).

AT+MS=10,0,12000,12000 selects V.32 bis 12000 bps fixed mode (same as N0S37=10).

For <automode> = 1 (automode enabled, i.e., automatically selected speed and modulation):

The modem connects at the highest possible rate in accordance with V.8 bis/V.8, or

V.32 bis Annex A if V.8 bis/V.8 is not supported by the remote modem.

a. 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:

AT+MS=10,1,1200,24000 selects automoding down from V.32 bis 14400 bps.

b. 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:

AT+MS=11,1,300,16800 selects automode starting at V.34 16800 bps (no comparable S37 command).

AT+MS=9,1,300,12000 selects automode starting at V.32 bis 12000 bps (same as N1S37=10).

3. <min_rate> is an optional number which specifies the lowest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 2400 specifies the lowest rate to be 2400 bps. The default is 300 for 300 bps.

4. <max_rate> is an optional number which specifies the highest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 14400 specifies the highest rate to be 14400 bps. The default is 28800 for 28800 bps.

5. <x_law> is an optional number which specifies the codec type. The options are:

0 = m-Law
1 = A-Law

Note that ATZ will reset the <x_law> selection to 0 (m-Law).

6. <rb_signaling> is an optional number which enables or disables robbed bit signaling generation in a server modem or enables or disables robbed bit signaling detection in a client modem. The options are:

0 = Robbed bit signaling generation (server modem) or detection (client modem) disabled (default)

1 = Robbed bit signaling generation (server modem) or detection (client modem) enabled

Note that ATZ will reset the <rb_signaling> selection to 0 (disabled).

AT+Hn   Enable/Disable RPI and DTE Speed

This command enables or disables Rockwell Protocol Interface (RPI) processing and sets the DTE speed. (Applicable only to modems supporting RPI and RPI+). +H0 Disable protocol interface and video ready mode.

AT+H1 Enable RPI mode and set DTE speed to 19200 bps.
AT+H2 Enable RPI mode and set DTE speed to 38400 bps.
AT+H3 Enable RPI mode and set DTE speed to 57600 bps.
AT+H11 Enable RPI+ mode (applicable only to modems supporting RPI). When in RPI+ mode, a link is established between the modem and the WinRPI or WinRPI95 host PC software driver to allow the modem to support protocol (V.42bis/LAP-M/MNP2-5) connections with a remote modem. This command should only be used when the WinRPI or WinRPI95 driver software is installed in the PC.

AT+H16 Enable video ready mode

2. ECC Command Set

COMMAND   DESCRIPTION

AT%Cn   Enable/Disable Data Compression
            Enables or disables data compression negotiation.The modem can only perform data decompression on an error corrected link. The parameter value, if valid, is written to S41 bits 0 and 1.

            AT%C0   Disables data decompression.Resets S46 bit 1.
            AT%C1   Enables MNP 5 data compression negotiation.Resets S46 bit 1.
            AT%C2   Enables V.42 bis data compression.Sets S46 bit 1.
            AT%C3   Enables both V.42 bis and MNp 5 data compression.Sets S46 bit1.(Default)

AT\An   Select Maximum MNP Block Size
            The modem will operate an MNP error corrected link using a maximum block size controlled by the parameter supplied. The parameter value, if valid, is written to S40 bits 6 and 7.

            AT\A0   64 characters.
            AT\A1   128 characters.(Default.)
            AT\A2   192 characters.
            AT\A3   256 characters.

AT\Bn   Transmit Break to Remote
            In non-error correction mode, the modem will transmit a break signal to the remote   modem with a length in multiples of 100ms according to parameter specified. If a number in excess of 9 is entered, 9 is used. The command works in conjunction with the \K command. In error correction mode, the modem will signal a break through the active error correction protocol,giving no indication of the length.

            AT\B1-\B9   Break length in 100 ms units.(Default=3, Non-error correction mode only.)

2.1   MNP 10 Command Set

COMMAND   DESCRIPTION

AT)Mn   Automatic Level Adjustment Controls
            This command is included only for compatibility and performs no function.

        AT)M0   AT)M0 command.
        AT)M1   AT)M1 command.
        AT)M2   AT)M2 command.

AT*Hn   Link Negotiation Speed
          This command is included only for compatibility and performs no
function.
       *H0 *H0 command.
       *H1 *H1 command.
       *H2 *H2 command.

AT-Kn   MNP Extend Services

          Enables or disables conversion of a V.42 LAPM connection to an MNP
10 connection.
          The parameter value, if valid, is written to S40 bits 0 and 1.
          AT-K0 Disables V.42 LAPM to MNP 10 conversion. (Default.)
          AT-K1 Enables V.42 LAPM to MNP 10 conversion.
          AT-K2 Enables V.42 LAPM to MNP 10 conversion; inhibits MNP Extended
Services initiation during V.42 LAPM answer mode detection phase.

AT-Qn   Enable Fallback to V.22bis/V.22

       This command is included only for compatibility and performs no function.
              AT-Q0   AT-Q0 command.
              AT-Q1   AT-Q1 command.

AT@Mn   Initial Cellular Power Level Setting
          This command is included only for compatibility and performs no
function.
       @M0 @M0 command.
       .
       .@M30 @M30 command.

AT-SEC=n   Enable/Disable MNP10-EC
       Enables or disables MNP10-EC operation. The command format is:
          AT-SEC=n, [<tx level>] where <tx level> is the optional transmit
level sub parameter.
          AT-SEC=0 Disable MNP10-EC; the transmit level is that defined in S91.
          AT-SEC=1, [<tx level>] Enable MNP10-EC; the transmit level will be
defined by the sub parameter <tx level> range 0 to 30 (0 dBm to -30 dBm), the
default <tx level> (<tx level> not specified) is the S91 value.

AT:En   Enable Compromise Equalizer
          This command is included only for compatibility and performs no
function.
       AT:E0   AT:E0 command.
       AT:E1   AT:E1 command.

3. List Of Class 1 Fax Commands

COMMAND	DESCRIPTION
AT+FCLASS=n	Select Service Class
AT+F\<command\>?	Report Active Configuration
AT+F\<command\>=?	Report Operating Capabilities
AT+FAE=?	0 if autoansweris disabled; 1 if auto answer is enabled
AT+FRH=n	Receive Data with HDLC Framing
AT+FRM=n	Receive Data
AT+FFRMn	Receive silence
AT+FTH=n	Transmit Data with HDLC Framing
AT+FTM=n	Transmit data
AT+FTS=n	Stop Transmission and Wait

4. List Of Class 2 Fax Commands

COMMAND	DESCRIPTION
AT+FCLASS=n	Select Service Class. Same as class 1.
AT+FDT	Data Transmission
AT+FET=n	Transmit Page Punctuation
AT+FDR	Begin or Continue Phase C Receive Data
AT+FK	Session termination
AT+FCON	Facsimile connection response
AT+FDCS:	Report current session
AT+FDIS:	Report remote identification
AT+FCFR:	Indicate confirmation to receive
AT+FTSI:	Report the transmit station ID
AT+FCSI:	Report the called station ID
AT+FPTS:	Page transfer status
AT+FET:	Post page message response
AT+FHNG:	Call termination status
AT+FMFR?	Request Manufacturer Identification
AT+FMDL?	Identify Product Model
AT+FREV?	Identify Product Revision
AT+FDCC=	DCE Capabilities Parameters
AT+FDIS	Current Sessions Capabilities Parameters
AT+FDCS	Current Session Results Parameters
AT+FLID=	Local ID String
AT+FCR	Capability to Receive
AT+FPTS=	Page Transfer Status
AT+FCQ	Copy Quality Checking
AT+FAE	Adaptive answer
AT+FBUF?	Buffer Size
AT+FPHCTO	DTE Phase C Response Time-out
AT+FAXERR	T.30 Session Error Report
AT+FBOR	Data Bit Order

5. List Of Voice Commands (Voice Models Only)

COMMAND   DESCRIPTION
AT#BDR   Select Baud Rate(Turn off Autobaud)
            This command forces the modem to select a specific DTE/modem baud rate without further speed sensing on the interface. When a valid #BDR=n command is entered, the OK result code is sent at the current assumed speed. After the OK has been sent, the modem switches to the speed indicated by the #BDR=n command it has just received.

            When in "Online Voice Command Mode" and the #BDR setting is nonzero (no autobaud selected), the modem supports a full duplex DTE interface. This means that the DTE can enter commands at any time, even if the modem is in the process of sending a shielded code indicating DTMF detection to the DTE.When in Online Voice Command Mode and the #BDR setting is zero (autobaud selected), shielded code reporting to the DTE is disabled. [Note that when #BDR has been set nonzero, the modem employs the S30 Deadman Timer, and this timer starts at the point where #BDR is set nonzero. If this period expires (nominally 60 seconds) with no activity on the activity on the DTE interface, the modem reverts to #BDR=0 and #CLS=0)

            Parameters: n=0-48 (New baud rate is n*2400bps), default:
0
            Result Codes: OK   If n=0-48
                                    ERROR   Otherwise

            Command options:
            #BDR?   Returns the current setting of the #BDR command as an ASCII decimal value in result code format.
            #BDR=?   Returns a message indicating the speeds that are supported.
            #BDR=0   Enables autobaud detection on the DTE interface.
            #BDR=n   Where 1<n<48.Sends OK message at current speed,then switches to the new speed defined by n*2400 bps unless and until another #BDR=n command is received. Autobaud is disabled, and the character format is maintained at the format most recently detected.

AT#CLS   Select Data , Fax, or Voice
            This command selects Data,Fax,or Voice Mode from operation in any mode.
            Parameters: n = 0, 1, 2, or 8;
            Default: 0
            Result Codes: OK   If n=0,1,2, or 8
                            ERROR   Otherwise.
            Command options:
            #CLS?   Returns the current setting(0,1,2, or 8)of the #CLS command as an ASCII decimal value in result code format.

#CLS=0   Data. This is similar to setting +FCLASS=0,and instructs the modem to act like a data modem on subsequent answer or originate operations. When a disconnect or inactivity time out in the non-autobaud mode is detected, the modem automatically sets the #CLS setting to 0 and hangs up. This ensures that the modem is always in a known state despite   disorderly DTE behavior.

#CLS=1   Class 1 fax. This is similar to setting +FCLASS=1, and instructs the modem to be a Class 1 fax modem. Once this is set, either the +FAA or +FAE command can be used to force subsequent answers to be Class 1 adaptive answers.

#CLS=2   Class 2 fax. This is similar to setting +FCLASS=2, and instructs the modem to be a Class 2 fax modem. Once this is set, the +FAA command can be used to force subsequent answers to be Class 2 adaptive answers.

#CLS=8   Voice Mode. This is the main setting the DTE uses to effect directed or adaptive answer or originate sequences involving voice modes. All telephone calls initialized by #CLS=8 result (after answer or successful call progress) in the modem in Online Voice Command Mode.

#CLS=n	0	Data mode
	1	Fax class 1 mode
	2	Fax class 2 mode
	8	Voice mode

AT#MDL?   Identify Model
This command requests the model number or name of the modem.

AT#MFR?   Identify Manufacturer
This command requests the modem manufacturer.

AT#REV?   Identify Revision
The #FREV? command requests the revision level of the modem. The message   format is the same as the ATI3 message.

AT#VBQ?   Query Buffer Size
This query-only command returns the size of the modem's voice transmit and voice receive buffers in ASCII decimal, followed by the OK result code.

AT#VBS   Bits Per Sample (Voice Compression Factor)
This command selects the degree of ADPCM voice compression to be used.
Parameters: n=2, 3, or 4 (Voice compression bits per

sample)

Default: 4
Result Codes: OK   If n=2,3,or 4
                                  ERROR   Otherwise.

Command options:
#VBS?   Returns the current setting of the #VBS command as an
ASCII decimal value in result code format.rates are correlated with the #VCI?
query command response which provides the single compression method
available.
#VBS=?   Returns "2,3,4", which are the ADPCM compression
bits/sample rates available.
                        These bits/sample compression method available.
#VBS=n   n=2, Selects 2 bits per sample ADPCM
            n=3, Selects 3 bits per sample ADPCM
            n=4, Selects 4 bits per sample ADPCM (Default)

AT#VBT   Beep Tone Timer
        This command defines the time period, in 10ths of a second up to 4
seconds(40) which is used by the modem as the DTMF or fixed tone duration for
generating tones via the D command while in Online Command Mode.
        Parameters: n=0-40 (0-4 seconds), Default: 10 (1 second)

        Result Codes: OK   If n=0-40
                                           ERROR   Otherwise.

        Command options:
        #VBT?   Returns the current setting of the #VBT command as an
ASCII   decimal value
                        in result format.
        #VBT=?   Returns the message, "0-40".
        #VBT=0   Disables the tone generation capability.
        #VBT=1 to 40   Sets tone duration time.

AT#VCI?   Identify Compression Method
        This command queries the modem as to its compression method and
raw bits-per-sample capability. <OP0C0>;<D>pairs, separated by<LF0>s, Within
each line, the<O>is left justified, and is separated from the<D> by the semicolon
character and operated from the bits-per- sample string by another semicolon.
<F255P245C255>

AT#VLS   Voice Line Selection
        This action command can be used to select which devices are routed
through the modem.

Parameters: n=0,1,2,3,or 4 [This is the device position number(not device number) as reflected in response to #VLS=?]

Default: 0

Result Codes: OK   If n=0,1,2,3,or 4

VCON   If device selected does not connect to the telephone line. (A speaker is such a device, but a telephone line with speaker ON is not such a device, and generates OK.)

ERROR   If n does not equal 0,1,2,3,or 4,or if already off-hook.

Command options:

#VLS?   This query returns the current setting of the #VLS command as an ASCII decimal value in result code format.

#VLS=?   This query requests a report of the device types available for selection. The response is a series of numbers separated by commas, and each number indicates a device position number. Currently, device position numbers do happen to correspond to device type numbers as 0,1,2,3,or 4, but this correlation is not required (i.e.,0's could be placed in the first few device position number locations to correspond to multiple telephone line connections.)

#VLS=n   where n=0   telephone line with telephone set (Default)

1   transmit/receive device (handset)

2   transmit only device (on-board speaker)

3   receive only (microphone)

4   telephone line with speaker on and handset

#VLS=0   The default option on the modem. This command instructs the modem that when entering any of the three voice operating submodes (Online Command, Transmit, or Receive), that the telephone line interface should be routed through the modem. The OK response is sent to the DTE, and any previous connection is lost(i.e.,the modem ends up on-hook as a result of issuing this command to connect to the telephone line).

#VLS=1   This command instructs the modem to route only the handset through the modem. This setting can be chosen before   recording a greeting message.

#VLS=2   This command instructs the modem to route only the speaker through the modem. This setting can Command Mode, and the VCON response is generated for completeness. However, since this is an output only device, nothing of consequence can happen until the DTE sends the #VTX command.

#VLS=3   This command instructs the modem that only the auxiliary input device (microphone) should be routed through the modem. This setting can be chosen before recording a greeting message.

#VLS=4   This command is the same as #VLS=0,except that the modem enables the internal speaker as well as the telephone line/handset circuit.

AT#VRA   Ringback Goes Away Timer(Originate)
This command can be used, when originating a voice call(#CLS=8)to set the "Ringback Goes Away" timer value,i.e.,an amount of time (in units of 100ms) measured from when the ringback cadence stops once detected. If ringback is not detected within this period, the modem assumes that the remote has picked up the line and switches to Online Voice Command Mode. Every time a ringback cycle is detected, this timer is reset.

Parameters: n=0-255 (0-25.5 seconds); Default: 70 (7,000ms)

Result Code: OK   If n=0-255
                                   ERROR   Otherwise.

Command options:

#VRA?   Returns the current setting of the #VRA command as an ASCII decimal value in result code format.

#VRA=?   Returns the message,"0-255".

#VRA=0   Turns off the "ringback goes away timer."After one ringback, the dialing modem sends VCON and enters Online Voice Command Mode immediately.

#VRA=n   Where n defines the period without ringback(after at least one ringback has been detected)in 100 ms units.

AT#VRN   Ringback Never Came Timer(Originate)
This command can be used when originating a voice call(#CLS=8)to set the "Ringback Never Came" timer value, i.e., an amount of time (in units of 100 ms) measured from completion of dialing. If ringback is not detected within this period, the modem assumes the remote has picked up the line and switches to Online Voice Command Mode.

Parameters: n=0-255 (0-25.5 seconds); Default: 100 (10,000ms)

Result Code: OK   If n=0-255.
                                   ERROR   Otherwise.

Command options:

#VRN?   Returns the current setting of the #VRN command as an ASCII decimal value in result code format.

#VRN=?   Returns the message,"0-255".

#VRN=0   Turns off the "righback never came timer". After dialing, the modem sends
                         VCON and immediately enters Online Voice Command Mode.

#VRN=n   Where n defines the period without ringback after dialing in 100 ms units.

AT#VRX   Voice Receive
This actin command is only valid if the modem is in the Online Voice Command Mode (indicated previously with the VCON message), and is the switch to the Voice Receive Mode. This command is used when a voice file is to

be received from the line, microphone, or handset. The #VLS command should have been previously issued to select the input source.

           Parameters: None

           Result Codes:

                  CONNECT   When voice transfer from modem to DTE can begin.

                  ERROR   If #VLS=0 and not connected to any input device.

AT#VSD   Enable Silence Detection (Voice Receive)

           This command is used to enable or disable Voice Receive Mode silence deletion.

           Parameters: n=0 or 1; Default: 0   or 1

           Result Code: OK   If n=1

                                ERROR   Otherwise

           Command options:

           #VSD?   Returns the current setting of the #VSD command as an ASCII decimal value in result code format.

           #VSD=?   Returns the message ,"1".

           #VSD=0   Turns off the silence deletion.

           #VSD=1   Turns on the silence deletion if the silence sensitivity setting #VSS is nonzero.

                  The aggressiveness of the silence deletion is controlled by #VSS.

AT#VSK   Buffer Skid Setting

          This command queries and sets the number of bytes