Look

I101 V.90/K56flex MODEM USER'S MANUAL

TABLE OF CONTENT

1. Contents of Package
2. Comprehensive Modem Installation Instructions

3. Troubleshooting

Section 1   Contents of Package

- One V.90/K56flex PCI bus window modem
- One telephone cable
- One CD-ROM disk comprises Communication software, Modem Driver & User's Manual
- Quick installation guide

   Please contact the place of purchase if any of the above listed items are missing.
   Speaker and microphone are additional accessories. User can purchase seperately by personal favoriate.

Section 2   Comprehensive Modem Installation Instructions

Section 2.1   System Requirements

The modem operates on a personal computer equipped with the following:

- Windows 95 / 98 / NT4.0 operating system
- MMX Compatible CPU, Pentium 200 or above is recommomded

- 8 MB hard disk space
- 16 MB RAM
- One vacant 32-bit PCI slot
- One available IRQ: 3 through 15

Section 2.2   Hardware Installation

Please refer to Fig. 2 - 1 and proceed to following steps for how to insert your modem into the computer and connect telephone wire and audio accessories.
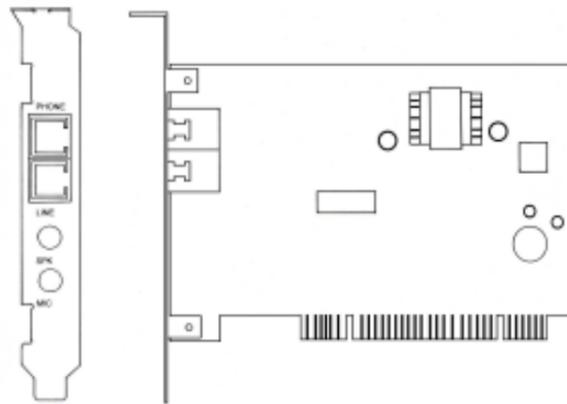

FIGURE 2-1 Internal modem diagram

1.	Turn off and unplug your computer from the AC outlet.
2.	Unplug any peripheral devices (keyboard, monitor, etc.) from your computer to avoid the risk of electric shock.
3.	Take the cover off your computer, review computer's manual if you need further instructions.
4.	Find an empty PCI slot.
5.	Unscrew the PCI slot bracket and save the screw, then remove the bracket.
6.	Plug the modem into the PCI slot carefully until the modem is properly seated.
7.	Fasten the modem bracket firmly with the screw saved in step 5.
8.	Reassemble your computer cover and re-plug cables for peripheral.
9.	Plug one end of telephone cord into the **"LINE"** jack at the modem's bracket. Plug another end of the telephone cord into the telephone wall jack
10.	Some models may comprise a phone jack for an optional telephone. If you wish to use a phone through the same telephone wall jack when the modem is not in use, plug the telephone cord of the phone into **"PHONE"** jack at the modem's bracket now. Lift the handset and listen for a dial tone to check for a properly connection.
11.	Connect the **"SPK"** and **"MIC"** jack to speaker and microphone respectively.
12.	Plug the power cord into the computer and turn the computer on.
13.	Up to now, the hardware installation has been finished. If you have not encountered any problems, you can go to **Section 2.3 System Setup**. If you are having problems, see **Section 3 Troubleshooting.**

NOTE : The telephone wall jack you use must be for an ANALOG phone line (the type found in most homes). Many offices are equipped with digital phone lines. Please be sure you know which type of line you have. The modem will be damaged if you use a digital phone line.

Section 2.3   System Setup

Section 2.3.1 Setup instructions for Windows 98

STEP 1.   After you complete the modem hardware installation and turn on your PC, Windows system will automatically detect your new added devices.Windows system will then prompt you with a Add New Hardware Wizard screen as shown in figure.

Then click on **Next**.

STEP 2.   A prompt screen will ask you to select **"search for the best driver for your device"** or display a list of all the drivers in a specific location, so you can select the driver you want". Please select the recommended one as shown in figure.

Then click on **Next**

STEP 3.   And then, a prompt screen will ask you to indicate where your driver is located, "floppy disk drives", **"CD-ROM drive"**, "Microsoft Windows Update" or "specify a location:". Please select "CD-ROM drive" as shown in figure.

Insert the **Modem Driver** CD-ROM disk attached with your modem into the CD-ROM drive device then click on **Next**.

STEP 4.   Click NEXT to update recommended driver.

STEP 5.   Then, a prompt screen indicates Windows has found the best driver for your modem as
                     shown   in figure.

Please make sure the source of your driver is correct then click on **Next**.

STEP 6.   Click on **Finish** to complete the modem installation.

STEP 7.   The system will restart your system. If there is no error message while the system is re-booting, your
                     modem has been set up properly and functionally.

Section 2.3.2 Setup instructions for Windows 95

Before you start the installation for Windows 95, please check your version of Windows 95 prior to system setup. Please open **My Computer** window then click on **Control Panel**. When the **Control Panel** window opened, double click the **System** icon and click on the **General** tab. The **General** tab will show you that you have the **Windows 95 Version 4.00.950B"**, **Windows 95 Version 4.00.950A"** or **Windows 95 Version 4.00.950"**. Take note of the version and go to the next appropriate step.

Setup instructions for Windows 95 Version 4.00.950B

STEP 1.   After you complete the modem hardware installation and turn on your PC. Windows system will automatically detect your new added devices. Windows system will then prompt you with an **Update Device Driver Wizard** screen, as shown in figure.
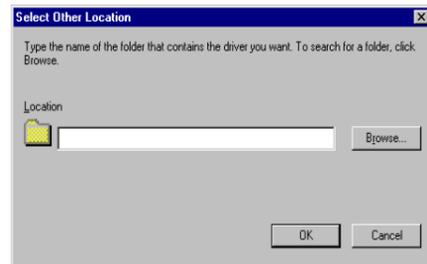

Please insert the **Modem Driver** CD-ROM disk into your CD-ROM drive device D:\, then click on the **Next**.

STEP 2.   Then a prompt screen will advise you the Windows system can not locate a driver for your modem, as shown in figure.

`   Please click on **Other Locations**.

STEP 3.   Then a prompt screen will ask you to locate the driver for your modem as shown in figure.
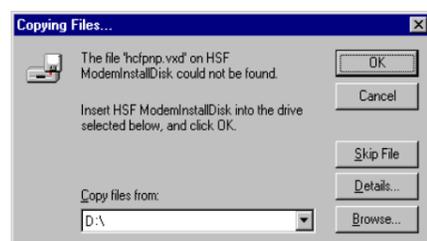

Please browse the CD-ROM disk directory at **D:** and select the exact driver. Then click on **OK**.

STEP 4.   Then, a prompt screen will advise you and confirm the modem? driver has been found, as shown in figure.

Then click on **Finish**.

Note: If installation wizard shows following prompt window, specify the driver directory again and click **OK**.

STEP 5.   The system will prompt with another **Update Device Driver Wizard** screen with the phrase **Wave Device for Voice Modem**. Please insert the **Modem Driver** disk attached with your modem into the CD-ROM drive device **D:**. Then go through the **STEP 1** and **STEP 4** again.

STEP 6.   If you are not encountered any problem through the **STEP 1** to **STEP 5**, you will be prompted to restart system. If there is no error message, your modem has been set up properly and functionally.

Setup instructions for Windows 95 Version 4.00.950(or .950A)

STEP 1.   After you complete the modem hardware installation and turn on your PC. Windows system will automatically detect your new added devices. Windows system will then prompt you with a **New Hardware Found** screen as shown in figure.

On this screen it will ask you **"elect which driver you want to install your new hardware"**, please select **"river from disk provided by hardware manufacturer"**. Then click on **OK**.

STEP 2.   And then, a prompt screen may ask you to locate where your driver is from, as shown in figure. Please insert the **Modem Driver** disk attached with your modem into CD-ROM drive device **D:\.**
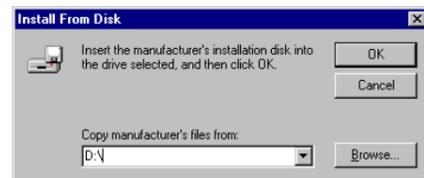
Then click on **OK**.

STEP 3.   The system will prompt with another **"New Hardware Found"** screen with the phrase **"Have Device for Voice Modem"**. Please insert the **Modem Driver** disk attached with your modem into the CD-ROM drive device **D:\.** Then go through the **STEP 1** and **STEP 2** again

STEP 4.   If you are not encountered any problem through the **STEP 1** to **STEP 3**, please turn off your PC and restart it. If there is no any error message, your modem has been set up properly andfunctionally.

Section 2.3.3 Uninstall Modem in Windows 98/95

In any reason, you want to remove or reinstall the modem. Please follow the steps below to completely uninstall the modem.

STEP 1. Click on the **Add/Remove Programs** icon in **CONTROL PANEL**.

STEP 2. Select " **Connexant SoftK56 Modem"** under the **Install/Uninstall** tab and click the **ADD/Remove** button
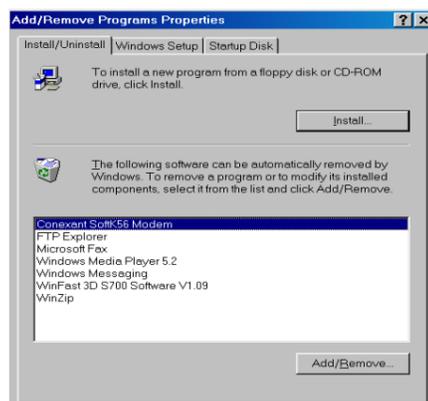
STEP 3. When the uninstall is completed, the INF files , VXDs and registry information caused by modem installation will also be cleared. Click **Yes** to remove modem driver.

Section 2.3.4 Setup Instructions for Windows NT4.0

STEP 1. Run "SETUP.EXE" in "\Driver\NT40\SETUP.EXE" and click **NEXT** for next step.
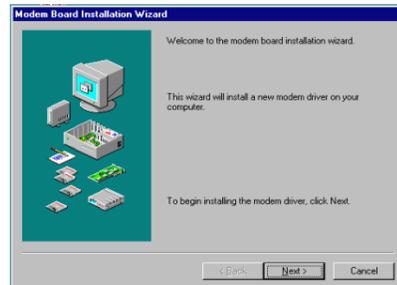
STEP 2. Click **NEXT** for next step.
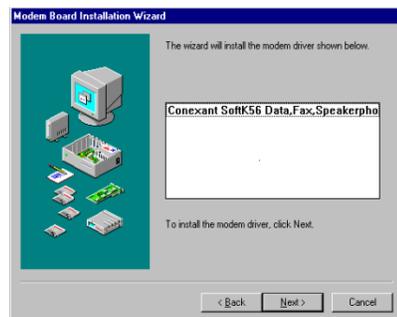
STEP 3. The Installation Wizard will automatically install the driver. Click **FINISH** when the process is completed.

Section 2.3.5 Uninstall Modem in Windows NT4.0

STEP 1. Click on the **Add/Remove Programs** icon in **CONTROL PANEL**.

STEP 2. Select **" Connexant SoftK56 PCI Modem(Uninstall only)"** under the **Install/Uninstall** tab and click the **ADD/Remove** button
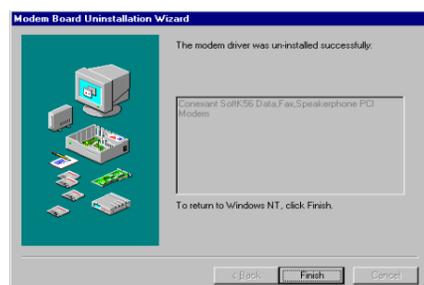

STEP 3. Click **Next** to uninstall the modem driver
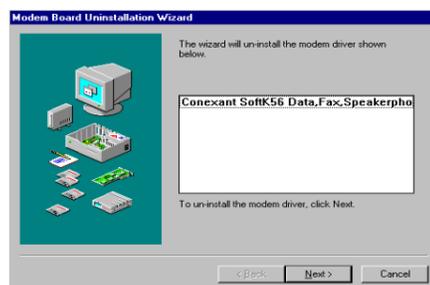
STEP 4. The Uninstallation Wizard will automatically install the driver. Click **FINISH**.

STEP 5. Click **Yes** to re-boot your system and complete the uninstallation.

Section 2.4   Testing and Your Modem

Before you set up your software, start with a quick test to check that your modem is working. Once you have determined that your modem is setup properly, go on to **Section 2.6 Install Communication Software** to install your communications software. If you are having problems, see **Section 3 Troubleshooting**.

Click on **Start** and point to **Setting**. Then click on **Control Panel**. When the **Control Panel** window opens. Scroll down to the **Modem** icon and double click on it. Click on the **Diagnostics** tab and highlight the COM port for your modem. Then click on **More Info**, your computer will automatically communicate with your new modem using AT commands and receiving responses from your modem. A list of response means the modem is setup properly.

Section 2.5   Install Communication Software

You can install the communication software from the CD-ROM disc attached with your new modem. Please consult the software manual in the CD-ROM disc for the detail of software installation.

You do not have to use the communication software attached with your new modem. The modem was designed for and tested using a wide range of communications software packages. Many communication applications identify the modem automatically and configure themselves for the correct operating settings. Some of the communication applications will ask you to select the type of modem you are using. Select a **Generic Fax class 1 modem** will let you use basic communication and fax functions.

Section 3   Troubleshooting

Your modem is designed to provide reliable and trouble-free functionality, however, should you experience any difficulty, the information contained in this section will assist you in determining and resolving the source of the problem.

Problem: Modem does not respond to AT commands
Possible solutions:
1.   Make sure the modem is not configured with a conflicting COM port and IRQ setting. Make sure the communication software is configured with the correct COM and IRQ settings (the same COM port and IRQ as the modem). Your communications software will not be able to send or receive any data if it is not configured to match the COM port and IRQ settings for the modem.

        DOS based communication program is not working with this modem neither can you operate the modem in MS-DOS prompt screen.

2.   Make sure the modem is properly initialized using the driver software. The software may improperly initialize your modem because you have selected an incorrect modem type. You may also be prompted to enter an initialization string by the software. Use AT&F as your initialization string.

Problem: Modem dials but does not connect
Possible solutions:
1.   Be sure the IRQ setting is identical on the modem and the software.
2.   Make sure that the phone line is working properly. A noisy line will prevent proper modem operation.

Problem: Modem makes a connection but no data appears on screen
Possible solutions:
3.   Make sure all communication parameters (baud rate, data, stop, and parity bits) are properly configured and are identical on both sides. Be certain hardware flow control (RTS/CTS - default) is enabled in both the modem and the communication software.
4.   Press the ENTER key several times. The remote system may be waiting to receive your data before it begins.
5.   Make sure the correct terminal emulation mode is being used in the software (refer to software manual).

Problem: Modem displays errors while on-line with a remote modem
Possible solutions:
6.   Make sure Call Waiting is turned off.
7.   Make sure RTS/CTS hardware flow control is enabled (do not use XON/XOFF software flow control when transferring binary files).
8.   Make sure the data speed is not faster than your computer capability. Operating too many applications at the same time may cause communication problem. Close unnecessary application in your system.

Problem: Modem exhibits poor voice recording or playback

Possible solutions:

9. Make sure the correct modem type is selected in the Voice/FAX software. Volume adjustment is available in control panel.

10. Make sure your computer is fast enough to handle voice operations (38.4 Kbps). Voice operations are CPU intensive and require a better CPU sharing when running under Windows.

Problem: No dial tone

Possible solutions:

11. Ensure that the telephone cord it securely connected at both modem and wall outlet.

12. Unplug the telephone cord from the computer and connect it directly to a telephone from the wall outlet. Check for a dial tone. If there is none, the problem is in the telephone cord or system. Call your telephone service provider.

13. Double-check your country setting. Different country setting will cause different modem performance. Please select the correct country as you located.

14. Check modem performance with a direct line from your telephone company. Some PBXs may cause the telephone line condition change and affect modem performance.

Problem: The modem does not answer incoming calls

Possible solutions:

15. Ensure that the automatic answer parameter is set to one of the enabled options, using the ATS0 command (ATS0=1 to answer after one ring, and so on).

16. Ensure that no other devices, such as fax or answering machines, are answering calls before the modem does.

If you can not resolve your situation after reading this section, contact your dealer or vendor for assistance.

Appendix 1   Specifications

Modulation standard   : V.90, K56 flex, V.34+, V.34, V.32bis, V.32, V.29, V.27ter, V.22bis, V.23,V.22, V.21,
                                       V.17, Bell212/103
Compression   : V.42bis, MNP Class 5
Error Correction   : V.42, MNP Class 2-4
Host Interface   : PCI bus
FAX Group   : Group III
FAX Command   : EIA/TIA 578 class 1
VOICE Command   : IS - 101
Transmit level   : -10 dBm +/- 1 dB
Sensitivity   : -43 dBm
Power   : 0.75 W max
Temperature   : 0 to 55 degrees C, operating; -20 to 80 degrees C, non-operating

Appendix 2   AT Commands

SYNTAX AND PROCEDURES

The command and response syntax and procedures generally conform to referenced recommendations and standards. Since these recommendations and standards describe characteristics universal to a large installed base of modems to a maximum degree, there may be syntax and procedural differences due to extensions and behavioral differences in implemented commands, parameters, and responses beyond that described in these recommendations and standards.

The syntax and procedures described in this section are based on V.25ter with additional information included for implemented extensions and behavioral differences beyond V.25ter.

Alphabet

The T.50 International Alphabet 5 (IA5) is used in this document. Only the low-order seven bits of each character are significant to the modem; any eighth or higher-order bit(s), if present, are ignored for the purpose of identifying commands and parameters. Lower-case characters are considered identical to their upper-case equivalents when received by the modem from the DTE. Result codes from the modem are in upper case.

DTE Commands Lines

Words enclosed in <angle brackets> are references to syntactical elements. The brackets are not used when the words appear in a command line, the brackets are not used. Words enclosed in [square brackets] represent optional items which may be omitted from the command line at the specified point. The square brackets are not used when the words appear in the command line. Other characters that appear in syntax descriptions must as included as shown.

Any modem responses are mentioned in terms of their alphabetic format; the actual response issued will depend on the setting of parameters that affect response formats, e.g., Q and V commands.

Command Line General Format

A command line is made up of three elements: the prefix, the body, and the termination character. The command line prefix consists of the characters "AT" or "at" or, to repeat the execution of the previous command line, the characters "A/" or "a/".

The body is made up of individual commands described in this document. Space characters (IA5 2/0) are ignored and may be used freely for formatting purposes, unless they are embedded in numeric or string constants. The termination character may not appear in the body. The modem can accept at least 40 characters in the body. The termination character may be selected by a user option (parameter S3), the default being CR.

Types of DTE Commands

There are two types of commands: action commands and parameter commands. Commands of either type may be included in command lines, in any order.

Action commands may be "executed" (to invoke a particular function of the equipment, which generally involves more than the simple storage of a value for later use), or "tested" (to determine whether or not the equipment implements the action command, and, if subparameters are associated with the action, the ranges of subparameter values that are supported).

Parameters may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine whether or not the equipment implements the parameter, and the ranges of values supported).

Appendix 2.1 DATA COMMAND SET

A2.1 COMMAND GUIDELINES

The commands used to control and report modem operation in data modem mode are defined in this section. The default values are typical of a fully configured modem supporting all data rates and options. The actual default value is defined by manufacturer.

Commands will only be accepted by the modem once the previous command has been fully executed, which is normally indicated by the return of an appropriate result code. Execution of commands D and A, either as a result of a direct command or a re-execute command, will be aborted if another character is entered before completion of the handshake.

A2.1.1 Escape Code Sequence

When the modem has established a connection and has entered on-line data mode, it is possible to break into the data transmission in order to issue further commands to the modem in an on-line command mode. This is achieved by the DTE sending to the modem a sequence of three ASCII characters specified by register S2. The default character is '+'. The maximum time allowed between receipt of the last character of the three escape character sequence from the DTE and sending of the OK result code to the DTE is controlled by the S12 register.

A2.1.1.1 +FCLASS=0- Select Data Modem Mode

+FCLASS=0 selects the Data Modem Mode. The Data Modem Mode commands and responses described in this section are applicable when command +FCLASS=0. (See Section 3.2.1.2 for the definition of the FCLASS command.)

A2.2 DATA COMMANDS

The modem will respond to the commands detailed below. Parameters applicable to each command are listed with the command description.

A2.2.1 Generic Modem Control

A2.2.1.1 Z - Reset to Default Configuration

This command instructs the modem to reset to default values as altered by non-volatile parameter storage. If the modem is connected to the line, it will be disconnected from the line, terminating any call in progress.

All of the functions of the command are completed before the modem issues the result code. The DTE should not include additional commands on the same command line after the **Z** command because such commands are ignored.

A3.2.1.2 \N <mode> **- Operating Mode**

This command controls the preferred error correcting mode to be negotiated in a subsequent data connection.

Defined Values

<mode> Decimal number which corresponds to the selected mode.

    0   Selects normal speed buffered mode (disables error-correction mode) and forces &Q6 (selects asynchronous operation in normal mode.)

    1   Same as \N0.

    2   Selects reliable (error-correction) mode and forces &Q5 (the modem will try to negotiate an error corrected link). 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.

3   Selects auto reliable mode and forces &Q5 (the modem will try to negotiate an error corrected link). 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.

4   Selects LAPM error-correction mode and forces &Q5 (the modem will try to negotiate an error corrected link). Failure to make an LAPM error-correction connection results in the modem hanging up.

5   Selects MNP error-correction mode and forces &Q5 (the modem will try to negotiate an error corrected link). Failure to make an MNP error-correction connection results in the modem hanging up.

A3.2.1.3 &F - Set to Factory-Defined Configuration

This command instructs the modem to set all parameters to factory default values defined in the product Configuration Table. The modem loads the factory default configuration (profile). The factory defaults are identified for each command and in the S-Parameter descriptions. A configuration (profile) consists of a subset of S-Parameters.

A3.2.1.4 &T [<value>] - Local Analog Loopback Test

The modem will perform the local analog loopback test if &T1 is selected. The test can be run only when in an asynchronous operation in non-error-correction mode (normal). To terminate the test in progress, the escape sequence must be entered first. If S18 is non-zero, the test will terminate automatically after the time specified by S18 and the OK result code will be reported.

Defined Values

<value> Decimal number corresponding to the selected value.

0   Terminates test in progress.

1   Initiates local analog loopback, V.54 Loop 3. 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.

A2.2.1.5 I [<value>] - Request Identification Information

This command causes the modem to report one or more lines of product information text as provided by the Product Configuration File, as selected by the <value> subparameter, followed by a final result code.

Defined Values

<value> Decimal number corresponding to the selected information.

0   <value> 0 report.

…

7   <value> 7 report.

9   <value> 9 report.

A2.2.1.6 +GMI - Request Manufacturer Identification

This command causes the modem to report the modem product manufacturer as provided by the Product Configuration File.

A2.2.1.7 +GMM - Request Model Identification

This command causes the modem to report the modem product model as provided by the Product Configuration File.

A2.2.1.8 +GMR - Request Revision Identification

This command causes the modem to report the modem version, revision level or date as provided by the Product Configuration File.

A2.2.1.9 +GSN - Request Product Serial Number Identification

This command causes the modem to report the modem product model serial number as provided by the Product Configuration File.

A2.2.1.10 +GOI - Request Global Object Identification

This command causes the modem to transmit one or more lines of information text identifying the device, based on the ISO system for registering unique object identifiers. Typically, the text consists of a single line containing numeric strings delimited by period characters. The general format of object identifiers is defined in Section 28 of ITU-T Recommendation X.208; the encoding rules are defined in ITU-T Recommendation X.209.

A2.2.1.11 +GCAP - Request Complete Capabilities List

This extended-format command causes the modem to transmit one or more lines of information text listing additional capabilities command +<name>s , which is intended to permit the user to identify the overall capabilities of the modem. In particular, if the modem implements a particular modem control standard that uses Extended Syntax Commands, and if that modem control standard includes command(s) that indicate general capabilities, the +<names>(s) of those commands will be reported to the modem in response to a +GCAP command.

A2.2.1.12 +GCI=<COUNTRY_CODE> **- Country of Installation**

This extended syntax command indicates and selects the country of installation for the modem. This parameter selects the settings for any operational parameters that need to be adjusted for national regulations or telephone networks.

Defined Values

<country_code> 8-bit country code from Annex A of T.35. The value is the hexadecimal equivalent of the T.35 code, with bit 8 treated as the most significant bit and bit 1 treated as the least significant bit.

Default

If the modem is specified for use in only one country, that country code is the default. Otherwise, the default is the expected country of sale or first installation. The modem may use hardware means to select the country of installation, in which case the modem uses that to determine the default value.

Reporting Current or Selected Values

Command: +GCI?

Response: +GCI: <current country_code>

A2.2.1.13 +VCID=<pmode> **- Caller ID (CID)**

This command controls the reporting and presentation of data associated with the Caller ID services in the U.S. and Canada in the Incoming Call Line ID (ICLID) data format.

Defined Values

<pmode> Decimal number corresponding to the selected option.

    0   Disable Caller ID reporting. (Default).

    1   Enables Caller ID with formatted presentation to the DTE. The modem will present the data items in a <Tag><Value> pair format. The expected pairs are data, time, caller code (telephone number), and name.

    2   Enables Caller ID with unformatted presentation to the DTE.

Reporting Current or Selected Values

Command: +VCID?

Response: +VCID: <pmode>

A2.2.2 DTE-Modem interface commands

The parameters defined in this section control the operation of the interface between the DTE and modem.

A2.2.2.1 E [<value>] - Command Echo

The modem enables or disables the echo of characters to the DTE according to the parameter supplied.

Defined Values

<value> Decimal number corresponding to the selected option.

    0   Disables command echo.

    1   Enables command echo. (Default.)

A2.2.2.2 Q [<value>] - 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.

Defined Values

<value> Decimal number corresponding to the selected option.

    0   Enables result codes to the DTE. (Default.)

    1   Disables result codes to the DTE.

A2.2.2.3 V [<value>] - Result Code Form

This command selects the sending of short-form or long-form result codes to the DTE.

Defined Values

<value> Decimal number corresponding to the selected option.

    0   Enables short-form (terse) result codes. Line feed is not issued before a short-form result code.

    1   Enables long-form (verbose) result codes. (Default.)

A2.2.2.4 W [<value>] - Connect Message Control

This command controls the format of CONNECT messages. Note that the W command can be overridden by register S95 bits (see S95 description).

Defined Values

<value> Decimal number corresponding to the selected option.

0   Upon connection, the modem reports only the DTE speed (e.g., CONNECT 19200). Subsequent responses are disabled. (Default.)

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

2   Upon connection, the modem reports the DCE speed (e.g., CONNECT 14400). Subsequent responses are disabled.

3   Upon connection, the modem reports DCE speed and the error correction protocol.

A2.2.2.5 X[<value>] - 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 dial 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 3-5 indicates the messages which are enabled for each X value.

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

Defined Values

<value> Decimal number corresponding to the selected option.

0   CONNECT result code is given upon entering online data state. Dial tone and busy detection are disabled.

1   CONNECT <text> result code is given upon entering online data state. Dial tone and busy detection are disabled.

2   CONNECT <text> result code is given upon entering online data state. Dial tone detection is enabled, and busy detection is disabled.

3   CONNECT <text> result code is given upon entering online data state. Dial tone detection is disabled, and busy detection is enabled.

4   CONNECT <text> result code is given upon entering online data state. Dial tone and busy detection are both enabled. (Default.)

A2.2.2.6 &C[<value>] - RLSD Behavior

This parameter determines how the state of the Received Line Signal Detector (RLSD) output relates to the detection of received line signal from the distant end. Changing the parameter will take effect immediately in both the command and online command states.

In &C1 mode of operation, RLSD is not turned off until all data previously received from the remote modem is delivered to the local DTE. However, such buffered data will be discarded and RLSD will be turned off if the DTE turns off DTR (if &D1 or &D2 is set).

Defined Values

<value> Decimal number corresponding to the selected option.

0   RLSD is always ON.

1   RLSD follows the state of the carrier. (Default.)

A2.2.2.7 &D[<value>]**- DTR Behavior**

This parameter determines how the modem responds when the Data Terminal Ready (DTR) input is changed from the ON to the OFF condition during online data state.

Defined Values

<value> Decimal number corresponding to the selected option.

  0   Modem ignores DTR.

  1   Upon an on-to-off transition of DTR, the modem enters online command state and issues an OK result code; the call remains connected.

  2   Upon an on-to-off transition of DTR, the modem instructs the underlying modem to perform an orderly cleardown of the call. The disposition of any data in the modem pending transmission to the remote modem is controlled by the +ETBM parameter; otherwise, this data is sent before the call is cleared, unless the remote modem clears the call first (in which case pending data is discarded). The modem disconnects from the line. Automatic answer is disabled while DTR remains off.

A2.2.2.8 &K[<value>] **- Flow Control**

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

Defined Values

<value> Decimal number corresponding to the selected option.

  0   Disables flow control.

  3   Enables RTS/CTS flow control. (Default for data modem modes.)

  4   Enables XON/XOFF flow control.

  5   Included for compatibility only and has no effect other than returning an OK result code.

  6   Included for compatibility only and has no effect other than returning an OK result code.

A2.2.2.9 &M[<mode>] **- Asynchronous/Synchronous Mode Selection**

This command is included for compatibility only and has no effect other than returning a result code. The only valid values are 0-3.

A2.2.2.10 &Q[<mode>] **- Sync/Async Mode**

This command determines the DTR operating mode. (Also, see \N.)

  NOTE: When the &Q0 is issued to select the mode, the subsequent connect message will report the DCE speed regardless of the W command and S95 settings.

Defined Values

<mode > Decimal number corresponding to the selected mode:

  0   Selects asynchronous operation in normal mode (speed buffering)

  1   Selects asynchronous operation in normal mode (speed buffering)

  2   Selects asynchronous operation in normal mode (speed buffering)

  3   Selects asynchronous operation in normal mode (speed buffering)

  6   Selects asynchronous operation in normal mode (speed buffering).

A2.2.2.11 +IFC=[<modem_by_DTE>[,<DTE_by_modem>]] **- DTE-Modem Local Flow Control**

This extended-format compound parameter controls the operation of local flow control between the DTE and the modem during the data state when V.42 error control is used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters.

Defined Values

<modem_by_DTE> Specifies the method to be used by the DTE to control the flow of received data from the modem.

- 0 None.
- 1 XON/XOFF on transmitted data (XON/XOFF on transmit data); do not pass XON/XOFF characters to the remote modem.
- 2 Circuit 133 (Ready for Receiving). (Default.)

<DTE_by_modem> Specifies the method to be used by the modem to control the flow of transmitted data from the DTE.

- 0 None.
- 1 XON/XOFF on received data.
- 2 CTS/RTS. (Default.)

Reporting Current or Selected Values

Command: +IFC?

Response: +IFC: <modem_by_DTE>,<DTE_by_modem>

A2.2.2.12 +ILRR=<value> **- DTE-Modem Local Rate Reporting**

This extended-format numeric parameter controls whether or not the extended-format +ILRR:<rate> information text is transmitted from the modem to the DTE.

Defined Values

<value> Decimal number corresponding to the selected option.

- 0 Disables reporting of local port rate (+ILRR: is not transmitted).
- 1 Enables reporting of local port rate (+ILRR: is transmitted).

Reporting Current or Selected Values

Command: +ILRR?

Response: +ILRR: <current value>

A2.2.3 Call Control

A2.2.3.1 D<modifier> **- Dial**

This command directs the modem to go on-line, dial according to the entered string and attempt to establish a connection. If no dial string is supplied, the modem will go on-line and attempt the handshake in originate mode.

> **NOTE:** If the ATD command is issued before the S1 register has cleared, the modem will respond with the NO CARRIER result code.

If +FCLASS=0 is selected, the modem will behave as a data modem and will attempt to connect to another data modem. The modem will have up to the period of time specified by register S6 or S7 to wait for carrier and complete the handshake. If this time expires before the modem can complete the handshake, the modem will go on-hook with the NO CARRIER response.

This command will be aborted upon receipt of any DTE character before completion of the handshake. If +FCLASS=1 or 1.0 is selected, the modem will behave as a facsimile modem and attempt to connect to a facsimile machine (or modem) by entering the HDLC V.21 channel 2 receive state (as if +FRH=3 had been issued). This command will be aborted upon receipt of any DTE character if the modem has not finished dialing. In this case, the modem will go on-hook and return to command mode after displaying the NO CARRIER message. If the modem finishes dialing, it will proceed as if the +FRH=3 command is issued. (Refer to the +FRH command to determine how the modem behaves following this stage.)

Defined Values

<modifier> The valid dial string parameters (modifiers) are described below. Punctuation characters may beused for clarity, with parentheses, hyphen, and spaces ignored.

0-9 DTMF digits 0 to 9.

A-D DTMF digits A, B, C, and D. Some countries may prohibit sending of these digits during dialing.

L Re-dial last number: the modem will re-dial the last valid telephone number. The L must be immediately after the D with all the following characters ignored).

P Select pulse dialing: pulse dial the numbers that follow until a "T" is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.

T Select tone dialing: tone dial the numbers that follow until a "P" is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.

W Wait for dial tone: the modem will wait for dial tone before dialing the digits following "W". If dial tone is not detected within the time specified by S7 or S6, the modem will abort the rest of the sequence, return on-hook, and generate an error message.

* The 'star' digit (tone dialing only).

The 'gate' digit (tone dialing only).

+

! Flash: the modem will go on-hook for a time defined by the value of S29. Country requirements may limit the time imposed.

@ Wait for silence: the modem will wait for at least 5 seconds of silence in the call progress frequency band before continuing with the next dial string parameter. If the modem does not detect these 5 seconds of silence before the expiration of the call abort timer (S7), the modem will terminate the call attempt with a NO ANSWER message. If busy detection is enabled, the modem may terminate the call with the BUSY result code. If answer tone arrives during execution of this parameter, the modem will handshake.

$ Wait for credit card dialing tone before continuing with the dial string. If the tone is not detected within the time specified by S7 or S6, the modem will abort the rest of the sequence, return on-hook, and generate an error message.

& Wait for credit card dialing tone before continuing with the dial string. If the tone is not detected within the time specified by S7 or S6, the modem will abort the rest of the sequence, return on-hook, and generate an error message.

, Dial pause: the modem will pause for a time specified by S8 before dialing the digits following ",".

;   Return to command state. Added to the end of a dial string. This causes the modem to return to the command state after it processes the portion of the dial string preceding the ";". This allows the user to issue additional commands while remaining off-hook. The additional commands may be placed in the original command line following the ";" and/or may be entered on subsequent command lines. The modem will enter call progress only after an additional dial command is issued without the ";" termina tor. Use "H" to abort the dial in progress, and go back on-hook.

^   Toggles calling tone enable/disable: applicable to current dial attempt only.

( )   Ignored: may be used to format the dial string.

-       Ignored: may be used to format the dial string.

<space> Ignored: may be used to format the dial string.

A2.2.3.2 T - 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-Parameter bit to indicate that all subsequent dialing should be conducted in tone mode. Note that the DP command will override this command. Clears S14 bit 5. This command may not be permitted in some countries. (See P.)

A2.2.3.3 P - Set Pulse Dial Default

This command forces pulse dialing until the next T dial modifier or T command is received. 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. (See T command.) This command may not be permitted in some countries.

A2.2.3.4 A - Answer

The modem will go off-hook and will attempt to answer an incoming call if correct conditions are met. Upon successful completion of answer handshake, the modem will go on-line in answer mode. This command may be affected by the state of Line Current Sense, if enabled. (Most countries do not require Line Current Sense.) Operation is also dependent upon +FCLASS command and country-specific requirements.

If +FCLASS=0 is selected, the modem will enter the connect state after exchanging carrier with the remote modem. If no carrier is detected within a period specified in register S7, the modem will hang up. Any character entered during the connect sequence will abort the connection attempt.

If +FCLASS=1.0 is selected, the modem will go off-hook in V.21 answer mode. It will generate the V.21 2100 Hz answer tone for 3 ± 0.5 seconds. Following a delay of 70 ms, it will proceed as if the +FTH=3 command were issued. At any stage up to (but excluding) the +FTH=3 command state, any character will abort the communication. (See the description of the +FTH command for details.)

A2.2.3.5 H[<value>] - Disconnect (Hang-Up)

This command initiates a hang up sequence. This command may not be available for some countries due to PTT restrictions.

Defined Values

<value> Decimal number corresponding to the selected option.

0   The modem will release the line if the modem is currently on-line.

1   If on-hook, the modem will go off-hook and remain in command mode.

A2.2.3.6 O[<value>] **- Return to On-Line Data Mode**

This command specifies that the modem will enter the on-line data mode from the on-line command mode with or without a retrain. If in the off-line command mode when this command is entered, the modem reports ERROR.

Defined Values

<value> Decimal number corresponding to the selected option.

0   Enters on-line data mode from the on-line command 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 (+++).

1   Performs a retrain then enters on-line data mode from the on-line command mode.

A2.2.3.7 L[<value>] **- Speaker Volume**

This command sets the speaker volume control according to the parameter supplied.

Defined Values

<value> Decimal number corresponding to the selected option.

0   Off.

1   Low volume. (Default.)

2   Medium volume.

3   High volume.

A2.2.3.8 M[<value>] **- Speaker Control**

This command controls speaker on or off according to the supplied parameter.

Defined Values

<value> Decimal number corresponding to the selected option.

0   Speaker off.

1   Speaker on during call establishment, but off when receiving carrier. (Default.)

2   Speaker on.

3   Speaker is off when receiving carrier and during dialing, but on during answering.

A2.2.3.9 &G[<value>] **- Select Guard Tone**

This command is included for compatibility only and has no effect other than returning an OK result code.

Defined Values

<value> Decimal number corresponding to the selected option.

0   Included for compatibility only and has no effect other than returning an OK result code. (Default.)

1   Included for compatibility only and has no effect other than returning an OK result code.

2   Included for compatibility only and has no effect other than returning an OK result code.

A2.2.3.10 &P[<value>] **- Select Pulse Dial Make/Break Ratio**

This command determines the make/break ratio used during pulse dialing. It is only effective if the appropriate bit to enable this command is set through the Product Configuration File. If enabled, it will override the make/break ratios in the OEM parameters in the Product Configuration File. The default is country-dependent.

Defined Values

<value> Decimal number corresponding to the selected information.

    0   Selects 39%-61% make/break ratio at 10 pulses per second. (Default.)

    1   Selects 33%-67% make/break ratio at 10 pulses per second.

    2   Selects 39%-61% make/break ratio at 20 pulses per second.

    3   Selects 33%-67% make/break ratio at 20 pulses per second.

A2.2.3.11 &V - Display Current Configuration and Stored Profile

This command reports the current (active) configuration and the stored (user) profiles.

A2.2.3.12 &W - Store Current Configuration

This command saves the current (active) configuration (profile), including S-Parameters, in Product Configuration File. The current configuration is comprised of a list of storable parameters illustrated in the &V command. These settings are restored to the active configuration upon receiving an Z command or at power up.

A2.2.3.13 *B - Display Blacklisted Numbers

This command requests the modem to return a list of blacklisted numbers to the DTE. The format of the response is shown by the example below. Permanently forbidden numbers as defined by country requirements will not appear on this list. If no numbers are blacklisted, only the OK result code is issued.

A2.2.3.14 *D - Display Delayed Numbers

This command causes the modem to send a list of the delayed numbers together with the delay associated with each. The modem will return a list of delayed telephone numbers as defined in the *B command. The format of the response is shown by the example below (delay times are shown as hours:minutes:seconds). If no numbers are delayed, only the OK result code is issued.

A2.2.4 Modulation Control Commands

A2.2.4.1 +MS=[<carrier>[,<automode>[,<min_tx_rate>[,<max_tx_rate>[,<min_rx_rate>[,<max_rx_rate>]]]]]] - Modulation Selection

This extended-format compound parameter controls the manner of operation of the modulation capabilities in the modem. It accepts six subparameters:

Where: Possible <carrier>, <min_tx_rate>, <max_tx_rate>, <min_rx_rate>, and <max_rx_rate values are listed in are Table 3-1 (see definitions below).

Defined Values

<carrier> A string which specifies the preferred modem carrier to use in originating or answering a connection.
        <carrier> values are strings of up to eight characters, consisting only of numeric digits and upper case letters. <carrier> values for ITU standard modulations take the form: <letter><1-4 digits><other letters as needed>. Defined values are listed in Table 2-1.

<automode> A numeric value which enables or disables automatic modulation negotiation (e.g., ITU-T V.32 bis Annex A or V.8).

    0   = Automode disabled.

    1   = Automode enabled. (Default.)

<min_rx_rate> and <max_rx_rate> Numeric values which specify the lowest (<min_rx_rate>) and highest (<max_rx_rate>) rate at which the modem may establish a receive connection. May be used to condition distinct limits for the receive direction as distinct from the transmit direction. Values for this subparameter are decimal encoded, in units of bit/s. The possible values for each modulation are listed in Table 2-1. Actual values will be limited to possible values corresponding to the entered <carrier> and fall-back <carrier> as determined during operation. (Default = lowest (<min_rx_rate>) and highest (<max_rx_rate>) rate supported by the selected carrier.)

<min_tx_rate> and <max_tx_rate> Numeric values which specify the lowest (<min_tx_rate>) and highest (<max_tx_rate>) rate at which the modem may establish a transmit connection. Non-zero values for this subparameter are decimal encoded, in units of bit/s. The possible values for each modulation are listed in Table 2-1. Actual values will be limited to possible values corresponding to the entered <carrier> and fall-back <carrier> as determined during operation. (Default = lowest (<min_tx_rate>) and highest (<max_tx_rate>) rate supported by the selected carrier.)

Reporting Current or Selected Values

Command: +MS?

Response: +MS: <carrier>,<automode>,<min_tx_rate>,<max_tx_rate>,<min_rx_rate>,<max_rx_rate>

Note: The current active settings are reported under control of the +MR parameter.

Table 2-1. +MS Command Supported Rates

Modulation	<carrier>	Possible (<min_rx_rate>, <min_rx_rate>, (<min_tx_rate>), and <max_tx_rate>) Rates (bps)
Bell 103	B103	300
Bell 212	B212	1200 Rx/75 Tx or 75 Rx/1200 Tx
V.21	V21	300
V.22	V22	1200
V.22 bis	V22B	2400 or 1200
V.23	V23C	1200
V.32	V32	9600 or 4800
V.32 bis	V32B	14400, 12000, 9600, 7200, or 4800
V.34	V34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400
V.90	V.90	56000, 54667, 53333, 52000, 50667, 49333, 48000, 46667, 45333, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000
K56flex	K56	56000, 54000, 52000, 50000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, 32000

A2.2.4.2 +MR=[<value>] - Modulation Reporting Control

This extended-format numeric parameter controls whether or not the extended-format +MCR:<carrier> and +MRR:<rate> intermediate result codes are transmitted from the modem to the DTE. If enabled, +MCR:<carrier> and +MRR:<rate> intermediate result codes represent the current (negotiated or renegotiated) modulation <carrier> and <rate> that are transmitted at the point during connect negotiation (handshaking) at which the modem has determined which modulation and rate will be used, i.e., before any Error Control or Data Compression reports are transmitted, and before any final result code (e.g., CONNECT) is transmitted.

Defined Values

<value> A decimal number corresponding to the selected option:

0 = Disables reporting of modulation connection (+MCR: and +MRR: are not transmitted).

1 = Enables reporting of modulation connection (+MCR: and +MRR: are transmitted). (Default.)

2 Enables reporting of modulation connection (+MCR: and Receive Rate Only: are transmitted).

Reporting Current or Selected Values
Command: +MR?
Response: +MR: <current value>

Reporting Supported Range of Parameter Values
Command: +MR=?
Response: +MR: (<value>range)

A2.2.4.3 %E[<value>] - Enable/Disable Line Quality Monitor, Auto-Retrain, and Auto-Rate Renegotiation

This command controls whether or not the modem will automatically monitor the line quality and request a retrain (%E1) or a rate renegotiation when line quality merits a change. If enabled, the modem attempts to retrain for a maximum of 30 seconds.

Defined Values
<value> A decimal number corresponding to the selected option:

0   = Disable line quality monitor, auto-retrain, and auto-rate renegotiation.
1   = Enable line quality monitor, auto-retrain, and auto-rate renegotiation. (Default.)

A2.2.5 Data Compression Commands

This section contains parameters to condition modem use of standard ITU-T V.42 bis Data Compression Procedures.

A2.2.5.1 +DS=[<direction>[,<compr_neg>[,<max_dict>[,<max_string>]]]] - Data Compression

This extended-format compound parameter controls the V.42bis data compression function if provided in the modem. It accepts four numeric subparameters:

Defined Values
<direction> Specifies the desired direction(s) of operation of the data compression function; from the DTE point of view.

0   = Negotiated; no compression (V.42bis P0=0).
3   = both directions, accept any direction (V.42bis P0=11). (Default.)

<compr_neg> Specifies whether or not the modem should continue to operate if the desired result is not obtained.

0   = Do not disconnect if V.42bis is not negotiated by the remote modem as specified in <direction>.

<max_dict> Specifies the maximum number of dictionary entries (2048 entries) which should be negotiated (may be used by the DTE to limit the codeword size transmitted, based on its knowledge of the nature of the data to be transmitted).

<max_string> Specifies the maximum string length (32 bytes) to be negotiated (V.42bis P2).

Reporting Current or Selected Values
Command: +DS?
Response: +DS: <direction>,<compr_neg>,<max_dict>,<max_string>

A2.2.5.2 +DR=[<value>] **- Data Compression Reporting**

This extended-format numeric parameter controls whether or not the extended-format "+DR: " intermediate result code is transmitted from the modem to the DTE.

Defined Values

<value> decimal number corresponding to the selected option:

    0   = Data compression reporting disabled (no +DR result code transmitted).

    1   = Data compression reporting enabled (+DR result code transmitted). (Default.)

Reporting Current or Selected Values

Command: +DR?

Response: +DR: <current value>

Reporting Supported Range of Parameter Values

Command: +DR=?

Response: +DR: (<value> range)

A2.2.5.3 %C[<value>] **- Enable/Disable Data Compression**

Enables or disables data compression negotiation. The modem can only perform data compression on an error corrected link.

Defined Values

<value> A decimal number corresponding to the selected option:

    0   Disables data compression.

    1   Enables both V.42 bis and MNP 5 data compression.

    2   Enables both V.42 bis and MNP 5 data compression.

    3   Enables both V.42 bis and MNP 5 data compression. (Default.)

A2.2.5.4 N[<mode>] **- Automode Enable**

This command is included for compatibility only and has no effect other than returning a result code. The only valid values are 0-1.

A2.2.6 Synchronous Access Mode Commands

A2.2.6.1 +ESA=[<trans_idle>[,<framed_idle> [,<framed_un_ov> [,<hd_auto>[,<crc_type> [,<nrzi_en>[,<syn1> [,<syn2>]]]]]]]] **- Configure Synchronous Access Mode**

This extended-format compound parameter controls the manner of operation of the Synchronous Access Mode in the modem. Enabling Synchronous Access Mode enables the use of the 8-bit command characters defined in Table 9/V.80 of the Draft ITU-T Recommendation V.80 (DATA COMMUNICATION OVER THE TELEPHONE NETWORK; In-Band modem Control and Synchronous Data Modes for Asynchronous DTE).

Defined Values

<trans_idle> Decimal number which specifies the bit sequence transmitted by the modem when a transmit data buffer underrun condition occurs, while operating in Transparent sub-Mode. The options are:

    0   In Transparent sub-Mode, modem transmits 8-bit SYN sequence on idle. Modem receiver does not hunt for synchronization sequence (default and fixed).

<framed_idle> Decimal number which specifies the bit sequence transmitted by the modem when a transmit data buffer underrun condition occurs immediately after a flag, while operating in Framed sub-Mode. The options are:

    0   In Framed sub-Mode, modem transmits HDLC flags on idle (default and fixed).

<framed_un_ov> Decimal number which specifies the actions undertaken by the modem when a transmit data buffer underrun or overrun condition occurs immediately after a non-flag octet, while operating in Framed sub-Mode.

0 In Framed sub-Mode, modem transmits abort on underrun in middle of frame. (Default.)

1 In Framed sub-Mode, modem transmits a flag on underrun in middle of frame, and notifies DTE of underrun or overrun.

<hd_auto> Decimal number which specifies whether or not, in V.34 half-duplex operation, additional procedures besides those specified in § 12/V.34 will be performed by the modem when switching from primary channel to secondary channel operation, and vice versa. This subparameter should not be com manded.

<crc_type> Decimal number which specifies the CRC polynomial used while operating in Framed sub-Mode. The options are:

        0 CRC generation and checking disabled. (Default and fixed.)

<nrzi_en> Decimal number which specifies if Non Return to Zero Inverted (NRZI) encoding is to be used by the modem for transmit and receive data. The options are:

        0 NZRI encoding and decoding disabled (default and fixed).

<syn1>, <syn2> Decimal number which specifies the octet value(s) to be used while performing character-oriented framing. <syn1> is to be commanded to 255 (FFh); <syn2> is not to be commanded.

Reporting Current or Selected Values

Command: +ESA?

Response: ESA: <trans_idle>,<framed_idle>,<framed_un_ov>,<hd_auto>,<crc_type>,<nrzi_en>,<syn1>,<syn2>

Reporting Supported Range of Parameter Values

Command: +ESA=?

Response: +ESA: (<trans_idle> range), (<framed_idle> range),(<framed_un_ov> range), (<hd_auto> range), (<crc_type> range), (<nrzi_en> range),(<syn1> range), (<syn2> range)

A2.2.6.2 +ITF=[<off>[,<on>[,<report_period>]]] **- Transmit Flow Control Thresholds**

In V.80 Synchronous Access Mode, this optional compound parameter allows the DTE to determine the effective input buffer size in the modem for data on transmit data from the DTE, to control the thresholds used for flow control of such data, and to control how often the modem reports to the DTE the number of octets in this buffer. Note that the DTE can adjust its own thresholds for flow control of data on received data from the modem.

Defined Values

<off> Determines the threshold, in octets, above which the modem will generate a flow off signal. Applicable in
    Synchronous Access Mode. The <off> range is 20 -7000. Default <off> value is 128. For the <on> and
<off> subparameters, the input buffer is assumed to reside between the modem's V.24 interface and the
Synchronous Access protocol layer; i.e., the buffer count includes all octets, including EM codes, received
from the DTE, with the exception of XON and XOFF if these are used to signal <modem-by-DTE> flow
control. The modem returns the ERROR result code if the DTE specifies that the <off> subparameter be
set to a value less than or equal to the <on> subparameter; in this case, the current parameter value
settings are set to default values.

<on> Determines the threshold, in octets, below which the modem will generate a flow on signal. Applicable in
Synchronous Access Mode. The <on> range is 10 -5000. Default <on> value is 64.

<report_period> Not supported. A fixed value of zero is used and reported.

Reporting Current or Selected Values

Command: +ITF?
Response: +ITF: <off>,<on>,<report_period>

Appendix 3.   S-PARAMETERS

The supported S-Parameters are summarized in Table A2-1.

Table 3-1. S-Parameter Summary

Register	Function	Units
S0	Number of Rings to Automatic Answer	rings
S1	Ring Counter	rings
S2	Escape Character	ASCII
S3	Line Termination Character	ASCII
S4	Response Formatting Character	ASCII
S5	Command Line Editing Character	ASCII
S6	Wait Time for Dial Tone Before Blind Dialing, or After "W" Dial Modifier	s
S7	Wait Time For Carrier After Dial, For Silence, or For Dial Tone After "W" Dial Modifier	s
S8	Pause Time for Dial Delay Modifier	s
S10	Carrier Loss Disconnect Time	0.1 s
S11	DTMF Tone Duration	0.001 s
S12	Escape Prompt Delay	0.02 s
S18	Test Timer	s
S29	Flash Dial Modifier Time	10 ms
S30	Disconnect Inactivity Timer	10 s
S46	Data Compression Control	-
S95	Result Code Messages Control	-

A3.1 AT=x - Write to Selected S-Parameter

This command writes the value x to the currently selected S-Parameter. An S-Parameter can be selected by using the ATSn command. All of the S-Parameters will return the OK response if x is a number. Some registers may not be written due to country specific PTT limitations.

A3.2 AT? - Read Selected S-Parameter

This command reads and displays the selected S-Parameter. An S-Parameter can be selected by using the ATSn command.

A3.3 Sn - Read/Write S-Parameter

The modem selects an S-Parameter, performs an S-Parameter read or write function, or reports the value of an S-Parameter.

n Establishes S-Parameter n as the last register accessed.

n=v Sets S-Parameter n to the value v.

n? Reports the value of S-Parameter n.

The parameter n can be omitted, in which case the last S-Parameter accessed will be assumed. The S can be omitted for AT= and AT?, in which case the last S-Parameter accessed will be assumed.

If the number "n" is beyond the range of the S-Parameters 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-Parameter the values will still be stored, but functionally the lower and higher limits will be observed. Input and output are always in decimal format. Note that some S-Parameters are read-only.

In some cases, writing to the S-Parameter will appear to be accepted but the value will not actually be written.

Appendix 4.   RESULT CODES

General

The modem responds to commands from the DTE and to activity on the line by signaling to the DTE in the form of result codes. The result codes that the modem can send are described below. Two forms of each result code are available: long-form, an English-like "verbose" response, and short-form, a data-like numeric response (included in parentheses following the long-form). The long-form code is preceded and terminated by the sequence < CR> < LF>. The short-form is terminated by < CR>, only with no preceding sequence.

If result messages are suppressed, nothing is returned to the DTE. The long-form results codes can be modified by the OEM through the Product Configuration File. Table 2 lists each result code short form (ATV0), result code long form (ATV1), and the corresponding n value in the ATVx command.

Table 4-1 Result Code

Short Form(ATV0)	Long Form (ATV1)	n Value in ATXn Command					Notes
		0	1	2	3	4	
0	OK	X	X	X	X	X	
1	CONNECT	X	X	X	X	X	
1	CONNECT XXXX	1	X	X	X	X	
2	RING	X	X	X	X	X	
3	NO CARRIER	X	X	X	X	X	
4	ERROR	X	X	X	X	X	
6	NO DIALTONE	3	3	X	X	X	
7	BUSY	3	3	3	X	X	
8	NO ANSWER	X	X	X	X	X	
24	DELAYED	4	4	4	4	X	
32	BLACKLISTED	4	4	4	4	X	
33	FAX	X	X	X	X	X	
35	DATA	X	X	X	X	X	
+F4	+FCERROR	X	X	X	X	X	

Notes: An 'X' in a column indicates that the message (either the long form if verbose, or the value only for short form) will be generated when that particular value of 'n' (shown at the top of the column) has been selected by the use of ATXn. If the column is blank, then no message will be generated for that x option. A numeral indicates which less explicit message (verbose or short form) will be output for that X option. (Also, see Section 3.3).

Description of Result Codes

OK (0)

The OK code is returned by the modem to acknowledge execution of a command line.

CONNECT (1)

The modem will send this result code when a connection has been established and the modem is switching from command state to online data state.

CONNECT XXXX (1)

For X1, X2, X3, and X4, the modem sends this result code when the DTE speed is XXXX bps and the modem has been

instructed to report the DTE speed to the DTE upon connecting. (Also, see the W command.)

RING (2)

The modem sends this result code when incoming ringing is detected on the line. What qualifies as a ring signal is determined by country-dependent parameters, modifiable through the Product Configuration File.

NO CARRIER (3)

The modem sends this result code when an attempt o establish a connection fails or an established connection has been terminated.Under X0, if busy tone detection is enforced, this result code is used as a response to the detection of busy or circuit busy. Under X0, if dial tone detection is enforced or selected, this result code indicates that dial tone has not been detected.

ERROR (4)

The modem returns this result code if the command is not recognized (e.g., the command line has a syntax error or the command is not supported), the command line maximum length is exceeded, a parameter value is invalid, or other problem with processing the command line is detected.
Under X0, X1, X2, and X3, this result is used instead of DELAYED and BLACKLISTED.

NO DIALTONE (6)

For X2 and X4, the modem sends this result code if it has been instructed to wait for dial tone during dialing but none is received.

BUSY (7)

For X3 and X4, if busy tone detection is enforced, the modem sends this result code when attempting to originate a call if the busy (engaged) signal is detected on the line.

NO ANSWER (8)

The modem sends this result code when:

1. Attempting to originate a call if a continuous ringback signal is detected on the line until the expiration of the timer S7.
2. "@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7)

DELAYED (24)

For X4, the modem returns this result code when a call fails to connect and the number dialed is considered 'delayed' due to country blacklisting requirements.

BLACKLISTED (32)

For X4, the modem returns this result code when a call fails to connect and the number dialed is considered 'blacklisted'.

DATA (35)

The modem returns this result code when a data modem connection is established in a facsimile mode.

+FCERROR (+F4)

This message is sent to the DTE when high speed fax data (V.27, V.29, V.33, or V.17) is expected and a V.21 signal is received.

Appendix 5.   VOICE COMMANDS

Configuration Commands

A5.1.1 +FCLASS=8 - Select Voice Mode

+FCLASS=8 selects the Voice Mode. The Voice Mode commands and responses described in this section are applicable when command +FCLASS=8. (See Section 3.2.1.2 for the definition of the FCLASS command.)

A5.1.2 +VNH=<hook> - Automatic Hang-up Control

This command enables or disables automatic hangups.

Defined Values

<hook> Decimal number corresponding to the selected option.

    0   The modem enables automatic hangups as is normal in other modes.

    1   The modem disables automatic hangups usually found in the other non-Voice Modes.

    2   The modem disables automatic hangups in the other non-Voice Modes. The modem performs only a "logical" hangup (returns to OK result code).

Reporting Current or Selected Values

Command: +VNH?

Response: +VNH: <hook>

Reporting Supported Range of Parameter Values

Command: +VNH=?

Response: +VNH: (<hook> range)

Voice Commands

A5.2.1 +VIP - Voice Initialize All Parameters

This command causes the modem to initialize all voice parameters to their default values.

A5.2.2 +VRX<n> - Start Modem Receive (Record)

This command causes the modem to start the voice reception process.

Defined Values

<n> Decimal number corresponding to the selected option.

    0   Start receive voice without periodic tone production during a voice receive operation.

    1   Start receive voice with periodic tone production during a voice re4ceive operation.

Reporting Current or Selected Values

Command: +VRX?

Reporting Supported Range of Parameter Values

Command: +VRX=?

5.2.3 +VTS=<string> - Send Voice Tone(s)

This command causes the modem to send DTMF tones, single frequency tone, and, optionally, double frequency

tones.

Defined Values
<string> To be added

Reporting Current or Selected Values
Command: +VTS?

Reporting Supported Range of Parameter Values
Command: +VTS=?

A5.2.4 +VTX - Start Modem Transmit (Playback)
This command causes the modem to start the voice transmission process.

A5.2.5 +VGR=<gain> - Voice Gain Receive (Record Gain)
This command causes the modem to set the gain for received voice samples.

Defined Values
<gain> Decimal number between 0 and 255 corresponding to the gain.

Reporting Current or Selected Values
Command: +VGR?

Reporting Supported Range of Parameter Values
Command: +VGR=?

A5.2.6 +VGT=<level> - Voice Gain Transmit (Playback Volume)
This command causes the modem to set the volume level.

Defined Values
<level> Decimal number (120-135) corresponding to the volume level.

Reporting Current or Selected Values
Command: +VGT?

Reporting Supported Range of Parameter Values
Command: +VGT=?

A5.2.7 +VIT=<timer> - Voice Inactivity Timer (DTE/Modem)
This command sets the modem's initial value for the DTE/modem inactivity timer.

Defined Values
<timer> Decimal number(0 and 255) corresponding to the time in units of 1.0 second. A value of 0 disables the timer.

Reporting Current or Selected Values
Command: +VIT?

Reporting Supported Range of Parameter Values
Command: +VIT=?

A5.2.8 +VLS=<label> **- Analog Source/Destination Selection**
This command causes the modem to select one or more source/destinations of the analog data.

Defined Values
Decimal number corresponding to the selected option:

0	Modem on-hook. Local phone connected to the line.
1	Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
2	Modem on-hook and connected to the Local phone.
3	Modem off-hook and connected to the line and Local phone.
4	Internal Speaker connected to the Modem. Modem on-hook. Local phone connected to the line.
5	Internal Speaker connected to the line. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
6	Internal Microphone connected to the Modem. Modem on-hook. Local phone connected to the line.
7	Internal Microphone and Internal Speaker connected to the line. Squelching active. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
8	External Speaker connected to the Modem. Modem on-hook. Local phone connected to the line.
9	External Speaker connected to the line. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
10	Internal Microphone and External Speaker connected to the line. Squelching active. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
11	External Microphone connected to the Modem. Modem on-hook. Local phone connected to the line.
12	External Microphone and Internal Speaker connected to the line. Squelching active. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
13	External Microphone and External Speaker connected to the line. Squelching active. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.
14	External Microphone and Speaker combination (handset or headset) connected to the Modem. Modem on-hook. Local phone connected to the line.
15	External Microphone and Speaker combination (handset or headset) connected to the line. Modem off-hook and connected to the line. Local phone provided with power to detect hook condition.

Notes: 1. Internal and External Microphone are treated the same by the Modem device set.
2. Internal and External Speaker are treated the same by the Modem device set.

Reporting Current or Selected Values
Command: +VLS?

Reporting Supported Range of Parameter Values
Command: +VLS=?

A5.2.9 +VRA=<interval> **- Ringback Goes Away Timer**

This command sets the length of time the modem will wait between ringbacks during call origination before the modem can assume that the remote station has gone off hook.

Defined Values

<interval> Decimal number (0-600) specifying the silence interval time in units of 0.10 second between the end of one ring interval and the start of the next ring interval. A value of 0 forces the modem to report the OK result code immediately after the first Ringback. The range is 0.01 to 60.0 seconds for <interval> = 1 to 600.

Reporting Current or Selected Values

Command: +VRA?

Reporting Supported Range of Parameter Values

Command: +VRA=?

A5.2.10 +VRN=<interval> **- Ringback Never Appeared Timer**

This command sets the length of time the modem will wait between ringbacks during call origination before the modem can assume that the remote station has gone off hook.

Defined Values

<interval> Decimal number (0-60) specifying the time period, in units of 1.0 second, that the modem will wait for Ringback during call origination. A value of 0 forces the modem to report the OK result code immediately after dialing. The range is 1 to 60 seconds for <interval> = 1 to 60.

Reporting Current or Selected Values

Command: +VRN?

Reporting Supported Range of Parameter Values

Command: +VRN=?

A5.2.11 +VSD=<sds>,<sdi> **- Silence Detection (Quiet and Silence)**

This command causes the modem to set the silence detection sensitivity and the required period of silence before the modem reports silence detected at the end of a voice receive either with the "Presumed End of Message" (QUIT) or "Presumed Hangup (SILENCE) event reports.

Defined Values

<sds> Decimal number corresponding to the selected parameter.

   0 Use +VSM silence compression setting and algorithm for long-term silence detection (if +VSM is in use) or proprietary silence compression setting and algorithm for long-term silence detection (if +VSM is not in use).

     127   Sets less aggressive long-term silence detection independent of presence or use of silence compression.

     128   Sets nominal long-term silence detection independent of presence or use of silence compression.

     129   Sets more aggressive long-term silence detection independent of presence or use of silence compression.

<sdi> Decimal number specifying the required period of silence, in units of 0.1 second, before the modem can report silence detected at the end of a voice receive either with the "Presumed End of Message" (QUIT) or "Presumed Hangup (SILENCE) event reports. A value of 0 disables the modem silence detection. The range is 0.1 to 25.5 seconds for <sdi> = 1 to 255.

Reporting Current or Selected Values
Command: +VSD?

Reporting Supported Range of Parameter Values
Command: +VSD=?

A5.2.12 +VSM=<cml>,<vsr>,<sds>,<sel> **- Compression Method Selection**
This command causes the modem to set the voice compression method, the silence compression sensitivity, and the voice sampling rate.

Defined Values
<cml> Decimal number identifying the compression method.
<vsr> <range of values> containing the supported range of voice samples per second of the analog signal.
<scs> <range of values> containing the supported range of sensitivity settings for voice receives.
<sel> <range of values> containing the supported range of expansion values for voice transmits.

Reporting Current or Selected Values
Command: +VSM?

Reporting Supported Range of Parameter Values
Command: +VSM=?

A5.2.13 +VTD=<dur> **- Beep Tone Duration Timer**
This command causes the modem to set the default DTMF/tone generation duration.

Defined Values
<dur> Decimal number specifying the default DTMF/tone generation duration in units of 0.01 second. A value of 0 specifies a manufacturer specific time interval. The range is 0.01 to 5 seconds for <dur>= 1 to 500.

Reporting Current or Selected Values
Command: +VTD?

Reporting Supported Range of Parameter Values
Command: +VTD=?

A5.2.14 +VDR=<enable>, <report> **- Distinctive Ring**
This command causes the modem to enable or disable reporting of the ring cadence information and to control the timing of the RING event code report if ring cadence reporting is enabled.

Defined Values
<enable> Decimal number corresponding to the selected option.

0   The modem will not report ring cadence information.

1   The modem will report ring cadence information as specified for the <report> subparameter.

<report> Decimal number specifying ring cadence information report when enabled by the <enable> subparameter.

0   The modem will produce only DROF and DRON messages. The modem will not produce any RING event codes. The modem will report other call progress event codes as normal. Other The modem will produce only DROF and DRON mes sages. The modem will produce a RING event code after <report>/10 seconds after the falling edge of the ring pulse (i.e., after the DRON report).

Reporting Current or Selected Values

Command: +VDR?

Reporting Supported Range of Parameter Values

Command: +VDR=?

A5.2.15 +VDT=<enable>,<report> **- Control Tone Cadence Reporting**

This command allows the modem to enable or disable reporting of the control tone cadence information in the frequency band used by the Ringback/Remote Ring, BUSY, and reorder/Fast Busy tones (usually in the 300to 600 Hz range).

Defined Values

<enable> Decimal number corresponding to the selected option.

0   The modem will not produce any control tone cadence report.

1   The modem will produce control tone cadence report as specified for the <report> subparameter.

<report> Decimal number specifying the produced any control tone cadence report when enabled by the <enable> subparameter.

0   The modem will produce only CPOF and CPON messages.

Reporting Current or Selected Values

Command: +VDT?

Reporting Supported Range of Parameter Values

Command: +VDT=?

A5.2.16 +VBT=<deassert>,<assert> **- Buffer Threshold Setting**

This command causes the modem to report the <deassert> and <assert> subparameter values as a <compound ranges of values>. The OK result code follows the report.

Speakerphone Commands

A5.3.1 +VSP=<mode> **- Speakerphone ON/OFF**

This command turns the speakerphone ON or OFF

Defined Values

<mode> Decimal number corresponding to the selected option.

    0   The speakerphone function is OFF.

    1   The speakerphone function is ON.

Reporting Current or Selected Values

Command: +VSP?

Reporting Supported Range of Parameter Values

Command: +VSP=?

A5.3.2 +VDX=<mode> **- Speakerphone Duplex Mode**

This command selects speakerphone half-duplex or full duplex mode.

Defined Values

<mode> Decimal number corresponding to the selected option.

    0   The speakerphone mode is half duplex.

    1   The speakerphone mode is full duplex.

Reporting Current or Selected Values

Command: +VDX?

Reporting Supported Range of Parameter Values

Command: +VDX=?

A5.3.3 +VGM=<gain> **- Microphone Gain**

This command causes the modem to set the microphone gain of the speakerphone function.

Defined Values

<gain> Decimal number between 0 and 255 corresponding to the gain.

Reporting Current or Selected Values

Command: +VGM?

A5.3.4 +VGS=<gain> **- Speaker Gain**

This command causes the modem to set the speaker gain of the speakerphone function.

Defined Values

<gain> Decimal number between 0 and 255 corresponding to the gain.

Reporting Current or Selected Values

Command: +VGS?

Appendix 5   Government compliance notices

FCC compliance

This equipment complies with Part 68 of the FCC Rules. On this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your telephone company.

If your telephone equipment causes harm to the telephone network, the Telephone Company may discontinue your service temporarily. If possible, they will notify in advance. But, if advance notice isn't practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect proper operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.
The FCC prohibits this equipment to be connected to party lines or coin-telephone service.
In the event that this equipment should fail to operate properly, disconnect the equipment from the phone line to determine if it is causing the problem. If the problem is with the equipment, discontinue use and contact your dealer or vendor.

FCC Class B statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits 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 or relocate the receiving antenna.
      Increase the separation between the equipment and the 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.

Notice: 1) Shielded cables, if any, must be used in order to comply with the emission limits.
        2)Any change or modification not expressly approved by the Grantee of the equipment
          authorization could void the user's authority to operate the equipment.

DOC compliance information

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.
Before installing this equipment, users ensure that it is permissible to be connected to the facilities of the local Telecommunications Company. The equipment must also be installed using an acceptable method of connection. The

customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.
NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the sum of the Load Numbers of all the devices does not exceed 100.

European CTR 21 compliance

The equipment has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point. In the event of problem, you should contact your equipment supplier in the first instance.
Note: The manufacturer should ensure that the vendor and user of the equipment is clearly informed of the above information by means of package and /or user manuals of the forms of user instructions.