User's Guide for ZyXEL Omni 56K USB Modem

ZyXEL

ZyXEL Communications Corporation

ZyXEL Omni 56K USB Modem

$C \epsilon$
Declaration of Conformity

The following products is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC). The listed standard as below were applied:

The following Equipment:

Product	:	V.90 MODEM
Model Number	:	Omni 56K USB

RFI Emission: Limit class B according to EN 50081-1:1992

Limits class B for harmonic current emission according to EN 61000-3-2:1995

Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3:1995

Immunity : Generic immunity standard according to EN 50082-1:1997

Electrostatic Discharge according to EN 61000-4-2:1995

Contact Discharge: 4 kV, Air Discharge : 8 kV

Radio-frequency electromagnetic field according to EN 61000-4-3:1995

80 – 1000MHz with 1KHz AM 80% Modulation: 3V/m

Electromagnetic field from digital telephones according to ENV 50204:1995

900 ±5MHz with 200Hz rep. Frequency ,Duty Cycle 50%

Electrical fast transient/burst according to EN 61000-4-4:1995

AC/DC power supply: 1kV, Data/Signal lines : 0.5kV

Surge immunity test according to EN 61000-4-5:1995

AC/DC Line to Line: 1kV, AC/DC Line to Earth : 2kV

Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1995

0.15 – 80MHz with 1KHz AM 80% Modulation: 3V/m

Power frequency magnetic field immunity test according to EN 61000-4-8:1993

3A/m at frequency 50Hz

Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994

30% Reduction @ 10ms, 60% Reduction @100ms, >95%Reduction @5000ms

The following importer/manufacturer is responsible for this declaration:

Company Name	**ZyXEL**	Communications Services GmbH.
Company Address	:	Thaliastrasse 125a/2/2/4 A-1160 Wien • AUSTRIA
Telephone	:	Tel.: 01 / 494 86 77-0 Facsimile : Fax: 01 / 494 86 78

Person is responsible for marking this declaration:

Manfred RECLA   ZyXEL Europ. Techn. Support
Name (Full Name)   Position/ Title

July 07, 2000
Date

ZyXEL Communications
Services GmbH.
Thaliastrasse 125a/2/2/4
A-1160 Wien • AUSTRIA
Tel.: 01 / 494 86 77-0
Fax: 01 / 494 86 78

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

FC

The following equipment:

Product Name : ZyXEL Communication Corporation

Trade Name : V.90 MODEM

Model Number : Omni 56K USB

It's herewith confirmed to comply with the requirements of FCC Part 15 Rules.
Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and

(2)This device must accept any interference received, including interference that
may cause undesired operation.

The result of electromagnetic emission has been evaluated by QuieTek EMC
laboratory (NVLAP Lab. Code : 200347-0) and showed in the test report.
(Report No. : QTK-006H055F)

It is understood that each unit marketed is identical to the device as tested, and
Any changes to the device that could adversely affect the emission
Characteristics will require retest.

The following importer / manufacturer is responsible for this declaration:
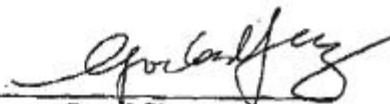
Company Name   ZyXEL Communications Corporation

Company Address   1650 Miraloma Avenue Placentia, CA 92870

Telephone   (714) 632-0882 Facsimile: (714) 632-0858

Person is responsible for marking this declaration:

Gordon Yang	Vice President
Name (Full name)	Position / Title

7/10/00	
Date	Legal Signature

Limited Warranty

ZyXEL Omni 56K USB Modem

Conditions of ZyXEL Limited Warranty:

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two (2) years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL, at its discretion, repairs or replaces the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement consists of a new or re-manufactured functionally equivalent product of equal value, and shall solely be at the discretion of ZyXEL. This warranty shall not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Limitations and exclusions of this warranty:

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose.

Limitations of liability:

ZyXEL shall in no event be held liable for indirect or consequential damages of any kind of character to the purchaser.

How to obtain warranty service:

To obtain the services of this warranty, contact ZyXEL's Service Center. Refer to the separate Warranty Card for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty shall be repaired or replaced (at the discretion of ZyXEL) and the customer billed for parts and labor. All repaired or replaced products are shipped by ZyXEL to the corresponding return address, Postage Paid (USA and territories only). If the customer desires some other return destination beyond the U.S. borders, the customer shall bear the cost of the return shipment. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Become a Registered Owner

Complete the pre-addressed registration card and place it in the mail. Registered owners shall receive future product information and update announcement. Save your dated invoice as proof of purchase.

Customer Support

If you have questions about your ZyXEL product or desire assistance, contact ZyXEL Communications Corporation offices worldwide, in one of the following ways:

METHOD / LOCATION	E-MAIL – SUPPORT/SALES	TELEPHONE/FAX	WEB SITE/FTP SITE	REGULAR MAIL
WORLDWIDE	support@zyxel.com.tw support@europe.zyxel.com sales@zyxel.com.tw	+886-3-578-3942 +886-3-578-2439	www.zyxel.com www.europe.zyxel.com ftp.europe.zyxel.com	ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, HsinChu, Taiwan 300, R.O.C.
NORTH AMERICA	support@zyxel.com sales@zyxel.com	+1-714-632-0882 800-255-4101 +1-714-632-0858	www.zyxel.com ftp.zyxel.com	ZyXEL Communications, Inc., 1650 Miraloma Avenue, Placentia, CA 92870, U.S.A.
SCANDINAVIA (DENMARK)	support@zyxel.dk sales@zyxel.dk	+45-3955-0700 +45-3955-0707	www.zyxel.dk ftp.zyxel.dk	ZyXEL Communications A/S, Columbusvej 5, 2860 Soeborg, Denmark.
AUSTRIA	support@zyxel.at sales@zyxel.at	+43-1-4948677-0 0810-1-ZyXEL 0810-1-99935 +43-1-4948678	www.zyxel.at ftp.zyxel.co.at NOTE: for Austrian users with *.at domain only!	ZyXEL Communications Services GmbH. Thaliastrasse 125a/2/2/4 A-1160 Vienna, Austria
GERMANY	support@zyxel.de sales@zyxel.de	49-2405-6909-0 0180-5213247 Tech Support hotline 0180-5099935 RMA/Repair hotline 49-2405-6909-99	www.zyxel.de ftp.europe.zyxel.com	ZyXEL Deutschland GmbH. Adenauerstr. 20/A4 D-52146 Wuerselen Germany

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Preface

Thank you for purchasing the ZyXEL Omni 56K USB modem.

About ZyXEL Omni 56K USB

The Omni 56K USB is an analog Data/Fax/Voice modem used for Internet access via the PSTN (Public-Switched Telephone Network) line. It supports the convenience of Universal Serial Bus (USB) connection to PC. Users can plug and play USB cables without turning off the computer and since the modem is "bus powered", you do not need to plug in a power adapter, offering true simplicity and energy efficiency. It can run an upstream maximum rate of 33.6Kbps and downstream rate of 56Kbps. The rate selection depends on the line quality and server side configuration.

How to Use This Guide

This Guide is divided into 5 chapters. The first two chapters provide general information for ZyXEL Omni 56K USB modem, and the next three chapters provide advanced information for technical users who might need them for programming or other applications.

Other Reference

To quickly learn how to install and configure your Omni 56K USB modem, please refer to the *ZyXEL Omni 56K USB Modem Read Me First.*

Chapter 1
Introduction

This chapter introduces you to the features and specifications for the ZyXEL Omni 56K USB modem, and provides instructions for installing your modem.

1.1 Main Features

- ZyDAS ZD1051 data pump with V.90 capability.

- USB technology with USB bus power for easy installation (USB Rev 1.1-compliant)

- USB CDC (Communication Devices Class) 1.1 ACM (Abstract Control Model) compatible

- V.90 56K down-stream data transmission

- Fast retrain with auto fall-forward and fall-back

- Automatic data/fax call detection

- G3 14.4Kbps fax send/receive

- Support fax Class 1, Class 2 and Class 2.0 command set

- Voice TAM Function

- Voice digitization and compression

- Voice record via IS101 Command Set

- Error correction and data compression

- Microsoft Windows® 98/2000 plug and play compatible

- Flash EPROM upgradeable

Chapter 2
Installing ZyXEL Omni 56K USB

2.1 Panel Description

2.1.1 Front Panel LEDs

The description of front panel LEDs is as follows:

Table 1.   Front Panel LEDs for Omni 56K USB

LED	FUNCTION	DESCRIPTION
USB	USB Indicator	ON: USB link is up OFF: USB link is down
OH	Hook Status	ON: off hook OFF: on hook

2.1.2 Back Panel
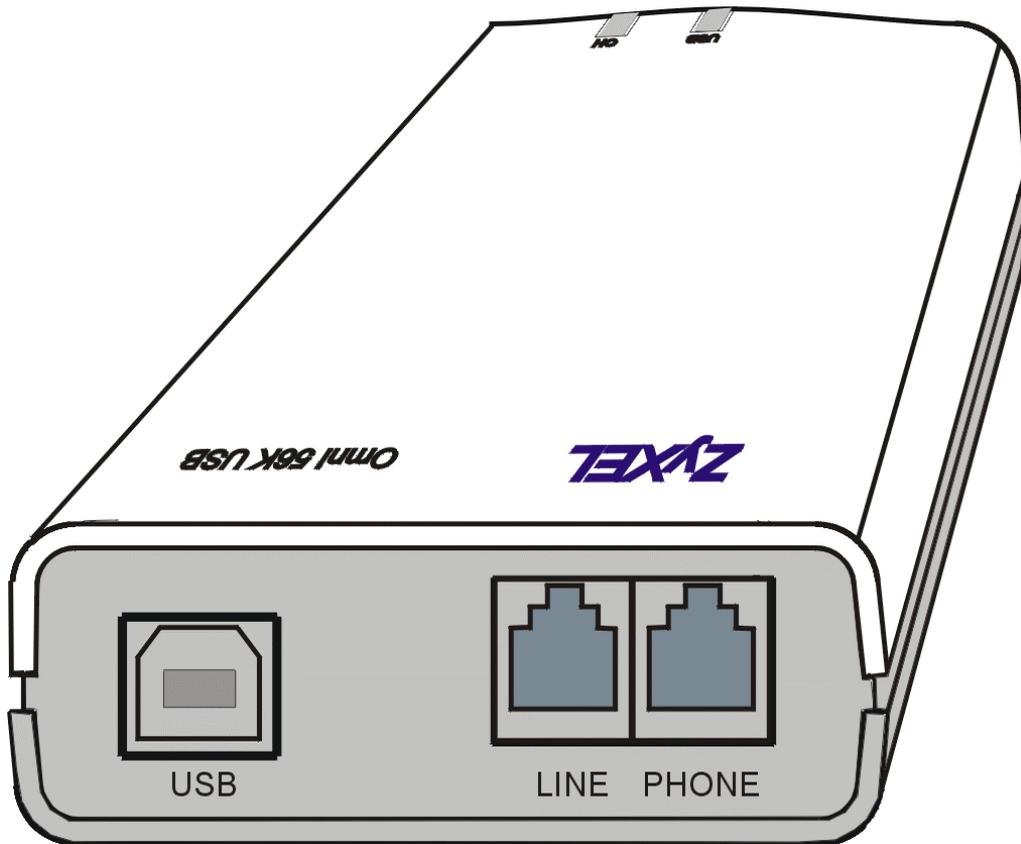
Figure 1.   Back Panel

Table 2.   Back Panel Description

BACK PANEL	DESCRIPTION
USB	Universal Serial Bus connector that connects to any one of your devices with USB port, such as your computer or USB hub.
LINE	Analog port RJ-11 terminal jack for connecting to wall jack.
PHONE	Analog port RJ-11 terminal jack for connecting to your phone set.

2.2 Connecting Your Omni 56K USB

When connecting your Omni 56K USB modem, please refer the following figure:
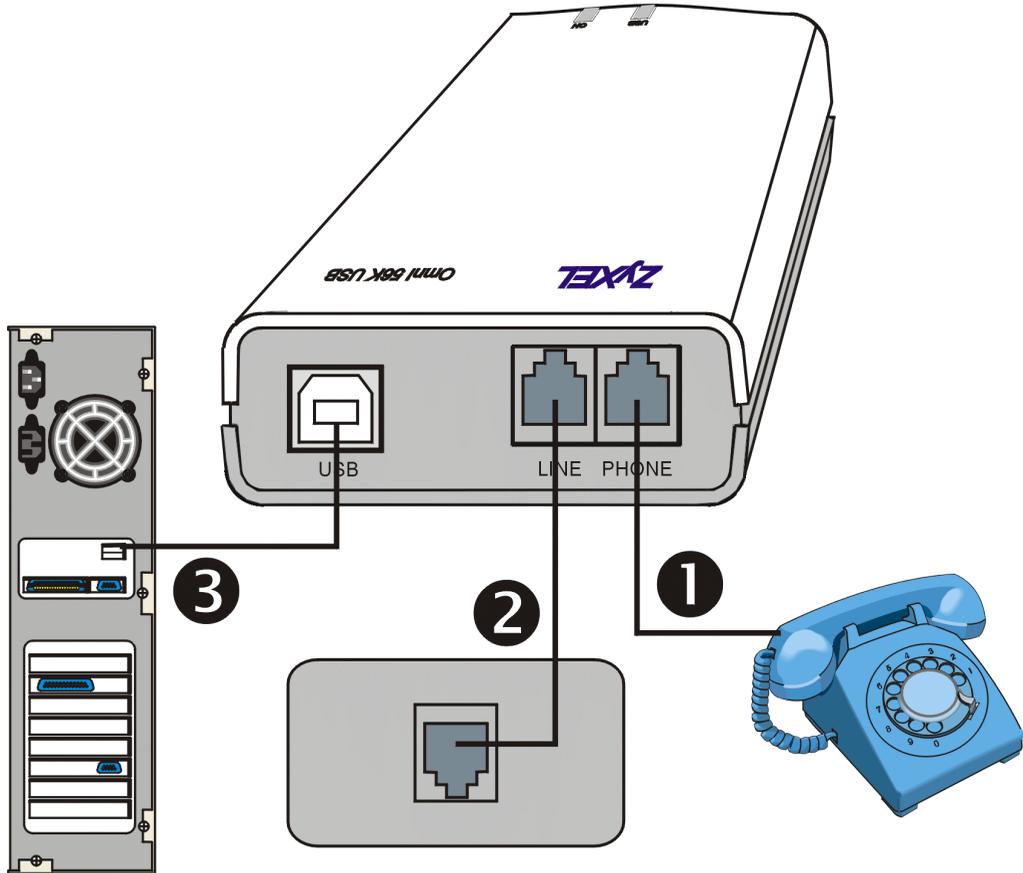
Figure 2.   Back Panel Connections

2.2.1 USB Connector

The Omni 56K USB is an USB (Universal Serial Bus)-based modem, providing a USB connector on the back panel of the device.

2.3   Getting Started

When you plug the USB connector attached with your Omni 56K USB to the USB port of your PC (personal computer), the Plug and Play function of the operating system detects if its driver has been installed. If not, Windows® prompts you for the USB device driver.

For more information on connecting and starting your modem, please refer to *ZyXEL Omni 56K USB Modem Read Me First* on the included CD-ROM disc.

Chapter 3
Specifications and Functional Description

This chapter introduces the specifications and functions of the Omni 56K USB. This chapter and the next three chapters are designed for advanced users who might need more information about Omni 56K USB modem's specifications and functions when programming or other applications.

3.1 Specifications

3.1.1 Hardware Specification

Table 3.   Hardware Specifications

ITEM	SPECIFICATION DESCRIPTION
Operating Requirements	Temperature: 0°C to 40°C
	Humidity: 5 to 90% (non-condensing)
Weight	102g
Dimensions	75mm (W) x 100mm (H) x 25mm (L)

3.1.2 Firmware Specification

Table 4.   Firmware Specifications

Physical layer for data mode	Multi-Auto
	ACPM of V.90
	V.34bis 33.6 Kbps to 2.4 Kbps
	V.32bis 14.4/12/9.6/7.2/4.8 Kbps
	V.32 9.6/4.8 Kbps
	V.23 1200/600/75 bps
	V.22bis 2.4 Kbps
	V.22/Bell 212 1.2K bps
	V.21/Bell 103 300 bps
	Auto Fallback/Forward
Link layer	MNP 3-4 (Microcom Networking Protocol)
	MNP 5
	V.42
	V.42bis
	V.42 SREJ
Flow control	Hardware flow control: RTS/CTS
	Software flow control: XON/XOFF
Command set	Full AT command set
	Dialing type: DTMF/Pulse
Diagnostics	Power on self-test
	Analog loop-back test
	Analog loop-back with self-test
	Local digital loop-back test
	Remote digital loop-back test
	Remote digital loop-back with self-test
FAX	V.17 G3 FAX (send and receive)
	V.29 G3 FAX (send and receive)
	V.27ter G3 FAX (send and receive)
	EIA Class 1 Command Set
	EIA Class 2 Command Set
	EIA Class 2.0 Command Set
Voice	TAM function

3.2   **Protocol Support**

■   Data Physical Layer

   . ITU-T V.90
   . ITU-T V.34bis/V.34
   . ITU-T V.32bis/V.32
   . ITU-T V.22bis/V.22
   . ITU-T V.21
   . ITU-T V.23
   . Bell 212A
   . Bell 103

■   Fax Physical Layer

   . ITU-T V.17
   . ITU-T V.29
   . ITU-T V.27ter
   . ITU-T V.21

■   Error Control and Data Compression

   . ITU-T V.42
   . ITU-T V.42bis
   . MNP3-5

■   Command Set

   . Standard Command set
   . EIA Class 1 Fax Command set
   . EIA Class 2 Fax Command set
   . EIA Class 2.0 Fax Command set
   . Basic AT Command set
   . Extended AT& Command Set
   . Extended AT* Command Set
   . Extended AT# Command Set
   . IS101 Voice Command set

For more information on detailed command sets, please refer to *Chapter 5.*

3.3 Omni 56K USB Capability

The data/fax/voice feature of the Omni 56K USB is described in the following table:

Table 5. Data/Fax/Voice Feature Description

FEATURE	DESCRIPTION
Data	.2W Dial-Up Line
	.Multi-auto/V.90/V.34/V.32bis/V.32/V.23/V.22bis/V.22/Bell212A/V.21/Bell 103
	.Hardware/Software Flow Control
	.Error Control/Data Compression
	.ZyXEL AT Command Set
	.External Plug and Play for Windows® 98/2000 in USB mode
	.Repeat Dial/Cyclic Dial
	.Caller ID
	.Distinctive Ring
	.AT Protection for software application
Fax	.V.17/V.29/V.27ter
	.G3 T.30 Protocol
	.EIA Class 1/Class 2/Class 2.0 Command Set
Voice	.TAM function

3.3.1 Data Function

Physical Layer Capability

Omni 56K USB modem is a high performance universal modem capable of transmission speeds up to 56/33.6 Kbps full-duplex on a 2-wire dial-up line. Universal compatibility covers a broad range of ITU-T and BELL standards.

Table 6.   Physical Layer Capacity

STANDARD	BIT RATE [bps]	BAUD RATE [baud]	MODULATION	CARRIER FREQUENCY [Hz]
V.90	28000-56000	8000	PCM	0
V.34	2400-33600	multiple	TCM	multiple
V.32bis	14400	2400	128-TCM	1800
V.32bis	12000	2400	64-TCM	1800
V.32bis	9600	2400		1800
V.32bis	7200	2400	16-TCM	1800
V.32bis	4800	2400		1800
V.32	9600	2400	32-TCM	1800
V.32 uncoded	9600	2400	16-QAM	1800
V.32	4800	2400	4-DPSK	1800
V.23	1200/75	1200/75	FSK	
V.23	600/75	600/75	FSK	
V.22bis	2400	600	16-QAM	1200 Call 2400 Ans
V.22 (BELL 212)	1200	600	4-DPSK	1200 Call 2400 Ans
V.21 (BELL 103)	300	300	FSK	

Flow Control

This feature refers to stopping and restarting the flow of data into and out of the modem's transmission and receiving data buffers. Flow control is necessary so that a device does not receive more data than it can handle. The Omni 56K USB provides two kinds of flow control methods.

Hardware CTS/RTS Flow Control

This is a bi-directional flow control where CTS and RTS are simulated RS-232C signals that must be available on your computer. When the modem's transmission buffer is almost full, the modem drops CTS to signal the DTE that it cannot accept data any more. Turn on the CTS to notify the DTE that it can keep sending data to the modem. On the computer software side, when the receiving buffer of the software is almost full, it drops RTS to signal the modem to stop sending data to the DTE. Turn on the RTS and the modem starts sending data again to the DTE.

Software XON/XOFF Flow Control

This is a bi-directional flow control. XON and XOFF (flow control protocols for asynchronous communication) character defaults are decimals 17 and 19.These can be changed by modifying the S-Registers S31 and S32.Both the modem and the DTE treats XOFF as a signal to stop transmitting data and treats XON as a signal to restart sending data. Modems does not send these characters received from the local DTE to the remote modem.

Error Control

Error control keeps the modem data link error-free by detecting and re-transmitting erroneous data. Omni 56K USB modem supports both MNP and V.42 error control protocols. The MNP protocol was an industry standard developed and licensed by Microcom, Inc. Omni 56K USB modem supports level 4 and 3 error control protocols, commonly denoted as MNP4 and MNP3.

V.42 is a developed standard by CCITT (Consultative Committee for International Telephony and Telegraphy). V.42 supports both LAPM (Link Access Procedure for Modems) and MNP4. A V.42 handshaking tries an LAPM connection first, and if not successful, it tries MNP4.

Data Compression

In the modem, the data compression is activated in an attempt to reduce the number of bits actually sent. The receiving modem applies these techniques in reverse to recover the actual data from the compressed data stream.

Omni 56K USB modem supports both V.42bis and MNP5 data compression protocols. Data compression needs an error-free data link to work correctly, otherwise the corrupted compressed data stream ruins the decompression process. MNP5 is used with MNP4 error control and V.42bis is used with V.42 error control. The compression efficiency of V.42bis is generally higher than that of MNP5. In some cases, V.42bis can be 50% to 100% higher and in other cases it is just slightly higher. In general, it is about 50% more efficient.

Repeat Dial

The modem dials the default number stored in non-volatile RAM (Random Access Memory), EEPROM (**e**lectrically **e**rasable **p**rogrammable **r**ead-**o**nly **m**emory) repeatedly if not connected. (s38.0=1,*Dn)

Cyclic Dial

Dial the number stored in EEPROM at location n (0 to 3) if cyclic dial s44.3=1 is set.

If the first dial is not successful, the modem cycles dial through the four numbers stored in memory.

Caller Number Delivery (Caller ID)

Caller Number Delivery (CND), commonly called **Caller ID,** is a new kind of phone service that may be offered by your local phone company. Check your phone company for availability. You must subscribe to it and usually pay an additional monthly service charge for this service.

With CND service, the phone company's central office sends the coded caller information to the called station. This information is sent once between the first and second ring. Your modem can decode this caller information and present it to the connected computer/terminal during the second ring period as part of the call progress ring message. The modem also reports the Caller ID information if asked by the command **AT*T**.

There are two kinds of caller information message formats sent by the phone company.

■ One is the single message format that includes date, time, and caller ID.

■ The other is the multiple message format which also includes the caller name as registered with the phone company.

The command **ATS40.2=**n is used to enable (**n=1**) or disable (**n=0**) the Caller ID detection function. The default is disabled. Enable it only when you have this service and want to enable its detection.

> **NOTE:** The Caller ID message may cause some communication software that is not expecting it to become confused. If you plan to use the Caller ID feature, be sure you are using software that supports it.

In single message format, the modem sends a ring message to the terminal as follows:

```
RING

TIME: <MM-DD hh:mm>

CALLER NUMBER: <CALLER_ID> or CALLER NAME:<CALLER_NM>

RING
```

MM is the two-digit month message, DD is the two-digit date message, hh is the hour and mm is the minute of the time, and CALLER_ID is the phone number of the caller or CALLER_NM his/her name.

The following is an example of a caller ID message as it might appear on your screen:

```
RING

TIME: 04-28 12:30

CALLER NUMBER: 7135551414 or CALLER NAME: John Doe

RING
```

In the multiple message format, if the caller's number and name are available, the ring message displays both:

```
RING

TIME: MM-DD hh:mm

CALLER NUMBER: <Caller_ID>

CALLER NAME: <Caller_Name>

RING
```

Here is an example:

RING

TIME: 04-28 12:30

CALLER NUMBER: 7135551414

CALLER NAME: Tracy Huang

RING

If the caller number and name are not available, the ring message appears as follows:

RING

TIME: 04-28 12:30

REASON FOR NO NUMBER: OUT_OF_AREA

REASON FOR NO NAME: PRIVACY

RING

The last CND message that the modem received can be displayed by using the AT*T command.

Setting **S48.0=1** causes the modem to report CND information in its ASCII coded hexadecimal raw data format. The DTE software is responsible for explaining the data.

> **NOTE:** Please refer to the Bellcore Technical Advisory document TR-NWT-000030 for the exact data format. The above Caller ID scheme applies to the North America area. Different countries may employ different Caller ID schemes, check if the scheme used in your country is supported before using the Caller ID feature. For most other Caller ID schemes, only the Caller telephone number is provided.

Distinctive Ring

Distinctive Ring is a phone service that may be offered by your phone company. Check your phone company for availability. With this service, you can have several phone numbers assigned to the same phone line. The phone company sends a different type of ring signal for each phone number being called. The subscriber can distinguish which number is called by which type of ring is received.

One benefit of this feature is the ability to have three numbers on the same line allowing you to list the three numbers for voice, data, and fax, respectively. You can then have your fax machine answer only the ring corresponding to the fax number and have your modem answer only the ring corresponding to the data number. A voice call is not answered by either fax machine or data modem and it is answered only by picking up the phone. You can also have the answering machine answer only the voice ring. A more complicated use is that you can have one number for multiple uses, such as one number for both data and fax.

A ring signal is a composition of repeated on and off states. Different types of rings usually correspond to different compositions of the "on" part (cadence) of the ring. Your modem can distinguish up to four types of ring signals and can be commanded to answer or not answer any one of these four types of ring signals. Following is a list of these four types of ring signals. These are the ring types used in the USA. The difference among the ring types is the two-second ON part of the ring signal. It comprises a long, double short, or triple short ring.

S-register **S40 bits 3-6** are used for distinctive ring control. Each bit controls the answering of a particular ring type. Setting a bit to "1" enables answering, setting it to "0" rejects the ring. Note that the ring may still be heard even if it is not counted as an accepted ring by the modem.

The control relationships between bits 3 to 6 in register S40 and the different ring types are:

Table 7.   Different Ring Types in Register S40

TYPE	BIT (ON)	RING SEQUENCE
1	3	1.2s or 2s on; 4s off
2	4	0.8s on, 0.4s off, 0.8s on; 4s off
3	5	0.4s on, 0.2s off, 0.4s on, 0.2s off, 0.8s on; 4s off
4	6	0.3s on, 0.2s off, 1s on, 0.2s off, 0.3s on; 4s off

3.3.2 Security Function

The Omni modem provides a security function, that (when enabled) prevents an unauthorized user from making a connection. Two types of security function are provided. Type 1 security is used when the remote modem is also a ZyXEL modem; type 2 security is used when the remote modem is any other brand of modem.

With the type 1 connection, the dial-in (remote) modem sends in its supervisor password for checking at the initial connection handshake, and the local modem checks this password against its pre-stored acceptable password list. With a type 2 connection, the remote terminal is prompted to enter the password at the initial connection and the local modem does the password checking.

Two levels of security are provided. With level 1 security, the local modem maintains the connection if the password check is OK, otherwise the line is disconnected. With level 2 security, the local modem disconnects the line if the password has been found in its pre-stored acceptable list and then dials back the phone number corresponding to the dial-in password. The line is simply disconnected if the password does not match.

Four user passwords may be defined. The corresponding four dial-back numbers are the modem's four stored phone numbers. Any character (ASCII 0 to 127) can be used in the password. The maximum password length is 8 characters.

The security functions are only accessible through AT commands in terminal mode. Any access attempt results in the modem's prompting to enter the supervisor password. The attempt is rejected if the entered password is not correct. The default supervisor password is ZyXEL when the modem is shipped from the factory. This supervisor password is also the password sent for automatic password checking in a type 1 connection. To modify the supervisor password, use

```
AT*HS
```

Enter the original password and a new password and then to re-enter the new password for verification. For example:

PASSWORD   (Enter supervisor password)

****

PASSWORD   (Enter new supervisor password)

****

Verify (Enter the new supervisor password again)

****

OK

The command AT*Hn modifies the nth user password and the supervisor password on the screen for viewing. Again, enter the supervisor password first.

The following commands enable different types and levels of security:

CODE	DESCRIPTION
*G0	Disables security function.
*G1	Enables type 1 and level 1 security, with password check.
*G2	Enables type 1 and level 2 security, with password check and call-back.
*G3	Enables type 1 and level 1 security, with password check.
*G4	Enables type 1 and level 2 security, with password check and call-back.
*G5	Enables type 2 and level 2 security, with password check and call-back, remote site enters the call-back number.

NOTE: Before the security type or level can be changed, the modem requires the supervisor password.

For type 2 security, the remote site prompts you to enter the user password. A maximum of three tries in 40 seconds is allowed. If a correct password is not entered within this time limit, the line is disconnected. If the remote site is to enter the call-back number, it prompts you to do so.

3.3.3 Fax Function

Fax Physical Layer Protocol

Table 8.   Fax Physical Layer Capacity

STANDARD	BIT RATE [bps]	BAUD RATE [baud]	MODULATION	CARRIER FREQUENCY [Hz]
V.17	14400-7200	2400	TCM	1800
V.29	9600-4800	2400	QAM/DPSK	1700
V.27ter	4800-2400	1600/1200	PSK/DPSK	1800

EIA (Electronic Industries Association) Class 1/Class 2/Class 2.0 Command Set

Please refer to Fax Command Set in *Chapter 5*.

ITU-T T.30 Fax Protocol

The ITU-T T.30 fax protocol is known as the G3 fax handshake signals and procedures. The modem takes full control of this protocol – initiating and terminating fax calls, managing the communication session, and transporting the image data. Therefore, the modem relieves the computer fax software of the T.30 protocol handling.

Your modem allows for fax speeds up to 14400 bps when transmitting to a fax machine which complies with the V.17 fax standard. Speeds fall back to 12000, 9600, or 7200 bps in poor line conditions. When connecting to a G3 fax device, your modem allows for fax speeds up to 9600 bps and automatically falls back to 7200, 4800, and 2400 bps if the line quality is poor.

3.3.4 Voice Function

Voice capability stands for the modem's ability to digitize incoming voice messages, which the computer stores and forwards. It also means that the modem playback the recorded digitized voice on line for a message announcement.

Voice IS-101 Command Set

Please refer to the Voice command sets in *Chapter 5*.

4-bit Voice Data Compression

The main issue in the digitized voice mode is the amount of storage required. A relatively simple ADPCM algorithm can reduce the speech data rate to half the rate and maintain about the same voice quality. This algorithm can also be used to reduce the speech data rate to 1/3 or 1/4 of the original rate, but with voice quality degradation. Only 4-bit ADPCM is used in the Omni 56K USB.

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Chapter 4
Result Codes

</div>

4.1 Result Codes

The result code is the command response or the Connect message to the DTE. The format of the result code is dependent on Xn and Vn command. The lists are as follows:

Table 9.   Result Codes

Result Code for ATV0	ATV1	X0	X1	X2	X3	X4	X5	X6	X7
0	OK	0	0	0	0	0	0	0	0
1	CONNECT	0	0	0	0	0	X	X	X
2	RING	0	0	0	0	0	0	0	0
3	NO CARRIER	0	0	0	0	0	0	0	0
4	ERROR	0	0	0	0	0	0	0	0
5	CONNECT 1200		0	0	0	0	X	X	X
6	NO DIAL TONE			0		0	0	0	0
7	BUSY				0	0	0	0	0
8	NO ANSWER				0	0	0	0	0
9	RINGING				0	0	0	0	0
10	CONNECT 2400		0	0	0	0	X	X	X
11	CONNECT 4800		0	0	0	0	X	X	X
12	CONNECT 9600		0	0	0	0	X	X	X
14	CONNECT 19200		0	0	0	0	X	X	X
15	CONNECT 7200		0	0	0	0	X	X	X

Result Code for ATV0	ATV1	X0	X1	X2	X3	X4	X5	X6	X7
16	CONNECT 12000		0	0	0	0	X	X	X
17	CONNECT 14400		0	0	0	0	X	X	X
18	CONNECT 16800		0	0	0	0	X	X	X
19	CONNECT 38400		0	0	0	0	X		
20	CONNECT 57600		0	0	0	0	X		
21	CONNECT 76800		0	0	0	0	X		
22	CONNECT 115200		0	0	0	0	X		
23	CONNECT 230400		0	0	0	0	X		
24	CONNECT 460800		0	0	0	0	X		
25	CONNECT 921600		0	0	0	0	X		
26	CONNECT 307200		0	0	0	0	X		
27	CONNECT 153600		0	0	0	0	X		
28	CONNECT 102400		0	0	0	0	X		
29	CONNECT 61440		0	0	0	0	X		
30	CONNECT 51200		0	0	0	0	X		
31	CONNECT 624000		0	0	0	0	0		
32	CONNECT 124800		0	0	0	0	0		
33	CONNECT 62400		0	0	0	0	X		
34	CONNECT 41600		0	0	0	0	X		
35	CONNECT 31200		0	0	0	0	X	X	X
36	CONNECT 24960		0	0	0	0	X		
37	CONNECT 20800		0	0	0	0	X		
38	CONNECT 33600		0	0	0	0	X	X	X
39	CONNECT 28800		0	0	0	0	X	X	X
40	CONNECT 26400		0	0	0	0	X	X	X
41	CONNECT 24000		0	0	0	0	X	X	X
42	CONNECT 21600		0	0	0	0	X	X	X
100	CONNECT 56000		0	0	0	0	X	X	X
101	CONNECT 54666		0	0	0	0	X	X	X
102	CONNECT 53333		0	0	0	0	X	X	X
103	CONNECT 52000		0	0	0	0	X	X	X

| Result Code for | | X0 | X1 | X2 | X3 | X4 | X5 | X6 | X7 |
ATV0	ATV1								
104	CONNECT 50666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
105	CONNECT 49333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
106	CONNECT 48000		**0**	**0**	**0**	**0**	**X**	**X**	**X**
107	CONNECT 46666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
108	CONNECT 45333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
109	CONNECT 44000		**0**	**0**	**0**	**0**	**X**	**X**	**X**
110	CONNECT 42666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
111	CONNECT 41333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
112	CONNECT 40000		**0**	**0**	**0**	**0**	**X**	**X**	**X**
113	CONNECT 38666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
114	CONNECT 37333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
115	CONNECT 36000		**0**	**0**	**0**	**0**	**X**	**X**	**X**
116	CONNECT 34666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
117	CONNECT 33333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
118	CONNECT 32000		**0**	**0**	**0**	**0**	**X**	**X**	**X**
119	CONNECT 30666		**0**	**0**	**0**	**0**	**X**	**X**	**X**
120	CONNECT 29333		**0**	**0**	**0**	**0**	**X**	**X**	**X**
121	CONNECT 28000		**0**	**0**	**0**	**0**	**X**	**X**	**X**

NOTE: If error control result codes are enabled (X4, X5, X6, X7), the resulting message is formatted as the following:

X4: **CARRIER** Rx Rate.

    PROTOCOL: Error Control Level

    COMPRESSION: Compression Level

    CONNECT DTE Speed

X5: **CONNECT** DTE Speed/Protocol Rx Rate/Error Control Level

X6: **CONNECT** Rx Rate/ARQ

X7: **CONNECT** Rx Rate/ARQ/Error Control Level

Where ARQ denotes that **A**utomatic **R**etransmission re**Q**uest type of error control is enabled.

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Chapter 5
Command Sets

</div>

This chapter lists the command set Omni 56K USB supports. These commands include data command sets, fax command sets and voice command sets.

5.1   Data Command Sets

5.1.1 Basic AT Command Sets

Table 10.   Basic AT Command Sets

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
A/		Re-execute the last command once.	
A>		Re-execute the last command once or repeat the last call up to 9 times. (See also S8)	
<any key>		Terminate current connection attempt when entered in handshaking state.	
+++		Escape sequence code, entered in data state, wait for modem to return to online command mode.	

All of the following commands require an "AT" prefix:

Table 11.   AT Command Sets Requiring an "AT" Prefix

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
A		Go online in answer mode. (See also S39.2, S43.6).	
Bn		Handshake option:	S28.7

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
	B0 *	Select CCITT V.22 for 1200 bps.	
	B1	Select Bell 212 for 1200 bps communication.	
D*s*		Dial **s** (numbers and options) that follow (see also S38.0, S35.4). The options of **s** are listed as follows:	
	0-9, A, B, C, D #, *	Digits for dialing.	
	P	Pulse dialing	S23.1
	T	Tone dialing	S23.1
	,	Pause for a time specified in S8. Remaining digits are dialed as in-band DTMF (**D**ual **T**one **M**ulti-**F**requency).	
	;	Return to command state after dialing.	
	!	Hook flash.	S56
	@	Wait for a 5 second silence before proceeding, otherwise return NO ANSWER.	
	R	Reverse handshake (go online in Answer mode).	S17.5
	W	Wait for the second dial tone. Remaining digits are dialed as in-band DTMF.	
DL		Dials the last-dialed number.	
DS*n*	n=0-3	Dials the number stored in non-volatile RAM at location 'n.'	S44.3
E*n*		Command mode local echo of keyboard commands:	S23.0
	E0	Echo off.	
	E1 *	Echo on.	
H*n*		On/off hook control:	
	H0 *	Hang up (on-hook) the modem or ISDN, same as 'ATH'.	
	H1	Off hook the modem.	
I*n*		Display inquired information:	
	I0	Display numerical product code, same as 'ATI.'	
	I1	Display product information and ROM checksum.	
	I2	Display modem link status report.	
	I12	Display physical layer status.	
	I13	Display channel response for V.34.	

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
L*n*	n=0 to 7 4 *	Speaker volume control. The higher the value, the higher the volume.	S24.4-6
M*n*		Speaker control:	S21.1-2
	M0	Speaker is always OFF.	
	M1 *	Speaker is ON until carrier is detected.	
	M2	Speaker is always ON.	
	M3	Speaker is ON after the last digit is dialed out. Tone dialing is not heard.	
O		Return to online state.	
O1		Force modem to request a retrain.	
Q*n*		Result code displayed:	S23.7
	Q0 *	Modem returns result code.	
	Q1	Modem does not return result code.	
	Q2	Modem returns result code but quiet after answering on a RING. (see also S42.2)	S40.1
Sr.b=*n*		Set bit 'b' of S-register 'r' to value 'n'. 'n' is a binary digit '0' or '1'.	
Sr.b?		Display value of bit 'b' of S-register 'r'.	
Sr=*n*		Set S-register 'r' to value 'n'. 'n' must be a decimal number between 0 and 255.	
Sr?		Display value stored in S-register 'r'.	
T		Tone dial.	S23.1
UPX		Download firmware to the Flash EPROM (**e**rasable **p**rogrammable **r**ead-**o**nly **m**emory) by using Xmodem protocol.	
V*n*		Sets display type for Result Codes:	S23.6
	V0	Display result code in numeric form. (See also S35.7 and the result code table of 'ATXn'.)	
	V1 *	Display result code in verbose form.	
X*n*	n=0-7 5 *	Result code options, see the Options Table.	S23.3-5
Z*n*	n=0-2	Reset modem and set power-on profile.	S15.5-7
	Zn	Reset modem and load user profile n (0-1).	
	Z2	Reset modem and load factory settings.	
+++		Escape sequence code, entered in data state, wait for modem to return to command state.	

5.1.2 Extended AT& Command Sets

Table 12.   Extended AT& Command Set

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
&Bn		Data rate, terminal-to-modem (DTE/DCE):	S28.6
	&B0	DTE rate follows connection rate. (See also S44.6).	
	&B1 *	DTE (data terminal equipment)/DCE (data circuit-terminating equipment) rate fixed at DTE setting (See also S18, S20, and S44.6).	
&Cn		Carrier Detect (CD) options:	S21.4
	&C0	CD always ON (See also S42.7).	
	&C1 *	CD tracks presence of carrier (See also S38.3, S42.7).	
&Dn		Data Terminal Ready (DTR) options. (See also S25):	S21.6-7
	&D0	Ignore DTR signal, assume DTR is always ON.	
	&D1	108.1, DTR OFF-ON transition causes dial of the default number. (See also 'AT*Dn' and S48.4).	
	&D2 *	108.2, Data Terminal Ready, DTR OFF causes the modem to hang up.	
	&D3	Same as &D2 but DTR OFF causes the modem to hang up and reset from profile 0.	
&F		Load factory settings to RAM as active configuration.	
&Gn		Guard tone options:	S28.4-5
	&G0 *	No guard tone (within USA, Canada).	
	&G2	1800 Hz guard tone.	
&Hn		Data flow control, DTE/DCE:	S27.3-5
	&H0	Flow control disabled.	
	&H3 *	Hardware (CTS/RTS) flow control.	
	&H4	Software (XON/XOFF) flow control.	
&Kn		Modem error control and data compression:	S27.0-2
	&K0	No error control. (Same as AT&K).	
	&K1	MNP4 (See also S41.0), (include MNP3).	

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
	&K2	MNP4+MNP5 (See also S38.5, S41.0).	
	&K3	V.42+MNP4.	
	&K4 *	V.42+V.42bis, compatible with &K2 (See also S38.5).	
&Nn		Modem link mode options (DCE/DCE). (See also S43.7, S48.1):	S19
	&N0 *	Multi-Auto, auto-negotiate highest possible link rate: V.90, V.34, V.32bis, V.32, V.23, V.22bis, V.22 and Bell 212, V.21 Bell 103, G3 Fax V.17/V.29/V.27ter.	
	&N3	V.32bis 12000T/9600/7200T/4800	
	&N4	V.32 9600/4800	
	&N5	V.32 4800	
	&N12	V.23 1200/75	
	&N13	V.23 600/75	
	&N14	V.22bis 2400	
	&N15	V.22 1200	
	&N16	V.21 300	
	&N17	V.32bis 14400/12000/9600/7200/4800	
	&N18	V.32bis 12000/9600/7200/4800	
	&N19	V.32bis 7200/4800	
	&N24	BELL 212 1200	
	&N25	BELL 103 300	
	&N60	V.34 33600	
	&N61	V.34 31200	
	&N62	V.34 28800	
	&N63	V.34 26400	
	&N64	V.34 24000	
	&N65	V.34 21600	
	&N66	V.34 19200	
	&N67	V.34 16800	
	&N68	V.34 14400	
	&N69	V.34 12000	
	&N70	V.34 9600	
	&N71	V.34 7200	
	&N72	V.34 4800	
	&N73	V.34 2400	
	&N99	V.90 28000	

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
	&N98	V.90 29333	
	&N97	V.90 30666	
	&N96	V.90 32000	
	&N95	V.90 33333	
	&N94	V.90 34666	
	&N93	V.90 36000	
	&N92	V.90 37333	
	&N91	V.90 38666	
	&N90	V.90 40000	
	&N89	V.90 41333	
	&N88	V.90 42666	
	&N87	V.90 44000	
	&N86	V.90 45333	
	&N85	V.90 46666	
	&N84	V.90 48000	
	&N83	V.90 49333	
	&N82	V.90 50666	
	&N81	V.90 52000	
	&N80	V.90 53333	
	&N79	V.90 54666	
	&N78	V.90 56000	
&Pn		Pulse dial make/break ratio:	S23.2
	&P0 *	make / break=39% / 61%	
	&P1	make / break=33% / 67%	
&Rn		RTS (Request To Send) function selection:	S21.5
	&R0	CTS tracks RTS, response delay is set in S26.	
	&R1 *	Ignore RTS, assumes RTS always ON.	
&Sn		Data Set Ready (DSR) function selection:	S21.3
	&S0 *	DSR overridden, DSR always ON.	
	&S1	DSR according to CCITT (ITU-TSS). (See also S41.5, S44.4).	
&Tn		Modem testing:	S16
	&T0	Terminate test in progress.	
	&T1	Initiate Analog Loop-back (ALB) test.	
	&T3	Initiate Local Digital Loop-back (LDL) test.	
	&T4	Grant Remote Digital Loop-back request from remote modem.	S14.1

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
	&T5	Deny Remote Digital Loop-back request from remote modem.	S14.1
	&T6	Initiate Remote Digital Loop-back (RDL) test.	
	&T7	Initiate Remote Digital Loop-back with self-test. (RDL+ST)	
	&T8	Initiate Analog Loop-back with self-test. (ALB+ST)	
&Vn		View profile settings:	
	&V0	View current active settings.	
	&Vn	View the (n-1) user profile settings (n=1-2).	
	&V3	View factory default settings.	
&Wn	n=0-1	Save current settings to user profile n in non-volatile RAM. (See also S35.6).	
&Yn		Break handling. Destructive Break clears the buffer. Expedited Break is sent immediately to the remote system:	S28.2-3
	&Y0	Destructive, expedited.	
	&Y1 *	Non-destructive, expedited.	
	&Y2	Non-destructive, unexpedited.	
&Z?		Display all the phone numbers stored in non-volatile RAM.	
&Zn=s	n=0 to 3	Store phone number/s to NVRAM at location n (n=0 to 3) use AT*Dn or ATS29=n to set the default dial pointer.	

5.1.3 Extended AT* Command Sets

Table 13.   Extended AT* Command Sets

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
*Cn		Character length, including start, stop and parity bit:	S15.3-4
	*C0 *	10-bit character length.	
	*C1	11-bit character length.	
	*C2	9-bit character length.	
	*C3	8-bit character length.	
*Dn	n=0 to 3	Set default dial pointer at telephone directory location 'n.'	S29
	*D0 *	(See also S35.4 and S38.0).	
*En		Modem error control negotiation:	S21.0
	*E0 *	If error control negotiation fails, keep the non-error control connection.	
	*E1	If error control negotiation fails, disconnect the call (hang-up).	
*Gn	*G0	Disables security function (default).	
	*G1	Enables type 1 security, with password check.	
	*G2	Enables type 1 security, with password check and call back.	
	*G3	Enables type 2 security, with password check.	
	*G4	Enables type 2 security, with password check and call back.	
	*G5	Enables type 2 security, with password check and call back; remote site enters the call back number.	
	*G9	Reset the supervisor password to "ZyXEL".	

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
	NOTE:		
	1. The command *Gn requests supervisor password checking.		
	2. In security type 1, the remote site must be a ZyXEL modem.		
	3. In security type 2, the remote site can be any other type of modem.		
	4. The modem can store 4 (0 to 3) telephone numbers. If call back security is disabled, the modem searches the password table to check the remote modem's password. If they match, the modem keeps the connection, otherwise the modem hangs up. If call back security is enabled, the modem completes the password checking. If there is no match, the modem disconnects the line, finds the corresponding phone number and call back immediately. The remote modem should be set to auto-answer the call and response.		
*HS		Modifies supervisor password.	
	NOTE: The default supervisor password is "ZyXEL".		
*Hn	N=0 to 3	Modifies the user password table at location 'n.'	
*Pn	n=0 to 15 *P9 *	Set transmission power level; ranges from –8 dBm to –15 dBm. (Default: –11 dBm)	S17.1-4
*Qn		Action taken when line quality changes:	S27.6-7
	*Q0	No action to poor signal quality.	
	*Q1	Retrain action taken if signal quality is poor. (See also S41.2).	
	*Q2 *	Adaptive rate, automatic fall-back or forward.	
	*Q3	Disconnect if signal quality is poor.	
*T		Recall the last CND (Caller ID) information.	S40.2
*V		View password table.	

5.1.4 Extended AT# Command Sets

Table 14.   Extended AT# Command Sets

COMMAND	OPTIONS	FUNCTION AND DESCRIPTION	Ref.
#En		Modem status in escape state:	
	#E0	Disable the report of modem status in escape state.	
	#E1	Enable the report of modem status in escape state.	

5.2 Fax Command Sets

5.2.1 Service Class 1 Commands

Table 15.   Service Class 1 Commands

COMMAND	DESCRIPTION	VALUE
+FCLASS=n	Service Class Identification and Control	n=0: Sets to modem mode n=1: Sets to Class 1 mode n=2.0: Sets to Class 2.0 mode n=8: Sets to Voice mode
+FTS=n	Stop transmission and pauses	n=0 to 255 in 10 ms units
+FRS=n	Wait for Silence	n=0 to 255 in 10 ms units
+FTM=<MOD>	Transmit Data with <MOD> Carrier	See table 16
+FRM=<MOD>	Receive Data with <MOD> Carrier	See table 16
+FTH=n	Transmit HDLC Data with <MOD>=3 Carrier	n=3
+FRH=n	Receive HDLC Data with <MOD>=3 Carrier	n=3

The value of <MOD> parameters are listed in the following table:

Table 16.   The Value of <MOD> Parameters

VALUE	MODULATION	SPEED
3	V.21 ch 2	300
24	V.27ter	2400
48	V.27ter	4800
72	V.29	7200
73	V.17	7200
74	V.17 short train	7200
96	V.29	9600
97	V.17	9600
98	V.17 short train	9600
121	V.17	12000
122	V.17 short train	12000
145	V.17	14400
146	V.17 short train	14400

5.2.2 Service Class 2 Commands

The following Class 2 commands are supported and implemented as per TIA (Telecommunications Industry Association) PN2388 (dated 8/20/1990):

Table 17.   Command Syntax

COMMAND SYNTAX	DESCRIPTION
+<command>=<value>	Execute a command or set a parameter.
+<command>=?	Read permissible settings.
+<command>?	Read current settings.

Table 18.   Supported Commands (per TIA PN2388 dated 8/20/1990)

COMMAND	DESCRIPTION	VALUE
+FAA=*n*	Auto-answer mode parameter:	
	Answer as set by +FCLASS.	n=0
	DCE answers and auto-determines type.	n=1
+FBADLIN= <*value*>	Bad line threshold (number of consecutive bad lines for a bad page parameter): Determine if Copy Quality OK on the T.30 flow chart. <value>=0 to 255; a value of 0 implies that error checking is disabled.	0 to 255
+FBOR=*n*	Phase C data bit order:	
	Select direct bit order.	n=0
	Select reversed bit order in receiving mode for phase C data.	n=1
+FBUF?	Buffer size; read only parameter: Allow DTE to determine the characteristics of the DCE's buffer size.	
+FCIG=*"string"*	Local fax station ID string, for polling Rx.	
+FCLASS=*n*	Service class selection: Refer to +FCLASS Class 1 command in previous section.	
+FCON	DCE responds fax connection.	
+FCQ=*n*	Copy quality check capability parameter:	
	No copy quality check capability.	n=0
	Only check 1D phase C data.	n=1
	Check both 1D and 2D phase C data.	n=2
+FCR=*n*	"Capability to receive" parameter:	
	DCE does not receive message data or poll a remote device.	n=0
	DCE receives message data or polls a remote device.	n=1
+FDCC=*vr, br, wd, ln, df, ec, bf, st*	DCE capabilities parameters:	
	Vertical resolution: Normal; 98 lpi.	vr=0
	Vertical resolution: Fine; 196 lpi.	vr=1
	Bit rate: 2400 bit/s; V.27ter.	br=0
	Bit rate: 4800 bit/s; V.27ter.	br=1
	Bit rate: 7200 bit/s; V.29 or V.17.	br=2
	Bit rate: 9600 bit/s; V.29 or V.17.	br=3

COMMAND	DESCRIPTION	VALUE
	Bit rate: 12000 bit/s; V.17.	br=4
	Bit rate: 14400 bit/s; V.17.	br=5
	Page width: 1728 pixels in 215mm.	wd=0
	Page width: 2048 pixels in 255mm.	wd=1
	Page width: 2432 pixels in 303mm.	wd=2
	Page length: A4; 297mm.	ln=0
	Page length: B4; 364mm.	ln=1
	Page length: unlimited length.	ln=2
	Data compression format: 1-D; modified Huffman.	df=0
	Data compression format: 2-D; modified Read.	df=1
	Error correction disabled.	ec=0
	Disable binary file transfer.	bf=0
	Minimum scan time/line: 0 ms.	st=0
	Minimum scan time/line: 5 ms.	st=1
	Minimum scan time/line: 10 ms (normal); 5 ms (fine).	st=2
	Minimum scan time/line: 10 ms.	st=3
	Minimum scan time/line: 20 ms (normal); 10ms (fine).	st=4
	Minimum scan time/line: 20 ms.	st=5
	Minimum scan time/line: 40 ms (normal); 20ms (fine).	st=6
	Minimum scan time/line: 40 ms.	st=7
+FDCS=*vr, br, wd, ln, df, ec, bf, st*	Current session parameter; refer to +FDCC command.	
+FDIS=*vr, br, wd, ln, df, ec, bf, st*	Current session negotiation parameter; refer to +FDCC command.	
+FDR	Receive phase C data command; initiates document reception.	
+FDT=*df, vr, wd, ln*	Transmit phase C data command: release the DCE to proceed with negotiation.	
+FET=*n*	End of page or document command:	
	More pages; same document.	n=0
	End of document; another document follows.	n=1
	No more pages or documents.	n=2
	Procedure interrupt; another page follows.	n=4
	Procedure interrupt; end of document, another document follows.	n=5
	Procedure interrupt; end of document.	n=6
+FK	Regular fax abort command.	
+FLID=*"string"*	Local ID string parameter.	
+FLO=*n*	Flow control options:	
	No flow control.	n=0
	Set XON/XOFF software flow control.	n=1
	Set CTS/RTS hardware flow control.	n=2
+FLPL=*n*	Document for polling command:	
	The DTE has no document available for polling.	n=0
	Indicate a document available for polling.	n=1
+FMDL?	Request DCE model.	
+FMFR?	Request DCE manufacturer.	

COMMAND	DESCRIPTION	VALUE
+FMINSP=*n*	Minimum phase C speed parameter:	
	2400 bps.	n=0
	4800 bps.	n=1
	7200 bps.	n=2
	9600 bps.	n=3
	12000 bps.	n=4
	14400 bps.	n=5
+FPHCTO= <*value*>	DTE Phase C response time-out: Determine how long the DCE waits for a command after reaching the end of data when transmitting in Phase C. <value>=0 to 255; 100 ms units.	0 to 255
+FPTS=*n*	Page transfer status:	
	Received page good.	n=1
	Page bad; retrain requested.	n=2
	Page good; retrain requested.	n=3
	Page bad; procedure interrupt requested.	n=4
	Page good; procedure interrupt requested.	n=5
+FREL=*n*	Phase C received EOL alignment:	
	The EOL patterns are bit aligned as received.	n=0
	The last received bits of EOL patterns are byte aligned by the DCE, with necessary zero fill bits inserted. Refer to TIA (Telecommunications Industry Association) PN-2388 for details.	n=1
+FREV?	Request the DCE revision identification.	
+FSPL=*n*	"Enable polling" command:	
	Disable polling.	n=0
	Enable polling.	n=1

All other +F commands are not supported, but the modem responds OK. In many cases this means "it is ignored".

Table 19.   Class 2 Command Responses

RESPONSE	VALUE	FUNCTION AND DESCRIPTION
+FCFR		Confirmation.
+FCIG:"string"		Report remote ID response CIG.
+FCON		Facsimile connection response.
+FCSI:"string"		Report remote ID response CSI.
+FDCS:vr, br, wd, ln, df, ec, bf, st		Report session parameters response; refer to +FDCC=.... command.
+FDIS:vr, br, wd, ln, df, ec, bf, st		Report session negotiation parameters response; refer to +FDCC=.... command.
+FDTC:vr, br, wd, ln, df, ec, bf, st		Report remote capabilities response; refer to +FDCC=.... command.
+FET:n		Post page message response; refer to the +FET=n command.
+FHNG:n		Call termination status response:

RESPONSE	VALUE	FUNCTION AND DESCRIPTION
	n=00	Normal and proper end of connection.
	n=10	Transmit error on phase A hang up code.
	n=20	Transmit error on phase B hang up code.
	n=40	Transmit error on phase C hang up code.
	n=50	Transmit error on phase D hang up code.
	n=70	Receive error on phase B hang up code.
	n=90	Receive error on phase C hang up code.
	n=100	Receive error on phase D hang up code.
+FNSC:"HEX string"		Report the non-standard facilities command frame.
+FNSF:"HEX string"		Report the non-standard facilities frame response.
+FNSS:"HEX string"		Report the non-standard setup frame response.
+FPOLL		Remote polling indication.
+FPTS:n		Receive page transfer status response; refer to +FPTS=n command.
+FTSI:"string"		Report remote ID response TSI.
+FVOICE		Transition to Voice response.

Class 2 Flow Control

Flow control is necessary to match the DTE-DCE data rate to the line-signaling rate while transmitting or receiving Group 3 (T.4) data. In Class 2 fax mode, both hardware (RTS/CTS) and software (XON/XOFF) flow control are enabled.

5.2.3 Service Class 2.0 Commands

Table 20.   Service Class 2.0 Commands

COMMAND	DESCRIPTION	VALUE
+FDT	Transmit phase C data command: releases the DCE to proceed with the negotiation.	
+FDR	Receive phase C data command: initiates document reception.	
+FKS	Terminate a Session, orderly fax abort.	
+FIP	Initialize Service Class 2.0 Parameters.	
+FCLASS=n	Service Class Identification and Control.	n=0, 1, 2.0, 8; refer to the +FCLASS Class 1 command
+FMI?	Identify DCE Manufacturer	ZyXEL
+FMM?	Identify DCE	Omni 56K USB
+FMR?	Identify DCE Revision	Vx.x
+FCC=vr, br, wd, ln, df, ec, bf, st	Establish DCE Capabilities:	
	Vertical Resolution	vr=0:Normal; 98 lpi vr=1:Fine; 196 lpi
	Bit Rate	br=0:2400 bps br=1:4800 bps br=2:7200 bps br=3:9600 bps br=4:12000 bps br=5:14400 bps
	Page Width	wd=0:1728 pixels in 215mm wd=1:2048 pixels in 255mm wd=2:2432 pixels in 303mm
	Page Length	ln=0:A4; 297mm ln=1:B4; 364mm ln=2:unlimited length
	Data Compression Format	df=0:1-D df=1:2-D
	Error Correction	ec=0:Disable
	Binary File Transfer	bf=0:Disable

	Minimum Scan Time/Line	st=0:0 ms
		st=1:5 ms
		st=2:10 ms (normal); 5 ms (fine)
		st=3:10 ms
		st=4:20 ms (normal); 10 ms (fine)
		st=5:20 ms
		st=6:40 ms (normal); 20 ms (fine)
		st=7:40 ms
+FIS=vr, br, wd, ln, df, ec, bf, st	Current Session Negotiating Parameters	Same as above.
+FCS=vr, br, wd, ln, df, ec, bf, st	Current Session Parameters	Same as above.
+FLI="string"	Local Facsimile Station ID String, TSI/CSI	
+FPI="string"	Local Facsimile Station ID String, CIG	
+FLP=n	Indicate document available for polling	N=0:No document N=1:A document is available
+FSP=n	Enable/Disable polling	N=0:Disable N=1:Enable
+FNR=rpr, tpr, idr, nsr	Negotiation Reporting Enable	Rpr= 0:Receiver parameters are not reported. Rpr=1:Receiver parameters are reported. Tpr= 0:Transmitter parameters are not reported. Tpr=1:Transmitter parameters are reported. idr= 0:ID Strings are not reported. idr=1:ID Strings are reported. nsr= 0:Non-standard frames are not reported. nsr= 1:Non-standard frames are reported.
+FIE=n	Procedure Interrupt Parameter	n=0:Disable n=1:Enable
+FPS=n	Page Transfer Status	n=1:Received page is good. n=2:Page is bad; retrain is requested. n=3:Page is good; retrain is

		requested.
		n=4:Page is bad; procedure interrupt is requested.
		n=5:Page is good; procedure interrupt is requested.
+FLO=n	Flow Control Select	n=0:No flow control
		n=1:Sets XON/XOFF software flow control
		n=2:Sets CTS/RTS hardware flow control
+FPR=n	Serial Port Rate Control	n=0:Automatic DTE rate detection by the DCE
		n>0:Serial rate is fixed at the value multiplied by 2400 bps.
+FBO=n	Phase C Data Bit Order	n=0:Selects direct bit order
		n=1:Selects reversed bit order
+FEA=n	Phase C Received EOL (End-Of-Line) alignment	n=0:EOL patterns are as received
+FCR=n	Capability to Receive	n=0:Not receive message data or poll a remote device.
		n=1:Receive message data or poll a remote device.
+FCQ=<rq>, <tq>	Copy Quality disable/enable	rq=0:Receive copy quality check is disable.
		rq=1:Receive copy quality check is enable.
		tq=0:Transmit copy quality check is disable.
		tq=1:Transmit copy quality check is enable.
+FRQ=pql, cbl	Receive Quality Thresholds	Pgl=0-64h:Specifies the percentage of good lines
		cbl=0-ffh:Specifies the maximum tolerable number of consecutive bad lines.
+FAA=n	Adaptive Answer Mode	n=0:Answers as set by +FCLASS
		n=1:Answers and auto-determines the call type.
+FCT=n	Phase C Timeout	n=0-ffh, 1 sec units
+FMS=n	Minimum Phase C Speed	n=0:2400 bps
		n=1:4800 bps
		n=2:7200 bps

		n=3:9600 bps
		n=4:12000 bps
		n=5:14400 bps
+FBS?	Buffer Size	512, 256

5.2.4 Voice AT Commands

Table 21.   Voice AT Commands

COMMAND	FUNCTION	OPTION	DEFAULT	DESCRIPTION
+FLO	Flow control select	0, 1, 2	2	0: No flow control. 1: (XON/XOFF) Software flow control. 2: (RTS/CTS) Hardware flow control.
+VIP	Initialize parameters	N/A	N/A	+VSD=15, 70 (15*4, 7 second) +VTD=100 (1 second) +VRN=10 (10 second) +VRA=70 (7 second) +VGR=0 (Enable AGC) +VGT=128 +FLO=2 (RTS/CTS) +VIT=70 (7 second)
+FCLASS	Voice/data/fax selection	0, 1, 2.0, 8	0	0: DATA. 1: CLASS 1 FAX. 2.0: CLASS 2.0 FAX. 8: VOICE.
+FMI?	Manufacturer ID	N/A	ZyXEL	
+FMM?	Model ID	N/A	Omni 56K USB	
+FMR?	Revision	N/A	Vx.xx	
+VRX	Voice Recording	N/A	N/A	Start recording.
+VGR	Set the gain for the received voice sample	0	0	0: Automatic gain control (AGC).
+VGT	Set the gain for the transmitted voice sample	0 to 255	128	0: Silence. 1 to 255: The larger the value, the louder the voice.

+VLS	Select a voice I/O device	0, 1, 2	0	0: The DCE is on-hook. Local phone connected to Telco line. 1: The DCE is on-hook and is connected to the local phone. The local phone is also provided with power. The modem can record/play through the local phone set. 2: The DCE is off-hook and is connected to the phone line. The local phone is provided with power. The modem can record/play through the local telephone line.
+VRA	Ring back goes away timer	0 to 255	70	0: turn off the timer. 1 to 255: Defines the period without ringback (after at lease one ringback has been detected) in 100 ms units.
+VRN	Ring back never come timer	0 to 255	10	0: turn off the timer. 1 to 255: Defines the period without ringback after dialing in 1 sec unit.
+VTX	Voice transmit mode	N/A	N/A	Switches to voice transmit mode.
+VSD	Silence detection	Threshold, Period (0 to 255), (0 to 255)	15, 70	Threshold: 0: Disable silence detection. 1 to 255: The smaller the value, the more sensitive to the silence detection it is. Period: 1 to 255: The required period of silence detection before DCE reporting the silence event. 0: Disable silence detection. Unit: 0.1 second
+VSM	Selection of compression method	4; ZyXEL ADPCM; 4 Bit; (9600)	4, 9600	IMA 4 bit ADPCM. Sample rate: 9600.
+VTS= [x, y, z]	Dual Tone Generation	x: 0 to 3000 Hz y: 0 to 3000 Hz z: 0 to 1000 (10ms)	N/A	x: first tone frequency y: second tone frequency z: duration in 10ms unit
+VTS= {x, y}	DTMF Tone Generation	x: 0 to 9, *, #, A to D y: 0 to 1000 (10ms)	N/A	x: DTMF digits (0 to 9, *, #, A, B, C, D) y: duration in 10ms unit
+VTS= x, x…	DTMF Tone Generation	x: 0 to 9, *, #, A to D	N/A	x: DTMF digits (0 to 9, *, #, A, B, C, D) Duration: +VTD setting (in 10ms unit).

+VTD	Set default duration of DTMF tone	1 to 255	100	Unit: 0.01 second.
+VIT	Inactivity timer	0 to 255	70	Unit: 0.1 second.

5.2.5 Voice Shielded DTE Commands

Table 22.   Voice Shielded DTE Commands

COMMAND	DESCRIPTION
<DLE>p	Pause: suspend voice data to the output device in playback state.
<DLE>r	Resume: resume suspended voice data in playback state.
<DLE><ETX>	Terminate voice playback state: switch to online voice command mode after completing remaining data in buffer.

5.2.6 Voice Shielded DTE Responses

Table 23.   Voice Shielded DTE Responses

RESPONSE CODE	DESCRIPTION
<DLE>0 – <DLE>9 <DLE>*, <DLE># <DLE>A – <DLE>D	DTMF digit detected
<DLE>a	Answer Tone detected
<DLE>b	Busy detected
<DLE>c	Calling Tone detected
<DLE>d	Dial Tone detected
<DLE>e	European Data Modem Calling Tone detected
<DLE>f	Bell Answer Tone detected
<DLE>h	The local handset on-hook
<DLE>q	Quiet detected
<DLE>s	Silence detected
<DLE>H	The local handset on-hook
<DLE>u	Transmission Under run in playback state
<DLE><ETX>	End of stream

5.3 S-Register Descriptions

In most bit-mapped S-registers, the default bit value is 0. Non-0 default values are followed by an asterisk. In some cases, default values are shown in the reference column preceded by +. Some bits are reserved for factory use and should not be changed.

5.3.1 Basic S-Registers "ATSn=x"

Table 24.   Basic S-Registers "ATSn=x"

COMMAND	FUNCTION AND DESCRIPTION	+Ref.
S0=	Sets the number of rings on which the modem answers. 0 value disables auto-answer.	+000
S1=	Counts and stores number of rings from an incoming call.	+000
S2=	Defines escape code character, default '+' (43 dec.). A value of 128 to 255 disables the escape code.	+043
S3=	Defines ASCII Carriage Return.	+013
S4=	Defines ASCII Line Feed.	+010
S5=	Defines ASCII Backspace. A value of 128 to 255 disables the Backspace key's delete function.	+008
S6=	Sets the number of seconds the modem waits before dialing if 'X0' or 'X1' is selected. If a setting of 'X2,' 'X7' is selected, the modem dials as soon as it detects a dial tone. This register also sets the time-out interval for the "W" dial modifier to wait for the dial tone. (See also S41b4.)	+003
S7=	Sets duration, in number of seconds modem waits for a carrier.	+060
S8=	Sets duration, in seconds, for pause (,) option in Dial command and pause between command re-executions for Repeat (>) command.	+002
S9=	Sets duration, in tenths of a second of remote carrier signal before recognition. (Ignored if in non-FSK or half-duplex operation.)	+006
S10=	Sets duration, in tenths of a second, modem waits after loss of carrier before hanging up.	+007
S11=	Sets duration and spacing, in milliseconds of dialed Touch-Tones.	+070

Table 25.   Extended S-Registers "ATSn=x"

COMMAND	Bit	dec	hex	FUNCTION AND DESCRIPTION	Ref.
S13=	Bit	dec	hex	Bit-mapped register.	+000
	1	2	2	Capture modem manufacturer information during V.42 handshake, can be displayed at ATI2 <Last Speed/Protocol> line if available ('Flash' or 'ZyXEL'	

COMMAND	Bit	dec	hex	FUNCTION AND DESCRIPTION	Ref.
				stands for ZyXEL connection).	
S14=	bit	dec	hex	Bit-mapped register:	+002
	1	0	0	Grant Remote Digital Loop-back test request.	&T4
		2	2	Deny Remote Digital Loop-back test request.	&T5*
S15=	bit	dec	hex	Bit-mapped register.	+066
	0, 1	0	0	Even parity.	
		1	1	Odd parity.	
		2	2	No parity.	*
	2	0	0	1 stop bit.	*
		4	4	2 stop bits.	
	4, 3	0	0	10 bit character length.	*C0*
		8	8	11 bit character length.	*C1
		16	10	9 bit character length.	*C2
		24	18	8 bit character length.	*C3
	7-5	0	0	Profile 0 as active settings after power on.	Z0
		32	20	Profile 1 as active settings after power on.	Z1
		64	40	Factory default as active settings after power on.	Z2*
S16=		dec	hex	Test status register.	+000
		0	0	No test in progress.	&T0
		1	1	Analog Loop-back test in progress.	&T1
		3	3	Local Digital Loop-back test in progress.	&T3
		6	6	Remote Digital Loop-back test in progress.	&T6
		7	7	Remote Digital Loop-back with self-test in progress.	&T7
		8	8	Analog Loop-back with self-test in progress.	&T8
S17=	Bit	dec	hex	Bit-mapped register.	+022
	4-1	0-30	0-1E	Set transmit power level from 0 to –15 dBm. (See also S35b3) (Default *P11)	*Pn
	5	0	0	Normal dial. (Default)	D
		32	20	Reverse dial, go online in answer mode.	DR
S18=		dec	hex	Force modem to fix baud rate when answering.	+000
		0	0	Disable fixed baud function.	
		1-46	1-2E	Enable baud rate to be fixed when answering. Speed value settings (n) the same as S20.	
S19=		dec	hex	Modem connection mode, same.	+000/&Nn
		0-99	0-63	Setting value as 'AT&Nn' command.	
S20=		Dec	hex	DTE speed (bps). Auto-detected from AT Command.	+001
		0	0	230400 bps	
		1	1	115200 bps (Default)	

COMMAND	Bit	dec	hex	FUNCTION AND DESCRIPTION	Ref.
		2	2	76800 bps	
		3	3	57600 bps	
		4	4	38400 bps	
		5	5	19200 bps	
		6	6	16800 bps	
		7	7	14400 bps	
		8	8	12000 bps	
		9	9	9600 bps	
		10	A	7200 bps	
		11	B	4800 bps	
		12	C	2400 bps	
		13	D	1200 bps	
		14	E	460800 bps	
		15	F	300 bps	
		16	10	307200 bps	
		17	11	153600 bps	
		18	12	102400 bps	
		20	14	61440 bps	
		21	15	51200 bps	
		22	16	624000 bps	
		24	18	124800 bps	
		25	19	62400 bps	
		26	1A	41600 bps	
		27	1B	31200 bps	
		28	1C	24960 bps	
		29	1D	20800 bps	
		46	2E	921600 bps	
NOTE: Only speeds up to S20=15 are supported by auto-speed detection.					
S21=	Bit	dec	hex	Bit-mapped register.	+178
	0	0	0	Maintain a non-error control connection when modem error control handshake fails. (Default)	*E0
		1	1	Drop connection when modem error control handshake fails.	*E1
	1-2	0	0	Speaker is always OFF.	M0
		2	2	Speaker is ON until carrier is detected. (Default)	M1*
		4	4	Speaker is always ON.	M2
		6	6	Speaker is ON after last digit is dialed out until carrier is detected.	M3

COMMAND	Bit	dec	hex	FUNCTION AND DESCRIPTION	Ref.
	3	0	0	DSR is always ON. (Default)	&S0
		8	8	According to CCITT. (See also S44.4, S41.5).	&S1
	4	0	0	CD is always ON.	&C0
		16	10	CD tracks presence of data carrier. (See also S38.3) (Default)	&C1
	5	0	0	CTS follows RTS in synchronous mode. Response delay set in S26.	&R0
		32	20	Ignore RTS (CTS always ON) in synchronous mode. (Default)	&R1
	6-7	0	0	Assume DTR always ON.	&D0
		64	40	108.1, DTR OFF-ON transition causes dial of the default number.	&D1
		128	80	108.2 Data Terminal Ready, DTR OFF causes the modem to hang up and return to command state. (Default)	&D2
		192	C0	108.2, DTR OFF causes the modem to hang up and reset the modem to profile 0 after DTR dropped.	&D3
S23=	bit	dec	hex	Bit-mapped register.	+105
	0	0	0	Command echo disabled.	E0
		1	1	Command echo enabled. (Default)	E1
	1	0	0	Tone dial. (Default)	T
		2	2	Pulse dial.	P
	2	0	0	Pulse dial make/break ratio = 39% / 61% (Default)	&P0
		4	4	Pulse dial make/break ratio = 33% / 67%	&P1
	3-5	0	0	ATX0 (See result code table)	X0
		8	8	ATX1	X1
		16	10	ATX2	X2
		24	18	ATX3	X3
		32	20	ATX4	X4
		40	28	ATX5, error control result code is enabled. (Default)	X5
		48	30	ATX6, error control result code is enabled.	X6
		56	38	ATX7, error control result code is enabled.	X7
	6	0	0	Display result code in numeric format. (see S35.7)	V0
		64	40	Display result code in verbose format. (Default)	V1
	7	0	0	Modem returns result code. (Default)	Q0
		128	80	Modem does not return result code. (see also S40.1)	Q1
S24=	bit	dec	hex	Bit-mapped register.	
	6-4	16-112	10-70	Speaker volume control, increments of 16 in decimal value.	L0-7

S25=		0 to 255	0-FF	Specify the time delay that DTR signal needs to be OFF before it is recognized, in 10 ms units. If S25=0, the delay time is set to 4 ms.	+000
S26=		dec	hex	RTS/CTS delay.	+000
		0 to 255	0-FF	Set the delay, in 10 millisecond units between the RTS and modem's CTS response in synchronous mode. (see '&Rn' command)	&Rn
S27=	Bit	dec	hex	Bit-mapped register.	+156
	0-2			Modem error control.	
		0	0	No error control.	&K0
		1	1	MNP4 + MNP3 (see also S41.0)	&K1
		2	2	MNP4 + MNP5 (see also S38.5, S41.0)	&K2
		3	3	V.42+MNP4	&K3
		4	4	V.42 + V.42bis (compatible with &K2) (Default)	&K4*
	3-5	0	0	Flow control disabled.	&H0
		24	18	Hardware (RTS/CTS) flow control. (Default)	&H3
		32	20	Software (XON/XOFF) flow control.	&H4
		40	28	Reserved.	&H5
	6-7			Signal quality.	
		0	0	No response to poor signal quality.	*Q0
		64	40	Retrain action taken if signal quality is poor.	*Q1
		128	80	Adaptive rate (auto fall-back/forward) when signal quality changes. (Default)	*Q2
		192	C0	Disconnect when signal quality is poor.	*Q3
S28=	bit	dec	hex	Bit-mapped register.	+068
	2-3	0	0	Destructive, expedited break.	&Y0
		1	4	Non-destructive, expedited break. (Default)	&Y1
		10	8	Non-destructive, un-expedited break.	&Y2
	4-5	0	0	No guard tone. (Default)	&G0
		16	10	550 Hz guard tone.	&G1
		32	20	1800 Hz guard tone.	&G2
	6	0	0	DTE/DCE rate follows link rate. (See also S18, S44b6)	&B0
		1	64	DTE/DCE rate is fixed at the DTE setting, range from 300 to 460.8 Kbps. (Default, also see S18, S44b6)	&B1
S29=		0 to 3	0 to 3	Set default dial phone number pointer, use AT&Zn=s to store phone numbers in EEPROM.	+000 *D
S31=		0-255	0-FF	Holds the ASCII decimal value of the XON.	+017
S32=		0-255	0-FF	Holds the ASCII decimal value of the XOFF.	+019
S35=	bit	dec	hex	Bit-mapped register.	+032

	bit	dec	hex		
	1	2	2	Disable aborting from terminal during modem handshaking.	
	3	8	8	Add 16dB attenuation to the leased line transmission power.	
	5	32	20	Enable Selective Reject in V.42. (Default)	
	7	128	80	Enable extended numerical result codes from 50 to 65 when an error corrected connection is made. Use with ATV0. (see result code table)	V0 S23.6
S36=	bit	dec	hex	Bit-mapped register.	
	7-5	0	0	No security function. (Default)	*G0
		32	20	Type 1* security, with password check.	*G1
		64	40	Type 1* security, with password check and call back.	*G2
		96	60	Type 2* security, with password check.	*G3
		128	80	Type 2* security, with password check and call back.	*G4
		160	A0	Type 2* security, with password check and call back; call back number from remote.	*G5
S38=	bit	Dec	hex	Bit-mapped register.	+000
	0	1	1	Repeatedly dialing default number if not connected.	*Dn, S29
	3	0	0	CD tracks the carrier. (Default)	&C0
	3	8	8	DCD ON/OFF sequence follows UNIX standard, DCD ON before connect message is sent, DCD off after last DCE response is sent.	&C1, S21.4
	4	16	10	Auto-mode fax receiving disabled, hang up if a fax call is received. (Default)	&N0
	5	32	20	Disable MNP5 negotiation.	&Kn
S39=	bit	dec	hex	Bit-mapped register.	+032
	2	4	4	Reverse the answers. Answer in originating mode.	ATA
S40=	bit	dec	hex	Bit-mapped register.	+000
	1	2	2	No result code is displayed in answer mode.	Q2
	2	4	4	Enables caller ID detection.	
	3	8	8	Enables type 1 ring detection.	
	4	16	10	Enables type 2 ring detection.	
	5	32	20	Enables type 3 ring detection.	
	6	64	40	Enables type 4 ring detection.	
S41=	bit	dec	hex	Bit-mapped register.	+000
	0	1	1	Special MNP compatibility. (see also S27.0, S38.5)	&Kn
	3	8	8	Enable CCITT signals 140 and 141 on EIA-232D interface.	
	4	16	10	In X2-X7 setting, modem waits for S6 seconds before dialing and ignores dial tone detection.	
	5	32	20	DSR follows DCD and pulses for 0.5 sec after DCD	&Sn

				on-off transition.	
	6	64	40	Force S0>=2; does not answer on the first ring.	S0
	7	128	80	Ignore calling tone, not to be used as fax detection.	
S42=	Bit	dec	hex	Bit-mapped register.	+000
	1	2	2	Enables throughput averaging.	
	2	4	4	CND message forces on even if ATQ2 is set.	
	3	8	8	Disable escape sequence code in answer mode.	
	4	16	10	Disable V.17 14,400 Fax in calling mode, no effect to answering mode.	
	6	64	40	Disable 'RINGING' result code.	Xn
	7	128	80	DCD forced on but pulse off for 0.5 second at carrier loss.	&C0
S43=	Bit	dec	hex	Bit-mapped register.	+008
	6	64	40	Enable 1.5 sec, pause between off-hook and modem answering.	
	7	128	80	Modem hang-up if the line condition does not permit modem to run at the highest speed set by '&Nn' command.	
S44=	Bit	dec	hex	Bit-mapped register.	+000
	3	8	8	ATDSn initiates auto-dial of the stored numbers consecutively until connection is made (cyclic dial).	DSn
	4	16	10	DSR follows DTR. (see also S41.5)	&S1
	6	64	40	When selected with '&B0', DTE speed fixed at 38400 when the link speed is above 9600. DTE speed fixed at 9600 if link speed is 7200. If it is below 7200, DTE speed follows link speed. When selected with &B1, DTE speed fixed at current rate when an ARQ connection is made. When a non-ARQ connection is made, DTE speed follows the link speed. (See also S18.)	&Bn
S45=		dec 0-255	hex 0-FF	Delay during which the CND silence detection is disabled, in 20 ms units. (See also S46)	+100
S46=		dec	hex	CND silence detection interval.	+028
		0 to 255	0-FF	To process the CND, silence must be detected for the specified interval, in 20 ms units.	
S48=	Bit	dec	hex	Bit-mapped register.	+000
	0	1	1	Cause CND information to be reported in raw format.	
	2	4	4	Enable data calling tone (CNG) sending.	
	3	8	8	Reverse the V.23 channel speed. Originate mode modem speed (Send/Receive) 1200/75; Answer mode modem speed (Send/Receive) 75/1200.	&N12
	4	16	10	(Work with &D1 command) DTR ON causes the modem to dial the default number and DTR OFF	

				causes the modem to hang-up and reset to profile 0. When the modem is idle (waiting for command), it does not dial any number when DTR changes from ON to OFF.	
S52=	Bit	dec	hex	Bit-mapped register.	+000
	7	0	0	Select 'Mark' as the first signal of the V.23 handshaking sequence. (Default)	&N12
		128	80	Select 'Space' as the first signal of the V.23 handshaking sequence.	&N12
S56=		dec	hex		+000
		0 to 255	0-FF	Hook flash detect time, in units of 10ms. A value of zero use country-specific default duration.	
S57=	bit	dec	hex	Bit-mapped register.	+016
	4	16	10	Enables the reporting of Class 1 capability in response to +FCLASS=?	

Bit	S-register bit number, 'b', used in 'ATSr.b=n' and 'ATSr.b=?'
dec	Decimal value, 'x', used in 'ATSn=x'
hex	Equivalent Hexadecimal value.
+nnn	Factory default when listed in 'Reference' column.
NOTE:	'AT' is omitted when an AT command is referred to in the 'Reference' column.

Chapter 6
Firmware Upgrade

The ZyXEL Omni 56K USB provides a firmware upgrade function either by upgrading the software provided in the CD-ROM disc that came with your modem package, or by using a terminal program such as Bitware or Hyperterminal. To obtain the latest firmware version, please go to ZyXEL's website at http://www.zyxel.com.

6.1.1 Upgrading by Software (for Windows® 98/NT/2000)

To upgrade the firmware by using the provided software, perform the following steps:

Step 1. Please go to ZyXEL's website at http://www.zyxel.com and download the latest firmware.

Step 2. Double-click on the downloaded file.

Step 3. Follow the step-by-step on screen instructions to complete the installation.

After finishing, you may now use your modem.

> **NOTE:** To obtain the latest firmware version, please go to ZyXEL's website at http://www.zyxel.com.

6.1.2 Upgrading by Using a Terminal Program

To upgrade the firmware by using a terminal program, such as Bitware or HyperTerminal in Windows®, perform the following instructions. For more information on installing Bitware on your computer, please refer to the *Read Me First* that came with your modem package.

Step 1. Start your terminal program.

Step 2. Type in **atupx** and the following message appears:

> You have chosen XMODEM protocol with 128 byte block length and checksum tail to upload the firmware file to update your modem, data in Flash ROM is erased!
> Are you sure (Y/N)?

Step 3. Be sure you have a new version of firmware file on hand, then click **Y**. The terminal responds with:

> Erase the flash ROM now. Please wait.

After which the following appears:

> Ready to program to flash. Please start upload.

Step 4. Now, select XMODEM checksum mode to send the new firmware to your modem. Enter the filename to start uploading.

Glossary

Analog	An electrical circuit that is represented by means of continuous, variable physical quantities (such as voltages and frequencies), as opposed to discrete representations (like the 0/1, off/on representation of digital circuits).
Analog Loopback Test	Testing method in which the modem's analog signal is connected to the analog input.
Answer	In a connection between two modems, one modem works as the recipient (in answer mode) and the second modem as the initiator (originate mode).
Architecture	A design. The term *architecture* can refer to either hardware or software, or to a combination of hardware and software. The architecture of a system always defines its broad outlines, and may define precise mechanisms as well.
ARQ	Automatic Retransmission reQuest – standardized method in error control protocols.
ASCII	American Standard Code for Information Interchange. This code assigns a 7-bit numerical value to characters, digits and control characters. An ASCII character is a 7-bit character with a decimal value ranging from 0 to 127.
Asynchronous	Data transfer method in which a character's data bits are framed by additional bits (start bit, parity bit and stop bit). There are variable idle times between characters.
AT Command	The commands used with an intelligent modem. Every command line is started with the AT prefix (ATtention). To send an AT command to a modem, you must have communications software running.
Authenticity	Proof that the information came from the person or location that reportedly sent it. One example of authenticating software is through digital signatures.
Auto-answer	Modem's ability to automatically answer a call after a set number of rings.
Backbone	A high-speed line or series of connections that forms a major pathway within a network.
Bandwidth	This is the capacity on a link usually measured in bits-per-second (bps).
bis	Old French word for two.
Bit	(Binary Digit) – A single digit number in base-2, in other words, either a one or a zero. The smallest unit of computerized data.
Bit Rate	Count of data bits transmitted per time unit. The framing bits needed for asynchronous transfer are also counted in the calculation of the bit rate. In general, the bit rate is ten times the character rate.
bps	Unit of measurement. Bits per second.
Byte	A set of bits that represent a single character. There are 8 bits in a Byte.
Carrier	The carrier is a modulated tone and is used by the modem to transfer the data.
CCITT	Comité Consultatif International Thonique et Traphique; former name for the ITU-TSS (ITU-T), the international standard making organization for telecommunications.
CD	See DCD.

CDR	Call Detail Record. This is a name used by telephone companies for call-related information.
Cipher Text	Text that has been scrambled or encrypted so that it cannot be read without deciphering it. See Encryption.
Class 2	A standard for fax transfers using a fax modem. Currently several drafts exist which are incompatible with each other. ZyXEL modems support the draft PN-2388 of August 20th 1990 and the final 2.0 standard.
Client	A software program that is used to contact and obtain data from a Server software program on another computer. Each Client program is designed to work with one or more specific kinds of Server programs, and each Server requires a specific kind of Client. A Web Browser is a specific kind of Client.
CNG	Call negotiation tone. A calling fax machine sends this tone before connecting to quickly establish a fax connection. A data modem may also have a data calling tone.
CO	(Central Office): a facility that serves local telephone subscribers. In the CO, subscribers' lines are joined to switching equipment that allows them to connect to each other for both local and long distance calls.
Command Mode	In command mode, a modem accepts commands from the local DTE. Data transfer is suspended while the modem is in command mode.
Compatibility	If components are compatible, they work with each other.
COM Port	Another name for the serial port on a PC.
Compression	*See data compression.*
Cookie	A string of characters saved by a web browser on the user's hard disk. Many web pages send cookies to track specific user information. Cookies can be used to retain information as the user browses a web site. For example, cookies are used to 'remember' the items a shopper may have in a shopping cart.
CRC	Cyclic redundancy check; an error checking protocol.
Crossover Ethernet Cable	A cable that wires a pin to its opposite pin, for example, RX+ is wired to TX+. This cable connects two similar devices, for example, two data terminal equipment (DTE) or data communications equipment (DCE) devices.
CTS/RTS	Control signal lines on an RS-232C serial interface. These lines are needed to use hardware flow control.
Cursor	A special marker on a display.
Data Bit	In asynchronous transfers, a character is composed of data bits (the actual information) and framing bits (start bit, stop bit/s, parity bit). The framing bits are needed to recognize whether a character has been successfully transmitted and where a new character starts.
Data Compression	Re-coding of information. The same information is represented by less data bits. ZyXEL modems use MNP4 and V.42 compression schemes.
Data Packet	Block of data that is framed by error control groups. A block consists of up to 256 8-bit groups. Data packets are used in synchronous transfer.
Data Pump	The important module doing modulation and demodulation for a modem. The data pump is

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	decisive for the quality and the speed of a modem's transfer capabilities.
DCD	Data Carrier Detected – a control signal line of the RS-232C interface.
DCE	Data Communications Equipment is typically a modem or other type of communication device. The DCE sits between the DTE (data terminal equipment) and a transmission circuit such as a phone line.
Decryption	The act of restoring an encrypted file to its original state.
Demodulation	Transferring analog signals into digital data bits.
Denial of Service	Act of preventing customers, users, clients or other machines from accessing data on a computer. This is usually accomplished by interrupting or overwhelming the computer with bad or excessive information requests.
Digital	The use of a binary code to represent information, such as 0/1, or on/off.
Digital Loopback Test	A modem test procedure that transfers the received digital data back to the modulator and transmits them out.
Digital Signature	Digital code that authenticates whomever signed the document or software. Software, messages, Email, and other electronic documents can be signed electronically so that they cannot be altered by anyone else. If someone alters a signed document, the signature is no longer valid. Digital signatures are created when someone generates a hash from a message, then encrypts and sends both the hash and the message to the intended recipient. The recipient decrypts the hash and original message, makes a new hash on the message itself, and compares the new hash with the old one. If the hashes are the same, the recipient knows that the message has not been changed. Also see Public-key encryption.
DIP Switch	Dual inline package switch. DIP switches are abundant in the world of electronic equipment. They are used to set certain parameters on a printer, modem or other peripheral devices. No DIP switches can be found in ZyXEL modems. ZyXEL modems let you perform all settings from the front panel or through command sequences.
DLE	The ASCII code that is used in voice data mode to separate data segments from command segments.
DRAM	Dynamic RAM that stores information in capacitors that must be refreshed periodically.
DSL	Digital Subscriber Line technologies enhances the data capacity of the existing twisted-pair wire that runs between the local telephone company switching offices and most homes and offices. There are actually seven types of DSL service, ranging in speeds from 16 Kbits/sec to 52 Mbits/sec. The services are either symmetrical (traffic flows at the same speed in both directions), or asymmetrical (the downstream capacity is higher than the upstream capacity). DSL connections are point-to-point dedicated circuits, meaning that they are always connected. There is no dial-up. There is also no switching, which means that the line is a direct connection into the carrier's frame relay, ATM (Asynchronous Transfer Mode), or Internet-connect system.
DSP	Digital signal processor. ZyXEL modems are equipped with this/these device(s). DSPs generate, process and analyze all signals.
DSLAM	A Digital Subscriber Line Access Multiplexer (DSLAM) is a network device, usually at a telephone company central office, that receives signals from multiple customer Digital Subscriber Line connections and puts the signals on a high-speed backbone line using multiplexing techniques. Depending on the product, DSLAM multiplexers connect DSL

	lines with some combination of asynchronous transfer mode (ATM), frame relay, or IP networks.
DSR	Data Set Ready – a control signal line of the RS-232C standard.
DTE	Originally, the DTE (data terminal equipment) meant a dumb terminal or printer, but today it is a computer, or a bridge or router that interconnects local area networks.
DTMF	Dual Tone Multi-Frequency. The technology used in pushbutton telephones, commonly known as touchtone, of generating audible notes to represent numbers.
DTR	Data Terminal Ready – a control signal line of the RS-232C standard interface. Some computers set this signal when they are turned on, even if they are not able to receive data.
Echo	For a modem user, echo has two meanings: A modem can return all received characters to its local terminal/computer so they can be seen on-screen. The other meaning of the term "echo" is that part of the analog signal the modem sent out is bounced back by the telephone network to the modem's receiver, mixing there with the remote modem's signal.
EDR	Extended Distinctive Ring – A feature of ZyXEL modems that helps to distinguish between data, fax and voice calls.
EEPROM	An Electronically Erasable and Programmable Read Only Memory. Such a device is used in ZyXEL modems to store settings and profiles. An EEPROM does not lose data when the modem is turned off.
EIA	Electronic Industry Association (of North America); this organization was the first to draft a standard serial port (RS-232C).
EMI	ElectroMagnetic Interference. The interference by electromagnetic signals that can cause reduced data integrity and increased error rates on transmission channels.
Encryption	The act of substituting numbers and characters in a file so that the file is unreadable until it is decrypted. Encryption is usually done using a mathematical formula that determines how the file is decrypted.
EPROM	Electrically Programmable Read Only Memory. A memory chip that may be programmed electronically, but must be exposed to ultraviolet radiation to be erased.
Error Correction	A method to compensate for errors which occurred in the transmission path. Error correction is done by the modems and is transparent to the DTEs. The most familiar correction methods are MNP5 and V.42bis.
Ethernet	A very common method of networking computers in a LAN. There are a number of adaptations to the IEEE 802.3 Ethernet standard, including adaptations with data rates of 10 Mbits/sec and 100 Mbits/sec over coaxial cable, twisted-pair cable, and fiber-optic cable. The latest version of Ethernet, Gigabit Ethernet, has a data rate of 1 Gbit/sec.
Events	These are network activities. Some activities are direct attacks on your system, while others might be depending on the circumstances. Therefore, any activity, regardless of severity is called an event. An event may or may not be a direct attack on your system.
FAQ	(Frequently Asked Questions) – FAQs are documents that list and answer the most common questions on a particular subject.
Fax	Long distance copy; facsimile – transfer of graphical data between two fax units. The graphical data is compressed during transfer (G3).

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FCC	The FCC (Federal Communications Commission) is in charge of allocating the electromagnetic spectrum and thus the bandwidth of various communication systems.
FIFO-Buffer	First-in-first-out buffer. A buffer of this type is used in the 16550 type UARTs that allow higher data throughput rates on PCs.
Firmware	The ZyXEL modems' system software is located in flash EPROMs. Depending on the size of the EPROM(s), some features may or may not be available.
Flash Memory	The nonvolatile storage that can be electrically erased and reprogrammed so that data can be stored, booted, and rewritten as necessary.
Flow Control	Method to stop and start the data flow to avoid loss of data.
Front Panel	The front panel on the ZyXEL modems consists of LED indicators and key switches.
FSK	Frequency Shift Keying – a frequency modulation scheme.
Full-duplex	Transmission link where transmission can take place in both directions simultaneously.
G3 Fax	Several fax standards exist. Most available fax machines use the Group 3 (G3) standard. This standard defines the compression of graphic data and a transmission speed of up to 14400 bps with an automatic fallback to 2400 bps if the telephone line is bad.
Gateway	A gateway is a computer system or other device that acts as a translator between two systems that do not use the same communication protocols, data formatting structures, languages, and/or architecture.
Handshake	At the beginning of a connection, the modems must negotiate and initialize the protocols to be used and the speed at which the connection is to be established. This negotiation phase and the following initialization phase is called handshake.
HDLC	HDLC (High-level Data Link Control) is a bit-oriented (the data is monitored bit by bit), link layer protocol for the transmission of data over synchronous networks.
High-speed Modem	A modem that works at bit rates higher than 9600 bps.
Hook-Flash	The hook-flash is a signal used in a dial sequence. This signal may be used for call transfers or to request an outside line on certain PABX.
Host	Any computer on a network that is a repository for services available to other computers on the network. It is quite common to have one host machine provide several services, such as WWW and USENET.
HTTP	Hyper Text Transfer Protocol. The most common protocol used on the Internet. HTTP is the primary protocol used for web sites and web browsers. It is also prone to certain kinds of attacks.
Hz	Hertz. A unit of measurement for frequency. Cycles per second.
Inside Wiring	Wiring that is done from the point of demarcation to the jack in the wall where the line terminates.
internet	(Lower case i) Any time you connect 2 or more networks together, you have an internet.
Internet	(Upper case I) The vast collection of inter-connected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's. The Internet

now (July 1995) connects roughly 60,000 independent networks into a vast global internet.

Interrupt	In a computer, some tasks must be performed regularly and without delay. This is possible because the CPUs provide special interrupt vectors. These vectors each point to some short program sequence. An interrupt stops the currently running program and the segment to which the vector points is executed.
Intranet	A private network inside a company or organization that uses the same kinds of software that you would find on the public Internet, but that is only for internal use.
IP	Internet Protocol. The IP (currently IP version 4, or IPv4), is the underlying protocol for routing packets on the Internet and other TCP/IP-based networks.
IRC	Internet Relay Chat. IRC was developed in the late 1980s as a way for multiple users on a system to "chat" over the network. Today IRC is a very popular way to "talk" in real time with other people on the Internet. However, IRC is also one avenue hackers use to get information from you about your system and your company. Moreover, IRC sessions are prone to numerous attacks that while not dangerous can cause your system to crash.
ISP	Internet Service Providers provide connections into the Internet for home users and businesses. There are local, regional, national, and global ISPs. You can think of local ISPs as the gatekeepers into the Internet.
ITU-TSS	International Telecommunications Union – Telecommunication Standards Sector. New name for the standard making organization CCITT. See CCITT.
Jack Type	Different types of jacks (RJ11, RJ45, or RJ48) can be used for an ISDN line. The RJ11 is the most common in the world and is most often used for analog phones, modems, and fax machines. RJ45 and RJ48 are essentially the same, as they both have the same 8-pin configuration. An RJ11 jack can fit into an RJ45/RJ48 connector, however, an RJ45/RJ48 cannot fit into an RJ11 connector.
LAN	Local Area Network is a shared communication system to which many computers are attached. A LAN, as its name implies, is limited to a local area. This has to do more with the electrical characteristics of the medium than the fact that many early LANs were designed for departments, although the latter accurately describes a LAN as well. LANs have different topologies, the most common being the linear bus and the star configuration.
LAPM	Link Access Procedure for Modems – a protocol that controls the handshake between two modems.
LATA	(Local Access and Transport Area): A geographic territory used primarily by local telephone companies to determine charges for intrastate calls. As a result of the Bell divestiture, switched calls that both begin and end at points within the LATA (intraLATA) are generally the sole responsibility of the local telephone company, while calls that cross outside the LATA (interLATA) are passed on to an Inter eXchange Carrier (IXC).
Layer Protocol	A standard of the ISO (International Standards Organization) which defines everything regarding data communications from the hardware to the screen display in seven levels.
LEC	(Local Exchange Carrier): The local phone companies – either a Regional Bell Operating Company (RBOC) or an independent phone company (e.g., GTE) – that provide local transmission services.
LED	Light Emitting Diode – a display element.

LINE	The jack on the rear panel which is connected to the wall phone outlet.
Linux	A version of the UNIX operating system designed to run on IBM compatible computers.
Logic Bomb	A virus that only activates itself when certain conditions are met. Logic bombs usually damage files or cause other serious problems when they are activated.
Mailer	A program that works with a remote BBS and requests and distributes messages automatically.
Master/Slave	Refers to the architecture in which one device (the master) controls one or more other devices (the slaves).
Memory	A fast storage component of a computer where data can be saved and from where it can be retrieved.
MNP	Protocols for error correction and data compression from Microcom, Inc.
Modem	An artificial word concatenated from **mo**dulator and **dem**odulator. A modem translates the digital signals received from its local DTE to analog signals that are transmitted via a telephone line. At the other end, the analog signals are demodulated and sent to the DTE as digital signals again.
Modulation	Translating digital states to analog waveforms.
NDIS	Network Driver Interface Specification is a Windows® specification for how communication protocol programs (such as TCP/IP) and network device drivers should communicate with each other.
NetBIOS	Network Basic Input/Output System. NetBIOS is an extension of the DOS BIOS that enables a PC to connect to and communicate with a LAN.
Network	Any time you connect 2 or more computers together so that they can share resources, you have a computer network. Connect 2 or more networks together and you have an internet.
NIC	Network Interface Card. A board that provides network communication capabilities to and from a computer system. Also called an adapter.
Node	Any single computer connected to a network.
Off-line	A modem that is not connected to another modem is off-line.
On-line	A modem that is engaged in a connection with another modem is on-line.
Open Architecture	Allows the system to be connected easily to devices and programs made by other manufacturers. Open architectures use off-the-shelf components and conform to approved drafts. A system with a *closed architecture,* on the other hand, is one whose design is proprietary making it difficult to connect the system to other systems.
Originate	In a modem connection, one modem must work in the originate mode, the other in the answer mode.
Packed Data	Data from which redundant information has been removed. Some file extensions denote packed files. Standard extensions are .ZIP, .ARC, .LZH, .TAR, .ZOO and others. If you transfer packed data do not use MNP5 compression.
Parity	A method to check whether a character has been correctly transmitted in asynchronous transfer. Usual settings are even parity and odd parity. In a connection, the modems at both ends must use the same parity settings.

Parity Bit	The parity bit is sent as additional information with the data bits in asynchronous transfers. It controls the integrity of the transferred data. If parity is even, the parity bit is set if an uneven number of data bit is sent in the character, resulting in an even number of set bits.
Password Cracker	A program that uses a dictionary of words, phrases, names, etc. to guess a password.
Password Encryption	A system of encrypting electronic files using a single key or password. Anyone who knows the password can decrypt the file.
Password Shadowing	The storage of a user's username and password in a network administrator database.
PBX	Private Branch eXchange is a small version of the phone company's larger central switching office. A PBX is a private telephone switch. It is connected to groups of lines from one or more central offices and to all of the telephones at the location served by the PBX.
PC	Personal Computer – acronym for computers which are compatible with the IBM PC or AT computers.
PHONE	Jack to which a telephone set may be connected.
Pirate	Someone who steals or distributes software without paying the legitimate owner for it. This category of computer criminal includes several different types of illegal activities. Making copies of software for others to use. Distributing pirated software over the Internet or a Bulletin Board System. Receiving or downloading illegal copies of software in any form.
Pirated Software	Software that has been illegally copied, or that is being used in violation of the software's licensing agreement. Pirated software is often distributed through pirate bulletin boards or on the Internet. In the internet underground it is known as Warez.
Plain Text	The opposite of Cipher Text, Plain Text is readable by anyone.
Point of Demarcation	The physical point where the phone company ends its responsibility with the wiring of the phone line.
Port (H/W)	An interface on a computer for connecting peripherals or devices to the computer. A printer port, for example, is an interface that is designed to have a printer connected to it. Ports can be defined by specific hardware (such as a keyboard port) or through software.
Port	An Internet port refers to a number that is part of a URL, appearing after a colon (:) right after the domain name. Every service on an Internet server listens on a particular port number on that server. Most services have standard port numbers, e.g., Web servers normally listen on port 80.
POTS	Plain Old Telephone Service is the analog telephone service that runs over copper twisted-pair wires and is based on the original Bell telephone system. Twisted-pair wires connect homes and businesses to a neighborhood central office. This is called the local loop. The central office is connected to other central offices and long-distance facilities.
Processing Unit	A computer's brain. Here all the necessary calculations are performed.
Promiscuous Packet Capture	Actively capturing packet information from a network. Most computers only collect packets specifically addressed to them. Promiscuous packet capture acquires all network traffic it can regardless of where the packets are addressed.

Protocol	A "language" for communicating on a network. Protocols are sets of standards or rules used to define, format, and transmit data across a network. There are many different protocols used on networks. For example, most web pages are transmitted using the HTTP protocol.
Proxy Server	A server that performs network operations in lieu of other systems on the network. Proxy Servers are most often used as part of a firewall to mask the identity of users inside a corporate network yet still provide access to the Internet. When a user connects to a proxy server, via a web browser or other networked application, he submits commands to the proxy server. The server then submits those same commands to the Internet, yet without revealing any information about the system that originally requested the information. Proxy servers are an ideal way to also have all users on a corporate network channel through one point for all external communications. Proxy servers can be configured to block certain kinds of connections and stop some hacks.
PSTN	Public Switched Telephone Network was put into place many years ago as a voice telephone call-switching system. The system transmits voice calls as analog signals across copper twisted cables from homes and businesses to neighborhood COs (central offices); this is often called the local loop. The PSTN is a circuit-switched system, meaning that an end-to-end private circuit is established between caller and called.
Public Domain	A special form of distributing software. Public domain software authors make no claim to commercialize their rights.
Public Key Encryption	System of encrypting electronic files using a key pair. The key pair contains a public key used during encryption, and a corresponding private key used during decryption.
QUIET	A state in the voice mode of ZyXEL modems. Quiet is detected after a long pause in voice data.
RAM	Random Access Memory – working memory. The modem uses it among many other uses to store information on sent, but not yet acknowledged data.
Redundancy	Extra data that does not generate additional information.
Remote Location	The modem at the other end of the line (the one you are calling or that is calling).
Reset	Return a device into a defined base status.
Retrain	The re-initialization process a modem is doing with the remote modem when the receiving condition becomes bad.
RFC	An RFC (Request for Comments) is an Internet formal document or standard that is the result of committee drafting and subsequent review by interested parties. Some RFCs are informational in nature. Of those that are intended to become Internet standards, the final version of the RFC becomes the standard and no further comments or changes are permitted. Change can occur, however, through subsequent RFCs.
ROM	Read Only Memory. The ROM holds the system software and the profiles and settings of the modem (refer to EEPROM).
Router	A device that connects two networks together. Routers monitor, direct, and filter information that passes between these networks. Because of their location, routers are a good place to install traffic or mail filters. Routers are also prone to attacks because they contain a great deal of information about a network.
RS	Abbreviation of recommended standard.

RTS/CTS	*See CTS/RTS.*
RXD	Line for the received data on a serial port following RS-232C.
Server	A computer, or a software package, that provides a specific kind of service to client software running on other computers.
Security Function	Features of the ZyXEL modems that help deny illegitimate contacts to your computer system through telephone lines.
Self-test	Ability of the modem to check its components and operations for faults.
Serial Port	Communication path through which data is transferred bitwise. Only one wire each is available for transmitted and received data.
Shareware	A distribution method for software. The author lets the user try out the fully functional software for a certain amount of time at no charge. If the customer wants to keep and use the product after the period, he must pay the requested fees. This method depends heavily on the honesty of the user.
Shoulder Surfing	Looking over someone's shoulder to see the numbers they dial on a phone, or the information they enter into a computer.
Signal to Noise Ratio	A measure for the signal quality of a connection.
SILENCE	Status detected in voice mode. If the modem returns a silence message, no voice energy was detected after a connection was established.
Slave	Any device that is controlled by another device called the master.
SPAM	Unwanted e-mail, usually in the form of advertisements.
Speech Digitalization	Changing spoken sound into digital data that can be processed and saved by a computer.
SPID	(Service Profile Identifier): The ISDN switch needs to have a unique identification number for each ISDN set to which it sends calls and signals.
Spoofing	To forge something, such as an IP address. IP Spoofing is a common way for hackers to hide their location and identity.
SRAM	Static Random Access Memory. A memory device used to store both program and data.
S-register	Abbreviation of status-register. The currently used parameters are stored in the status registers. S-registers are a part of the modem's internal memory.
SREJ	Selective Reject – extension of the V.42 protocol that allows the more efficient handling of retransmission of erroneous data blocks.
Start Bit	In asynchronous transfers, a new character is introduced by the start bit.
Stop Bit	In asynchronous transfers, every character is terminated by one or two stop bits that show where a character ends.
Straight Through Ethernet Cable	A cable that wires a pin to its equivalent pin. This cable connects two dissimilar devices, for example, a data terminal equipment (DTE) device and a data communications equipment (DCE) device. A straight through Ethernet cable is the most common cable used.

Switched 56	Digital service at 56 Kbps provided by local telephone companies and long distance carriers. Similar to ISDN, Switched 56 traffic can travel over the same physical infrastructure that supports ISDN. Switched 56, however, is an older technology with decreasing significance.
Symbol Speed	Speed at which a signaling unit is transferred. In modern modem modulation, a signaling unit is no longer a single bit. Thus, the bit speed is different from the symbol speed.
Synchronous	In synchronous transfer, a dedicated control signal line transmits a clock signal that paces the transmitted data. In high speed connections, the transfer between two modems is always synchronous, even if the DCE to DTE connection is asynchronous.
T.30	A standard for fax transfers.
TAE6	A standard for a telephone wall outlet used in some countries, particularly in Germany.
Telnet	Telnet is the login and terminal emulation protocol common on the Internet and in UNIX environments. It operates over TCP/IP networks. Its primary function is to allow users to log into remote host systems.
Tempest	Illegal interception of data from computers and video signals.
ter	Old French word for three.
Terminal	A device that allows you to send commands to a computer somewhere else. At a minimum, this usually means a keyboard and a display screen and some simple circuitry.
Terminal Equipment	A computer running terminal software is used as terminal equipment in modem connections.
Terminal Software	Software that pretends to be (emulates) a physical terminal and allows you to type commands to a computer somewhere else.
Token	A token is a re-encoding of information in less bits; basically an abbreviation.
Transfer Mode	Data can be transferred either synchronously or asynchronously.
Transfer Rate	The speed at which the data bits are effectively transferred.
UART	Universal Asynchronous Receiver and Transmitter; a special IC chip which controls the serial port. Different models are available for PCs. Models with an internal buffer usually allow higher transfer rates.
UNIX	A widely used operating system in large networks.
URL	(Uniform Resource Locator) URL is an object on the Internet or an intranet that resides on a host system. Objects include directories and an assortment of file types, including text files, graphics, video, and audio. A URL is the address of an object that is normally typed in the Address field of a Web browser. The URL is basically a pointer to the location of an object.
V.	The ITU-TSS V. – standards describe data transfer via telephone lines.
WAN	Wide Area Networks link geographically dispersed offices in other cities or around the globe. Just about any long-distance communication medium can serve as a WAN link, including switched and permanent telephone circuits, terrestrial radio systems, and satellite systems.
Warez	A term that describes Pirated Software on the Internet. Warez include cracked games or

	other programs that software pirates distribute on the Internet.
Western Jack	Telephone wall outlet connector used in the USA and other countries.
WWW	(World Wide Web) – Frequently used when referring to "The Internet", WWW has two major meanings – First, loosely used: the whole constellation of resources that can be accessed using Gopher, FTP, HTTP, telnet, USENET, WAIS and some other tools. Secondly, the universe of hypertext servers (HTTP servers).
X.	The ITU-TSS X.– standards describe data transfer in public data networks.
XMODEM	A widely used, though somewhat aged, file transfer protocol. The use of 128 byte data blocks severely limits the achievable throughput.
XON/XOFF	Software flow control. The data flow is stopped by sending ASCII character Control-Q (dec. 17; hex $11) and restarted by Control-S (dec. 19; hex $13).
YModem	A file transfer protocol that uses data blocks of 1 Kbyte and transfers filenames and more than one file in one transfer.
ZModem	A file transfer protocol with variable block size, re-initiation of aborted transfers and transfer of several files in one transfer along with file (and path) names.

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