Omni 56K II and Omni 56K Plus II

Voice/Fax/Data Modem

User's Guide

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ZyXEL

TOTAL INTERNET ACCESS SOLUTION

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Online Registration

Don't forget to register your ZyXEL product (fast, easy online registration at www.zyxel.com) for free future product updates and information.

Customer Support

Please have the following information ready when you contact customer support.

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

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, 300, Taiwan
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	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
GERMANY	Support@zyxel.de Sales@zyxel.de	+49-2405-6909-0 +49-2405-6909-99	www.zyxel.de	ZyXEL Deutschland GmbH. Adenauerstr. 20/A4 D-52146 Wuerselen, Germany
MALAYSIA	Support@zyxel.com.my Sales@zyxel.com.my	+603-795-44-688 +603-795-34-407	www.zyxel.com.my	Lot B2-06, PJ Industrial Park, Section 13, Jalan Kemajuan, 46200 Petaling Jaya Selangor Darul Ehasn, Malaysia

Table of Contents

List of Figures

List of Tables

Preface

Thank you for purchasing the ZyXEL Omni 56K II /Omni 56K Plus II modem.

Register your modem online at www.zyxel.com for free future product updates and information.

About This User's Guide

This manual is designed to guide you through the installation and configuration of your modem.

Related Documentation

Supporting Disk

More detailed information and examples can be found in the included disk (as well as on the zyxel.com web site).

Quick Start Guide

The Quick Start Guide is designed to help you get up and running right away. It contains a detailed, easy-to-follow connection diagram, and information on configuring for Internet access.

ZyXEL Glossary and Web Site

Please refer to www.zyxel.com for an online glossary of networking terms and additional support documentation.

Syntax Conventions

"Enter" means for you to type one or more characters and press the carriage return. "Select" or "Choose" means for you to select one predefined choice.

For brevity's sake, we will use "e.g." as shorthand for "for instance" and "i.e." for "that is" or "in other words" throughout this manual.

The Omni 56K II and Omni 56K Plus II may be referred to as the modem or the device in this manual.

Chapter 1
Getting To Know Your Modem

This chapter introduces you to the features and specifications for the ZyXEL Omni 56K II and Omni 56K Plus II modems.

1.1   The Omni 56K II and Omni 56K Plus II Modem

The Omni 56K II and Omni 56K Plus II are analog Data/Fax/Voice modems used for Internet access via telephone wire. The Omni 56K Plus II also supports a Universal Serial Bus (USB) connection to a computer. Both modems can run upstream maximum rates of 48 kilobits per second (Kbps) and downstream rates of 56Kbps. The actual rate depends on the line quality, the distance to the exchange and server side configuration.

1.2   Features of the Omni 56K II and Omni 56K Plus II Modem

ZyDAS Fifth Generation Data Pump with V.92 Capability

The Omni 56K II and Omni 56K Plus II modems provide the v.92 quick connect feature. This feature can shorten the modem handshaking time and therefore reduces the wait time and associated dial-up cost for each new connection.

V.92: 56K Down-stream and 48K Up-stream Data Transmission

The Omni 56K II and Omni 56K Plus II modems comply with the V.92 standard for data communications. This means that your modem is able to communicate at 56K on data communications originating from your service provider and at 48K on communications going to your service provider.

Microsoft Windows 95/98/2000/Me/XP: RS-232 Plug and Play Compatible

Your modem provides the convenience of simply being connected to the serial port on your computer. The serial port is a dedicated communications port and allows for optimum data speeds between your computer and modem.

Microsoft Windows 98/2000/Me/XP: USB Plug and Play Compatible (Omni 56K Plus II)

The Omni 56K Plus II modem is fully compliant to the USB 1.1 standard. You can use the USB port to install the Omni 56 Plus II without having to restart your computer.

Hot-swappable with Other USB Devices (Omni 56K Plus II)

The USB option allows you to simply plug in or disconnect your modem without the need for lengthy computer restarts. This timesaving benefit simplifies the installation process as well as providing a quick and easy way to transfer your modem between different computers.

Automatic Data/Fax Call Detection

The Omni 56K II and Omni 56K Plus II modems can automatically answer an incoming call and ascertain whether that call is a data or a fax call. When used with the supplied software, this feature will allow you to use your modem as a powerful communications device that can receive calls, broadcast and receive messages from voice boxes, and receive faxes on one phone line.

G3 14.4Kbps Fax Send/Receive

Your modem supports the V.17 fax standard that will allow for fax speeds of up to 14400 bps when transmitting to another V.17 fax machine. When connecting to an earlier G3 fax device, your modem operates at speeds up to 9600.

Support Fax Class 1, Class 2 and Class 2.0 Command Set

The fax facilities as offered on the Omni 56K II and Omni 56K Plus II modems provide full compatibility with the class 1, class 2 and class 2.0 command sets. This compatibility means that your fax modem is fully configurable with a wider range of options that can be optimized if need be.

Voice Digitization (via the IS-101 Command Set) and Compression

The IS-101 Command Set is a defined standard that details the voice recording and playback capability of a data communications device. The Omni 56K II and Omni 56K Plus II modems follow this standard and this allows for the recording and transmission of digitized voice and voice/data.

When activated, this feature provides the ability to digitize incoming voice messages, which the computer stores and either plays back at your request, or forwards onto other remote devices. This means that the modem can playback a recorded digitized voice online for the use of message announcements or act as a separate answering service.

Data Compression and Error Correction

Data compression is utilized to reduce the number of bits actually sent and received. This saves on the actual amount of data being sent and therefore increases the modem's speed (or throughput). Error correction protocols are used so that the compressed data can be accurately decompressed on the receiving end.

Omni 56K II and Omni 56K Plus II modems support V.44, V.42bis and MNP5 data compression protocols as well as MNP4/V.42 error correction. MNP5 is used with MNP4 error control; V.44 and V.42bis are used with V.42 error control. The compression efficiency of V.42bis is generally higher than that of MNP5.

Flash ROM Upgradeable

ZyXEL has a policy of free distribution of new firmware when it becomes available. You can download the updated firmware from www.zyxel.com and install it in your modems.

Chapter 2
Installation

This chapter guides you through the installation process for your modem.

2.1   Panel Descriptions

2.1.1   Front Panel LEDs

The descriptions of the front panel LEDs are listed below:

Table 2-1 Front Panel LEDS For Omni 56K Plus II

LED	FUNCTION	STATUS	DESCRIPTION
USB	USB indication	ON OFF	The USB link is up. The USB link is down or the modem is in RS-232 mode.
OH	Hook Status	ON OFF	The modem is off hook. The modem is on hook.
DATA	Data Traffic	ON OFF	The modem is sending or receiving data. The modem is not sending or receiving data.
MR	Modem Ready	ON OFF	The modem is ready. The modem is not ready.

Table 2-2 Front Panel LEDs for Omni 56K II

LED	FUNCTION	STATUS	DESCRIPTION
V.92	V.92 mode	ON OFF	The modem is operating in V.92 mode. The modem is not operating in V.92 mode.
OH	Hook Status	ON OFF	The modem is off hook. The modem is on hook.
DATA	Data Traffic	ON OFF	The modem is sending or receiving data. The modem is not sending or receiving data.
MR	Modem Ready	ON OFF	The modem is ready. The modem is not ready.

2.1.2 Back Panel

Table 2-3 Back Panel Description

LABEL	DESCRIPTION
ON/OFF	The power switch for the modem.
AC IN	This receptacle is the power input socket and is used to plug the power adapter into the modem.
RS-232	This serial port DB-9 female connector is used to plug the RS-232 cable from serial port of a DTE or computer.
USB (Omni 56K Plus II only)	A Universal Serial Bus connector that connects to the USB port on your computer or to an USB hub.
LINE	Connect this analog RJ-11 port to a wall phone jack.
PHONE	Connect this analog RJ-11 port to your telephone.
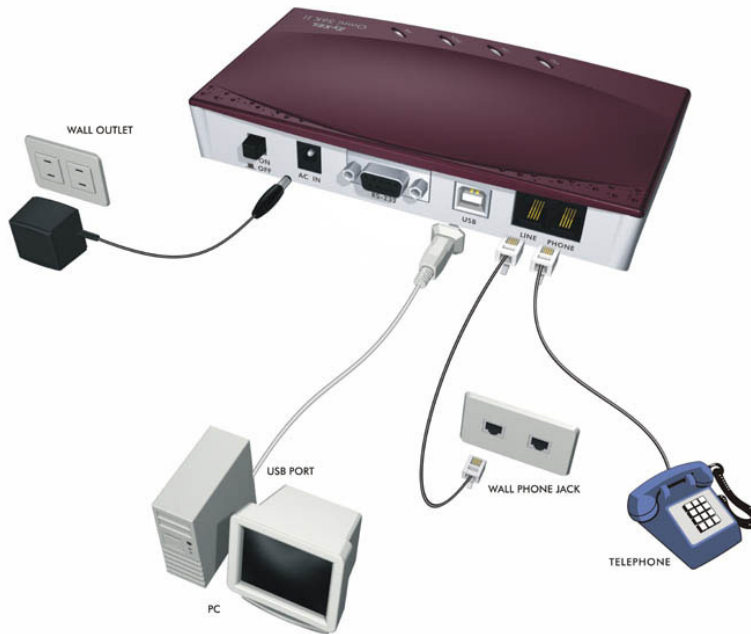
Figure 2-1 Omni 56K Plus II Rear Panel and Connections

The rear panel for the Omni 56K Plus II is identical to the rear panel of the Omni 56K Plus II, except that the Omni 56K II does not have the USB port.

2.2 Connecting Your Omni 56K II (RS-232 Port)

Step 1. Connect your modem to your analog phone or fax.

Step 2. Use the phone cord included to connect to the phone jack on the wall.

Step 3. Plug one end of your RS-232 cable to your modem and the other end to your computer's serial port.

Step 4. Use the included power adaptor to connect your modem to the power outlet. Turn on the modem

Step 5. Turn on your computer and insert the included CD.

2.2.1 Driver Installation

Windows automatically starts an installation wizard when it detects new hardware. Use the wizard to select the driver on your included CD. Browse to **D:\Drivers\Omni56KII** (where D: is your CD-ROM drive), and click **Next** or **OK**.

Figure 2-2 Windows 98 Add New Hardware Wizard
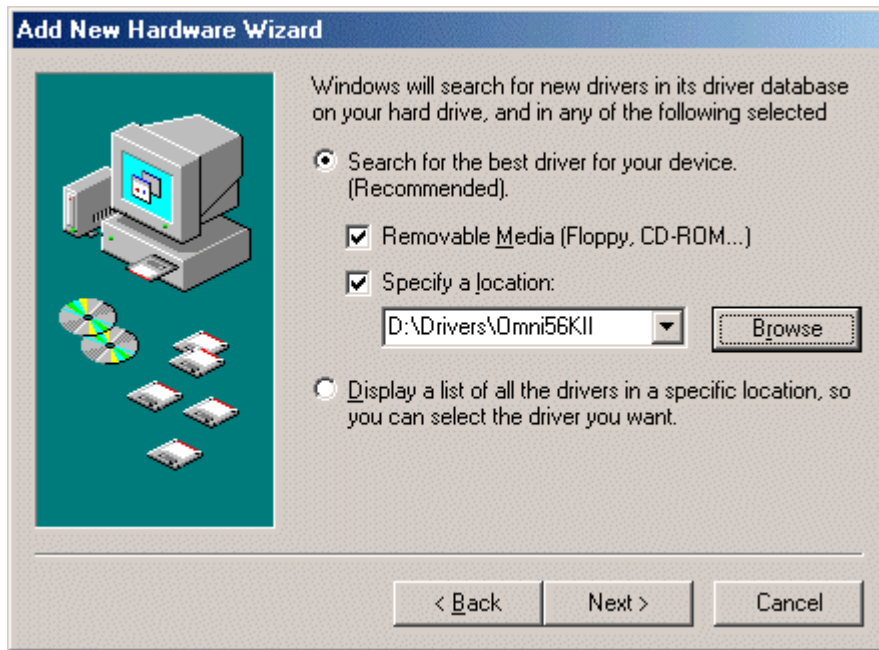
Figure 2-3 Windows Me Add New Hardware Wizard
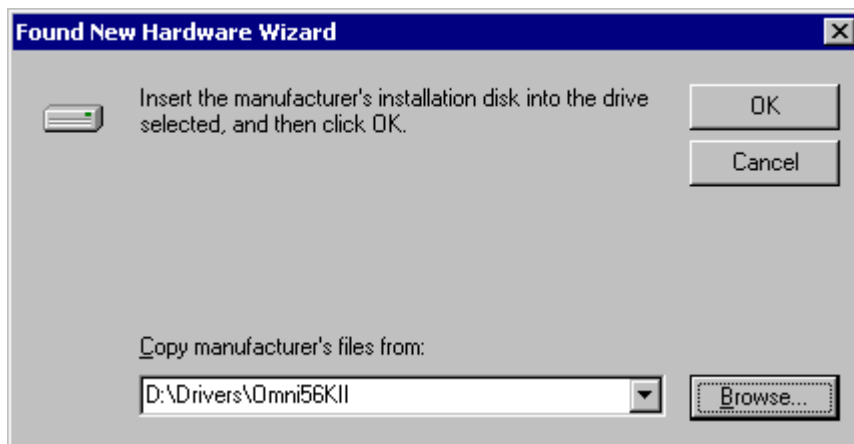
Figure 2-4 Windows 2000 Found New Hardware Wizard
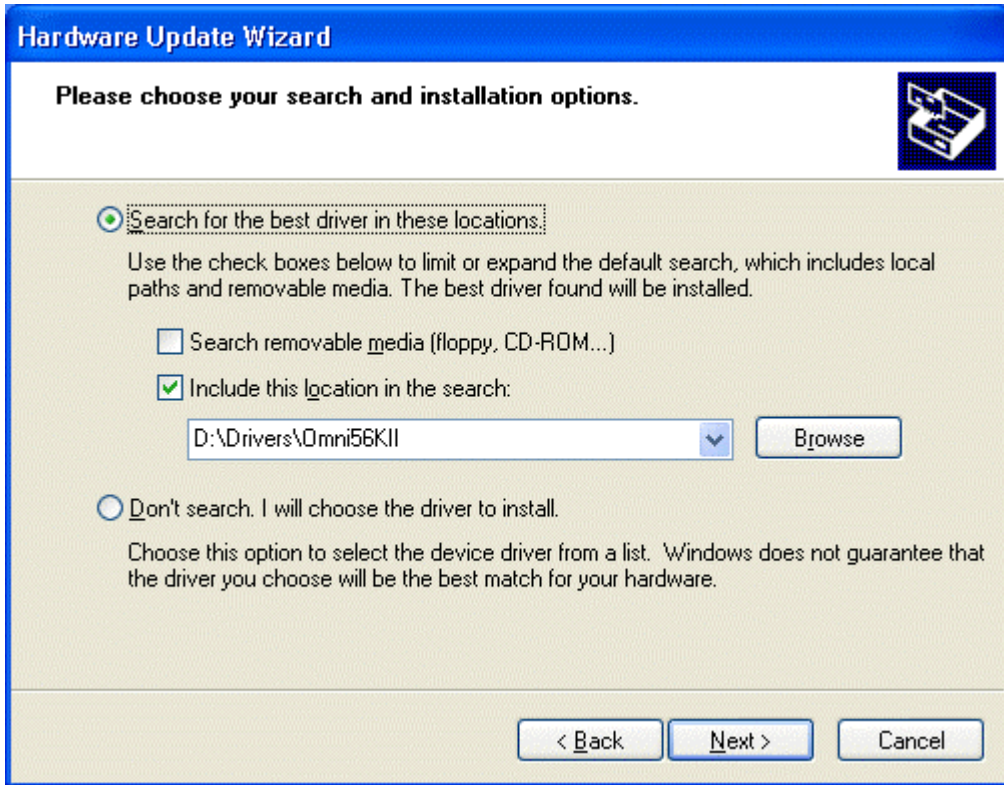
Figure 2-5 Windows XP Hardware Update Wizard

Click Yes **or** Continue Anyway **if a warning screen appears.**

Restart your computer if prompted.

If Windows does not automatically detect your modem, make sure that the modem is connected and turned on. Then restart your computer or use the add new hardware option in **Control Panel** to start the installation wizard. Browse on the CD to the location described above.

2.3   Connecting Your Omni 56K Plus II (USB Port)

Step 1. Connect your modem to your analog phone or fax.

Step 2. Use the phone cord included to connect to the phone jack on the wall.

Step 3. Plug one end of your USB cable to your modem and the other end to your computer's USB port.

Step 4. Use the included power adaptor to connect your modem to the power outlet. Turn on the modem.

Step 5. Insert the included CD into your CD-ROM drive.

2.3.1   Driver Installation

Windows automatically starts an installation wizard when it detects new hardware. Use the wizard to select the driver on your included CD. Browse to **D:\Drivers\Omni56KPlusII** (where D: is your CD-ROM drive) and the folder for your Windows OS; then click **Next** or **OK**.

Figure 2-6 Windows 98 Add New Hardware Wizard
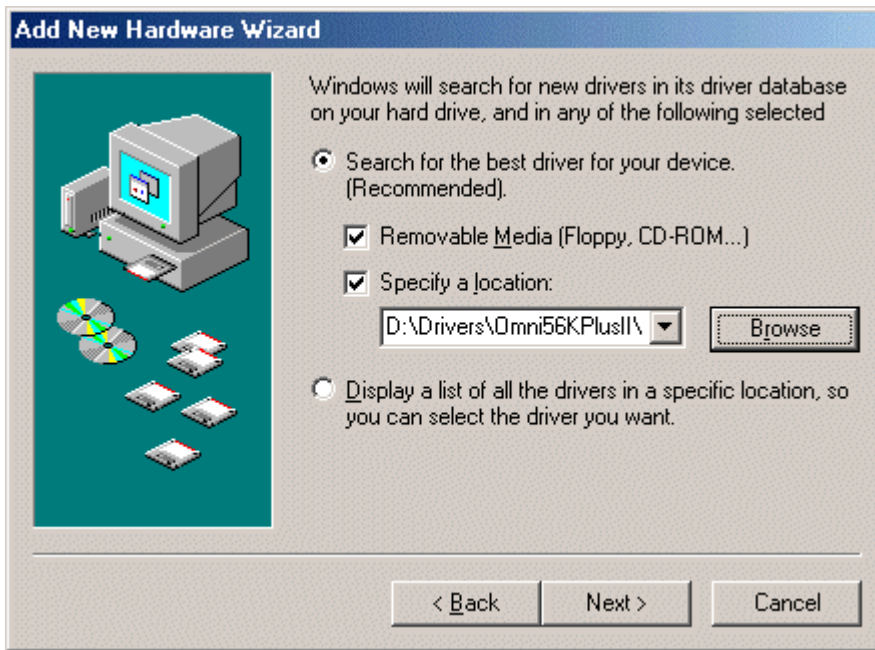
Figure 2-7 Windows Me Add New Hardware Wizard

Figure 2-8 Windows 2000 Upgrade Device Driver Wizard
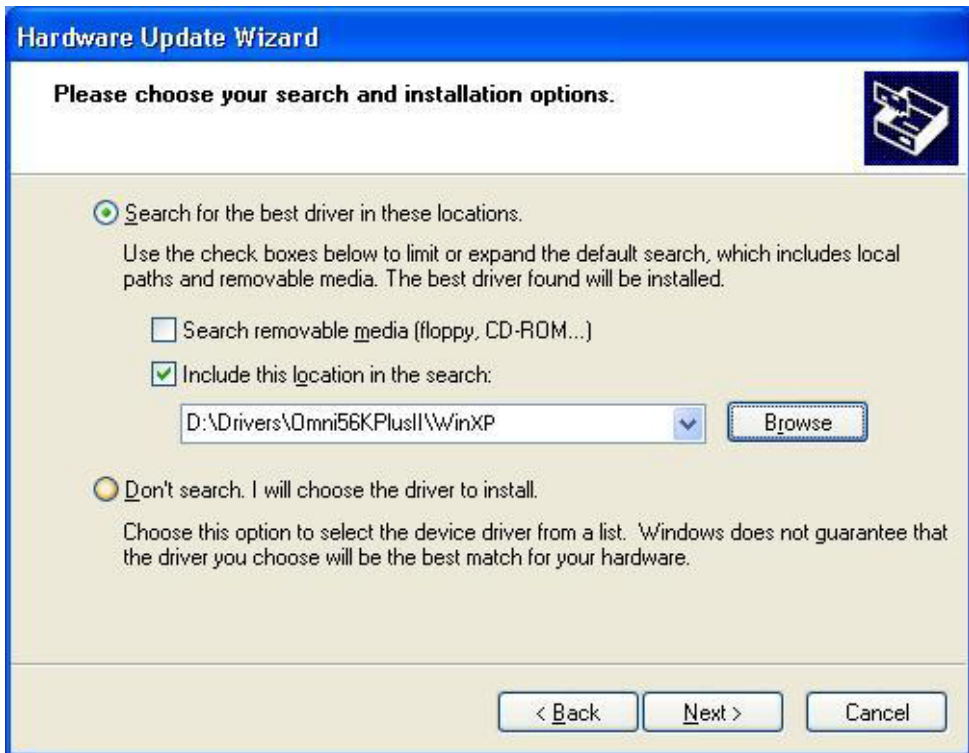
Figure 2-9 Windows XP Hardware Update Wizard

Click Yes **or** Continue Anyway **if a warning screen appears.**

Restart your computer if prompted.

If Windows does not automatically detect your modem, make sure that the modem is connected and turned on. Unplug the USB cable and plug it back in or use the add new hardware option in **Control Panel** to start the installation wizard. Browse on the CD to the location described above.

2.4   TCP/IP Setup

2.4.1   Installing TCP/IP in Windows 95/98/Me

Click **Start**, **Settings, Control Panel** and double-click the **Network** icon.

Click **Add** in the **Network** window **Configuration** tab.

Select **Protocol** and then click **Add**.

Select **Microsoft** from the list of manufacturers.

Select **TCP/IP** from the list of network protocols and then click **OK**.

2.4.2   Configuring TCP/IP in Windows 95/98/Me

In the **Network** window **Configuration** tab, select your network adapter's **TCP/IP** entry and click **Properties**.

Click the **IP Address** tab. If your ISP gave you an IP address, select **Specify an IP address** and enter your IP address and subnet mask. Otherwise, click **Obtain an IP address automatically**.

Click the **DNS Configuration** tab. Select **Enable DNS**, enter your **Host** name, **Domain** name, and the **DNS** of your ISP, then click **OK.**

Click the **Gateway** tab. Highlight any installed gateways and click **Remove** until none are listed.

Click **OK** to save and close the **TCP/IP Properties** window.

Click **OK** to close the **Network** window.

Restart your computer if prompted. Insert the Windows CD if prompted.

2.4.3   Configuring TCP/IP in Windows NT/2000/XP

From the **Control Panel**, click **Network and Dial-up Connections** (**Network Connections in XP**) and right-click your modem's icon and click **Properties**.

Select **Internet Protocol** (TCP/IP) (under the **General** tab in Win XP) and click **Properties**.

The **Internet Protocol TCP/IP Properties** window opens. If your ISP gave you an IP address, select **Use the following IP address:** and enter your IP address, subnet mask and default gateway: then select **Use the following DNS server addresses**. Otherwise, select **Obtain an IP address automatically** and **Obtain DNS server automatically**.

Click **Advanced** and remove any installed gateways in the **IP Settings** tab, then click **OK**.

Click **OK** to save and close the **TCP/IP Properties** window.

Click **OK** to close the **Network** window.

Restart your computer if prompted. Insert the Windows CD if prompted.

2.5   Dial-Up Networking

Fill in the wizard screens with information from your ISP to create a new dial-up connection.

Windows 98: Click **Start**, **Programs**, **Accessories**, **Communications**, **Dial-Up Networking**.
     Double-click the **Make New Connection** icon.

Windows 2000/Me: Click **Start**, **Settings**, **Network and Dial-Up Connections**, **Make New Connection**.

Windows XP: Click **start**, **All Programs**, **Accessories**, **Communications**, **New Connection Wizard**.

After you set up the connection, click or double click the new connection. A pop-up window requests your username and password.

2.6   Installing Bitware From the Included CD

Bitware software lets you transmit faxes or talk on the telephone while using the Internet.

Insert the included CD. Choose the Bitware program from the Product list-box, and select your Windows system and language on the right side, then click **Install**. Follow the wizard to complete the installation process.

Figure 2-10 Bitware Master Setup

Chapter 3
Specifications & Functions

This chapter introduces the specifications and functions of the Omni 56K II and Omni 56K Plus II modems.

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

3.1 Specifications

3.2 Hardware Specification

Table 3-1 Hardware Specifications

ITEM	SPECIFICATION DESCRIPTION
Power Requirements	9V AC
Operating Requirements	Temperature: 0° C to 40° C Humidity: 5 to 90 % (non-condensing)
Weight	215g
Dimensions	166mm (W) x 40mm (H) x 84mm (L)

3.3 Firmware Specification

Table 3-2 Firmware Specifications

PHYSICAL LAYER FOR DATA MODE	Multi-Auto V.92 V.90 V.34bis 33.6 Kbps to 2.4 Kbps V.34 28.8 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 212A 1.2K bps V.21/Bell 103 300 bps Auto Fallback/Forward	
LINK LAYER	MNP 3-4 MNP 5 V42 V42bis V42 SREJ V44	
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 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	4 bits / sample ADPCM, 9600 samples / second Online voice playback and recording. IS-101 voice command set.	

3.4   Protocol Support

▪ Data Physical Layer

. ITU-T V.92

. 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.44

. ITU-T V.42

. ITU-T V.42bis

. MNP3-5

- Command Sets

. Standard command set

. EIA Class 1 Fax Command set

. EIA Class 2.0 Fax Command set

. ZyXEL AT Command set

. IS101 Voice Command set

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

3.5   Omni 56K II and Omni 56K Plus II Capability

The data/fax/voice feature of Omni 56K II and Omni 56K Plus II is described below:

Table 3-3 Feature Description

FEATURE	DESCRIPTION
Data	2W Dial-Up Line Multi-auto/V.92/V.90/V.34bis/V.34/V.32bis/V.32/V.22bis/V.22/ Bell212A Hardware/Software Flow Control Error Control/Data Compression ZyXEL AT Command Set External Plug and Play for Windows 95/98/2000/Me/XP in RS232 mode External Plug and Play for Windows 98 /2000/Me/XP 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	4 bit IMA ADPCM Remote Recording on PC storage IS-101 Command Set

3.6   Data Function

3.6.1   Physical Layer Capability

The Omni 56K II and Omni 56K Plus II modems are high performance universal modems capable of transmission speeds up to 56/48Kbps full-duplex on a 2-wire dial-up line. Universal compatibility covers a broad range of ITU-T and BELL standards.

Table 3-4 Physical Layer Capacity

STANDARD	BIT RATE [BPS]	BAUD RATE [BAUD]	MODULATION	CARRIER FREQUENCY [HZ]
V.92 – upstream	24000-48000	8000	PCM	0
V.92 – downstream	28000-56000	8000	PCM	0
V.90	28000-56000	8000	PCM	0

STANDARD	BIT RATE [BPS]	BAUD RATE [BAUD]	MODULATION	CARRIER FREQUENCY [HZ]
V.34bis/V.34	2400-33600	multiple	TCM	multiple
V.32bis	14400	2400	128-TCM	1800
V.32bis	12000	2400	64-TCM	1800
V.32bis	7200	2400	16-TCM	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 212A)	1200	600	4-DPSK	1200 Call 2400 Ans
V.21	300	300	FSK	
BELL 103	300	300	FSK	

3.7   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 II and Omni 56K Plus II provide two kinds of flow control methods.

3.8   Hardware CTS/RTS Flow Control

This is a bi-directional flow control where CTS (Clear to Send) and RTS (Ready to Send) are RS-232 signals that must be available on your computer. CTS is an RS-232 signal that means the device can send data now. RTS signifies that the device is now ready to receive data. Both CTS and RTS are hardware methods of flow control.

3.9   Software XON/XOFF Flow Control

This is a bi-directional flow control. XON and XOFF 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 will treat XOFF as a signal to stop transmitting data and will treat XON as a signal to restart sending data. Modems will not send these characters received from the local DTE to the remote modem.

3.10   Error Control

Error control keeps the modem data link error-free by detecting and re-transmitting erroneous data. The Omni 56K II and Omni 56K Plus II modems support both MNP and V.42 error control protocols. The MNP protocol was an industry standard developed and licensed by Microcom, Inc. Omni 56K II and Omni 56K Plus II modems support level 4 and 3 error control protocols, commonly denoted as MNP4 and MNP3. V42 is a standard developed by CCITT. V.42 supports both LAPM and MNP4. A V.42 handshake will try an LAPM connection first, and if it is not successful, it will try MNP4.

3.11   Data Compression

In the modem, the data compression is activated 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.

The Omni 56K II and Omni 56K Plus II modems support V.44, V.42bis and MNP5 data compression protocols. Data compression needs an error-free data link to work correctly, otherwise the corrupted compressed data stream will ruin the decompression process. MNP5 is used with MNP4 error control, V.44 and V.42bis are used with V.42 error control. The compression efficiency of V.42bis is generally higher than that of MNP5.

3.12   Repeat Dial

The modem will dial the default number stored in non-volatile RAM, EEPROM, repeatedly if not connected. (s38.0=1,*Dn)

3.13   Cyclic Dial

Dial the number stored in EEPROM at location n(0-3) if cyclic dial s44.3=1 is set. If the first dial is not successful, the modem will cycle dial through the four numbers stored in memory.

3.14 Caller Number Delivery (Caller ID)

Caller Number Delivery (CND), commonly called Caller ID, is a feature 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 will send 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 will also report 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, which 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.

> **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 will send 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: Brent Harper
```

```
RING
```

In the multiple message format, if the caller's number and name are available, the ring message will display 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 will appear 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 will cause the modem to report CND information in its ASCII coded hexadecimal raw data format. The DTE software is responsible for explaining the data.

> **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.**

3.15 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 will send 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 will not be answered by either a fax or data machine - it will only be answered when someone picks 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 3-6 in register S40 and the different ring types are:

Table 3-5 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

TYPE	BIT (ON)	RING SEQUENCE
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

3.16 Security Function

The Omni 56K II and Omni 56K Plus II modems provide a security function, which (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 will send in its supervisor password for checking at the initial connection handshake, and the local modem will check this password against its pre-stored acceptable password list. With a type 2 connection, the remote terminal will be prompted to enter the password at the initial connection and the local modem will do the password checking.

Two levels of security are provided. With level 1 security, the local modem will maintain the connection if the password check is OK, otherwise the line will be 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 to the phone number corresponding to the dial-in password. The line is simply disconnected if the password does not march.

4 user passwords may be defined. The corresponding 4 dial-back numbers are the modem's 4 stored phone numbers. Any character (ASCII 0-127) can be used in the password field and the maximum password length is 8 characters.

The security functions are only accessible through AT commands in terminal mode. Any access attempt will result in the modem's prompting to enter the supervisor password. The attempt will be 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

You will be asked for 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, the modem prompts you enter the supervisor password first.

The commands below enable different types and levels of security:

Table 3-6 Modem Security Function

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 callback.
*G3	Enables type 1 and level 1 security, with password check.
*G4	Enables type 1 and level 2 security, with password check and callback.
*G5	Enables type 2 and level 2 security, with password check and callback, remote site enters the callback number.

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

For type 2 security, the remote site is prompted to enter the user password. A maximum of 3 tries in 40 seconds is allowed. If a correct password is not entered within this time limit, the modem disconnects. If the remote site needs to enter the callback number, it will be prompted to do so.

3.17 Fax function

3.17.1   Fax Physical Layer Protocol

Table 3-7 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
V.21	300	300	FSK	

3.17.2   EIA Class 1/Class 2 & Class 2.0 Command Sets

Please refer to *Section 5.2 Fax Command Sets.*

3.17.3   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.

You modem allows for fax speeds up to 14400 bps when transmitting to another fax machine that complies with the V.17 fax standard. Speeds will 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 will automatically fall back to 7200, 4800, and 2400 bps if the line quality is poor.

3.18 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 can playback the recorded digitized voice online for a message announcement.

3.18.1   Voice IS-101 Command Set

Please refer to the voice command sets Chapter 5.

3.18.2   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. 4-bit ADPCM is used in the Omni 56K II and Omni 56K Plus II modems.

Chapter 4
Result Codes

This chapter details the command responses for the Omni 56K II and Omni 56K Plus II modems.

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 the Xn and Vn commands. The lists are as follows:

Table 4-1 Result Codes

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

RESULT CODE FOR		X0	X1	X2	X3	X4	X5	X6	X7
ATV0	**ATV1**								
16	CONNECT 12000		●	●	●	●	✛	✛	✛
17	CONNECT 14400		●	●	●	●	✛	✛	✛
18	CONNECT 16800		●	●	●	●	✛	✛	✛
19	CONNECT 38400		●	●	●	●	✛		
20	CONNECT 57600		●	●	●	●	✛		
21	CONNECT 76800		●	●	●	●	✛		
22	CONNECT 115200		●	●	●	●	✛		
23	CONNECT 230400		●	●	●	●	✛		
24	CONNECT 460800		●	●	●	●	✛		
25	CONNECT 921600		●	●	●	●	✛		
26	CONNECT 307200		●	●	●	●	✛		
27	CONNECT 153600		●	●	●	●	✛		
28	CONNECT 102400		●	●	●	●	✛		
29	CONNECT 61440		●	●	●	●	✛		
30	CONNECT 51200		●	●	●	●	✛		
31	CONNECT624000		●	●	●	●	●		
32	CONNECT124800		●	●	●	●	●		
33	CONNECT 62400		●	●	●	●	✛		
34	CONNECT 41600		●	●	●	●	✛		
35	CONNECT 31200		●	●	●	●	✛	✛	✛
36	CONNECT 24960		●	●	●	●	✛		
37	CONNECT 20800		●	●	●	●	✛		
38	CONNECT 33600		●	●	●	●	✛	✛	✛
39	CONNECT 28800		●	●	●	●	✛	✛	✛
40	CONNECT 26400		●	●	●	●	✛	✛	✛

RESULT CODE FOR		X0	X1	X2	X3	X4	X5	X6	X7
ATV0	ATV1								
41	CONNECT 24000		●	●	●	●	✛	✛	✛
42	CONNECT21600								
100	CONNECT 56000		●	●	●	●	✛	✛	✛
101	CONNECT 54666		●	●	●	●	✛	✛	✛
102	CONNECT 53333		●	●	●	●	✛	✛	✛
103	CONNECT 52000		●	●	●	●	✛	✛	✛
104	CONNECT 50666		●	●	●	●	✛	✛	✛
105	CONNECT 49333		●	●	●	●	✛	✛	✛
106	CONNECT 48000		●	●	●	●	✛	✛	✛
107	CONNECT 46666		●	●	●	●	✛	✛	✛
108	CONNECT 45333		●	●	●	●	✛	✛	✛
109	CONNECT 44000		●	●	●	●	✛	✛	✛
110	CONNECT 42666		●	●	●	●	✛	✛	✛
111	CONNECT 41333		●	●	●	●	✛	✛	✛
112	CONNECT 40000		●	●	●	●	✛	✛	✛
113	CONNECT 38666		●	●	●	●	✛	✛	✛
114	CONNECT 37333		●	●	●	●	✛	✛	✛
115	CONNECT 36000		●	●	●	●	✛	✛	✛
116	CONNECT 34666		●	●	●	●	✛	✛	✛
117	CONNECT 33333		●	●	●	●	✛	✛	✛
118	CONNECT 32000		●	●	●	●	✛	✛	✛
119	CONNECT 30666		●	●	●	●	✛	✛	✛
120	CONNECT 29333		●	●	●	●	✛	✛	✛
121	CONNECT 28000		●	●	●	●	✛	✛	✛

Note: If error control result codes are enabled (X4, X5, X6, X7), the resulting message will be formatted as:

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

ARQ denotes that the Automatic Retransmission reQuest type of error control is enabled.

Chapter 5
Command Sets

This chapter lists the command sets that the Omni 56K II and Omni 56K Plus II modems support. 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 5-1 Basic AT Command Sets

COMMAND	OPTIONS	FUNCTION & 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>		This command terminates the current connection attempt when entered in handshaking state.	
+++		This is the escape sequence code. When entered, the modem returns to online command mode.	

All the Following Commands Require an "AT" Prefix:

Table 5-2 AT Command Sets Requiring an "AT" Prefix

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
A		Go online in answer mode. (See also S39.2,S43.6)	
Bn		Handshake option.	S28.7
	B0 *	Select CCITT V.22 for 1200 bps	
	B1	Select Bell 212A for 1200 bps communication.	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
Ds		Dials (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 will be dialed as in-band DTMF.	
	;	Return to command state after dialing.	
	!	Hook flash	S56
	@	Waits for a 5 second silence before proceeding, otherwise returns NO ANSWER.	
	R	Reverse handshake. (go online in Answer mode)	S17.5
	W	Wait for the second dial tone. Remaining digits will be dialed as in-band DTMF.	
DL		Dials the last-dialed number.	
DSn	n=0-3	Dial the number stored in non-volatile RAM at location 'n.'	S44.3
En		Echoes the keyboard commands.	S23.0
	E0	Echo off	
	E1 *	Echo on	
Hn		On/off hook control.	
	H0 *	Hang up (on-hook) the modem or ISDN, same as 'ATH.	
	H1	Sets the modem to off hook.	
In		Displays the inquired information.	
	I0	Displays the numerical product code, same as 'ATI.'	
	I1	Displays the product information and ROM checksum.	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
	I2	Displays the modem link status report.	
	I12	Displays the physical layer status.	
	I13	Displays the channel response for V.34	
Ln	n=0-7 4 *	Speaker volume control. The higher the value, the higher the volume.	S24.4-6
Mn		Speaker control	S21.1-2
	M0	The speaker is always OFF.	
	M1 *	The speaker is ON until carrier detected.	
	M2	The speaker is always ON.	
	M3	The speaker is ON after the last digit is dialed out Tone dialing is not heard.	
O		Returns to online state.	
O1		Force the modem to request a retrain.	
Qn		Displays the result code displayed.	S23.7
	Q0 *	The modem returns the result code.	
	Q1	The modem does not return the result code.	
	Q2	The modem returns the result code but is quiet after answering on a RING. (see also S42.2)	S40.1
Sr.b=n		Sets bit 'b' of S-register 'r' to value 'n'. 'n' is a binary digit '0' or '1'.	
Sr.b?		Displays the value of bit 'b' of S-register 'r'	
Sr=n		Sets S-register 'r' to value 'n'. 'n' must be a decimal number between 0 and 255.	
Sr?		Displays the value stored in S-register 'r'	
T		Tone dial	S23.1
UPX		Download firmware to the Flash EPROM by using Xmodem protocol.	
Vn		Sets the display type for result codes.	S23.6
	V0	Displays the result code in numeric form. (See also S35.7 and the result code table of 'ATXn')	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
	V1 *	Displays the result code in verbose form.	
Xn	n=0-7 5 *	Result code options, see Table 4-1.	S23.3-5
Zn	n=0-2	Resets the modem and set power-on profile.	S15.5-7
	Zn	Resets the modem and load user profile n (0-1).	
	Z2	Resets the modem and load factory settings.	
+++		This is the escape sequence code. When entered, the modem returns to online command mode.	

5.1.2   Extended AT& Command Sets

Table 5-3 Extended AT& Command Sets

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
&Bn		Data rate, terminal-to-modem. (DTE/DCE)	S28.6
	&B0	The DTE rate follows the connection rate. (See also S44.6)	
	&B1 *	The DTE/DCE rates are fixed at the 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 the 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 dialing 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.	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
&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)	
	&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).	
	&K5 *	V.42+V.44	
&Nn		Modem link mode options (DCE/DCE). (See S19 also S43.7, S48.1)	
	&N0 *	Multi-Auto, auto-negotiate the highest possible link rate: .90,V.34bis, V.32bis, V.32, V.22bis, V.22 and Bell 212A, G3 Fax V.17/V.29/V.27ter.	
	&N3	V.32 9600T/9600/7200T/4800	
	&N4	V.32 9600/7200/4800	
	&N5	V.32 4800	
	&N12	V.23 1200/75	
	&N13	V.23 600/75	
	&N14	V.22bis 2400/1200	
	&N15	V.22 1200	
	&N16	V.21 300	
	&N17	V.32bis 14400/12000/9600/7200/4800	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
	&N18	V.32bis 12000/9600/7200/4800	
	&N19	V.32bis 7200/4800	
	&N24	BELL 212A 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	
	&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	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
	&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 is always ON.	
&Sn		Data Set Ready (DSR) function selection.	S21.3
	&S0 *	DSR overridden, DSR is always ON.	
	&S1	DSR according to CCITT (ITU-TSS). (See also S41.5, S44.4)	
&Tn		Modem testing.	S16
	&T0	Terminate the test in progress.	
	&T1	Initiate an Analog Loop-back (ALB) test.	
	&T3	Initiate a Local Digital Loop-back (LDL) test.	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
	&T4	Grant a Remote Digital Loop-back request from a remote modem.	S14.1
	&T5	Deny a Remote Digital Loop-back request from a remote modem.	S14.1
	&T6	Initiate a Remote Digital Loop-back (RDL) test.	
	&T7	Initiate a Remote Digital Loop-back test with self-test. (RDL+ST)	
	&T8	Initiate an Analog Loop-back test with self-test. (ALB+ST)	
&Vn		View the profile settings.	
	&V0	View the current active settings.	
	&V1	View the user profile settings.	
	&V2	View the factory default settings.	
&W		Save the current settings to user profile in nonvolatile 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 *	Nondestructive, expedited.	
	&Y2	Nondestructive, unexpedited.	
&Z?		Display all the phone numbers stored in nonvolatile RAM.	
&Zn=s	n=0-3	Store phone number/s to NVRAM at location n (n=0-3) use AT*Dn or ATS29=n to set the default dial pointer.	

5.1.3 Extended AT* Command Sets

Table 5-4 Extended AT* Command Sets

COMMAND	OPTIONS	FUNCTION & 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=0-3	Set the 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 the 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 callback number.	
	*G9	Resets the supervisor password to "ZyXEL".	

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
		Note: The command *Gn requests supervisor password checking.	
		1. In security type 1, the remote site must be a ZyXEL modem.	
		2. In security type 2, the remote site can be any other type of modem.	
		3. The modem can store 4 (0-3) telephone numbers. If callback security is disabled, the modem will search the password table to check the remote modem's password. If they match, the modem keeps the connection, otherwise the modem will hang up. If callback security is enabled, the modem will complete the password checking. If there is no match, the modem disconnects the line, otherwise the modem disconnects the line and find the corresponding phone number and call back immediately. The remote modem should be set to automatically answer the call and response.	
*HS		Modifies the supervisor password.	
		Note: The default supervisor password is ZyXEL.	
*Hn	N=0-3	Modifies the user password table at location 'n.'	
*Pn	n=0-15 *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	The modem will not act on 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 the signal quality is poor.	
*T		Recall the last CND (Caller ID) information.	S40.2
*V		Views password table.	

5.1.4   Extended AT# Command Sets

Table 5-5 Extended AT# Command Sets

COMMAND	OPTIONS	FUNCTION & DESCRIPTION	REF.
#En		Modem status in escape state	
	#E0	This disables the reporting of modem status when it is in escape state	
	#E1	This enables the reporting of modem status when in escape state	

5.2   Fax Command Sets

5.2.1   Service Class 1 Commands

Table 5-6 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	Stops data transmission and pauses	n=0-255 in 10 ms units.
+FRS=n	Wait for Silence	n=0-255 in 10 ms units.
+FTM=<MOD>	Transmit Data with <MOD> Carrier	See Table 5-6
+FRM=<MOD>	Receive Data with <MOD> Carrier	See Table 5-6
+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 lists as below:

Table 5-7 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 PN2388 (8/20/90):

Table 5-8 Service Class 2 Command Syntax

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

Table 5-9 Service Class 2 Commands Supported Commands (per TIA PN2388 8/20/90)

COMMAND	DESCRIPTION	VALUE
+FAA=*n*	Automatic answer mode parameters.	
	Answer as set by +FCLASS.	n=0
	DCE answers and automatically determines the type of call.	n=1
+FBADLIN= <*value*>	Bad line threshold (number of consecutive bad lines for a bad page parameter). Determine if Copy Quality is OK on the T.30 flow chart. A value of 0 implies that error checking is disabled.	0-255
+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. This Read Only parameter allows the DTE to determine the characteristics of the DCE's buffer size.	
+FCIG=*"string"*	Sets the local fax station ID string that is sent to polling Rx.	
+FCLASS=*n*	Service class selection. Refer to the +FCLASS Service Class 1 command in Table 5-6.	
+FCON	DCE automatically responds to a fax connection.	
+FCQ=*n*	Sets the copy quality check capability parameters.	
	Disables the copy quality check capability.	n=0

COMMAND	DESCRIPTION	VALUE
	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 will 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*	Sets the DCE capabilities parameters.	
	Sets Vertical resolution to Normal (98 lpi).	vr=0
	Sets Vertical resolution to 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
	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
	Disables Error correction.	ec=0
	Disables binary file transfer.	bf=0
	Minimum scan time/line: 0 ms.	st=0
	Minimum scan time/line: 5 ms.	st=1

COMMAND	DESCRIPTION	VALUE
	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,l n,df,ec,bf,st*	Current session parameters; refer to the +FDCC command.	
+FDIS=*vr,br,wd,l n,df,ec,bf,st*	Current session negotiation parameters; refer to the +FDCC command.	
+FDR	This initiates document reception after receiving a phase C data command.	
+FDT=*df,vr,wd, ln*	Transmits a 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 the XON/XOFF software flow control.	n=1
	Set the CTS/RTS hardware flow control.	n=2
+FLPL=*n*	This command indicates the availability of documents for polling.	
	The DTE has no document available for polling.	n=0

COMMAND	DESCRIPTION	VALUE
	Indicates that a document is available for polling.	n=1
+FMDL?	Request the DCE model.	
+FMFR?	Request the DCE manufacturer.	
+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: Determines how long the DCE will wait for a command after reaching the end of data when transmitting in Phase C. <value>=0 to 255; 100 ms units.	0-255
+FPTS=*n*	Page transfer status	
	Received page status - good.	n=1
	Received page status - bad; retrain requested.	n=2
	Received page status - good; retrain requested.	n=3
	Received page status - bad; procedure interrupt requested.	n=4
	Received page status - 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 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 will respond OK. In many cases this means "don't care."

Table 5-10 Class 2 Command Responses

RESPONSE	VALUE	FUNCTION AND DESCRIPTION
+FCFR		Confirmation.
+FCIG:"string"		Reports the remote ID response CIG.
+FCON		Facsimile connection response.
+FCSI:"string"		Reports the remote ID response CSI.
+FDCS:vr,br,wd,ln,df, ec,bf,st		Reports the session parameters response; refer to the +FDCC=.... command.
+FDIS:vr,br,wd,ln,df, ec,bf,st		Reports the session negotiation parameters response; refer to the +FDCC=.... command.
+FDTC:vr,br,wd,ln,df, ec,bf,st		Reports the remote capabilities response; refer to the +FDCC=.... command.
+FET:n		Message response for a received page; refer to the +FET=n command in Table 5-9.
+FHNG:n		Call termination status response.
	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"		Reports the non-standard facilities command frame.
+FNSF:"HEX string"		Reports the non-standard facilities frame response.
+FNSS:"HEX string"		Reports the non-standard setup frame response.
+FPOLL		Remote polling indication.
+FPTS:n		Receive a page transfer status response; refer to the +FPTS=n

RESPONSE	VALUE	FUNCTION AND DESCRIPTION
		command.
+FTSI:"string"		Report the remote ID response TSI.
+FVOICE		Changes 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 5-11 Service Class 2.0 Commands

COMMAND	DESCRIPTION	VALUE
+FDT	Transmit a phase C data command. This command releases the DCE to proceed with the negotiation.	
+FDR	Receive a phase C data command. This command initiates document reception.	
+FKS	Terminates a Session, orderly fax abort.	
+FIP	Initialize the 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 II/Omni 56K Plus II
+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

COMMAND	DESCRIPTION	VALUE
	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	The current session's negotiating parameters	The same as above
+FCS=vr,br,wd,ln,df,ec,bf,st	The current session's parameters	The same as above
+FLI="string"	Local Facsimile station ID String, TSI/CSI	
+FPI="string"	Local Facsimile station ID String, CIG	
+FLP=n	Indicates a document is available for polling	n=0:No document n=1:A document is available
+FSP=n	Enable/Disable polling	n=0:Disable n=1:Enable

COMMAND	DESCRIPTION	VALUE
+FNR=rpr,tpr,idr,nsr	Enable Negotiation Reporting	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 alignment	n=0:EOL patterns are as received

COMMAND	DESCRIPTION	VALUE
+FCR=n	Capability to Receive	n=0: Do not receive message data or poll a remote device. n=1: Receives message data or polls a remote device.
+FCQ=<rq>,<tq>	Copy Quality disable/enable	rq= 0:Receive copy quality check is disabled. rq=1:Receive copy quality check is enabled. tq= 0:Transmit copy quality check is disabled. tq=1:Transmit copy quality check is enabled.
+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 automatically 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

5.3　Voice AT Commands

Table 5-12 Voice AT Commands

COMMAND	FUNCTION	OPTION	DEFAULT	DESCRIPTION
+FLO	Select Flow control.	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 II or Omni 56K Plus II	
+FMR?	Revision	N/A	V1.x	
+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.	0-255	128	0: Silence 1-255: The larger the value, the louder the voice will be.
+VLS	Select a voice I/O device.	0,1 (Omni 56K Plus II only), 2	0	0: The DCE is on hook. A local phone is connected to the Telco line. 1: The DCE is on-hook and is connected to the local phone. Power is also provided to the local phone. The modem can record/play through the local phone set.

COMMAND	FUNCTION	OPTION	DEFAULT	DESCRIPTION
				2: The DCE is off-hook and is connected to the telephone line. Power is also provided to the local phone. The modem is able to record/play through the local telephone line.
+VRA	Ring back goes away timer	0 - 255	70	0 : turns off the timer 1-255: Defines the period without ringback (after at least one ringback has been detected) in 100 -ms units.
+VRN	Ring back never come timer	0 - 255	10	0 : turns off the timer 1-255: Defines the period without ringback after dialing in 1 sec units.
+VTX	Voice transmit mode	N/A	N/A	Switches to voice transmit mode.
+VSD	Silence detection	Threshold, Period (0-255), (0-255)	15,70	Threshold: 0: Disable silence detection. 1-255: The smaller the value, the more sensitive to the silence detection it will be. Period: 1-255: The required period of silence detection before DCE reports 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: 0-3000 Hz y: 0-3000 Hz z: 0-1000(10ms)	N/A	x: first tone frequency y: second tone frequency z: duration in 10ms unit
+VTS= {x,y}	DTMF Tone Generation	x:0-9,*,#, A-D y:0-1000 (10ms)	N/A	x: DTMF digits (0-9,*,#, A,B,C,D) y: duration in 10ms unit
+VTS= x,x...	DTMF Tone Generation	x:0-9,*,#, A-D	N/A	x: DTMF digits (0-9,*,#, A,B,C,D) Duration:+VTD setting. (in 10ms unit)

COMMAND	FUNCTION	OPTION	DEFAULT	DESCRIPTION
+VTD	Set default duration of DTMF tone.	1-255	100	Unit: 0.01 second.
+VIT	Inactivity timer.	0-255	70	Unit: 0.1 second.

5.4   Voice Shielded DTE Commands

Table 5-13 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.

5.5   Voice Shielded DTE Responses

Table 5-14 Voice Shielded DTE Responses

RESPONSE CODE	DESCRIPTION
<DLE>0 - <DLE>9 <DLE>A-<DLE>D <DLE>*,<DLE>#	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 is on hook
<DLE>s	Silence detected
<DLE>H	The local handset is off hook

RESPONSE CODE	DESCRIPTION
<DLE>u	Transmission Buffer Underrun. The DCE reports this code if the DEC's buffer becomes empty without first receiving a <DLE><ETX> command.
<DLE><ETX>	End of stream

5.6   S-Register Descriptions

In most bit-mapped S-registers, the default bit value is 0. An asterisk follows non-0 default values. 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.

5.6.1   Basic S-Registers "ATSn=x"

Table 5-15 Basic S-Registers "ATSn=x"

COMMAND	FUNCTION & DESCRIPTION	REF.
S0=	Sets the number of rings on which the modem will answer. A value of 0 disables auto-answering.	+000
S1=	Counts and stores the number of rings from an incoming call.	+000
S2=	Defines the escape code character, default ' +' (43 dec.). A value of 128-255 disables the escape code.	+043
S3=	Defines the ASCII Carriage Return.	+013
S4=	Defines the ASCII Line Feed.	+010
S5=	Defines the ASCII Backspace key. A value of 128-255 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 will dial 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, that the modem waits after the carrier is lost before hanging up.	+007

COMMAND	FUNCTION & DESCRIPTION	REF.
S11=	Sets duration and spacing, in milliseconds, of dialed Touch-Tones.	+070

5.6.2 Extended S-Registers "ATSn=x"

Table 5-16 Extended S-Registers "ATSn=x"

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
S13=	bit	dec	hex	Bit-mapped register.	+000
	1	2	2	Captures modem manufacturer information during V.42 handshake, can be displayed at ATI2 <Last Speed/Protocol> line if available ('Flash' or 'ZyXEL' 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	
		8	8	11 bit character length	
		16	10	9 bit character length	
		24	18	8 bit character length	
	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

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		1	1	Analog Loop-back test in progress	&T1
		3	3	Local Digital Loop-back test in process	
		6	6	Remote Digital Loop-back test in process	
		7	7	Remote Digital Loop-back with self-test in process	
		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. Baud rate value settings (n) the same as S20.	
S19=		dec 0-99	hex 0-63	Modem connection mode, same setting value as 'AT&Nn' command.	+000/&Nn
S20=		dec	hex	DTE speed (bps). Auto detected from AT Command	+001
		0	0	230400 bps	
		1	1	115200 bps (Default)	
		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	

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		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 a modem error control handshake fails (default).	*E0
		1	1	Drop a connection when the modem error control handshake fails.	*E1
	1-2	0	0	The speaker is always OFF.	M0
		2	2	The speaker is ON until the carrier is detected. (Default)	M1*
		4	4	The speaker is always ON.	M2

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		6	6	The speaker is ON after the last digit is dialed out the until carrier is detected.	M3
	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 the presence of the data carrier (see also S38.3) (default).	&C1
	5	0	0	CTS follows RTS in synchronous mode. The response delay is set in S26.	&R0
		32	20	Ignore RTS (CTS always ON) in synchronous mode. (Default)	&R1
	6-7	0	0	Assume DTR is always ON.	&D0
		64	40	108.1, DTR OFF-ON transition causes the modem to dial the default number.	&D1
		128	80	108.2 Data Terminal Ready, DTR OFF causes the modem to hang up and return to the command state (default)	&D2
		192	C0	108.2, DTR OFF causes the modem to hang up and reset the modem to profile 0 after the DTR is 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	ATX18	X1
		16	10	ATX2	X2
		24	18	ATX3	X3

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		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	Displays the result code in numeric format (see S35.7).	V0
		64	40	Displays the result code in verbose format (default).	V1
	7	0	0	The modem returns the result code (default).	Q0
		128	80	The modem does not return the 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.	L0-3
S25=		0 to 255	0-FF	Specify the time delay that the 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 the 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	
		24	18	Hardware (RTS/CTS) flow control (default)	
		32	20	Software (RTS/CTS) flow control	

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		40	28	Reserved	
	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		+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	The DTE/DCE rate follows link rate (see also s18, S44b6)	&B0
		1	64	The DTE/DCE rate is fixed at the DTE setting, range from 300-460.8 Kbps (default, also see S18, S44b6)	
S29=		0 to 3	0 to 3	Sets the default dial phone number pointer, use AT&Zn=s to store phone numbers in the Windows registry.	+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
	1	2	2	Disables aborting from the 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).	

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
	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
S38=	bit	dec	hex	Bit-mapped register.	+000
	0	1	1	Repeatedly dials the default number if not connected.	*Dn, S29
	3	0	0	CD tracks the carrier (default).	&C0
	3	8	8	The DCD ON/OFF sequence follows UNIX standard, DCD ON before connect message is sent, DCD off after the last DCE response is sent.	&C1, S21.4
	4	16	10	Auto-mode fax receiving is disabled, hangs 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		Enables caller ID detection.	
	3	8		Enables type 1 ring detection.	
	4	16		Enables type 2 ring detection.	
	5	32		Enables type 3 ring detection.	
	6	64		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 on-off transition.	&Sn
	6	64	40	Force S0>=2; does not answer on the first ring.	S0

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
	7	128	80	Ignore calling tone, not to be used as fax detection.	
S42=	bit	dec	hex	Bit-mapped register.	
	1	2	2	Enables throughput averaging.	2
	2	4	4	A CND message forces on even if ATQ2 is set.	
	3	8	8	This disables the escape sequence code in answer mode.	
	4	16	10	This disables the V.17 14,400 Fax in calling mode and no effect on answering mode.	
	6	64	40	This disables the 'RINGING' result code.	Xn
	7	128	80	The DCD is forced on but pulses off for 0.5 second at carrier loss.	&C0
S43=	bit	dec	hex	Bit-mapped register.	+008
	6	64	40	Enable a 1.5 second pause between off-hook and modem answering.	
	7	128	80	The modem hangs-up if the line condition does not permit the 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 a 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 is fixed at 38400 when the link speed is above 9600. DTE speed is fixed at 9600 if the link speed is 7200. If it is below 7200, the DTE speed follows link speed. When selected with &B1, DTE speed is fixed at the 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	The delay during which the CND silence detection is disabled, in 20 ms units (see also S46).	+100
S46=		dec	hex	The CND silence detection interval.	+028

COMMAND	BIT	DEC	HEX	FUNCTION AND DESCRIPTION	REF.
		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	This causes CND information to be reported in raw format.	
	2	4	4	This enables the sending of data calling tones (CNG).	
	3	8	8	Reverses 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	(Works with the &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 a 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 (default).	&N12
S56=	bit	dec	hex		+000
		0 to 255	0-FF	Hook flash detect time, in units of 10ms. A value of zero uses 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

This section describes how you can upgrade the firmware in your modem.

The ZyXEL Omni 56K II and Omni 56K Plus II provides a firmware upgrade function that allows you to upgrade the firmware either by upgrade software provided in the supplied CD, or by terminal program such as Bitware or HyperTerminal. To obtain the latest firmware version, please go to ZyXEL's website site at http://www.zyxel.com.

6.1   Upgrading by Software

To upgrade the firmware using the provided software, follow the steps listed below:

Step 1.   Insert the CD-ROM that comes with your modem package into your CD-ROM drive.

Step 2.   Double-click the Zyfwm.exe icon on your CD.

Step 3.   You will see the first screen of the ZyXEL F/W upload wizard. Select the COM port that is connected to your modem, then click **Next**.

Step 4.   Click **Browse** to find the directory where your latest firmware file is located, then click **Next** to start uploading.

Follow the upload wizard to complete the upgrade process. After finishing, you may use your modem again.

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

6.2   Upgrading by Terminal Program

To upgrade the firmware by terminal program, you have to prepare a terminal program first, such as the terminal function in Bitware or HyperTerminal in Windows, then follow the instructions listed below. For more information on how to install Bitware on your computer, please refer to the Quick Start Guide that came with your modem package.

Step 1.   Start your terminal program.

Step 2.   Type in 'atupx', it will show a message as below:

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 will be 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 will respond:

Erase the flash ROM now. Please wait.

Then, it will continue to show:

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 file name then start uploading.

Chapter 7
Troubleshooting

This chapter covers potential problems and the possible solutions.

Table 7-1 Troubleshooting

PROBLEM	CORRECTIVE ACTION
None of the LEDs turn on when I start the modem.	Make sure your modem is turned on and the included power adapter is connected to it as well as plugged into an appropriate and functioning power outlet.
	Check the RS-232 cable connections between the modem and your computer (Omni 56K Plus only).
	Check the USB cable connections between the modem and your computer (Omni 56K Plus II only).
	Carefully follow the instructions in this User's Guide to install the software driver.
	Contact technical support if these steps fail to solve the problem.
I cannot access the modem via my computer.	Make sure the modem's RS-232 port is connected to your computer's serial port (Omni 56K Plus only).
	Unplug the USB cable and plug it back in again (Omni 56K Plus II only).
	Restart your computer.
I cannot connect to the Internet.	Make sure the Line port is properly connected to the wall jack.
	Restart the modem by using the **ON/OFF** switch on your modem.
	Restart your computer.
	Make sure that you have entered your ISP connection information correctly. The password may be case sensitive, so make sure that the Caps lock key is not turned on.
	Make sure that your computer's TCP/IP settings are configured properly.

PROBLEM	CORRECTIVE ACTION
I cannot get the software driver to uninstall and reinstall properly.	Close your Windows applications.
	Use the add and remove hardware option in the Windows **Control Panel** to remove the modem.
	Insert the included CD. If a screen automatically opens, close it.
	Unplug the RS-232 cable (Omni 56K Plus only) and plug it back in.
	Unplug the USB cable (Omni 56K Plus II only) and plug it back in.
	Use the add new hardware option in **Control Panel** to start the installation wizard.
	Restart your computer if prompted.

Index