US Robotics ®

The Intelligent Choice in Information Access

Sportster ®

FLASH x2

User's Guide

U.S. Robotics. From the leader in networking.

3Com ®

This manual covers installation and operating instructions for the following U.S. Robotics modems:

· Sportster Flash with x2

IMPORTANT MESSAGE: This product is capable of download speeds up to 56Kbps; however, the download speeds you experience may be lower due to varying line conditions. We are continuing to test and improve our modem technology to achieve faster speeds. Visit our Web site at **http://www.3Com.com** for future updates and enhancements.

Table of Contents

3Com/U.S. Robotics : The Intelligent Choice in Information Access™

Congratulations! You have just purchased the Sportster Flash modem. Since 1976, 3Com/U.S. Robotics has grown to become a key manufacturer and developer of information access technology. 3Com/U.S. Robotics advanced technology allows you to use your faxmodem to open up a new world of information access. Now you can take advantage of the highest transfer rates available today with our new x2™ technology!

As an innovator in the data communications field, 3Com/U.S. Robotics has a history of bringing the latest technology to market at an affordable price.

3Com/U.S. Robotics owns the core technology, known as the data pump, that works in its access products. This allows 3Com/U.S. Robotics to bring new technologies and features to market faster and at a lower cost, while passing the savings on to you.

Be sure to read the following section to learn more about the latest 3Com/U.S. Robotics breakthrough, x2 technology. Your new 56K Professional Message Modem takes advantage of this technology to make connecting over analog lines faster than ever before.

For more information on 3Com/U.S. Robotics, visit the 3Com/U.S. Robotics World Wide Web Home Page at: **http://www.3com.com**.

Welcome to x2™ Information Access

The latest breakthrough in online communications

Until now, 33.6Kbps was thought to be the practical limit for speed over standard phone lines. Now, x2 shatters that barrier, to bring you download speeds of up to 56Kbps. However, the download speeds you experience may be lower due to varying line conditions. This modem is software upgradeable, allowing easy upgrades to new features and enhancements as they become available.

An integrated end-to-end solution from the leader

3Com is well positioned to bring you x2 technology. Our U.S. Robotics modems are the world's number one seller, and our Total Control™ and Courier™ product lines are favored by many Internet service providers. This widespread acceptance allows 3Com to offer x2 technology to virtually anyone.

Taking advantage of the modern telephone network

x2 technology uses the increasingly digital telephone network to bring you faster downloads, by eliminating the analog-to-digital conversion in the downstream path.

x2 takes advantage of the typical network configuration found when an analog subscriber connects to a digitally connected server. Since x2 bypasses the analog-to-digital conversion in the downstream path, it can use nearly all of the available 64K network bandwidth. (Upstream data, typically less speed sensitive, travels at the standard V.34 rate.)

The result is a completely new kind of transmission technique. Based on "encoding" rather than "modulation," it can give you download speeds that you never thought possible. What's more, with standard V.42*bis* compression, x2 can download at speeds up to a blistering 115.2Kbps.

The new standard for online speed

3Com has already submitted x2 to the ITU-T standards committee for acceptance as the next online standard.

For more information on U.S. Robotics x2 technology, see our World Wide Web page at **http://.3com.com**.

Features

Data Communications

Your modem offers a range of internationally accepted standard modulation methods and protocols. It utilises hardware-based V.42/MNP 2-4 error control and V.42 bis/ MNP 5 data compression.

Your modem will transmit at speeds up to 33,600 bps with throughput to 115,200 bps. Also, it is universally compatible with the following standards: V.34, V.32 bis, V.32, V.22 bis, Bell 212A/V.22, V.23, V.21 modems.

Fax Capability

You can use your modem with Class 1 or Class 2.0 fax software to exchange faxes with Group 3 fax machines world-wide at speeds up to 14.400 bps.

Flash ROM Upgradable

Sportster Flash supports software download through flash memory. You can download upgrades to obtain quickly and easily the latest features.

Speakerphone*

You can use your new Sportster as a full-duplex speakerphone without the echoing sound of some speakerphones. The full-duplex feature allows you to speak at the same time as someone on the other end without losing any sound quality. This affords you all the convenience of a speakerphone without the extra hardware and leads for the home or office.

The external modems have built-in microphones.

Personal Voice Mail*

With Personal Voice Mail, your modem is a full-featured messaging system offering business-quality voice mail features in the convenience of your home or office.

Using this feature, you can send voice greetings and record voice messages like a standard answering machine with several "voice mailboxes" on one system. You can even access your voice messages remotely. Your modem will auto-detect incoming fax, voice, and data calls and provides fax-on-demand services you can tailor to your needs.

* A headset, external powered speakers or soundcard is required to utilise all voice features including hands-free speakerphone.

External Modem Installation

Getting Started

This chapter will walk you through the installation of your external modem with your personal computer.

Before getting started, make sure that you have the following items:
· Modem
· Serial Cable
· Data/Fax/Voice software and User Guide
· RJ11 - telephone lead & Tail lead adaptor
· Power Adaptor
· PSTN (Standard) Telephone Socket
· This Guide

There are two parts to installation: software and hardware. Software allows you to communicate with your modem so that you can send and receive data and faxes, as well as activate voice features. Software installation is discussed in your communications software user guide. Hardware is the modem itself, which will be connected to your computer by the serial cable.

Hardware Installation Steps

Before you begin the modem installation, turn off your computer and any attached devices, such as a printer. Follow these steps to install your modem. Refer to the drawing below of the back panel.

1. Connect the serial cable to the modem and to the computer. When looking for your serial port label on the back of your computer, select COM, MODEM, RS-232, or SERIAL. Do **NOT** select AUX, GAME, LPT, or PARALLEL. *Note which serial port you selected.* This information will be necessary when installing your communications software.

2. Plug the power adaptor into the power socket and into a standard wall outlet.

3. Plug one end of the phone lead into the telephone socket (labelled with a wall plug icon on the bottom of the case) and the other end into a phone wall socket.

4. If you wish to use your modem and phone through the same phone wall socket, plug your phone's lead into the modem's other socket (labelled with a phone icon on the bottom of the case), using the supplied Tail lead adaptor.

5. An external powered speaker must be connected for speakerphone use. For more information, see the next page and consult your software manual.
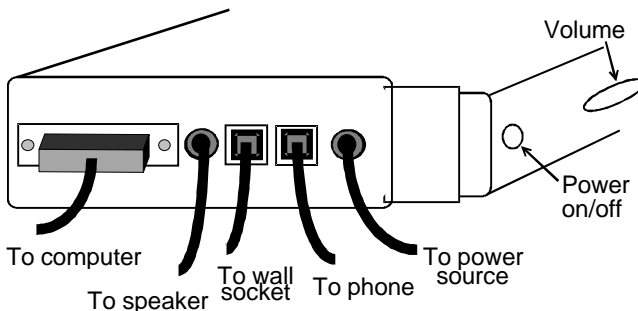
Speaker Attachment

An external powered speaker or headset can be connected to the 3.5 mm speaker socket located on the back of your Sportster. This accessory is required when using the speakerphone and voice mail facilities.

Microphone

The microphone that is built into your modem is located on the front panel.

Installing your Software

1. Insert the software diskette included with your modem or another modem software disk. If using other software, consult its own manual for installation procedures.

2. From Program Manager, choose File. Then choose Run and type a:\install and press <Enter>.

3. Once the software is installed, enter the software group and click on the application icon.

You have successfully finished installing your modem and software.

Communications Software

Note: If you are using the communications software included with your modem, you can disregard this chapter. However, if you are using your own communications software, please refer to the software's manual and this chapter.

Communications software allows you to change settings and issue commands to your modem.

The software included with your modem is pre-configured for optimal performance with the Sportster. Refer to the software manual for any additional information. Be sure to install software after the modem is installed.

Configuring Your Modem

Some programs allow you to select your modem type from a menu. Select the appropriate U.S. Robotics Sportster High Speed modem. If yours is not present, try a Courier Dual Standard, V.32 bis, V.FC, or V.34.

Other programs require you to enter an initialisation string in the software Modem Set-up screen. If this is the case, enter the following string to initialise your modem with the optimal settings for your PC:

AT&F1<Enter>.

These settings include: hardware flow control, a fixed serial port rate, and full result codes.

If you must use software flow control, enter the following string:

AT&F2<Enter>

Configuring Your Software

1. Turn on your computer and modem

2. Install your communications software (refer to the software's documentation).

3. From DOS, change to your Windows directory and type **MSD**.

   Type C for COM Ports. Find the line UART Chip Used and match it with the COM Port column to which you attached your modem to determine the UART type (usually 8250, 16450, or 16550). Remember your UART type for step 5.

4. Start your communications software program.

5. Set the software's serial port (baud) rate based on your UART type. Also, fix or lock the serial port rate (if referred to as autobaud, select OFF).

UART	Serial Rate
16550	115.2K or 57.6K bps
16450	38.4K bps
8250	19.2K bps

6. Specify the serial (COM) port used by the modem in your communications software if working in DOS. Check the serial port to which your modem is connected.

7. Specify your modem's flow control setting: RTS/CTS for hardware flow control (highly recommended) or XON/XO FF for software flow control. You should disable the flow control method you are not using.

Testing Your Installation

1.   To test your modem and software installation, perform the software function that puts your computer in Terminal mode. In Terminal mode, a cursor appears on your screen, allowing you to send commands directly to the modem.

2.   To determine if your computer and modem are communicating properly, type the following command: **AT E1 Q V1<Enter>**

   ·   If the COM port and IRQ settings are correct on your modem and in your software, the modem responds: **OK**

   ·   If the characters you type do not appear, no **OK** appears, or double characters appear, see the Troubleshooting section in this guide.

Sportster Flash and x2

Congratulations on your purchase of x2 56K technology! x2 is a revolutionary new technology that allows your modem to use normal analogue phone lines to enable download speeds up to 56kbps.

Information about x2

For more information about x2, visit the 3Com, U.S. Robotics brand x2 Web Site at http://www.3Com.com.

Enhanced x2 Features

Your Sportster modem with x2 has new result codes and the following new features. Refer to later sections for more information.

To do this	Use this command
Detemine if x2 is enabled in your modem	**ATI7**
Disable or enable x2	**ATS32.5=1 or 0**
Limit the upper speed limit of an x2 connection	**AT&N**
Limit the lower speed limit of an x2 connection	**AT&U**

Note: New x2 features should be transparent to most users. If you are an advanced user, see "Controlling x2" and "Controlling Link Speeds with &N and &U" for detailed information regarding these new features.

How to Tell if x2 is Enabled in Your Modem

If you are not sure whether x2 is enabled in your Sportster modem, use the **ATI7** command to display product configuration information. If x2 is enabled on your Sportster modem, the following information displays:

```
USRobotics      Sportster Configuration Profile...
Product type    (Country) External
Options          V32bis, V.34+,x2
Fax Options     Class 1/Class 2.0
Clock Freq       92.0Mhz
Eprom            256k
Ram              64k

FLASH date       6/30/97
FLASH rev        10.1.68
Serial Number    xxxxxxxxxxxxxxxxx

OK
```

Note: Dates, serial numbers, and revision numbers may vary. The most important line is the "Options" line, which lists support for x2.

How x2 Works

U.S. Robotics brand x2 technology enables analogue modems to receive data at up to 56 kbps over the standard analogue, public switched telephone network (PSTN). x2 overcomes the limitations imposed on standard, analogue modems by exploiting the digital connections that most Internet and online service providers have at their end to connect to the PSTN.

The Shift from Analogue to Digital Circuits

When the first telephone networks were established, they were completely analogue. Over time, telephone companies began replacing portions of their analogue networks with digital circuits, which provided a higher telephone signal quality at a more economical price.

Today, the PSTN is almost entirely digital. Typically, the only portion of the telephone network that remains analogue is the line that connects your home to the telephone company's local exchange. The rest of the telephone network is digital.

Client and Server Modems

x2 will not require changes to your wiring and equipment that's already in place. All that is required to use x2 is a software upgrade.

Client Modems

x2 client modems can receive data at speeds up to 56kbps[*] and send data at V.34 speeds up to 33,600bps. The following products are examples of U.S. Robotics brand Client Modems:

- Courier™ V.Everything™ with x2

- Sportster® with x2

- Analogue Modem Pools or NETServer with x2

Server Modems

The digital x2 modems that x2 client modems connect to are called x2 server modems. Server modems can send data to x2 client modems at speeds up to 56kbps. A server must have a "digital" interface to the PSTN. This digital interface can be in the form of a "trunk-side" T1, Primary Rate Interface (PRI) , or Basic Rate Interface (BRI). The following products are examples of server x2 modems:

- Courier I-modem with x2 (in Server Mode)

- Quad Modem 5.0/5.1 (in Server Mode)

---

[*] Pending line conditions

- MP I-modem or NETServer I-modem with x2

Making x2 Work

To use x2, the x2 client modem must connect to an x2 server modem. If clients attempt to connect to ISPs that do not use x2, the client modem will negotiate the next available modulation. For example, an x2 client modem calling into an ISP that only supports V.34, will negotiate the highest V.34 connection rate. The maximum V.34 connection speed is 33.6kbps.

When an x2 client modem connects to an x2 server modem, the path through the telephone network between the modems is subject to the following conditions for an x2 connection to be made.

A Digital Connection At One End

ISPs or online services must have a digital connection to the PSTN. Most major online services have digital connections to the PSTN.

Only One Digital-to-Analogue Conversion

There can be only one digital-to-analogue conversion in the telephone network between the x2 server modem and the x2 client modem.

Controlling x2

Use the following S58 settings to control x2:

To do this	Use this command
Disable x2	**S32.5=1**
Enable x2 (default)	**S32.5=0**

Controlling Link Speeds with &N and &U

You can use the &N and &U commands to control link speeds. Sportster modems without x2 can still use the &N and &U commands, but can only control link speeds up to 33.6kbps.

Controlling Link Speeds

You can use the &N and &U commands to control the link speeds of your Sportster with x2. Use the following table to determine how to use &N and &U commands:

To limit the	Use
Highest possible connect speed	&N
Lowest possible connect speed	&U
Range of possible connect speeds	&N and &U

Note: The default values for &N and &U are 0. If you change these values, you will limit the speeds at which you can connect. 3Com recommends that you do not alter these values.

Limiting the Highest Possible Connect Speed

The &N command allows you to limit the highest possible connect speed. If a remote modem attempts to connect to your Sportster with x2 at a speed higher than &N, your Courier with x2 will not allow it to connect.

To limit the	Use this command	Where x is
Highest possible connect speed	**AT&N=x**	**A value from 0 to 31**

Note: See table 12.4 for a list of connect speed values.

Limiting the Lowest Possible Connect Speed

The &U command allows you to limit the lowest possible connect speed. If a remote modem attempts to connect to your Courier with x2 at a speed lower than &U, your Sportster with x2 will not allow it to connect.

To limit the	Use this command	Where x is
Lowest possible connect speed	**AT&U=x**	**A value from 0 to 31**

Note: See table 12.4 for a list of connect speed values.

Limiting a Range of Possible Connect Speeds

By setting &N and &U values, you can limit the range of speeds at which your Sportster with x2 connects. If a remote modem does not connect to your Sportster with x2 at a range between the speeds designated by the &N and &U commands, your Sportster with x2 will not allow it to connect.

Note: The link speed associated with the &U argument cannot be greater than the link speed associated with &N argument.

Use the following table to understand the relationship between &U and &N commands:

If &U	And &N	Then your modem
Equals zero	Equals zero	Connects at the highest possible speed.
	Is greater than zero	Connects at the &N speed only.
Is greater than zero	Is greater than zero and greater than &U	Connects at the highest possible speed in the range from &U to &N.

&N and &U Command Values

Use the following table for a complete list of &N and &U link speeds and their associated indexes:

Link Speed	Index	Link Speed	Index	Link Speed	Index
Highest	0	21600	11	45333	22
300	1	24000	12	46666	23
1200	2	26400	13	48000	24
2400	3	28800	14	49333	25
4800	4	31200	15	50666	26
7200	5	33600	16	52000	27
9600	6	33333	17	53333	28
12000	7	37333	18	54666	29
14400	8	41333	19	56000	30
16800	9	42666	20	57333	31
19200	10	44000	21		

Note: For x2-mode links, &N and &U are used to constrain the speed of the higher speed direction of the link.

Troubleshooting x2 Client Connections

Use the chart below to understand issues affecting your Sportster modem and how to fix them:

Step	This may be the issue	Do this	
1	x2 may not be enabled on your Sportster.	See the section "How to Tell if x2 is Enabled" (Use the **ATI7** command)	
2	x2 protocol issues	Use the **ATI11** command and check the "x2 status" field for more information.	
		If this message appears	**You cannot use x2 because**
		"Multiple CODECS in channel"	There are multiple analogue-to-digital conversions on the channel.
		"Remote modem is not x2"	The remote modem does not support x2.
		"Channel is x2-capable but feature is not installed"	The modem has not been upgraded to x2.
3	Your Sportster may be connected to the public network via a PBX or other telephone equipment with analogue-to-digital and digital-to-analogue conversions.	Contact your telephone equipment vendor for information about obtaining pure analogue service. Due to extra analogue-to-digital conversions performed by some PBX's and other telephone equipment, x2 client modems may not be able to make x2 connections.	
4	There is another issue.	Do the following: • Visit the 3Com, U.S. Robotics brand x2 Web Site at http://www.3Com.com • Contact 3Com Technical Support	

New x2 Result Codes

Use the following table for a list of all result codes, including new x2 result codes:

Numeric	Alphanumeric
180	CONNECT 33333
181	CONNECT 33333/ARQ
182	CONNECT 33333/x2
183	CONNECT 33333/ARQ/x2
184	CONNECT 37333
185	CONNECT 37333/ARQ
186	CONNECT 37333/x2
187	CONNECT 37333/ARQ/x2
188	CONNECT 41333
189	CONNECT 41333/ARQ
190	CONNECT 41333/x2
191	CONNECT 41333/ARQ/x2
192	CONNECT 42666
193	CONNECT 42666/ARQ
194	CONNECT 42666/x2
195	CONNECT 42666/ARQ/x2
196	CONNECT 44000
197	CONNECT 44000/ARQ
198	CONNECT 44000/x2
199	CONNECT 44000/ARQ/x2
200	CONNECT 45333
201	CONNECT 45333/ARQ
202	CONNECT 45333/x2
203	CONNECT 45333/ARQ/x2
204	CONNECT 46666
205	CONNECT 46666/ARQ
206	CONNECT 46666/x2

New x2 Result Codes (Continued)

Numeric	Alphanumeric
207	CONNECT 46666/ARQ/x2
208	CONNECT 48000
209	CONNECT 48000/ARQ
210	CONNECT 48000/x2
211	CONNECT 48000/ARQ/x2
212	CONNECT 49333
213	CONNECT 49333/ARQ
214	CONNECT 49333/x2
215	CONNECT 49333/ARQ/x2
216	CONNECT 50666
217	CONNECT 50666/ARQ
218	CONNECT 50666/x2
219	CONNECT 50666/ARQ/x2
220	CONNECT 52000
221	CONNECT 52000/ARQ
222	CONNECT 52000/x2
223	CONNECT 52000/ARQ/x2
224	CONNECT 53333
225	CONNECT 53333/ARQ
226	CONNECT 53333/x2
227	CONNECT 53333/ARQ/x2
228	CONNECT 54666
229	CONNECT 54666/ARQ
230	CONNECT 54666/x2
231	CONNECT 54666/ARQ/x2
232	CONNECT 56000
233	CONNECT 56000/ARQ
234	CONNECT 56000/x2
235	CONNECT 56000/ARQ/x2

Troubleshooting

Before the modems connect…

If your modem doesn't respond to any AT commands,

- Make sure the modem is on.
- Make sure you selected the correct COM port and IRQ in your communications software, and/or in your Windows Control Panel.
- Make sure the computer is in Terminal mode.
- Type in all upper (AT) or lower (at) case.
- There may be a COM port/IRQ conflict. Try alternative IRQ/ COM port settings.

If your modem displays double characters on your monitor,

- Both your modem's and software's local echoes are on and need to be turned off by typing the command **ATE0<Enter>.**

If your modem doesn't go off hook to dial a number or doesn't answer the phone,

- Make sure the phone lead is connected to the socket on the modem labelled TELCO and to a phone wall socket.
- Review your software manual to see what DTR operations are required.
- Make sure that your software has auto answer enabled.

If both modems exchange carrier signals but fail to establish a communications link,

- Place the call again. The telephone company routes all calls, even local calls, differently each time you call.
- Call a different modem to see if the problem persists.

The problem may be with the modem you first tried to call.

If your modem doesn't connect at 2400 bps with a 2400 bps modem,

·   The remote modem might be an older 2400 bps modem that
    does not support error control. Disable error control with the
    following command: **AT&M0<Enter>**
·   Try connecting with the remote modem again.
·   When the call is finished, remember to reset the modem:
    ATZ<Enter>

During data transfer…

If your screen displays random or garbage characters,

·   Set your software to the same word length, parity, and Stop bits
    as the remote modem.
·   Make sure that your software and modem are set to the same
    flow control setting and to either a fixed or variable serial port
    rate.
·   Type the following command to load the template that enables
    hardware flow control as well as other optimal settings.
    AT&F1<Enter>
·   Disable any Terminate and Stay Resident (TSR) programs
    running in the background.

**If your communications software is reporting many Cyclic
Redundancy Check (CRC) errors and low Characters Per Second
(CPS),**

·   You might have a bad phone line. Place the call again. The
    phone company routes calls differently each time you call.
·   Type the following command to load the template that enables
    hardware flow control as well as other optimal settings:
    AT&F1<Enter>
·   Lower the serial port rate in your communications software to
    38,400 bps or 19,200 bps.
·   Try a different file transfer protocol (do not use Xmodem if other
    protocols are available). Disable any Terminate and Stay
    Resident (TSR) programs running in the background.

If errors are occurring in your V.17 fax transmissions,

·   Enter the following initialisation string in your software modem
      set-up screen: **AT&H3&I2&R2S7=60**
·   Disable any Terminate and Stay Resident (TSR) programs that
      are running in the background.
·   If your problems occur when you send faxes from Windows and
      your computer has a 16550 UART, load the comdriver that came
with your fax software. (This may require re-installing the software.)

**If you are running DOS 6.0, run the following DOS program before
you run your fax software.**

·   Type VER at the DOS prompt to determine your version of
      DOS.
·   Run the program MEMMAKER.EXE from the DOS directory
      prompt. This program loads all of your Terminate and Stay
      Resident (TSR) programs in the most efficient order.

U.S. Robotics On-line Resources

Connecting to the U.S. Robotics BBS

To connect to the U.S. Robotics Bulletin Board System (BBS), dial 33320910308 If this is your first time connecting to our BBS, you will be asked to enter your name and a password and to fill out a questionnaire.

Internet FTP

The Internet FTP provides a free library containing the same files as the BBS site. To access the FTP site type **ftp.usr.com.**

Internet on Demand

The Internet on Demand (IOD) provides automatic technical support through a library containing product information, quick reference cards, and installation help. To obtain an index of available documents, send a blank e-mail to euro**support@usr.com**. To have a document e-mailed to you, place the document's number in the subject field.

World Wide Web

The U.S. Robotics Home Page contains the same information as the Internet on Demand listing, as well as information about U.S. Robotics. To log on to the Web, type **http://www.3Com.com**.

CompuServe

Access the same information as the Internet FTP site through CompuServe.

America Online

Connect to the U.S. Robotics Forum through America Online. Go to the *Keyword* field and type **USROBOTICS** to connect to the various U.S. Robotics resources, such as libraries, message boards, online customer support, and product announcements.

Fax and Technical Support Hotline

Technical questions about U.S. Robotics modems can also be answered via fax or by technical support representatives.

> Hotline: +33 (0) 3 20 19 24 24
> Fax: +33 (0) 3 20 19 24 34

Are You Still Having Problems?

- Re-read this manual, especially the Remarks on Using the Modem section.
- Contact your reseller who will be able to provide you with the necessary assistance. This is much more efficient and less costly than sending the modem back to us for a problem that is possibly only a simple matter of adjusting the settings.
- If your reseller can't help you, contact U.S. Robotics Customer Support. When you call, specify your modem serial number (found on the outside of the box), the software being used, and if possible, the contents of your ATI7 screen.

> Hotline: +33 (0) 3 20 19 24 24
> Fax: +33 (0) 3 20 19 24 34
> USR BBS: +33 (0) 3 20 91 03 08
> CompuServe: GO USROBOTICS
> Internet: eurosupport@usr.com

If You Must Return the Modem to Us

- Contact U.S. Robotics Customer Support to obtain a Return Materials Authorisation (RMA) number. You must have an RMA number before returning the modem to us.
  Phone : +33 (0) 3 20 87 04 97
  Fax : +33 (0) 3 20 87 06 94

- Ship the unit, postage paid, in a strong box made of corrugated cardboard with plenty of packing material (preferably the original container.)

- Include your RMA number, name and address on the shipping label as well as inside the package.

- Ship to the following address:
  U.S. Robotics Logistics sarl
  European Repair Center
  RMA#
  Rue Jules Verne
  Centre de Gros N°2
  F-59818 Lesquin Cedex
  France

Glossary

Cross references are printed in boldface. Cross references with items in the Command Summary chapter are printed in italics.

Analogue Loopback
A modem self-test in which data from the keyboard or an internal test pattern is sent to the modem's transmitter, modulated into **analogue** form, looped back to the receiver, and demodulated into **digital** form.

Analogue Signals
A variety of signals and wavelengths that can be transmitted over communications lines such as the sound of a voice over the phone line. Contrast with **digital signals**.

Answer Mode
The mode used by your modem when answering an incoming call from an originating modem. The transmit/receive frequencies are the reverse of the originating modem, which is in **Originate mode**.

Application
A computer program designed to perform a specific function, such as a word processor or a spreadsheet.

ARQ
Automatic Repeat reQuest. A general term for a function that automatically allows your modem to detect flawed data and retransmit it. See **MNP** and **V.42**.

ASCII
American Standard Code for Information Interchange.
A 7bit binary code (0's, 1's) used to represent letters, numbers, and special characters such as $, !, and /.

Asynchronous Transmission
Data transmission in which the length of time between transmitted characters may vary. Because the time lapses between transmitted characters are not uniform, the receiving modem must be signalled as to when the data bits of a character begin and when they end. The addition of **Start** and **Stop bits** to each character serves this purpose.

Auto Answer
Sets the modem to pick up the phone line when it detects a certain number of rings. See S-register (S0) in Technical Quick Reference.

Auto Dial
A process where your modem dials a call for you. The dialling process is initiated by sending an ATDT (dial tone) or ATDP (dial pulse) command followed by the telephone number to dial. Auto Dial is used to dial voice numbers. See command Dn.

Baud Rate
A term used to measure the speed of an analogue transmission from one point to another. Although not technically accurate, baud rate is commonly used to mean **bit rate.**

Binary Digit
A 0 or 1, reflecting the use of the binary numbering system (only two digits). Used because the computer recognises either of two states, OFF or ON. Shortened form of binary digit is **bit.**

Bit Rate
Also referred to as transmission rate. The number of **binary digits**, or bits, transmitted per second (**bps**). Communications channels using telephone channel modems are established at set bit rates, commonly 300, 1200, 2400, 4800, 9600, 14,400 and higher.

Bits Per Second (BPS)
The bits **(binary digits)** per second rate. Thousands of bits per second are expressed as kilobits per second or kbps.

Buffer
A memory area used as temporary storage during input and output operations. An example is the modem's command buffer.

Byte

A group of **binary digits** stored and operated upon as a unit. A byte may have a coded value equal to a character in the **ASCII** code (letters, numbers) or have some other value meaningful to the computer. In user documentation, the term usually refers to 8-bit units or characters. 1 kilobyte (Kbyte) is equal to 1,024 bytes or characters; 640 Kbytes indicates 655,360 bytes or characters.

Carrier

A tone signifying a connection the modem can alter to communicate data across telephone lines.

Character

 A representation, coded in binary digits, of a letter, number, or other symbol.

Characters Per Second (CPS)

A data transfer rate generally estimated from the **bit rate** and the **character** length. For example, at 2400 bps,
8-bit characters with **Start** and **Stop bits** (for a total of ten bits per character) will be transmitted at a rate of approximately 240 characters per second (cps). Some protocols, such as error-control protocols, employ advanced techniques such as longer transmission **frames** and **data compression** to increase cps.

Class 1 and 2.0

International standards used between facsimile application programs and facsimile modems for sending and receiving faxes.

Cyclic Redundancy Checking (CRC)

An error-detection technique consisting of a cyclic algorithm performed on each block or **frame** of data by both sending and receiving modems. The sending modem inserts the results of its computation in each data block in the form of a CRC code. The receiving modem compares its results with the received CRC code and responds with either a positive or negative acknowledgement.

Data Communications

A type of communications in which computers are able to exchange data over an electronic medium.

Data Compression Table

A table containing values assigned for each character during a call under MNP5 data compression. Default values in the table are continually altered and built during each call: the longer the table, the more efficient **throughput** gained.

Data Mode

The mode in which the fax modem is capable of sending and receiving data files. A standard modem without fax capabilities is always in data mode.

DCE

Data Communications (or Circuit-Terminating) Equipment, such as dial-up modems that establish and control the data link via the telephone network.

Default

Any setting assumed, at startup or reset, by the computer's software and attached devices, and operational until changed by the user or software.

Detect Phase

In the **ITU-T** V.42 error-control protocol, the first stage in establishing if both modems attempting to connect have V.42 capability.

Dictionary

The term used for compression codes built by the V.42 bis data compression algorithm.

Digital Loopback

A test that checks the modem's RS-232 interface and the cable that connects the terminal or computer and the modem. The modem receives data (in the form of **digital signals**) from the computer or terminal, and immediately returns the data to the screen for verification.

Digital Signals

Discrete, uniform signals. In this manual, the term refers to the **binary digits** 0 and 1. Contrast with **analogue** signals.

DTE
Data Terminal (or Terminating) Equipment. A computer that generates or is the final destination of data.

Duplex
Indicates a communications channel capable of carrying signals in both directions. See **Half Duplex, Full Duplex.**

EIA
Electronic Industries Association, which defines electronic standards in the U.S.

Error Control
Various techniques that check the reliability of characters (**parity**) or blocks of data. V.42 and MNP error-control protocols use error detection (CRC) and retransmission of flawed frames (ARQ).

Facsimile
A method for transmitting the image on a page from one point to another. Commonly referred to as fax.

Fax Mode
The mode in which the fax modem is capable of sending and receiving files in a facsimile format. See definitions for **V.17, V.27ter, V.29.**

Flow Control
A mechanism that compensates for differences in the flow of data input to and output from a modem or other device. See commands &Hn, &In, &Rn.

Frame
A data communications term for a block of data with header and trailer information attached. The added information usually includes a frame number, block size data, error-check codes, and Start/End indicators.

Full Duplex
Signal flow in both directions at the same time. In microcomputer communications, may refer to the suppression of the on-line Local Echo.

Half Duplex

Signal flow in both directions, but only one way at a time. In microcomputer communications, may refer to activation of the on-line **Local Echo**, which causes the modem to send a copy of the transmitted data to the screen of the sending computer.

Hz

Hertz, a frequency measurement unit used internationally to indicate one cycle per second.

ITU-T

An international organisation that defines standards for telegraphic and telephone equipment. For example, the Bell 212A standard for 1200-bps communication in North America is observed internationally as **ITU-T** V.22. For 2400-bps communication, most U.S. manufacturers observe V.22 bis. The initials ITU-T represent the 'International Telecommunications Union - Telecommunications sector'.

LAPM

Link Access Procedure for Modems, an error-control **protocol** defined in **ITU-T** Recommendation V.42. Like the **MNP** protocols, LAPM uses cyclic redundancy checking (**CRC**) and retransmission of corrupted data (**ARQ**) to ensure data reliability.

Local Echo

A modem feature that enables the modem to display keyboard commands and transmitted data on the screen. See command Hn.

MNP

Microcom Networking Protocol, an error-control protocol developed by Microcom, Inc., and now in the public domain. There are several different **MNP** protocols, but the most commonly used one ensures error-free transmission through error detection (**CRC**) and retransmission of errored frames.

Modem

A device that transmits/receives computer data through a communications channel such as radio or telephone lines. It also changes signals received from the phone line back to digital signals before passing them to the receiving computer.

Non-volatile Memory (NVRAM)
User-programmable random access memory whose data is retained when power is turned off. On the Sportster, it includes four stored phone numbers and the modem settings.

OFF/ON Hook
Modem operations that are the equivalent of manually lifting a phone receiver (taking it off-hook) and replacing it (going on-hook).

On-line Fallback/Fall Forward
A feature that allows high-speed, error-control modems to monitor line quality and fall back to the next lower speed in a defined range if line quality diminishes; as line conditions improve, the modems switch up to the next higher speed.

Originate Mode
The mode used by your modem when initiating an outgoing call to a destination modem. The transmit/receive frequencies are the reverse of the called modem, which is in **Answer mode.**

Parity
A simple error-detection method that checks the validity of a transmitted character. Character checking has been surpassed by more reliable and efficient forms of error checking, including **V.42 and MNP 2-4** protocols. Either the same type of parity must be used by two communicating computers, or both may omit parity.

Protocol
A system of rules and procedures governing communications between two or more devices. Protocols vary, but communicating devices must follow the same protocol in order to exchange data. The format of the data, readiness to receive or send, error detection and error correction are some of the operations that may be defined in protocols.

RAM
Random Access Memory. Memory that is available for use when the modem is turned on, but that clears of all information when the power is turned off. The modem's RAM holds the current operational settings, a flow control **buffer**, and a command buffer.

Remote Digital Loopback
A test that checks the phone link and a remote modem's transmitter and receiver.

Remote Echo
A copy of the data received by the remote system, returned to the sending system, and displayed on the screen. Remote echoing is a function of the remote system.

ROM
Read Only Memory. Permanent memory, not user-programmable.

Serial Transmission
The consecutive flow of data in a single channel. Compare to parallel transmissions where data flows simultaneously in multiple channels.

Start/Stop Bits
The signalling bits attached to a character before the character is transmitted during **Asynchronous Transmission.**

Terminal
A device whose keyboard and display are used for sending and receiving data over a communications link. Differs from a microcomputer or a mainframe in that it has little or no internal processing capabilities.

Terminal Mode
Software mode that allows direct communication with the modem. Also known as command mode.

Throughput
The amount of actual user data transmitted per second without the overhead of protocol information such as Start and Stop bits or frame headers and trailers. Compare **characters per second.**

V.8
The ITU-T standard specification that covers the initial handshaking process.

V.17 Fax
A **ITU-T** standard for making facsimile connections at 14400 bps, 12000 bps, 9600 bps, 7200 bps.

V.21
A **ITU-T** standard for modems operating in asynchronous mode at speeds up to 300 bps, full-duplex, on public switched telephone networks.

V.22
A **ITU-T** standard for modem communications at 1200 bps, compatible with the Bell 212A standard observed in the U.S. and Canada.

V.22 bis
A **ITU-T** standard for modem communications at 2400 bps. The standard includes an automatic link negotiation fallback to 1200 bps and compatibility with Bell 212A/V.22 modems.

V.27
A **ITU-T** standard for facsimile operations that specifies modulation at 4800 bps, with fallback to 2400 bps.

V.29
A **ITU-T** standard for facsimile operations that specifies modulation at 9600 bps, with fallback to 7200 bps.

V.32
A **ITU-T** standard for modem communications at 9600 bps and 4800 bps. V.32 modems fall back to 4800 bps when line quality is impaired.

V.32 bis
A **ITU-T** standard that extends the V.32 connection range: 4800, 7200, 9600, 12000, and 14400 bps. V.32 bis modems fall back to the next lower speed when line quality is impaired, fall back further as necessary, and also fall forward (switch back up) when line conditions improve.

V.34
An **ITU-T** standard that currently allows data rates as high as 33,600 bps.

V.42

A **ITU-T** standard for modem communications that defines a two-stage process of detection and negotiation for LAPM error control.

V.42 bis

An extension of **ITU-T** V.42 that defines a specific data compression scheme for use during V.42 connections.

Xmodem

The first of a family of error control software **protocols** used to transfer files between modems. These protocols are in the public domain and are available from many bulletin board services.

XON/XOFF

Standard **ASCII** control characters used to tell an intelligent device to stop/resume transmitting data.

Ymodem

An error-checking protocol that can send several files of data at a time in 1024-byte (1K) blocks. This protocol can use either checksums or CRC for error checking.

Ymodem G

Similar to Ymodem, except it includes no error checking, which makes it faster.

Zmodem

Similar to Xmodem and Ymodem, except it includes batch transfer, the ability to recover from a partially complete transfer, an autostart feature, and improved efficiency.

Quick Reference

Introduction

The Quick Reference appendix includes information about the following:

· Front Panel Lights

· Command Summary

· S-Registers

Front Panel Lights

Symbol	Meaning	Status
AA	Auto Answer/ Answer	Answer mode: ON when register S0 is set to 1 or higher (Auto Answer), and when answering a call; OFF when modem originates a call. Light flashes when there is an incoming call.
CD	Carrier Detect	ON if modem receives a valid data signal (carrier) from a remote modem, indicating that data transmission is possible. Always ON if CD override is ON (&C0).
RD	Received Data	Flashes when modem sends result codes or passes received data bits.
SD	Send Data	Flashes when computer sends a data bit.
TR	Data Terminal	ON if modem receives a DTR Ready signal from computer. Always ON (modem ignores DTR) if the DTR override is ON (&D0).
CS	Clear to Send	ON until modem lowers CTS when Transmit Data hardware flow control is enabled (&H1, &H3).
ARQ/	Error Control/	Data Mode: Automatic Repeat Request.
FAX	Fax Operations	ON if modem is set to &M4 or &M5 and successfully establishes an error control connection. Flashes when modem retransmits data to remote modem. Fax Mode: Flashes to indicate fax mode.
OH	Off Hook	ON when modem accesses the phone line. OFF when modem is On Hook.

Command Summary

- Type commands in either upper or lower case, not a combination. Use the Backspace key to delete errors. (You cannot delete the original AT command since it is not stored in the modem buffer.)
- If a command has numeric options and you don't include a number, zero is assumed. For example, if you type ATB, the command ATB0 is assumed.
- Every command but A/, +++ and A> must begin with the AT prefix and be entered by pressing a carriage return (Enter key).
- The maximum command length is 60 characters. The modem doesn't count the AT prefix, carriage returns, or spaces.

Note: Defaults are marked with an asterisk (*).

Command Set

$ Displays a basic command list; on-line help.

A   Manual Answer: goes off hook in answer mode. Pressing any key aborts the operations.

A/   Re-executes the last issued command. Used mainly to redial. This does not require the AT prefix or a Carriage Return.

Any key   Aborts off-hook dial/answer operation and hangs up.

AT   Required command prefix, except with A/ and +++. Use alone to test for OK result code.

B*n*   U.S./ITU-T answer sequence.
*   B0   ITU-T V.25 answer sequence
    B1   U.S. answer tone

| D*n* | Dials the specified phone number. Includes the following: |
| | |

*	P	Pulse (rotary) dial
	T	Tone dial
	,	(Comma) Two-second pause; linked to S8 register
	;	(Semicolon) Return to Command mode after dialling
	!	(Exclamation point) Flashes the switch hook
	W	Wait for second dial tone (X3 or higher); linked to S6 register
	@	Dials, waits for quiet answer, and continues (X3 or higher)
	R	Originates call using answer (reverse) frequencies
	#,*	Extended touch tone pad tones

DL   Dials the last-dialled number.

DS*n* Dials the phone number string stored in NVRAM at position n (n = 0*3). Phone numbers are stored with the &Zn=s command.

D$ Displays a list of Dial commands.

E*n*		Sets local echo.
	E0	Echo OFF
*	E1	Modem displays keyboard commands

F*n*		Sets online local echo of transmitted data ON/OFF.
	F0	Local echo ON. Modem sends a copy of data it sends to the remote system to your screen.
*	F1	Local echo OFF. Receiving system may send a remote echo of data it receives.

H*n*   Controls ON/OFF hook.
    H0   Hangs up (goes on hook)
    H1   Goes off hook

I*n*   Displays the following information.
    I0   Four-digit product code
    I1   Results of ROM checksum
    I2   Results of RAM self test
    I3   Product type
    I4   Current modem settings
    I5   Nonvolatile memory (NVRAM) settings
    I6   Link diagnostics
    I7   Product configuration
    I9   Plug and Play information
    I11   Call statistics

L*n*   Controls speaker volume.
    L0   Lowest
    L1   Low
*   L2   Medium
    L3   High

M*n*   Operates speaker.
    M0   Speaker always OFF
*   M1   Speaker ON until CONNECT
    M2   Speaker always ON
    M3   Speaker ON after dial, until CONNECT

O*n*   Returns online.
    O0   Returns online
    O1   Returns online and retrains

P   Sets pulse dial (for phone lines that don't support
    touch-tone dialling).

Q*n*   Displays/suppresses result codes.
*   Q0   Displays result codes
    Q1   Quiet mode; no result codes
    Q2   Displays result codes only in Originate
         mode
    Q3   Displays result codes only in Ring mode.

Sr.b=n   Sets bit .b of register r to n (0/OFF or 1/ON).

Sr=n   Sets register r to n.

Sn?   Displays contents of S-Register n.

S$ Displays a list of the S-Registers.

T   Sets tone dial.

V*n*   Displays verbal/numeric result codes.
    V0 Numeric codes
*   V1 Verbal codes

Xn   Sets result code displayed. Default is X4.

Xn Setting

Result Codes	X0	X1	X2	X3	X4
155/CONNECT 33600	●	●	●	●	●
180/CONNECT 33333	●	●	●	●	●
184/CONNECT 37333	●	●	●	●	●
188/CONNECT 41333	●	●	●	●	●
192/CONNECT 42666	●	●	●	●	●
196/CONNECT 44000	●	●	●	●	●
200/CONNECT 45333	●	●	●	●	●
204/CONNECT 46666	●	●	●	●	●
208/CONNECT 48000	●	●	●	●	●
212/CONNECT 49333	●	●	●	●	●
216/CONNECT 50666	●	●	●	●	●
220/CONNECT 52000	●	●	●	●	●
224/CONNECT 53333	●	●	●	●	●
228/CONNECT 54666	●	●	●	●	●
232/CONNECT 56000	●	●	●	●	●
236/CONNECT 57333	●	●	●	●	●

Functions	X0	X1	X2	X3	X4
Adaptive Dialling		●	●	●	
Wait for 2nd Dial Tone (W)			●		●
Wait for Answer (@)			●	●	
Fast Dial		●		●	

* Requires @ in dial string; replaces NO CARRIER

Y*n*   Selects power-on/reset default configuration.
*   Y0   Default is profile 0 setting in NVRAM
       Y1   Default is profile 1 setting in NVRAM
       Y2   Generic Template (&F0)
       Y3   Hardware Flow Control (&F1)
       Y4   Software Flow Control (&F2)

Z*n*   Resets modem.
       Z0   Resets modem to NVRAM profile selected
             by Y command
       Z1   Resets modem to NVRAM profile 0
       Z2   Resets modem to NVRAM profile 1
       Z3   Resets modem to factory default profile 0 (&F0)
       Z4   Resets modem to factory default profile 1 (&F1)
       Z5   Resets modem to factory default profile 2 (&F2)

&$ Displays a list of ampersand (&) commands.

&A*n*   Enables/disables ARQ codes.
       &A0 ARQ result codes disabled
       &A1 ARQ result codes enabled
       &A2 V- modulation indicator added
*   &A3 Protocol indicators added - LAPM/MNP/NONE
            (error control) and V42bis/MNP5 (data
            compression)

&B*n*   Sets modem's serial port rate.
       &B0 Variable, follows connection rate
*   &B1 Fixed serial port rate
       &B2 Fixed in ARQ mode, variable in non-ARQ mode

&C*n*   Controls Carrier Detect (CD) signal.
       &C0 CD override
*   &C1 Normal CD operations

&D*n*   Controls Data Terminal Ready (DTR) operations.
       &D0 DTR override
       &D1 Reserved
*   &D2 Normal DTR operations

&F*n* Loads a read-only (non-programmable) factory
configuration.
    &F0   Generic template
    &F1   Hardware flow control template
    &F2   Software flow control template

&H*n* Sets Transmit Data(TD) flow control (also see &R*n*)
    &H0   Flow control disabled
*   &H1   Hardware flow control, Clear to Send (CTS)
    &H2   Software flow control, XON/XOFF
    &H3   Hardware and software flow control

&I*n* Sets Receive Data (RD) software flow control
(see also &R*n*).
*   &I0   Software flow control disabled
    &I1   XON/XOFF signals to your modem and remote
          system
    &I2   XON/XOFF signals to your modem only

&K*n* Enables/disables data compression.
    &K0   Data compression disabled
*   &K1   Auto enable/disable
    &K2   Data compression enabled
    &K3   MNP5 compression disabled

&M*n* Sets Error Control (ARQ) 1200 bps and higher.
    &M0   Normal mode, error control disabled
    &M1   Reserved
    &M2   Reserved
    &M3   Reserved
*   &M4   Normal/ARQ
    &M5   ARQ mode

&N*n* Sets connect speed. If connection cannot be established at this speed, the modem will hang up.

*	&N0	Variable rate
	&N1	300 bps
	&N2	1200 bps
	&N3	2400 bps
	&N4	4800 bps
	&N5	7200 bps
	&N6	9600 bps
	&N7	12,000 bps
	&N8	14,400 bps
	&N9	16,800 bps
	&N10	19,200 bps
	&N11	21,600 bps
	&N12	24,000 bps
	&N13	26,400 bps
	&N14	28,800 bps
	&N15	31,200 bps
	&N16	33,600 bps
	&N17	33,333 bps
	&N18	37,333 bps
	&N19	41,333 bps
	&N20	42,666 bps
	&N21	44,000 bps
	&N22	45,333 bps
	&N23	46,666 bps
	&N24	48,000 bps
	&N25	49,333 bps
	&N26	50,666 bps
	&N27	52,000 bps
	&N28	53,333 bps
	&N29	54,666 bps
	&N30	56,000 bps
	&N31	57,333 bps

Note: When &N is used in conjunction with &U, &N sets the highest speed at which your modem will connect, and &U sets the lowest speed at which the modems will connect. The factory default settings for these values should be sufficient for most users.

	&N=0	&N>0
&U=0	Connects at best possible speed between your modem and remote modem	Connects at speed defined by &N
&U>0	Connects at any speed faster than the value of &U.	Connects at any speed between &N and &U.

&R*n* Sets Receive Data (RD) hardware flow control,
       Request to Send (RTS) (see also &In and &Hn).
    &R0 Reserved
    &R1 Modem ignores RTS
*   &R2 Received Data to computer only on RTS

&S*n* Controls Data Set Ready (DSR) operations.
*   &S0 DSR override; always ON
    &S1 Modem controls DSR

&T*n* Begins test modes.
    &T0 Ends testing
    &T1 Initiates Analogue Loopback
    &T2 Reserved
    &T3 Initiates Local Digital Loopback
    &T4 Enables Remote Digital Loopback
*   &T5 Prohibits Remote Digital Loopback
    &T6 Initiates Remote Digital Loopback
    &T7 Initiates Remote Digital with self-test and
         error detector
    &T8 Initiates Analogue Loopback with self-test
         and error detector

&U*n* Sets floor connect speed when &Un is set greater than 0.
       &Nn is the ceiling connect speed. See &Nn.
*   &U0 Disabled
    &U1 300 bps
    &U2 1200 bps
    &U3 2400 bps
    &U4 4800 bps
    &U5 7200 bps
    &U6 9600 bps

```
           &U7    12,000 bps
           &U8    14,400 bps
           &U9    16,800 bps
           &U10   19,200 bps
           &U11   21,600 bps
           &U12   24,000 bps
           &U13   26,400 bps
           &U14   28,800 bps
           &U15   31,200 bps
           &U16   33,600 bps
           &U17   33,333 bps
           &U18   37,333 bps
           &U19   41,333 bps
           &U20   42,666 bps
           &U21   44,000 bps
           &U22   45,333 bps
           &U23   46,666 bps
           &U24   48,000 bps
           &U25   49,333 bps
           &U26   50,666 bps
           &U27   52,000 bps
           &U28   53,333 bps
           &U29   54,666 bps
           &U30   56,000 bps
           &U31   57,333 bps
```

&W*n* Writes current configuration to NVRAM templates.
    &W0   Modifies the NVRAM 0 template (Y0)
    &W1   Modifies the NVRAM 1 template (Y1)

&Y*n* Sets break handling.
    &Y0   Destructive, but doesn't send break
*   &Y1   Destructive, expedited
    &Y2   Non-destructive, expedited
    &Y3   Reserved

&Zn=s   Writes phone number string s to NVRAM at position
           n (n = 0*3).

&Zn=L   Writes last executed dial string to NVRAM at position
           n (n = 0*3).

&Zn?   Displays the phone number stored at position

n (n = 0*3).

<Ctrl>C   Cancels the display of the help screens.

<Ctrl>K   Cancels the display of the help screens.

<Ctrl>S   Pauses help screens.

+++   Escapes to online-command mode.

S-Registers

To change a setting, use the ATSr=n command, where r is the register and n is a decimal value from 0*255 (unless otherwise indicated).

Register	Default	Function
S0	1	Sets the number of rings on which to answer in Auto Answer Mode. When set to 0, Auto Answer is disabled.
S1	0	Counts and stores the number of rings from an incoming call (read only).
S2	43	Stores the ASCII decimal code for the escape code character. Default character is "+."
S3	13	Stores the ASCII code for the Carriage Return character <CR>.
S4	10	Stores the ASCII decimal code for the Line Feed character <LF>.
S5	8	Stores the ASCII decimal code for the Backspace character <BS>.
S6	4	Sets the number of seconds the modem waits for dial tone before dialling.
S7	60	Sets the number of seconds the modem waits for a carrier or answers before returning on-hook and sending a No Carrier result code.
S8	2	Sets the duration, in seconds, for the pause (,) option in the Dial command.
S9	6	Sets the required duration, in tenths of a second, of the remote modem's carrier signal before recognition by your modem.

Register	Default	Function
S10	7	Sets the duration, in tenths of a second, that the modem waits after loss of carrier before hanging up. This guard time allows the modem to distinguish between a line hit, or other disturbances that momentarily break the connection, from a true disconnect (hang up) by the remote modem.

While we don't recommend connecting the modem to a line with call waiting, if you have it, you may wish to adjust this setting upward to prevent the modem from misinterpreting the second call signal as a disconnect by the remote modem. A better alternative is to ask your phone company how to temporarily disable call waiting (usually *70). For example: ATDT *70 phone number.

Note: If you set S10 = 255, the modem will not hang up when carrier is lost. Dropping DTR hangs up the modem. |
| S11 | 72 | Sets the duration and spacing, in milliseconds, for tone dialling. |
| S12 | 50 | Sets the duration, in fiftieths of a second, of the guard time for the escape code sequence. |

Register	Default	Function
S13	0	Bit-mapped register. Select the bit(s) you want on and set S13 to the total of the values in the Value column. For example, ATS13 = 17 enables bit 0 (value is 1) and bit 4 (value is 16).

Bit	Value	Result
0	1	Reset when DTR drops.
1	2	Reset non-MNP transmit buffer from 1.5K to 128 bytes.*
2	4	Set backspace key to delete.
3	8	On DTR signal, auto dial the number stored in NVRAM at position 0.
4	16	At power on/reset, Auto Dial the number stored in NVRAM at position 0.
5	32	Reserved.
6	64	Reserved.
7	128	Disconnect on escape code.

* The 1.5K-byte non-ARQ buffer allows data transfer with Xmodem- and Ymodem-type file transfer protocols without using flow control.
The 128-byte option lets remote users with slower modems keep data you're sending from scrolling off their screens. When remote users send your computer an XOFF (Ctrl-S) and you stop transmitting, the data in transit from your modem's buffer doesn't exceed the size of their screen.
This is also very helpful in situations when a remote modem/printer application is losing characters.

Register	Default	Function
S14	0	Reserved.
S15	0	Bit-mapped register setup. To set the register, see instructions for S13.

Bit	Value	Result
0	1	Disable ARQ/MNP for V.22.
1	2	Disable ARQ/MNP for V.22 bis.
2	4	Disable ARQ/MNP for V.32/V.32bis.
3	8	Disable MNP handshake.
4	16	Disable MNP level 4.
5	32	Disable MNP level 3.
6	64	MNP incompatibility.
7	128	Disable V.42 operation.

Register	Default	Function
S16	0	Bit-mapped register setup. To set the register, see instructions for S13.

Bit	Value	Result
0	1	Reserved.
1	2	Touch tone dialling test.
2-7	4-128	Reserved.

Register	Default	Function
S17	0	Reserved.
S18	0	Test timer for &T loopback testing. Sets the time in seconds of testing before the modem automatically times out and terminates the test. When set to 0, the timer is disabled. Valid range is 1-255.

Register	Default	Function
S19	0	Sets the duration, in minutes, for the inactivity timer. The timer activates when there is no data activity on the phone line; at time-out the modem hangs up. S19 = 0 disables the timer.
S20	0	Reserved.
S21	10	Sets the length, in 10-millisecond units, of breaks sent from the modem to the computer; applies to MNP or V.42 mode only.
S22	17	Stores the ASCII decimal code for the XON character.
S23	19	Stores the ASCII decimal code for the XOFF character.
S24	0	Reserved.
S25	20	Sets the duration, in hundredths of a second, that DTR must be dropped so that the modem doesn't interpret a random glitch as a DTR loss. (Most users will want to use the default; this register is useful for setting compatibility with older systems running under older operating software.)
S26	0	Reserved.

Register	Default	Function
S27	1	Bit-mapped register setup. To set the register, see instructions for S13.

Bit	Value	Result
0	1	Enables ITU-T V.21 modulation at 300 bps for overseas calls; in V.21 mode, the modem answers both overseas and domestic (U.S. and Canada) calls, but only originates V.21 calls. (Default Bell 103)
1	2	Enables unencoded (non-trellis coded) modulation in V.32 mode; rarely used part of ITU-T Recommendation V.32.
2	4	Disables V.32 modulation.
3	8	Disables 2100 Hz answer tone to allow two V.42 modems to connect more quickly.
4	16	Enables V.23 fallback mode.
5	32	Disables V.32 bis mode.
6	64	Reserved.
7	128	Software compatibility mode. This setting disables the codes and displays the 9600 code instead. The actual rate of the call can be viewed on the ATI6 screen. Used for unusual software incompatibilities. Some software may not accept 7200, 12.000 and 14.400 bps or greater result codes.

Register	Default	Function
S28	0	Eliminates the V.32 answer tones for a faster connection.
	8	Default item, all times are in tenths of seconds.
	255	Disables all connections except V.32 at 9600 bps.
S29	20	Sets the duration, in tenths of a second, of the V.21 answer mode fallback timer.
S30	20	Reserved.
S31	128	Volume control for speakerphone.
S32	2	Bit mapped register setup. To set the register, see the instructions for S13.

Bit	Value	Result
0	1	V.8 Call Indicate enabled.
1	2	Enables V.8 mode.
2	4	Disable V.FC modulation.
3	8	Disable V.34 modulation.
4	16	Disable 33.6 kbps support.
5	32	Reserved.
6	64	Reserved.
7	128	Reserved.

Register	Default	Function
S33	0	Bit mapped register setup. To set the register, see the instructions for S13.

Bit	Value	Result
0	1	Disable 2400 symbol rate.
1	2	Disable 2743 symbol rate.
2	4	Disable 2800 symbol rate.
3	8	Disable 3000 symbol rate.
4	16	Disable 3200 symbol rate.
5	32	Disable 3429 rate.
6	64	Reserved.
7	128	Disable shaping.

Register	Default	Function
S34	0	Bit mapped register setup. To set registers, see instructions for S13.

Bit	Value	Result
0	1	Disable 8S-2D trellis encoding.
1	2	Disable 16S-4D trellis encoding.
2	4	Disable 32S-2D trellis encoding.
3	8	Disable 64S-4D trellis encoding.
4	16	Disable non-linear coding.
5	32	Disable TX level deviation.
6	64	Disable Pre-emphasis.
7	128	Disable Pre-coding.

Register	Default	Function
S35-S37		Reserved.
S38	0	Sets an optional delay, in seconds, before a forced hang-up and clearing of the Transmit buffer when DTR drops during an ARQ call. This allows time for a remote modem to acknowledge receipt of all transmitted data before it is disconnected. The modem immediately hangs up when DTR drops. This option only applies to connections terminated by dropping DTR. If the modem receives the ATH command, it ignores S38 and immediately hangs up.

Sportster Flash Specifications

Compatibility	**Data**: ITU-T V.34 (Inc. 33,600bps), V.FC, ITU-T V.32*bis*, V.23, V.22 *bis*, V.22, V.21 and Bell 212A, 103.
	Fax: Send and receive Group III Fax, Class 1, Class 2.0; ITU-T V.17, V.29, V.27 *ter*
Speeds	**Data**: 33.6K, 31.2K, 28.8K, 26.4K, 24K, 21.6K, 19.2K, 16.8K, 14.4K, 12K, 9600, 7200, 4800, 2400, 1200, 1200/75/1200, 300 bps
	Fax: 14.4K, 12K, 9600, 7200, 4800, 2400
Error correction	ITU-T V.42, MNP 2-4
Data compression	ITU-T V.42 *bis*, MNP level 5
Operation	Full/Half duplex on 2 wire telephone line
Format (DTE-DCE)	Serial, binary, asynchronous
Command set	Compatible with the AT command set; Fax mode: EIA 578 Class 1, EIA 592 Class 2.0
Flow control	XON/XOFF, RTS/CTS
Telephone interface	RJ11
Voice coding	IMA ADPCM
Tone detection	DTMF
Call differentiation	Toggle between voice, fax and data
Silence detect	Adjustable level and duration
Dialling	Pulse (pulses 0-9), tone (DTMF 0-9, #, *)
Call status	Dial tone, busy tone, voice detect
Configuration storage	Two modem configurations and four telephone numbers
Transmission level	-10dBm
Reception sensitivity	-43dBm
Operating temperature	From 0 to +50 °C
Storage temperature	From -40 to +70 °C
Transportation temperature	From -40 to +70 °C
Operating humidity	From 20% to 80% without condensation
Storage humidity	From 5% to 90% without condensation
Operating altitude	3000 meters

CE Mark

Electromagnetic Compatibility
This device complies with the following standards in accordance with
the European Directives 89/336/EEC.

- Immunity EN 50082-1 06/92

- Emission EN 55022 class B 08/87

Safety
This device complies with the following standards in accordance with
the European Directives 91/263/EEC
EN 60950/A2 10/93 and EN 41003 08/93
The ports on this modem have the following safety status:

- Telephone line connector = TNV

- All other ports = SELV

These definitions are classified as per safety standard:

EN 60950/A2 10/93.

- SELV: Safety Extra Low Voltage

- TNV: Telecommunications Network Voltage, voltages
in compliance with standard EN 41003 08/93 criteria.

Ringer Equivalence Number (REN)

The modem's REN (Ringer Equivalence Number) is 1.

The total of the RENs of all items connected to one telephone line must
not exceed 4. As long as the total is 4 or less, the ringing
characteristics of the connected items should not be affected.

Limited Warranty

U.S. Robotics warrants to the original end-user purchaser that this product will be free from defects in materials and workmanship for a period of five years from the date of purchase. During the limited warranty period, and upon proof of purchase, the product will be repaired or replaced (with the same or a similar model, which may be a refurbished model) at U.S. Robotics' option, without charge for either parts or labor. This limited warranty shall not apply if the product is modified, tampered with, misused, or subjected to abnormal working conditions (including, but not limited to, lightning and water damage).

THIS LIMITED WARRANTY DOES NOT GUARANTEE YOU UNINTERRUPTED SERVICE. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. U.S. ROBOTICS SHALL IN NO EVENT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, INCLUDING, WITHOUT LIMITATION, LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, LOSS OF DATA OR USE, DAMAGE TO EQUIPMENT, AND CLAIMS AGAINST THE PURCHASER BY ANY THIRD PERSON, EVEN IF U.S. ROBOTICS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

This limited warranty gives you specific legal rights. You may have others, which vary from nation to nation. Some nations do not allow limitations on duration of an implied warranty, or the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you.