

BitSURFR Pro ISDN Modem

User's Guide

MOTOROLA
5000 Bradford Drive
Huntsville, AL 35805-1993

Doc No. 6 457 5041 02 014
August 1996
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5000 Bradford Drive
Huntsville, Alabama 35805-1993

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UPDATES

Updates to the products and the manual are obtainable at participating Motorola dealers and distributors, or directly from Motorola.

FCC REQUIREMENTS

The telephone company may change technical operations or procedures affecting your equipment. You will be notified of changes in advance to give you ample time to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, please contact

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for information on obtaining service or repairs. The telephone company may ask that you disconnect this equipment from the network until the problem has been resolved. If your equipment continues to disrupt the network the telephone company may temporarily disconnect service. If this occurs you will be informed of your right to file a complaint with the FCC.

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

An FCC compliant telephone cord and modular plug are provided with this equipment, which is designed to connect to the telephone network or premises wiring using a compatible modular jack that is Part 68 complaint. See installation instructions for details.

WARNING

This equipment generates and uses radio frequency energy. If not installed and used in accordance with the manufacturer's instructions, it could cause interference to radio and television reception. It has been type tested and complies with the limits for a Class B computing device in accordance with the specifications in Part 15 of the FCC Rules designed to provide reasonable protection against interference in a residential installation. There is no guarantee that interference will not occur. If this equipment causes interference to radio or television, as determined by turning the equipment off and on, the user is encouraged to correct the interference by using the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If necessary, the user should consult the dealer or a radio/television technician for additional suggestions. The following booklet prepared by the Federal Communication Commission is helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

SPECIAL REQUIREMENTS FOR CANADA

Certain requirements exist for data communication products manufactured for use in Canada. Principle among these requirements is the application of the IC label as described below. However, certain data communication products do not require the IC label nor adherence to IC requirements. If this is the case the IC label will not be affixed to the units.

INDUSTRY CANADA (IC) REQUIREMENTS

IC labels are affixed to each unit sold in Canada. This label has the certification number for that particular unit. The numbers are different for each model.

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. IC does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. For their own protection users should ensure that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION

Users should not attempt to make installation connections themselves, but should contact the appropriate electric inspection authority or electrician.

CANADIAN EMISSION REQUIREMENTS

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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Service and Support

Chapter 1

Introduction

WELCOME

The BitSURFR Pro ISDN Modem connects your PC to the Integrated Services Digital Network (ISDN) for high-speed data transfer. ISDN is a digital telephone network that requires the installation of a special line into your home or office. The BitSURFR Pro can be configured and operated using a variety of software and has two standard telephone jacks for connecting telephones, facsimile machines, modems, fax modems or answering machines.

This *User's Guide* contains a detailed description of AT commands and all advanced modes of operation. It contains a section on troubleshooting any problems you may encounter with your BitSURFR Pro, as well as appendices that describe the AT command set, ISDN interfaces, product specifications, and guidelines and forms for ordering ISDN service. For a quick and easy guide to connecting and configuring your new BitSURFR Pro, refer to the accompanying *Getting Started Guide*. For information on installing the Internet access software packaged with your BitSURFR Pro, refer to the "Installing Optional Software" insert included in your documentation bundle.

Note

Unless you are an experienced ISDN user, we recommend that you configure your BitSURFR Pro for additional features (such as Caller ID delivery and security) only after you have successfully installed and used the BitSURFR Pro.

Features

Your BitSURFR Pro includes the following features:

- Data throughput rates up to 11 kilobytes per second
- PPP async-to-sync conversion
- Asynchronous Inverse Multiplexing (AIMux)
- Caller ID number delivery to external Caller ID display unit.
- Caller ID delivery and security features via AT commands
- Call Waiting and Conference Calling compatibility

- Plug and Play compatibility
- V.120 rate adaptation
- ISDN AT command set
- Integrated NT1 device
- Multilink PPP
- Two standard RJ11 telephone jacks for telephone, fax, or modem connections
- Softload support for upgrading the BitSURFR Pro software

Just look at what the BitSURFR Pro will do for you...

Easy Operation

Your BitSURFR Pro makes it easy to benefit from the latest technology. Its menu-driven design and on-screen help options prompt you through each task. If you wish, you can also run the BitSURFR Pro using a concise vocabulary of ISDN AT commands—a kind of simplified shorthand for talking with your new equipment. There's a full index of AT commands in Appendix C of this guide.

Data Communication

Your BitSURFR Pro is a highly advanced digital modem designed to accommodate a wide range of software and protocols. It supports both single-link and multi-link Point-to-Point Protocol (PPP) as well as Asynchronous Inverse Multiplexing (AIMux). Because ISDN is designed for digital data transmission, it is faster, more accurate and more reliable than traditional analog telephone connections.

Analog Communication

Your BitSURFR Pro brings together the operation of up to two additional communication tools. Its dual standard RJ11 telephone jacks (exactly the kind you've been using for years) will allow you to network telephones, answering machines, fax machines, Caller ID display units, or even analog modems. As an added plus, flexible calling options—like Call Waiting or Call Conferencing—are completely compatible with your BitSURFR Pro.

Caller ID Delivery and Security

Your BitSURFR Pro gives you the power to identify and log the telephone numbers of incoming calls received. You can also use the BitSURFR Pro to block unwanted calls from a specific list of numbers, or use it to screen calls, allowing only a favored list of numbers to get through.

On-Going Support

Your BitSURFR Pro is built to last and designed with the future in mind. A “softload” process is built in for automatically upgrading the BitSURFR Pro software with the utmost ease and speed. And if you ever have a problem with your BitSURFR Pro that you can’t solve alone, Motorola’s expert technical support staff is just a fax, e-mail, or phone call away. They’ll be happy to help resolve any problem. To contact Motorola, refer to the “Service and Support” section at the back of this guide.

DOCUMENT CONVENTIONS

Here are a few document conventions you need to know to make the most of this guide:



Note

The Note symbol alerts you to important information and helpful tips.



Caution

The Caution symbol alerts you to possible system-related problems or failures.



Warning

The Warning symbol alerts you to situations which could cause possible injury.

OTHER RESOURCES

You’ll find plenty of information about ISDN benefits and use available for free from the real experts, people like you who use it every day. Try these online resources for the latest updates:

- Motorola’s own BBS. Our number is (508) 337-7304.

- Dan Kegel's informative ISDN page, located on the WWW at <http://alumni.caltech.edu/~dank/isdn/>.
- The FAQ (Frequently Asked Questions) list from the Internet news group at comp.dcom.isdn.
- A catalog of National ISDN Solutions for Selected NIUF Applications, Second Edition, produced by the North American ISDN Users' Forum, available on the Internet by anonymous file transfer protocol, at <ftp://info.bellcore.com/pub/ISDN/CATALOG/>.

COMMON SENSE WARNINGS

Use common sense when you use your BitSURFR Pro or any electrical equipment. Here are a few tips to remember.

Telephone Wiring

If your installation requires that you install or modify telephone wiring, keep the following in mind, especially if you cannot hire an expert:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the telephone interface.
- Use caution when installing or modifying telephone lines.

Lightning Protection

Motorola recommends that you plug your BitSURFR Pro into a power strip that provides surge protection. However, surge protection devices do not offer protection from direct lightning strikes. If you want to ensure complete protection during an electrical storm, then before the storm arrives, you must unplug the BitSURFR Pro from its AC power source and ISDN line, and from all devices connected to it (unless you wish to unplug each of those devices from their AC power sources and any telephone lines connected to them).

Chapter 2

Using Your BitSURFR Pro

Your new BitSURFR Pro is capable of handling a variety of data transfers. The following subsections provide instructions for setting up and using your BitSURFR Pro to perform the most common types of data communications.

TYPES OF CALLS

Your BitSURFR Pro handles two types of calls: data and voice. Data calls transmit information in digital form and are placed from the BitSURFR Pro. Voice calls carry analog communications and are placed via the BitSURFR Pro analog ports with the help of your analog equipment (such as your phone, analog modem, or fax machine). Depending on your ISDN line configuration and the protocol you are using, you may place a call on each B-channel at the same time: one data call using both B-channels together, one data call and one voice call, or two voice calls.



Note

In order for your BitSURFR Pro to accomplish multiple calls at once, it must prioritize use of the ISDN line. For example, if you have both B-channels in use when making a AIMux data call, you will be unable (temporarily) to place a voice call. On the other hand, you will not lose your voice channel when making a multi-link point-to-point protocol (MLPPP) call. In any case, your line must be configured for two B-channels to place or receive two simultaneous calls.

Your BitSURFR Pro can place and receive data calls using a communications software package. To place a voice call, you simply use your telephone or related device exactly like you always have.

PLACING AND RECEIVING A DATA CALL

Using a PC-based Communications Program

In many cases, your communications program will treat your BitSURFR Pro like an analog modem. All you need do is provide your program with the appropriate information to send the call.



Note

You need to verify that your communications program is set to use hardware flow control (RTS/CTS) so that the vast majority of programs will work with these settings.

To prepare your communications program to place BitSURFR Pro ISDN data calls, select **Motorola BitSURFR Pro**, **BitSURFR**, or **TA210** under Modem Command Defaults or Modem Type. If none of these selections is available, then select **Generic Compatible High-Speed** or **Hayes Compatible High-Speed**.

If you choose the Generic or Hayes default setting, then you must replace the initialization string (sometimes referred to as the “originate string”) with an initialization string that matches your configuration requirements. Initialization strings are composed of AT commands; for more information on using AT commands, refer to Chapter 3 of this guide.

Initialization Strings

Initialization strings are AT command strings that are used to configure your BitSURFR Pro. Most communications packages allow you to store an initialization string so the communications program can initialize the BitSURFR Pro before a call is attempted. Before you select the appropriate initialization string, make sure you know the protocol supported by the remote application you will be calling.

Table 2-1 describes the initialization strings for some of the most commonly used protocols: single-link point-to-point protocol (PPP), multi-link PPP, and V.120. Using the following table, identify the type of connection required by your application, and then read across the table to find the appropriate AT command initialization string.

Table 2-1. Protocol Initialization Strings

Type of Connection	Common Applications	Number of Channels	Initialization String
V.120 at 56 kbps	PC-to-PC, PC-to-Mac, Mac-to-PC, and some ISPs	One	AT&F&C1&D2
V.120 at 64 kbps	PC-to-PC, PC-to-Mac, Mac-to-PC, and some ISPs	One	AT&F&C1&D2 %A4=0
Point-to-Point Protocol (PPP) at 56 kbps	Internet	One	AT&F1&C1&D2
Point-to-Point Protocol (PPP) at 64 kbps	Internet	One	AT&F1&C1&D2 %A4=0
Multi-link PPP at 56 kbps per Channel	Internet	Two	AT&F1&C1&D2 @B0=2
Multi-link PPP at 64 kbps per Channel	Internet	Two	AT&F1&C1&D2 @B0=2%A4=0
AIMux at 56 kbps Per Channel	Internet and File Transfer	Two	AT&F2&C1&D2
AIMux at 64 kbps Per Channel	Internet and File Transfer	Two	AT&F2&C1&D2 %A4=0

For example, if you want to use multi-link PPP to access the Internet and your service provider accommodates 56 kbps per channel, the chart tells you to use the following AT command initialization string:

AT&F&C1&D2A2=95@B0=2

Type the command in all upper case, with no spaces or extra characters.

If you want to use multi-link PPP to access the Internet and your service provider accommodates 64 kbps per channel, the chart suggests a similar but slightly longer command:

AT&F&C1&D2%A2=95@B0=2%A4=0

Again, you should type the command in all upper case, with no spaces or extra characters.



Note

The B-channels are capable of supporting up to 64 kbps, but some network B-channels may be limited to a bandwidth of 56 kbps. This should be so stated in the network specifications provided by your ISDN service provider. Due to this limitation, the BitSURFR Pro defaults to 56 kbps. Choose the initialization string based on the line speed your service provider supports.



Note

You need to verify that your Internet software is set to use hardware flow control and PPP. This will allow your BitSURFR Pro and Internet software to connect to the Internet for those service providers requiring Synchronous PPP connections, common for ISDN access.

Also remember:

- Make sure your communications program's baud rate is set to **115.2 kbps** if your software (COM driver and communications program) supports it. Otherwise, set your baud rate to the highest rate supported.
- Make sure your communications program's flow control (or handshaking) is set to **RTS/CTS**. Some communications programs refer to the RTS/CTS setting as "hardware".
- Make any other entries required by your communications program, then follow its operating instructions to place and receive calls. Most programs automatically dial and answer data calls.

Placing a Data Call with a Communications Program

Most communications programs will automatically dial and answer data calls. To initiate a data call using a communications program, the number to be dialed should be stored in the appropriate dialing setup section for the communications program.

To place a **multi-link PPP** call, two telephone numbers separated by an ampersand (&) are required as in the following example:

ATD5551212&5551213

The telephone numbers are provided by the service to which you will connect. Typically, only one number is provided for multi-link PPP; in this case, simply enter the number twice, and make sure the numbers are separated by an ampersand as previously shown.

Using AT Commands Through a PC or Terminal

Use the following procedures if your PC is using a terminal emulation program:

1. Make sure you are in AT command mode. If you are not sure, type **AT** and press **Enter**. If your screen responds with OK, you are in AT command mode.
2. Use the AT dial command (**D**). For example, to dial the number 555-1212, you would enter the following from your PC or terminal: **ATD 555 1212**.
3. After you use the dial command, your system will place the call. If successful, a "Connect" message will be displayed on your screen and your BitSURFR Pro will transition to data mode.

Chapters 3 and 5 of this guide provide more information on AT commands and call placement.

Manual Answering

To answer a data call manually, use the AT answer command (**A**). A RING message will appear on your PC monitor or terminal screen letting you know that you have an incoming call. If the BitSURFR Pro

is set to answer automatically (Rings to Answer is not set to 0), then the call will be answered without any action on your part; otherwise, type **ATA** to accept the call and transition to the data mode.

PLACING AND RECEIVING A VOICE CALL

The voice feature permits you to place analog calls (telephone, fax, or analog modem) to a non-ISDN number or to an ISDN number that has the necessary phone, fax or modem.



Note

You cannot connect a voice call to a BitSURFR Pro (or other terminal adapter or ISDN modem) unless the appropriate device--modem, telephone or fax--is connected at both ends. The analog equipment requirements are the same as if there was non-ISDN telephone service.



Note

Use ISDN SURFR Setup or the AT110 command to verify that the link layer status indicates ACTIVE on the desired voice port. This indicates that the desired BitSURFR Pro voice port is synchronized with the ISDN network.

From Your Telephone

To place a call, do what you're used to doing. Make the call as if you were using a standard phone line.

To answer a call, simply pick up the receiver. If your party hangs up, you will receive a dial tone within ten seconds.

If you have trouble placing a voice call—for example, your telephone has no dial tone or your ISDN modem will not send or receive—go to the link layer status indicator to verify that the voice port in question is active. If it is, the problem may lie with the device attached to that port. If the desired voice port is indicated as anything other than active, or you cannot otherwise get your BitSURFR Pro operating properly at this point, refer to the Troubleshooting section in this guide.

From Your Modem Or Fax Modem

Follow the instructions from your communications program user's guide for placing and receiving calls.

From Your Fax Machine

Send your fax as if you were using a standard telephone line.

From a Modem or Fax Modem Via a Communications Program

Follow the instructions given in your communications program documentation for configuring, placing, and receiving calls.

If you have trouble placing or receiving a voice call, refer to Chapter 14, Troubleshooting Guide in this guide.

RECEIVING CALLER ID INFORMATION

Another feature of the BitSURFR Pro is its ability to deliver Caller ID information when receiving a call to one of the voice ports. The BitSURFR Pro will deliver the date, time and calling party number from either voice port to an external Caller ID box.



Note

Called ID information will not be delivered to a Caller ID box if a voice call is received while both channels are in use by a Multilink PPP call.

It is recommended that the user set the date and time in the BitSURFR Pro before inserting a Caller ID box in the analog line path. The commands to do this are:

AT>D0 = to set the date, and...

AT>D1 = to set the time (24-hour format).

Both command variables must be entered as six-digit numbers. For example:

AT>D0 = 061996 will set the date to June 19, 1996, and...

AT>D1 = 153900 will set the time to 3:39 p.m.

These parameters may also be set in LocalMenu.



Note

ISDN SURFR Setup will set the time and date for you based on your PC's system clock if you enable the applicable checkbox within ISDN SURFR Setup.

WINDOWS 95 DIAL-UP NETWORKING

Use the following procedures to configure Windows 95 Dial-Up Networking for Internet access using your BitSURFR Pro. Dial-Up Networking uses PPP as a transmission protocol and can be configured to access the growing number of Internet Service Providers who utilize PPP as the remote dial-in connection protocol.

Network Protocol Installation

Networking components must be installed in Windows 95 before Dial-Up Networking can be used for Internet Access. These components are installed under the "Network" folder found in the Control Panel. Ensure that "Dial-Up Adapter" and "TCP/IP" are installed before proceeding.

Dial-Up Networking Configuration

Follow the steps below to configure a Windows 95 Dial-Up Networking interface for Internet or Remote LAN access.

1. Open the *My Computer* folder.
2. Open the *Dial-Up Networking* folder.
3. Select the *Connections* menu item and then select "Make New Connection".
4. Enter a name for the connection and chose the BitSURFR Pro device in the *Select a Modem* field.
5. Select the *Configure* button to set properties for the BitSURFR Pro.
6. Under the *General* tab, select the proper COM port you are using and set the *Maximum Speed* to 115200.
7. Select the *Connection* tab. No changes are required for the Connection and Call preferences.

8. Select *Port Settings* and ensure that the FIFO buffer option is checked and then click the OK button.
9. Select *Advanced* and ensure that "Use Flow Control" is checked and that the flow control method is set for Hardware (RTS/CTS).
10. Enter the appropriate commands in the *Extra Settings* field depending on the protocol to be used. Refer to the extra settings chart below for appropriate field entries.

Table 2-2. Protocol Extra Settings Entry

Protocol	Extra Settings Entry
56K V.120	&F&C1&D2
64K V.120	&F&C1&D2%A4=0
56K PPP	&F1&C1&D2
64K PPP	&F1&C1&D2%A4=0
112K MLPPP	&F1&C1&D2@B0=2
128K MLPPP	&F1&C1&D2@B0=2%A4=0
64K AIMux	&F2&C1&D2
56K AIMux	&F2&C1&D2%A4=1

11. Select OK to accept the *Advanced Connection Settings*.
12. Select the *Options* tab. No changes will be required unless a manual login procedure is required by the host device. This will not be required if using point-to-point protocol (PPP) or multi-link point-to-point protocol (MLPPP); however, if the BitSURFR Pro is required to use V.120 protocol, then the *Connection Control* will likely have to be checked for "Bring up terminal window after dialing". This will allow a manual login after the BitSURFR Pro has connected using V.120. Check with the host administrator to see if manual login is required.
13. Select OK to accept the settings displayed in BitSURFR Pro Properties.
14. Select *Next>* and enter the telephone number to be dialed.

15. Select *Next>* and *Finish*.

A new connection interface is now added to the Dial-Up Networking folder.

Additional configuration may be required to ensure proper protocol negotiation to the ISP or remote LAN. Use the following steps for final configuration:

1. Highlight the file created in the *Dial-Up Networking* folder.
2. Select *File* and *Properties* from the menu bar.
3. No changes are required for the telephone number entry unless MLPPP protocol is used. When using MLPPP, a second phone number is required in the Telephone Number field. The second number is the number of the second B-channel to be connected and likely will be the same as the first number. An example of the format is:

5551212&5551212

The minimum requirement for the second number is to repeat the last digit of the first number or enter the least significant uncommon digits. Therefore, to dial 5551212 twice the entry can be abbreviated to “5551212&2”; and then to dial 5551234 and 5556789, the entry would be “5551234&6789”. If using this dial method, the “Use country code and area code” option must be unchecked. If left checked, Windows 95 will not retain the ampersand (&) character in the dial string when dialing unless it is manually inserted before each and every dial attempt. Remember to add the area code and dialing prefix if required.

4. Select the *Server Type* option.
5. Configure *Server Type* options as required for your application. For Internet access applications the server type will be “PPP, Windows 95, Windows NT 3.5, Internet”, all “Advanced options” unchecked, and “Allowed Network Protocols:” set for TCP/IP only.
6. Select the “TCP/IP Settings”. Use default settings unless otherwise instructed by your service provider.

7. Select OK.
8. Select OK at the *Server Type* window.
9. Select OK at the main configuration window.

Configuration for Dial-Up Networking is now complete.

Dialing

From the *Dial-Up Networking* folder, double-click the file created for Internet or remote LAN access. The *Connect To* window will appear. Enter the assigned user name and password for your account and then select Connect. The BitSURFR Pro will dial and connect to the host device and start PPP negotiation automatically. If this fails, see Chapter 14, Troubleshooting Guide for possible solutions.

Resetting Your BitSURFR Pro

Your BitSURFR Pro should be in AT command mode when you receive it. However, if you enter an AT command but receive no response from the BitSURFR Pro (i.e., you do not get an OK or error message), or if you are using ISDN SURFR Setup and it reports that the terminal adapter is not responding, you are probably not in AT command mode. If this happens, you need to reset your BitSURFR Pro card.

To reset your BitSURFR Pro, locate the four-position switch on the rear panel, place switch position 4 in the ON position, and then remove and reapply power to the unit.

Chapter 3

AT Command Operation

GENERAL

This chapter explains how to use the AT commands to operate and configure the BitSURFR Pro ISDN modem. Chapter 4, Option Configuration discusses configuration and operation commands in detail. Additionally, the entire BitSURFR Pro AT Command Set is contained in Appendix C.



Note

You must use a terminal emulation mode from your communications software package to enter AT commands.

AT COMMAND STATEMENT

You must type the command statement in a specific form for the BitSURFR Pro to recognize and follow the instruction. The command statement begins with the letters **AT** (indicating ATtention). This is followed by one or more commands which can each consist of a sequence of keyboard symbols such as & and %, letters, or numbers, and is then followed by a carriage return (the **Return** key) or end-of-line character.

AT COMMAND MODE

You can issue AT commands only when the DTE port (*also referred to as the Data port*) is configured for AT command mode. Normally, the DTE port is in AT command mode whenever it is off-line. If you type **AT**, press **Return** and the response is **OK**, you are in AT command mode. After the BitSURFR Pro connects with another ISDN modem and goes into the on-line data mode, characters sent to the BitSURFR Pro by your computer are interpreted as data (not as commands) and are transmitted to the remote ISDN modem.

ESCAPE SEQUENCE + + +

If the BitSURFR Pro is in data mode, the escape sequence will return the BitSURFR Pro to AT command mode and remain on-line. The escape sequence consists of a pause (normally 1 second), three escape

characters, and then another pause. The default escape sequence characters are:

+ + +

The escape sequence character is set by the S2 command and can be changed if necessary. If there is a possibility that the data being transferred may contain the escape sequence, you can disable the escape sequence to prevent any possibility of false escapes from data mode into AT command mode.

Once you have escaped to AT command mode using the escape sequence, you can now enter AT commands. The ATO command returns the BitSURFR Pro to the data mode.

CREATING A COMMAND STATEMENT AT

Use the following steps to create a command statement:

1. Type **AT** and the command string.
2. Press the **Return** key to send the command statement to the BitSURFR Pro.

The following is an example of a command statement using the dial command (D):

ATD555-1212

This statement can be read as "Attention: dial 555-1212".

Here's another example of a command statement:

AT>Z

This command statement means "Attention: reload switch parameters and restart the ISDN network."

After entering a command line, the BitSURFR Pro either returns a response message indicating whether or not the command was accepted, or gives the data requested by the command line.

The AT command also sets some of the data parameters--namely the port speed, parity, stop bits, and bits per character--to match your computer. This process is repeated each time the AT prefix is typed.

COMMAND STATEMENT GUIDELINES

When typing command statements, the following rules apply:

- The attention code (AT) may be upper or lower case, but not a combination like "aT".
- The **Return** key must be pressed to execute (enter) a command.
- The command buffer can hold up to 128 characters including spaces.
- The backspace or delete key erases the last character (depending on your terminal).

DTE CHARACTER ECHO E

As commands are typed, they normally appear on your monitor so you can verify the input. This is called *local character echo*. To determine if echo is set properly, type **AT**. If the terminal displays **AT**, echo is set correctly. If it displays **AATT**, then disable echo by typing **ATE** and press **Return**. If the terminal does not display the AT at all, enable echo by typing **ATE1** and press **Return**. The echo option only affects command mode operation.

COMMAND STATEMENT BUFFER

The BitSURFR Pro temporarily stores up to 128 characters in a buffer. If you attempt to enter more than 128 characters, the BitSURFR Pro will ignore everything after the first 128. To correct this condition, retype the command using 128 characters or less.

The characters used by the AT command interpreter to represent end-of-line, line feed, and backspace are set respectively by the **S3**, **S4**, and **S5** AT commands and can be changed if necessary.

The punctuation used in telephone numbers takes up space in the buffer, as do spaces. For example, the dash (-) in 555-1212 represents a punctuation in a telephone number.

BACKSPACE KEY

Use the backspace key to change the command statement or correct errors. The backspace key allows the cursor to be moved back to the character(s) in error. The command can then be retyped from that point.

For example: **ATD5551211** has been typed. To change the last 1 to 2, press the **backspace** key once, type **2**, and press **Return** to execute the command.

REPEATING A COMMAND A/

This command tells the BitSURFR Pro to repeat the last command stored in its buffer. The command is automatically executed without any need to retype the command or press the **Return** key.

For example: The **ATD5551212** command has been executed, and the phone is busy. To repeat the instruction, type **A/**, but do not use **AT** before this command because **AT** would empty the command string buffer and the **A/** command would not execute.

VOICE PORT COMMANDS *X

Some options may be configured for the voice port in addition to the data port. To use an AT command to configure a voice port, enter an asterisk (*) followed by a **1** or **2** (designating voice port 1 or voice port 2) immediately after the AT. The following example shows enabling Caller ID logging for voice port 1.

AT*1@N0=1

DISPLAYING AN OPTION VALUE ?

To display the value of a configuration option, follow the command with a question mark. For example, to display the DTE speed, enter:

AT@P2?

Alternately, you may enter **AT@P2=?** which is equivalent to the above command.

NUMBERED COMMANDS

Commands starting with the same letter are distinguished by a number following the letter.

For example, the **E0** command selects echo off, and the **E1** command selects echo on.

GROUP COMMANDS

A group of commands can be typed in a single command statement. Pressing the **Return** key sends the entire command string to the BitSURFR Pro. The BitSURFR Pro executes each command individually in the order it appears in the command statement, reading from left to right.

For example, the command statement **ATQ0V1D5551212** means:

- **AT** Attention
- **Q0** Allow status messages to be sent
- **V1** Select verbose messages
- **D5551212** Dial 555-1212

The BitSURFR Pro executes the AT command followed by the **Q**, **V**, and **D** commands, and returns the response message corresponding to the last command on the line. If an error is encountered in a command line, subsequent commands on the same line are ignored.

Some commands use special formats or have special rules concerning their use. For example, the dial **D** command initiates the dial process so that only dial modifier commands can follow the **D** command.

DISPLAYING HELP &H

The BitSURFR Pro contains an AT Command Help feature accessed by using the **&H** command. The **&H** command has two forms. If **&H** is entered without an = sign, help is displayed for all AT commands. If **&H** is entered with an = sign followed by a list of AT commands separated by commas, help will be displayed for each command listed. For example, to display help for the **&V**, **!C0**, and **!C1** commands, enter:

AT&H=&V,!C0,!C1

If the help information requires more than one screen, then the following message will be displayed:

--- SPACE to continue, A to abort, or C for continuous display ---

If you press the spacebar, the next screen of information will be displayed. If you press the "A" key, then the display of help information will be aborted and an "OK" message will be returned. If you press the

"C" key, then help information will be displayed continuously without prompting at the end of each screen.

COMMAND SCOPE

Command scope refers to the extent of a command's effect on the BitSURFR Pro. All AT commands have a scope of Global, Channel, or Port.

Global commands affect the BitSURFR Pro as a whole, potentially disrupting operation on all of the ports and channels. Use a global command cautiously (or not at all) if there are active calls on any port.

Channel commands affect only the B1, B2, or D-channels of the BitSURFR Pro. Use a channel command cautiously if there are active calls on any port.

Port commands affect only the operation of the DTE port or voice port.

CONFIGURING USING AT COMMANDS

To use the AT commands to configure your BitSURFR Pro, you must use a terminal or the terminal window of your communications software program.

Table 3-1 is a step-by-step sequence of the actual AT commands used to configure switch options for the BitSURFR Pro.

Table 3-1. BitSURFR Pro Configuration Using AT Commands

Step	AT Command	Explanation
1	AT>F	Sets Switch and Global parameters to factory default.
2	AT!C0= <i>n</i>	This is the Switch Type. For <i>n</i> , enter 0 AT&T 5ESS 1 Northern Telecom DMS-100 2 National ISDN 1 (NI-1) <i><default></i>
3	AT!C1= <i>n</i>	This is the switch version. For <i>n</i> , enter 0 AT&T Point-to-Point 1 AT&T Multi-Point 2 DMS100 PVC IC-0 3 DMS100 PVC IC-1 4 National ISDN 1 (NI-1) <i><default></i>

Table 3-1. BitSURFR Pro Configuration Using AT Commands

4	AT!C6=x...x	This is the data SPID. For x...x, enter the SPID value up to 20 digits in length. <i>default is null</i>
5	AT!N1=x...x	This is the data Directory Number (DN). For x...x, enter the DN value up to 20 digits in length. <i>default is null</i>
If the Voice SPID and DN are not required, then skip steps 5 through 8.		
6	AT*1!C6=x...x	This is the Voice 1 SPID. For x...x, enter the SPID value up to 20 digits in length. <i>default is null</i>
7	AT*1!N1=x...x	This is the Voice 1 DN. For x...x, enter the DN value up to 20 digits in length. <i>default is null</i>
8	AT*2!C6=x...x	This is the Voice 2 SPID. For x...x, enter the SPID value up to 20 digits in length. <i>default is null</i>
9	AT*2!N1=x...x	This is the Voice 2 DN. For x...x, enter the DN value up to 20 digits in length. <i>default is null</i>
Step 9 is required for proper operation.		
10	AT>W>Z	Saves switch parameters to stored profile and restarts the network.

To review the switch configuration, use the following steps:

1. Enter **AT!C0?** and press **Return**.
2. Enter **AT!C1?** and press **Return**.

To review all of the SPIDs and DNs you have entered, enter the **AT>V=C** command and press **Return**.

Now, that you have successfully used the AT commands to configure the switch options for your ISDN line, you are ready to establish ISDN connection.

1. To make sure that you are in AT command mode, type **AT**, then press **Return**. You should receive an **OK** response.

2. Type **ATI8** and press **Return**. The screen that appears identifies the BitSURFR Pro's features and other details about your BitSURFR Pro ISDN modem.
3. Next, type **AT&F** and press **Return** to configure the BitSURFR Pro to connect to the ISDN Motorola Bulletin Board Service (BBS). Make sure that you type the command string in ALL uppercase or ALL lowercase.
4. To connect to ISDN Motorola BBS, type **ATDT15083377304** and press **Return**.

Chapter 4 Option Configuration

GENERAL

This chapter explains how to configure BitSURFR Pro parameters to fit your application. Each configuration option is grouped by function; associated commands are provided to the right of the headings. PPP, AIMux, BONDING, V.25bis dialer, and Caller ID delivery and security options are also discussed in detail in their respective chapters.

CONFIGURATION COMMANDS

Configuration commands are issued either by LocalMenu or AT commands. If you need more information about the format and operation of AT commands, refer to Chapter 3 in this guide. If you wish to use LocalMenu to configure your BitSURFR Pro, refer to the *Getting Started Guide* for step-by-step instructions.

CONFIGURATION OPTIONS

The BitSURFR Pro supports a number of configuration options. The parameter values of each option can be saved in memory (stored profiles) and retained even when the unit is powered off.

The BitSURFR Pro's nonvolatile memory is used for stored profiles and stored telephone numbers.

CONFIGURATION PROFILES

The BitSURFR Pro contains three sets of configuration options:

- *Factory defaults* (also referred to as factory profiles) are stored permanently in the BitSURFR Pro.
- *Active settings* (also referred to as active profiles) are stored temporarily in the BitSURFR Pro.
- *Custom settings* (also referred to as stored profiles) are stored in nonvolatile memory.

These option storage methods are called profiles. To prevent accidental changes, the ISDN network options are stored separately from other options and can be saved, loaded, or reset only by using the switch, store, and load commands.

Active Profile

The active profile holds the current configuration option settings and is used by the BitSURFR Pro for all operations and functions. When options are changed, the active profile is changed.

 **Note**
*The active profile is lost when the BitSURFR Pro is unplugged or loses power. The stored profile is loaded into the active profile according to the **&Y** command setting when the BitSURFR Pro is plugged in.*

Stored Profiles

When the most suitable active configuration is established, it can be saved in a stored profile to be recalled on powerup or loaded back into the active profile at any time. There are two stored profiles available, referred to as *Stored Profile 0* and *Stored Profile 1*.

Factory Profile

The factory profiles are permanently stored in the BitSURFR Pro, and can always be loaded into the active configuration. Figure 4-1 illustrates how the active, stored and factory profiles interact.

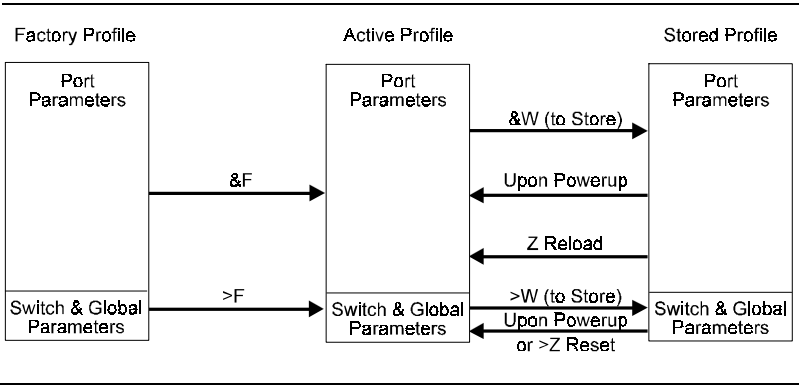


Figure 4-1
Profile Storage and Recall

Changing the Configuration While On-line

The value of any configuration option can be changed while the BitSURFR Pro is on-line. However, changes to switch options do not take effect until the new configuration is saved by entering the **>W** command and the network is reset by entering the **>Z** command.

LOADING AND SAVING CONFIGURATION

The active profile you create can be stored or the factory default profile can be loaded and saved in order to change the BitSURFR Pro's operating configuration.

Powerup Stored Profile

Use the **&Y** command to instruct the BitSURFR Pro which stored profile to load when power is applied, or when the Data Terminal Ready (DTR) reset (**&D3**) option is in effect.

Command	Operation
&Y0	Loads active from stored profile 0 upon powerup or DTR reset.
&Y1	Loads active from stored profile 1 upon powerup or DTR reset

Loading Stored Profile **Z** and **>Z**

Use the **Z** command to load the port options or the **>Z** to load the switch options from the stored profile.

Command	Operation
Z0	Loads the active profile port options from stored profile 0 (except switch options).
Z1	Loads the active profile port options from stored profile 1 (except switch options).
>Z	Loads the active profile switch options from the stored profile and restarts the network.

Loading Factory Profile **&F** and **>F**

Use the **&F** and **>F** commands to load the active port and switch profiles from the Quick Setup factory profile



Note

Reloading the factory switch profile will overwrite the current switch configuration.

Command	Operation
&F1	Loads the active profile port options from the Quick Setup factory profile 1 (except switch and global options).
&F2	Loads the active profile port options from the Quick Setup factory profile 2 (except switch and global options).
&F3	Loads factory default port options from the Quick Setup factory profile 3 (except switch and global options).
>F	Loads the active profile switch and global options from the factory default profile.

The Quick Setup factory default profiles are industry standard for compatibility with most PCs and communications links. They are stored permanently in the BitSURFR Pro and you cannot modify them. The Quick Setup factory default profiles are listed in Appendix D.

Saving the Active Profile &W and >W

The BitSURFR Pro performs many functions based on configuration values located in the active profile. Selected active profile values can be changed with AT commands to meet current system requirements.

Some active port profile values can be changed and then saved in the stored profile using the **&W** command. When power is applied to the BitSURFR Pro, it automatically loads the stored profile into the active profile. This can save time once a proven configuration is established. The **>W** command stores switch values for use when power is reapplied.

Command	Operation
&W0	Stores active profile to stored profile 0 (except switch and global options).
&W1	Stores active profile to stored profile 1 (except switch and global options).
>W	Stores switch and global options to stored profile.

DISPLAYING CONFIGURATION AND INFORMATION

The port, switch, and global configuration can be displayed using view commands. This is a convenient way to review your BitSURFR Pro configuration without having to display the value for each individual option.

Display Port Configuration &V

To display the current port configuration use the **&V** command. This command is helpful in determining if the BitSURFR Pro is configured properly for your PC or terminal.

Command	Operation
&V	Display port configuration options (except for V.120 and stored dial strings)
&V=E	Display V.120 configuration options
&V=Z	Display stored dial strings

Display Global Configuration >V=G

To display the current global configuration options, use the **>V=G** command. The **>V=G** command displays the switch configuration as well as parameters relating to provisioning. This command is helpful in determining if the BitSURFR Pro is configured properly for the network.

Display DN, SPID, and TEI >V=C

To display the current DN, SPID, and TEI values, use the **>V=C** command. This command is helpful in determining if your BitSURFR Pro is configured properly for your network.

Display Product Information

Use the **I** command to display product information.

Command	Operation
I0	Product ID ("960")
I1	ROM checksum
I2	ROM checksum verification
I3	Firmware revision
I4	Numeric capability string
I8	Verbose capability string
I9	Plug-and-Play ID (use for Plug-and-Play operating systems)
I10	Displays ISDN link layer status.

DATE AND TIME

The BitSURFR Pro can keep the date and time internally. This date and time will be displayed on an analog Caller ID box when an incoming call is received on one of the BitSURFR Pro's analog ports.

Set the Date and Time

The date is a six-digit value that includes the month, date and year (MM/DD/YY). The time is a six-digit value that includes the hour, minute and second (HH:MM:SS). The time must be entered in 24-hour clock format.

When the BitSURFR Pro is first powered up, the time will begin incrementing from 00:00:00, and may be used to keep the elapsed time. When you enter the correct date and time, the BitSURFR Pro will keep the accurate date and time until the BitSURFR Pro loses power.

Command	Operation
>D0=	Sets the date
>D1=	Sets the time

CONFIGURATION OPTIONS

The following sections describe each of the configuration options. For each section, the AT commands associated with the option are provided to the right of the option heading name.

ISDN Network Options

To program the ISDN network options, you must have the Terminal Endpoint Identifiers (TEIs) that are usually automatically assigned within the equipment, Service Profile Identifier (SPID), and Directory Numbers (DNs) agreed upon with the telephone company at subscription time. You must also know the central office switch type. Refer to Appendix B for instructions on how to order your ISDN service if you have not already done so. Configuration information will be provided to you at the time of installation.

Ideally, you should first set the network options to a known state (factory default settings). This can be done by using the **>F** command to reset all of the network parameters to factory defaults or by using the **!C0=x** command to set the network switch type. If the **>F** command is used, the network switch type needs to be set. The BitSURFR Pro does not use network options that have been changed, until the options are saved to the stored profile (**>W**) and the network has been restarted (**>Z**). This means that at the end of setup (i.e., changing any of the network options), enter the **>W** command to save the network options to the stored profile and enter the **>Z** command to restart the network using the new network options.

Network Switch Type **!C0**

To make voice or data calls with the BitSURFR Pro, the unit must be configured to match the central office switch type of the ISDN line that is being used. The following table lists switch types supported by the BitSURFR Pro.

Note

Changing the switch type causes all of the other switch options to be set to their factory default settings.

Command	Operation
!C0=0	AT&T 5ESS.
!C0=1	Northern Telecom DMS-100
!C0=2	National ISDN-1 (NI-1)*

* default

Switch Software Version !C1

These commands select the software version that the central office switch is using when the network switch type is set for AT&T 5ESS (**AT!C0=0**)

Command	Switch Type
!C1=0	AT&T Point-to-Point
!C1=1	AT&T Multi-Point*

* default

These commands select the software version that the central office switch is using when the network switch type is set for Northern Telecom DMS100 (**AT!C0=1**).

Command	Switch Type
!C1=2	DMS100 PVC IC-0
!C1=3	DMS100 PVC IC-1*

* default

These commands select the software version that the central office switch is using when the network switch type is set for National ISDN-1 (**AT!C0=2**).

Command	Switch Type
!C1=4	National ISDN-1 (NI-1)*

*default

SPID (Service Profile Identifier) !C6, *1!C6, *2!C6

Your ISDN service provider will provide you with a SPID number when you subscribe. Your SPID identifies the set of service or feature options associated with your line. The following table lists the valid SPID requirements with respect to switch type. The BitSURFR Pro will validate your SPID number based on these requirements.

Switch Type	Length	Valid Characters
AT&T	0 to 20 characters	numerals 0 to 9
Northern Telecom DMS100	0 to 20 characters	all printable characters
National ISDN-1 (NT-1) (includes Siemens)	9 to 20 characters	numerals 0 to 9

Use the following AT commands to enter your SPID numbers:

Command	Operation
!C6=	Sets the data SPID number
*1!C6=	Sets the voice 1 SPID number
*2!C6=	Sets the voice 2 SPID number

**Note**

Your SPID number may or may not resemble your Directory Number. Each ISDN service provider will have their own scheme for assigning SPID numbers.

DN (Directory Number) !N1, *1!N1, *2!N1

The DN is provided to you by your ISDN service provider when you subscribe. It is the “phone number” for the port it is associated with. The following table lists the valid DN requirements with respect to the switch type. The BitSURFR Pro will validate the DN based on these requirements.

Switch Type	Length	Valid Characters
AT&T	0 to 24 characters	numerals 0 to 9, *, #
Northern Telecom DMS100	0 to 24 characters	numerals 0 to 9, *, #
National ISDN-1 (NI-1)	0 to 15 characters	numerals 0 to 9

The following AT commands are used to enter the DNs:

Command	Operation
!N1=	Sets the data DN
*1!N1=	Sets the voice 1 DN
*2!N1=	Sets the voice 2 DN

TEI (Terminal Endpoint Identifier) !D3, *1!D3, *2!D3

The terminal endpoint identifier (TEI) is a number used by the central office switch to uniquely identify each device that may be connected to the ISDN.



Note

In most cases the TEI assignment is automatic (dynamic). Thus, you will not have to enter a TEI into your BitSURFR Pro. If the TEI is fixed (or manual), your ISDN service provider will supply you with this number when you subscribe.

TEI Value	Meaning
0 - 63	Fixed or Manual TEI number
255	TEI will be automatically assigned *
127	Disables port

*default

The following AT commands are used to enter the TEI numbers:

Command	Operation
!D3=	Sets the data TEI number
*1!D3=	Sets the voice 1 TEI number
*2!D3=	Sets the voice 2 TEI number

FLEXIBLE CALLING COMMANDS

The following commands configure feature values for Flexible Calling. In most cases, the values need not be changed from the defaults.

**Note**

If you are a Pacific Bell customer, refer to Chapter 7, Flexible Calling for the required values.

Command	Operation
!V3=	Conference Feature Value, range: 1-63, <i>default (60)</i>
!V4=	Drop Feature Value, range: 1-63, <i>default (62)</i>
!V5=	Transfer Feature Value, range: 1-63, <i>default (61)</i>
!V8=	Message Waiting Value, range: 1-63, <i>default (63)</i>

PORT OPTIONS

These options determine how the data and voice ports communicate on the ISDN line used by your BitSURFR Pro. The majority of options apply only to the data port. Unless explicitly designated, you may assume an option applies only to the data port.

Rate Adaption Protocol Selection %A2

The %A2= commands select the rate adaption protocol.

Command	Operation
%A2=0	Clear channel with no protocol
%A2=2	V.120 rate adaption protocol*
%A2=3	BONDING protocol
%A2=3&M	AIMux protocol
%A2=95	Point-to-Point protocol

* default

**Note**

Both the local ISDN modem (BitSURFR Pro) and remote ISDN modem must be set to the same rate adaption protocol. Also, %A2=0 (clear channel) is synchronous mode only. Asynchronous data should be passed using the V.120 or AIMux rate adaption protocols. The AIMux

command is actually the BONDING command (%A2=3) combined with the asynchronous DTE data mode command (&M).

V.120 Configuration %E

This command customizes the V.120 protocol. Typically, the factory default settings for the V.120 protocol work in almost all applications. The following settings can be modified for special applications.

Command	Operation
%E0=	V.120 maximum transmit frame size Range: 1-260 default (256) <i>See note below.</i>
%E1=	V.120 maximum receive frame size Range: 1-260 default (260)
%E2=	V.120 window size Range: 1-127 default (8)
%E3=	V.120 T200 transmission timer Range: 1-255 default (10)



Note

*Some ISDN modems can only accommodate 128 byte V.120 transmit frame sizes. If your call disconnects when using V.120 protocol, set the V.120 maximum transmit frame size to 128 by entering **AT%E0=128**.*

Rate Multiplier @B0

This command selects the number of B-channels (1 or 2). It is typically used in conjunction with the BONDING, AIMux, and PPP options. Refer to Chapter 8, Asynchronous Inverse Multiplexing Protocol, Chapter 9, Point-to-Point Protocol, and Chapter 11, BONDING Protocol for more details.

Command	Operation
@B0=1	Selects one B-channel (56 or 64 kbps)*
@B0=2	Selects two B-channels (112 or 128 kbps)

* default

Authentication Protocols (PAP and CHAP) @M2

These commands allow you to choose authentication schemes used by PPP servers to validate the identity of the originator of the connection. After establishing a link and enabling the Password Authentication Protocol (PAP) or the Challenge-Handshake Authentication Protocol (CHAP), your Internet package will require you to enter a password to be authenticated by the host. This password can be entered using the dial-string modifier >P="password". For additional information on PAP and CHAP, see "Authentication Protocols (PAP & CHAP)" on page 9-4.

Command	Operation
@M2=N	Disables PAP
@M2=P	Enables PAP*
@M2=C	Enables CHAP-MD5
@M2=M	Enables CHAP-MS (<i>Microsoft</i>)

* default

CHAP Respond Mode @M20**Note**

CHAP Respond Mode should only be used with the Windows 95 operating system. CHAP-MS does not support CHAP Respond Mode.

This command is used with the Challenge-Handshake Authentication Protocol (CHAP). It is used to ensure the BitSURFR Pro responds to all challenge messages by using the provided password and the built-in algorithm. This password (up to 30 characters) must be the same as the password that you have entered in your Windows 95 Dialer.

Command	Operation
@M20="password"	Provides your password to the Internet package. <i>default=0</i>
@M20=""	Clears the password



Note

It is highly recommended that you use the Dial String Modifier (>P="password") to provide your password, and not the @M20 command. If the Dial String Modifier is provided and you enter the @M20="password" command, the password in the Dial String Modifier takes precedence.



Note

The Respond Mode parameter is stored in nonvolatile memory and remains active even after the BitSURFR Pro is powered off. Once the Respond Mode command @M20="password" has been issued, Respond Mode will remain active for CHAP until the @M20="" command is entered to clear the password.

B-Channel Speed %A4

This command selects the B-channel speed. The B-channels are capable of supporting up to 64 kbps, but some network B-channels may be limited to a bandwidth of 56 kbps. This should be so stated in the network specifications provided by the telephone company. Due to this limitation, the BitSURFR Pro defaults to 56 kbps.

Command	Operation
%A4=0	B-channel speed is 64 kbps
%A4=1	B-channel speed is 56 kbps*

* default

Rings To Answer S0

This command instructs the BitSURFR Pro on which ring to answer an incoming data call. If this value is set too high, the calling unit may "time out" before the call is answered. The BitSURFR Pro will *not* automatically answer the call if the value is set to "0".

Command	Operation
S0=	Range: 0-255 default (1)

Ring Count S1

This command is read only. It returns the current ring count, and is "0" if the phone is not ringing. The count remains for eight seconds after the last ring.

Command	Operation
S1?	Display the ring count.

Wait for Connection S7

This command instructs the BitSURFR Pro how long it should wait for a connection. If the connection is not complete within this amount of time, a **NO CARRIER** message is returned.

Command	Operation
S7=	Range: 0-255 <i>default (30)</i> Units = seconds

Speech Call Answer Option %A93

This command instructs the BitSURFR Pro as to whether to answer an incoming data call as a speech Bearer Capability (BC) call.

Command	Operation
%A93=D	Do not answer*
%A93=E	Answer

* *default*

3.1kHz Audio Call Answer Option %A94

This command instructs the BitSURFR Pro as to whether to answer an incoming data call as a 3.1kHz audio Bearer Capability (BC) call.

Command	Operation
%A94=D	Do not answer*
%A94=E	Answer

* *default*

Data Call Answer Option %A95

This command instructs the BitSURFR Pro as to whether to answer an incoming data call as a data Bearer Capability (BC) call.

Command	Operation
%A95=D	Do not answer
%A95=E	Answer*

* default



Note

The BitSURFR Pro voice port will answer speech or audio calls only. The voice port answer options are not configurable.

Echo Disable Tone %A96

This command instructs the BitSURFR Pro whether or not to generate an Echo Disable Tone. When selected, the BitSURFR Pro will send a tone at the beginning of the data call that will disable the echo canceller.

Command	Operation
%A96=0	Disables echo tone*
%A96=1	Enables echo tone

* default

Dialing Method %A97

This command instructs the BitSURFR Pro as to the type of dialing method used when placing a data call. In most cases, the default of Enbloc is correct. However, in some instances, it may be necessary to change to Overlap Dialing for the call to complete properly.

Command	Operation
%A97=O	Overlap
%A97=E	Enbloc*

* default

Data Port Originate Mode %A98

This command alters the Bearer Capability (BC) sent to the switch in placing outgoing data calls. Placing an outgoing data call with voice BC (or 3.1 kHz audio) may sometimes facilitate the completion of a call through a network that may not necessarily accommodate data end-to-end mode. The answering unit must be able to receive a voice BC call as if it were a data BC call.

Command	Operation
%A98=D	Originates with data BC*
%A98=A	Originates with 3.1 kHz audio BC
%A98=S	Originates with voice BC

* default

Voice Port Originate Mode *1%A98, *2%A98

This command has the same effect as the %A98 command for the data port except that the voice port cannot be configured to originate with data BC.

Command	Operation
*0%A98=A	Originates with 3.1 kHz audio BC
*0%A98=S	Originates with speech BC *

* default

TERMINAL INTERFACE AND PIN OPTIONS

These options affect the interface between the BitSURFR Pro and your computer. They select the format of the data sent to your computer, and the operation of the pins on the DTE interface with your computer.

DTE Data Mode &M

An important consideration in configuring the BitSURFR Pro is the type of interface with your computer. There are two basic types of interface: asynchronous and synchronous.



Note

The BitSURFR Pro cannot operate in synchronous mode if attached to a PC (unless an add-in synchronous card has been installed in your PC) or asynchronous terminal. The BitSURFR Pro's synchronous features are designed primarily for various commercial applications.

The BitSURFR Pro supports an asynchronous mode (the default) and two synchronous modes. BitSURFR Pro operation in synchronous mode is described in Chapter 10.

The **&M** command used in conjunction with the BONDING command (**%A2=3**) configures the BitSURFR Pro for AIMux operation.

Command	Operation
&M	Asynchronous mode*
&M1	Synchronous mode 1
&M2	Synchronous mode 2

* default

DTR Detect Time S25

This command specifies the time (in .01 second increments) that DTR must stay low to be recognized. Also, in Sync Mode 1 (**&M1**) the DTR detect time is the amount of time (in seconds) between when a call connects and when the BitSURFR Pro begins to monitor the DTR pin.

Command	Operation
S25=	Range: 0-255 <i>default (5)</i> Units = 1/100 seconds

DTE Speed @P2

This command sets the speed at which your computer operates. The AT command processor normally detects the DTE speed and parity automatically.

Command	Operation
AT@P2=300	300 bps
AT@P2=1200	1200 bps

Command	Operation
AT@P2=2400	2400 bps
AT@P2=4800	4800 bps
AT@P2=9600	9600 bps
AT@P2=19200	19200 bps
AT@P2=38400	38.4 kbps
AT@P2=48000	48 kbps
AT@P2=56000	56 kbps
AT@P2=57600	57.6 kbps
AT@P2=64000	64 kbps †
AT@P2=112000	112 kbps
AT@P2=115200	115.2 kbps*
AT@P2=128000	128 kbps †

* default

† disables autobaud

DTE Parity @P3

This command sets the DTE parity. The AT command processor, in most cases, will detect the DTE speed and parity automatically.

Command	Operation
@P3=N	No parity*
@P3=O	Odd parity
@P3=E	Even parity
@P3=M	Mark parity

* default

DTE Number of Data Bits @P4

This command sets the number of data bits your computer uses.

Command	Operation
@P4=7	7 data bits
@P4=8	8 data bits*

* default

DTE Number of Stop Bits @P6

This command sets the number of stop bits your computer uses.

Command	Operation
@P6=0	One stop bit*
@P6=1	One and one-half stop bits
@P6=2	Two stop bits

* default

Flow Control Options \Q

This command controls the flow of data when the BitSURFR Pro and your computer are set to different asynchronous speeds or when using V.120 protocol in asynchronous mode. If the DTE speed is faster than the BitSURFR Pro speed, flow control will stop data transmission when the BitSURFR Pro buffers are full. When buffer space becomes available, flow control instructs your computer to resume transmitting data. The opposite will happen if the BitSURFR Pro speed is faster than the DTE speed.

The \Q1 command enables bidirectional XON/XOFF flow control. The BitSURFR Pro sends an XOFF (**DC3**) character to your computer to stop data transmission and sends an XON (**DC1**) character when transmitting can resume. Your computer can also send an XOFF character to tell the BitSURFR Pro to stop transmitting and an XON character when transmitting can resume.

The \Q2 command enables unidirectional CTS flow control. The BitSURFR Pro turns CTS off causing your computer to stop transmitting and turns CTS on when your computer can resume transmitting.

The \Q3 command enables bidirectional RTS/CTS flow control. The BitSURFR Pro can turn CTS on and off, causing your computer to start and stop transmitting. Your computer can turn RTS on and off causing the BitSURFR Pro to start and stop transmitting.

The \Q4 command enables unidirectional XON/OFF flow control. The BitSURFR Pro sends an XOFF character to your computer to stop transmitting and sends an XON character to resume transmitting.

Command	Operation
\Q	Flow control off
\Q1	DTE/DCE XON/XOFF flow control
\Q2	DTE CTS flow control
\Q3	DTE/DCE RTS/CTS flow control*
\Q4	DTE XON/XOFF flow control

* default

Data Carrier Detect (DCD) &C

This command controls the DCD output (pin 8) in asynchronous mode. There are three choices: *Always On*, *Normal*, and *Always On Except During Disconnect*.

- *Always On* (default) - Use the **&C** command to force DCD to always be on.
- *Normal* - Use the **&C1** command to specify that DCD remains off until the BitSURFR Pro recognizes the remote BitSURFR Pro's carrier signal and the rate adaption protocol (if any) is established.
- *Always On except during disconnect* - Use the **&C2** command to force DCD to always be on except during a disconnect. The **S10** command determines how long the DCD signal will remain off after a disconnect.

Command	Operation
&C	DCD always on*
&C1	DCD goes on when the BitSURFR Pro establishes a connection
&C2	DCD always on except during S10 disconnect

* default



Note

During synchronous data mode operation, the DCD output behaves as if it were in normal mode regardless of the &C option setting.

Data Carrier Detect (DCD) Drop Time S10

This command controls the amount of time which the DCD signal is turned off after a disconnect. This command applies only if the **&C2** command is in effect.

Command	Operation
S10=	Range: 0-255 <i>default (14)</i> Units = 1/10 seconds

Data Terminal Ready (DTR) &D

This command controls interpretation of the DTR input. The commands, **&D1**, **&D2**, and **&D9** are valid only when the BitSURFR Pro is in asynchronous mode.

**Note**

In synchronous mode, the DTR pin has other functions (see Chapter 10).

- *Ignore (default)* - Use the **&D** command to allow the BitSURFR Pro to ignore the DTR signal. This option is valid for both asynchronous and synchronous modes.
- *DTR Drop to Command Mode* - Use the **&D1** command to specify that if the BitSURFR Pro is on-line and detects a high-to-low transition of DTR, the BitSURFR Pro will exit the data mode and enter the AT command mode. If the BitSURFR Pro is off-line DTR will have no effect, the BitSURFR Pro can connect and enter the data mode without DTR on.
- *DTR Drop Hangs Up* - Use the **&D2** command to specify that if the BitSURFR Pro is off-line, it will not connect (dial or answer) if DTR is low. If the BitSURFR Pro is on-line and a high-to-low transition of DTR is detected, the BitSURFR Pro will hang up, return to the command mode, and disable auto answer.
- *DTR Drop Resets* - Use the **&D3** command to reinitialize the data port when the BitSURFR Pro detects an on-to-off transition of DTR. If it is on-line, it will hang up and reset the active configuration to the stored configuration based on the Powerup Stored Profile (**&Y**) option. The BitSURFR Pro will not

automatically answer while DTR is off. This option is valid for both asynchronous and synchronous modes.

- *DTR Dial* - Use the **&D9** command to enable DTR dialing of the stored dial string for the asynchronous mode.

Command	Operation
&D	Ignores DTR*
&D1	On-to-off DTR transition recalls the command mode
&D2	On-to-off DTR transition causes the BitSURFR Pro data port to disconnect and disables auto answer while DTR is off
&D3	On-to-off DTR transition resets the data port and disables autoanswer
&D9	Enables DTR dial for asynchronous mode

* default



Note

For all modes, DTR must remain low for the duration of the time indicated by the S25 register to be considered a drop in DTR.

Persistent DTR Dialing (PDD) &L

This command controls the PDD feature which provides the capability for a given port to automatically re-dial the configured stored phone number 0 continuously whenever the port does not have an active call and the DTR pin is on.

Command	Operation
&L0	Disables persistent DTR dialing*
&L1	Enables persistent DTR dialing

* default

Data Set Ready (DSR) &S

This command selects the function of the DSR output (pin 6). DSR normal means DSR is off until the BitSURFR Pro begins the connect sequence, then remains on as long as the BitSURFR Pro is on-line.

Command	Operation
&S	DSR always on*
&S1	DSR on after protocol is connected

* default

Request to Send/Clear to Send &R

This command controls the CTS output (pin 5) when the BitSURFR Pro is in synchronous mode. In asynchronous mode, CTS is always on unless the CTS flow control option is enabled.

- *Normal* (default) - Use the **&R** command to allow CTS to follow RTS (pin 4) after a configurable delay. If the BitSURFR Pro is on-line and ready to receive data from the DTE, when it detects an off-to-on RTS transition, the BitSURFR Pro turns CTS on after the delay specified in S26 (default is 0).
- *Forced High* - Use the **&R1** command to allow the BitSURFR Pro to ignore RTS. CTS is turned on when the BitSURFR Pro is on-line and ready to receive data from the DTE.

Command	Operation
&R	CTS follows RTS*
&R1	CTS forced on

* default

Request to Send/Clear to Send Delay S26

This command sets the amount of time to follow the off-to-on transition of the RTS pin before the CTS pin is turned on.



Note

This command is valid only in synchronous mode.

Command	Operation
S26=	Range: 0-255 <i>default (1)</i> Units = 1/100 seconds

COMMAND AND MESSAGE OPTIONS

The AT command interpreter interprets the commands and sends status and connect messages to your computer. This section describes the options that affect the command interpreter and the messages that it can send.

Choosing to Use Response Messages Q

This command enables or disables response messages. The unit still responds to commands when the response display is inhibited.

Command	Operation
Q	Enables response messages*
Q1	Disables response messages (quiet mode)
Q2	Disables during answer mode

* default

Selecting Response Form V

This command instructs the BitSURFR Pro which type of response message to display. These messages indicate the present state of the BitSURFR Pro and can appear as digits or words. Some software requires digit responses, but word responses are preferred because their meanings are easier to remember. See the **X** command later in this section.

Command	Operation
V	Enables digit response message
V1	Enables word response message*

* default

CARRIER/PROTOCOL/CHANNEL Messages Display W

This command instructs the BitSURFR Pro whether or not to return the CARRIER, PROTOCOL, and CHANNEL messages (result codes numbered greater than 50) when a call is connected. When this option is disabled only the CONNECT message is returned when a call is

connected. Table 5-1 in Chapter 5 describes the status and connect messages along with their respective result codes.

Command	Operation
W	Disables Carrier/Protocol/Channel Messages*
W1	Enables Carrier/Protocol/Channel Messages

* default



Note

*If the **W** command option is set to 1, then the **CARRIER**, **PROTOCOL** and **CHANNEL** messages will be displayed regardless of the **X** command option setting.*

Connect Speed and Dial Messages Display X

This command selects the connect speed and dial messages display (result codes numbered less than 50). Table 5-1 in Chapter 5 describes the status and connect messages along with their respective result codes.

Command	Operation
X	Enables messages OK, CONNECT, RING, NO CARRIER, ERROR (corresponds to result codes 0-4, respectively)
X1	Enables all messages except BUSY (result code 7) (corresponds to result codes 0-5, 10-14, 17-19, 28, 32)
X2	Enables all messages* (corresponds to result codes 0-5, 7, 10-14, 17-19, 28, 32)

*default



Note

*If the **X** command option is set to 0 or 1 and a call is placed to a busy line, the BitSURFR Pro will return a **NO CARRIER** message.*

Command Mode @P1

This command determines which set of commands are used to operate the BitSURFR Pro.

Command	Operation
@P1=N	None
@P1=A	AT command mode enabled*
@P1=VB	V.25 bis BISYNC
@P1=VH	V.25 bis HDLC

*default

**Note**

AT@P1=N, AT@P1=VB, and AT@P1=VH disables the AT command set. If an AT&W has not been executed after modifying the command mode, the AT command set can be re-enabled by removing and reapplying power to the BitSURFR Pro. Otherwise, the AT command set must be re-enabled by resetting the BitSURFR Pro to the factory default configuration. This is accomplished by placing the 4th switch on the 4-position dip switch located on the rear of the BitSURFR Pro into the ON position, then unplugging (for 10 seconds) and reapplying power to the BitSURFR Pro. Return the 4th switch on the 4-position dip switch to the OFF position. The 3 remaining switches are reserved and should remain in the OFF position. Be sure to close all active applications before doing this.

DTE Character Echo E

This command instructs the BitSURFR Pro whether or not to echo characters received from your computer while in the command mode.

Command	Operation
E0	Disables character echo
E1	Enables character echo*

* default

Escape Character S2

This command configures the ASCII character used to escape from the data mode and return to the AT command mode. The default character is '+'.

Command	Operation
S2=	Range: 0-127 <i>default (43)</i> 128-255 is disabled

Carriage Return Character S3

This command configures the ASCII character used by the AT command processor to indicate the end of a command line in both the receive and transmit directions. The standard character used for this is the ASCII carriage return (13).

Command	Operation
S3=	Range: 0-127 <i>default (13)</i>

Line Feed Character S4

This command configures the character sent by the AT command processor after each status message. The standard character used for this is the ASCII line feed (10) (CTRL-L).

Command	Operation
S4=	Range: 0-127 <i>default (10)</i>

Backspace Character S5

This command configures the character sent by the AT command processor to back up one space in the command line. The standard character used for this is the ASCII backspace (8) (CTRL-H).

Command	Operation
S5=	Range: 0-127 <i>default (8)</i>

Escape Sequence Guard Time S12

This command sets the escape sequence guard time--the minimum pause before and after the escape characters (pause, +++, pause). The guard time also defines the maximum amount of time between each of

the three characters in the escape sequence. This becomes significant only at low data rates and small pauses. The guard time is in 0.02 second increments.

Command	Operation
S12=	Range: 0-255 <i>default (50)</i> Units = 1/50 seconds

DTE Guard @G

This command allows the user to prevent other users from altering the saved configuration. It disables the ability to save configurations to nonvolatile memory through the use of AT commands (**&W** and **&Z**) and restores the stored configuration (profile 0) after each call.

This feature is useful in modem pooling applications where a user can acquire a modem for a call, reconfigure the modem, and then make the call. When the call is complete, the user can release the modem without worrying about restoring the configuration.

Command	Operation
@G=D	Disables DTE guard*
@G=E	Enables DTE guard

* *default*

CALLER ID DELIVERY

Caller ID Delivery permits you to identify and log the telephone numbers of incoming calls. Except where noted, these commands can be configured for either data or voice port. To configure a command for the voice port, add an asterisk (*) followed by a 1 or 2 (to designate voice port 1 or voice port 2) immediately after AT.

Caller ID Auto Delivery @N1

Auto Delivery allows the BitSURFR Pro to display the incoming telephone number immediately following the incoming call response message (**RING** if verbose responses have been selected, or **2** if

numeric responses have been selected). *This option is valid only for the DTE port.*

Command	Operation
@N1=0	Disables auto delivery*
@N1=1	Enables auto delivery

* default

Caller ID Delivery to Voice Ports

If you have an analog Caller ID device connected to a voice port, you can view an incoming analog telephone number immediately after the first ring. If you do not have an analog Caller ID device, you can still retrieve the incoming telephone number, from the list of telephone numbers, if you have enabled Caller ID Logging. No AT commands are necessary to enable Caller ID on the POTS ports.

Caller ID Logging @N0

When Caller ID Logging is enabled, the BitSURFR Pro stores each incoming telephone number. The Logging feature is available to all ports, data and voice, and stores up to 10 telephone numbers per port. Each number may be up to 16 digits in length. Enabling or disabling this feature does not clear the list of stored numbers. You must place an asterisk (*) followed by a 1 or 2 before the command in order for it to configure voice port 1 or 2.

Command	Operation
@N0=0	Disables logging for the DTE port †
@N0=1	Enables logging for the DTE port
*1@N0=0	Disables logging for voice port 1 †
*1@N0=1	Enables logging for voice port 1
*2@N0=0	Disables logging for voice port 2 †
*2@N0=1	Enables logging for voice port 2

† default

Caller ID Number Clearing and Retrieval @Ln

Use these commands to clear the Caller ID logs, or to retrieve the most recent telephone number received by a port, or to retrieve the entire list of numbers logged by a port. You can use these commands whether or not Caller ID Logging is enabled. The retrieval commands do not clear the list of stored numbers. The feature is available to both the data port and the voice ports. You must place an asterisk (*) followed by a 1 or 2 before the command in order for it to configure voice port 1 or 2.

Command	Operation
@L0	Clears the list of numbers for the DTE port
@L1	Retrieves the most recent number for the DTE port
@L2	Retrieves the entire list of numbers for the DTE port
*1@L0	Clears the list of numbers for voice port 1
*1@L1	Retrieves the most recent number for voice port 1
*1@L2	Retrieves the entire list of numbers for voice port 1
*2@L0	Clears the list of numbers for voice port 2
*2@L1	Retrieves the most recent number for voice port 2
*2@L2	Retrieves the entire list of numbers for voice port 2

Caller ID Screening and Blocking @IS

Caller ID Security operates in one of two mutually exclusive modes: Call Screening and Call Blocking. Both features operate based on a list of user-entered ID numbers. The entire list of Caller ID Security numbers may be assigned to one port or the list may be divided between the voice and data ports. If Call Screening is selected, an incoming call is accepted only if its number is in the list of stored ID numbers. If Call Blocking is selected, an incoming call is accepted only if its number is not in the list of stored ID numbers. If the feature is disabled, all incoming calls are accepted.

Command	Operation
@IS=D	Disables Caller ID security for the DTE port †
@IS=S	Enables Caller ID security for screening calls for the DTE port
@IS=B	Enables Caller ID security for blocking calls for the DTE port

Command	Operation
*1@IS=D	Disables Caller ID security for voice port 1 †
*1@IS=S	Enables Caller ID security for screening calls for voice port 1
*1@IS=B	Enables Caller ID security for blocking calls for voice port 1
*2@IS=D	Disables Caller ID security for voice port 2 †
*2@IS=S	Enables Caller ID security for screening calls for voice port 2
*2@IS=B	Enables Caller ID security for blocking calls for voice port 2

† default

Caller ID Status and ID Numbers @Ix

Chapter 6, Caller ID Delivery and Security, discusses ID Security numbers in detail. You can add up to 44 14-digit numbers to the Caller ID Security list. You can divide the numbers among the ports as you like. Note that identical numbers assigned to different ports are treated as one number in the Caller ID Security list. In other words, you can assign 44 numbers to each port if the numbers are the same.

Command	Operation
@IA=	Adds the given ID to the Security ID list for the data port. If no space is available, an ERROR message will be returned.
*1@IA=	Adds the given ID to the Security ID list for voice port 1. If no space is available, an ERROR message will be returned.
*2@IA=	Adds the given ID to the Security ID list for voice port 2. If no space is available, an ERROR message will be returned.
@ID=	Deletes the given ID from the Security ID list for the data port. If the ID does not exist in the list, an ERROR message will be returned.
*1@ID=	Deletes the given ID from the Security ID list for voice port 1. If the ID does not exist in the list, an ERROR message will be returned.

Command	Operation
*2@ID=	Deletes the given ID from the Security ID list for voice port 2. If the ID does not exist in the list, an ERROR message will be returned.
@IC	Clears the Caller ID Security list (deletes all IDs) for the data port.
*1@IC	Clears the Caller ID Security list (deletes all IDs) for voice port 1.
*2@IC	Clears the Caller ID Security list (deletes all IDs) for voice port 2.
@IL	Lists the status of Caller ID Security for the data port and lists all IDs stored in the list.
*1@IL	Lists the status of Caller ID Security for voice port 1 and lists all IDs stored in the list.
*2@IL	Lists the status of Caller ID Security for voice port 2 and lists all IDs stored in the list.
*1@IP	Copies the Security status and Caller ID Security list from voice port 1 to the data port.
*2@IP	Copies the Security status and Caller ID Security list from voice port 2 to the data port.
@IV	Copies the Security status and Caller ID Security list from the data port to voice port 1 and voice port 2.

Chapter 5 Call Placement

GENERAL

This chapter details call operation and termination using AT commands. Your BitSURFR Pro communicates with your PC or terminal asynchronously any time the BitSURFR Pro is in AT command mode.

OPERATION MODES

The BitSURFR Pro functions in one of three modes:

- Off-line Command Mode (AT command mode)
- On-line Command Mode
- Data Mode

When the DTE data mode is set to synchronous, the BitSURFR Pro functions only in off-line command mode or data mode (there is no way to exit to on-line command mode).

Note

Your BitSURFR Pro will communicate with the DTE asynchronously when in the off-line command mode regardless of the DTE data mode setting (&M).

Off-line Command Mode

AT commands can only be entered when the BitSURFR Pro is in the off-line or on-line command mode. Commands can be entered separately or in strings to change BitSURFR Pro options, rebuild profiles, store or change telephone numbers, initiate or receive phone calls, and go to the data mode. In off-line command mode (generally referred to as command mode), there is no data call active.

On-line Command Mode (Asynchronous Data Mode Only)

This mode is entered from the asynchronous data mode after the escape sequence (+++) has been entered. The data communication link remains established but data transmission is suspended. The BitSURFR Pro will now accept commands as it does in the off-line command mode.

Data Mode

The BitSURFR Pro switches to data mode (on-line) after it successfully connects with a compatible ISDN modem. In data mode, the BitSURFR Pro sends and receives data, but will not accept or execute command instructions.

Escape Sequence (Asynchronous Data Mode Only)

If the BitSURFR Pro is in the asynchronous data mode, using the escape sequence will return the BitSURFR Pro to the command mode and keep the BitSURFR Pro on-line. The escape sequence consists of a pause (normally 1 second), three escape characters, and then another pause. The default escape sequence characters are:

+ + +

The escape sequence character is stored in S-register two (S2) and can be changed if necessary. The escape sequence can also be disabled to prevent any possibility of false escapes into the command mode (set S2 to any value from 128 to 255).

After entering the escape sequence, the BitSURFR Pro will return to the AT command mode, but will not hang up or break the connection with the remote BitSURFR Pro. AT commands can now be entered to the BitSURFR Pro. The **ATO** command returns the BitSURFR Pro to the data mode. The **ATH** command hangs up the call.

CALL PLACEMENT STRATEGIES

Before a data call is placed, the BitSURFR Pro should be configured correctly. Correct configuration depends on the type of data to be sent, protocol, DTE speed, and ISDN speed. For more information on how to configure the BitSURFR Pro, refer to the Configuration section in the *Getting Started* guide and Chapter 4 "Option Configuration" in this manual.

Rate Adaption

When a data call is placed, the BitSURFR Pro will try to establish a physical data connection on the ISDN B-channel. The B-channel is a digital channel that can transfer data at either 56 kbps or 64 kbps, depending on the path the network chooses when routing the call.

A rate adaption protocol will be needed if your PC or terminal is asynchronous or the DTE rate is set at any rate other than 56kbps or 64 kbps. A rate adaption protocol adapts the lower speed of the PC or terminal to the higher speed of the ISDN B-channel. Use the **AT%A2=** command to select a rate adaption protocol.

Your BitSURFR Pro supports the V.120 rate adaption protocol. V.120 rate adaption protocol is an error-correcting protocol ensuring error-free data transfer at speeds up to 115.2 kbps. Note, however, that throughput is limited by channel speed to about 75 kbps. When using a rate adaption protocol, both the calling and called units must use the same protocol. Also, unless you are using V.120 in asynchronous mode, the PCs or terminals on both ends must be set to the same DTE speed before data can be transferred.

B-Channel Speed

The B-channel speed of a true end-to-end ISDN connection is 64 kbps. However, if a call is routed over intermediate 56 kbps circuits, the B-channel speed will be reduced to 56 kbps. The answering ISDN modem will automatically adjust to the B-channel speed of the incoming call. However, the originating ISDN modem must be configured for 56 kbps in order for the call to complete. Otherwise, a call attempted at 64 kbps over a line that is only capable of 56 kbps operation will fail.

Data Path Compatibility

In some instances, it may not be possible for the BitSURFR Pro to make a successful data call from one location to another because Circuit Mode Data (CMD) is not supported between the calling and called unit networks. In this case, the originate mode command (**%A98**) can be used to force the network to treat data calls as if they were speech or audio calls. Data calls placed and answered as speech or audio calls have an ISDN B-channel speed of 56 kbps regardless of the BitSURFR Pro's link speed setting. This allows the BitSURFR Pro to make a data call even if there is no true end-to-end ISDN 64 kbps data path.

Echo Canceling

To eliminate echoes, the network may route speech calls through an echo canceller. The echo canceller disrupts data calls and can cause the calling ISDN modem to fail to connect with the called unit. When placing data calls over speech circuits, you should turn on the Echo

Disable Tone using the **%A96** command. When this option is selected, the BitSURFR Pro sends a tone at the beginning of the data call to disable the echo canceller.

Dialing **D**

The **D** command causes the BitSURFR Pro to dial a number. For example, to dial the number 555-1212, enter:

ATD 555-1212

Use spaces, hyphens, parentheses, or other punctuation (except dial modifiers) to make the command line easier to read and enter. For example, the following are all treated as the same command:

ATD 1-800-555-1212
ATD 1 (800) 555-1212
ATD18005551212



Note

Except for the semicolon modifier, standard dial modifiers are ignored by your BitSURFR Pro.

Any Key Abort

If you want to abort the dialing sequence at any time before a connection is established, just press any key on the PC or terminal. This feature is called *Any Key Abort*.

Directory Register

The BitSURFR Pro stores up to 10 numbers in directory registers 0 - 9. These numbers are maintained in the stored profile to allow the most frequently used numbers to be dialed easily. For each stored number, the BitSURFR Pro retains the entire dial command with all its modifiers. The stored numbers remain in the stored profile until they are written over with new numbers. Removing power from the BitSURFR Pro does not affect the directory of stored phone numbers.

Store Phone Number **&Zn=x**

To store a phone number using AT commands, enter the **&Zn=x** command, where *n* is the directory register number (0 - 9), and *x* is the

dial command sequence (digits and modifiers) you wish to store in that register. For example:

AT&Z1= 9 1-800-555-1212

This stores the dial command above beginning with the 9 into directory register number 1. The total length of the dial command (counting only digits and modifiers, not spaces or punctuation) may not exceed 40 characters.

A slightly shorter form of the **&Z** command, without the register number and equals sign, can also be used to store a phone number into register zero. For example:

AT &Z 1-800-555-1212

The **&Z** commands are disabled if the DTE guard feature is enabled (refer to the section on DTE Guard option in Chapter 4 "Option Configuration" in this guide).

Display Stored Phone Number &Zn?

To display a number that is stored in the phone number directory, use the **&Zn?** command. To cause the BitSURFR Pro to display (i.e., send to your PC or terminal) the dial command stored in directory register 1, for example, you would enter:

AT &Z1?

To display all of the stored phone numbers, enter:

&V=Z

Dialing a Stored Phone Number S=n

Use the **S** dial modifier to dial a previously stored number. Once a number is stored, it can be dialed by entering **ATDS=n** where *n* represents any number between 0 to 9.

For example, **ATDS=1** dials the number stored in location 1. Alternatively, the shorthand syntax **ATDS** may be used to dial the number stored in location 0. This is equivalent to entering **ATDS=0**.

For maximum flexibility, the stored numbers can be linked in series with each other or other digits on the command line. For example, if you were to enter **ATDS=0S=11212** where stored number 0 is “1800” and stored number 1 is “555”, the BitSURFR Pro will dial the number 1-800-555-1212.

ANSWERING CALLS **A**

When your BitSURFR Pro detects an incoming call, it asserts the RI signal on the PC interface and sends a RING message to the PC or terminal after each ring. If your BitSURFR Pro is set to auto answer, it will answer. You can also answer the call manually by sending the **ATA** command to your BitSURFR Pro. Each of these answering methods is described below.

Auto Answer **S0=n**

Your BitSURFR Pro can automatically answer incoming calls if the following conditions are met:

- The auto answer option is set. (See details below.)
- The DTR signal is forced "on" using the DTR option. Refer to the “TERMINAL INTERFACE AND PIN OPTIONS” section in Chapter 4 in of this guide.
- The BitSURFR Pro is in off-line mode.

After the specified number of rings, the BitSURFR Pro answers and begins the connect sequence.

Auto answer is controlled by command **S0**. This command determines on which ring the BitSURFR Pro will answer. You can set **S0** to any value between 1 and 255 for auto answer.

Setting **S0** to 0 (the factory default) disables auto answer.

Connecting

After the physical link between your BitSURFR Pro and the remote ISDN modem is established, the BitSURFR Pro attempts to establish a rate adaption protocol.

Return On-line O

When the BitSURFR Pro has established the link-layer protocol, it enters the On-line Data Mode and is ready to send and receive data. Normally, the BitSURFR Pro remains in this mode until the PC or terminal sends the data mode escape sequence (+++) or until the call is terminated.

If the PC or terminal sends the escape sequence to the BitSURFR Pro while it is on-line and in asynchronous data mode, the BitSURFR Pro enters the on-line command mode. In this mode, the PC or terminal can send AT commands to the BitSURFR Pro. To return to data mode, send the **ATO** command.

Hang Up Command H

To disconnect a call, escape to the command mode and enter the **ATH** command. Your BitSURFR Pro will then disconnect and hang up.

CALL STATUS INDICATIONS

DTE Status LED

The DTE status LED, located on the front of the BitSURFR Pro, indicates whether a data call is connected and the number of channels connected. During call establishment, the DTE status LED will blink slowly. Once the call is connected, the DTE status LED will indicate the number of channels connected using the sequence that is described below. The maximum number of channels connected is dependent on the type of protocol that is selected.

Some protocols, such as V.120, are designed to only connect one channel. These protocols are referred to as single-link protocols. Other protocols, such as AIMux and Multi-link PPP, are designed to connect multiple channels. These protocols are commonly known as *multi-link protocols*.

DTE status LED operation observes the following rules for single-link and multi-link protocols when the call is connected:

- If a single-channel protocol is selected and the call is connected, the DTE status LED will glow a steady green.
- If a multi-channel protocol is selected and only one channel is connected, the DTE status LED will blink rapidly.

- If a multi-channel protocol is selected and two channels are connected, the DTE status LED will glow a steady green.

For detailed information regarding the operation of the DTE status LED for a specific protocol, please refer to the chapter on that protocol.

Status and Connect Messages

When the PC or terminal sends your BitSURFR Pro a command, the BitSURFR Pro attempts to execute it, and then sends a status message to the PC or terminal, when enabled, reporting the results of the command. For that reason, the status messages returned by the BitSURFR Pro are also called *result messages*. If the command is a dial command, then the message that is returned is called a *connect message*. Status messages may also be sent as the result of other conditions detected by the BitSURFR Pro; however, they are sent only when the BitSURFR Pro is in AT command mode (not data mode).

The messages that are sent depend upon the message configuration options that are in effect: worded messages or number codes for the **V** command, and normal or extended messages for **X** and **W** commands. For more information, see Chapter 4 "Option Configuration" in this guide.

Table 5-1 lists the status and connect messages in number codes, in words, and with their corresponding meanings.

Table 5-1. Normal Status and Connection Messages

Number Code	Word Message	Meaning
0	OK	Command received OK.
1	CONNECT	Connection made at 0-300 bps, or at any speed while X command in effect.
2	RING	Incoming ring detected.
3	NO CARRIER	Valid carrier not detected within period specified by register S7, or carrier lost for 300 ms or more. Message is also sent when incompatible protocols are configured for the originating and answering ISDN modem
4	ERROR	Command not recognized or too long.

Table 5-1. (Cont.) Normal Status and Connection Messages

Number Code	Word Message	Meaning
5	CONNECT 1200	Connection made at 1200 bps.
6	NO DIALTONE	ISDN Link is not synchronized.
7	BUSY	Dialed number busy.
10	CONNECT 2400	Connection made at 2400 bps.
11	CONNECT 4800	Connection made at 4800 bps.
12	CONNECT 9600	Connection made at 9600 bps.
14	CONNECT 19200	Connection made at 19200 bps.
28	CONNECT 38400	Connection made at 38400 bps.
32	CONNECT 48000	Connection made at 48000 bps.
17	CONNECT 56000	Connection made at 56000 bps.
18	CONNECT 57600	Connection made at 57600 bps.
19	CONNECT 64000	Connection made at 64000 bps.
20	CONNECT 112000	Connection made at 112000 bps.
21	CONNECT 128000	Connection made at 128000 bps.
22	CONNECT 115200	Connection made at 115200 bps.
57	CARRIER 56000	ISDN Line Speed is 56000.
59	CARRIER 64000	ISDN Line Speed is 64000.
79	PROTOCOL: PPPC	Point-to-Point Protocol.
81	PROTOCOL: ISDN	Clear Channel Protocol.
83	PROTOCOL: V.120	V.120 Rate Adaption Protocol.
85	PROTOCOL: BOND	BONDING Protocol.
96	CHANNEL B1	Using Channel B1.
97	CHANNEL B2	Using Channel B2.

Call Termination

Your BitSURFR Pro will terminate a call when any of the configured call termination conditions occur. These conditions are listed in Table 5-2 below.

Table 5-2. Call Termination Conditions

Termination Condition	Selective Disable	Notes
Any Key Abort	No	Only during the connect sequence, before the connection is established.
ATH Command	No	BitSURFR Pro must be in the command mode.
Loss of DTR	Yes	Depends upon S25.
Call Placement Failure	Partial	Due to no dial tone, busy signal, or no carrier; timeout set in S7.
Rate Adaption Protocol Link Establish Failure	No	Unable to establish the rate adaption protocol.
Protocol Disconnect Request Received	No	A disconnect request was received from remote ISDN modem.
Protocol Error Detected	No	Fatal protocol error detected.
BitSURFR Pro Reset or Powered Off	No	BitSURFR Pro automatically disconnects when reset or powered off.

Chapter 6

Caller ID Delivery and Security

GENERAL

Your BitSURFR Pro includes two Caller ID features available to both the data port and voice ports:

- **Caller ID Delivery** allows you to *identify* and *log* the telephone numbers of incoming calls.
- **Caller ID Security** allows you to *block* unwanted incoming calls or *screen* (permit delivery of) only those calls desired. Although blocking and screening are mutually exclusive, you can set one port to Call Blocking and the other port to Call Screening.

OPERATION FUNDAMENTALS

You can configure Caller ID Delivery and Security options using AT commands. Operation of Caller ID Delivery and Security commands and responses is the same for both data and voice ports. To use an AT command to configure a voice port, you must precede the command with an asterisk (*) and a 1 or a 2 (for voice port 1 or 2) as in the following examples:

AT Command	Action
AT@N0=1	Enables the logging feature for the data port.
AT*1@N0=1	Enables the logging feature for voice port 1.
AT*2@N0=1	Enables the logging feature for voice port 2.

You may view the current configuration of the data port Caller ID Delivery and Caller ID Security option commands by entering **AT&V**. Enter the command **AT**@N0?*** to view the voice port configuration.

CALLER ID DELIVERY

The Caller ID software automatically identifies an incoming telephone number, if possible; what it does afterward will depend upon the features you have selected on a per-port basis.



Note

The BitSURFR Pro does not support Caller ID Deluxe.

The Caller ID Auto Delivery and Logging features may in some cases display one of the following descriptions instead of a telephone number:

BLOCKED: The caller has blocked display of his telephone number.

NO NUMBER: The incoming call does not contain any information identifying the telephone number.

OUT OF AREA: Information on the calling party is unavailable due to network interworking.

NO CID SERVICE: Network does not provide any information on the calling party.

Caller ID Auto Delivery

Caller ID Auto Delivery allows the BitSURFR Pro to display the incoming telephone number. The number is displayed immediately following the incoming call response message (**RING** if verbose responses have been selected, or **2** if numeric responses have been selected). This option is valid only for the data port.

AT Command	Action
AT@N1=1	Enables Caller ID Auto Delivery.
AT@N1=0	Disables Caller ID Auto Delivery (factory default).

Even if Caller ID Auto Delivery is disabled, you may still retrieve the incoming telephone number from the list of telephone numbers if you have enabled Caller ID Logging.

Caller ID Delivery to Voice Ports

If you have an analog Caller ID device connected to a voice port, you may view an incoming analog telephone number immediately after the first ring. If you do not have an analog Caller ID device, you may still retrieve the incoming telephone number from the list of numbers if you have enabled Caller ID Logging; however, you must set the BitSURFR Pro's internal date and time option in order to activate this feature. For more information on setting the Date and Time option, refer to Chapter 4 of this guide.

Caller ID Logging

When Caller ID Logging is enabled, the BitSURFR Pro stores each incoming telephone number. The Caller ID Logging feature is available to both ports—data and voice—and stores up to ten telephone numbers per port. Each number may be up to 16 digits in length. When the list is full, the BitSURFR Pro will replace the oldest number with the most recent. Because the lists of telephone numbers are stored in volatile (temporary) memory, the lists are cleared whenever your BitSURFR Pro is disconnected or loses power. Enabling or disabling this feature *does not* clear the list of stored numbers.

AT Command	Action
AT@N0=1	Enables data port Caller ID Logging.
AT*1@N0=1	Enables voice port 1 Caller ID Logging.
AT*2@N0=1	Enables voice port 2 Caller ID Logging.
AT@N0=0	Disables (factory default) data port Caller ID Logging.
AT*1@N0=0	Disables (factory default) voice port 1 Caller ID logging.
AT*2@N0=0	Disables (factory default) voice port 2 Caller ID logging.

Number Retrieval

You can use these commands to retrieve the most recent telephone number received by a port, or to retrieve the entire list of numbers logged by a port. You can use these commands regardless of whether Caller ID Logging is enabled. These commands *do not* clear the list of stored numbers.

AT Command	Action
AT@L1	Retrieves the most recent telephone number received by the data port.
AT*@L1	Retrieves the most recent telephone number received by voice port 1.
AT*2@L1	Retrieves the most recent telephone number received by voice port 2.

AT Command	Action
AT@L2	Retrieves the entire list of telephone numbers received by the data port.
AT*@L2	Retrieves the entire list of telephone numbers received by voice port 1.
AT*2@L2	Retrieves the entire list of telephone numbers received by voice port 2.

When you retrieve the entire list of numbers, the list is displayed in descending order, most recent to oldest.

Number Clearing

You can use these commands to clear telephone numbers logged by a port.

AT Command	Action
AT@L0	Clears the list of telephone numbers for the data port.
AT*n@L0	Clears the list of telephone numbers for a voice port (where <i>n</i> is the voice port number).

CALLER ID SECURITY

When enabled, Caller ID Security operates on a port in one of two mutually exclusive modes: Call Screening and Call Blocking. Both features operate based on a list of user-entered ID numbers. The entire list of Caller ID Security numbers may be assigned to one port, or the list may be divided between the data port and the two voice ports. If Call Screening is selected, an incoming call is accepted only if its number is in the list of stored ID numbers. If Call Blocking is selected, an incoming call is accepted only if its number is not in the list of stored ID numbers. If this feature is disabled, all incoming calls are accepted. This feature is available to both the data port and the voice ports.



Note

*If Caller ID Logging is enabled, the incoming telephone number will not be logged if the call is screened or blocked.
If Call Screening is enabled, but the originating call does*

not contain Caller ID information, the call will not be accepted. However, if Call Blocking is enabled, the call will be accepted. Also, note that the Caller ID Security list is not the same list as the list of logged numbers.

AT Command	Action
AT@IS=S	Enables Call Screening for the data port.
AT@IS=B	Enables Call Blocking for the data port.
AT@IS=D	Disables Caller ID Security for the data port.
AT*1@IS=S	Enables Call Screening for voice port 1.
AT*1@IS=B	Enables Call Blocking for voice port 1.
AT*1@IS=D	Disables Caller ID Security for voice port 1.
AT*2@IS=S	Enables Call Screening for voice port 2.
AT*2@IS=B	Enables Call Blocking for voice port 2.
AT*2@IS=D	Disables Caller ID Security for voice port 2.

ID Numbers

When comparing the incoming Caller ID number and the stored Caller ID Security list, your BitSURFR Pro begins with the last number of the incoming Caller ID and reads right to left. If the stored list includes abbreviated numbers (fewer than the normal seven digits for a local call) the BitSURFR Pro will allow a match with any incoming call that ends with those numbers. For example, a stored number of 8000 will be considered a match with 1-205-430-8000 and 1-901-555-8000. To ensure complete security, enter the entire desired phone number (seven digits for local calls or 10 for long distance) in the stored list.

Wild Card Characters

You can use the question mark (?) as a wild card character when entering numbers to the Caller ID Security list. The wild card character causes a match with any single digit in the incoming number. For example, the incoming calling ID number "2054308000" produces a match with stored numbers "80??", "43080??", "205???8000", and "0?", but not with "80?", "205?", or "430?". Note that any wild cards to the left of a matched number will be ignored.

Entering ID Numbers

You can add up to 44 14-digit numbers to the Caller ID Security list. You can divide the numbers among the ports as you like. Note that identical numbers assigned to different ports are treated as one number in the Caller ID Security list. In other words, you may assign 44 numbers to each port if the numbers are the same. Unless preceded by an asterisk (*), the commands below configure and operate the data port. The voice ports must be configured using the AT* prefix as previously discussed.

AT Command	Action
AT@IA=<i>n</i>	Adds a telephone number to the Caller ID Security list for the data port (where <i>n</i> equals the telephone number). If no space is available, an ERROR message is returned.
AT*1@IA=<i>n</i>	Adds a telephone number to the Caller ID Security list for voice port 1 (where <i>n</i> equals the telephone number).
AT*2@IA=<i>n</i>	Adds a telephone number to the Caller ID Security list for voice port 2 (where <i>n</i> equals the telephone number).
AT@ID=<i>n</i>	Deletes a telephone number from the Caller ID Security list for the data port (where <i>n</i> equals the telephone number). If the ID does not exist, an ERROR message is returned.
AT*1@ID=<i>n</i>	Deletes a telephone number from the Caller ID Security list for voice port 1 (where <i>n</i> equals the telephone number).
AT*2@ID=<i>n</i>	Deletes a telephone number from the Caller ID Security list for voice port 2 (where <i>n</i> equals the telephone number).
AT@IC	Clears the Security ID list. (This command deletes <i>all</i> IDs from the data port.)
AT*1@IC	Clears the Security ID list for voice port 1.
AT*2@IC	Clears the Security ID list for voice port 2.
AT@IL	Lists the status of Caller ID Security for the data port, and lists all IDs stored in the list.

AT Command	Action
AT*1@IL	Lists the status of Caller ID Security for voice port 1, and list all IDs stored in the list.
AT*2@IL	Lists the status of Caller ID Security for voice port 2, and list all IDs stored in the list.
AT@IV	Copies the Security status and Caller ID Security list from the data port to the voice ports.
AT*1@IP or AT*2@IP	Copies the Security status and Caller ID Security list from a voice port to the data port.

Network Verification of Caller ID Information

In some networks, the Caller ID information can be generated either by the caller's equipment or by the network. If the caller's equipment provides its own ID, the network may or may not verify the Caller ID information provided by the caller. Bits are provided in the incoming call setup message to identify the source and verification of the calling party ID. It would be possible for a caller to falsify his Caller ID information. Therefore, if Caller ID Security screening is enabled, then a caller whose ID is not network-generated or network-verified will be rejected, even if his Security ID is in the list.

If it is necessary to make an exception for a particular caller, then the “!” may be included anywhere in the stored ID string to indicate that network generation or verification of the calling ID is not required for that particular caller. If Caller ID Security blocking is enabled, the ISDN modem will block the call if it is on the Caller ID Security list, but accept callers that are not on the ID list, regardless of the source or verification.

Note

On AT&T central office switches, there is no information supplied in the incoming setup message to identify the source and verification of the calling party ID. Therefore, if the ISDN modem is configured on an AT&T switch, there will be no security screening of calls based on network veri-

fication of Caller ID information. If the network verification character (“!”) is included in a stored ID string, it will be ignored.

Chapter 7 Flexible Calling

GENERAL

Your BitSURFR Pro supports three Flexible Calling services:

- **Call Waiting**--a feature that lets you put one voice call on hold while answering another voice call.
- **Conference Calling** (also known as Three-Way Calling or TWC)--a feature that allows for conversation between three parties, each at a different location.
- **Message Waiting**--a feature that notifies you when a message has been left on your service-provided voice messaging system (if you subscribe to one).



Note

These services are available only if included in your ISDN line configuration. Contact your local provider for more information.

CALL WAITING

To use Call Waiting, press and release the receiver button (or “flash”) when you hear the call waiting tone. This places your current call on hold and answers the second call. The call waiting tone will be repeated only once, after 10 seconds. To toggle back and forth between the calls, merely press and release the receiver button.

If the active caller hangs up, the call on hold will be retrieved within ten seconds, or you may retrieve the call immediately by pressing and releasing the receiver button.

If the caller on hold hangs up, you will return to a standard two-way call. You will receive no notice that the caller on hold has hung up. If you press and release the receiver button, you will hear a dial tone; press and release the receiver button again to return to your two-way call.

You may disconnect a call only if it is active. To do so, simply hang up on the active call. After a brief moment, the phone will ring; answer the phone to retrieve the call on hold.



Note

*There is no way to disable Call Waiting and the waiting tone. The typical method, *70, does not work with ISDN. Provision your ISDN line for capability U or V and Call Waiting will only be on the primary line. You may then use your fax or modem on the second line without disruption from the Call Waiting feature.*

CONFERENCE CALLING

To use conference calling, you must first have an active call. This call can either be one you have placed or have received.

- Press and release the receiver button. When you hear a dial tone, dial the number of the third party you wish to include in the conversation.
- To connect (bridge) all three parties, press and release the receiver button after the phone at the other end begins ringing or after the third party has answered.

If you misdial while calling the third party, press and release the receiver button before the phone at the other end begins ringing. This will abort the call.

If you hear a busy signal when calling the third party, press and release the receiver button. This will abort the call. You cannot bridge to a busy signal.

If you receive no answer when calling the third party, you must press and release the receiver button once, pause, then press and release it again—the first time to bridge the calls, the second to disconnect the third party call.

If your first caller hangs up before the calls are bridged, you will receive a dial tone when you attempt to bridge. Press and release the receiver button to return to your second call.

If your second caller hangs up before the calls are bridged, you will get silence on the line. After ten seconds, or if you press and release the receiver button, the other call will be retrieved.

To disconnect one of the parties, press and release the receiver button. This will disconnect the last party connected. You cannot disconnect the

party you called first; that party must hang up to be disconnected from the call.

If you hang up before the calls are bridged, your phone will ring to return you to your first call.

MESSAGE WAITING

This flexible calling feature, available on primary DN's to users who subscribe to a central office-based voice messaging service, notifies users when a message has been left and is waiting for them.

Message Waiting notification is indicated on the BitSURFR Pro through the voice port LEDs. Depending on which POTS port the message notification signal comes in on, either the Voice Port 1 or Voice Port 2 LED will double-blink (two short blinks followed by a pause, repeated) until the user retrieves the message(s) from the messaging service center.

FLEXIBLE CALLING FOR PACIFIC BELL CUSTOMERS

Note

The following applies only to users who receive ISDN service from Pacific Bell.

To use Flexible Calling services, you must change the value for each feature from its factory default. Use the table below as a guideline for changing the feature values.

Feature	Factory Default	Change Value to
Message Waiting	63	9
Drop	62	8
Transfer	61	7
Conference	60	6

Use the following AT commands to change the required feature values:

AT!V3=6

AT!V5=7

AT!V4=8

AT!V8=9

Flexible Calling

Immediately after issuing a command to change the factory defaults, you must invoke the AT command **AT>W>Z** to store and retain the new feature values.



Note

This function is performed automatically by SURFR Setup.

Chapter 8

Asynchronous Inverse Multiplexing Protocol

GENERAL

Asynchronous Inverse Multiplexing (AIMux), also known informally as asynchronous BONDING, is a protocol that permits asynchronous devices to pass data over one or two synchronous "BONDED" channels allowing data to be transferred at speeds up to 115.2 kbps.

The AIMux protocol supports a DTE rate of 115.2 kbps, as well as providing flow control to and from your computer. AIMux is not an error-correcting protocol. You may configure this option using AT commands or LocalMenu.

CONFIGURATION VIA AT COMMANDS

To configure the BitSURFR Pro for AIMux operation, enter:

AT%A2=3&M

Note

The AIMux command is actually the BONDING command (%A2=3) combined with the asynchronous DTE data mode command (&M).

The BitSURFR Pro also supports a Rate Multiplier option (@B0=n) that allows you to select the number of B-channels (1 or 2) to connect. By default, the BitSURFR Pro connects one B-channel. This keeps one channel open for voice calls. If you desire two channels, configure the Rate Multiplier for two B-channels (112 or 128 kbps). Enter:

AT@B0=2

To re-configure the Rate Multiplier for one B-channel (56 or 64 kbps), enter:

AT@B0=1

Set flow control, if desired, using the **AT\Qn** command. The flow control factory default is *bi-directional RTS/CTS*.



Note

The Quick Setup factory profile &FZ can be used to configure the BitSURFR Pro for the AIMux protocol. Note that the profile defaults to @B0=2, so if only one channel is required, @B0=1 should be added to the command string as follows: AT&F2@B0=1.

PLACING AN AIMUX BONDING CALL

You can place an AIMux call using any normal call placement method. The answering party must be set to run AIMux or the call will disconnect shortly after connection.



Note

To place an AIMux call, only one telephone number is required. If more than one channel is to be connected, the AIMux protocol automatically connects the second channel; you do not have to dial both numbers.

When establishing an AIMux connection, with the Rate Multiplier option set for 2 (**AT@B0=2**), the protocol will connect only the minimum number of channels required to support the lowest DTE speed. For example, if one PC or terminal is configured for 115.2 kbps and the other for 57.6 kbps, AIMux will connect only one channel. At higher rates, AIMux will connect both channels unless the Rate Multiplier option is set for 1 (**AT@B0=1**).



Note

If both B-channels are in use for an AIMux call, you will lose your voice capability for the duration of the call. Likewise, you cannot place an AIMux call using both channels if a voice call is already established.

If the DTE speeds are not the same, the PC or terminal configured for the higher speed must be configured for flow control. Otherwise, AIMux will not make the connection because loss of data is likely.

When an AIMux call is connected, the DTE status LED indicates the number of channels connected. The DTE status LED will flash fast

when only one channel is connected and will be steady when two channels are connected.

DISCONNECTING AN AIMUX CALL

Disconnecting a data call disconnects all channels associated with AIMux. If either channel is disconnected by the switch (service provider equipment), the entire call is disconnected by the BitSURFR Pro.

Chapter 9 Point-to-Point Protocol

GENERAL

Point-to-Point Protocol (PPP) provides a standard method of transporting multi-protocol datagrams (a unit of transmission in the network layer such as IP) over point-to-point links. PPP is a popular protocol standard used in the equipment employed by many Internet Service Providers (ISP). The PPP feature allows the BitSURFR Pro (in asynchronous mode) to connect with a remote synchronous PPP device over the ISDN.

PPP can be either single-link (using one B-channel to permit throughput up to 64 kbps) or multilink (using two B-channels to permit throughput greater than 64 kbps).

An Internet access package is required to use PPP. You may configure PPP using AT commands or LocalMenu. Both the calling party and the answering party must be set to run the same protocol--single-link or multilink otherwise, the call will disconnect.

DYNAMIC CHANNEL ALLOCATION (DCA)

The BitSURFR Pro Multilink PPP Protocol DCA feature allows you to dynamically drop one of the channels used for the multilink PPP call for use by voice port 1 only. Voice port 2 cannot be used for DCA.

Note

If you need support for DCA, you must have an NI-1 line with the "additional call offering" feature enabled.

If you have configured the BitSURFR Pro for Multilink PPP and your ISDN line is provisioned to allow *Additional Call Offerings*, an incoming call on the Voice 1 directory number will be indicated by ringing the phone.

Note

If a voice call is received while both channels are in use with a Multilink PPP call, Caller ID information for the voice call will not be delivered to a Caller ID box. The Caller ID information will be logged if logging is enabled.

If you answer the phone, the BitSURFR Pro will automatically use only one B-channel for PPP allowing the other B-channel to be used for the voice call. PPP throughput will be reduced while the voice call is active. When the voice call is complete, the BitSURFR Pro will then resume using both B-channels for PPP. Similarly, if you place a call on Voice Port 1, the BitSURFR Pro will use only one B-channel for PPP and likewise resume using both B-channels when the call is complete.



Note

While your BitSURFR Pro controls the channels allotted to outgoing calls, the control of channels allotted to incoming calls involves your telephone company's switch equipment. If you have an AT&T custom configuration (as opposed to AT&T NI-1), your BitSURFR Pro will not be able to provide Dynamic Channel Allocation for incoming calls during a Point-to-Point connection if your ISDN provider is AT&T. In this case, incoming calls will receive a busy signal as long as you are using both B-channels for a multilink PPP call.

CONFIGURATION USING AT COMMANDS

To configure the BitSURFR Pro for single-link PPP:

1. Enter the command: **AT%A2=95**
2. Set the rate multiplier to 1 by entering the command:
AT@B0=1
3. If Password Authentication Protocol is required, enter the command: **AT@M2=P**

You can also enter these commands as part of the initialization string.



Note

The Quick Setup factory profile &F1 can be used to quickly and easily configure for single-link PPP operation and can be used in combination with @B0=2 to configure for Multi-link PPP operation.

To configure the BitSURFR Pro for multilink PPP:

1. Enter the command: **AT%A2=95**

2. Set the rate multiplier to 2 by entering the command:
AT@B0=2
3. If Password Authentication Protocol is required, enter the command: **AT@M2=P** . To disable Password Authentication Protocol, enter the command: **AT@M2=N**



Note

Bi-directional RTS/CTS flow control (\Q3) is the only flow control supported by the PPP protocol; XON / XOFF is not supported.

PLACING A PPP CALL

You can place a PPP call using any normal call placement method. Both the answering party and the calling party must be set to run PPP, and the protocols must match--they must both be single-link or multilink. Otherwise, the call will disconnect.

To place a single-link call, only one telephone number is required.

To place a multilink call, two telephone numbers separated by an ampersand (&) are required as in the following example:

ATD5551212&5551313

The telephone numbers are provided by the service you will connect with. Typically, only one number is provided for multilink PPP; in this case, simply enter the number twice, and make sure the numbers are separated by an ampersand as shown above.



Note

During Multilink PPP sessions you will lose Caller ID capability to the POTS ports.

When a multilink call is established, the DTE status LED indicates the number of channels connected. The DTE status LED will flash fast when only one channel is connected; specifically during the setup of the second channel or when the second channel is dropped to answer or place a voice call. Any time two channels are connected, the DTE status LED will be on steady green. Note that during initial call setup, the

second channel may be added so fast that the fast-flash is not noticeable. When a single-link call is established, the DTE status LED will be on steady (not flashing) green.

DISCONNECTING A PPP CALL

Disconnecting a data call disconnects all channels associated with PPP. If either channel of a multilink PPP call is disconnected by the switch (service provider equipment), the entire call is disconnected.

AUTHENTICATION PROTOCOLS (PAP & CHAP)

The BitSURFR Pro supports two authentication methods in conjunction with the Point-to-Point protocol: Password Authentication Protocol (PAP) and Challenge-Handshake Authentication Protocol (CHAP).

CHAP supports multiple authentication algorithms, and the BitSURFR Pro supports two of these algorithms: CHAP-MD5 and CHAP-MS. CHAP-MD5 is widely used in the industry as the standard CHAP algorithm. CHAP-MS is a version of the algorithm developed by Microsoft and is used on Microsoft NT RAS servers.

PAP and CHAP are enabled using the AT command `@M2`. See the “Authentication Protocols (PAP and CHAP) `@M2`” section on page 4-13 for a full description of these commands.

The CHAP feature supports two message modes: Pass-through and Respond. In Pass-through mode the BitSURFR Pro passes all challenge messages to the DTE. In Respond mode the BitSURFR Pro responds to all challenge messages by using the provided password and the built-in algorithm. The Respond feature is necessary for proper operation of Windows 95 Dial-up Networking when used with MD5 CHAP.

Your BitSURFR Pro defaults to the Pass-through mode. Respond mode is invoked either by entering the AT command `@M2="password"` or the dial-string modifier `>P="password"`. If you provide the dial-string modifier and also use the `@M2="password"` command, the password in the dial-string modifier takes precedence and will be used by the BitSURFR Pro. See the “CHAP Respond Mode `@M2`” section on page 4-13 for a full description of this command.

Chapter 10 Synchronous Operation

SYNCHRONOUS MODES

Your BitSURFR Pro supports two synchronous modes. Operation in each of these modes is described below.



Note

Your BitSURFR Pro cannot operate in synchronous mode if attached to a PC or asynchronous terminal (unless an add-in synchronous card is installed in your PC). It must be attached to a synchronous DTE. The BitSURFR Pro's synchronous features are designed primarily for various commercial applications.

Synchronous Mode 1: Sync Pause Mode

Synchronous mode 1 is for DTEs that are capable of both asynchronous and synchronous operation on the same port. In this mode, the BitSURFR Pro operates asynchronously in the AT command mode when off-line. The BitSURFR Pro switches over to synchronous mode after the connection is established.

Dialing is performed in the same manner as in asynchronous mode. The BitSURFR Pro sends all status and connect messages to the DTE in asynchronous mode. When a connection is made, the BitSURFR Pro delays for 5 seconds (configurable with the **S25** command) before monitoring DTR.

This delay serves two purposes. If separate dialing and communication terminals are used, this allows the terminal operator to switch the cable between the two. If separate dialing and communications software is being used on the same terminal, the delay allows time for the dialing software to complete and the communications software to initialize and turn DTR on.

After the BitSURFR Pro connects, the DSR, CD, and CTS pins will be high. This can be used by the DTE as an indication to begin sending synchronous data to the BitSURFR Pro.

The BitSURFR Pro disconnects if it detects an on-to-off transition of the DTR pin when **&D0** is not in effect, or it receives a disconnect message from the switch. After a disconnect, the BitSURFR Pro returns to the off-line state. If the BitSURFR Pro is set to auto answer, it will only answer when DTR is on or **&D0** is in effect. If you do not want the BitSURFR Pro to answer, DTR must remain low for at least 8 seconds after the ringing ends.

Synchronous Mode 2: Dial Stored Number Mode

The BitSURFR Pro will automatically dial the telephone number stored in directory entry number 0 when it detects an off-to-on transition of the DTR pin.

Once the BitSURFR Pro connects, the DSR, CD, and CTS pins will be high to indicate to the DTE that it can begin sending synchronous data.

The BitSURFR Pro disconnects upon detecting an on-to-off transition of the DTR pin when **&D0** is not in effect, or receiving a disconnect message from the switch. After disconnecting, the BitSURFR Pro hangs up and returns to the off-line state.

If the BitSURFR Pro is set to auto answer, it will only answer when DTR is on or **&D0** is in effect. If you do not want the BitSURFR Pro to answer, DTR must remain off for at least 8 seconds after the ringing ends. After that time, if DTR turns on, the BitSURFR Pro will originate a call. If DTR turns on during the ringing process, but before the required ring count is reached, the BitSURFR Pro will not originate a call.

V.25bis Dialer Synchronous Mode

When V.25bis dialer mode is selected, the correct synchronous mode is automatically set. A full description of the V.25bis dialer can be found in Chapter 12.

Chapter 11 BONDING Protocol

GENERAL

BONDING is a protocol standard from the Bandwidth ON Demand INteroperability Group for combining the bandwidth of several 56 kbps or 64 kbps channels.

 Note

BONDING is a synchronous protocol; you may not use it if your BitSURFR Pro is attached to a PC or asynchronous terminal (unless an add-in synchronous card is installed in your PC).

BONDING can "bond" from two to 31 channels at once. The high-speed data, which must be grouped in multiples of 56 kbps or 64 kbps, is split into the various channels after arrival at the DTE interface. On the opposite end, the data is recombined into the original data stream and sent to the DTE interface. Due to delays between different calls, the channels are delay-equalized to permit correct positioning of data for the interleaving.

 Note

Although the BONDING specification defines four modes, Mode 1 is the common mode of operation for all BONDING-compatible implementations, and is the only mode supported by the BitSURFR Pro.

BONDING ON THE BITSURFR PRO

Because the BitSURFR Pro supports one ISDN basic rate interface (2B+D), two simultaneous calls can be made for an effective bandwidth of 112 kbps (2 x 56 kbps) or 128 kbps (2 x 64 kbps).

CONFIGURATION USING AT COMMANDS

To configure the BitSURFR Pro for BONDING protocol, include the following commands in the initialization string:

- To select the BONDING protocol, enter:
AT%A2=3&M1

- To configure the Rate Multiplier for two B-channels, enter:

AT@B0=2

PLACING A BONDING CALL

You can place a BONDING call by entering the AT command **ATD**. The answering party must be set to run BONDING or the call will disconnect shortly after connection.



Note

To place an BONDING call, only one telephone number is required. If more than one channel is to be connected, the BONDING protocol automatically connects the second channel; you do not have to dial both numbers.

If you have specified a rate multiplier of 2 and the answering party indicates it will support 2 or more channels for BONDING, the answering side will pass the directory number for the second call in the negotiation. The second call is made automatically, and is indicated by the flashing DTE (data port call status) LED. If delay equalization between the channels is obtained, data mode is entered. The terminal screen will indicate the BONDING connection and the DTE speed (56 kbps, 64 kbps, 112 kbps, or 128 kbps), and the LS LED will be on.



Note

When a rate multiple of 2 is negotiated, both B-channels are used and therefore a voice call is prevented from being made for the duration of the BONDING call. Likewise, a BONDING call with a rate multiplier of 2 is not possible when a voice call is established.

If the rate multiple is set to 1 on either the originator or answerer, the second call will not be made and data mode will be entered immediately after negotiation. The terminal screen will indicate the speed the call connected at on units so equipped.

If the BitSURFR Pro is answering a multi-channel call, the voice directory number will be used for the second call. If you are using a point-to-point line with only one directory number, then upon answering a BONDING call requesting two channels, this directory number will be

sent to the origination side (the same number as the first one dialed). This is because a point-to-point line can receive two calls using the same directory number. AT&T 5E5/5E6 can also be configured to receive two calls using the same directory number.

When a BONDING call is connected, the DTE status LED indicates the number of channels connected. The DTE status LED will flash fast when only one channel is connected and will be steady green when two channels are connected.

DISCONNECTING A BONDING CALL

Disconnecting a data call disconnects all BONDING channels. If either channel is disconnected by the switch, the entire call is disconnected by the BitSURFR Pro. The disconnection can be validated by the DTE LED being off.

Chapter 12

V.25bis Dialer Operation

GENERAL

V.25bis is an autodialer option used by synchronous Data Terminal Equipment (DTE) to control dialing and terminal adapter functions.



Note

V.25bis Dialer is a synchronous protocol and may not be used by the BitSURFR Pro if it is attached to a PC or asynchronous terminal (unless an add-in synchronous card is installed in your PC). The BitSURFR Pro's synchronous features are designed primarily for various commercial applications.

Your BitSURFR Pro supports a subset of the CCITT V.25bis recommendation, primarily intended for the dialing and answering commands for HDLC or bisYNC modes of V.25bis operation.

SELECTING V.25BIS

The V.25bis option is selected using the **AT@P1** command. To select V.25bis, type one of the following AT commands:

- **AT@P1=VB** for V.25bis bisYNC mode.
- **AT@P1=VH** for V.25bis HDLC mode.

The DTR pin is used to activate the V.25bis dialer. When the DTR pin is turned on, use the dialer command setting to start the appropriate V.25bis mode.



Note

The Quick Setup factory profile &F3 can be used to quickly and easily configure the BitSURFR Pro for V.25bis HDLC operation.

When you select V.25bis dialer operation, use the DTE Speed option to configure the dialer port speed.



Note

The V.25bis dialer option is not activated until the DTR signal has been turned off and then back on. This must

likely will occur when the asynchronous DTE used to enter AT commands is disconnected from the DTE port and the device which uses the V.25bis dialing feature is connected. Once the V.25bis dialer is activated, AT commands can no longer be entered.

OPERATION IN V.25BIS MODE

When the V.25bis option is enabled, most BitSURFR Pro options still apply. Selecting V.25bis forces the BitSURFR Pro into synchronous communication mode (regardless of the synchronous mode option). Only the DCD pin option setting applies when V.25bis is enabled and the BitSURFR Pro is off-line.



Note

The BitSURFR Pro V.25bis HDLC mode operates only as ASCII NRZ.

REACTIVATING THE AT COMMAND PROCESSOR

The V.25bis dialer option and the AT command processor cannot be active at the same time. Subsequently, once the V.25bis dialer has been activated, the BitSURFR Pro will have to be “forced” back to its factory default configuration in order to reactivate the AT command processor. This is accomplished by placing the switch labeled 4 on the 4-position switch located on the rear of the BitSURFR Pro into the ON position and removing and reapplying power to the BitSURFR Pro. AT commands can now be entered and the V.25bis dialer will no longer be active.

DTE INTERFACE PINS

The function of some pins on the DTE port is different for V.25bis modes than in other synchronous modes.

DTR Pin Operation

For the BitSURFR Pro to accept V.25bis commands, the DTE must hold the DTR signal high. When configured for V.25bis dialing, the DTR pin option setting does not apply because the V.25bis specification explicitly defines how the dialer will respond to changes in DTR.

DCD Pin Operation

The default operation of the V.25bis dialer asserts the DCD pin when DTR is high (DCD follows DTR). Some devices may require DCD to be low until the connection is established. For those devices, the BitSURFR Pro can be configured only to raise DCD upon connection by setting the DCD pin option to NORMAL. The DCD pin option setting of ON is the default for CCITT V.25bis operation. Refer to the Terminal Interface and Pin Options section in Chapter 4 of this manual.

CTS Pin Operation

The BitSURFR Pro asserts the CTS pin when DTR is high (CTS follows DTR), except that CTS goes low during the connect sequence.

DSR Pin Operation

The BitSURFR Pro holds the DSR pin low until a connection has been established.

COMMAND MESSAGES

The following V.25bis commands are supported by the BitSURFR Pro.

Command	Description
CRN	Dial command.
CIC	Connect incoming calls.
DIC	Disregard incoming calls.

INDICATION MESSAGES

The following V.25bis indications are supported by the BitSURFR Pro.

Command	Description
CNX	Call connect indication.
INC	Incoming call indication.

RESPONSE MESSAGES

The BitSURFR Pro sends a response message immediately after receiving a V.25bis command message. Response message characters and functions are listed below.

Response	Function
VAL	Valid command.
INV	Invalid command. Command is invalid or inappropriate.
INVCU	Command unknown. Transmission error (parity, framing) occurred.
INVMS	Invalid Message Syntax. Command is too long; command contains invalid characters.
INVPS	Invalid Parameter Syntax. Wrong number of parameters; parameter contains invalid character or too many characters.
INVPV	Invalid Parameter Value. Parameter is out of range or is null.
CFICB	Call Failure, Local DCE busy.
CFI	Call Failure, Reason Unknown.

Chapter 13

Using Softloads to Upgrade the BitSURFR Pro

GENERAL

The softload feature allows new software to be downloaded from your PC into your BitSURFR Pro through the data port. This allows software updates and new features to be added to your BitSURFR Pro without physically removing the unit from service.



Note

You only should attempt to softload files that have been obtained directly from the Motorola Web Page, Motorola BBS, or Motorola. For addresses and phone numbers, refer to the page titled "Service And Support" at the rear of this manual.

The BitSURFR Pro softload file contains an ASCII coded "header" which can be displayed to verify the software's product and version information before initiating the softload. On DOS-based PCs, you can accomplish this using the **TYPE** command. For example, to view the header information of a file called SAMPLE.SL, enter:

TYPE SAMPLE.SL

A typical header is displayed below.

```
METHOD: SOFTLOAD YGMS-1
PRODUCT: BitSURFR Pro
BOARD ID: 4574190
CPU ID: 0
VERSION: 1F
```

When you obtain the softload file, you should also receive a utility called SOFTLOAD.EXE. This utility allows you to softload your BitSURFR Pro by entering a command from the DOS prompt.



Note

It is strongly recommended that you use the ISDN SURFR Setup utility to upgrade your BitSURFR Pro ISA because it eliminates several possible errors that could occur in the soft-loading process.

SOFTLOAD USING ISDN SURFR SETUP FOR WINDOWS

Use the following instructions to upgrade your BitSURFR Pro using the ISDN SURFR Setup for Windows utility:

1. Obtain the software update file. This will be a data file with a ".SL" file extension. Read any associated text files provided with the softload file for notes and additional instructions.
2. From Windows, launch the ISDN SURFR Setup utility provided with your BitSURFR Pro ISA. Make sure that it properly detects the BitSURFR Pro ISA that you want to upgrade.
3. Click on the *Softload* button.
4. A confirmation dialog box will appear. Click the *OK* button.
5. You will be prompted to select the softload file. After you have selected the appropriate file (with the ".SL" extension), click *OK*. The softload process will begin.

Do not reboot or remove power from your PC, or otherwise interrupt the softload process during this procedure.

After about five minutes or so, the process will be complete. A dialog box will appear to report that the upgrade was successful.

SOFTLOAD USING THE DOS SOFTLOAD UTILITY

Use the following instructions to upgrade your BitSURFR Pro using the Softload utility:

1. Connect your BitSURFR Pro to a COM port on your PC. Power on the BitSURFR Pro.
2. Obtain the software update file. This will be a data file with an ".SL" extension. Read any text file provided with the software file for notes and instructions.
3. From the DOS command line, run the softload utility. Specify the COM port to which your BitSURFR Pro is connected and the name of the softload file to download. For example, the command line:

SOFTLOAD /C2 SAMPLE.SL

downloads SAMPLE.SL to the BitSURFR Pro connected at COM2. You can use /C1, /C3 or /C4 to indicate COM1, COM3, or COM4.

4. For help, enter: **SOFTLOAD /?**.

**Note**

Do not run the Softload program under Windows. If you are running Windows 3.1 or 3.11, exit Windows before running this program. If you are running Windows 95, shut down Windows and restart your computer in MS-DOS mode.

Softload will last a few minutes. During this time do not turn off or re-boot your computer or BitSURFR Pro. When the softload is complete, you will see the message "Softload successfully completed."

If power is removed from the BitSURFR Pro during a softload, or if the computer is accidentally re-booted during a softload, then you must start another softload using this softload utility. The BitSURFR Pro will not otherwise function until a successful softload has been completed.

SOFTLOAD USING A COMMUNICATIONS PACKAGE**Caution**

Read all instructions before attempting a softload!

The softload facility in the BitSURFR Pro supports the following functions: set/display softload password, request softload version information, and initiate softload. All softload operations must be initiated using the AT commands, listed in the chart and described below:

Command	Operation
%P1	Display or set softload password.
\$Q	Request softload version information.
\$Y=x	Initiate softload with password x.

Set/Display Softload Password %P1

You must enter a password to perform softload. This helps prevent accidental softload attempts. Use the **%P1** command to display or change your softload password.

Softload

The password, stored in nonvolatile memory, consists of zero to eight alphanumeric digits. Leading zeros are significant, and the password is case sensitive. You can disable the password, preventing any softload operations except inquiries.

By default, the softload password is set to null. Commands for resetting your softload password are listed on the chart below.

Command	Operation
%P1?	Display softload password.
%P1=x	Set softload password to x, where x is 0-8 alphanumeric digits.
%P1=D	Disable the softload function. To enable softload, set your password again.



Note

We recommend that you change the softload password when you initially configure your unit in order to prevent accidental softload attempts.

Request Softload Product Version Information \$Q

The **\$Q** command returns the product code and the version number of the software currently being used by the BitSURFR Pro. It can provide a positive verification of the success of a softload operation. A typical response to the **\$Q** command might be:

```
PRODUCT NUMBER: 4574190
ACTIVE SOFTWARE: 1F
BOOT SECTOR INFO --
SOFTLOAD METHOD: SOFTLOAD YGMS-1
PRODUCT ID: BitSURFR Pro
BOARD NUMBER: 4574190
REVISION: 1F
TIMESTAMP: JAN 26 96 22:30
```

Initiate Software Download \$Y=x

Before initiating softload, configure both the BitSURFR Pro and the communications package for RTS/CTS flow control (hardware handshaking). Do not use software flow control (XON/XOFF) since the softload files contain XON/XOFF characters that would be misinterpreted as flow control characters.

**Caution**

If the communications software is not set to hardware (RTS/CTS) flow control, the softload will fail!

The file transfer software should be set to 38400 bps (or the fastest data rate that the PC can support) full duplex asynchronous operation, eight-bit characters, no parity.

The **\$Y** command initiates softload. This command requires the softload password previously set by the **%P1** command. If the password does not match the unit's stored password, the BitSURFR Pro will return an ERROR message.

If the password matches, the BitSURFR Pro begins by displaying the softload method ID. Then the BitSURFR Pro will display the message "READY", and it will enter the YModem-G receive mode. At this point the BitSURFR Pro is ready to accept a softload using the YModem-G transfer protocol. The BitSURFR Pro sends the YModem-G initiation character (G), and you may begin the file transfer. If a file transfer has not started within two minutes, the BitSURFR Pro will time out and send the message:

Error code: 0x75

Softload failed! Restarting softload

The BitSURFR Pro will re-enter the YModem-G receive mode, and begin sending the YModem-G initiation character again. The BitSURFR Pro is again ready to accept a softload.

At this point it is still possible to cancel the softload procedure, if a file transfer has not been started. If the command **\$Y=x** has been issued, but no file transfer has been attempted, then removing and re-applying power to the BitSURFR Pro will return the unit to normal AT command mode. Do not remove power from the BitSURFR Pro once a file transfer has been started.

**Caution**

Once a file transfer has begun, the BitSURFR Pro will lose all functionality except the ability to softload. If the transfer is canceled for any reason, then the BitSURFR Pro will re-

enter the YModem-G receive mode and will accept another softload attempt, but the BitSURFR Pro will not otherwise function until a valid softload is completed.

If power is removed from the BitSURFR Pro during a softload, then when power is restored the BitSURFR Pro will immediately re-enter the YModem-G receive mode. Another softload may proceed normally, except that the file must be uploaded at 19200 bps, regardless of the speed of the first softload. See the Softload Failure section at the end of this chapter for further instructions.

The YModem-G transfer should send one file. After the file has been transferred, the BitSURFR Pro will pause for several seconds. Do not remove power from the BitSURFR Pro during this pause. If the BitSURFR Pro verifies that the file has been received and programmed correctly, it will send the message:

"Softload successful, restarting TA"

The BitSURFR Pro will reset itself, and then it will be ready to perform with the new software upgrade.

If an error occurs during the transfer, see the section entitled "Softload Failure" at the end of this chapter.

A Typical Softload Session

The following example demonstrates a typical softload session from a PC using the HyperACCESS communications package supplied with your BitSURFR Pro.

The steps in performing a softload transfer are:

1. If there is a README.TXT file accompanying the softload file, read it for a description of the software contained in the softload file.
2. To be sure that the software in the softload file is correct, display the file on the PC (be careful not to modify it). At the top of each file is a header (ASCII format) containing the product and version information for the softload file. The DOS command "TYPE" may be used to display the file. The product should be "BitSURFR Pro" and the product ID should be "4574190".

3. For best results, the softload file should be on the PC's hard disk for the downloading process, not on a floppy disk.
4. Connect the PC to the BitSURFR Pro's DTE port. Begin the communications software program on the PC.
5. Configure the software for 38400 bps (or the fastest data rate that the PC can support) full-duplex asynchronous operation, 8-bit characters with no parity, and RTS/CTS flow control of the DTE (hardware handshaking). If the communications software is not set to RTS/CTS flow control, the softload will fail! To set HyperACCESS to RTS/CTS flow control, go to the Properties menu and open the Communications window. Then select the Port Setup button. Check the settings for Software Handshaking. Make sure that both of the Xon/Xoff options are deselected. Then check the settings for Hardware Handshaking. Make sure that RTS is selected for Receiving, and CTS is selected for Sending.
6. Using the terminal emulation on the PC, send an AT command to the BitSURFR Pro. The BitSURFR Pro should respond with **OK**.
7. Configure the BitSURFR Pro for RTS/CTS flow control. This may be done using either LocalMenu or the **AT+Q3** command.
8. Initiate softload. Enter the command **AT\$Y=x** (where *x* is the softload password). The TA responds with either ERROR (if the password is invalid) or the softload method banner (SOFTLOAD YGMS-1). This banner identifies the download method and file format. The BitSURFR Pro will send the message "READY" to indicate that it is ready for softload, and it will begin sending the YModem-G initiation character (**G**).
9. Initiate the YModem-G file upload on the PC. Upload only the ".SL" file to the BitSURFR Pro; do not attempt to send any other type of file. During the softload the TD (Transmit Data) LED on the BitSURFR Pro will blink green as the file is being sent to the BitSURFR Pro. Do not cancel the file transfer once it has begun. Do not remove power from the BitSURFR Pro during the softload.

10. When the file transfer is complete, the BitSURFR Pro will pause for several seconds. Do not remove power from the BitSURFR Pro during this pause! Then it will display the message “Softload successful, restarting TA”. The BitSURFR Pro will reset itself and return to AT command mode. Your BitSURFR Pro will be ready to perform using the new software upgrade.
11. If any errors are encountered during the file transfer, the BitSURFR Pro will display an error code and the message “Softload failed! Restarting softload” and it will re-enter YModem-G receive mode and begin sending the YModem-G initiation character (**G**). At this point a new file transfer may be started. If softload fails, see the Softload Failure section at the end of this chapter.

SOFTLOAD FAILURE

This section describes what to do if you get an error while softloading using a communications software package.

The BitSURFR Pro can contain only one set of software at a time. During a softload, the BitSURFR Pro is replacing its existing software with the new software contained in the softload file. For this reason, if the file transfer is interrupted for any reason, then the software in the BitSURFR Pro will be incomplete, and the BitSURFR Pro will be unable to function. In most cases, it will retain enough functionality to perform another softload. A successful softload must be performed before the BitSURFR Pro will be able to operate normally.

Canceling Softload Before a File Transfer has been Started

When the **AT\$Y=x** command is issued, the BitSURFR Pro responds with the softload method banner and the message “READY”. It will begin sending the YModem-G initiation character (**G**). At this point it is possible to cancel the softload, by removing and reapplying power to the BitSURFR Pro, as long as a file transfer has not been started. Do not remove power from the BitSURFR Pro if a file transfer has been started. After a file transfer begins, it is impossible to return to the old software.

Interrupted File Transfer

Do not cancel a file transfer, since this will render the BitSURFR Pro unable to function except to perform another softload. If a file transfer is accidentally interrupted, then the BitSURFR Pro will display an error code and the message "Softload Failed! Restarting softload". The BitSURFR Pro will then re-enter the YModem-G receive mode and will send the YModem-G initiation character (**G**). At this point you may start a new file transfer, however, the communications software must be set to 19200 bps, 8-bit characters and no parity before initiating the file transfer. The softload will be invalid at any other setting. If the softload transfer is successful, the TA will then restart itself and be fully operational with the new software upgrade.

If a Softload Attempt Fails

If a softload attempt fails, do not remove power from the BitSURFR Pro. The BitSURFR Pro should be sending the YModem-G initiation character (**G**) continuously. Re-read this chapter, and check the setup on your communications package. Then attempt another softload. If repeated softload attempts fail, contact Motorola ISG technical support for assistance. See the pages titled *Service and Support* at the rear of this manual for details.

If BitSURFR Pro Does Not Respond After a Softload Attempt

After a successful softload, your BitSURFR Pro should respond to AT commands. If the softload failed, the BitSURFR Pro should re-enter the YModem-G receive mode. It will not respond to AT commands while in YModem-G receive mode. In this mode, the BitSURFR Pro should send the YModem-G initiation character (**G**) to the terminal continuously, indicating that the BitSURFR Pro is ready for softload.

If power has been removed from the BitSURFR Pro during a softload attempt or after a softload failure, make sure the communications package is set to 19200 bps before another softload is attempted. If power has not been removed, then do not change the DTE speed.

If your BitSURFR Pro will not respond to AT commands, and the YModem-G initiation character (**G**) is not being sent to the terminal, try sending the Ymodem-G Cancel command (**Ctrl-X**). Depress the Ctrl-X keystroke combination repeatedly until you see the message "Softload

Softload

failed! Restarting Softload" and the BitSURFR Pro begins sending G's. If there is still no response, try removing and then reapplying power to the BitSURFR Pro.

Chapter 14

Troubleshooting Guide

GENERAL

This chapter discusses basic troubleshooting and also provides information on where to find further help, if necessary. In nearly all cases where you have a problem with the BitSURFR Pro, the problem is not that the BitSURFR Pro is broken or not functioning properly; rather, there is a loose connection or an error has been made in configuring your BitSURFR Pro or your ISDN line. This chapter deals with the most common problems that you might encounter during installation, configuration, and operating the BitSURFR Pro.



Caution

Do not attempt to repair the BitSURFR Pro yourself. Both FCC and IC regulations prohibit user servicing.

Because a data communications system typically involves a number of components (the PC, the BitSURFR Pro, the cables, the telephone line, the remote TA and the remote PC), there are many factors that can contribute to a communications problem. The first step is to identify where in the system the problem lies.

Before you begin troubleshooting, consider the following:

- Has the problem always been there, or did it start recently?
- If the problem started recently, what has changed since the BitSURFR Pro last worked? Was the BitSURFR Pro's configuration changed? Was the PC's configuration or software changed? Are you trying to communicate with a different remote device, or has the remote device's configuration changed?
- Is the problem intermittent, or can you duplicate it at will?
- Does the BitSURFR Pro work with other remote devices or with other PCs?
- Check the BitSURFR Pro's configuration. Make sure that the BitSURFR Pro's switch options match those provided by your service provider.
- Does the problem occur when placing data calls, and does it affect voice operation as well?

The answers to these questions may help you identify the source of the problem. If you don't know where the problem lies, or if the problem seems to be in the BitSURFR Pro, the following section may help you pinpoint and correct the problem. Each describes a problem symptom, and explains the possible causes and solutions. If the problem persists even after following the troubleshooting procedures, contact Motorola for assistance. See the *Service and Support* section at the end of this guide for information on how to contact Motorola.

If you are using a communications software package on your PC, see if it provides a terminal emulation mode so that you can communicate directly with the BitSURFR Pro. This will allow you to enter AT commands directly to the BitSURFR Pro, and see the responses on the screen.

Problem #1: When power is turned on, nothing happens.

Possible Cause: The BitSURFR Pro may not be getting power.

Possible Solution: Check to be sure the power adapter is plugged in to a live outlet.

Problem #2: The BitSURFR Pro will not communicate or establish a link to the network switch (The LS LED will not turn green after I configure the BitSURFR Pro and connect the ISDN line). Or, I get a NO DIALTONE message when attempting to place a data call, or there is no dial tone when I pick up the phone.

Possible Solutions:

- Ensure the ISDN cable is connected.
- Try performing a network restart. (AT>Z)
- Verify that the switch type and version settings are for the correct switch.
- Verify that the DNs, SPIDs, and TEI values match those agreed to at subscription time with the network provider. Also check that the switch options have been saved into the stored profile and the network link has been restarted. (AT>W>Z)
- Verify that the network switch supports Northern Telecom ISDN Basic Rate Access on the user-network interface and functional mode operation in the layer 3 user network signaling, or AT&T

ISDN Basic Rate Access 5ESS generic program 5E4.2 or above for a TYPE A terminal, or National ISDN-1 Basic Rate Access for a basic (non-EKTS) terminal.

- Verify that for Northern Telecom and National ISDN-1, EKTS and CACH are turned off at the switch and there are no supplementary data services turned on. (EKTS may be turned on at PacBell DMS100 NI-1 switches.)

Problem #3: The BitSURFR Pro appears to power up correctly, but does not respond to AT commands sent from the PC.

Possible Cause: The TD LED indicates if the BitSURFR Pro is receiving any data from the PC. If the TD LED does not blink when the PC sends an AT command, the problem may be in the PC or the cable.

Possible Solutions:

- Check your PC, terminal, or other DTE. Make sure it is configured properly and is set up to communicate using the correct port.
- Check the DTE cable. Is it connected properly?
- You may need a different type of DTE cable. If your DTE port is set up as a DCE, then you may need a crossover (null modem) cable, which reverses the receive and transmit lines. Try to find out the function of the pins on your equipment's serial interface port, and compare them with the BitSURFR Pro's pin functions listed in Appendix E "Interfaces". For example, the PC's receive pin should be connected to the BitSURFR Pro's transmit pin, and vice versa.
- Some PCs or other DTEs expect a CD and CTS signal from the BitSURFR Pro in order to transmit. In the BitSURFR Pro's default configuration, both CD and CTS are forced (always on).

Possible Cause: If the TD LED blinks when the BitSURFR Pro receives an AT command, but the RD LED does not blink (indicating that the BitSURFR Pro does not respond to the command), then the problem may be in either your PC's configuration or the BitSURFR Pro's configuration.

Possible Solutions:

- Make sure the BitSURFR Pro is set to the proper communications mode. The BitSURFR Pro will only respond to AT commands if it is in the command mode.

- Make sure the BitSURFR Pro's AT command interpreter is enabled. Try unplugging then re-plugging the power supply to cause the BitSURFR Pro to reset. If you still cannot send AT commands or otherwise configure the BitSURFR Pro, locate the 4-position switch on the rear panel, place switch position 4 in the ON position, and restart by unplugging then re-plugging the power cord.



Caution

Unplug the power cord from the wall or power strip; do not unplug it from the BitSURFR Pro.

- Be sure that your PC or other DTE either provides a DTR signal, or that the BitSURFR Pro is set to force DTR On (DTR Option 0, **AT&D**).

Problem #4: AT commands echoed from the BitSURFR Pro are not displayed correctly at the PC (but response messages are).

Possible Solution: Check the DTE echo option. If the PC displays duplicate characters (i.e. **AATT**), DTE echo should be disabled (**ATE**). If the PC does not display AT at all, be sure DTE echo is enabled (**ATE1**).

Problem #5: AT response messages are not being displayed properly at the PC (but AT commands are).

Possible Solutions:

- First, be sure that the BitSURFR Pro's AT command interpreter is enabled and that AT messages are enabled. Both these settings are the default.
- If numbers are being returned from the BitSURFR Pro when you enter commands, the BitSURFR Pro is probably set to return message codes instead of messages. Change to the message code option (**ATV1**).
- Some terminals automatically display what is typed, rather than waiting for the BitSURFR Pro to echo the characters (half-duplex mode). It is possible that the AT commands aren't really getting to the BitSURFR Pro at all, but are being displayed on the terminal anyway. If the AT commands are getting to the BitSURFR Pro, it's TD LED will blink.

Problem #6: Data calls do not automatically answer.

Possible Solution: Check that the rings to answer command **S0** is set to a nonzero value. Also, if the ring count is set too high, the calling device may time out and terminate the call.

Problem #7: Data calls connect but automatically terminate within about 5 seconds.

Possible Solutions:

- Check that the remote device is running the same rate adaption protocol.
- Make sure you are calling the correct device.

Problem #8: Calls to the BitSURFR Pro are rejected by the BitSURFR Pro or calls from the BitSURFR Pro are not accepted by the switch.

Possible Solutions:

- Verify that the switch type and version settings are for the correct switch.
- Verify that the SPID and DN match the number agreed to at subscription time with the local telephone company. Also check that the switch options have been saved in the stored profile and that the network link has been restarted (**AT>W>Z**).
- Verify that the line is configured at the switch to accept the type of call desired. Data calls need circuit-switched data capability, and voice calls need circuit-switched voice capability.

Problem #9: When the BitSURFR Pro tries to dial or answer data calls, it aborts for no apparent reason.

Possible Cause: This can occur if the PC sends any characters to the BitSURFR Pro while it is dialing, answering, or connecting. The BitSURFR Pro has a feature called any key abort that aborts the call if any characters are received from the PC before the call is connected.

Possible Solution: If this problem occurs in the answer mode on the first ring, the problem may be that the PC is echoing the RING message back to the BitSURFR Pro, causing it to abort. In this case, you can disable response messages using the **ATQ** command.

Problem #10: After a data call connects, your PC receives bad or garbled data.

Possible Cause: This usually indicates a rate adaption problem.

Possible Solutions:

- Verify that both the BitSURFR Pro and the remote device are set for the same rate adaption protocol (e.g., V.120).
- The remote device may be trying to establish a synchronous protocol, unaware that the BitSURFR Pro is set for asynchronous mode. Suspect this problem if the garbled data consists of long streams of one or two characters. To correct the problem find out which mode and protocol the remote device is attempting, and set your BitSURFR Pro and PC accordingly.

Problem #11: After a data call connects, the BitSURFR Pro seems to intermittently lose data, especially when transferring large amounts of data.

Possible Cause: This usually indicates a flow control problem.

Possible Solutions:

- Be sure that the BitSURFR Pro and PC flow control methods match. Flow control must be configured in both. Refer to the section TERMINAL INTERFACE AND PIN OPTIONS, and Flow Control in Chapter 4.
- Remember that if you are using the clear channel protocol, there is normally no flow control between the two devices. You may want to use V.120, if possible, since it supports this feature.
- You must have a 16550 UART for maximum performance. In addition, multimedia PCs require enough processing power to service the serial port in a timely manner. A 486/100MHz PC is the minimum system required for multimedia and high-speed serial operation.

Problem #12: The BitSURFR Pro hangs up in the middle of a data call.

Possible Cause: V.120 frame size is incompatible.

Possible Solutions:

- Some ISDN modems can only accommodate 126 byte V.120 transmit frame sizes. If your call hangs up when using V.120 protocol, set V.120 maximum transmit frame size to 126 (**AT%E0=126**).
- If your BitSURFR Pro appears to be initiating the disconnect, refer to the Call Termination section in Chapter 5, Call Placement for a list of the possible reasons for call termination.

Problem #13: After a data call is made, the BitSURFR Pro intermittently stops sending or receiving data.

Possible Solution:

Check to see if software flow control (such as XON/XOFF) is enabled in the BitSURFR Pro or in the PC. If so, you can only transfer ASCII (text) data. Binary files may contain embedded XON or XOFF characters, which can be misinterpreted as flow control signals. If you need to send binary data, use hardware flow control methods. Refer to the sections TERMINAL INTERFACE AND PIN OPTIONS, and Flow Control Options \Q, in Chapter 4, Option Configuration.

Problem #14: The BitSURFR Pro seems to take an excessive amount of time to establish an ISDN connection (the LS LED or SURFR Setup status display have excessive delays before indicating that the line is ACTIVE).

Possible Cause: The BitSURFR Pro has a random timer that may delay ISDN connection for up to two minutes. This timer is designed to prevent overloading the central office switch in case it fails then comes back on line.

Possible Solution:

Wait until the ISDN connection is made (not more than two minutes), or, if you have a telephone attached, bring the connection up immediately by picking up the handset then hanging up. If the connection is not made within two minutes, refer to Problem #2 in this chapter.

Problem #15: All my ISDN parameters are correct and the BitSURFR Pro does not connect with the remote ISDN modem I am calling.

Possible Solutions:

- You are using the wrong B-channel rate adaptation protocol. V.120 is the common protocol to use for asynchronous applications such as when calling an ISDN BBS. Some Internet Service Providers (ISPs) may use V.120 depending on their equipment. Select the V.120 protocol with **AT%A2=2**.
- You are using the wrong B-channel rate adaptation protocol. Async-to-Sync PPP protocol is the common protocol used for Internet access. Many ISPs require ISDN users to use sync PPP as the access method to their equipment. Select Async-to-Sync PPP protocol with **AT%A2=95**. The BitSURFR Pro seems to take an excessive amount of time to establish an ISDN connection (the LS LED has excessive delays before indicating that the line is ACTIVE).
- You have entered the wrong phone number when dialing. Check the dialed number for correctness.
- Your ISDN line channel speed is set to 64 kbps, but your telephone company does not provide 64 kbps. Change the settings in your BitSURFR Pro to match the ISDN line speed supported by your phone company. Use the **AT%A4=1** command to select 56K and the **AT%A4=0** command to restore to 64K.
- You may not have long distance services available on your ISDN line. Contact your ISDN service provider.

BEFORE YOU CONTACT MOTOROLA

Our Technical Support staff will be glad to help you. In order to make your call to them as clear and helpful as possible, please complete this worksheet in its entirety *before* you contact Motorola.

1. Make sure you have gone through the troubleshooting procedures.
2. Write down the name of your product: _____
3. Write down the serial number found on the bottom of the BitSURFR Pro: _____
4. Write down the document number found on the bottom right corner of the *User's Guide* title page: _____
5. Enter the command **ATI3** and the write down the result (code revision level): _____
6. Have the following information available:
 - How your BitSURFR Pro is configured, what you are using it for (Internet access, LAN connection, etc.), and what peripheral devices are connected to it;
 - What software you are using (System Software, Internet Valet, MicroPhone LT, etc.);
 - What type of PC, terminal or other DTE you are using, and its characteristics (CPU speed, RAM, etc.);
 - What tests, if any, you have run and what the results were (loopback test, for example);
 - What the LED status indicators have indicated, if anything.
7. Be seated at the PC to which you have connected your BitSURFR Pro, and have the equipment running (as your problem permits).

Contact Technical Support at (800) 221-4380. For a complete list of available resources, please refer to the *Service and Support* section at the end of this manual.

Chapter 15

Test Mode Operation

COMMUNICATION DIAGNOSTICS

Communication diagnostic tests verify that your BitSURFR Pro, your PC, the central office switch, and the remote unit are all operating correctly. These tests help determine the element responsible for a fault.

Initiate and terminate communication tests using the AT command set.



Note

If the S18 Test Timer is enabled (not set to 0), then any test currently being executed will end when this timer expires.

Local Terminal Loopback &T9 S18

The local terminal (DTE) loopback test loops data back to the PC by connecting the TD and RD pins so that whatever the PC sends is echoed back (Figure 15-1).

To initiate this test from your PC or terminal enter: **AT&T9**. The BitSURFR Pro may be on-line or off-line when the test is initiated. Any protocol, mode, and DTE rate can be used. The test is successful if the data is successfully echoed back to the PC (a BERT (bit error rate test) device can be helpful in checking for data errors). This test verifies the operation of the PC, the PC cable, and the PC interface of the BitSURFR Pro.

This test terminates when the S18 timer expires.

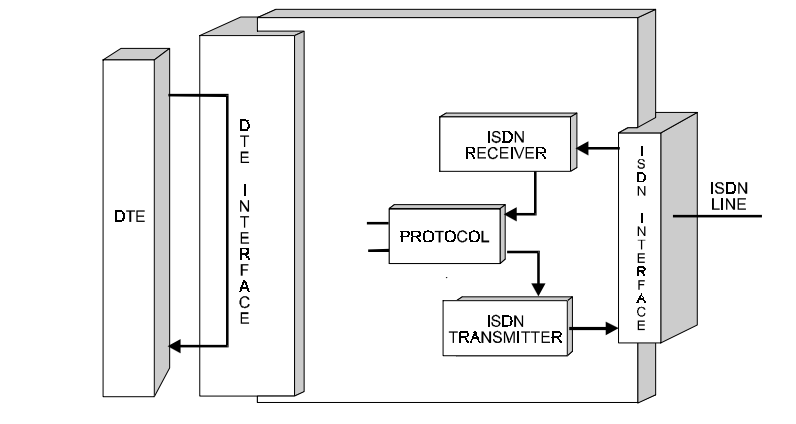


Figure 15-1
Local Terminal Loopback

Local Loopback Test &T1

Local loopback loops data from the local PC back to the PC so that whatever the PC sends is echoed back (Figure 15-2). Also, the RTS pin is echoed on the CTS pin and the DTR pin is echoed on the DSR, DCD, and RI pins. Run this test if you are encountering data errors before and after data calls are placed. This test is useful in diagnosing the PC and the BitSURFR Pro. The DTR Reset (&D3) option will not affect this test mode.

To initiate the test from your PC or terminal, enter:

AT&T1

The BitSURFR Pro may be on-line or off-line when the test is initiated. Any protocol, mode, and DTE rate may be used. Data from the local PC will be echoed back to the sender and the CTS pin will follow the RTS pin and the DSR, DCD and RI pins will follow the DTR pin. The PC portion of the test verifies the operation of the PC, the PC cable the PC interface in the BitSURFR Pro and the data buffers in the BitSURFR Pro. The test is successful if the data is successfully echoed back to the sender. A BERT device can be helpful in checking for data errors.

To terminate the test, use the **AT +++** escape sequence.

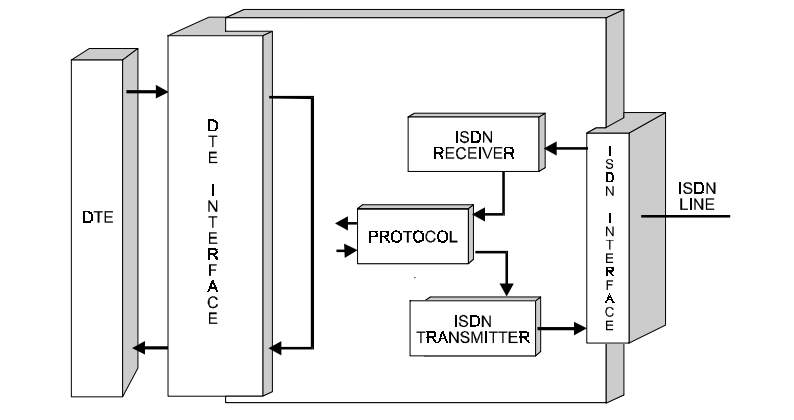


Figure 15-2
Local Loopback

Digital Loopback Test &T3

Digital loopback loops the ISDN B-Channel data normally sent to the local PC (Figure 15-3). Any B-Channel data received by the BitSURFR Pro is processed by the rate-adaptation protocol, and then echoed back out the B-channel to the sending unit. This test is useful in diagnosing the PC, BitSURFR Pro, switch ISDN line, and remote unit. Run this test if you are encountering data errors after a call is placed successfully.

To initiate the test from your PC, enter +++ to escape to command mode and enter:

AT&T3

The BitSURFR Pro must be on-line when the test is initiated (a call must be placed) before the unit can loop B-channel data. Any protocol, mode, and DTE rate may be used although the protocol on the two units must be compatible. The remote unit should be set to the same rate adaptation protocol as the local BitSURFR Pro, and left in normal data mode (*not* placed in Bilateral test mode). Data sent by the remote TA will be received by the local BitSURFR Pro, then echoed back to the remote TA. The test is successful if the data is correctly echoed back to the sender. A BERT device can be helpful in checking for data errors.

The test should be run in both directions if possible (i.e., use the local BitSURFR Pro as both the sending unit and as the loopback unit). If the B-channel data test is successful, it indicates that the local and remote units and network are functioning. If there are errors, the problem could be in any of those elements.

To terminate the test, enter: **AT&T0**

To return to data mode, enter: **ATO**

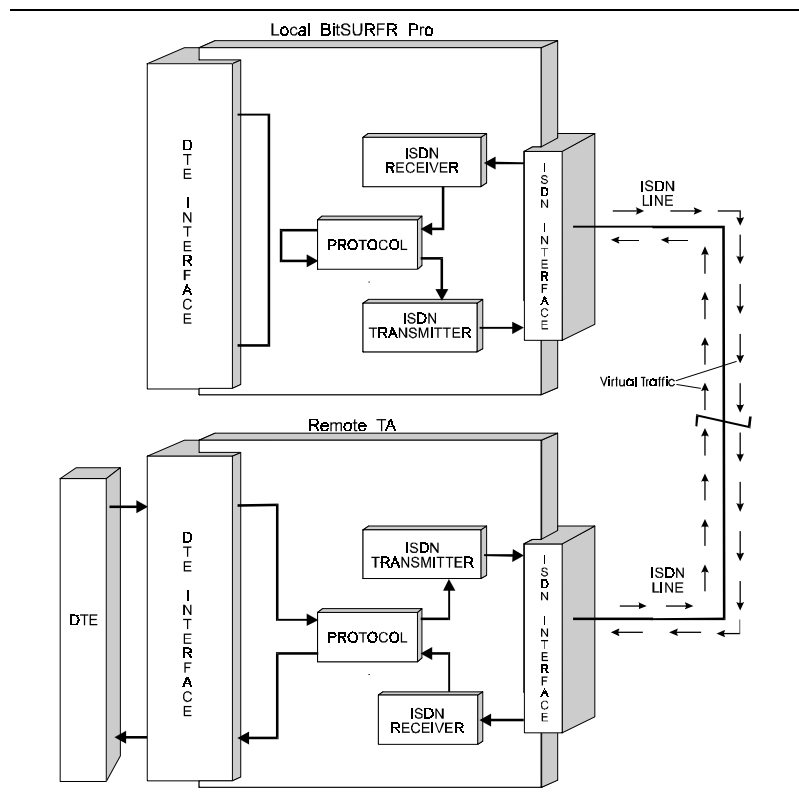


Figure 15-3
Digital Loopback

Bilateral Loopback Test &T8

Bilateral loopback combines the functions of local loopback and digital loopback. It loops data from the local PC back to the PC, so that whatever the PC sends is echoed back (Figure 15-4). Also, it loops the ISDN B-Channel data normally sent to the local PC. Any B-Channel data received by the BitSURFR Pro is processed by the rate-adaptation protocol, and then echoed back out the B-channel to the sending unit. This test is useful in diagnosing the PC, BitSURFR Pro, switch, ISDN line, and remote unit. Run this test if you are encountering data errors after a call is placed successfully. The DTR Reset (&D3) option will not affect this test mode.

To initiate the test from your PC, enter: **AT&T8**. The BitSURFR Pro can be on-line or off-line when initiating the test, but you must place a call before the unit can loop B-channel data. You can use any protocol, mode, and DTE rate, however, the protocol and DTE rates on the two units must be compatible. The remote unit should be set to the same rate adaptation protocol as your BitSURFR Pro and left in normal data mode (NOT placed in Bilateral test mode). Data sent by the remote TA will be received by the BitSURFR Pro then echoed back to the remote TA. The test is successful if the data is successfully echoed back to the sender. A BERT device can be helpful in checking for data errors. Also, data from the local PC will be echoed back to the PC. The PC portion of the test verifies the operation of the PC, the PC cable, the PC interface of the BitSURFR Pro, and the data buffers in the BitSURFR Pro.

The test should be run in both directions if possible (i.e. use the local BitSURFR Pro as both the sending unit and as the loopback unit). If the B-channel data test is successful, it indicates that the local and remote units and the network are functioning. If there are errors, the problem could be in any of those elements.

To terminate the test use the AT +++ escape sequence to return to AT command mode and enter: **AT&T0**.

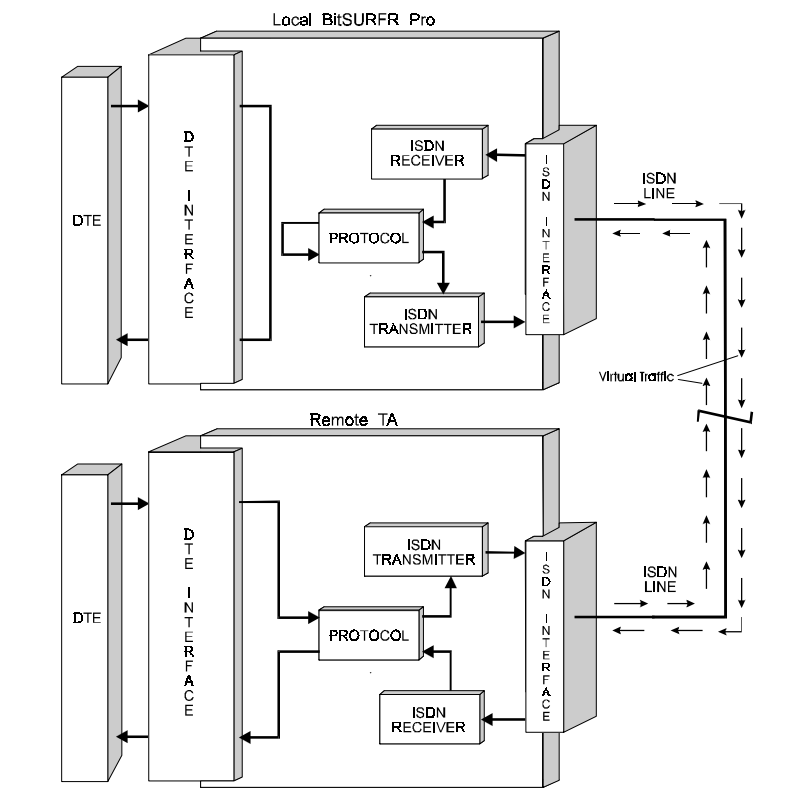


Figure 15-4
Bilateral Loopback

Appendix A Specifications

ISDN Line Type

ISDN Basic Rate Interface, ANSI T1.601 compliant, "U" reference point

Connection Types

Circuit-switched (dial-up)

DTE Data Rates

300, 1200, 2400, 4800, 9600, 19.2k, 38.4k, 48k, 56k, 57.6k, 64k, 112k, 115.2k, 128k

DCE Data Rates

B-channel: 56 kbps or 64 kbps
D-channel: 16 kbps

Data Rate Adaption Protocols

Clear Channel
V.120
Point-to-Point Protocol, single-link and multi-link
Asynchronous Inverse Multiplexing (AIMux)
BONDING

DTE Available Interfaces

EIA-232E (V.24)

Switch Compatibility

Northern Telecom DMS100 - Central office switch running software version BCS-29, BCS-30, BCS-31, BCS-32, or BCS-33
Layer 1 (physical): Conforms to ANSI T1.601
Layer 2 (Link): Conforms to Northern Telecom specification NIS 208-4, Issue 1.1 section C, based on CCITT Recommendation Q.921
Layer 3 (Signaling): For BCS-29 and BCS-30, conforms to NIS 208-4, Issue 1.1, sections D-H. For BCS-31, -32, and -33 conforms to

Specifications

NIS 208-5, Issue 1.1 Section D-H. These are based on CCITT Recommendation Q.931.

AT&T 5ESS - Central office switch running generic program 5E4.2, or above for type A terminal

Layer 1 (physical): Conforms to ANSI T1.601

Layer 2 (Link): Conforms to AT&T specification 5D5-900-311, December 1987, Part III, based on CCITT Recommendation Q.921

Layer 3 (Signaling): For 5E4.2, conforms to 5D5-900-301, Issue 1.04, September 1987, Parts IV - VI. For 5E5, conforms to 5D5-900-311, Issue 1.00, December 1987, Parts IV - VII. For 5E6 and 5E7, conforms to 5D5-900-321, Issue 1.02, September 1990, Parts IV - VII. These are based on CCITT Recommendation Q.931. For 5E8, conforms to National ISDN-1.

US National ISDN-1 - Central office switches, as described in Bellcore Special Report SR-NWT-001953, Issue 1, June 1991, and Revision 1, December 1991

Flexible Calling

Caller ID Delivery and Security, Call Waiting, Conference Calling, and Message Waiting. The BitSURFR Pro does not support Electronic Key Telephone Service (EKTS) except on PacBell DMS 100 NI-1 switches.

Dimensions

Width: 6.25 inches

Height: 1.25 inches

Depth: 5.25 inches

Environmental

0° to +40° Celsius

95% relative humidity, noncondensing

Power Requirements

115 Vac, 60 Hz

Power Consumption

3 watts nominal

Appendix B Ordering ISDN

GENERAL

There are two ways to order an ISDN telephone line from your service provider. The easiest way is to use an ISDN Ordering Code. If your service provider does not recognize ISDN Ordering Codes, then you will be required to specify the ISDN line configuration using the alternate method. Motorola has provided forms for both methods in the following sections.

ISDN ORDERING CODES

An ISDN Ordering Code is a simple way to refer to a complex ISDN Telco switch line configuration or translation. Because of the complexity of an ISDN switch translation, equipment manufacturers (like Motorola) have teamed with service providers to test their equipment in advance with standard translations. Once verified, the translation is registered with the ISDN modem at Bellcore, who makes this information available to the various service providers. This provides a way for you to request an ISDN line with a configuration that is known to function correctly with your ISDN modem.

CHOOSING AN ISDN ORDERING CODE

Several Ordering Codes are available for use with the BitSURFR Pro. Table B-1 outlines the different features provided by each code. Generally speaking, the more features an ISDN Ordering Code supports, the more it will cost. This is not always true, so it is best to inquire about the price for each of the codes that meets your needs.

Table B-1. National ISDN-1 Ordering Codes

Ordering Code	Simultaneous Voice & Data Calls	Data Rates to 128 Kbps	Caller ID	Flexible Calling (3 Way Calling, Transfer, Hold)	Message Waiting
Capability S	Yes	Yes	Yes	No	No
Capability P	Yes	Yes	Yes	Yes	No
Capability U*	Yes	Yes	Yes	Yes	No
Capability V**	Yes	Yes	Yes	Yes	Yes

* Also referred to as *EasyISDN 1* or *Capability 1* (may not yet be available in all areas)

** Also referred to as *EasyISDN 2* or *Capability 1A* (may not yet be available in all areas)



Note

Internet access using the *BitSURFR Pro* is typically accomplished by using either *PPP* or *Multi-link PPP* protocols. *Multi-link PPP* is capable of using both *B-channels* for data transfer, but will drop one of the *B-channels* if an incoming call is answered or an outgoing voice call is initiated. This transfer of bandwidth between data and voice calls during *Multi-link PPP* is known as *Dynamic Channel Allocation (DCA)*. Early versions of AT&T's *5ESS* switch called *Custom* (also known as *Point-to-Point* or *Multipoint*) do not support *DCA* on incoming voice calls. If you are planning to use the *Multi-link DCA* feature, ask your service provider to provide you with a *National ISDN-1* line configuration rather than an *AT&T Custom ISDN* line.

ORDERING ISDN USING ORDERING CODES

To order your ISDN line using an ISDN Ordering Code, simply call your phone company's ISDN Support Center (their number may be under the Optional Services section of your phone book) and request an ISDN basic rate line provisioned with the ISDN Ordering Code of your choice. They will supply the information you need to complete the configuration of your *BitSURFR Pro* (SPIDs and DNs). If you prefer, fill out the **ISDN Line Configuration Faxback Request Form #1** (located in this section) and mail or fax it to your service provider.



Note

When using the ISDN Ordering Codes method, you will need to configure your BitSURFR Pro Switch Type to National ISDN-1.

ORDERING ISDN USING ALTERNATE METHOD

If your service provider does not support the ISDN Ordering Codes method of ordering, then you must specify the configuration of your line. To help you, Motorola has provided a form specifying the required options for the service provider. This information is found in the **ISDN Line Configuration Faxback Request Form #2** (located in this section). Follow the instructions below to order your service.

1. Fill out the **Consumer Information** on pages one and two.
2. Fax, or in some other way deliver, all four pages of the request form to your ISDN service provider.
3. Use the information returned to you by your service provider to configure your BitSURFR Pro.

After the BitSURFR Pro is configured, you must save the configuration and re-start the BitSURFR Pro before the setup will take effect.

If you ordered your ISDN service using the ISDN Ordering Codes (Faxback Form #1), use Table B-2 on the following page as a guide for setting the BitSURFR Pro switch options. If you ordered your ISDN service using the alternate method (Faxback Form #2), then use Table B-3 as a guide for setting the BitSURFR Pro switch options.

Table B-2. Switch Configuration According to Ordering Codes

ISDN Ordering Code	Provider Supplied Information	BitSURFR Pro Switch Options
CAPABILITY P	1 SPID 1 DN	1) Set Switch Type to National ISDN-1 2) Set Data SPID and DN to provider supplied SPID and DN 3) Set Voice 1 SPID and DN to provider supplied SPID and DN 4) Set Voice 2 SPID and DN to provider supplied SPID and DN
CAPABILITY P CAPABILITY S CAPABILITY U CAPABILITY V	2 SPIDs 2 DNs	1) Set Switch Type to National ISDN-1 2) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 3) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 4) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN

Table B-3. Switch Configuration According to Switch Type

Provider Switch Type	Provider Supplied Information	BitSURFR Pro Switch Options
AT&T Multi-Point	1 SPID 1 DN	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Multi-Point 3) Set Data SPID and DN to provider supplied SPID and DN 4) Set Voice 1 SPID and DN to provider supplied SPID and DN 5) Set Voice 2 SPID and DN to provider supplied SPID and DN
AT&T Multi-Point	2 SPIDs 2 DNs	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Multi-Point 3) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 4) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 5) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN
AT&T Point-to-Point	1 DN	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Point-to-Point 3) Set Data DN to provider supplied DN
Northern Telecom DMS100 PVC IC-0 DMS100 PVC IC1 (simultaneous voice and data)	2 SPIDs 2 DNs	1) Set Switch Type to Northern Telecom DMS100 2) Set Switch Version to PVC IC-0 or PVC IC-1 (depending on information supplied to you) 3) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 4) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 5) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN

Table B-3. Switch Configuration According to Switch Type (Cont.)

Provider Switch Type	Provider Supplied Information	BitSURFR Pro Switch Options
Northern Telecom DMS100 PVC IC-0 DMS100 PVC IC-1 (voice or data, not simultaneous)	1 SPID 1 DN	1) Set Switch Type to Northern Telecom DMS100 2) Set Switch Version to PVC IC-0 or PVC IC-1 (depending on information supplied to you) 3) Set Data SPID and DN to provider supplied SPID and DN 4) Set Voice 1 SPID and DN to provider supplied SPID and DN 5) Set Voice 2 SPID and DN to provider supplied SPID and DN
National ISDN-1	-----	Same as Table B-2

FAXBACK REQUEST FORM #1

CONSUMER: Please complete the section below, then fax or otherwise deliver this page to your ISDN service provider. Configure your BitSURFR Pro with the information returned to you.

NAME		TITLE
COMPANY NAME		
ADDRESS		
CITY	STATE	ZIP
TELEPHONE NUMBER		FAX NUMBER

Please check the ISDN Ordering Code desired:

- | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| ☐ Capability P | ☐ Capability S | ☐ Capability U |
| ☐ Capability V | ☐ Other _____ | |

Please check the preferred long distance carrier

- | | | | |
|-------------------------------|------------------------------|---------------------------------|--------------------------------------|
| ☐ AT&T | ☐ MCI | ☐ Sprint | ☐ Other _____ |
|-------------------------------|------------------------------|---------------------------------|--------------------------------------|

ISDN SERVICE PROVIDER: Please fax, or otherwise return, this sheet with the requested configuration to the person listed above.

National ISDN-1:

Voice 1 SPID _____ Data/Voice 2 SPID _____

Voice 1 DN _____ Data/Voice 2 DN _____

FAXBACK REQUEST FORM #2

CONSUMER: Please complete the section below and the top of page 2, then fax, or otherwise deliver, all four pages to your ISDN service provider. Configure your BitSURFR Pro with the information returned to you.

NAME		TITLE
COMPANY NAME		
ADDRESS		
CITY	STATE	ZIP
TELEPHONE NUMBER		FAX NUMBER

ISDN SERVICE PROVIDER: Listed on the following pages are the line configuration requirements for the **Motorola BitSURFR Pro**. Fax, or otherwise return, this sheet with the requested configuration to the person listed above.

Check one answer for each of the following questions. If your line is set for NI-1, check *Not Applicable* in items 2 and 3:

1. Is the line set for CUSTOM (e.g. switch specific) or NI-1 (e.g. AT&T standard, NT1 PVCIC-2, or Siemens EWSD NI-1)? ☐ Custom ☐ NI-1
2. Switch Type? ☐ AT&T 5ESS ☐ NT1 DMS 100 ☐ Not Applicable
3. Switch Version? (DMS100 only) ☐ PVC IC-0 ☐ PVC IC-1 ☐ Not Applicable
(AT&T 5ESS) ☐ Point-to-Point ☐ Multipoint ☐ Not Applicable
4. Long Distance Carrier? ☐ AT&T ☐ MCI ☐ Sprint ☐ Other _____

List the applicable ISDN line information:

- 5a. Voice 1 SPID _____ 5b. Data/Voice 2 SPID _____
- 5c. Voice 1 DN _____ 5d. Data/Voice 2 DN _____

CONSUMER: Select the following optional services desired for this line.

Feature Requirements (check only one box in each category):

1. Preferred Long Distance Carrier* ☐ AT&T ☐ MCI
☐ SPRINT ☐ OTHER_____
2. NI-1 Signaling (Recommended) ☐ Yes ☐ No
3. Caller ID** ☐ Yes: both Voice ports ☐ Yes: Data/Voice 2 only
☐ Yes: Voice 1 only ☐ No
4. Hold, Conference, Drop** ☐ Yes: both Voice ports ☐ Yes: Data/Voice 2 only
☐ Yes: Voice 1 only ☐ No
5. Message Waiting** ☐ Yes: both Voice ports ☐ Yes: Data/Voice 2 only
☐ Yes: Voice 1 only ☐ No

* Some long distance carriers do not provide ISDN data service. If you choose a long distance carrier that supports ISDN data service, you must contact the carrier and request ISDN data service. You should also provide the long distance carrier with the directory number(s) you will be using.

** There may be additional charges for these services.

ISDN SERVICE PROVIDER: The following is a list of ISDN line configuration requirements for the **MOTOROLA BitSURFR Pro**. In addition to the basic requirements, the optional features listed above should also be incorporated into the line setup.

ISDN Physical Line Requirements:

- 2B+D Basic Rate Interface (BRI), 2B1Q U interface (ANSI T1.601)
- NIUF Standard Line Configuration Line Set (NIIG) 17

ISDN Line Configuration Requirements:

The BitSURFR Pro supports the following switch types and versions:

- AT&T 5ES5 E4.2 and later, Custom or Standard (NI-1)
- Northern Telecom DMS100 BCS-29 and later, PVC0 - PVC1 or PVC2 (NI-1)
- Siemens EWSD 10.0 and later NI-1
- Other NI-1 Compliant NI-1

The following bearer capabilities are required:

- Circuit mode voice (circuit-switched voice, CSV) service for speech and 3.1 kHz audio
- Circuit mode data (circuit-switched data, CSD) for 56 kbps and 64 kbps unrestricted data
- Simultaneous circuit switched voice (CSV) and circuit switched data (CSD) calls

AT&T

General:

Line Set (NIIG)..... 17
B1 Service..... On Demand (DMD)
B1 Long Distance Access Rate 64kbps (desired)
B2 Service..... On Demand (DMD)
B2 Long Distance Access Rate 64kbps (desired)
Data Line Class..... Point-to-Point (PP) or Multi-Point
(MP), (MP desired)
Maximum B-Channels..... 2
Circuit Switched Voice Bearer
(CSV) Channels Any

Voice 1

Voice 2/Data

Number of CSV Calls.....	See Consumer answer #4 on page 2	
Number of CSD Calls.....	1	1
Terminal Type.....	Type A	Type A
Hold, Conference, Drop.....	See Consumer answer #4 on page 2	
Caller ID	See Consumer answer #3 on page 2	
Electronic Key Telephone Sets (EKTS)*.	No	No
Intercom Groups.....	No	No
Hunting/Multiline Hunt	No	No
Message Waiting.....	See Consumer answer #5 on page 2	
Shared Directory Numbers	No	No
D-Channel Packet	No	No
Additional Call Offering.....	Yes (if MP desired)	No

NI-1 Specific:

Line Type** Standard

***Note:** PacBell DMS100 NI-1 switches may have EKTS set on.

****Note:** See the Northern Telecom DMS100 *General* options (page 4) when the Line Type is set for standard (NI-1).

NORTHERN TELECOM DMS100

General:

Line Type..... ISDN Basic Rate, Functional
Line Set (NIIG) 17
B1 Long Distance Access Rate 64kbps (desired)
B2 Long Distance Access Rate 64kbps (desired)
Bearer Service Circuit Switch Voice and Data on any
B-Channel

	Voice 1	Voice 2/Data
Circuit Switched Service	Yes	Yes
TEI	Dynamic	Dynamic
Non Initializing Terminal.....	No	No
Electronic Key Telephone Sets (EKTS)* ..	No	No
Call Appearance Handling (CACH).....	No	No
Hold, Conference, Drop.....	See Consumer answer #4 on page 2	No
Caller ID	See Consumer answer #3 on page 2	No
Intercom Groups	No	No
Hunting/Multiline Hunt	No	No
Message Waiting.....	See Consumer answer 5# on page 2	No
Shared Directory Numbers	No	No
D-Channel Packet	No	No
Additional Call Offering	Yes (if MP desired)	No

NI-1 Specific:

Version.....PVC IC-2

***Note:** PacBell DMS100 NI-1 switches may have EKTS set on.

COMMENTS AND SUGGESTIONS:

Motorola welcomes any suggestions on how to improve this document to help make ordering ISDN lines easier. If you have any suggestions or comments, please let us know. You may fax all comments to: **Motorola, Attention: ISDN Product Manager, Fax (205) 837-1484**

Appendix C

AT Command Set

CMD	Description	Possible Values
Global Commands: Action		
>D0=	Sets the Date	6 digits (MM/DD/YY)
>D1=	Sets the Time	6 digits (HH:MM:SS)
>V=	Views Switch & Global Parameters	G Views Global Parameters C SPIDs, DNs, and TEIs
>F	Loads Switch Options from Quick Setup factory profile	
>W	Saves ISDN Switch & Global Options to Stored Profile	
>Z	Restores Switch Options from stored profile & restart network	
Global Commands: Switch Configuration		
!C0=	Switch Type	0 AT&T 5ESS 1 Northern Telecom DMS-100 2 National ISDN <default>
!C1=	Switch Software Version	!C0=0: 0 AT&T Point-to-Point 1 AT&T Multi-Point !C0=1: 2 DMS100 PVC IC-0 3 DMS100 PVC IC-1 !C0=2: 4 National ISDN 1 <default>
!C6=	Data SPID	Range: 0-20 characters default (null string)
*!C6=	Voice SPID 1	Range: 0-20 characters default (null string)
*2!C6=	Voice SPID 2	Range: 0-20 characters default (null string)
!D3=	SAPI-0 data TEI	Range: 0-63, 255 (auto), 127 (disable) default (255)
*1!D3=	SAPI-0 Voice TEI 1	Range: 0-63, 255 (auto), 127 (disable) default (255)

Note: Voice Port parameters are preceded by '*'.

AT Command Set

CMD	Description	Possible Values
*2!D3=	SAPI-0 Voice TEI 2	Range: 0-63, 255 (auto), 127 (disable) default (255)
!N1=	Data Directory Number	Range: 0-20 characters (0-9,#,*) default (null string)
1!N1=	Voice Directory Number 1	Range: 0-20 characters (0-9,#,) default (null string)
2!N1=	Voice Directory Number 2	Range: 0-20 characters (0-9,#,) default (null string)
!V3=	Conference Feature Value	Range: 1-63, default (60)
!V4=	Drop Feature Value	Range: 1-63, default (62)
!V5=	Transfer Feature Value	Range: 1-63, default (61)
!V8=	Drop Feature Value	Range: 1-63, default (63)
Global Commands: Softload		
%P1?	Displays Softload Password	
%P1=x	Sets Softload Password to x	Range: 0-8 alphanumeric characters default (null string)
%P1=D	Disables the Softload function. To enable Softload, set the Password again.	D, case sensitive
\$Q	Requests Softload Version Information	
\$Y=x	Initiates Softload with Password x	
Port Commands: Configuration		
En	Local Echo Off	n = 0 Echo Off 1 Echo On <default>
Qn	Status Displays	n = 0 Status On <default> 1 Status Off 2 Status off during answer mode
Vn	Verbose	n = 0 Numeric 1 Verbose <default>
Wn	Carrier/Protocol Result Codes	n = 0 Disables <default> 1 Enables

Note: Voice Port parameters are preceded by '*':

CMD	Description	Possible Values
Xn	Connect Messages	$n = 0$ Enables result codes 0-4 1 Enables 0-5, 10-15, 17-19, 28, 32 2 Enables 0-5, 7, 10-15, 17-19, 28, 32 <default>
S0=	Rings Until Answer	Range: 0-255 default (1)
S1?	Ring Count (Read Only)	Range: 0-255 default (0)
S2=	Escape Character	Range: 0-127 default (43) Range: 128-255 Disabled
S3=	Carriage Return Character	Range: 0-127 default (13)
S4=	Line Feed Character	Range: 0-127 default (10)
S5=	Back Space Character	Range: 0-127 default (8)
S7=	Wait for Connection	Range: 1-255 default (30) Units = seconds
S10=	DCD Drop Time	Range: 1-255 default (14) Units = 1/10 seconds
S12=	Guard Time	Range: 0-255 default (50) Units = 1/50 seconds
S18=	Test Timer	Range: 0-255 default (0) Units = seconds
S25=	DTR Detect Time	Range: 0-255 default (5) Units = 1/100 seconds
S26=	RTS to CTS time	Range: 0-255 default (1) Units = 1/100 seconds
&Cn	Data Carrier Detect	$n = 0$ Always On <default> 1 Tracks Connection (async only) 2 Always except during S10 disconnect (async only)
&Dn	Data Terminal Ready (DTR)	$n = 0$ Ignore DTR (async/sync) <default> 1 Recall ACU (async only) 2 Hangup - auto answer disabled while DTR down (async only) 3 Hangup - reset port 9 DTR Dial
&Ln	Persistent DTR Dialing	$n = 0$ Disables <default> 1 Enables

Note: Voice Port parameters are preceded by '*'.

AT Command Set

CMD	Description	Possible Values
&Mn	Sync mode	n = 0 Async <default> 1 Sync-DTR disc delay (S25) 2 Sync - DTR dialing (auto answer disabled while DTR down)
&Rn	Clear to Send (CTS)	n = 0 CTS follows RTS 1 CTS always on when on-line <default>
&Sn	Data Set Ready (DSR)	0 DSR always on <default> 1 DSR on after protocol installed except test modes
&Yn	Selects Powerup Stored Profile	n = 0 Selects stored Profile 0 upon powerup or DTR reset <default> 1 Selects stored Profile upon powerup or DTR reset
&Zn=	Stores Telephone Number	n = 0-9 0-40 characters (0-9,#,*)
\Qn	Flow Control	n = 0 Disables flow control 1 Enables bidirectional XON/XOFF flow control 2 Enables unidirectional CTS flow control 3 Enables bidirectional RTS/CTS flow control <default> 4 Enables unidirectional XON/XOFF flow control
%A2=	Rate Adaption Protocol	0 None - Clear Channel 2 V.120 <default> 3 BONDING 3&M AIMux (this command includes the async sync mode command &M) 95 PPP
%A4=	Line Channel Speed	0 64kbps 1 56kbps <default>
%A93=	Speech BC Call Answer Option	D Do Not Answer <default> E Answer

Note: Voice Port parameters are preceded by '*'.

CMD	Description	Possible Values
%A94=	3.1Khz Audio Call Answer Option	D Do Not Answer <default> E Answer
%A95=	Data BC Call Answer Option	D Do Not Answer E Answer <default>
%A96=	Echo Disable Tone	0 Off <default> 1 On
%A97=	Dialing Method	O Overlap E Enbloc <default>
%A98=	Originate Mode Data	D Data <default> A 3.1Khz audio S Speech
*1%A98	Originate Mode Voice 1	A 3.1 kHz Audio S Speech <default>
*2%A98	Originate Mode Voice2	A 3.1 kHz Audio S Speech <default>
@B0=	Rate Multiplier	1 56 or 64 kbps (1 B-channel) <default> 2 112 or 128 kbps (2 B-channels)
@G=	DTE Guard Mode	D Disabled <default> E Enabled
@M2=	Authentication Protocol	N None <default> P PAP C CHAP-MD5 M CHAP-MS
@M20=	CHAP Respond Mode	"password" <default=0> "" Clears the password
@P1=	Command Interpreter	N None A AT <default> VB V.25 bis BISYNC VH V.25 bis HDLC
@P2=	DTE Speed	300, 1200, 2400, 4800, 9600, 19200, 38400, 48000, 56000, 57600, 64000*, 112000, 115200 <default>, 128000* (* disables Autobaud)
@P3=	Parity	N None <default> O Odd E Even M Mark
@P4=	Number of Data Bits	Range: 7-8 default (8)

Note: Voice Port parameters are preceded by '*'.

AT Command Set

CMD	Description	Possible Values
@P6=	Number of Stop Bits	0 One <default> 1 One and One-Half 2 Two
Port Commands: Action		
A	Answer	
D	Dial	S=n Dials Stored Number n 0-9,#,* Digits ; Stay in command mode (P, T, W, and comma are ignored) >P="password" (CHAP only)
H	Hangup	
In	Information	n = 0 Product ID ("960") 1 ROM Checksum 2 Checksum Verification 3 Revision ("4574166-1E C34A PASS") <board #>-<software> <checksum> <PASS FAIL> 4 Numeric Capability String 8 Verbose Capability String 9 Plug-and-Play ID 10 ISDN Link status
O	Returns On-line	
@MENU	Invoke Local menu	
Zn	Reloads Port from stored profile n	n = 0, 1
&Fn	Loads Port from Quick Setup factory profile n	n = 0-3
&Tn	Test Modes	n= 0 End Test 1 Local Loopback 3 Digital Loopback 8 Bilateral Loopback 9 Local Terminal Loopback
&H	Help Command	
&H=	Help for Individual Command	Enters individual commands for which help is desired. AT&H=cmd[,cmd...]
&V	Views Port Parameters	
&V=	Views Parameters	E V.120 Parameters Z Stored Telephone Numbers

Note: Voice Port parameters are preceded by '*'.

CMD	Description	Possible Values
&Wn	Saves active to stored profile n	n = 0, 1
Port Commands: V.120 (B-channel only)		
%E0=	V.120 Maximum Transmit Frame Size	Range: 1-260 <i>default</i> (256)
%E1=	V.120 Maximum Receive Frame Size	Range: 1-260 <i>default</i> (260)
%E2=	V.120 Window Size	Range: 1-127 <i>default</i> (8)
%E3=	V.120 T200 Transmission timer	Range: 1-255 <i>default</i> (5)
Port Commands: Caller ID		
@N0=	Caller ID Logging	0 Disables < <i>default</i> > 1 Enables
@N1=	Caller ID Auto Delivery	0 Disables < <i>default</i> > 1 Enables
@Ln	Caller ID Number Clearing and Retrieval	0 Clears the list of numbers 1 Retrieves most recent number 2 Retrieves the entire list
@IS=	Caller ID Screening & Blocking	D Disables Security < <i>default</i> > S Enables Screening B Enables Blocking
@IA=	Adds the given ID to the Security ID list.	
@ID=	Deletes the given ID from the Security ID list.	
@IC	Deletes all IDs.	
@IL	Lists Caller ID Security status for the port; list all stored IDs	
@IP	Copies the Security status and Security list from the current port to all data ports	
@IV	Copies the Security status and Security list from the current port to all analog ports	

Note: Voice Port parameters are preceded by '*'.

Appendix D

Quick Setup Factory Profiles

Use the **&Fn** command to load the following profiles:

Factory Profile #0 (Asynchronous V.120 Operation) (AT&F0)

AT CMD	Option Setting	AT CMD	Option Setting
E1	LOCAL ECHO ENABLED	&D0	DTR IGNORED
Q0	STATUS MESSAGE ENABLED	\Q3	RTS/CTS FLOW CONTROL
V1	VERBOSE MESSAGES	&M0	ASYNCHRONOUS MODE
W0	DISABLE PROTOCOL MESSAGES	&R1	CTS FORCED
X2	ALL CONNECT MESSAGES	%A2=2	V.120 PROTOCOL
S0=1	AUTOANSWER ENABLED	%A4=1	LINE CHANNEL SPEED 56K
S2=43	'+' ESCAPE CHARACTER	%A93=D	DO NOT ANSWER SPEECH CALL
S3=13	CARRIAGE RETURN CHARACTER	%A94=D	DO NOT ANSWER AUDIO CALL
S4=10	LINE FEED CHARACTER	%A95=E	ANSWER DATA CALL
S5=8	BACKSPACE CHARACTER	%A97=E	DIALING ENBLOC
S7=30	WAIT FOR CONNECT 30 SECONDS	%A98=D	ORIGINATE CALL AS DATA
S10=14	CARRIER FAIL DETECT TIME 1.4 SECONDS	@P1=A	AT COMMANDS
S12=50	++ ESCAPE GUARD TIME 1 SECOND	@P2= 115200	DTE SPEED = 115.2 Kbps
S18=0	TEST EXIT TIMER (DISABLED)	@P3=N	DTE PARITY NONE
S25=5	DTR DROP RESPONSE TIME .5 SECONDS	@P4=8	DTE DATA BITS 8
S26=1	RTS TO CTS DELAY TIME (SYNC) .1 SECOND	@P6=0	DTE STOP BIT 1
&C0	DCD FORCED ON	@M2=P	ENABLE PAP
&S0	DSR FORCED ON	@B0=1	1 B-CHANNEL

Factory Profile #1 (Async to Sync PPP, Single-Link) (AT&F1)

AT CMD	Option Setting	AT CMD	Option Setting
E1	LOCAL ECHO ENABLED	&D0	DTR IGNORED
Q0	STATUS MESSAGE ENABLED	\Q3	RTS/CTS FLOW CONTROL
V1	VERBOSE MESSAGES	&M0	ASYNCHRONOUS MODE
W0	DISABLE PROTOCOL MESSAGES	&R1	CTS FORCED
X2	ALL CONNECT MESSAGES	%A2=95	PPP
S0=1	AUTOANSWER ENABLED	%A4=1	LINE CHANNEL SPEED 56K
S2=43	'+' ESCAPE CHARACTER	%A93=D	DO NOT ANSWER SPEECH CALL
S3=13	CARRIAGE RETURN CHARACTER	%A94=D	DO NOT ANSWER AUDIO CALL
S4=10	LINE FEED CHARACTER	%A95=E	ANSWER DATA CALL
S5=8	BACKSPACE CHARACTER	%A97=E	DIALING ENBLOC
S7=30	WAIT FOR CONNECT 30 SECONDS	%A98=D	ORIGINATE CALL AS DATA
S10=14	CARRIER FAIL DETECT TIME 1.4 SECONDS	@P1=A	AT COMMANDS
S12=50	++ ESCAPE GUARD TIME 1 SECOND	@P2=115200	DTE SPEED = 115.2 Kbps
S18=0	TEST EXIT TIMER (DISABLED)	@P3=N	DTE PARITY NONE
S25=5	DTR DROP RESPONSE TIME .5 SECONDS	@P4=8	DTE DATA BITS 8
S26=1	RTS TO CTS DELAY TIME (SYNC) .1 SECOND	@P6=0	DTE STOP BIT 1
&C0	DCD FORCED ON	@M2=P	ENABLE PAP
&S0	DSR FORCED ON	@B0=1	1 B-CHANNEL

Shading indicates variation from profile #0.

Factory Profile #2 (AIMux) (AT&F2)

AT CMD	Option Setting	AT CMD	Option Setting
E1	LOCAL ECHO ENABLED	&D0	DTR IGNORED
Q0	STATUS MESSAGE ENABLED	\Q3	RTS/CTS FLOW CONTROL
V1	VERBOSE MESSAGES	&M0	ASYNCHRONOUS MODE
W0	DISABLE PROTOCOL MESSAGES	&R1	CTS FORCED
X2	ALL CONNECT MESSAGES	%A2=3	AIMux (BONDING)
S0=1	AUTOANSWER ENABLED	%A4=0	LINE CHANNEL SPEED 64K
S2=43	'+' ESCAPE CHARACTER	%A93=D	DO NOT ANSWER SPEECH CALL
S3=13	CARRIAGE RETURN CHARACTER	%A94=D	DO NOT ANSWER AUDIO CALL
S4=10	LINE FEED CHARACTER	%A95=E	ANSWER DATA CALL
S5=8	BACKSPACE CHARACTER	%A97=E	DIALING ENBLOC
S7=30	WAIT FOR CONNECT 30 SECONDS	%A98=D	ORIGINATE CALL AS DATA
S10=14	CARRIER FAIL DETECT TIME 1.4 SECONDS	@P1=A	AT COMMANDS
S12=50	++ ESCAPE GUARD TIME 1 SECOND	@P2= 115200	DTE SPEED = 115.2 Kbps
S18=0	TEST EXIT TIMER (DISABLED)	@P3=N	DTE PARITY NONE
S25=5	DTR DROP RESPONSE TIME .5 SECONDS	@P4=8	DTE DATA BITS 8
S26=1	RTS TO CTS DELAY TIME (SYNC) .1 SECOND	@P6=0	DTE STOP BIT 1
&C0	DCD FORCED ON	@M2=P	ENABLE PAP
&S0	DSR FORCED ON	@B0=2	2 B-CHANNELS

Shading indicates variation from profile #0.

Factory Profile #3 (V.25bis Synchronous) (AT&F3)

AT CMD	Option Setting	AT CMD	Option Setting
E1	LOCAL ECHO ENABLED	&D2	HANG-UP
Q0	STATUS MESSAGE ENABLED	\Q3	RTS/CTS FLOW CONTROL
V1	VERBOSE MESSAGES	&M1	SYNCHRONOUS MODE
W0	DISABLE PROTOCOL MESSAGES	&R0	CTS FOLLOWS RTS
X2	ALL CONNECT MESSAGES	%A2=0	NONE--CLEAR CHANNEL
S0=1	AUTOANSWER ENABLED	%A4=1	LINE CHANNEL SPEED 56K
S2=43	'+' ESCAPE CHARACTER	%A93=D	DO NOT ANSWER SPEECH CALL
S3=13	CARRIAGE RETURN CHARACTER	%A94=D	DO NOT ANSWER AUDIO CALL
S4=10	LINE FEED CHARACTER	%A95=E	ANSWER DATA CALL
S5=8	BACKSPACE CHARACTER	%A97=E	DIALING ENBLOC
S7=30	WAIT FOR CONNECT 30 SECONDS	%A98=D	ORIGINATE CALL AS DATA
S10=14	CARRIER FAIL DETECT TIME 1.4 SECONDS	@P1=VH	V.25BIS HDLC
S12=50	++ ESCAPE GUARD TIME 1 SECOND	@P2= 115200	DTE SPEED = 115.2 Kbps
S18=0	TEST EXIT TIMER (DISABLED)	@P3=N	DTE PARITY NONE
S25=5	DTR DROP RESPONSE TIME .5 SECONDS	@P4=8	DTE DATA BITS 8
S26=1	RTS TO CTS DELAY TIME (SYNC) .1 SECOND	@P6=0	DTE STOP BIT 1
&C0	DCD FORCED ON	@M2=P	ENABLE PAP
&S1	DSR ON AFTER PROTO- COL INSTALLED	@B0=1	1 B-CHANNEL

Shading indicates variation from profile #0.

Appendix E Interfaces

ISDN INTERFACE

Figure E-1 and Table E-1 illustrate and describe the BitSURFR Pro ISDN interface.

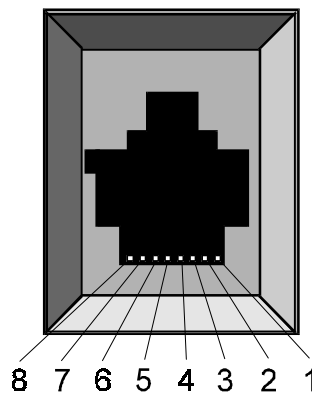


Figure E-1
U Interface RJ45 Pin Functions

Table E-1. U Interface RJ45 Pin Functions

Pin	Name	Function
1	Battery Status	No connection
2	Battery Status	No connection
3	---	No connection
4	Signal	U interface tip or ring
5	Signal	U interface tip or ring
6	---	No connection
7	Powering	No connection
8	Powering	No connection

DTE INTERFACE

Table E-2 describes the pin functions of the DTE interface on the BitSURFR Pro.



Note

In the following table, unused pins have no electrical connection.

Table E-2. EIA/232E/V.24 Pin Functions

DB-25 Pin	EIA-232E Pin	V.24 Pin	Function
1	AA	101	Protective Ground (FG)
2	BA	103	Transmitted Data to TA (TC)
3	BB	104	Received Data from TA (RD)
4	CA	105	Request to Send (RTS)
5	CB	106	Clear to Send (CTS)
6	CC	107	Data Set Ready (DSR)
7	AB	102	Signal Ground (SG or GND)
8	CF	109	Data Carrier Detect (CD or DCD)
15	DB	114	Transmit Clock (TC)
17	DD	115	Receive Clock (RC)
20	CD	108	Data Terminal Ready (DTR)
21	RL	---	Remote Loopback
22	CE	125	Ring Indicator (RI)
24	DA	113	External Transmit Clock
25	TM	142	(not used)

POTS PORT INTERFACE

Figure E-2 and Table E-3 illustrate and describe the BitSURFR Pro POTS Port interface.

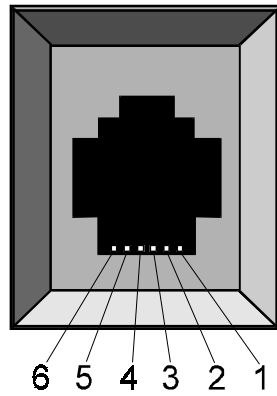


Figure E-2
POTS Port Interface RJ11 Pin Functions

Table E-3. POTS Port Interface RJ11 Pin Functions

Pin	Name	Function
1	---	Not used
2	---	Not used
3	R	Ring
4	T	Tip
5	---	Not used
6	---	Not used

Appendix F LocalMenu

GENERAL

Before you connect your BitSURFR Pro to your ISDN line, you must configure your BitSURFR Pro to match the ISDN line configuration and any application requirements. The following explains how to configure the BitSURFR Pro for use with the ISDN network using *LocalMenu*.

LocalMenu is a user-friendly, built-in firmware application that does not require the use of AT commands. Its use is recommended if you operate from a "dumb" (null) terminal or if you use a PC that is not running Windows. (You must have a VT100-compatible terminal or VT100-compatibility in your communications package.)

To configure your BitSURFR Pro, you will need the information provided by your ISDN service provider when your ISDN line was configured.

Configuration consists of entering the switch type, SPID and DN numbers provided to you by the telephone company, as well as entering any options specific to your application. Once you have configured your BitSURFR Pro, you should not have to do so again unless you change your line configuration or your application. Chapter 4 of the *User's Guide* gives detailed information on configuration options, as do the chapters on specific features and protocols.

If you ordered your ISDN service using the ISDN Ordering Codes (Form #1 in Appendix B of the *User's Guide*), use Table F-1 as a guide for setting the BitSURFR Pro switch options. If you ordered your ISDN service using the alternate method (Form #2 in Appendix B of the *User's Guide*) then use Table F-2 as a guide for setting the BitSURFR Pro switch options.

Note

Always set Switch Type first. When the Switch Type is changed, the Switch Version, SPIDs, and DNs reset to default values. If your line is configured for both voice ports, one port must be configured with the same SPID and DN as the data port.

Table F-1. Switch Configuration According to Ordering Codes

ISDN Ordering Code	Provider Supplied Information	BitSURFR Pro Switch Options
CAPABILITY P	1 SPID 1 DN	1) Set Switch Type to National ISDN-1 2) Set Data SPID and DN to provider supplied SPID and DN 3) Set Voice 1 SPID and DN to provider supplied SPID and DN 4) Set Voice 2 SPID and DN to provider supplied SPID and DN
Motorola Access 3 CAPABILITY P CAPABILITY S	2 SPIDs 2 DNs	1) Set Switch Type to National ISDN-1 2) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 3) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 4) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN

Table F-2. Switch Configuration According to Switch Type

Provider Switch Type	Provider Supplied Information	BitSURFR Pro Switch Options
AT&T Multi-Point	1 SPID 1 DN	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Multi-Point 3) Set Data SPID and DN to provider supplied SPID and DN 4) Set Voice 1 SPID and DN to provider supplied SPID and DN 5) Set Voice 2 SPID and DN to provider supplied SPID and DN
AT&T Multi-Point	2 SPIDs 2 DNs	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Multi-Point 3) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 4) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 5) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN

Table F-2. Switch Configuration According to Switch Type (Continued)

Provider Switch Type	Provider Supplied Information	BitSURFR Pro Switch Options
AT&T Point-to-Point	1 DN	1) Set Switch Type to AT&T 2) Set Switch Version to AT&T Point-to-Point 3) Set Data DN to provider supplied DN
Northern Telecom DMS100 PVC IC-0 DMS100 PVC IC1 (simultaneous voice and data)	2 SPIDs 2 DN's	1) Set Switch Type to Northern Telecom DMS100 2) Set Switch Version to PVC IC-0 or PVC IC-1 (depending on information supplied to you) 3) Set Data SPID and DN to provider supplied Data/Voice 2 SPID and DN 4) Set Voice 1 SPID and DN to provider supplied Voice 1 SPID and DN 5) Set Voice 2 SPID and DN to provider supplied Data/Voice 2 SPID and DN
Northern Telecom DMS100 PVC IC-0 DMS100 PVC IC-1 (voice or data, not simultaneous)	1 SPID 1 DN	1) Set Switch Type to Northern Telecom DMS100 2) Set Switch Version to PVC IC-0 or PVC IC-1 (depending on information supplied to you) 3) Set Data SPID and DN to provider supplied SPID and DN 4) Set Voice 1 SPID and DN to provider supplied SPID and DN 5) Set Voice 2 SPID and DN to provider supplied SPID and DN
National ISDN	-----	Same as Table F-1

LOCALMENU

To access LocalMenu, you must use a VT100 terminal or your PC's communication program must be in VT100 terminal emulation mode.

**Note**

The mouse cannot be used to communicate with the BitSURFR Pro using LocalMenu. Use the spacebar to

*select between the Menu and Option regions. Use the arrow keys to move the cursor from item to item within a region. Press the **Return/Enter** key to select/edit an item within the selected region.*

To configure your BitSURFR Pro using LocalMenu:

- 1. Make sure you are in AT command mode. If unsure, type **AT** and press ENTER. If your screen responds with OK, you are in AT command mode.
- 2. Type **AT@MENU** and press ENTER. This starts LocalMenu and displays the LocalMenu screen. (To return to AT command mode, simply exit LocalMenu.)



Note
When you enter AT@MENU, the BitSURFR Pro "polls" your PC or terminal to verify that it is VT100 compatible. If it is not compatible, LocalMenu will not run and the BitSURFR Pro will remain in AT command mode.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.	Device: ISDN Terminal Adapter Revision: H
LOCALMENU HELP	
LocalMenu Display Option GRAPHICS (Change Display Option to ASCII if lines are displayed as characters.) If using a Windows communications package, set the Arrow, Function, and Control keys to "pass through" to the application. Use the Spacebar to move the cursor from Region to Region. Use the Arrow keys to move the cursor from item to item within a region. Use the Enter key to select/edit an item within the selected region.	
MENUS	
RESET MENU	HELP
EXIT MENU	NET SWITCH
CALL SETUP	DATA OPTS
CMDS/MSGS	PROTOCOLS
STORED NOS	SECURITY
LOAD/SAVE	<More>

GRAPHICS should appear highlighted at the top of the screen. This initial screen provides instructions on moving from region to region and within a region, and on selecting and editing an item within a region.

**Note**

If you are using Windows terminal emulation software on a PC, the arrow keys might not function with LocalMenu unless you configure them to act as terminal keys instead of Windows accelerator keys. Change the preferences in your terminal settings to use the function keys for DEC VT-100 (ANSI) terminal emulation.

- To enter Switch Type, SPID number, and Directory Number (DN), press the spacebar to go to the **MENUS** region, then use the down arrow key to move to the **NET SWITCH** option as illustrated in the following screen. When **NET SWITCH** highlights, press **Return**.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.	Device: ISDN Terminal Adapter Revision: H												
LOCALMENU HELP													
LocalMenu Display Option GRAPHICS (Change Display Option to ASCII if lines are displayed as characters.) If using a Windows communications package, set the Arrow, Function, and Control keys to "pass through" to the application. Use the Spacebar to move the cursor from Region to Region. Use the Arrow keys to move the cursor from item to item within a region. Use the Enter key to select/edit an item within the selected region.													
MENUS <table border="0"> <tr> <td>RESET MENU</td> <td>HELP</td> <td>CALL SETUP</td> <td>CMDS/MSGS</td> <td>STORED NOS</td> <td>SECURITY</td> </tr> <tr> <td>EXIT MENU</td> <td>NET SWITCH</td> <td>DATA OPTS</td> <td>PROTOCOLS</td> <td>LOAD/SAVE</td> <td><More></td> </tr> </table>		RESET MENU	HELP	CALL SETUP	CMDS/MSGS	STORED NOS	SECURITY	EXIT MENU	NET SWITCH	DATA OPTS	PROTOCOLS	LOAD/SAVE	<More>
RESET MENU	HELP	CALL SETUP	CMDS/MSGS	STORED NOS	SECURITY								
EXIT MENU	NET SWITCH	DATA OPTS	PROTOCOLS	LOAD/SAVE	<More>								

**Note**

When you order your ISDN line, the telephone company will provide Switch Type information. Always set Switch Type first. When the Switch Type is changed, the Switch Version, SPIDs, and DNs reset to default values. If your line is configured for both voice ports, one port must be configured with the same SPID and DN as the data port. No matter

which method you use, configuration consists of entering the Switch Type, SPID number, and DN provided to you by the telephone company, as well as entering any options specific to your application. Once you have configured your BitSURFR Pro and saved the configuration, you should not have to do so again unless you change your line configuration or your application.

- 4. If your Switch Type is not highlighted in the **Network Switch Type** field (as illustrated in the following screen), press **Return** to select the **Network Switch Type** field. The **Network Switch Type** region will appear at the bottom of the screen.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.		Device: ISDN Terminal Adapter Revision: H	
NATIONAL ISDN MENU			
Network Switch Type	NI-1	Network Switch Version	NI-1
DROP Feature Value	062	CONFERENCE Feature Value	060
TRANSFER Feature Value	061	MSG WAITING Feature Value	063
Save Switch/Globl Profile (EXECUTE)		Restart Network Link	(EXECUTE)
Port To Configure	DATA		
TEI	AUTO		
SPID			
Directory Number			
MENUS			
RESET MENU	HELP	CALL SETUP	CMDS/MSGS
EXIT MENU	NET SWITCH	DATA OPTS	PROTOCOLS
			STORED NOS
			LOAD/SAVE
			SECURITY
			<More>

- 5. In the **Network Switch Type** field, use the arrow keys to move to the Switch Type supplied by your service provider. Press **Return** to select your Switch Type.
- 6. Use the right arrow key to move to the **Network Switch Version** field. The **Network Switch Version** field highlights. Press **Return**. The **Network Switch Version** parameter region appears at the bottom of the screen.

7. Use the arrow key to highlight your switch version, then press **Return**.

Next, you will enter the SPID number and DN for the Data port, Voice 1 port, and Voice 2 port configurations. Refer to the Switch Configuration tables in this section to guide you.

8. Arrow down to the **Port To Configure - DATA** field and press **Return**. When the **Port To Configure** region appears at the bottom of the screen, press **Return** to accept the highlighted **DATA** option.
9. Now that you have selected the **Data** port option, use the down arrow key to move to the **SPID** field and press **Return**. In the **SPID** field below, key in the Data SPID number supplied by your service provider, and press **Return**. The Data and Voice 2 SPID are normally the same. Voice 1 is the other or "Main" SPID.
10. To enter the DN for the Data port, use the down arrow key to move to the **Directory Number** field and press **Return**. In the **Directory Number** field below, key in DN number supplied by your service provider, and press **Return**. The Data and Voice 2 DN are normally the same. Voice 1 is the other or "Main" DN.
11. To enter the Voice 1 port number, arrow down to the **Port To Configure - DATA** field and press **Return**. When the **Port To Configure** region appears at the bottom of the screen, arrow down to **Voice 1** and press **Return** to accept the **Voice 1** highlighted option.
12. Now that you selected the **Voice 1** option, use the down arrow key to move to the **SPID** field and press **Return**. In the **SPID** field below, key in the Voice 1 SPID number supplied by your service provider, and press **Return**.

- 13. To enter the DN for the Voice 1 port, use the down arrow key to move to the **Directory Number** field and press **Return**. In the **Directory Number** field below, key in DN number supplied by your service provider, and press **Return**.
- 14. To enter the Voice 2 port number, simply repeat steps 10-12, but this time select **Voice 2** and enter the service provider supplied Voice 2 SPID number and DN.
- 15. To save the Switch, Data, Voice1, and Voice 2 port configurations, use the arrow keys to move to **Save Switch/Globl Profile (EXECUTE)** field. When the **Save Switch/Globl Profile (EXECUTE)** option highlights, press **Return**.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.	Device: ISDN Terminal Adapter Revision: H				
NATIONAL ISDN MENU					
Network Switch Type	NI-1	Network Switch Version	NI-1		
DROP Feature Value	062	CONFERENCE Feature Value	060		
TRANSFER Feature Value	061	MSG WAITING Feature Value	063		
Save Switch/Globl Profile	(EXECUTE)	Restart Network Link	(EXECUTE)		
Port To Configure	DATA				
TEI	AUTO				
SPID					
Directory Number					
MENUS					
RESET MENU	HELP	CALL SETUP	CMDS/MSGS	STORED NOS	SECURITY
EXIT MENU	NET SWITCH	DATA OPTS	PROTOCOLS	LOAD/SAVE	<More>

- 16. When the **Save Switch/Globl Profile** region appears at the bottom of the screen, press **Return** to save **PROFILE 0**. The **Save Switch/Globl Profile** option saves your port configurations.

After you press **Return**, the cursor will re-highlight the **Save Switch/Globl Profile (EXECUTE)** field.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.	Device: ISDN Terminal Adapter Revision: H		
NATIONAL ISDN MENU			
Network Switch Type	NI-1	Network Switch Version	NI-1
DROP Feature Value	062	CONFERENCE Feature Value	060
TRANSFER Feature Value	061	MSG WAITING Feature Value	063
Save Switch/Globl Profile	(EXECUTE)	Restart Network Link	(EXECUTE)
Port To Configure	DATA		
TEI	AUTO		
SPID			
Directory Number			
Save Switch/Globl Profile			
PROFILE 0			
— MENUS —			
RESET MENU	HELP	CALL SETUP	CMD5/MSG5
EXIT MENU	NET SWITCH	DATA OPT5	PROTOCOL5
		STORED NOS	SECURITY
		LOAD/SAVE	<More>

17. To initiate communication of the new information with the ISDN line, use the right arrow key to move to **Restart Network Link (EXECUTE)** field. Press **Return**.

LocalMenu Copyright 1994 - 1995 Motorola, Inc.	Device: ISDN Terminal Adapter Revision: H		
NATIONAL ISDN MENU			
Network Switch Type	NI-1	Network Switch Version	NI-1
DROP Feature Value	062	CONFERENCE Feature Value	060
TRANSFER Feature Value	061	MSG WAITING Feature Value	063
Save Switch/Globl Profile	(EXECUTE)	Restart Network Link	(EXECUTE)
Port To Configure	DATA		
TEI	AUTO		
SPID			
Directory Number			
— MENUS —			
RESET MENU	HELP	CALL SETUP	CMD5/MSG5
EXIT MENU	NET SWITCH	DATA OPT5	PROTOCOL5
		STORED NOS	SECURITY
		LOAD/SAVE	<More>

18. To exit LocalMenu, press the spacebar once to go to the **MENUS** region at the bottom of the screen, then use the arrow keys to move to **EXIT MENU**. When **EXIT MENU** highlights, press **Return**.

Incoming Data Calls While Using LocalMenu

The BitSURFR Pro will not answer an incoming data call while you are using LocalMenu, even if the Auto Answer option is enabled (S0 is not set to 0). This prevents you from unexpectedly being put in data mode and losing your LocalMenu session. However, the BitSURFR Pro will flash the DTE LED to notify you of the incoming call. When this happens, you may answer the data call by exiting LocalMenu. If the Auto Answer option is enabled, the call will then be answered immediately. If the Auto Answer option is disabled (S0=0), the BitSURFR Pro will return to AT command mode and you may answer the call by typing ATA. When the call connects, a connect message will be displayed and the DTE LED will be green.

Glossary

This glossary defines terms commonly used in data communications.

Analog Transmission	A continuous electronic signal. Analog phone lines transmit at a relatively slow speed compared to a computer's speed. Technology has increased this speed significantly but it is still slower than digital transmission. <i>See Digital Transmission for comparison.</i>
Any Key Abort	Pressing any key on the computer keyboard aborts a dialing sequence at any time before connection is established.
Asynchronous Inverse Multiplexing (AIMux)	A protocol that allows asynchronous devices to pass data over one or two synchronously bonded channels.
Asynchronous Transmission	A method of transmitting data which does not require a common clock (as in synchronous transmission), but rather transmits data one bit at a time separating fields of data by start and stop bits. <i>See Synchronous Transmission for comparison.</i>
AT Command Set	Hayes-compatible commands used to send instructions to the modem. The commands are referred to as AT Commands because each command must start with the attention characters "AT".
Attention Characters (AT)	A two-character prefix that comes before a command or command string.
B-channel	In ISDN terms, a "Bearer" channel, so called because it bears data or voice communication. ISDN lines provide two 64 kbps B-channels that can work either individually or in tandem.
Basic Rate Interface (BRI)	The basic ISDN-to-user connection containing three separate channels: two B-channels that carry user "conversations" from a telephone, computer, fax or almost any other device, and one D-channel that carries call set-up information for the network, but can also carry user data transmissions.
Bits Per Second (bps)	A measurement of the speed at which bits of data are transmitted over a communications medium.

Buffer	An allocated area of computer memory that is used for temporary storage of data during input and output operations (e.g., a modem's command buffer).
Central Office (CO)	The local telephone office. The local telephone office is responsible for the public telephone network to which devices, such as telephones, fax machines, etc., are connected.
Central Office Switch	A device, located at the telephone company's central office (CO) to which devices such as telephones, fax machines, modems, and terminal adapters can connect. <i>See also, Switch.</i>
Channel	A path or circuit along which information flows.
Clear to Send (CTS)	An EIA-232 control signal used with Request To Send (RTS) to perform flow control.
Command	A keyboard entry that causes the computer to carry out a specific operation. It is usually executed by pressing the RETURN key.
Command Mode	An operating mode which allows the modem to interpret information it receives from the local computer as modem commands. This mode instructs the modem or an ISDN modem to accept configuration commands. <i>See Data Mode for comparison.</i>
Configure	The process of setting up a port, terminal, or printer so that it communicates with another device.
D-channel	A "Data" channel shared by all users of ISDN that carries call set-up, signaling, and other user information.
Data Carrier Detect (DCD)	An EIA-232 status signal that indicates the presence of a carrier signal from a remote modem.
Data Communications Equipment (DCE)	This is the modem.
Data Mode	An operating mode which allows the modem to interpret information it receives from the local computer as data not commands. <i>See Command Mode for comparison.</i>
Data Set Ready (DSR)	An EIA-232 control signal that indicates the establishment of a connection to the telephone line.

Data Terminal Equipment (DTE)	The device that generates or is the final destination of data. This is the computer.
Data Terminal Ready (DTR)	An EIA-232 control signal that indicates to the modem that the local computer is ready for data communications.
Default	The factory setting for an option. Any setting assumed, at startup or reset, by the computer's software and attached devices, and operational until changed by the user.
Dial Modifiers	Part of the AT command Dial Command that modifies the dial sequence by inserting pauses, wait for another dial tone, or other information. Dial modifiers can be entered on a Dial Command line to control the way the modem originates the call.
Digital Transmission	An incredibly fast string of on and off electronic signals that represents either ones or zeros. Computers can understand the one/zero pattern and can convert the signal into any combination of text, graphics, colors, voice, or video.
Directory Number (DN)	The ISDN equivalent of an ordinary telephone number.
Escape Characters	A sequence of +++ characters that switches the modem from the Data Mode to Command Mode.
Flow Control	A feature that compensates for different bit rate speeds between devices. Controls the flow of data input to and output from a modem or other device.
Handshaking	A sequence two modems use while connecting. The handshaking sequence allows the modems to negotiate information needed for transmitting data before the data transmission begins.
High Level Data Link Control (HDLC)	The link layer protocol defined by ISO and the basis for most error control protocols used in data communications.
Integrated Services Digital Network (ISDN)	A design for a completely digital telephone/telecommunications network to carry voice, data, images, video, etc., at high speed by sending digitally-encoded signals. Though these are optimally sent over fiber lines, ISDN can work on the copper wiring phone lines that service most homes and businesses today.

Internet	The world-wide network that provides services such as file transfer, information, remote login, mail, etc. to registered users.
ISA	Industry Standard Architecture. A standard bus for PC compatible add-in cards.
ITU	International Telecommunications Union.
kilobits per second (Kbps)	A thousand bits per second; a common measurement of data transmission speed.
LCD	Liquid Crystal Display.
LED	Light Emitting Diode.
Modem (Modulate/Demodulate)	A device that converts digital data from a computer into an analog signal for transmission over the telephone line. The receiving modem converts the signal back to digital.
Multipoint	A circuit made up of three or more connected stations.
NI-1 (National ISDN-1)	Bellcore's standard definition of protocols and services for BRI and PRI lines. NI-1 allows devices and switches to connect regardless of their manufacturers.
NT1 (Network Termination Type)	A device that terminates the 2-wire U-interface line from the telephone company and converts U-interface signals to S/T-interface signals.
Nonvolatile RAM	User-programmable Random Access Memory (RAM) retains data when modem power is turned off.
POTS (Plain Old Telephone Service)	Pre-ISDN equipment such as your home phone.
Point-to-Point	A circuit that connects two stations directly.
Point-to-Point Protocol (PPP)	A standard that allows a computer to use the TCP/IP protocols with a standard telephone line and a high speed modem.
Port	A modem's physical input/output interface (usually located at the rear of most modems).
Protocol	A formal set of conventions governing the format and control of inputs and outputs between communication devices.

Public Switched Telephone Network (PSTN)	Standard domestic and commercial phone service.
Request to Send (RTS)	An EIA-232 control signal used with the Clear To Send (CTS) command to control data flow.
Ringer Equivalence Number (REN)	A standard requirement established by the Federal Communications Commission (FCC) for devices such as a telephone or answering machine. The REN requirement can be found on a label on the bottom of your telephone or answering machine.
RJ11 Jack	The Universal Standard Order Code (USOC) for standard home and business phone jacks.
RJ45 Jack	The Universal Standard Order Code (USOC) for a standard ISDN connector.
Service Profile Identifier (SPID)	A unique number assigned to each device connected to the ISDN that identifies what types of services and features are supported (e.g., Call Waiting, Caller ID, etc.). SPIDs are optional in the ISDN standard, but usually required in North America.
Service Provider	An commercial organization providing telecommunications connections.
Softload	A process that allows new software for upgrades to be downloaded into the ISDN modem.
Switch	A device used by the telephone company to route multiple calls simultaneously.
Synchronous Transmission	A method of transmitting data in a continuous stream, one bit at a time, in a timed sequence. The entire stream is preceded by instruction bits that start the timing. This transmission is faster than asynchronous transmission because it does not require start bits, stop bits, or parity for each information segment.
Terminal	A device whose keyboard and display are used for sending and receiving data over a communications link.
Terminal Adapter (TA)	A device that allows a computer's digital signal to be transmitted over a digital phone line (ISDN). Sometimes referred to (inaccurately) as a digital modem or ISDN modem.

Glossary

Terminal Equipment Identifier (TEI)

A number that uniquely identifies each terminal equipment device. This identifier is usually automatically allocated when the device is attached to the network.

V.120

A standard rate adaption protocol for terminal adapter equipment.

Worldwide Web (WWW)

A worldwide network of connected databases, electronic services, and multiple information sources.

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Service and Support

GENERAL

The following list of toll-free and direct numbers can quickly put you in touch with the service or party of your choice. Remember, at Motorola, total customer satisfaction is only a phone call away.

MOTOROLA ISG SERVICE AND SUPPORT CENTER

Toll Free: 800-221-4380

FAX: 205-430-8067

This toll-free number connects you with one of Motorola's automated switchboards. Use this number to gain access to our experienced staff members trained to provide you with the best service and support Motorola has to offer.

- *Motorola FaxBack System.* Available 24 hours a day, this automated service allows you to use your touchtone phone to order documents that are delivered directly to your FAX machine.
- *Sales Support and Order Information.* Office hours are 7:00 A.M. to 7:00 P.M. CST.
- *Technical Assistance Help Desk.* Contact our Technical Support staff if you cannot identify or solve a technical problem with your Motorola product. If you prefer, you may fax a description of your problem directly to the Help Desk at 205-430-8067.
- *Product Repairs.* Contact our staff if it is determined that your Motorola product has a malfunction that cannot be resolved by Technical Support or if you must return your product. If you need to provide written material to support your problem, you can send a fax directly to the Product Repairs department at 205-430-7042.
- *Credit Information.* This service puts you in direct contact with personnel capable of providing information on credit and billing.

CUSTOMER RESPONSE CENTER

Toll Free: 800-4AMODEM

FAX: 205-830-5657

Use this number to obtain product specifications and descriptive literature on Motorola ISG products.

ISDN LifeGUARDS

Toll Free: 800-894-ISDN

The Motorola ISDN LifeGUARDS team is the most comprehensive and innovative program available for ISDN connection. The highly trained ISDN LifeGUARDS come to your rescue by providing information on the BitSURFR family of ISDN products, ISDN service availability and pricing in your area, and Internet service providers offering ISDN connections. The ISDN LifeGUARDS can even place your order for an ISDN line or Internet subscription.

The ISDN LifeGUARDS are available Monday through Friday from 8:00 A.M. to 12:00 midnight, Saturday from 12:00 noon to 12:00 midnight, and Sunday from 1:00 P.M. to 9:00 P.M. EST (major holidays excluded).

Internet/World Wide Web

<http://www.mot.com/MIMS/ISG/>

Motorola Information Systems Group (ISG) has a home page on the Internet. It provides a variety of product information, including specifications, frequently asked questions (FAQ), and other topics.

Motorola Bulletin Board Systems

ISDN: (508) 337-7304 Analog: (508) 261-1058

Motorola ISG maintains both an ISDN (digital) and an analog Bulletin Board System (BBS) to provide product information, technical specifications, new product releases, and industry information to customers, sales persons and distributors. You can also use our BBS to post questions about products and their applications, or to report any problems you may be experiencing. To use the ISDN BBS, make sure your B channel speed is set to 56 kbps (AT%A4=1).

Documentation Feedback via E-mail

mottdp2@email.mot.com

We at Motorola ISG are always looking for ways to improve our documentation. If you have any thoughts regarding the Motorola manuals that came with your Motorola product, please e-mail Technical Publications at the above address with your specific comments or suggestions.

Installing the BitSURFR Pro

There are two parts to the installation of your BitSURFR Pro ISDN modem. First you must *connect* the appropriate hardware. Then you must *configure* your BitSURFR Pro with your choice of software so the modem can communicate with your ISDN line.

Unless you are an experienced ISDN user, we recommend approaching this process in bite-sized pieces. Configure your BitSURFR Pro for additional features (such as Caller ID) only after you have successfully installed and used the BitSURFR Pro as described in this guide.

THE BitSURFR PRO

Use the illustrations in Figures 1 through 3 to help you identify the various parts of your BitSURFR Pro before you begin installation.

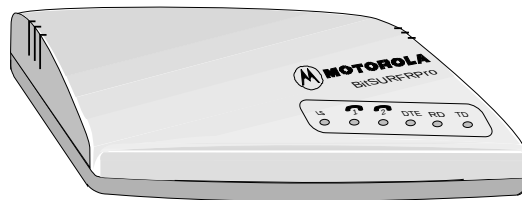


Figure 1 - BitSURFR Pro (Front View)

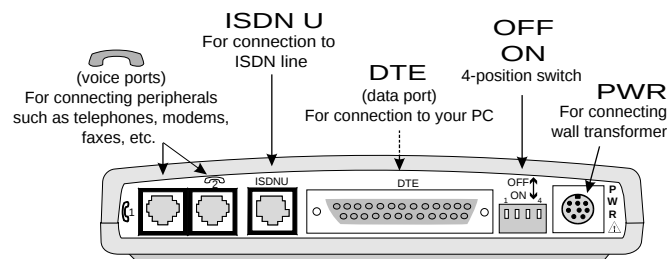


Figure 2 - BitSURFR Pro (Rear View)

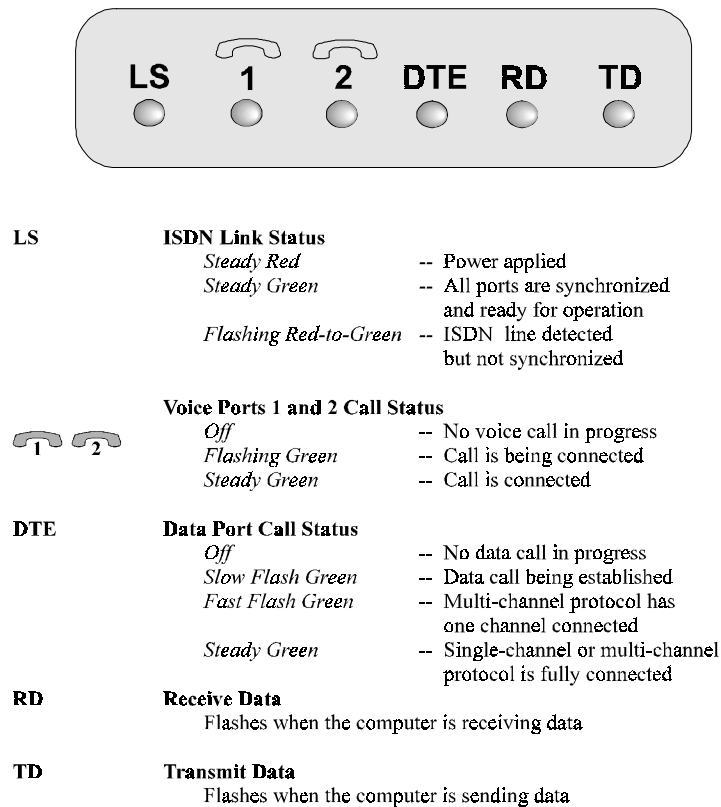


Figure 3 - LED Status Display

WHAT YOU WILL NEED

Before you begin the simple process of installing your new BitSURFR Pro, you need to be certain you have each of the following items.

For PC Installation and Configuration:

- ISDN line -- installed and configured for the BitSURFR Pro in advance (the enclosed *Ordering ISDN* guide will simplify this process for you.)
- BitSURFR Pro ISDN modem and wall transformer (supplied)
- DTE cable
- ISDN cable (supplied)
- IBM or compatible PC, 386 processor minimum
- Any peripheral devices you want to hook up, like your phone, fax, or modem
- ISDN SURFR Setup software (supplied)
- Data communications software (required for data operation; several optional packages supplied)
- Screwdriver (if required to secure DTE connections)

For Terminal Installation and Configuration:

- ISDN line -- installed and configured for the BitSURFR Pro in advance (the enclosed *Ordering ISDN* guide will simplify this process for you.)
- BitSURFR Pro ISDN modem and power transformer (supplied)
- DTE cable
- ISDN cable (supplied)
- Terminal
- Any peripheral devices you want to hook up, like your phone, fax, or modem
- BitSURFR Pro *User's Guide* Appendix for reference to AT commands (supplied)
- Screwdriver (if required to secure DTE connections)

HOW TO CONNECT YOUR BITSURFR PRO

Use the following procedures to hook up your BitSURFR Pro to your PC or terminal and to any peripheral devices:

1. Make sure that all four of the position switches to the right of the DTE port on the rear of the BitSURFR Pro are in the upper position marked **OFF**.
2. Connect the DTE cable to the BitSURFR Pro port labeled **DTE** port, and connect the other end of the DTE cable to the appropriate COM port on your PC or terminal. Depending upon your port design, you may need to screw the connection in place.
3. If desired, connect an analog device (touchtone telephone, modem or fax) into either BitSURFR Pro jack labeled with a telephone handset. (The jack is designed to operate with most popular phone cables.)
4. If your ISDN line is configured for Caller ID, you can connect a Caller ID display unit to either of the voice ports.



Note

The BitSURFR Pro does not support Caller ID Deluxe.

5. Connect the power cord to the BitSURFR Pro jack labeled **PWR** and then plug the other end into a surge-protected outlet or wall outlet.



Warning

When connecting the power cord, be sure you first connect it to the BitSURFR Pro and only then plug the transformer end into your wall outlet or power strip. This will prevent potential damage to your BitSURFR Pro, as well as reducing the possibility of electrical shock to the operator.

Within twenty seconds, the LS LED should light up and remain red and unblinking. If it does not, check your power connections. If it still does not light up, refer to Chapter 14 “Troubleshooting Guide” in the *User’s Guide*.

Windows 95 Installation

If you are using Windows 95, you will need to give the operating system some information about your BitSURFR Pro. This information is contained in a windows INF file on Disk 1 of the ISDN SURFR Setup installation diskette set (look for a filename with the extension **.INF**).

Follow the instructions below to install your BitSURFR Pro using Windows 95:

1. Make sure that your computer is on and Windows 95 is running.
2. Make sure that your BitSURFR Pro is on and connected to a COM port of your computer. (Refer to the earlier portion of this section for more specific instructions on connecting your BitSURFR Pro to your computer.)

If your BitSURFR Pro was already connected to your computer when you started it, Windows 95 may have automatically detected your new hardware. If so, proceed to step 8.
3. Double-click on the **My Computer** icon.
4. Double-click on the **Control Panel** folder.
5. Double-click on the **System** icon.
6. Click on the **Device Manager** tab. A directory tree of types of devices will be displayed.
7. Make sure that the **Computer** entry of your device tree is highlighted. Click on the **Refresh** button. Windows 95 will attempt to determine what new hardware has been connected to it. It should detect the BitSURFR Pro and to which COM port it is connected.
8. Windows 95 will display a New Hardware Found window. Choose the option **Driver from disk provided by hardware manufacturer** and click **OK**.



Note

Selecting an option different from the one prescribed here or canceling the operation at this point may preclude Windows 95 from detecting your BitSURFR Pro in any subsequent installation attempts.

9. Insert Disk 1 of the ISDN SURFR Setup installation diskette set into your PC's floppy disc drive and make sure that you have selected the correct drive in the dialog window. Click **OK**.
10. Choose the Motorola BitSURFR Pro, and click **OK**.
11. After a few moments, your BitSURFR Pro installation will be complete. An entry for the Motorola BitSURFR Pro will be added

to the list of modems under the Device Manager's tree of installed devices. Your BitSURFR Pro is now ready for configuration.

Connecting To Multiple Devices

Figures 4 through 7 show how to connect your BitSURFR Pro to a combination of communication tools. The illustrations suggest basic groupings; your actual setup may vary.

Figure 7 illustrates how it is possible to use the same COM port for both your BitSURFR Pro and an external modem connected to the BitSURFR Pro. You must connect an A/B switch to your COM port and connect the BitSURFR Pro and modem cables to the switch.



Caution

To prevent data loss in a configuration with an A/B switch, there can be no active communication between the PC and your BitSURFR Pro (not even call management software) while the modem is sending or receiving a call.

Whichever setup you choose, you will know you have a successful connection when the LS LED on your BitSURFR Pro remains red and unblinking. Once you've reached this point, the first half of the installation process is complete. You are now ready to configure your BitSURFR Pro.

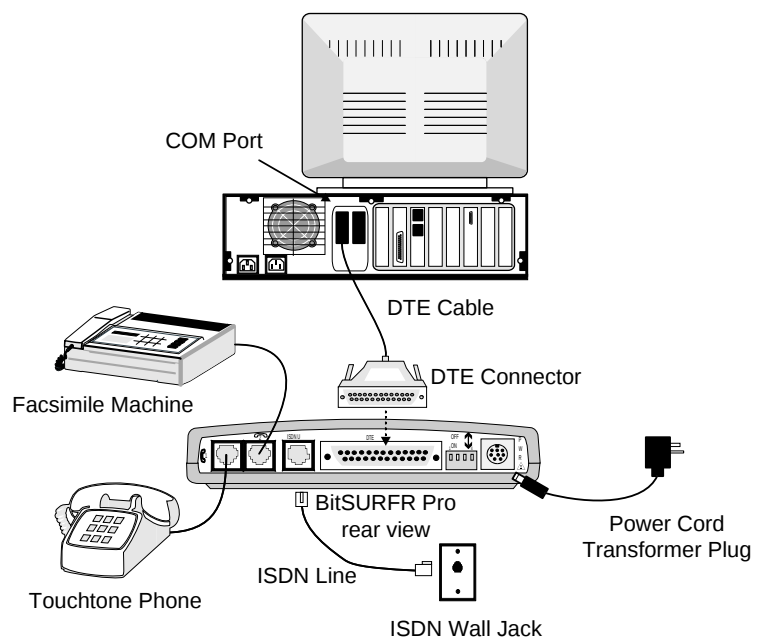


Figure 4 - Installation With Fax Machine

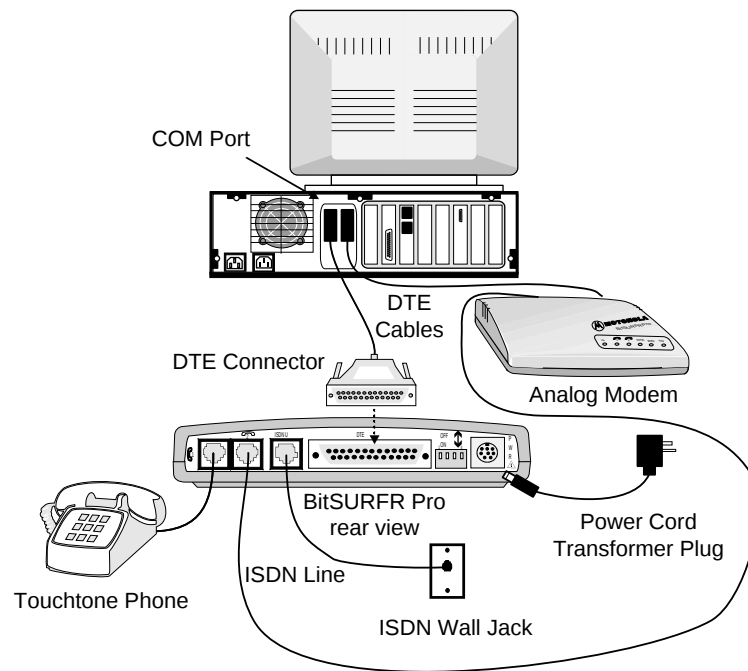


Figure 5 - Installation With External Analog Modem

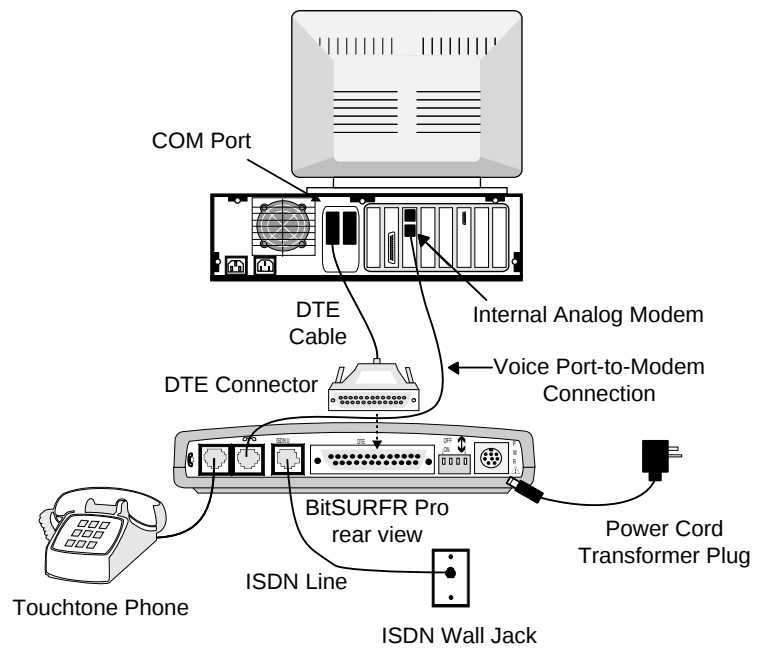


Figure 6 - Installation With Internal Analog Modem

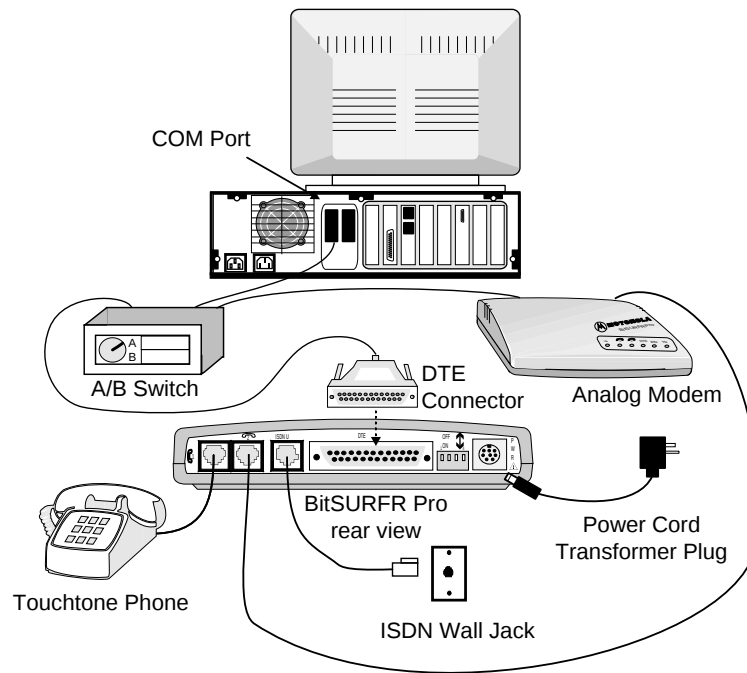


Figure 7 - Installation With A/B Switch

Configuring the BitSURFR Pro

The following section will guide you step by step through the second part of installing your new BitSURFR Pro ISDN modem: configuring the BitSURFR Pro for use with your ISDN service, and establishing an ISDN connection.

CONFIGURATION BASICS

Before you connect your BitSURFR Pro to your ISDN line, you must configure your BitSURFR Pro to match the ISDN line configuration and any application requirements. To configure your BitSURFR Pro, you will need the information provided by your ISDN service provider when your ISDN line was configured. You can configure your BitSURFR Pro using one of the following methods:

- *ISDN SURFR Setup*--a Windows-based application that lets you easily define ISDN service parameters and other options from your PC without having to use terminal emulation software to enter a series of AT commands. (For use if you are running Windows 3.1 or higher.)
- *LocalMenu*--a user-friendly built-in firmware application that does not require the use of AT commands. (For use if you are running DOS or a Windows version prior to 3.1.) Your communications program must support VT-100 terminal emulation. Refer to Appendix F in the *User's Guide* for specific instructions on using LocalMenu.
- *AT Commands*--a set of commands programmed into the BitSURFR Pro and used for both configuration and operation. You must use the terminal emulation mode of your communications program to enter these commands. Refer to Appendix C in the *User's Guide* for specific instructions.



Note

To configure your BitSURFR Pro, it must be in AT command mode. Your BitSURFR Pro should be in this mode when you receive it. However, if you enter an AT command and receive no response from the BitSURFR Pro (i.e., you do not

get an OK or error message), or if you are using ISDN SURFR Setup and it reports that the terminal adapter is not responding, you are probably not in AT command mode. To reset the BitSURFR Pro, locate the four-position switch on the rear panel, place switch position 4 in the ON position, and then remove and reapply power to the unit.

No matter which method you use, configuration consists of entering the switch type, SPID, and DN numbers provided to you by the telephone company, as well as entering any options specific to your application. Once you have configured your BitSURFR Pro, you should not have to do so again unless you change your line configuration or your application. Chapter 4 of the *User's Guide* gives detailed information on configuration options, as do the chapters on various features and protocols.

ISDN SURFR SETUP FOR WINDOWS

The enclosed ISDN SURFR Setup software is specifically designed to work with your BitSURFR Pro. It will gather some of the information necessary for ISDN service directly from your ISDN connection. Once you have configured your BitSURFR Pro and saved the settings, you should not have to do so again unless you change line configurations or applications.



Note

Configuration consists of entering the switch type, SPID and DN numbers provided by the telephone company. While ISDN SURFR Setup will determine much of this information itself, you will need -- and should always keep -- a permanent record of these important numbers supplied by your ISDN provider.

If you have not already done so, install ISDN SURFR Setup for Windows.

Installing ISDN SURFR Setup for Windows

1. Insert Disk 1 of ISDN SURFR Setup for Windows (Version 1.2 or later) into your PC's floppy disk drive.
2. *For Windows 95 users:* Click the Start button on the Taskbar and choose the Run... option.

For Windows 3.1x users: From the Program Manger, pull down the File menu and select the Run... option.

3. In the space provided, type A:\SETUP and click OK. (If the drive in which you inserted the disk is not A:\, replace A:\ with the appropriate drive letter.) Follow the on-screen prompts to complete the installation process.

Using ISDN SURFR Setup for Windows

1. *For Windows 95 users:* Once ISDN SURFR Setup is installed, click the START button on the status bar. From the Windows 95 menu, highlight PROGRAMS. Highlight the ISDN SURFR Setup folder icon and then click the ISDN SURFR Setup icon.

For Windows 3.1x users: Double-click on the ISDN SURFR Setup icon from the ISDN SURFR Setup program group.



Figure 8 - ISDN SURFR Setup

2. When ISDN SURFR Setup runs for the first time it will attempt to locate your BitSURFR Pro. After ISDN SURFR Setup finds your BitSURFR Pro, it will check the configuration data stored for it. If ISDN SURFR Setup finds any missing configuration data, it will bring up a form (see Figure 9) in which you enter the essential information to make your BitSURFR Pro and ISDN line talk together.

If you made an earlier attempt to install your BitSURFR Pro using another method, there may be some configuration information already stored for your BitSURFR. If so, you will need to click the CONFIGURE button to bring up the form to allow the additional entry of important information for your BitSURFR Pro.

The screenshot shows a Windows-style dialog box titled "Configure". At the top is a menu bar with "File". The main content area is organized as follows:

- Phone Company:** A group box containing nine radio buttons arranged in three columns:
 - Column 1: Ameritech, GTE, SouthWestern Bell, and "None of the above" (which is selected).
 - Column 2: Bell Atlantic, NYNEX, and US West.
 - Column 3: Bell South, Pacific Bell, and Frontier Telephone.
- Your Area Code:** A text input field.
- Update Caller ID Time Stamp:** A checkbox that is checked.
- Switch Type:** A dropdown menu currently showing "National ISDN".
- Switch Version:** A dropdown menu currently showing "NI-1".
- Data/Voice 2 and Voice 1:** Two side-by-side columns. Each column contains two text input fields: "SPID (Service Profile ID)" and "Directory Number (7 Digit Phone Number)".
- Buttons:** On the right side, there are four buttons: "Configure and Test", "Help", "More", and "Close".

Figure 9 - ISDN SURFR Setup Configure form

3. Select which phone company is providing your ISDN service or line. ISDN SURFR Setup will use that information to match your BitSURFR Pro to your phone company's services.
4. Enter your area code in the box provided. That information will be used later to make additional entries.
5. You will see an Update Caller ID Time Stamp option. Make sure this checkbox option is selected. This will set your BitSURFR Pro's Caller ID clock based on your PC's system clock. Your BitSURFR Pro uses this clock to tell you what time a call came in on Caller ID equipment.

6. Choose the Switch Type provided to you by your phone company (switch types represent the kind of software the phone company uses for your ISDN line). A pull-down button provides a list of possible choices from which to select (for example, National ISDN, AT&T 5ESS, or Northern Telecom DMS100).
7. If the phone company also provided you with a Switch Version Type (for the version of software the phone company is using for your ISDN line), enter that information in the Switch Version box (for example, NI-1, BCS-29, or AT&T Custom). If you were not given a Switch Version, leave the value shown as displayed after you selected your Switch Type.
8. In the space provided, enter the first of the two SPID values given to you by the phone company. This number is used to identify what services your ISDN line is supposed to have. (The SPID usually looks like a 10-digit phone number with some extra digits at the beginning or end. An example would be: 80055512120100.)
9. ISDN SURFR Setup will attempt to determine the Directory Number (DN) from the SPID value entered. If the phone company provided you with a DN that is different from the value shown, enter the number the phone company gave you. (The DN usually appears as a seven-digit phone number, but this may vary depending on your ISDN service provider. An example would be: 5551212.) If ISDN SURFR Setup was unable to determine the appropriate DN, this field will be blank. If this is the case, use the number provided by your phone company or contact your phone company for this number if you did not receive it.
10. Repeat the two previous steps for the second SPID value and DN.

The MORE/LESS toggle button will display more information to allow you to specify further details if needed. The options presented when the MORE button is activated are typically not changed except in special circumstances. Leave these settings as displayed unless your phone company gives you specific instructions for changing these values.

11. Connect your ISDN line to your BitSURFR Pro and then click on the CONFIGURE AND TEST button. ISDN SURFR Setup will transmit the configuration information to your BitSURFR Pro and then monitor the BitSURFR Pro's progress.
12. After a few moments (up to two minutes), you will see the message "Would you like to verify your phone number (DN) now?".
 - a. If you choose "YES", a Port to Port Call box will be displayed. Enter the number required to access an outside line (if necessary), and click on the "Finish" button to execute the test. SURFR Setup will attempt to verify the supplied DNs. If the DNs are not correct, you will be prompted to re-configure for the correct phone numbers. If the test is successful, SURFR Setup will indicate that the DNs are correct. Choose "Close" to exit. You will then receive the message "Your BitSURFR Pro appears to be properly configured."
 - b. If you choose "NO", you will receive the message "Your BitSURFR Pro appears to be properly configured". You can verify the DNs by clicking on the Self Call Test button on the Diagnose form.

Once you have received confirmation that it is properly configured, your BitSURFR Pro will be ready for use.

If ISDN SURFR Setup determined there is a problem with the configuration, a message informing you of this will be shown and you will be given the option to run the DIAGNOSE function. When prompted, click the YES button to display a screen listing possible errors. You should open the CONFIGURE form and correct these errors. The CONFIGURE form may now have certain fields highlighted in yellow to show which piece of information (or lack of it) is most likely causing a problem. Carefully check the displayed information against that provided by your phone company. Correct any errors and then click the CONFIGURE AND TEST button to update your BitSURFR Pro with the correct information.

Additional Features of the ISDN SURFR Setup

In addition to the CONFIGURE and DIAGNOSE buttons provided in the ISDN SURFR Setup main window, several other important features are available to make the most of your BitSURFR Pro.

Phone Monitor

Press the Phone Monitor button to test and track operation of the voice port named across the bottom of the screen while your BitSURFR Modem is connected to a telephone. As you make or receive calls, information will be displayed in a window on screen.

COM Port

Press the COM Port button to inform your BitSURFR Pro that you are changing the COM port to which your BitSURFR Pro is connected.

Terminal

Press the Terminal button to open a terminal emulation window in which you can enter AT commands. In addition, buttons are provided for logging on to the Motorola BBS and for running the BitSURFR Pro configuration utility LocalMenu.

Softload

The Softload feature is a convenient way to upgrade your BitSURFR Pro as new features become available. Softload allows software upgrades available from Motorola to be downloaded from your PC directly into your BitSURFR Pro through the data port, thus adding new features without physically removing the unit from service.

Help

Press the Help button to receive information about ISDN SURFR Setup, ISDN and some technical jargon.

About

Press the About button to receive information about the version of ISDN SURFR Setup currently running and information regarding the firmware version of BitSURFR Pro.

Exit

Press the Exit button to close ISDN SURFR Setup.

What's Next?

Once you have your BitSURFR Pro installed and configured (and connected to an ISDN line), go to the next section of this guide to begin exploring the world of high-speed telecommunications.

