

**Motorola™**

**iM1000**

**Data Modem**

*for Windows™ 95,  
Windows™ 98  
and Windows™ NT*

**User Guide**

**August 5, 1999**

**68P02953C65-O**

## *iM1000 - DATA MODEM*

**C**ongratulations on purchasing your Motorola iM1000 stand-alone data modem.

Your iM1000 offers wireless access to the internet. This data modem offers the following features:

- Packet Data transfer for IP DTE.
- Fax and Data Transfer for circuit data faxes and file transfer.

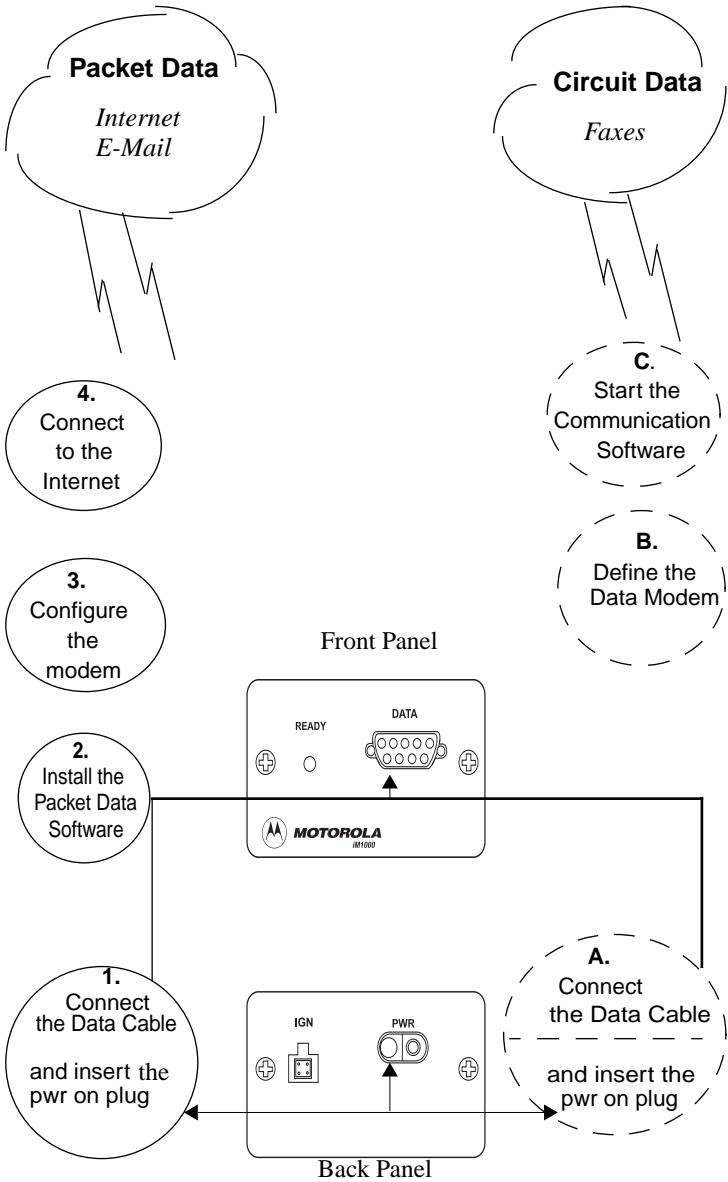
The iDEN Wireless Data Services solution provides you with the capability of connecting to the Internet and corporate intranets using your laptop computer (or compatible hand-held computing device) and your iM1000 stand-alone data modem.

With wireless data services, you can perform your most important laptop computer activities outside your office or home.



**Figure 1. iM1000 Data Modem**

# Overview



The iM1000 enables packet and circuit-data connections.

- **Packet data:** A wireless modem connection for accessing the Internet, sending and receiving e-mail, and transferring small files over the packet data network using standard IP protocols.

Data is sent in bursts. Packet data transmits packets (blocks) of data at high speed. After the data is transmitted, you can remain connected indefinitely without being charged for the idle time

- **Circuit data:** A wireless modem connection for sending and receiving faxes over the circuit-switched cellular channel.

Data is sent as a continuous stream through the network to another modem.

### NOTE

You may use the following information as a fast path to installation.

To prepare your computer and iM1000 data modem for wireless data use, the following procedures are necessary.

- **Connect the cable.**

Connect the modem to the computer via the data cable.

For more information see “INSTALLATION INSTRUCTIONS” on page 16.

- **Turn on the Modem.**

Turn on the modem before you proceed with the installation and configuration.

- **Set up Windows Components.**

Use these instructions to verify that Dial-Up Networking and the TCP/IP protocol are installed on your computer. If not, follow the procedure provided to install them.

For more information, see “Verifying and Installing Dial-Up Networking” on page 10 and “Verifying and Installing the TCP/IP Protocol” on page 13.

- **Install the software.**

Use the installation software to install the modem configuration data software.

For more information, see “Installing the Software” on page 17.

- **Configure your iM1000 data modem.**

Enter settings provided by your iDEN carrier.

For more information, see “CONFIGURING YOUR MODEM” on page 31.

#### **Connect to the Internet.**

Start the Dial-Up Networking session. Be sure that the modem is connected to the computer with the data cable. After successful installation, you can surf the Internet, send and receive faxes and e-mail messages, and transfer files.

The LED indicators located on the front panel of the iM1000 shows the service state

**Table 1: Status Light (LED) Indicator**

LED Indicator	Status of Your iM1000
Alternating Red and Green	A fatal error has been detected during power-up
Flashing Red	Registering - your iM1000 is signing on to your carrier's network. Please wait.
Solid Red	No service -your iM1000 cannot sign on. It will continue trying to every two minutes as long as it is turned on.
Flashing Green	In service - your iM1000 has successfully completed Packet Data registration.
Solid Green	In use - your iM1000 is currently being used

## Installation Requirements

To run the installation program, you need the following:

- An iM1000 unit
- A PC data cable for your data modem
- An IBM®-compatible PC with:
  - An Intel® 586 (or higher) processor
  - Microsoft® Windows® 95 installed, Windows® 98 or Windows® NT
  - Minimum 8 MB of addressable RAM
  - CD-ROM drive
  - 6 MB free hard-disk space
  - Recommended: Mouse or compatible pointing device
- The installation software that came with your package
- Communication software
- An account with an iDEN carrier

# HARDWARE INSTALLATION

## Introduction

Hardware installation has to be carried out by experienced technicians familiar with installing similar types of equipment.

## Before You Start Installing

### Ignition Sense Cable

#### NOTE

The iM1000 will not operate without the Ignition Accessories Cable installed or a power on plug connected.

## Installation Planning

Planning is the key to fast, easy iM1000 installation. Before a hole is drilled or a wire is run, inspect the vehicle and determine how and where you intend to mount the antenna, iM1000, and accessories. Plan wire and cable runs to provide maximum protection from pinching, crushing, and overheating.

## Recommended Tools For Installation

The following tools, screws, and washers are recommended for proper installation of your iM1000.

- Portable Drill
- Hammer
- Center Punch
- Four screws M4
- Four self drilling screws M4
- Four flat washers M4
- Four spring washers M4
- Phillips #2 Screwdriver

## **iM1000 Mounting**

The standard mounting of the iM1000 can be mounted on different types of mounting surfaces. Be sure the mounting surface is able to adequately support the weight of the iM1000. Allow sufficient space around the iM1000 for free air flow for cooling. Be sure the unit is close enough to the vehicle operator to permit easy access to operating indicators. Although the iM1000 can be mounted to a plastic dashboard, it is recommended that the mounting screws be located so they penetrate the supporting metal frame of the dashboard.

## **Antenna Mounting**

The best mounting location for the antenna is in the center of a large, flat conductive surface. In almost all vehicles, these requirements are best satisfied by mounting the antenna at the center of the roof. Some vehicles have a large trunk lid that provides a good antenna location. If the trunk lid is used, connect grounding straps between the trunk lid and vehicle chassis to ensure the trunk lid is at chassis ground.

Three types of antennas can be used:

1. RAFU136A - Magnetic Antenna
2. FAD5524A - Mobile Window Antenna
3. HAF9067A - Mobile Roof Mount Antenna

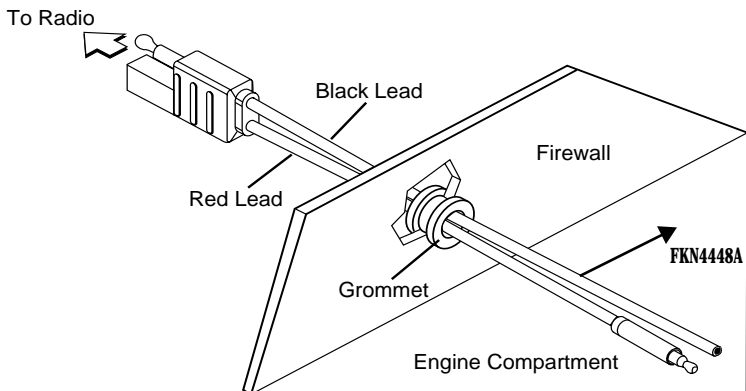
Make sure that you refer to the antenna installation instructions according to the kit number.

## **DC Power Cable Installation**

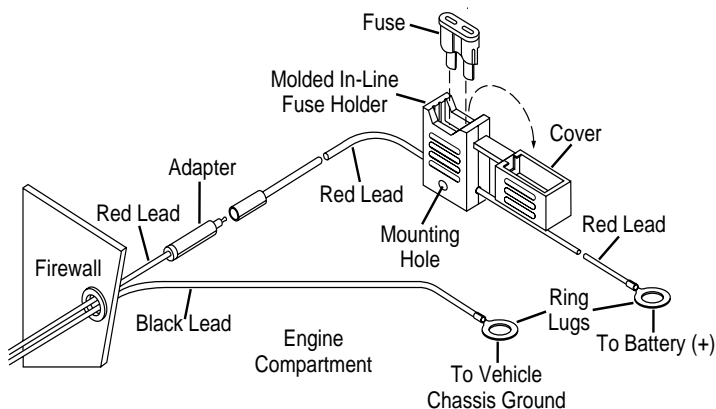
The iM1000 must be operated only in negative ground electrical systems. Reverse polarity does not damage the iM1000; however, iM1000 protection circuits cause the cable fuse to blow. Check the ground polarity before you begin installation.

The DC power cable (FKN4448A) is long enough for installation in most vehicles. Begin the power cable installation in the following manner.

1. Determine a routing plan for the power cable with reference to where the iM1000 is to be mounted.
2. Locate the nearest available chassis ground mounting point and shorten the black lead to remove excess cable length.
3. Locate the fuse holder as close to the battery as possible and away from any hot component. Mount the fuse holder using the provided mounting hole and dress wires as necessary. Connect the fuse holder red adapter lead plus to the mating receptacle on the red lead of the power cable. See Figure 3..
4. Connect the power cable black lead directly to the chassis ground.
5. Connect the power cable red lead from the fuse holder to the positive (+) battery terminal. Make sure the adapter cable is connected to the main power cable red lead.
6. Plug fuse into in-line fuse holder as shown in Figure 3..



**Figure 2. - Power Cable Routing into the Engine Compartment**



**Figure 3. - Power Cable Assembly**

## Mounting iM1000 - Vehicle Installation

1. Select the location to mount your iM1000 - either on the transmission hump or under the dashboard. When mounting the iM1000 on the transmission hump, ensure that the transmission housing is not affected.
2. Use the iM1000 mounting bracket as a template, mark the positions of the holes on the mounting surface.
3. Secure the iM1000 mounting flanges to the surface with the four (M4) screws provided.
4. Mount the antenna using the instructions provided with the antenna kit. Run the coaxial cable to the iM1000 mounting location.



- If necessary, cut off the access cable and install the cable connector.
5. To assure compliance with United States FCC regulations on RF exposure, position the antenna in such a way to maintain a separation distance of at least 8 inches (20 cms) between the antenna and the body of any user and nearby person. Connect the antenna cable connector to the radio antenna connector on the rear of the iM1000. See Figure 4.
  6. Plug the power cable into the iM1000 power connector.



**Figure 4. - Connections to iM1000 Rear Panel**

## **Power Configuration**

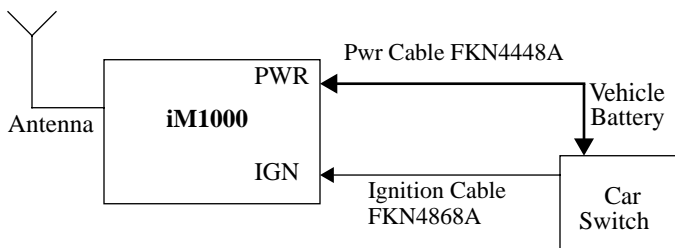
To turn ON the iM1000 modem, an ignition signal is required at the ignition connector. It can be supplied in two ways.

### ***Switched Power Connection***

When installed in a vehicle, the modem receives the ignition signal from the vehicle's ignition switch.

#### **NOTE**

The modem operates only when the car switch is turned ON.



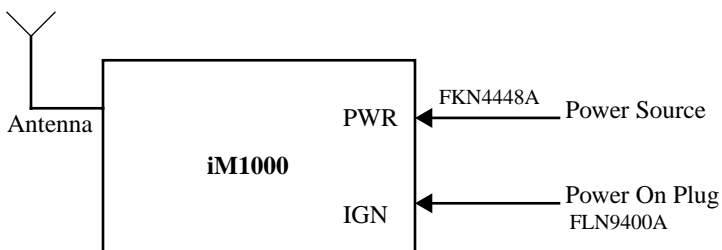
**Figure 5. Switched Power Connection**

Perform the following steps to install the iM1000 modem in a vehicle:

1. Prepare a routing plan for the ignition cable after determining where the iM1000 is to be mounted.
2. Connect the free end of the ignition cable to the vehicle ignition switch, and the other end (with the plug) to the iM1000 ignition connector.

### ***Continuous Power Connection***

A power on plug is permanently plugged into the ignition connector. When the power is supplied to the iM1000 DC Power Connector, the modem turns ON.



**Figure 6. Continuous Power Connection**

### **Data Cable Installation**

Connect one side of the 9-pin cable (FKN4369A) to the iM1000 communication connector and the other side to the DTE. Since the iM1000 is a modem, it can be connected only to DTE equipment, using a 9-pin to 9-pin cable.

## SETTING UP WINDOWS COMPONENTS

The Installation software automatically installs the packet data application on your IBM PC-compatible computer with Windows installed.

Windows must have Dial-Up Networking Version 1.3 or later and the TCP/IP protocol installed.

### NOTE

If your version of Dial-up Networking is earlier than Version 1.3, you can go to the Microsoft™ web site, [www.microsoft.com](http://www.microsoft.com), to get the upgrade.

- If Dial-Up Networking and the TCP/IP protocol are installed, skip this section and go to “INSTALLATION INSTRUCTIONS” on page 16.
- If you are not sure if they are installed, or if they are not installed, proceed with the rest of these instructions.

### IMPORTANT

If your computer has a network card or a security program that prevents IP address changes, see your system administrator before attempting to install this program.

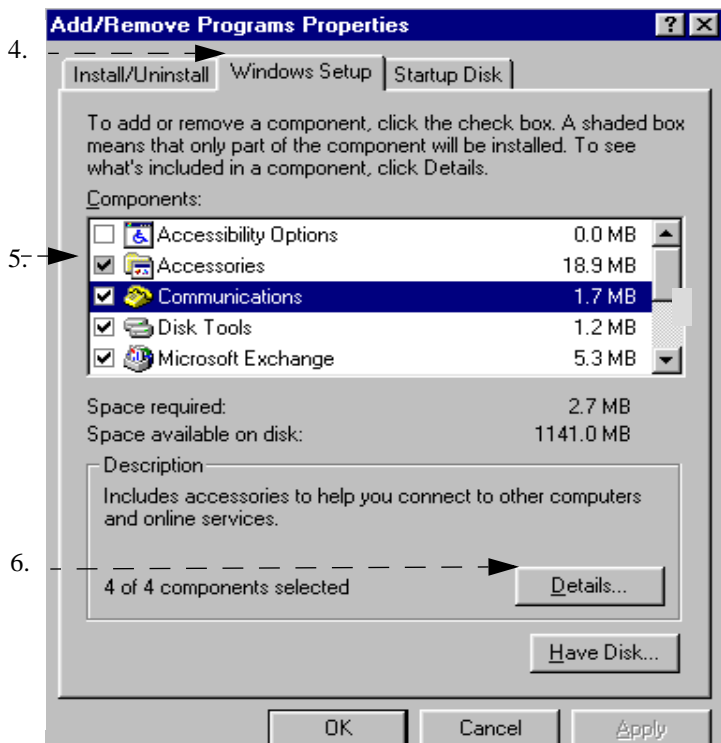
If your computer is connected to a network, be sure not to remove the existing network protocols during Packet Data installation.

## Verifying and Installing Dial-Up Networking

This section provides the procedure for setting up Dial-Up Networking on your Windows computer.

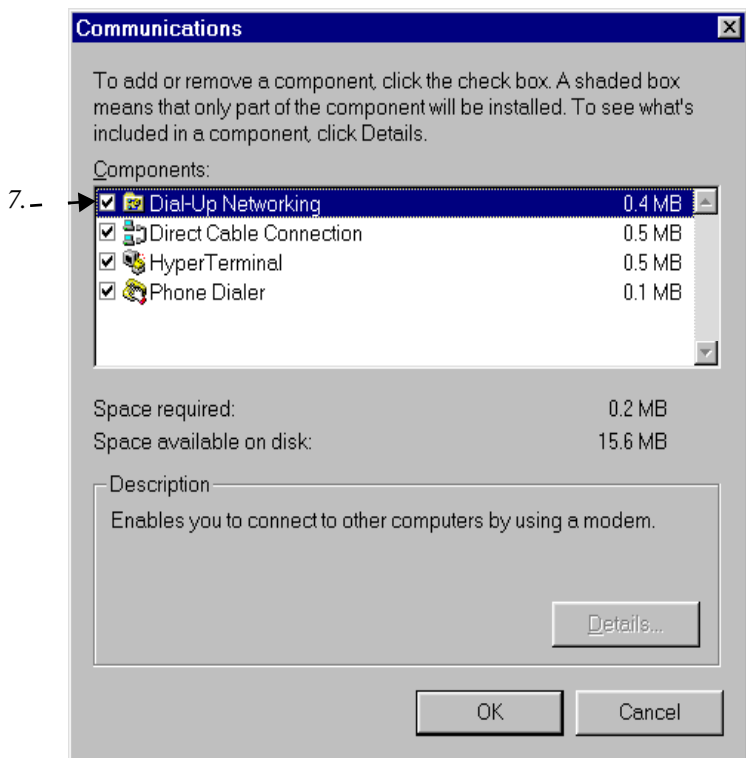
*Make sure that your Windows installation media (CD) is available. You may be asked to insert it later in the installation procedure.*

1. From your Windows desktop, double-click “My Computer”.
2. Double-click “Control Panel”.
3. Double-click “Add/Remove Programs”. The Add/Remove Programs Properties window opens.
4. Click the Windows Setup tab.



**Figure 7. Add/Remove Programs - Windows Setup Window**

5. Highlight “Communications” in the Components box.
6. Click “Details”. The Communications window opens.



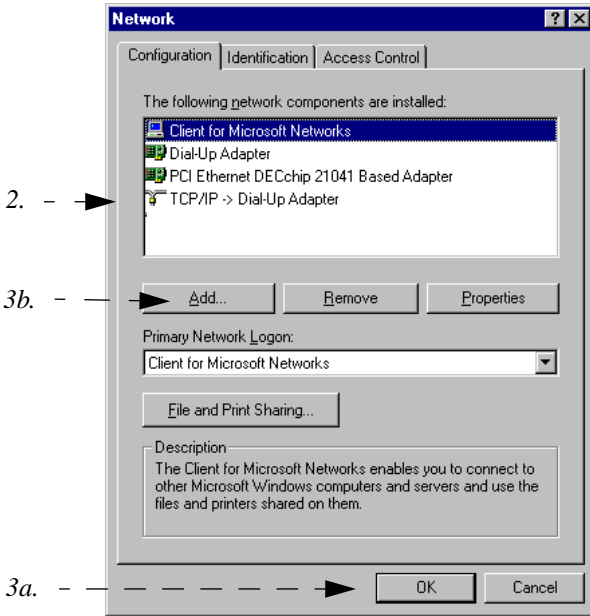
**Figure 8. Communications Window**

7. In the Communications window, perform the steps given in item (a.) or (b.) below:
  - a. If the selection box to the left of “Dial Up Networking” has a check mark in it, click “Cancel” to close the window. Click “Cancel” again to close the Add/Remove Programs Properties window.
  - b. If the selection box to the left of “Dial Up Networking” does not have a check mark in it, click the selection box to place a check mark in it. Click “OK” to close the window and then click “OK” again to close the Add/Remove Programs Properties window. Restart your computer.
8. Continue with “Verifying and Installing the TCP/IP Protocol” on page 13.

## Verifying and Installing the TCP/IP Protocol

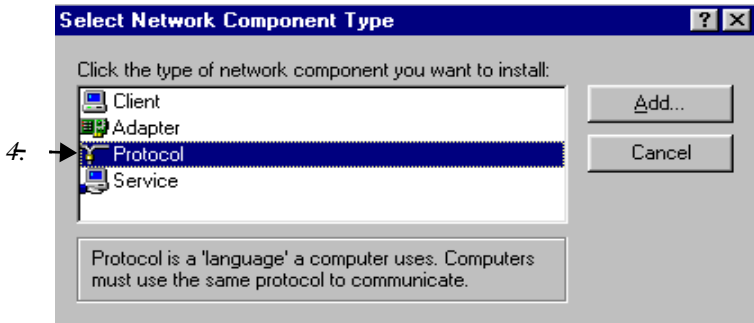
Use this procedure to ensure that your computer has the TCP/IP protocol installed.

1. From the Control Panel on your desktop, double-click “Network”. The Network window opens. *Your screen might not look exactly like the one illustrated.*



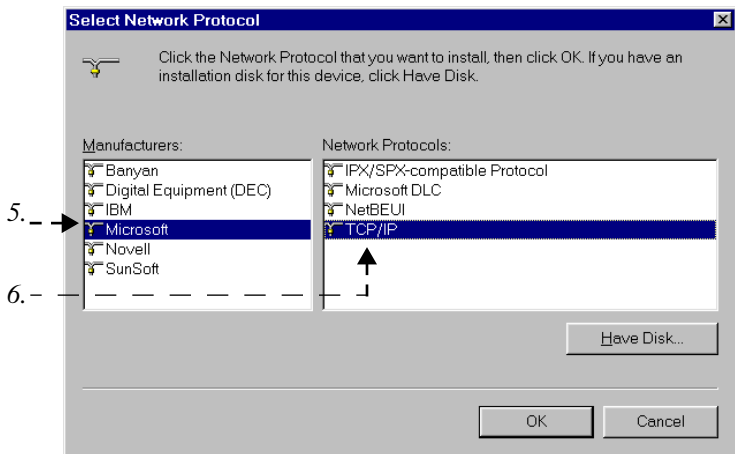
**Figure 9. Network Window**

2. Scroll down the list to find “TCP/IP Dial-Up Adapter”.
3. Do one of the following:
  - a. If you see “TCP/IP -> Dial-Up Adapter” in the list, click “OK”. Skip this section and go to “INSTALLATION INSTRUCTIONS” on page 16.
  - b. If you do not see “TCP/IP -> Dial-Up Adapter” in the list, click “Add”. The Select Network Component Type window opens.



**Figure 10. Select Network Component Type Window**

4. Highlight "Protocol" then click "Add". The Select Network Protocol window opens.



**Figure 11. Select Network Protocol Window**

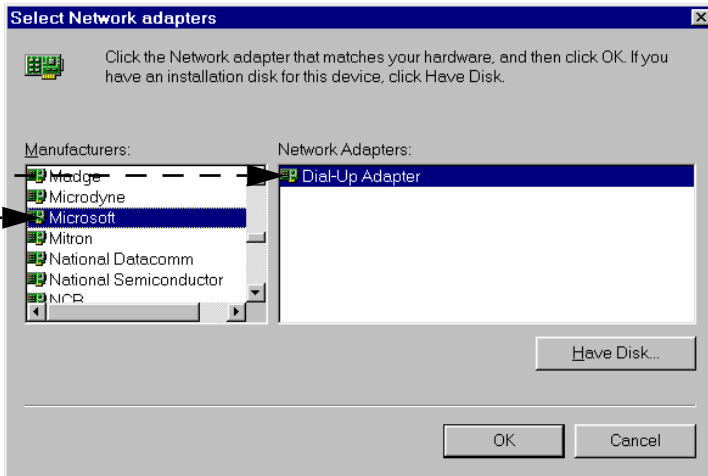
5. Under Manufacturer, select "Microsoft".
6. Under Network Protocol, select "TCP/IP", then click "OK". The TCP/IP Dial-Up Adapter appears in the list.

If the Dial-Up Adapter does not appear in the list, you do not have a Dial-Up Adapter installed. You can install one. Use the procedure for "Installing the Dial-Up Adapter" on page 15.

7. To close, click "OK".
8. If the Dial-Up Networking adapter is installed, continue with "INSTALLATION INSTRUCTIONS" on page 16.

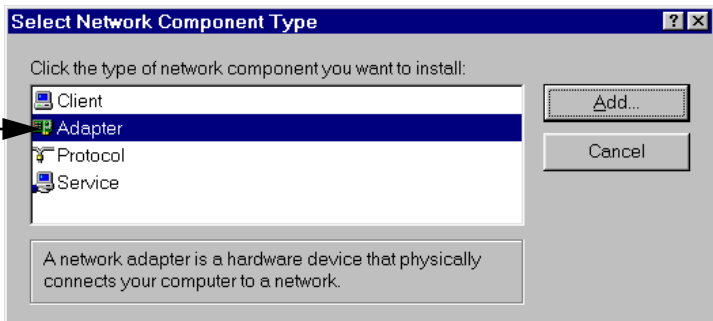
## Installing the Dial-Up Adapter

When you select “TCP/IP Protocol”, you are asked to select a network adapter. If you receive a message that you do not have one installed, use the following procedure to install one. If you have a Dial-Up Adapter installed, skip this section and go to “INSTALLATION INSTRUCTIONS” on page 16.



**Figure 12. Select Network Adapter Window**

1. At the Select Network Adapter window, under Network Adapters, highlight “Dial-Up Adapter”.
2. Under Manufacturers, highlight “Microsoft”.
3. Click “OK”. The Select Network Component Type window opens.



**Figure 13. Select Network Component Type Window**

4. Highlight “Adapter” then click “Add”. The Select Network Adapters window opens.
5. To verify that the adapter was added, from the Control Panel, click Network. Look for “Dial-Up Adapter” on the Network Configuration screen.



## ***INSTALLATION INSTRUCTIONS***

This section provides information for connecting the data cable and installing the software.

### **NOTE**

To instal the Wireless Data Services software on a computer or hand-held device that does not have Windows installed, or if you do not have the installation disks, proceed to “Configuring the Modem for Packet Data— without the Disk” on page 60.

### **Connecting the Cable**

*Your computer and your modem can be turned on or turned off when you connect the cable.*

To connect the data cable:

1. Connect the data cable to the accessory connector on your modem.
2. Attach the other end of the cable to a serial communication (COM) port on your computer or hand-held computing device.
3. Position the antenna of the radio product at least 8 inches (20cms) away from the body of any person when transmitting.

To remove the cable:

1. Disconnect the data cable from your modem.
2. Disconnect the data cable from your computer.

## Installing the Software

The Installation software enables packet data service.

### IMPORTANT

During installation, if you receive a message that you do not have one or more of the required Windows components installed, see “SETTING UP WINDOWS COMPONENTS” on page 10.

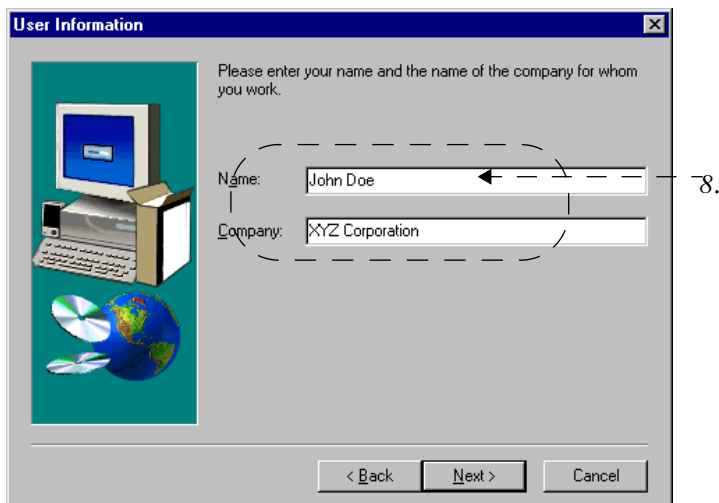
To install the modem wireless data services software:

1. Turn on the power to your modem.
2. Turn on your computer and start Windows 95, Windows 98 or Windows NT.
3. Insert the Installation CD-ROM in your CD-ROM drive.
4. Select “Start”, then select “Run”.
5. Type **d:\setup** (or substitute the correct drive letter).
6. Click “OK”. The Setup progress window opens. After it closes, the Welcome window opens.



**Figure 14. Installation Welcome Window**

7. Click “Next”. The User Information window opens.



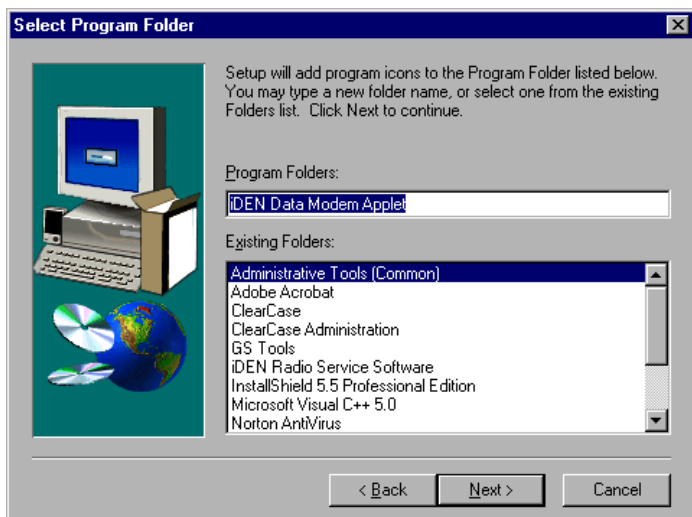
**Figure 15. User Information Window**

8. Enter your name and company, if it is not displayed.
9. Click “Next”. The Choose Destination Location window opens.



**Figure 16. Choose Destination Location Window**

10. Click “Next” to accept the default Destination Folder. The Select Program Folder window opens. “iDEN Data Modem Applet” is highlighted.

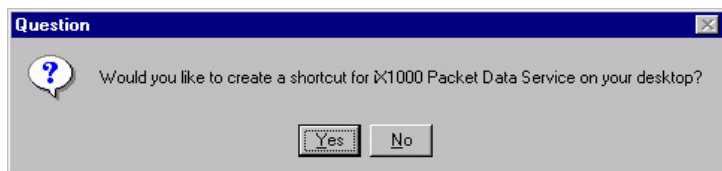


**Figure 17. Select Program Folder Window**

- Click “Next” to accept the default Program Folder, iDEN Data Modem Applet.

The installation program starts. A status window opens while the files are copying.

After the files are copied, you can add a shortcut to your Windows desktop.



**Figure 18. Add a Shortcut**

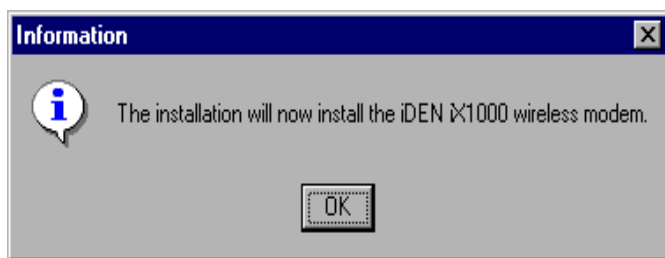
- Select “Yes” to add a shortcut.
- Make sure your modem is connected and turned on before you continue the installation.

#### **NOTE**

To configure your system for Windows NT, proceed with Steps 14 through 38. For Windows 95 and Windows 98, skip to Step 39.

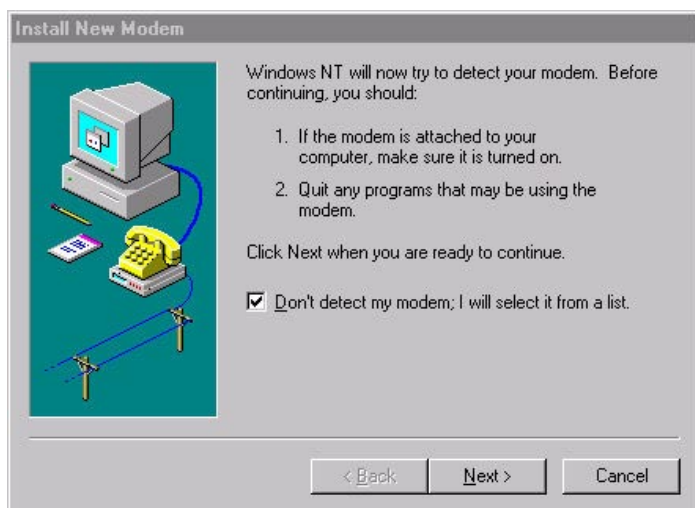
## Windows NT Installation Only (Steps 14 - 38)

14. For Windows NT, an information window opens with a message that wireless modem will be installed.



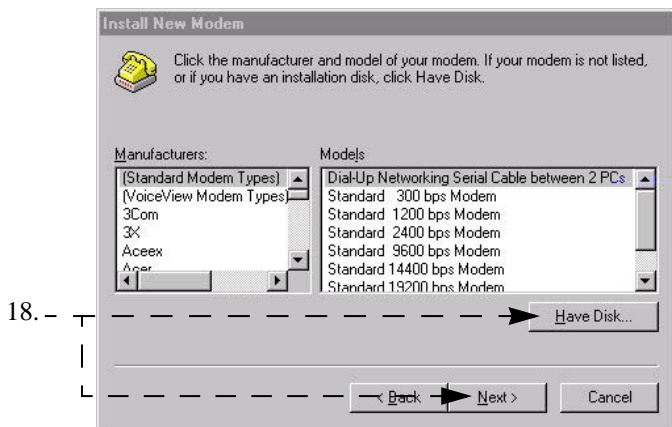
**Figure 19. Begin Modem Installation**

15. Click "OK". The Installing New Modem window opens.



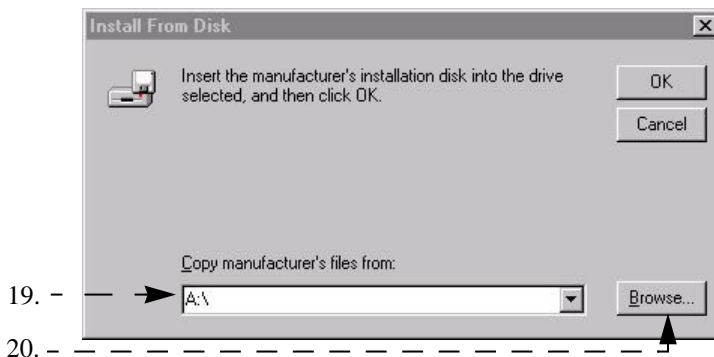
**Figure 20. Modem Detect Window**

16. If you do not want the system to take the time to search for a modem, click "Don't detect my modem. I will select it from a list".
17. Click "Next" to continue. The Modem Selection Window opens.



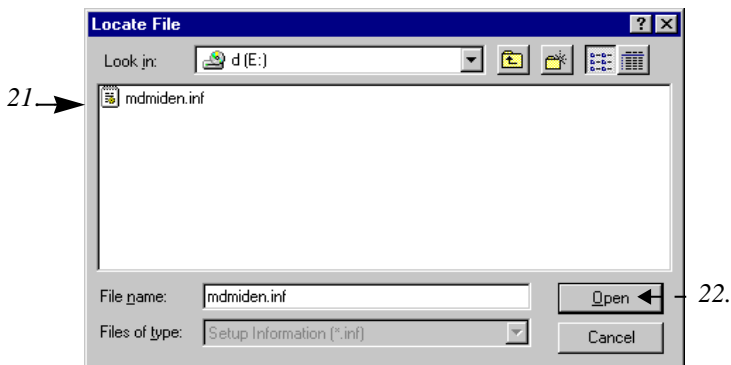
**Figure 21. Modem Selection Window**

18. Click “Have Disk”, then click “Next”. The Install From Disk window opens.



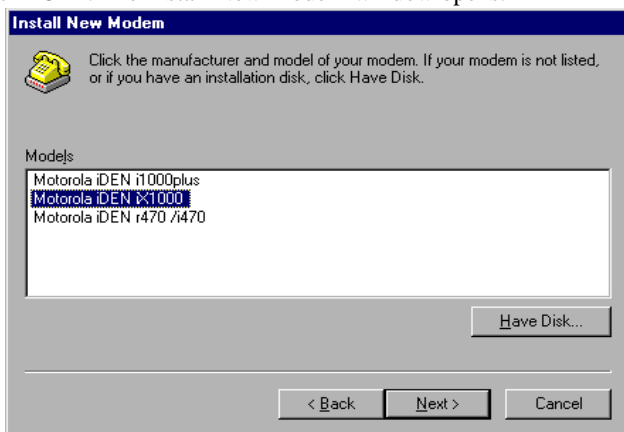
**Figure 22. Install From Disk Window**

19. Type the name of the drive that contains the CD.
20. Click Browse. The Locate File Window opens.



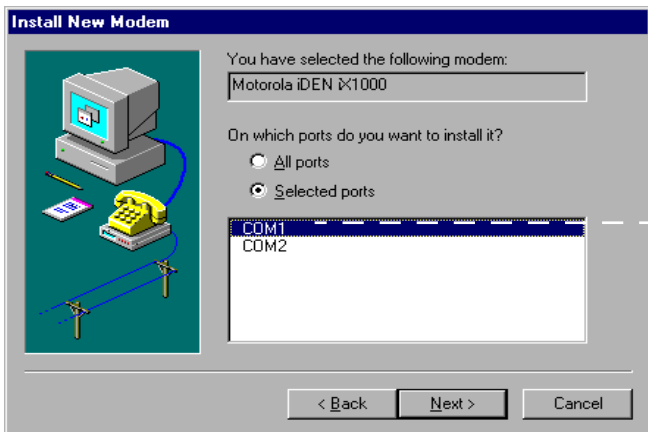
**Figure 23. Locate File Window**

21. Highlight the “mdmiden” file.
22. Click “Open”. The Locate File window opens again.
23. Click “OK”. The Install New Modem window opens.



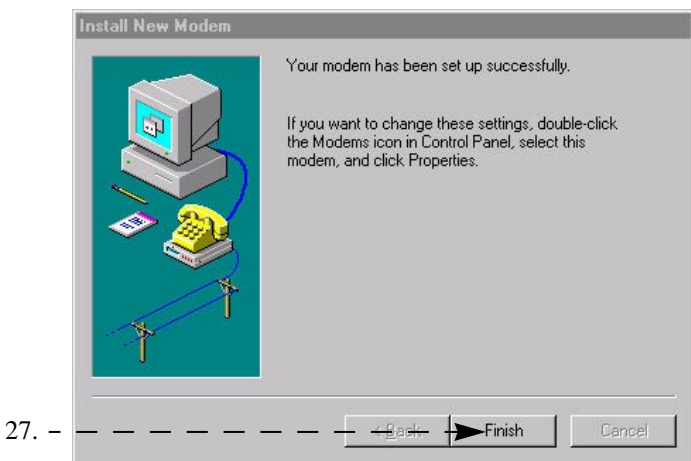
**Figure 24. Install New Modem Window**

24. Make sure that “Motorola iDEN iX1000” is highlighted.
25. Click “Next”. The Port Selection Window opens.



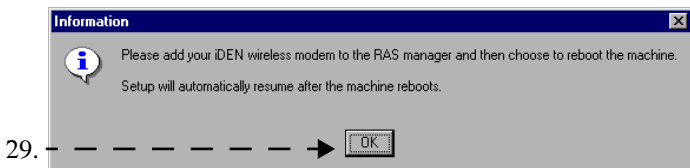
**Figure 25. Port Selection Window**

26. Highlight the COM port to which your modem is to be connected and click “Next”. The Modem Installation Finish window opens.



**Figure 26. Modem Installation Finish Window**

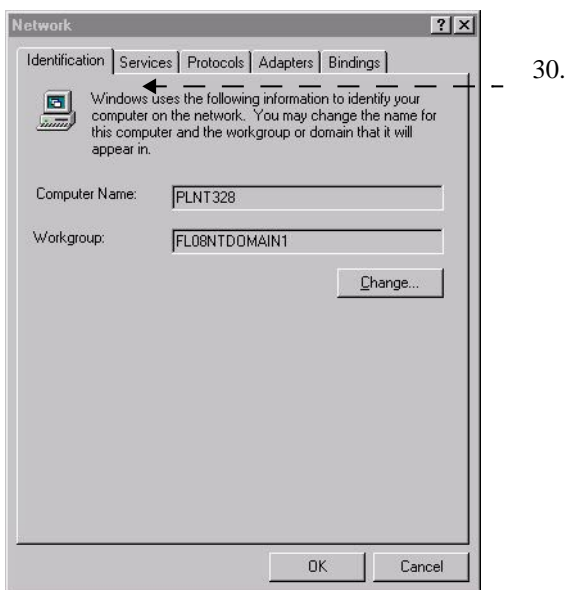
27. Click “Finish”.
28. “Configure the Data Modem in RAS Manager Window” opens



**Figure 27. Configure the Data Modem in RAS Manager Window**

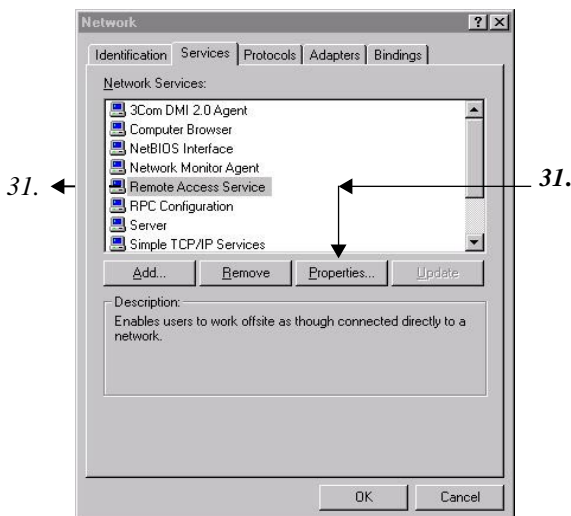


29. Click “OK”. The Network Configuration window opens.



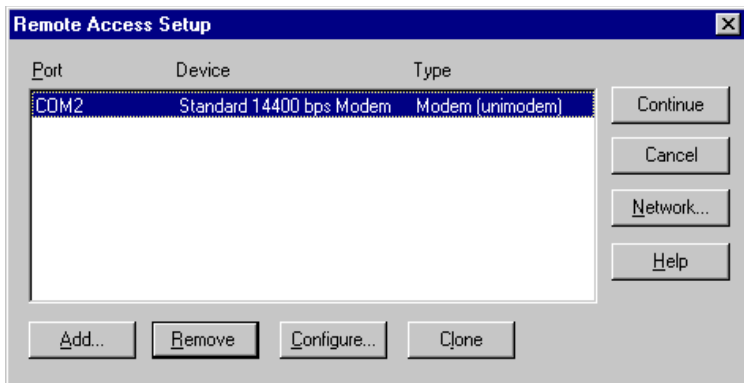
**Figure 28. Network Configuration Window**

30. Click “Services”. The Network Services Selection window opens.



**Figure 29. Network Services Selection Window**

31. Highlight “Remote Access Service” and click “Properties”.  
The Remote Access Setup window opens.

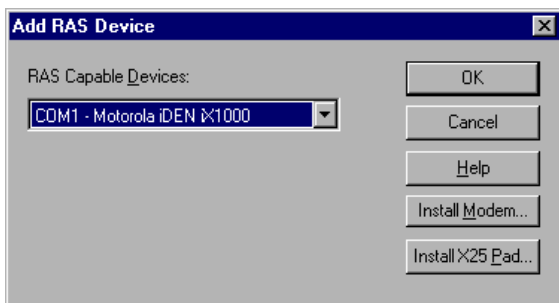


**Figure 30. RAS Access Setup Window**

32. Click “Add”. The Add RAS Device window opens.

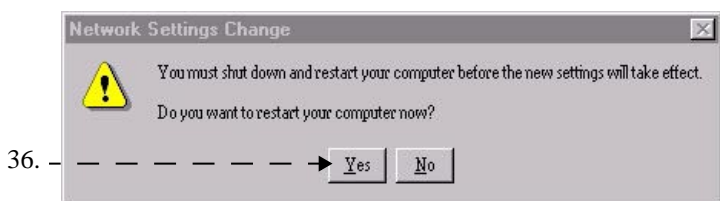
### NOTE

If a modem is already inserted in the same COM port as the data-capable modem, click “Remove” to remove it and then click “Add”.



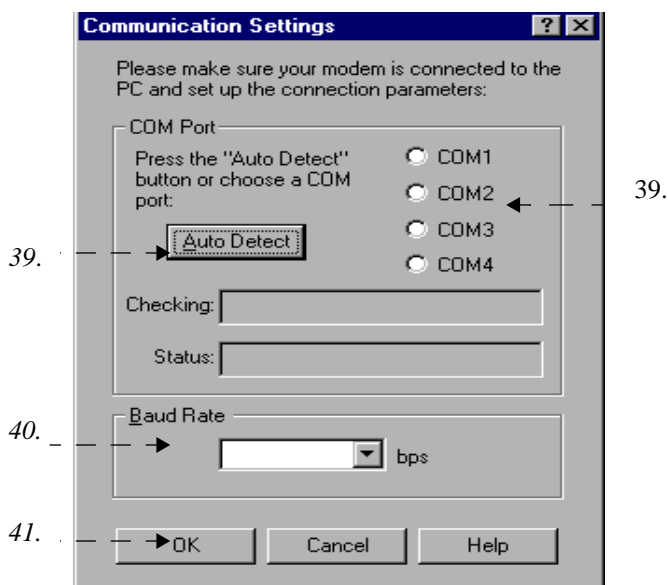
**Figure 31. Add RAS Devices Window**

33. Make sure that the COM port of your iX1000 modem is selected (COM1 in this example).
34. Click “OK”. The Remote Access Setup window now shows the added COM port. Click “Continue”.
35. Click “Close” on the Network Services Selection window.
36. The Computer Restart window opens. Click “Yes”



**Figure 32. Computer Restart Window**

37. When the Windows banner appears during the computer restart, “log on”.
38. The installation will automatically resume.



**Figure 33. Communication Settings Window.**

### IMPORTANT

There is a baud rate setting for your computer and a baud rate setting for your modem. If you do not choose AutoDetect and accept the default baud rate of 19200, be sure the settings for the computer and the modem are the same. If they are not, your computer might have a problem connecting with the modem.

39. At the Communications Settings window, do one of the following:
  - Click “Auto Detect” to have the program automatically detect the

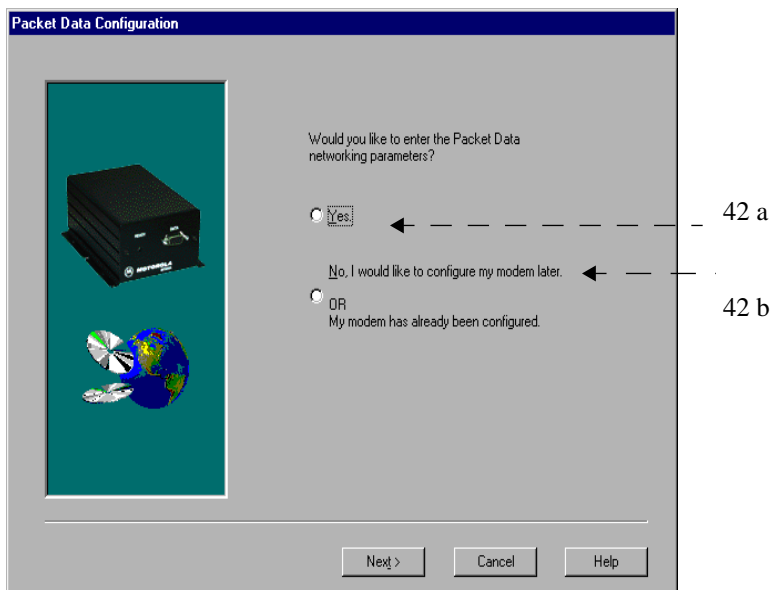
communication port to which your modem is connected and set the corresponding COM port button.

- Or, select a COM port by clicking its selection button

40. *Optional:* If you want to change the baud rate, click the down arrow to make another selection.

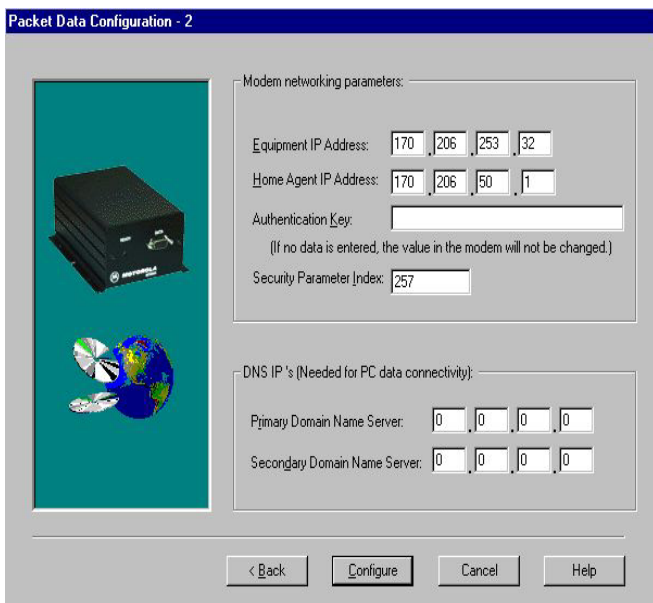
*Be sure that “Done” appears in the Status box before you continue*

41. Click “OK”. The Packet Data Configuration window opens.



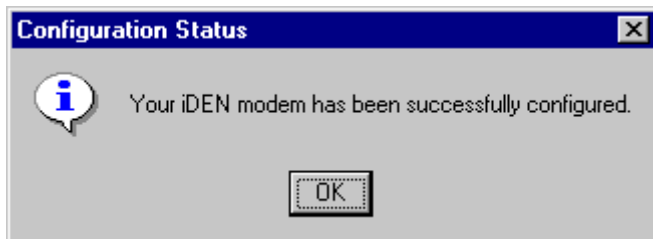
**Figure 34. Packet Data Configuration Window**

42. a. Click “Yes” to configure your modem now.  
 b. Click “No” to configure your modem later.  
 This would also be your choice if modem is already configured.  
 Setup is complete.
43. Click “Next”. If you have selected “Yes” previously, then the Packet Data Configuration-2 window opens.



**Figure 35. Packet Data Configuration-2 Window**

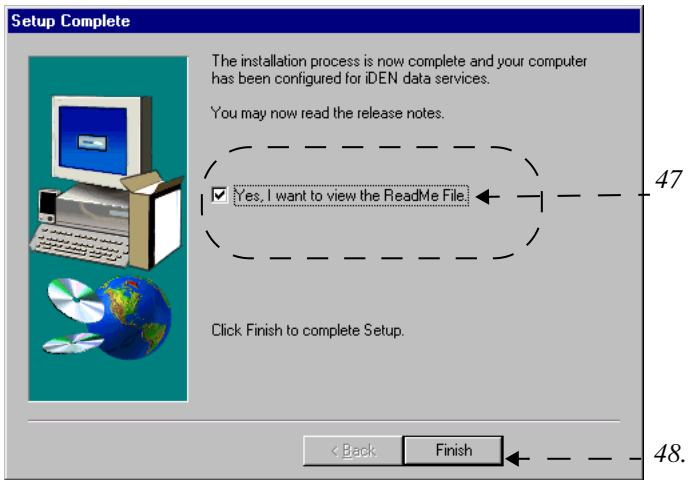
44. Enter the following information: *Some of this information may already be entered for you.*
  - Equipment IP Address
  - Home Agent IP Address
  - Authentication Key
  - Security Parameter Index
  - Primary Domain Name Server
  - Secondary Domain Name Server
45. Click “Configure”. The Configuration Status window opens with the below message.



**Figure 36. Configuration Status Window**

46. Click “OK”. The “setup complete window” appears

For Windows NT



**Figure 37. Windows NT, “Setup Complete” Window**

- 47. At the Setup Complete window, to read the ReadMe file now, leave the check mark. To read it later, remove the check mark.
- 48. Click “Finish”. The iDEN Data Modem Applet window appears on your desktop.

For Windows 95 and Windows 98



**Figure 38. Windows, “Setup Complete” Window**

49. At the setup complete window choose “Yes, I want to restart my computer now” and click “Finish”
50. Continue with “CONFIGURING YOUR MODEM” on page 31.

**NOTE**

If you want to use the data cable and your computer to run applications, continue with “CONFIGURING YOUR MODEM” on page 31. Otherwise, installation is complete.

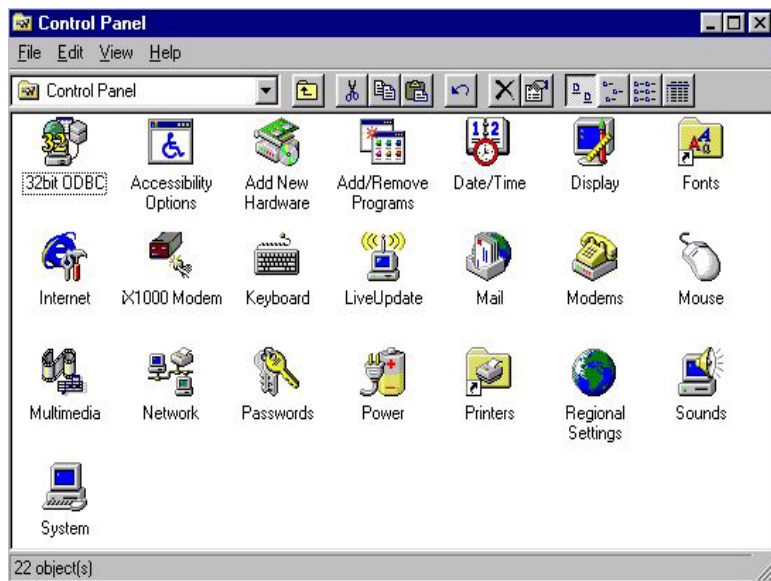
# CONFIGURING YOUR MODEM

The next step is to set up your computer and modem for packet data and circuit-switched data services.

## Setting Up Your Computer and Modem for Packet Data Services

If you did not choose to configure your iDEN modem during software installation, perform the following steps:

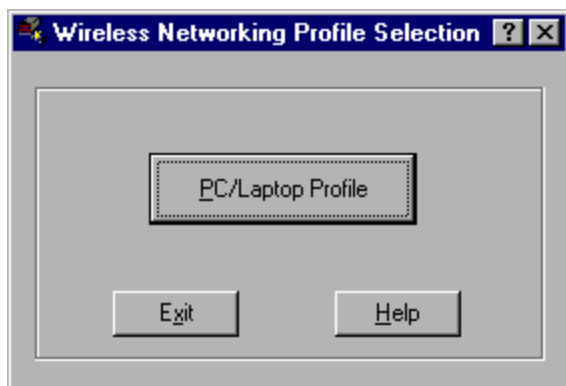
1. From your Windows desktop, double-click “My Computer”.
2. Double-click “Control Panel”. The Control Panel window opens.



**Figure 39. Control Panel Window**

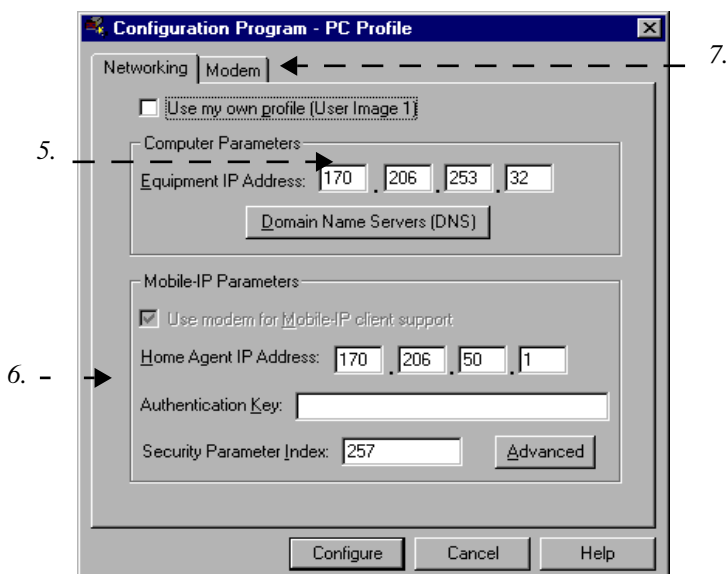
3. Double-click “iX1000 Modem”. The Wireless Network Profile Selection Window opens.





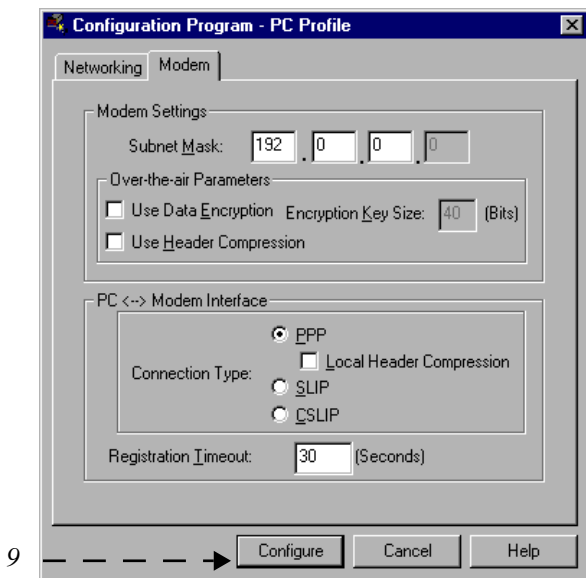
**Figure 40. Wireless Networking Profile Selection Window**

- Click “PC/Laptop Profile”. The Configuration Program-PC Profile window opens with the Networking tab active.



**Figure 41. PC/Laptop Networking Window**

- Enter the modem’s IP address, as provided by your iDEN carrier, if it is not already entered.
- Enter information in the rest of the fields as provided by your iDEN carrier. *Some of this information may already be entered.*
- Click “modem”. The modem Settings window opens.



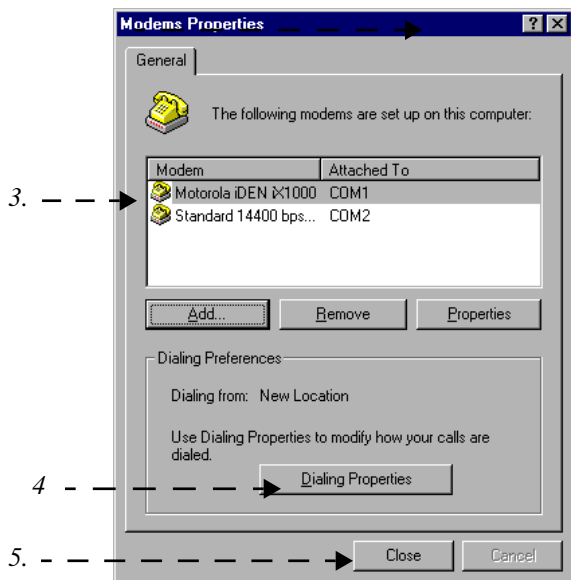
**Figure 42. Modem Settings Window**

8. Make sure the settings match those shown in Figure 42.
9. When you finish, click “Configure” to save your information. A window opens to indicate that your modem is successfully configured.
10. Click “OK”. The Wireless Network Profile Selection window reappears. Click “Exit”.

## Verifying Modem Installation

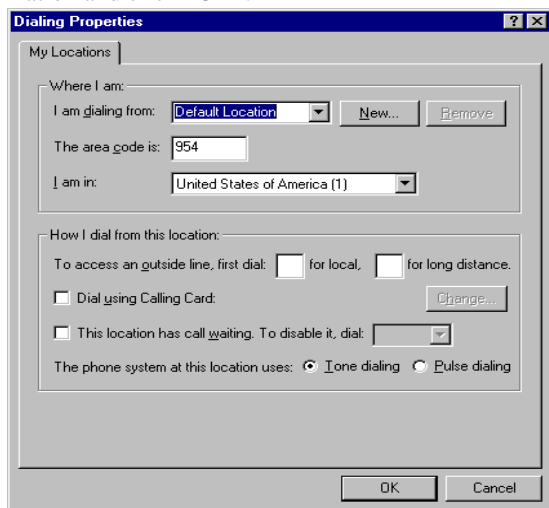
To verify that your modem definition is installed:

1. From your Windows desktop, double-click “My Computer”.
2. Double-click “Control Panel” and then double-click “Modems”. The Modem Properties window opens.
3. Make sure the Motorola iDEN iX1000 modem is on the displayed list.



**Figure 43. Modems Properties Window**

- If you have special dialing requirements, click “Dialing Properties”. The Dialing Properties window opens. Enter the appropriate information and click “OK”.



**Figure 44. Dialing Properties Window**

- In the Modem Properties window, click “Close” again.
- Close the Control Panel window.

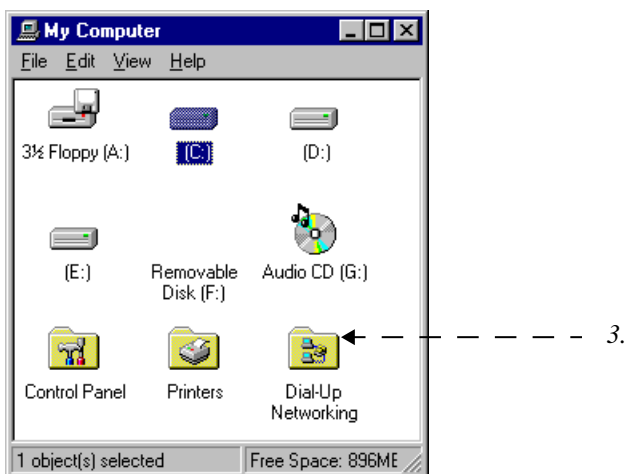
## Creating a Dial-Up Networking Connection in Windows

The setup program attempts to create the dial-up networking connection automatically. However, some versions of Windows 95 require that you create it manually. If you get such a message, use the following procedure.

If you do not have to create a dial-up networking connection, proceed to “STARTING THE INTERNET CONNECTION” on page 40.

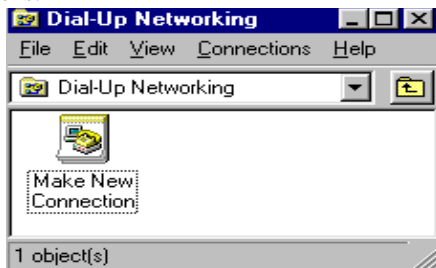
To create a packet data connection:

1. Be sure that your computer has Dial-Up Networking and TCP/IP installed. (For more information, see “Verifying and Installing Dial-Up Networking” on page 10 and “Verifying and Installing the TCP/IP Protocol” on page 13.)
2. From your Windows desktop, double-click “My Computer”.



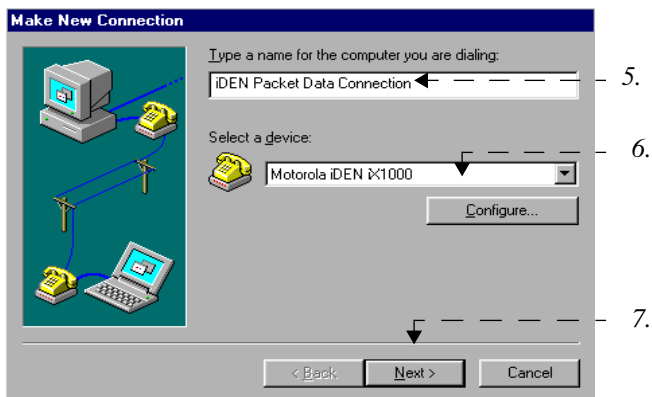
**Figure 45. My Computer**

3. Double-click “Dial-Up Networking”. The Dial-Up Networking window opens.



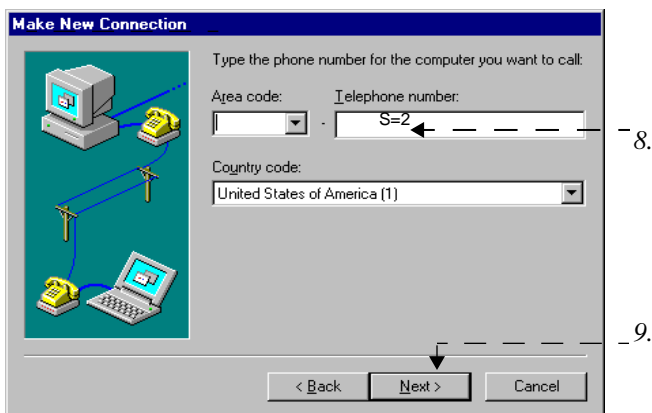
**Figure 46. Dial-Up Networking Window**

4. Double-click “Make New Connection”. The Make New Connection window opens.



**Figure 47. Make New Connection Window**

5. At “Type a name for the computer you are dialing”, type **iDEN Packet Data Connection**.
6. At “Select a modem”, if the Motorola iDEN modem does not appear, click the down arrow and select it.
7. Click “Next” to confirm this selection. The Make New Connection window changes and now displays fields for entering the modem number.



**Figure 48. Entering a Phone Number**

8. At “Telephone number”, enter **S=2**.
9. Click “Next” to confirm this selection.

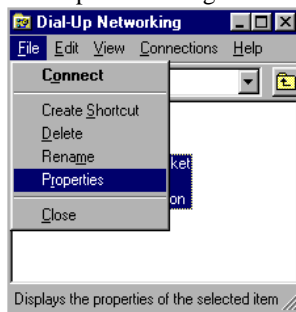
The next screen informs you that you successfully created a new Dial-Up Networking connection called “iDEN Packet Data Connection”, the same name you previously entered.

10. Click “Finish”. This procedure creates the iDEN Packet Data Connection icon in the Dial-Up Networking window.



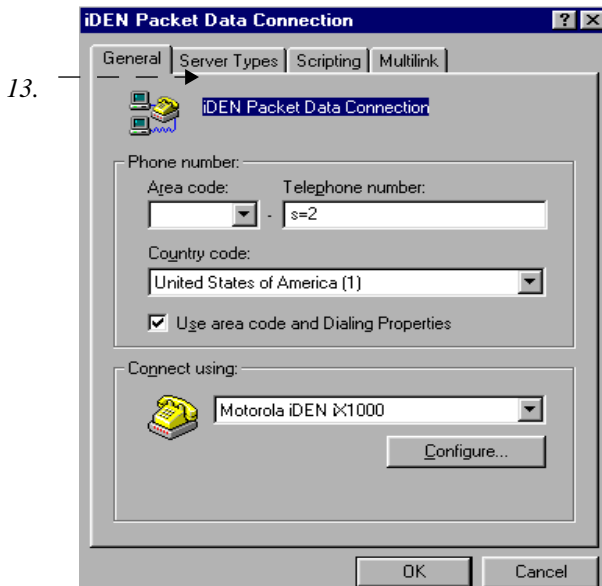
**Figure 49. iDEN Packet Data Connection Icon**

11. Click (*do not double-click*) “iDEN Packet Data Connection” to highlight it. The Dial-Up Networking window opens.



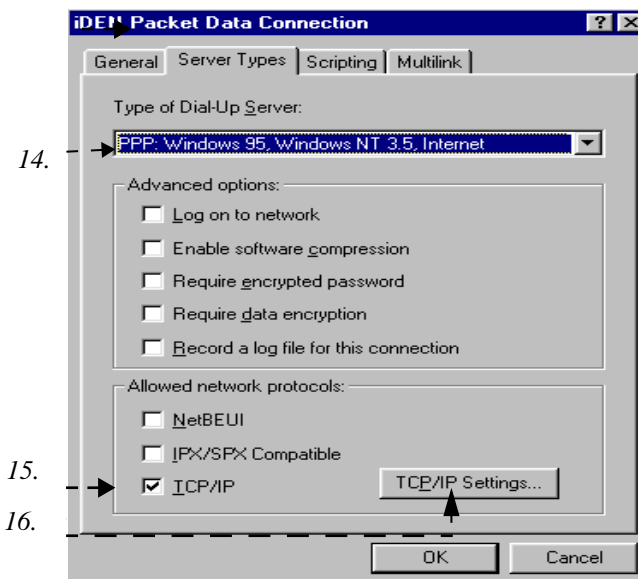
**Figure 50. Dial-Up Networking Window**

12. From the pull-down menu, click “File”, then click “Properties”. The iDEN Packet Data Connection window opens.



**Figure 51. iDEN Packet Data Connection Window**

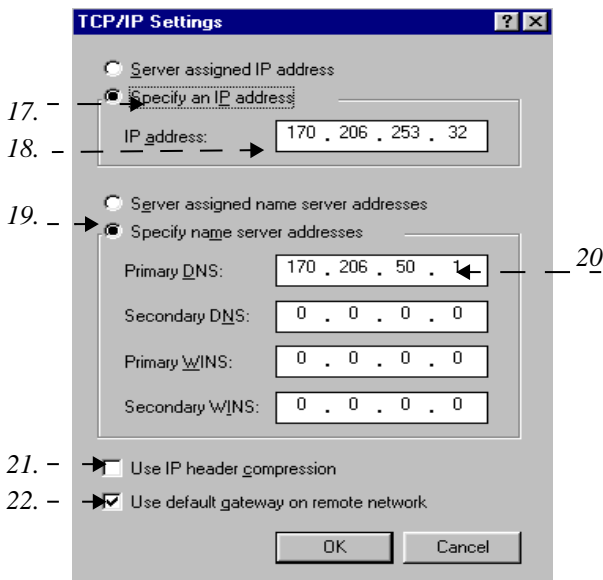
13. Click “Server Types”. The Server Types window opens.



**Figure 52. Server Types Settings**

14. Make sure the “Type of Dial-Up Server” is  
PPP:Windows 95, Windows NT 3.5, Internet.

15. Make sure that the selection box next to “TCP/IP” is checked. Remove the check marks from all other selection boxes.  
*To remove a check mark, click on it.*
16. Click “TCP/IP Settings”. The TCP/IP Settings window opens.



**Figure 53. TCP/IP Settings Window**

*Your iDEN carrier provides your Primary and Secondary DNS IP addresses.*

17. Make sure that the selection button next to “Specify an IP address” is selected.
18. Enter the IP address for the modem.
19. Make sure that the selection button next to “Specify name server addresses” is selected.
20. Enter the Primary DNS IP address provided by your iDEN carrier.
21. (Optional) Check the selection box next to “Use IP Header Compression”.
22. Make sure that the selection box next to “Use default gateway on remote network” is checked.
23. Continue clicking “OK” to return to the Dial-Up Networking window, then close it.



# STARTING THE INTERNET CONNECTION

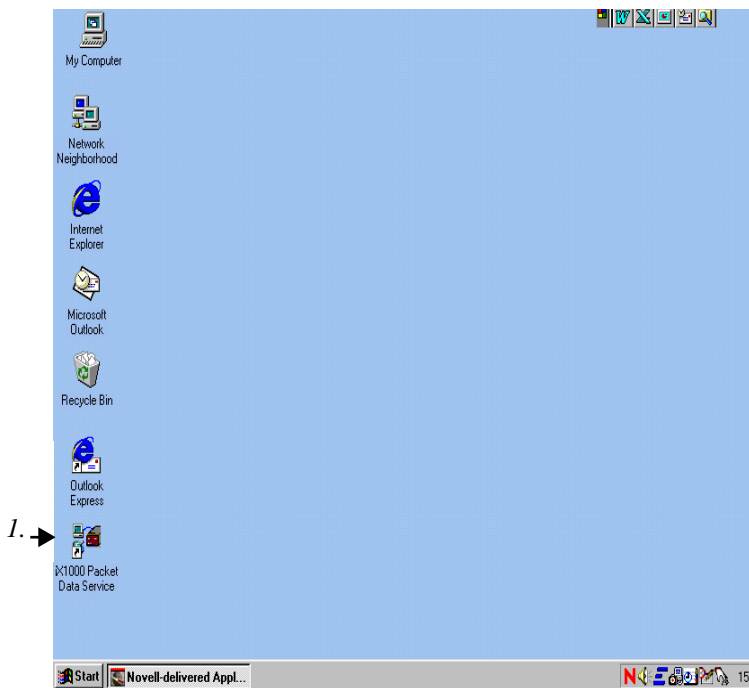
There are two ways that you can connect to the Internet with an iDEN modem: packet data and circuit-switched data.

- **Packet Data**—uses an IP address rather than a modem number.
- **Circuit-Switched Data**—uses a data modem number.

## Connecting with Packet Data Services

When a packet-data connection is active, your Internet service provider is your iDEN carrier.

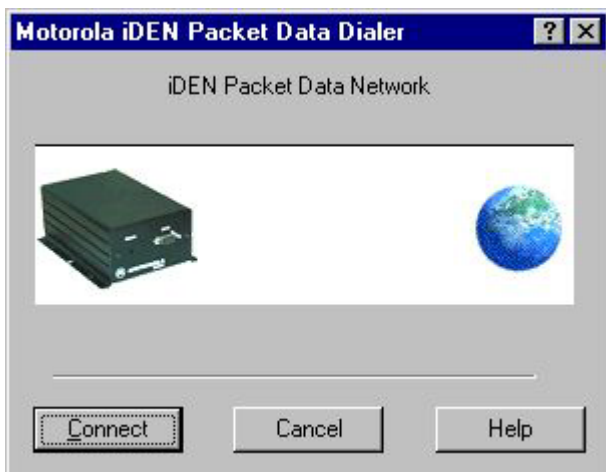
If you have not connected the data cable to the computer and your modem, do so now. If you need instructions, see “This section provides information for connecting the data cable and installing the software.” on page 16.



**Figure 54. iX1000 Packet Data Service Icon**

1. From your Windows desktop, double-click “iX1000 Packet Data Service”. The Dialer window opens.

*If you do not have this icon on your desktop, click Start, Programs, iDEN Data Modem Applet, Status Program.*



**Figure 55. Dialer Window**

- Click “Connect”. As the connection starts, you’ll see the following messages:

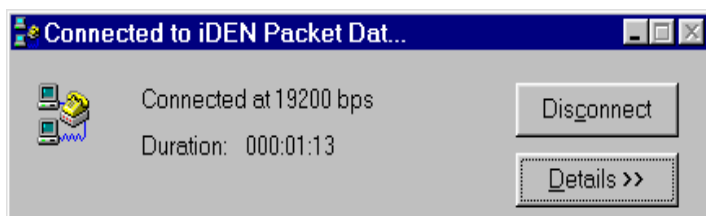
CONNECTING  
CONNECTED SUCCESSFULLY

## After You Are Connected to the Internet

The LED located on the front panel of the modem flashes green to indicate that your modem is packet-data registered.

### *Your Computer*

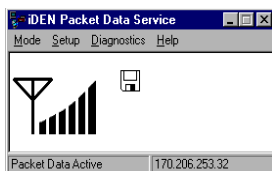
- Displays the “Connected to iDEN Packet Data” window. Simply glance at your computer screen to get the current connection baud rate and duration of the connection.



**Figure 56. Packet Data Status Window**

You can end your Packet Data connection by clicking “Disconnect”.

- Displays the “iDEN Packet Data Services” window, which provides a convenient picture of your modem’s current signal strength.

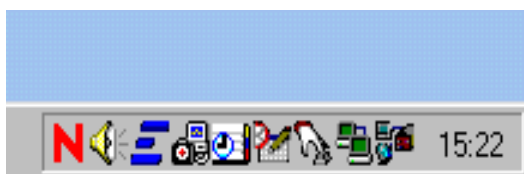


**Figure 57. iDEN Status Window**

You can view the expanded status box by clicking “Mode” then “Advanced”.

For more information about the iDEN status window, see “Using the iDEN Packet Data Service Window” on page 43.

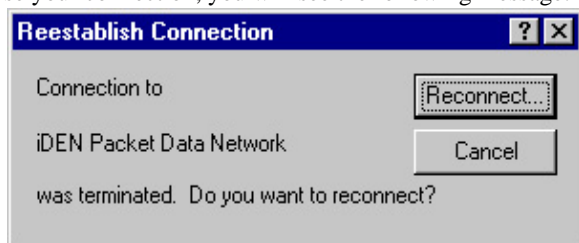
- Displays a modem icon on the Taskbar. You can open the status box by clicking on the modem icon.



**Figure 58. Modem Status Icon on the Taskbar**

### ***If You Lose Your Connection***

If you lose your connection, you will see the following message:




**Figure 59. Reestablish Connection**

To re-establish your connection, click “Reconnect”.

## When You Are Connected

When your iDEN modem is connected to your computer with the data cable, and your packet data modem is selected, you are Packet Data Registered even if you are not actively transmitting data.

-  Your PC displays a floppy disk icon, indicating that your modem is ready to make packet data calls.

*After you send data, the packet data transfers take place during times when the iDEN network is not busy. This operation is like sending a letter through the post office. You do not have simultaneous contact with the addressee.*

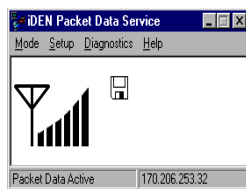
## Using the iDEN Packet Data Service Window

The iDEN Packet Data Service window on your computer screen informs you of the current status of your modem during a packet data connection.

*You can turn this option on and off. It is not required to use packet data services.*

- *Normal mode* provides signal strength.
- *Advanced mode* displays technical information about iDEN carrier and signal strength.

If the computer cannot connect with the modem, your computer will display an error message



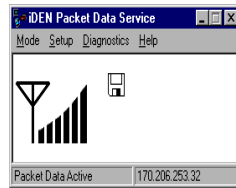
### NOTE

If the iDEN Packet Data Service window is not on your computer screen, you can open it by double-clicking the modem icon on the Windows 95, Windows 98, or Windows NT Taskbar.


## Normal Mode

Normal mode indicates that communication with your iDEN modem has started. A status message displays with the appropriate indicators.

The following table describes the indicators that appear in Normal mode.



**Table 2: iDEN Communication Indicators**

Indicator	Description
Signal Strength 	This indicator displays six bars when the signal is strongest.

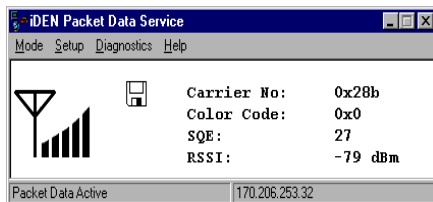
For more information, click your right mouse button in the status window where the indicators reside, and make a selection from the pop-up menu. The menu choices are:

<b>Advanced</b>	Provides technical information about your carrier and signal strength. <i>Normally, you would not need to view this information.</i>
<b>Help</b>	Click to get help for iDEN Packet Data Service window.
<b>About</b>	Click to get product information, such as manufacturer, software name and version, copyright and licensing information.
<b>Exit</b>	Click to close the pop-up menu.

## Advanced Mode

To open the Advanced Mode window:

1. From the Normal mode window, click “Mode”.
2. Click “Advanced”. The Advanced Mode window opens.



**Figure 60. iDEN iX1000 Status Window - Advanced**

The following information is displayed:

<b>Carrier No.</b>	The hexadecimal equivalent for the carrier number of a cell
<b>Color Code</b>	The hexadecimal value for the carrier color code
<b>SQE</b>	The decimal value for the Signal Quality Estimate in decibels (dB)
<b>RSSI</b>	The value that represents the signal strength power received in dBm units.

Advanced mode also has a pop-up menu. To access the pop-up menu, click your right mouse button in the status window.

The menu choices are:

<b>Normal</b>	Click to view the basic information for your modem.
<b>Help</b>	Click to get help for the status window panel.
<b>About</b>	Click to get product information, such as manufacturer, software name and version, copyright and licensing information.
<b>Exit</b>	Click to close the program.

If you see the following status message:

CANNOT COMMUNICATE WITH MODEM...

the computer does not recognize the IP address of the modem. If the IP address conflicts with the one given to you by your iDEN carrier, run the configuration program to synchronize the IP addresses. See “CONFIGURING YOUR MODEM” on page 31.

## Running Applications over Packet Data

You can run any standard TCP/IP application during a packet data session.

To start a packet-data session, double-click the iX1000 Packet Data Services icon.

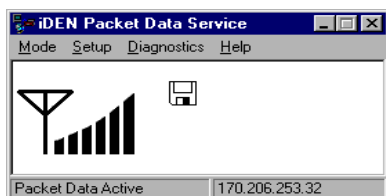
### NOTE

When a packet-data session is active, your service provider is your iDEN carrier and not an Internet service provider.

This means that any software specifically configured for use with other service providers might need to be reconfigured for use with your iDEN carrier.

## Ending a Packet Data Call

To end a packet data call:



**Figure 61. iDEN Status Window**

- If the status window is open, click the button marked X at the upper right corner of the iDEN Status window. This disconnects your modem from the network and closes the status window.
- If the status window is closed, click the modem icon on your desktop taskbar to open the status window. Then click the X at the upper right corner of the iDEN Status window.

## Connecting to the Internet via Circuit-Switched Data

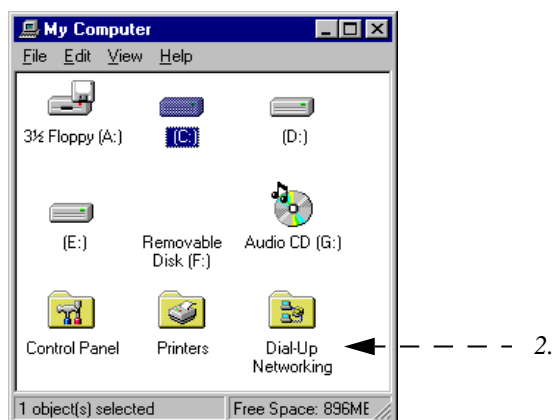
Circuit-switched data communications use AT commands, which are issued by your computer to your modem or, during fax transmissions, to the modem at the other end of the connection.

*AT commands refer to Hayes®-compatible modem commands.*

Make sure you have a Motorola iDEN data-enabled modem definition installed. For more information, see “CONFIGURING YOUR MODEM” on page 31.

To make a circuit-switched data connection:

1. From your Windows 95, desktop, double-click “My Computer”.



**Figure 62. My Computer Window**

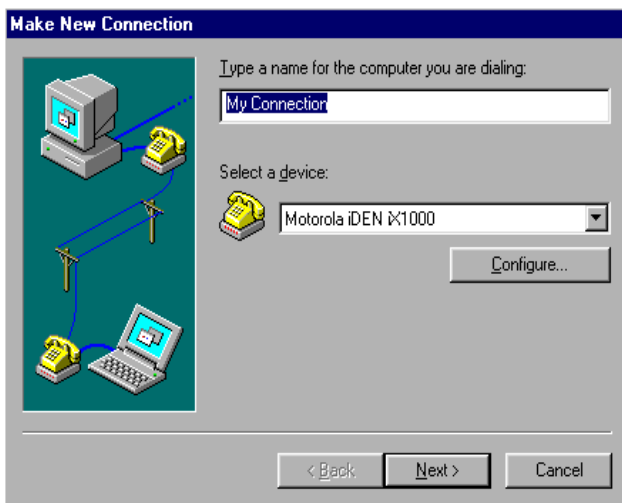
2. Double-click “Dial-Up Networking”. The Dial-Up Networking window opens.



**Figure 63. Dial-Up Networking Window**

3. Double-click “Make New Connection”. The Make New Connection window opens.





**Figure 64. Make New Connection Window**

4. At “Select a modem”, select the name of the Motorola iDEN modem.
5. Click “Next”. Follow the instructions for your Internet Service Provider (ISP).  
*Your ISP is not your iDEN carrier.*
6. Wait for the connection with your ISP to be established.
7. Start your application software (such as, Netscape<sup>®</sup> Navigator<sup>™</sup> or Microsoft<sup>™</sup> Internet Explorer).

## ***FAX SERVICES***

You can send and receive faxes using your existing Class 2-compatible communications software.

*You will not hear a dial tone during dialing operations.*

### **NOTE**

Before starting your communication software, see “Configuring Communications Software” on page 51.

## **Sending Faxes**

To send a fax message:

1. Connect your modem to the computer and make sure that both are turned on.
2. Start your fax communication software.
3. Dial the desired phone number.  
*Use the standard procedure for your communication software or choose the number from a dialing directory.*
4. After the connection is established, send the fax message. If you desire to attach a cover sheet, follow the instructions that came with your communication software.

## **Receiving Faxes**

To receive a fax message:

1. Follow the instructions in steps 1 and 2 for sending faxes above.
2. Use the AT command to set your modem to “Auto Answer”.
3. While the entire fax message is transmitting, the message, DATA CALL IN PROGRESS, displays.
4. View the fax on your computer screen.  
*Use the standard procedure for viewing and printing faxes provided by your communication software.*

## **TTY OPERATION**

*TTY operation provides assistance to hearing-impaired users.*

Your computer screen and keyboard replace the standard TTY device that you use with a telephone. Simply connect your data-enabled modem to a computer with a standard data cable (FKN4369A).

To use TTY mode:

- Configure the modem.
- Be sure HyperTerminal is installed in Windows 95, Windows 98, or Windows NT on your computer. For more information, see “Setting HyperTerminal” on page 58.

### **Before You Make a TTY Call**

1. Connect the data cable to your data-enabled modem, as follows:
  - a. Plug the cable into the accessory connector on the modem.
  - b. Attach the other end of the cable to a serial communication (COM) port on your computer.
2. Make an internet connection by following the instructions for “Connecting to the Internet via Circuit-Switched Data” on page 47.
3. Return to this page and follow the instructions in “Making a TTY Call”.

### **Making a TTY Call**

1. Double-click the icon that you created in the HyperTerminal setup. The HyperTerminal window opens.
2. At the flashing cursor inside the HyperTerminal window, type **ATZ0** (atz zero) then press Enter. You will see the message “OK”.
3. Type **AT+CBST=129** then press Enter. You will see the message, “Ok”.
4. Type **ATD** followed by the modem number in the following format: **ATD###-####**. You are now in TTY mode.

#### **NOTE**

Be sure to place your call to a TTY-specific modem number. For assistance contact Motorola at 1-877-483-2840.

## RELATED SOFTWARE

This section provides information about:

- Online service software
- Configuring communication software

### Online Service Software

Online service software is distributed by an Internet Service Provider (ISP), a fee-based online subscription service, such as IBM® Internet Access, AOL®, or Prodigy®.

1. Install the software provided by your online service.
2. Connect your modem to the computer and make sure that both are turned on.
3. Start your online software.  
*For instructions, see the information that came with your online service software.*
4. When your computer displays the message, CONNECT, log on to the network and start using the online service.

### Configuring Communications Software

For achieving peak operating efficiency with your modem during circuit-switched data use, configure your communication software according to the instructions provided below. Note that these instructions are application-specific.

#### PROCOMM PLUS for Windows 4.0

Before you install PROCOMM PLUS, modify the “pw2.ini” file in the Windows directory and type the following lines under “[options]”:

```
faxlockedrate=19200
fbor=12T
```

To configure for data modem:

1. In your communication software, select “Setup” on the menu bar, then select “Setup...” The Current Setup window opens.
2. Click the “Data Modem/Connection” icon.
  - a. Select “Connection Setup”.
    - (1) Set the default baud rate to 19200.
    - (2) From the Selected Port listing, choose the port to which the modem is connected.
    - (3) Click the selection box next to “Use Hardware Flow Control”.
    - (4) Select “Install New Modem or Connection” then select “Generic Hayes-Compatible 2400 (no fax)”.
  - b. Select “Data Modem Commands”.

- (1) Select "Advanced".
- (2) Type **&K3 S7=60** at the end of the existing initialization command.
- c. Select "Connect Messages".
  - (1) Turn off Autobaud Detect and set Locked Baud to 19.2 K.  
*(Autobaud is only supported for serial speeds of 300, 1200, 2400, 4800, 9600, 19200, or 38400 baud.)*
  - (2) Set "Auto".
3. Click the "Port Settings" icon and configure the settings as follows:
  - Baud Rate = 19200
  - Parity = None
  - Stop Bits = 1
  - Data Bits = 8
  - Duplex = Full
  - Software Flow Control (Xon/Xoff) = Off
4. Click the "Transfer Protocol" icon. For ZMODEM transfers, configure the settings as follows:
  - Transmit Method = 4K-Window
  - Error Detection = 32-bit CRC
5. Save the current connection.
6. Click the "Fax Connection" icon.
  - a. Select "Install New Fax/Modem".
    - (1) Select "Generic Class 2 Fax, 2400 Data Modem".
    - (2) Select the appropriate port.
  - b. Configure other settings as follows:
    - Flow Control = Hardware
    - Fax Class = Class 2
    - Maximum Transmit Rate = 9600
    - Maximum Receive Rate = 9600
  - c. Type **AT&K3 S7=60** to the existing initialization command.
  - d. Save your settings.

# TROUBLESHOOTING

If you have a problem while setting up and using your modem for data calls, read the symptoms and troubleshooting tips provided in the following table. If the system responds with an error message, refer to “Error Messages” on page 55.

Note that the response time for a wireless data call is slower than that for a wireline (normal) data call.

**Table 3: Identifying Symptoms**

Symptom	Troubleshooting Tips
Your modem does not respond to AT commands	Make sure that: <ul style="list-style-type: none"> <li>• The modem is powered on.</li> <li>• The cable is properly connected to the modem.</li> <li>• The cable is connected to the correct port and that this is the same port specified for use in your communication software.</li> <li>• The modem is set to the same baud rate as specified in your communication software.</li> </ul>
Computer screen appears distorted.	Turn off Auto Baud by activating AT+IPR command. Make sure that the baud rate setting in your software matches the baud rate setting on the modem.
No characters are displayed on the computer screen.	Turn on Local Echo by activating the ATE1 command. See “Configuring Communications Software” on page 51.
The modem does not auto-answer incoming data calls (not default operation).	Make sure that the S0 register contains a value other than 0 (zero) by issuing an AT&V command. You can also explicitly set ATS0=x from the software’s command mode where x is any number between 1 and 255.
NO CARRIER message displays when the modem attempts data calls.	Make sure that the S7 register contains a value greater than or equal to 60 by issuing an AT&V command or by explicitly setting ATS7=x where x is any number between 1 and 255.

**Table 3: Identifying Symptoms**

<b>Symptom</b>	<b>Troubleshooting Tips</b>
Received data is unrecognizable.	Make sure that flow control is set to RTS/CTS (that is, hardware flow control is enabled) in the communication software and set to &K3. See “Configuring Communications Software” on page 51.
Data is intermittently lost.	Make sure that flow control is set to RTS/CTS (that is, hardware flow control is enabled) in the communication software and set to &K3. See “Configuring Communications Software” on page 51.
The modem does not respond to a hang-up command from the software’s command mode.	Make sure that: <ul style="list-style-type: none"> <li>• Drop DTR on Hang-Up is enabled in the communication software.</li> <li>• The hang-up string setting is “+++ATH”.</li> </ul>
Slow modem response than usual and/or drops connections occasionally.	Check the signal strength icon to be sure the signal is not weak.
Software reports various modem initialization errors when it attempts fax calls.	Make sure that: <ul style="list-style-type: none"> <li>• The modem is switched on.</li> <li>• The cable is connected properly.</li> <li>• The cable is connected to the correct port and that this is the same port specified for use in your communication software.</li> <li>• You subscribed to the Data feature with your iDEN carrier.</li> <li>• The baud setting on the modem matches the baud setting in your software.</li> <li>• A generic Class 2 fax/modem is selected in the communication software.</li> <li>• The computer port’s baud rate is locked at the recommended 19200 setting as specified in the installation instructions.</li> <li>• The RTS/CTS flow control is enabled in the fax application and set to &amp;K3.</li> </ul>
Images transmitted/received are of poor quality	Ensure that the RTS/CTS flow control is enabled in the communication software and set to &K3. See “Configuring Communications Software” on page 51.

## Error Messages

While making or receiving data calls, you might receive error messages on the computer screen. Refer to the following list before contacting your carrier.

**Table 4: Error Messages**

Message	Explanation
<i>In the Software Application</i>	
BUSY	The number that you called is busy; the modem is ready for another command. Try again later.
ERROR	The command was not recognized, the command line maximum length was exceeded, an invalid parameter value was entered, or there is another problem with the command line. The modem is ready for another command. Make sure that the command (and parameters) that you issued are valid.
MODEM INITIALIZATION FAILED OR EQUIVALENT ERROR MESSAGE	Your communication software assumes that AutoBaud is supported by the modem. Make sure that: <ul style="list-style-type: none"> <li>• You are using one of the communication packages listed in “Configuring Communications Software” on page 51.</li> <li>• If Autobaud is turned on in the software, it requires being turned on in the programming menu of your modem.</li> </ul>
NO CARRIER	Your connection was terminated, or an attempt to establish the connection failed. Try your call again or contact your iDEN carrier.
NO DIALTONE	Cannot gain access to the network; the modem is ready for another command. You might not have subscribed to the Data service. If you have a valid subscription and are not able to access the system, contact your iDEN carrier.



## ***CUSTOMER SUPPORT***

For technical support, contact your iDEN carrier. Before you call, have your subscription number available and make a note of the exact problems and error messages you encountered.

### **NOTE**

Additional information for iDEN Wireless Data Services can be found on the Motorola iDEN web site at:  
<http://www.mot.com/iDEN>

**ACCESSORIES**

Kit Number	Model Description
<b>Antennas</b>	
HAF9067A	Mobile Roof Mount Antenna
FAD5524A	Mobile Window Antenna
RAF4136A	Magnetic Antenna
FTN6003A	High Capacity,1300mAh, LiIon
<b>Cables</b>	
FKN4448A	Power Cable
FKN4868A	Ignition Cable
FKN4369A	Data Cable (10 feet)
FKN4803A	Internal RF Cable
FKN4804A	Flex 30 Pin
<b>Plugs</b>	
FLN9400A	Power On Plug
FLN9401A	SB9000 Plug
FLN9402A	Programming Plug

## **APPENDIX**

### **For Advanced Users**

If you are an experienced user, refer to this section for:

- Setting HyperTerminal
- Installing packet data without the disk
- Using AT commands and S-Registers

### **Setting HyperTerminal**

To enter AT commands, you must set HyperTerminal.

#### **NOTE**

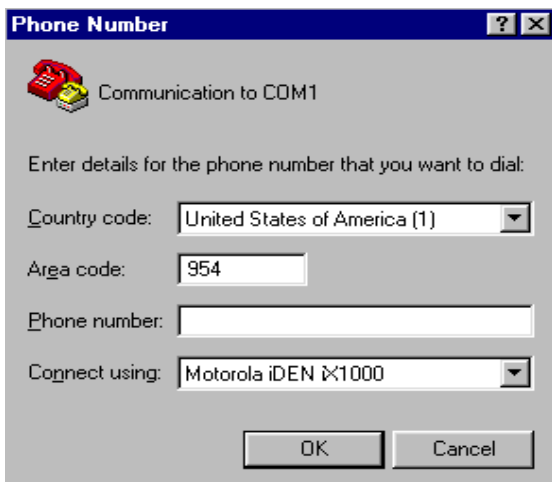
If, during this procedure, you cannot find the HyperTerminal file in the Accessories folder, search for it as follows:

1. From the taskbar on your Windows 95, Windows 98, or Windows NT desktop, select "Start".
2. Select "Find".
3. Select "Files or Folders" and search for the file name "hypertrm.exe".

If a search does not find the file, you can install it from your Windows 95, Windows 98, or Windows NT installation disks. Then repeat the procedure for Setting HyperTerminal described below.

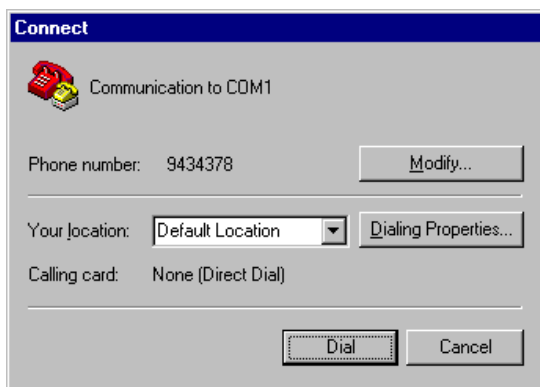
To set HyperTerminal:

1. From the taskbar on your Windows 95, Windows 98, or Windows NT desktop, select "Start".
2. Select "Programs".
3. Select "Accessories".
4. Select "HyperTerminal".
5. Double-click "Hypertrm.exe". The New Connection - HyperTerminal window opens, displaying the Connection Description dialog box.
6. Enter a name for your connection. For example, if you are using COM1, enter "Communication to COM1."
7. Select an icon to display with the name.
8. Click "OK". The modem Number dialog box opens, displaying the icon that you created above.



**Figure 65. Modem Number Dialog Box**

9. In the Connect using field, select the name of the Motorola iDEN iX1000 modem.
10. Click “OK”. The Connect window opens.



**Figure 66. Connect Window**

11. Click “Dial”.
12. When your call is complete, click “Yes” to save and close the session or click “No” to close the session without saving it.
13. When you finish, click “OK”.

## **Configuring the Modem for Packet Data— without the Disk**

*If you installed the packet data software on Windows 95, Windows 98, or Windows NT with the disk, skip this section.*

You can configure your modem for iDEN packet data services manually (that is, without the installation program) for an IBM PC-compatible computer, an Apple™ Macintosh computer, or a hand-held computing device.

### **Installation Requirements**

- An iDEN data modem
- A data cable (PC-compatible or Macintosh)
- An IBM PC-compatible or Macintosh computer, or a hand-held device with an RS232C serial port
- An active account with your iDEN carrier
- Communication software

If you have been using a wireline modem with your software application, make sure that the serial (COM) port that you specified in your communication software is the same port to which the modem is connected.

### **Installing Dial-Up Networking**

This section provides the procedure for setting up Dial-Up Networking on your Windows 95, Windows 98, or Windows NT computer.

*Make sure that your Windows 95, Windows 98, or Windows NT installation media (CD-ROM or disks) is available. You may be asked to insert the CD-ROM or floppy disk later in the installation procedure.*

1. From the Control Panel, double-click “Add/Remove Programs”. The Add/Remove Programs Properties window opens.
2. Select the “Windows Setup” tab.
3. Highlight “Communications” in the Components box.
4. Click “Details”. The Communications dialog box opens.
5. In the Communications dialog box:
  - a. Make sure that the selection box to the left of “Dial Up Networking” has a check mark in it.
  - b. Make sure that the selection box to the left of “HyperTerminal” has a check mark in it.
  - c. Click “OK” to close the dialog box, then click “OK” again.
6. Restart your computer.
7. Continue with defining your dial-up networking connection.

## Establishing Communication

To set up your iDEN modem for packet data services using AT commands, you must first establish basic communication with the modem.

If you have not connected the data cable to the computer and your modem, do so now. If you need instructions, see “This section provides information for connecting the data cable and installing the software.” on page 16.

### Software Connections

After you establish the hardware connections, you must run a terminal software program on your computer. The terminal program provides simple communication through the computer serial port.

To test the connection,

1. Type **ATi4** in the Terminal Window.
2. Press Enter. You should see one of the following messages:

MOTOROLA, IDEN OK	- or -	MOTOROLA, IDEN 0
----------------------	--------	---------------------

### If the Connection Fails

If the message, OK, or the message, 0, does not display when you issue the AT command, check the connections and try again. Make sure that:

- √ The modem is powered on.
- √ The cable is connected according to the instructions in “This section provides information for connecting the data cable and installing the software.” on page 16.
- √ The serial (COM) port on the computer, to which the cable is connected, is the same as the serial port specified in your communication software.
- √ The communication program that you are using is listed in “Configuring Communications Software” page 51.
- √ The software is configured according to the procedure described in this section.

If, after taking the above measures, the connection continues to fail, see “TROUBLESHOOTING” on page 53.

## Configuring Port and Dial Settings

If you are installing data modem on a computer or hand-held device that does not use Windows 95, Windows 98, or Windows NT, configure your port and dial settings, as follows:

Baud rate=**19200**  
 Data bits=**8**  
 Stop bits=**1**  
 Parity=**None**  
 Duplex=**Full**  
 Dial Method=**Tone**  
 Flow Control=**Hardware**  
 Data Initialization String=**AT&K3**

*If the hardware flow control is not supported, set the Data Initialization String to AT&K4.*

## Configuring the Modem with AT Commands

If you are not using the *Installation* disk, configure your AT command set using the following guidelines.

Enter the command indicated next to Command Syntax.

### NOTE

DCE refers to your iDEN modem.  
 DTE refers to your computer or hand-held computing device.

## Restore Factory Defaults

First, restore the current values to their factory default values. This will ensure a clean start for the rest of the configuration.

AT Command	Restore Factory-Default Configuration
Command Syntax	AT&F
Expected Return Code(s)	OK

### ***Activate DTR Monitoring***

By factory default, the DCE does not monitor the DTR line of the DTE/DCE physical connection. Many communications programs use the DTR line to terminate ongoing PPP/SLIP sessions. Therefore, you must activate DTR monitoring in the DCE.

AT Command	DTR Behavior
Command Syntax	AT&D2
Expected Return Code(s)	OK

### ***Activate DCD Management***

By factory default, the wireless modem keeps the Data Carrier Detect (DCD) line of the computer-to-modem physical connection active at all times. Some communications programs monitor this line to determine the status of the connection. To promote compatibility with these programs, enable DCD management in the modem.

AT Command	DCD Behavior
Command Syntax	AT&C1
Expected Return Code(s)	OK

### ***Set the Computer's IP Address***

You must inform the modem of the computer IP address to establish a SLIP or PPP connection between the modem and the computer. The following example uses the IP address 170.206.1.1. Substitute this value with the address supplied by your system administrator or service provider.

AT Command	Computer IP Address
Command Syntax	AT+WPNEI="170.206.1.1.
Expected Return Code(s)	OK



### Select iDEN Packet Wireless Data

The iDEN modem is capable of supporting multiple wireless data formats; therefore, you must select the desired data service.

AT Command	Select WDS-side stack
Command Syntax	AT+WS46=24
Expected Return Code(s)	OK

### Select SLIP or PPP

When iDEN Packet Data services are active, a SLIP or PPP connection is established between the computer and the modem. (The SLIP/PPP connection does NOT take place on the over-the-air interface.) By default, the modem attempts to establish a PPP connection. To establish a SLIP connection, you must specify this request.

Although the following chart displays the SLIP and the PPP selection commands, you may skip SLIP if you choose PPP.

AT Command	Select computer-side stack	
Command Syntax	PPP	AT+WS45=4
	SLIP	AT+WS45=3
Expected Return Code(s)	OK	

### Mobile IP Activation

The iDEN Data Implementation makes use of Mobile IP to manage a truly mobile computer. You may use a Mobile IP stack on the computer or use the Mobile IP stack built into the modem.

By default, the modem is configured for the mobile IP stack built into it. If you desire this mode of operation, skip ahead to “Configure Encryption Settings” on page 66.

Otherwise, you must deactivate the Mobile Node functionality within the modem.

AT Command	Modem Mobile IP Control	
Command Syntax	Activate	AT+WV300=1
	Deactivate	AT+WV300=0
Expected Return Code(s)	OK	

### ***Mobile IP Home Agent Address***

You must specify the IP address of the Home Agent. The following example uses the IP address 170.206.50.1. Substitute this value with the address supplied by your system administrator or service provider.

AT Command	MIP Home Agent Address
Command Syntax	AT+WV305="170.206.50.1"
Expected Return Code(s)	OK

### ***Mobile IP Authentication Key***

The Mobile IP Authentication Key is used as a PIN number to validate your Mobile IP connection with the Home Agent.

The following example uses the Authentication Key "ABC123". Substitute this value with the one supplied by your system administrator or service provider.

*Be sure to place quotation marks around the Authentication Key name.*

AT Command	MIP Authentication Key
Command Syntax	AT+WV301="ABC123"
Expected Return Code(s)	OK

### ***Mobile IP Security Parameter Index (SPI)***

The SPI is similar to the Authentication Key in that the modem and the Home Agent must have identical values registered for the computer.

The following example uses the SPI 256. Substitute this value with the SPI supplied by your system administrator or service provider.

AT Command	MIP Security Parameter Index
Command Syntax	AT+WV309=256
Expected Return Code(s)	OK

## Mobile Node IP Prefix Length

The prefix length of an IP address is the number of contiguous (adjoining) bits that make up the network prefix of that IP address. This command sets the prefix length of the computer's IP address (see "Set the Computer's IP Address" on page 63).

The following example uses the Prefix Length 2. Substitute this value with the Prefix Length supplied by your system administrator or service provider.

AT Command	Mobile Node IP Prefix Length
Command Syntax	AT+WV311=2
Expected Return Code(s)	OK

## Configure Encryption Settings

Data Encryption allows you to send and receive sensitive information without allowing others to electronically eavesdrop on your data transmissions. Although network performance might be adversely affected by the activation of data encryption, its use is recommended if you are connecting to secure networks.

Note that this encryption setting is independent of encryption offered by applications such as Netscape.

Data Encryption is disabled by default.

If you do not want to use the data encryption feature, skip ahead to "Saving Your AT Settings" on page 67.

If you want to use data encryption, you must specify the request as negotiable or not negotiable.

- If the encryption request is not negotiable and the network is not able to grant the request (for whatever reason) for encryption, your connection will be terminated.
- If the encryption request is negotiable and encryption is not available in the network, the connection will be maintained in a non-encrypted state.

You also have the option to specify an Encryption Key Size.

The following example uses the Encryption Key Size 40. You can substitute this value with any value within the allowed range of 40 to 64.

AT Command	Network Air-Link Encryption	
Command Syntax	No Encryption	AT+WV308=0,0,40
	Negotiable	AT+WV308=1,0,40
	Not Negotiable	AT+WV308=1,1,40
Expected Return Code(s)	OK	

## Header Compression

Use this command to disable header compression.

+WS182	This command enables or disables TCP header compression options. Some DTE-Side Stacks (such as PPP) will negotiate local header compression independently from this setting.	
	Action	AT+ws182=<header compression>
	Query	AT+ws182?
	Range	AT+ws182=?
	Parameter Values:	
	0	Over-the-air and local header compression enabled
	1	Over-the-air header compression enabled
	2	Local header compression enabled
3	Header compression disabled	

## Saving Your AT Settings

Your modem is now properly set up for typical iDEN Wireless Data Services use. These settings, however, are stored only in the modem's Random Access Memory (RAM). If the modem is turned off, the settings will be lost. The next step, then, is to save the settings in the modem's non-volatile memory.

Like many other modems, the iDEN modem is capable of storing more than one personality, or image, into non-volatile memory. Each image can then be read, altered, and saved without changing the contents of the others. The iDEN modem has three images.

By default, the third image is loaded when the modem is powered on or when the data cable is unplugged. It might seem logical to store these settings into this first profile. However, because many communication programs alter the contents of this first image, some of your parameters might be overwritten. For this reason, store these parameters in the second image.

By convention, the first image is named *User Image 0*, the second image is *User Image 1*, and the third image is *User Image 2*.

AT Command	Save User Default Configuration
Command Syntax	AT&W1
Expected Return Code(s)	OK

## Troubleshooting Diagnostic Commands

If a data connection could not be established, you might be able to determine the cause through the AT command interface.

Follow the steps listed below:

- Close all data applications.  
*Otherwise, these applications might start a retry command that will interrupt your troubleshooting efforts.*
- Unplug and re-connect the data cable.  
*This terminates any ongoing data connections.*
- Establish basic computer-to-modem communication.  
*For instructions, see “Establishing Communication” on page 61.*
- Query the last “Extended Error Code”.  
*Although you might not be able to see the text as you type it, you should see a result code returned to you.*

AT Command	Return Product Information
Command Syntax	AT+CEER
Expected Return Code(s)	See Below

## Extended Error Result Codes

Extended error result codes report the network reason why a data connection failed. If you report a failed connection to technical support, be sure to provide the code. See the following table for a list of the extended error result codes that the modem can return.

**Table 5: Extended Error Result Codes**

Code	Description
<i>General Modem Operation</i>	
257	No further information is available.
259	A command was issued during an improper state (Command/Online).
260	The connection was aborted by the user.
261	The DCE does not recognize an AT Command.
262	The connection was aborted due to a connection timeout.
263	The parameters for an AT Command are out of range.
266	The +FCLASS command failed due to incompatibilities with the current setting of the +WS46 command.

**Table 5: Extended Error Result Codes**

<b>Code</b>	<b>Description</b>
267	The +WS45 command failed due to incompatibilities with the value of the +WS46 command.
268	Invalid DTE-IP address was specified (+WPNEI).
269	Invalid Home Agent Address was specified (+WV305).
270	Invalid MIP Security Parameter Index was specified. (+WV309).
271	DCE IP address matched Home Agent IP Address (+WV304, +WV305).
272	The DTE tried to lock or unlock the DCE using an incorrect PIN.
275	An AT Command is not compatible with the currently active data service.
<i>Packet Data Operation</i>	
519	Requested level of encryption is not allowed.
545	Service is not present.
612	A data registration error was found. Contact your Service Provider.
833	FA: Mobile Node Administratively is prohibited from registration.
835	FA: Mobile Node Authentication failed.
836	FA: Home Agent Authentication failed.
897	HA: Mobile Node Administratively is prohibited from registration.
899	HA: Mobile Node Authentication failed.
900	HA: Foreign Agent Authentication failed.
1025	SLIP/PPP failed to respond.
1026	SLIP/PPP failed to configure the connection.
1027	SLIP/PPP link terminated.

**Table 5: Extended Error Result Codes**

<b>Code</b>	<b>Description</b>
<i>Circuit Data Operation</i>	
1280	No information is available.
1290	Unspecified Transmit Phase A Error
1300	Unspecified Transmit Phase B Error
1320	Unspecified Transmit Phase C Error
1330	Unspecified Transmit Phase D Error
1350	Unspecified Receive Phase B Error
1360	Unspecified Receive Phase C Error
1370	Unspecified Receive Phase D Error
<i>Network Error Codes</i>	
1538	No route to specified transit network.
1539	No route to destination.
1553	Called unit is busy.
1563	Destination is out of order.
1564	Invalid number format - incomplete
1570	No circuit/channel is available.
1574	Network is out of order.
1577	Temporary failure
1578	Switching equipment congestion
1580	Requested circuit/channel is not available.
1583	Resource is unavailable.
1594	Bearer capability is not presently available.
1593	Bearer capability is not authorized.
1599	Service or option is not available.
1601	Bearer service is not implemented.

**Table 5: Extended Error Result Codes**

<b>Code</b>	<b>Description</b>
1602	Channel type is not implemented.
1615	Service or option is not implemented.
1624	Incompatible destination.



## Commonly Used AT Commands

The subset of AT commands supported by iDEN Wireless Data Services is provided in this section for your reference.

These commands must be preceded by the command line prefix “AT”, for example, “ATa”.

### NOTE

DCE refers to your iDEN modem.

DTE refers to your computer or hand-held device.

*To enter commands, you can use upper- or lower-case letters, or both.*

### Answer

A	If an incoming (decoded) data service is pending, this command instructs the DCE to immediately connect to the call and start the answer sequence, as appropriate for the selected service.	
	Action	ATa
	Query	
	Range	

### Command Mode Echo

E	The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state.	
	Action	ATe <echo>
	Query	AT&v
	Range	
	Parameter Values:	
	0	Disable command mode character echo.
	1	Enable command mode character echo.

## Dial

D	This command instructs the DCE to originate a call. When the DCE receives the dial string from the computer, all non-numeric characters in the Dial String that are not recognized dial-modifiers are ignored. This allows the DTE to request modem numbers containing unsupported dial modifiers, hyphens, parenthesis, and other punctuation.	
	Action	ATd <Dial String>
	Query	
	Range	
	Parameter Values: Dial String contains a modem number to be dialed, translated into an array of ASCII characters between 0 and 9 inclusive. Dial Modifiers:	
	T	Allowed, but ignored by the modem.
	P	Allowed, but ignored by the modem.
	!	Hook Flash (1/2 second).
	W	Wait for time specified in S7 for dial tone.
		Wait for time specified in S7 for one or more rings followed by five seconds of silence before continuing execution of dial string.
,	Pause for time specified in S8.	
;	After dialing return to command mode.	

## Hangup

H	This command instructs the modem to terminate the active call.	
	Action	ATh
	Query	
	Range	

## Request Modem Information

I	This command causes the modem to issue a string to provide product information.	
	Action	ATi<request>
	Query	
	Range	
	Parameter Values:	
	0	OK Response code
	1	iDEN DTE/DCE Specification Version
	2	Software Model
	3	Product model
	4	Product manufacturer

## Go Online

O	This command causes the modem to enter the online state from the online command state.	
	Action	ATo
	Query	
	Range	

## Pulse Dialing

P	This command selects pulse dialing. It is provided for compatibility purposes.	
	Action	ATp
	Query	
	Range	

## Quiet Mode

Q	This command controls whether or not result codes are sent to the computer. If Quiet Mode is turned off, the result codes may be further modified by the Result Code Format and Extended Result Codes commands.	
	Action	ATq<setting>
	Query	AT&v
	Range	
	Parameter Values:	
	0	Result codes sent
	1	Result codes not sent

## Tone Dialing

T	This command selects DTMF dialing. It is provided for compatibility purposes.	
	Action	ATt
	Query	
	Range	

## Verbose Result Codes

V	This command sets your preference for result code format. It allows the computer to select Terse or Verbose result codes.	
	Action	ATv<setting>
	Query	AT&v
	Range	
	Parameter Values:	
	0	Numeric result code format
1	Verbose result code format	

## Extended Result Codes

X	This command provides an extended result code selection.	
	Action	ATx<setting>
	Query	AT&v
	Range	
	Parameter Values:	
	0,1	The modem does not return the BUSY or NO DIALTONE result codes.
	2	The modem might return the NO DIALTONE result code if appropriate, but does not return the BUSY result code.
	3	The modem may return the BUSY result code if appropriate, but does not return the NO DIALTONE result code.
4	The modem may return either the BUSY or NO DIALTONE result code, if appropriate.	

## Restore User Defaults

Z	This command causes the modem to reset all parameters and S-registers to their user-defined default values. There are three sets of user defaults. The parameter selects between which set (or image) is being requested.	
	Action	ATz<image>
	Query	
	Range	
	Parameter Values:	
	0	Load user image 0
	1	Load user image 1
2	Load user image 2	

## DCD Behavior

&C	This parameter determines how the DCD line (circuit 109) relates to the detection of received line signals from the distant end. Changing the parameter takes effect immediately in both the command and online command states.	
	Action	AT&c<setting>
	Query	AT&v
	Range	
	Parameter Values:	
	0	DCD always on
	1	The modem turns on the DCD to indicate the presence of a connection, and turns off the DCD to indicate the loss of a connection.

## DTR Behavior

&D	This parameter determines how the computer responds when the DTR line (circuit 108/2) is changed from the “on” condition to the “off” condition during the online data state.	
	Action	AT&d<setting>
	Query	AT&v
	Range	
	Parameter Values:	
	0	Modem ignores DTR
	1	If the DTR is turned on while in online data mode, the modem returns to command mode and issues the OK result code. The call remains connected.
2	If the DTR is turned off while in online data mode, the modem disconnects the call and returns the OK result code. If DTR is off while in command mode, the modem will not answer an incoming call, regardless of the setting, S0 (Automatic Answer).	

## Restore Factory Defaults

&F	This command causes the modem to reset all parameters and S-registers to their factory-defined default values. The optional parameter value, if present, must be 0.	
	Action	AT&f
	Query	
	Range	

## Local Flow Control (Traditional)

&K	This parameter selects the type of flow control used between the computer and the modem while in data transfer mode. This command is supported for backwards compatibility purposes. This command sets the method of flow control for both directions of the computer-to-modem interface, while the +IFC command allows for a separate setting for each direction. The setting of this command may implicitly alter the settings of the +IFC command.	
	Action	AT&k<setting>
	Query	
	Range	
	Parameter Values:	
	0	No Flow Control (not recommended).
	3	RTS/CTS Flow Control
	4	XON/XOFF Flow Control

## Display Current Parameter Values

&V	This command allows the computer to view the parameter and S-register settings for the active configuration profile.	
	Action	AT&v
	Query	
	Range	

## Local Character Framing

+ICF	This parameter determines the local serial port asynchronous data framing. The second parameter is needed only if you select less than eight data bits.	
	Action	AT+icf=<Framing>[,<Parity>]
	Query	AT+icf?
	Range	AT+icf=?
	Parameter Values:	
	Framing	
	0	AutoDetect
	3	8 data bits, 1 stop bit
	5	7 data bits, 1 parity bit, 1 stop bit
	Parity	
	0	Odd
	1	Even
	2	Mark
	3	Space



**Local Flow Control (PCCA)**

+IFC	<p>This extended compound parameter controls the local flow control between the computer and the modem. The two numeric subparameters are DCE_by_DTE (which controls the data from the modem) and DTE_by_DCE (which controls the data from the computer).</p> <p>To change the settings of these parameters, use the &amp;K command.</p>	
	Action	AT+ifc=<DCE_by_DTE>,<DTE_by_DCE>
	Query	AT+ifc?
	Range	AT+ifc=?
	Parameter Values:	
	DCE_by_DTE	
	0	No flow control was set by DTE.
	1	XON/XOFF; Do not pass XON/XOFF characters to the remote DCE.
	2	RFR active/inactive flow control
	3	XON/XOFF; Pass DC1/DC3 characters to the remote DCE in addition to acting upon local flow control.
	DTE_by_DCE	
	0	No flow control was set by DTE.
	1	XON/XOFF flow control
	2	CTS/RFS active/inactive flow control

## Local Data Rate

+IPR	This numeric extended-format parameter specifies the data rate between the DTE and the DCE.	
	Action	AT+ipr=<rate>
	Query	AT+ipr?
	Range	AT+ipr=?
	Parameter Values:	
	0	Automatic detection on baud rate, data framing
	300	Transmission speed in bits per second.
	2400	Transmission speed in bits per second.
	4800	Transmission speed in bits per second.
	9600	Transmission speed in bits per second.
	19200	Transmission speed in bits per second.
	38400	Transmission speed in bits per second.
	57600	Transmission speed in bits per second.
115200	Transmission speed in bits per second.	

## Lock/Unlock the DCE

+WCLK	When the DCE is locked, most communication over the serial port to the modem is suspended until the DCE is unlocked. If the PIN was removed (by setting its value to the empty string ("")), the DTE must still specify the PIN, represented by the empty string.	
	Action	AT+wclk=<LockStatus>,<PIN>
	Query	
	Range	AT+wclk=?
	Parameter Values:	
	Lock Status	
	0	Unlock the DCE
	1	Lock the DCE
	PIN	
	A PIN is stored as a series of alphanumeric characters, with a maximum length of 8 characters. If more than 8 characters are set as a PIN, only the first 8 are recognized.	

## Change the DCE's PIN

+WCPN	This command sets the PIN that locks or unlocks the DCE. Note that you must specify the desired PIN, as well as the current PIN. The factory-default PIN is the “empty string”, or a value of “”.	
	Action	AT+wcpn=<newPIN>,<oldPIN>
	Query	
	Range	AT+wcpn=?
	Parameter Values:	
A PIN is stored as a series of alphanumeric characters, with a maximum length of 8 characters. If more than 8 characters are set as a PIN, only the first 8 are recognized.		

## Packet Data Sleep Timer

+WS175	This timer controls the length of time the DCE stays on a packet channel while there is no traffic actively being transferred.	
	Action	AT+ws175=<timer>
	Query	AT+ws175?
	Range	AT+ws175=?
	Parameter Values:	
	0	Disable sleep timer
	5-255	Seconds before sleeping
10	Default value	

## SLIP MTU

+WV312	This setting specifies the Maximum Transmitted Unit used by SLIP connections. (PPP connections negotiate this value.)	
	Action	AT+wv312=<MTU>
	Query	AT+wv312?
	Range	AT+wv312=?
	Parameter Values:	
	68-1500	MTU Value Range
1006	Default value	

## Select Mobile IP Client

+WV300	This parameter activates/deactivates the Mobile Node client in the DCE. The mobile host can operate in two modes to access the iDEN packet data network.	
	Action	AT+wv300=<MIP Mode>
	Query	AT+wv300?
	Range	AT+wv300=?
	Parameter Values:	
	0	Deactivate Mobile Node in DCE
	1	Activate Mobile Node in DCE

## Mobile IP Authentication Key

+WV301	<p>The iDEN network uses the MIP Authentication Key to verify the authenticity of the DCE with the Home Agent. The DCE and the Home Agent must have identical values for this shared secret key for the DCE to satisfy the authentication process.</p> <p>NOTE: This command is applicable only when the Mobile Node Client in the DCE is Activated.</p>	
	Action	AT+wv301=<“key”>
	Query	
	Range	AT+wv301=?
	Parameter Values:	
	<p>The Authentication Key parameter is a text string of up to 32 characters. Unlike most text-string parameters, the Authentication Key is a text representation of a hexadecimal number. Therefore, only the characters 0-9 and A-F are acceptable. (The lower case characters, a-f, are also acceptable).</p> <p>Note that although this parameter represents a numeric value, the parameter is actually a text string, so the parameter must be enclosed in quotation marks.</p>	

## Mobile IP Session Timer

+WV302	This command determines the maximum amount of time that a remote node can be registered with its Home Agent before having to renew its registration. This parameter sets a user preference for a value that is negotiated within the network. During the negotiation process, the user preference may be overruled by the network without notification.	
	Action	AT+wv302=<timer>
	Query	AT+wv302?
	Range	AT+wv302=?
	Parameter Values:	
	1800-65534	Seconds before expiration
	65535	Timer never expires
	7200	Default value

## DTE IP Address

+WPNEI	This command sets the mobile node's permanent IP Address (also known as the Network Entity Identified, or NEI). NOTE: This parameter is applicable only when the Mobile Node Client in the DCE is Activated.	
	Action	AT+wpnei=<"address">
	Query	AT+wpnei?
	Range	AT+wpnei=?
	Parameter Values:	
	An IP address consists of up to 15 characters, and is in the format "ddd.ddd.ddd.ddd".	
	0.0.0.0	Default value

## DTE IP Address Prefix Length

+WV311	The Prefix-Length is the number of contiguous bits in an IP address that makes up the network prefix (or network number plus subnet number) of that IP address. This command sets the Prefix Length of the Mobile Node's IP address, as specified by +WPNEI.	
	Action	AT+wv311=<length>
	Query	AT+wv311?
	Range	AT+wv311=?
	Parameter Values:	
	2-24	Prefix length
	2	Default value

## Data Encryption

+WV308	The DTE uses this command to select whether or not to encrypt the air-link interface and also how the air-link is encrypted. Encryption is negotiated during packet data registration.	
	Action	AT+wv308=<encryption>,<firm offer>,<key size>
	Query	AT+wv308?
	Range	AT+wv308=?
	Parameter Values:	
	Encryption	
	0	Disabled
	1	Vancouver Encryption
	Firm Offer	
	0	Encryption setting is a negotiable preference
	1	Encryption setting is not negotiable
	Key Size	
	40-64	Encryption Key Size
40	Default value	

**DTE Stack**

+WS45	This command sets the protocol for communication between the DCE and the DTE. Circuit-switched data connections allow only the transparent character stream. For packet data connections, use SLIP or CSLIP or PPP.	
	Action	AT+ws45=<stack>
	Query	AT+ws45?
	Range	AT+ws45=?
	Parameter Values:	
	0	Transparent Character Stream
	1	Reliable Transparent Character Stream (TMDL)
	3	SLIP/CSLIP
	4	PPP

**WDS Stack**

+WS46	This command changes the data mode of the modem between circuit-switched data and packet data.	
	Action	AT+ws46=<service>
	Query	AT+ws46?
	Range	AT+ws46=?
	Parameter Values:	
	23	iDEN circuit-switched data/fax
	24	iDEN packet data
	252	Local Data Services

## Service Class

+FCLASS	This command switches between normal circuit-switched data mode and Class 2 fax mode. This setting has no effect during packet data service.	
	Action	AT+fclass=<class>
	Query	AT+fclass?
	Range	AT+fclass=?
	Parameter Values:	
	0	Class 0 operation (modem operation)
	2	Class 2 operation (fax operation)
8	Class 8 (voice operation - while tethered)	

## Packet Data Registration Timeout

+WS198	This command allows the DTE to specify a maximum amount of time to wait for packet data registration.	
	Action	AT+ws198=<time>
	Query	AT+ws198?
	Range	AT+ws198=?
	Parameter Values:	
	1-255	Seconds
30	Default value	

## Circuit Data Auto-Answer

S0	This command determines if and when the DCE should automatically answer an incoming call.	
	Action	ATs0=<rings>
	Query	ATs0?
	Range	ATs0=?
	Parameter Values:	
	0	Do not automatically answer incoming calls.
1-255	Answer after specified number of rings.	



## Circuit Data Establishment Timeout

S7	This command allows the DTE to specify the maximum amount of time between a request for a circuit data connection and the establishment of this connection.	
	Action	ATs7=<timer>
	Query	ATs7?
	Range	ATs7=?
	Parameter Values:	
	1-255	Seconds
	120	Default value

## Comma Dial Modifier Timer

S8	This command allows the DTE to set the duration of the pause associated with a comma (,) dial modifier.	
	Action	ATs8=<timer>
	Query	ATs8?
	Range	ATs8=?
	Parameter Values:	
	0-255	Seconds
	2	Default value

## Circuit Data Idle Timer

S30	This command specifies an idle line timeout for online data mode. If no data is sent by the DTE on the transmit data line for the specified period of time, the DCE disconnects the call, returns the OK result code, and returns to command mode.	
	Action	ATs30=<timer>
	Query	ATs30?
	Range	ATs30=?
	Parameter Values:	
	0-255	Seconds
	0	Default value

## AT Command Subset for Fax Operation

Your modem also supports a subset of the standard action command and response set commonly used in fax operation. Your communication software or specialized fax software uses these commands during regular fax operation.

If you issue an unsupported command, the modem displays the message, ERROR.

See the following list of fax commands.

**Table 6: AT Command Subset for Fax Operation**

Command	Function
+FDT	<p>Transmit data. The optional sub-parameters DF, VR, WD and LN are not allowed. <i>If you use any of them, your modem displays the message, ERROR.</i></p> <ul style="list-style-type: none"> <li>• Polled transmission is NOT supported (that is, the +FLPL parameter cannot be set to 1).</li> <li>• Block mode and ECM operation are NOT supported, that is, the +FTBC and +FECM parameters cannot be set to any number other than 0 (zero).</li> </ul>
+FDR	<p>Receive data.</p> <ul style="list-style-type: none"> <li>• Polled reception is NOT supported (that is, the +FLPL parameter cannot be set to 1).</li> <li>• Block mode and ECM operation are NOT supported, that is, the +FTBC and +FECM parameters cannot be set to any number other than 0 (zero).</li> </ul>
+FET	<p>Transmit Page Punctuation.</p> <ul style="list-style-type: none"> <li>• Another Page Next/Same Document, when followed by 0 (zero).</li> <li>• No More Pages or Documents, when followed by 2.</li> </ul> <p>Any other value causes the modem to display the message, ERROR.</p>
+FK	Terminates current fax session.

## S-Registers

S-registers are memory locations in the modem that you can program to suit your data communication needs. For instance, you can set up the modem to automatically answer all incoming data calls.

S-registers are numbered from 0 (zero) to 255 (that is, S0 to S255). Since many of these registers are reserved for purposes of internal operation, you may customize only a subset of the modem's registers.

To see the list of S-Registers that you may customize, see "Customizing S-Registers" on page 91.

### Programming an S-Register

To program an S-register:

1. Go to the command mode of your communication software.
2. Type **ATS $n$ = $x$**  where  $n$  is the number of the S-register that you want to customize; and  $x$  is the value that you want to assign to that register.

For example, to set up your modem to automatically answer all incoming data calls, type **ATS0= $x$**  (where  $x$  is any number between 1 and 255).

3. Press Enter.

#### NOTES

- You might experience undesirable consequences on the operation of the remote modem if you modify the S7 or S10 registers from their default values. For optimal performance, use the default values for these two registers.
- If you write to an S-register that is not programmable or if the value that you assigned to a register is invalid, the modem will still return an OK message on the computer screen. But, this will have no effect on S-register values.

## Reading the Value of an S-Register

You may also want to read the value of a particular S-register.  
For a list of supported S-registers, see Table 7 on page 91.

To read the value of an S-register:

1. Bring up the command mode of your communication software.
2. Type **ATS $n$**  where  $n$  is the number of the S-register that you want to read from the software's command mode.

For example, to read the value of S-register number 0 (zero), you would type **ATS0?**.

3. Press Enter. The value of the requested S-register displays.
4. If you attempt to read the value of an S-register that is not supported, the modem displays the message, ERROR.

You can also read S-register values in bulk by issuing an AT&V command.

## Customizing S-Registers

You can use the following list of S-registers to customize the modem's data operation.

**Table 7: Supported S-Registers**

Register #	Function
0	<p>Automatic Answer. Determines if the modem automatically answers an incoming call.</p> <ul style="list-style-type: none"> <li>• If the value assigned to this register is 0 (zero), the modem does not answer the call, but sends an appropriate message to the computer that commands the modem to answer the call.</li> <li>• If the value assigned to this register is non-zero, the modem answers the call without waiting for the computer to issue its answer-call command.</li> </ul> <p>The valid range of values is 0 (zero) to 255. The default is 0 (zero).</p>
2	<p>Escape Code Character. Specifies the ASCII character to be used to escape from either data or online mode to command mode.</p> <p>The valid range of values is 0 (zero) to 127. The default is 43 or the ASCII plus (+) key.</p>

**Table 7: Supported S-Registers**

Register #	Function
3	<p>Command Line Terminating Character. Specifies the ASCII character to be used to terminate a command line without carrying out any command that might be issued.</p> <p>The valid range of values is 0 (zero) to 127. The default is 13, which represents the Enter (PC-compatible) or Return (Macintosh) key.</p>
4	<p>Response Format Character.</p> <p>The valid range of values is 0 (zero) to 127. The default is 10 or the ASCII "Linefeed" character.</p>
5	<p>Command Line Editing Character.</p> <p>The valid range of values is 0 (zero) to 127. The default is 8 or the Backspace key.</p>
6	<p>Pause Before Blind Dialing.</p> <p>The valid range of values is 2 to 10. The default is 2, or 2 seconds.</p>
7	<p>Connection Completion Timeout.</p> <p>The valid range of values is 1 to 255 seconds. The default is 120 seconds.</p>
8	<p>Command Dial Modifier Time.</p> <p>The valid range of values is 0 (zero) to 255 seconds. The default is 2 seconds.</p>
10	<p>Automatic Disconnect Delay. Determines the amount of time between loss of carrier and disconnection of the data call.</p> <p>The valid range of values is 1 to 254 tenths of a second. The default is 14, or 1.4 seconds.</p>
12	<p>Escape Code Timer. Determines the time duration within which the escape code must be sent by the computer to escape from online mode to command mode.</p> <p>The valid range of values is 20 to 255. The time (in seconds) that the modem waits is determined by dividing the specified register value by 50. The default is 50 (that is, 50/50) or 1 second.</p>

**Table 7: Supported S-Registers**

<b>Register #</b>	<b>Function</b>
30	<p>Idle Timeout. Determines the amount of time that the modem waits in online mode for a command from the computer before disconnecting the call and returning to command mode.</p> <p>The valid range of values is 0 (zero) to 255 seconds. The default is 0 (zero) seconds or an infinite time period.</p>

## ***SAFETY AND GENERAL INFORMATION***

---

**IMPORTANT INFORMATION ON SAFE AND  
EFFICIENT OPERATION.  
READ THIS INFORMATION BEFORE USING YOUR  
INTEGRATED MULTI-SERVICE RADIO PRODUCT.**

---

### **For the Safe and Efficient Operation of Your Radio, Observe These Guidelines:**

Your radio product contains a transmitter and a receiver. When it is *ON*, it receives and transmits radio frequency (RF) energy. The radio operates in the frequency range of 806 MHz to 866 MHz and employs digital modulation techniques. This product is authorized under FCC Rule Part 47CFR 2. 1091 (b), which states that it should be used in such a way that a separation distance of at least 8 inches (20 cms) is normally maintained between the radio's antenna and the body of the user or nearby persons. When you use your radio product, the system handling your call, controls the power level at which your radio product transmits. The output power level typically may vary over a range from 0.0024 watts to 0.7 watts.

### **Exposure To Radio Frequency Energy**

Your Motorola Radio Product is designed to comply with the following national and international standards and guidelines regarding exposure of human beings to radio frequency electromagnetic energy:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) IEEE. C95. 1-1992
- National Council on Radiation Protection and Measurements (NCRP). Report 86
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- European Committee for Electrotechnical Standardization (CENELEC), ENV 50166-2, 1995 E
- National Radiological Protection Board of the United Kingdom, GS 11, 1988
- Verband Deutscher Elektrotechniker (VDE) DIN-0848
- Department of Health and Welfare Canada. Safety Code 6

## Antenna and Installation Considerations

- All equipment must be properly installed in accordance with Motorola installation instructions.
- To assure compliance with United States FCC regulations on RF exposure, the user of the equipment must position the antenna in such a way to maintain a separation of at least 8 inches (20 cms) between the antenna and the body of any user and nearby person.
- Ensure that the antenna is properly installed external to the vehicle and in accordance with the requirements of the antenna manufacturer/supplier.
- Use only the supplied or an approved antenna. Unauthorized antennas, modifications, or attachments could impair call quality, damage the modem, or result in violation of the ICNRP or the FCC.

## Interference to Medical and Personal Electronic Devices

Most electronic equipment is shielded from RF energy. However, certain equipment may not be shielded against the RF signals from your radio product.

### Pacemakers

Do not operate the radio when any person is within 6 inches (0.15 meters) of the antenna. That person may be using a pacemaker, a hearing aid or other personal electronic device which may not be adequately shielded.

### Hearing Aids

Some radio products may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

### Other Medical Devices

If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from external RF energy. Your physician may be able to assist you in obtaining this information.

## Interference to Other Electronic Devices

RF energy may affect improperly installed or inadequately shielded electronic operating and entertainment systems in motor vehicles. Check with the manufacturer or representative to determine if these systems are adequately shielded from external RF energy. Also check with the manufacturer of any equipment that has been added to the vehicle.



## Safety and General

### Use While Driving

Check the laws and regulations on the use of radio products in the area where you drive. Always obey them.

When using the radio product while driving, please:

- Give full attention to driving and to the road
- Pull off the road and park before using the product if driving conditions so require.



WARNING

### OPERATIONAL WARNINGS

#### POTENTIALLY EXPLOSIVE ATMOSPHERES

Turn off your radio product when you are in any area with a potentially explosive atmosphere, unless it is a radio product type especially qualified for use in such areas (for example, Factory Mutual Approved). Sparks in a potentially explosive atmosphere can cause an explosion or fire resulting in bodily injury, or even death.

**Note:** *The areas with potentially explosive atmospheres referred to above include fueling areas such as: below decks on boats; fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles such as grain, dust or metal powders; and any other area where you would normally be advised to turn off your vehicle engine. Areas with potentially explosive atmospheres are often, but not always posted.*

Do not transport or store flammable gas, liquid, or explosives in the compartment of your vehicle which contains your radio or accessories.

In the United States, Vehicles powered by liquefied petroleum gas (such as propane or butane) must comply with the National Fire Protection Standard (NFPA-58). For a copy of this standard, contact the National Fire Protection Association, One Batterymarch Park, Quincy, MA 02269, Attn: Publications Sales Division.



WARNING

## **OPERATIONAL WARNINGS**

### **BLASTING CAPS AND AREAS**

To avoid possible interference with blasting operations, turn off your radio product when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio". Obey all signs and instructions.

### **FOR VEHICLES EQUIPPED WITH AN AIR BAG**

An air bag inflates with great force. **DO NOT** place objects, including communication equipment, in the area over the air bag or in the air bag deployment area. If the communication equipment is improperly installed and the air bag inflates, this could cause serious injury.

Installation of vehicle communication equipment should be performed by a professional installer/technician qualified in the requirements for such installations. An air bag's size, shape, and deployment area can vary by vehicle make, model, and front compartment configuration (for example, bench seat vs. bucket seats).

Contact the vehicle manufacturer's corporate headquarters, if necessary, for specific air bag information for the vehicle make, model, and front compartment configuration involved in your communication equipment installation.



Caution

## **OPERATIONAL CAUTIONS**

### **DAMAGED ANTENNAS**

Do not use any radio product with a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn can result.

## **Cleaning Instructions**

Clean the external surfaces of the radio product with a damp cloth, using a mild solution of dishwashing detergent and water. Some household cleaners may contain chemicals that could seriously damage the radio product. Avoid the use of any petroleum-based solvent cleaners. Also, avoid applying liquids directly on the radio product.

# GLOSSARY

<b>asynchronous</b>	Data without an accompanying time signal. Timing is built into data characters as start and stop bits.
<b>AT command</b>	An order entered into the computer to request your modem to perform certain actions, such as dial a teledem number. AT commands are Hayes-compatible modem commands.
<b>baud rate</b>	Signaling speed of the modem. Common baud rates are 2400, 4800, 9600, 19200, and 38400.
<b>bps</b>	Bits per second. The rate at which data passes over the telephone line or through the air. The basic unit of measure for serial data transmission capacity.
<b>burst</b>	A unit of information consisting of a sequence of signals.
<b>circuit-switched data</b>	Continuous data communication, such as a modem call.
<b>CTS</b>	The Clear to Send signal passed from the local modem to the local terminal when the data port is ready to transmit data. Occurs in response to the Request To Send (RTS) signal.
<b>command mode</b>	The mode that accepts AT commands. Also known as Terminal Mode. When your modem is in this mode, it is waiting to receive AT commands that you type from your communication software.
<b>communication software</b>	A computer program designed to connect your computer to an external source, such as another computer or a fax machine.

<b>data services</b>	One of the functions of your iDEN modem. Wireless data services uses both circuit-switched and packet data transmissions.
<b>DCD</b>	Data Carrier Detect. An acceptable carrier signal received by the modem over the modem line. Also known as Received Line Signal Indicator (RLSI).
<b>DCE</b>	Data Communications Equipment. The equipment that establishes, maintains and terminates a connection. It converts data into units of sound and vice versa for communication over telephone or cellular networks.
<b>default</b>	A factory preset choice that, under normal circumstances, works best for your system. You can either accept the default or change it.
<b>dialing directory</b>	A modem book of frequently called modem numbers that you can set up and maintain in your communication software.
<b>DTE</b>	Data Terminal Equipment. A computer or hand-held device that generates and receives data, and provides functions that control data communications through a device like the modem.
<b>hand-held devices</b>	Small computing appliances, such as palm tops, personal digital assistants, and pen-based computers.
<b>home agent</b>	The server that is responsible for routing data from your home network to your computer.
<b>iDEN carrier</b>	Provider of packet data services.
<b>Internet</b>	Inter-connected networks that all use the TCP/IP protocols.
<b>Intranet</b>	A private network inside a company or organization.

<b>laptops</b>	Portable computers, such as notebooks and subnotebooks.
<b>mobile IP</b>	Mobile Internet Protocol—a locating device. Provides the capability to locate you on the network at all times.
<b>modem</b>	MOdulator/DEModulator. An electronic device enabling digital data to be sent over analog transmission facilities. Converts a digital signal to analog and back to digital again.
<b>non-volatile memory</b>	Permanently stored information. It is not lost when the power is turned off.
<b>packet data</b>	A block of data for transmission.
<b>parity bit</b>	An error-checking method in asynchronous transmission. An additional non-data bit added to a group of bits to indicate whether the number of bits in the group is odd or even.
<b>PIN</b>	Personal Identification Number. A security number that allows you to access a system.
<b>PPP</b>	Point-to-point protocol.
<b>protocol</b>	A set of conventions regulating the format and relative timing of message transfer between two communication terminals.
<b>RAM</b>	Random Access Memory. The working memory of the computer where you can enter information and call up data.
<b>RTS</b>	Request to Send. Signal sent from the local terminal to the local modem to prepare the modem for data transmission.
<b>serial port</b>	An input/output (I/O) port that transmits data one bit at a time; as opposed to a parallel port which transmits multiple (usually eight) bits simultaneously. RS232C is a common serial interface standard.

<b>service provider</b>	Provides your computer with Internet access. Also known as an ISP (Internet Service Provider).
<b>service-specific software</b>	A program that is designed for a designated online service.
<b>stop bit</b>	A data bit used in asynchronous transmission to signal the end of a character.
<b>system administrator</b>	The person responsible for monitoring computer activity in a specified area, such as a department or a company.
<b>terminal mode</b>	The mode that accepts AT commands. Also known as Command Mode. When your modem is in this mode, it is waiting to receive AT commands that you type from your communication software.
<b>transmission rate</b>	The rate at which data is transferred, in bits per second.
<b>wireless data services</b>	See data services.

