Lucent Technologies
Bell Labs Innovations

Branch Office Extender 6000

555-025-212

PBXgateway Quick Installation Guide

Issue 2.3/March 2000

Purpose of this Document

This document provides the step-by-step process for the complete installation, basic configuration, and troubleshooting of the Branch Office Extender 6000 PBXgateway.

Safety Considerations

IMPORTANT SAFETY INSTRUCTIONS

❑ Do not install this product near water.

  Example: In a wet basement location.

❑ Do not overload wall outlets, as this can result in the risk of fire or electrical shock.

❑ Do not attach the power supply cord to building surfaces. Do not allow anything to rest on the power cord. Do not locate this product where persons walking on it will abuse the cord.

❑ Do not operate the system if chemical gas leakage is suspected in the area. Use telephones located in some other safe area to report the trouble.

Table of Contents

Support Telephone Number

Call the Lucent Technologies Helpline (1-800-242-2121) or your Lucent Technologies authorized dealer if you need assistance when installing, programming, or using your system.

Prerequisites for Installation

The following items are required before installing the PBXgateway.

- Proper wiring with adequate punch down blocks to connect the PBXgateway to the DEFINITY ECS. Must be wired according to Table 3, page 5, and provide RJ-21 female connector.

- The T1 line between the corporate facility and the branch office MUST be operational and configured properly.

- The CSU/DSU must support an RS-232, V.35 or V.530 synchronous-serial connection.

- The distance from the DEFINITY to the PBXgateway should NOT exceed 450 feet.

- A CSU/DSU must be installed and functioning at both the corporate facility and the branch office. If the customer will provide the CSU/DSU the customer ensures that the device is working and meets the PBXgateway requirements. (see Table 1 for a list of recommended CSU/DSU devices)

Network	Model	Manufacturer	Type
T1	ACCULINK 3160/3162/3164	Paradyne	CSU/DSU
T1	DataMAX T1/FT1	ADC Kentrox	CSU/DSU
T1	TSU LT	Adtran	CSU/DSU
T1	554 A	GDC=	CSU/DSU

Table 1. Recommended Devices

- The following table provides information on Lucent provided (Paradyne) CSU/DSUs. Use this table in conjunction with the CSU/DSU Quick Reference document. Any setting not shown in the table may be left at default.

Port Type	V.35	Base Rate	Use Nx64 for ESF/B8zs Use Nx56 for D4/AMI
Tx. Clock	Int		
Port Rate	Matches total bandwidth	Start at:	First DS0 assigned to each Branch unit, i.e. for 3 Branch units with 5 DS0s each use N1, N6, N12
Clock Source	Net		
Assign to	Net		

Table 2. Paradyne CSU/DSU settings

Note: For any other recommended CSU/DSU see http://www.mck.com for more information.

- The system has been designed to operate from 100-240 VAC, 50-60Hz. Power should not be applied to the unit until specified in the installation procedures.

- The power supply and cabling should be installed away from high power/high RF noise devices such as computers, fans, fluorescent ballast, power supplies, etc.

- Use good wiring practices. Do not run wires over fluorescent lights, computers, air conditioners, etc. as this can introduce noise to the modems.

- Obtain the following information from your customer:

  MODE: (V.35, RS-232, RS-530)_____(Paradyne units all use V.35)
  NUMBER OF DS∅s FOR THE BRANCH 6000_____
  56K or 64K_____

  number of DS∅s **X** 64 or 56K(above) = _____ **SYNC RATE** ÷ number of stations = _____

  If the result is at least 40 KBPS use **ADPCM32 voice compression**
  If the result is less than 40 KBPS but at least 32 KBPS use **ADPCM24 voice compression**
  If the result is less than 32 KBPS but at least 16 KBPS use **G.729A voice compression**
  If the result is less than 16 KBPS, there is not enough bandwidth.

  Consult with your customer and refer them to information about voice compression on the last page of this document.

Installation Components

Description	Function	Provided W/ Gateway
PBXgateway		✔
Universal Power Cord	120 VAC outlet	✔
DB-9 RS232 Serial Cable (6 foot)	Console port to PC for system administration	✔
Mounting Hardware	To attach brackets for rack mount	✔
Mounting Brackets (2)	For rack mounting	✔
RS-530 type cable for high-speed links to CSU/DSU or terminal adapter	For connecting WAN ports on PBXgateway to CSU/DSU or terminal adapter	✔
System Administrator's Guide	The complete manual for the EXTender 6000 PBXgateway.	✔
Quick Installation Guide	The condensed installation guide	✔
RS-232, DB-25 to DB-9 modem cable [male-male]. *Note: This is a custom made cable.*	For connecting the PBXgateway to a modem for remote configuration.	✔
50 pin cables with RJ-21 connectors. *Note: RJ21 cables, connecting blocks and network cables may be ordered through MCK by calling 1-617-454-6100.*	Telephony interface between the punch down blocks and the PBXgateway. *(see page 6)*	Needed but not supplied
Punch down blocks	Provides the interface between the RJ-21 connector and the DEFINITY ECS.	Needed but not supplied

Table 3. Installation Components

Typical Installation

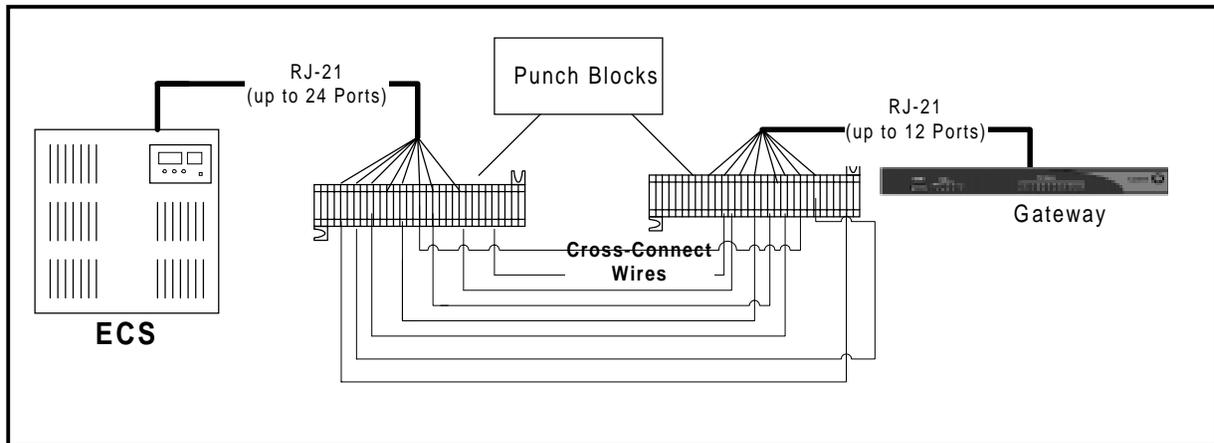A typical installation of the PBXgateway is shown in Figure 1.

Figure 1. Typical Installation

Mounting

The PBXgateway can be mounted in a standard 19-inch communication rack using provided hardware (Figure 2) or simply placed on a shelf within the rack.
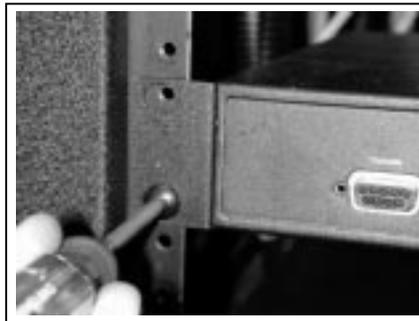
Figure 2. Mounting the PBXgateway

Connections

The PBXgateway requires connections A through E as shown below.
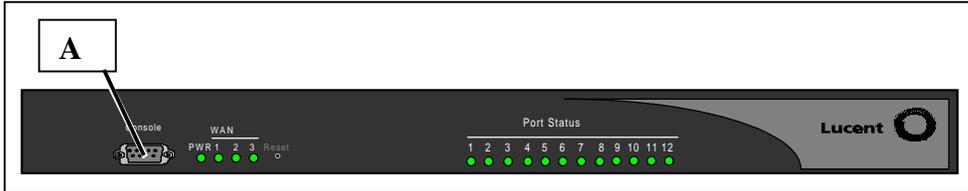
Front of Unit
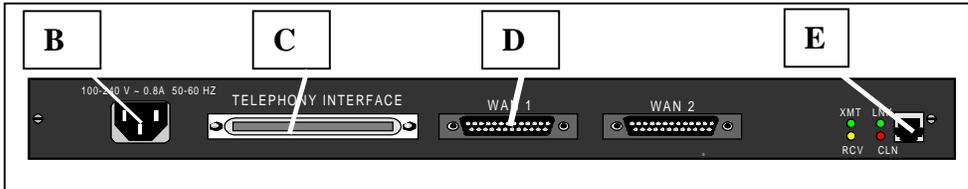
Back of Unit

Letter	Label	Cable Type	Description
A	Console	DB-9	Connect to a modem that may be supplied by Lucent or by the customer for remote access. (see page 12 for modem installation and setup) *Note: The console port also provides a temporary connection to a laptop or PC for initial configuration of the unit. (see page 8, Basic Configuration, for more information)*
B	-	Power	Connect to a 120VAC outlet. *Note: See "Power-Up" procedure on page 7 BEFORE plugging the unit into an active outlet.*
C	Telephony Interface	RJ 21	Wire to a punch down block and then to the DEFINITY ECS. (see Table 5, page 6)
D	WAN1	DB 25, serial, straight-through	Connects the PBXgateway to a synchronous-serial device. (CSU/DSU) *Note: An RS-530 type cable or DB-25 to M34 cable should be used for high-speed links to V.35 equipment.*
E	LAN	RJ 45 Ethernet	Connects the PBXgateway to the LAN for administrative purposes or management or for use in an IP application (optional). *Note: Use of the PBXgateway over IP Networks is currently not supported by Lucent Technologies.*

Table 4. Connections

Telephony Wiring

Pin	Cable Pair	Port	Pin	Cable Pair	Port	Pin	Cable Pair	Port
26 1	WH/BL BL/WH	1	34 9	RD/BR BR/RD	5	42 17	YL/OR OR/YL	9
28 3	WH/GN GN/WH	2	36 11	BK/BL BL/BK	6	44 19	YL/BR BR/YL	10
30 5	WH/SL SL/WH	3	38 13	BK/GN GN/BK	7	46 21	VI/BL BL/VI	11
32 7	RD/OR OR/RD	4	40 15	BK/SL SL/BK	8	48 23	VI/GN GN/VI	12

Table 5. Pin Assignments (25-Pair Cable)

Wire Color Abbreviations:
BK=Black, BR=Brown, RD=Red, OR=Orange, YL=Yellow, GN=Green, BL=Blue, VI=Violet, WH=White
SL=Slate

VT-100 Setup

 Procedure

1. Make sure the PBXgateway is connected as shown on page 5.

2. You will need to use a communications package — for example, HyperTerminal — to configure and test the PBXgateway. Attach one end of the RS-232 cable to your PC's COM1 port and the other end to the Console port connector on the front of the PBXgateway.

3. Set up HyperTerminal as follows:

a	Access: **Start** button > **Programs** > **Accessories** > **HyperTerminal** folder > **HyperTerminal** icon.
b	Type PBXgateway and click **OK**.
c	At the Phone Number dialog, select Connect using = **Direct to COM1** (ignore other settings) and click **OK**.
d	At the COM1 Properties dialog, set the parameters to **9600**, **8**, **none**, **1** and **Xon/Xoff** and click **OK**.
e	When the HyperTerminal window appears, it will be blank — that is, there is no logon prompt.
f	Click on **File,** then **Properties.** Select **Settings** tab and go to **Emulation** window. Select **VT100** and then click **OK.**

4. Go to *Power-Up* sequence on page 7.

Power-Up

1. Once the VT-100 program (HyperTerminal) is setup, plug the unit into an AC outlet. The device will begin a series of self-diagnostic tests, which are displayed as a series of LED flashes.

AC Power

100-240 V ~ 0.8A 50-60 HZ   TELEPHONY INTERFACE   WAN 1   WAN 2   XMT LNK   RCV CLN
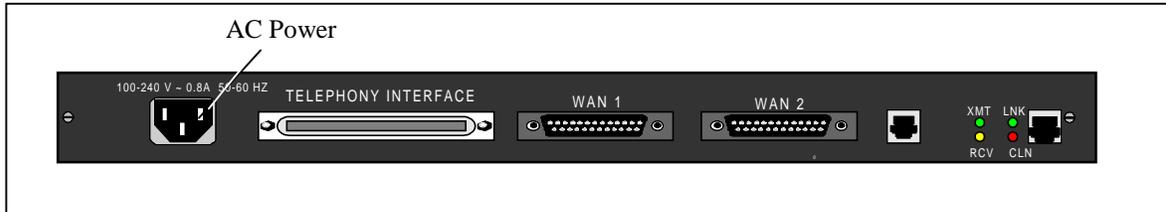
Back of Unit

2. Once the power-up sequence has finished, the state of the following LEDs should be Green.

> ## LED States:
>
> **PWR:** Solid Green
> **WAN1:** Solid Green if serial device connected to WAN 1.
> **Port LEDs**: Solid Green if connected properly to DEFINITY ECS.
>
> ## *IMPORTANT:*
>
> *If any of the LEDs DO NOT power-up under a "Green" state,*
> *refer to the System Administrator's Guide for troubleshooting information*

PWR and WAN 1   (Connected) Ports

Console   WAN   Port Status   Lucent
          WR 1 2 3 Reset   1 2 3 4 5 6 7 8 9 10 11 12
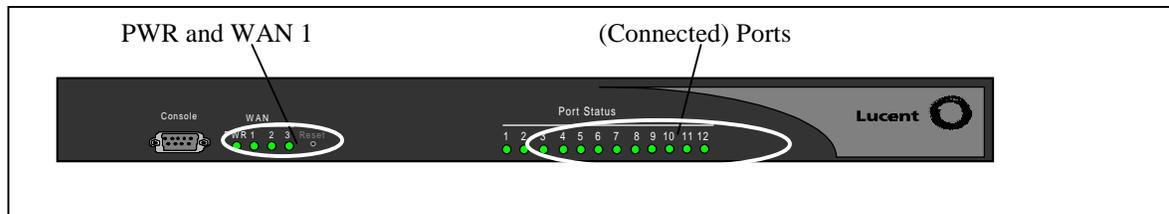
Front of Unit

The PC displays the following message:

Press "Enter" to start the PBXgateway shell…..

Note: If the PBXgateway is powered up prior to opening the terminal program, this message will not appear.

3. Go to *Basic Configuration* on page 8.

Basic Configuration

1. Press **Enter** and the *Welcome Screen* of the Management Interface (MI) will appear. (see Figure 3)

```
 _____
| ▄ Telnet - 192.168.104.65                    _ □ ☒ |
|  Connect  Edit  Terminal  Help                       |
| ##################################################### |
| #                                                   # |
| #                                                   # |
| #                                                   # |
| #              MCK Communications, Inc.             # |
| #              Branch Office EXTender               # |
| #                                                   # |
| #                                                   # |
| #          Remote PBX access for branch offices     # |
| #                                                   # |
| #                                                   # |
| #                                                   # |
| # Copyright (C) 1999 MCK Communications, Inc. All rights reserved. # |
| #                                                   # |
| #                                                   # |
| #                                                   # |
| # IMPORTANT! TERMINAL SETTINGS:                     # |
| #   Set the terminal type to VT100, 24 lines X 80 columns. # |
| #   A properly sized window should have '#' borders on all 4 sides. # |
| #                                                   # |
| # Press <F1> or <Ctrl-A> for more help.             # |
| #                                                   # |
| #              <Hit any key to continue>█           # |
| ##################################################### |
|_____|
```

Figure 3. Welcome Screen

IMPORTANT TERMINAL SETTINGS
The MI requires a screen size of 24 lines X 80 columns. Make sure the *Welcome Scr*een is bordered on all four sides with a # symbol, as shown in Figure 3.

> **To enlarge the screen** (within the VT-100 application)
>
> Click any corner of the screen.
> Drag the screen to enlarge.
> Check that the screen is bordered by "#" symbols.

2. Press any key to continue. The *Main Menu* will appear.

3. Table 6 shown below, lists the defaults of critical settings within the PBXgateway. If information obtained from the customer on page 3 do **NOT** match these defaults then…..

You must ……….	to…………	Default settings	Refer to ..
Set the Sync Rate of the WAN port	Match the data rate (sync rate) of the network device.	384,000 bps	page 9
Set the mode (interface type) of the WAN port. (v.35, RS-232, RS-530)	Match the interface type of the network device.	V.35	page 10
Set the voice compression algorithm	Match the available bandwidth	ADPCM32	page 11

Table 6. Configuration Steps

Setting the Sync Rate

Procedure

1. Access the *WAN 1 Menu* using the following path;

Path: `Switch->Configuration->WAN 1->Sync_Setup`

The following menu appears.

```
 Telnet - 192.168.100.69                                    _ □ ×
Connect  Edit  Terminal  Help
   Remote->Configuration->WAN->WAN_1->Sync_Setup       | BOE 1.2.1d2
============================================================================
 Port            |
 WAN             |            *Sync Rate          [512000 ]
 Connect         |
 Analog Card     |
 Log             |
 IP              |
 System          |
 Save            |
                 |
                 |
                 |
                 |=========================================================
                 |          Enter baudrate for sync WAN port
                 |            <F1> or <Ctrl-A> for help
----------------------------------------------------------------------------
Dec 01 14:13:35: MGMT   INFO: Successful Telnet login
Dec 01 14:16:26: MGMT   INFO: Telnet 1 disconnected from 192.168.101.148
Dec 01 14:21:31: MGMT   INFO: Telnet 1 connected from 192.168.101.148
Dec 01 14:21:31: MGMT   INFO: Successful Telnet login
----------------------------------------------------------------------------
 POWER   WAN1      WAN2      ANALOG   PORT: 1  2  3  4  5  6  7  8  9  10 11 12
  ON    DISABLED DISABLED ONHOOK          XX XX XX XX XX XX XX XX XX XX XX XX
```

Figure 4. WAN Menu

2. Press the → key to the **Sync Rate** parameter and type in the correct Sync rate. This parameter sets the synchronous data transfer speed of the WAN port and must match the network device speed.

Note: This Sync Rate information, displayed in bytes, must be obtained through the network device documentation.

3. Press the ← key to accept changes and go back to the *Configuration Menu.*

4. Press the ↓ key to the **Save** parameter. Press **Enter** to save changes to the active config (.swt) file.

Setting the Mode (signaling protocol)

Procedure

1. Access the *WAN 1 Menu* using the following path;

Path: `Remote or Switch->Configuration->WAN 1`

2. The following menu appears. Press the → key to access the parameters

```
 Telnet - 192.168.100.68                                    _ □ X
Connect  Edit  Terminal  Help
  Switch->Configuration->WAN->WAN_1                  | BOE 1.2.1d2
 =================================================================
 Port          |
 WAN           |            Enabled          No
 Log           |           *Mode             Sync-RS-530
 IP            |            Sync Setup        ...
 System        |
 Save          |
               |
               |
               |
 *** WARNING ***|
 Need to save  |
 changes made  |=================================================================
    to this    |            Select WAN port connection type
 configuration |               <F1> or <Ctrl-A> for help
 ----------------------------------------------------------------
 Dec 01 11:57:30: MGMT   INFO: Successful Telnet login
 Dec 01 12:11:00: MGMT   INFO: Telnet 1 disconnected from 192.168.101.148
 Dec 01 12:30:17: MGMT   INFO: Telnet 1 connected from 192.168.101.148
 Dec 01 12:30:18: MGMT   INFO: Successful Telnet login
 ----------------------------------------------------------------
 POWER   WAN1      WAN2     WAN3     PORT: 1  2  3  4  5  6  7  8  9  10 11 12
   ON    DISABLED DISABLED N/A            XX XX XX XX XX XX XX XX XX XX XX XX
```

Figure 5. WAN Menu

3. Press the ↓ key to the **Mode** parameter. This parameter must match the protocol used by the network device connected to the WAN port. Press the → key to scroll through the available protocols.

4. Press the ← key to accept changes and go back to the *Configuration Menu.*

5. Press the ↓ key to the **Save** parameter.

6. Press **Enter** to save changes to the active config (.swt) file.
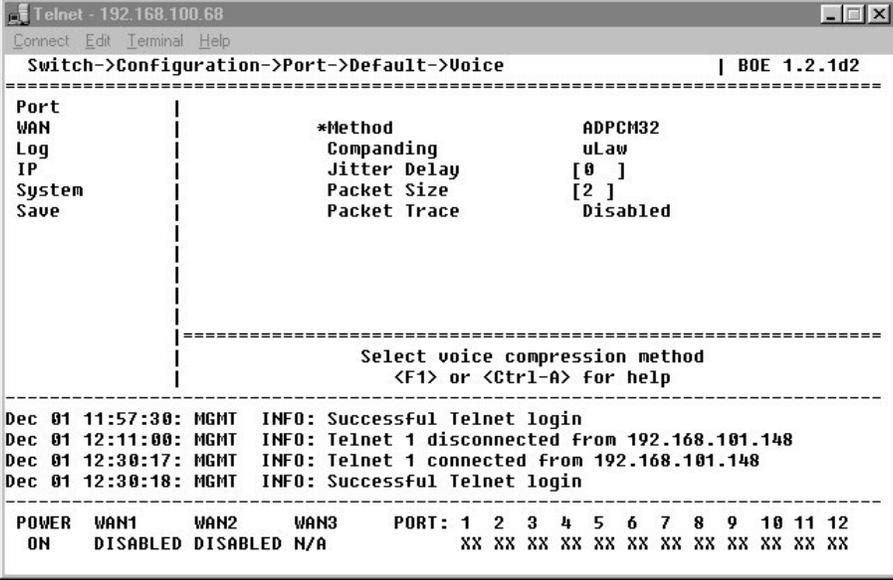   WAN1 Parameters

Setting Voice Compression

Procedure

1. Access the Voice Menu for the specific phone port from the main menu using the following path:

Path: ->Configuration->Port->Default->Voice

The following menu appears:

```
 ▄Telnet - 192.168.100.68                                          _□×
 Connect  Edit  Terminal  Help
  Switch->Configuration->Port->Default->Voice              | BOE 1.2.1d2
 ====================================================================
 Port       |
 WAN        |              *Method               ADPCM32
 Log        |               Companding           uLaw
 IP         |               Jitter Delay         [0  ]
 System     |               Packet Size          [2 ]
 Save       |               Packet Trace         Disabled
            |
            |
            |
            |
            |
            |==================================================
            |             Select voice compression method
            |              <F1> or <Ctrl-A> for help
 ------------------------------------------------------------------
 Dec 01 11:57:30: MGMT   INFO: Successful Telnet login
 Dec 01 12:11:00: MGMT   INFO: Telnet 1 disconnected from 192.168.101.148
 Dec 01 12:30:17: MGMT   INFO: Telnet 1 connected from 192.168.101.148
 Dec 01 12:30:18: MGMT   INFO: Successful Telnet login
 ------------------------------------------------------------------
 POWER   WAN1     WAN2     WAN3     PORT: 1  2  3  4  5  6  7  8  9  10 11 12
  ON     DISABLED DISABLED N/A            XX XX XX XX XX XX XX XX XX XX XX XX
```

Figure 6. Default Voice Menu

2. Press the → key to access the **Method** parameter and press the → key to scroll through the various compression methods available.

3. Press the ← key to accept changes and go back to the Configuration Menu.

4. Press the ↓ key to the **Save** parameter.

5. Press **Enter** to save changes to the active config (.swt) file.

6. Exit HyperTerminal and Save the file (Icon).

7. Disconnect the laptop connected to the console port of the PBXgateway unit.

Offsite Configuration

Introduction
The Branch Office Extender 6000 as supported by Lucent requires a modem at the PBXgateway location for remote access.

Lucent approved modems
If Lucent is to supply the modem there are two devices, shown below, that will be installed and supported by Lucent.

Modem	Lucent PEC Code
Sportster 9.6 K	PEC 2569-96K
Access Security Gateway Guard*	PEC 1222-GDS

* This document does not provide information on this modem. Consult the *Access Security Gateway Guard* documentation for installation, set up and configuration information.

Parts you need for installation
Gateway Site:
- Modem - Sportster 9.6 - PEC 2569-96K (with power supply)
- Direct analog phone line for connection to the modem
- RS-232, DB25 to DB9 modem cable [male-male] (see Table 7 for pinout information)
- Properly installed PBXgateway unit.

Modem Cable Pinouts

DB25 Male		DB9 Male	
Pin	Function	Pin	Function
2	Tx	2	Rx
3	Rx	3	Tx
7	Common	5	Common
8	DCD	7	RTS
20	DTR	8	CTS

Table 7. Modem Cable Pinouts

Setting the Modem DIP switches
The Sportster modem has one 8-position DIP switch located on the back of the unit. These switches must be set as described in Table 8, prior to installing the modem.

Position	Setting	Function	Description
1	UP	DTR Normal mode	Computer must provide DTR signal for modem to accept commands: dropping DTR terminates a call.
2	UP	Verbal result codes	-
3	DOWN	Display result codes	-
4	DOWN	No echo on offline commands	Suppress echo.
5	UP	Auto answer ON	Modem answers on first ring, or higher.
6	UP	Carrier Detect (CD) normal	Modem sends CD signal when it connects with another modem, drops CD on disconnect.
7	DOWN	Load factory defaults	Loads generic template from read only memory (ROM).
8	DOWN	Smart mode	Enable recognition (Smart mode).

Table 8. DIP Switch Settings

Installing the Sportster 9.6 modem at the Gateway Site

Procedure

1. Setup the modem dip switches as described in Table 8, page 15.

2. Connect the analog phone line to the modem.

3. Plug the modem cable (provided with the unit) into the back of the modem.

4. Power-up the modem. The modem will run through a series of self-diagnostic tests.

5. Plug the other end of the modem cable into the port labeled "Console port" on the front of the PBXgateway.

6. Power-up the Gateway unit.

The modem LED labeled "TR" (Data Terminal Ready)should be lit RED indicating the modem is ready to receive data.

<u>Customer Configuration</u>

Turn the following instructions over to the customer to verify and administer the following capabilities:

1. **Admin Password** – This option restricts access to the PBXgateway Management Interface, by requiring a password for entry. This *Admin Password* MUST be entered before any configuration parameters are changed. To provide security for your PBXgateway, you MUST administer and maintain these passwords.

    Note: The Remote and Switch units have their own separate Admin Passwords.

2. **Compression method** – The compression method is a selectable algorithm, which reduces the voice bandwidth requirements. The default compression method (ADPCM32) can be re-configured on a port-by-port basis, or across all eight ports if the available network bandwidth requirements change. This is done on the Switch unit.

Note: If your network connection provides less than 320,000 bps you will not have enough bandwidth for 8 extended phones to go off-hook simultaneously, unless you change your voice compression method from ADPCM 32. (see Port Setup in the System Administrator's Guide)

3. **Set Date**-This parameter ensures accurate date/time stamps for log messages and statistics collected in the Management Interface. Check the date and time and correct, if necessary.

4. **Connect Password** – This option provides a secure WAN link between the Switch and Remote modules. If configured, a *Connect Password* is required to connect to the alternate module.

5. **IP Address/Telnet**- This option provides access to the PBXgateway over the LAN network. The IP address allows the unit to communicate across the network and provides access through a standard Telnet connection. This parameter is required if you connect the unit to an Ethernet network.

Note: Refer to the System Administrator's Guide for more information on configuring these options.