Chapter 2

Hardware Description

This chapter provides information on the hardware for the BANDIT product family.

Note: For product specifications, see Appendix A, *Specifications*.

2.1 Chassis

The chassis for the BANDIT family of products is a small unit designed for easy collocation with other networking equipment. Figure 2-1 shows the outer shell of a BANDIT chassis. Section 2.1.1, *BANDIT Chassis Models*, describes the chassis for the BANDIT models. (Also see Section A.3.1, *Physical Specifications*.)

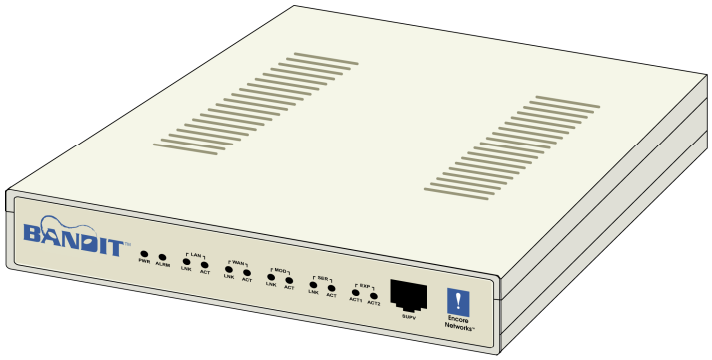

Figure 2-1. BANDIT Chassis

2.1.1 BANDIT Chassis Models

Note: For information on the BANDIT II, the BANDIT III, or the VSR-1200, see the *BANDIT II™, BANDIT III™, and VSR-1200™ Document Set*.

All products in the BANDIT family uses the ELIOS™ operating system. The BANDIT™ is available in the following models:[1]

- The original **BANDIT™** is the original, standard model. This tabletop model provides LAN, WAN, and modem ports, and a choice of several connections for the expansion port. The BANDIT can support 30 simultaneous IPsec VPN tunnels. This model can also support an optional serial port. This model uses an external power supply. (See Section 2.1.1.1, *The Original BANDIT*.)
- The **BANDIT IP™** is a streamlined tabletop model, providing LAN and WAN ports and a limited choice of connections for the expansion port. The BANDIT IP can support 30 simultaneous IPsec VPN tunnels. This model uses an external power supply. (See Section 2.1.1.2, *The BANDIT IP*.)
- The **BANDIT Plus™** is a rack-mounted model, providing all features of the original BANDIT, plus enhanced performance features, a full choice of connections for the expansion port, and support of 100 simultaneous IPsec VPN tunnels. The BANDIT Plus uses an internal power supply. (See Section 2.1.1.3, *The BANDIT Plus*.) The BANDIT Plus can also use a Remote Data Unit for additional serial ports. (See Section 2.3, *The Remote Data Unit*.)

1. Unless stated otherwise, each model autosenses 110–220 VAC input power.

- The **BANDIT Mini™** is a miniature desktop model that supports IPsec VPN, legacy protocols for automated teller machine (ATM) networks, remote terminals, and cluster controllers, transported over IP, for banking, financial services, utilities, and similar markets. The BANDIT Mini accepts DC power input. (See Section 2.1.1.6, *The BANDIT Mini*.)

In addition, the following products in the VPN and IP-to legacy family are available:

- The products in the IP Routing series provide dedicated legacy support over IP. They are designed to handle the requirements of automated teller machine (ATM) networks, remote terminals, and cluster controllers, operating over slow legacy protocols, for banking, financial services, utilities, and similar markets. These chassis are available in the following models:

  - The **IBR-10™** is a tabletop model that supports legacy protocols for automated teller machine (ATM) networks, remote terminals, and cluster controllers, transported over IP, for banking, financial services, utilities, and similar markets. (See Section 2.1.1.4, *The IBR-10*.)

Note: The IBR-10 does not provide support for VPNs.

  - The **ILR-100™** is a miniature desktop model that supports legacy protocols for automated teller machine (ATM) networks, remote terminals, and cluster controllers, transported over IP, for banking, financial services, utilities, and similar markets. The ILR-100 also can support IPsec VPNs. The ILR-100 accepts AC power input. (See Section 2.1.1.5, *The ILR-100*.)

- The products in the VSR series provide dedicated IPsec virtual private network connections over satellite and ground-based networks. The VSR products can use Encore Networks' proprietary Selective Layer Encryption™ (SLE™, patent pending) to support VPN tunnels. The VSR is available in the following models:

  - The **VSR-30™**, a tabletop unit, has two 10-Base-T Ethernet ports, can have an additional Ethernet port (in an extension module), supports broadband internet access, supports VOIP, and can support 30 VPN tunnels. It is typically placed as a VPN solution at remote sites of small and medium-size enterprises. (See Section 2.1.1.7, *The VSR-30*.)

- The **VSR-1200™**

Note: Please see the *BANDIT II™, BANDIT III™, and VSR-1200™ Document Set* for information about the VSR-1200.

Note: The VSR series provides legacy-to-IP support only if the model has access to one or more serial ports (via an expansion module or via RDUs).

2.1.1.1 The Original BANDIT

The original **BANDIT™** is the original unit designed for Encore Networks' family of VPN gateways. This tabletop model provides LAN, WAN, and modem ports, and a choice of several connections for the expansion port. The BANDIT can support 30 simultaneous IPsec VPN tunnels. This model can also support an optional serial port. This model uses an external power supply.

Note: The BANDIT documents use the term "original BANDIT" to refer to this chassis. The documents use the general term "BANDIT" to refer to all chassis in the BANDIT family of products, unless otherwise specified.

The front panel of the original BANDIT chassis (Figure 2-2) provides the Supervisory port for connection to the monitoring terminal (for example., a PC). The chassis front also contains several pairs of monitoring LEDs. The first pair of LEDs displays status on power and alarms. The remaining pairs of LEDs monitor the LAN and WAN ports, the internal modem, and the expansion port.

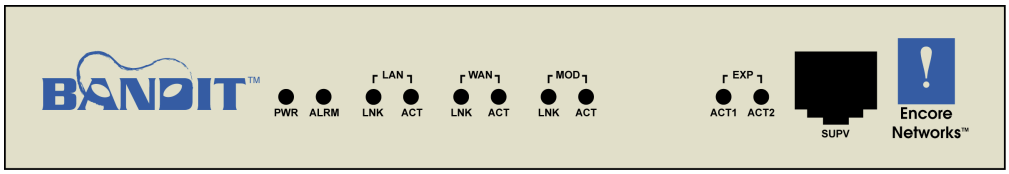

Figure 2-2. Original BANDIT Chassis Front, Standard

A second model of the original BANDIT also includes an LED pair for a serial port (Figure 2-3).

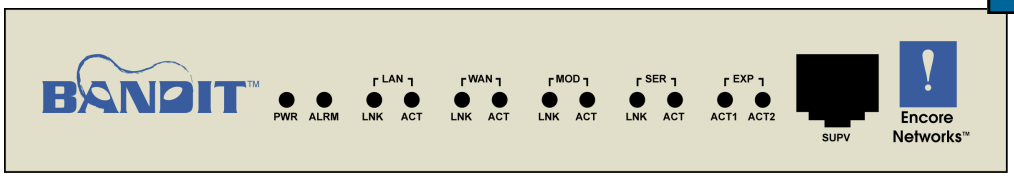

Figure 2-3. Original BANDIT Chassis Front, with Serial Port

The rear panel of the standard original BANDIT chassis (Figure 2-4) provides a slot for the expansion port, and connectors for the internal modem (an RJ11 connection), the WAN port (RJ45), the LAN port (RJ45), and the external power supply.

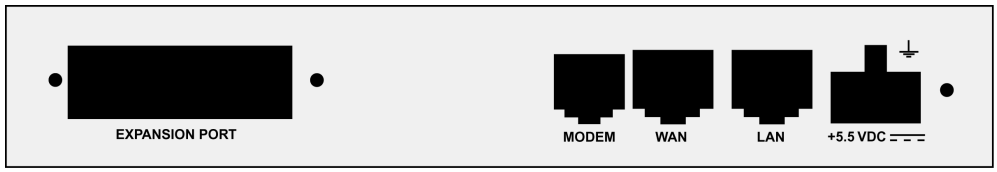

Figure 2-4. Original BANDIT Chassis Rear, Standard

Note: The expansion slot holds one of several expansion ports; for more information, see Section 2.1.5, *Expansion Ports*. The power supply port connects to an external power supply; for more information, see Section 2.1.2, *Power Supply*.

Figure 2-5 shows the rear of the original BANDIT model that includes the HD26 serial data port. When you connect the serial data port, you must choose a cable that provides the proper electrical interface and physical DCE or DTE interface. For more information, see Section 2.1.4.3, *HD26 Serial Port*.

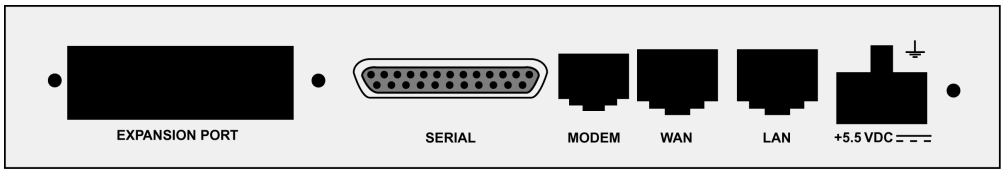

Figure 2-5. Original BANDIT Chassis Rear, with Serial Port

2.1.1.2 The BANDIT IP

The BANDIT IP™ is a streamlined tabletop unit, providing LAN and WAN ports and a limited choice of connections for the expansion port. The

BANDIT IP can support 30 simultaneous IPsec VPN tunnels. This model uses an external power supply.

Figure 2-6 shows the front of the BANDIT IP. The front contains the Supervisory port and LEDs for power, alarm, LAN port, WAN port, and expansion port.

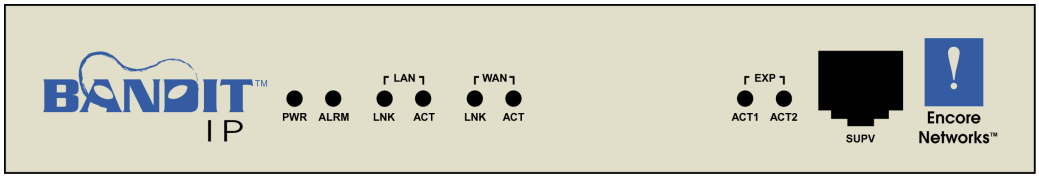

Figure 2-6. BANDIT IP Chassis, Front

Figure 2-7 shows the rear of the BANDIT IP, with connectors for the expansion port, WAN port, LAN port, and external power supply.

Figure 2-7. BANDIT IP Chassis, Rear

Note: The expansion slot holds an expansion port; for more information, see Section 2.1.5, *Expansion Ports*. The power supply port connects to an external power supply; for more information, see Section 2.1.2, *Power Supply*.

2.1.1.3 The BANDIT Plus

The BANDIT Plus™ is a rack-mounted unit, providing all features of the original BANDIT, plus enhanced performance features, a full choice of connections for the expansion port, and support of 100 simultaneous IPsec VPN tunnels. This model uses an internal power supply.

Figure 2-8 shows the front of the BANDIT Plus. The front contains the Supervisory port and LEDs for power, alarm, LAN port, WAN port, modem port, optional serial port, and expansion port.

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Figure 2-8. BANDIT Plus Chassis, Front

Figure 2-9 shows the rear of the BANDIT Plus, with connectors for the expansion port, HD26 serial port, modem port, WAN port, and LAN port. The chassis also has a power switch and an AC power connector.

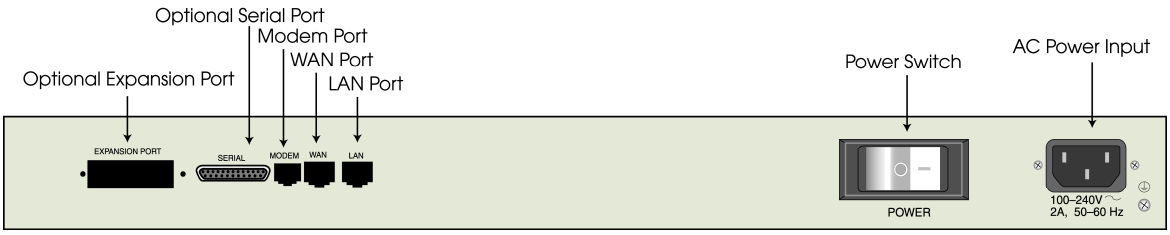

Figure 2-9. BANDIT Plus Chassis, Rear

The expansion slot holds one of several expansion ports; for more information, see Section 2.1.5, *Expansion Ports*.

A Remote Data Unit (RDU), providing 1 to 12 additional serial ports, can connect to one of the Ethernet ports on the BANDIT Plus. See Section 2.3, *The Remote Data Unit*.

2.1.1.4 The IBR-10

The IP Banking Router 10™ (IBR-10™) is a legacy-to-IP converter developed for networks that use legacy protocols but wish to use IP for transmission over public networks. The IBR-10 solution provides a quick, reliable, cost-effective method of using IP without replacing legacy equipment.

The IBR-10 encapsulates legacy protocols within IP and sends IP packets across the network. At the remote gateway, the IP packets are opened and the legacy protocol is sent to the endpoint. Networks with legacy equipment that may benefit from this method include utilities networks or banking and financial services markets.

The IBR-10 provides protocol conversion and spoofing, resulting in higher performance, faster transaction response, and a more efficient use of bandwidth.

With its feature-rich ELIOS™ operating system, the IBR-10 legacy-to-IP converter supports a wide range of financial applications currently used by banks, third-party EFT processors, and financial institutions. Such applications include:

- Banking/Point-of-Sale/Kiosks: Migration of ATM cash machines running VISA II, Bisync, or Poll-Select to IP
- Remote Office/Branch Office: Migration of SDLC/SNA applications to IP
- NCP Bypass: Connection of SDLC-based cluster controllers and remote terminals to IP-based mainframes and hosts, totally bypassing legacy FEP platforms
- Secure Transactions: Logical protection of data transactions via the use of the IP GRE tunneling protocol

The IBR-10's powerful ELIOS™ operating system and use of standards-based physical interfaces make it easy to integrate with other networking equipment, and allow it to interoperate with previously installed off-the-shelf IP routers and Ethernet switches. The 10/100-Base-T autosensing RJ-45 Ethernet port handles WAN traffic and provides connectivity to the IP world, eliminating the need for costly point-to-point or multi-drop leased lines. An RS-232, RS-449, V.35, or X.21 physical port interfaces with different legacy applications. (The IBR-10 does not support wireless connections.)

The customer must connect a supervisory console (such as a PC) to the IBR-10 for management and configuration.

Figure 2-10 shows the front of the IBR-10 chassis. The front contains the Supervisory port and LEDs for power, alarm, WAN port, and serial port.

Figure 2-10. IBR-10 Chassis, Front

Figure 2-11 shows the rear of the IBR-10 chassis. It has a DB25 serial port, a WAN Ethernet port, and a connector for the external power supply.

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Figure 2-11. IBR-10 Chassis, Rear

For specifications of the IBR-10 chassis, see Appendix A, *Specifications*. For the pin mapping of the DTE RS-232 cable for the DB25 serial port, see Table A-9.

2.1.1.5 The ILR-100

The IP Legacy Router 100™ (ILR-100™) is a legacy-to-IP converter developed for networks that use legacy protocols but wish to use IP for transmission over public networks. The ILR-100 solution provides a quick, reliable, cost-effective method of using IP without replacing legacy equipment. The ILR-100 is a miniature chassis that can sit in a small space on a desktop.

The ILR-100 encapsulates legacy protocols within IP and sends IP packets across the network. At the remote gateway, the IP packets are opened and the legacy protocol is sent to the endpoint. Networks with legacy equipment that may benefit from this method include utilities networks or banking and financial services markets.

The ILR-100 provides protocol conversion and spoofing, resulting in higher performance, faster transaction response, and a more efficient use of bandwidth.

With its feature-rich ELIOS™ operating system, the ILR-100 supports a wide range of applications currently used by banks, third-party EFT processors, and financial institutions. Such applications include:

- Banking/Point-of-Sale/Kiosks: Migration of ATM cash machines running VISA II, Bisync, or Poll-Select to IP
- Remote Office/Branch Office: Migration of SDLC/SNA applications to IP
- NCP Bypass: Connection of SDLC-based cluster controllers and remote terminals to IP-based mainframes and hosts, totally bypassing legacy FEP platforms

- Utilities: Transport of legacy SCADA applications over IP
- Secure Transactions: Logical protection of data transactions via the use of the IP GRE tunneling protocol

The ILR-100's powerful ELIOS™ operating system and use of standards-based physical interfaces make it easy to integrate with other networking equipment, and allow it to interoperate with previously installed off-the-shelf IP routers and Ethernet switches.

The 10/100-Base-T autosensing RJ-45 Ethernet port handles WAN traffic and provides connectivity to the IP world, eliminating the need for costly point-to-point or multi-drop leased lines.

An RS-232 DB-25 serial port interfaces with different legacy applications. The serial port is by default DCE, but you can use the BANDIT software to make the port DTE.

If you ordered wireless capability, an internal CDMA or GSM card provides radiofrequency connection to wireless networks.

The customer must supply a dedicated supervisory console, such as a PC, to use for remote management and configuration.

Note: The ILR-100 can also support IPsec VPN. See your Encore Networks sales representative if you would like your ILR-100 to support this feature.

Figure 2-12 shows the front of the ILR-100 chassis. The front contains the Supervisory port and LEDs for power, alarm, WAN port, serial port, and cellular wireless connection.

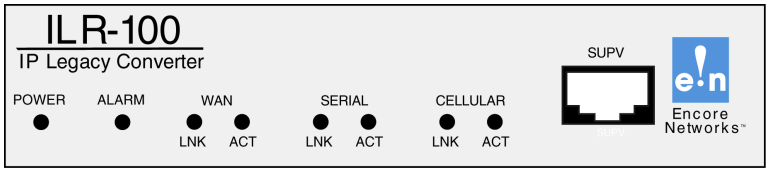

Figure 2-12. ILR-100 Chassis, Front

Figure 2-13 shows the rear of the ILR-100 chassis. It has an RS-232 DB-25 serial port, a connector for an antenna that provides range for cellular wireless connections, a WAN Ethernet port, and a connector for the external AC input power supply.

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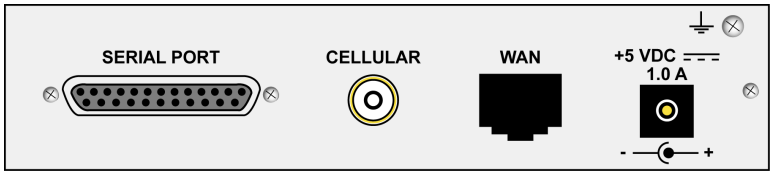

Figure 2-13. ILR-100 Chassis, Rear

For specifications of the ILR-100 chassis, see Appendix A, *Specifications*. For the pin mapping of the DTE cable for the RS-232 DB-25 serial port, see Table A-9.

Table 2-1 lists principal features for models of the ILR-100. All ILR-100 models use AC input power.

Table 2-1. ILR-100 Models

Principal Features	Models		
	VPN ILR-100 (Model E)	CDMA Wireless ILR-100 (Model C)	GSM Wireless ILR-100 (Model G)
Ethernet Port	•	•	•
RS-232 DB-25 Serial Port	•	•	•
IPsec VPN with Encryption	•	•	•
Internal CDMA Wireless Card		•	
Internal GSM Wireless Card			•

2.1.1.6 The BANDIT Mini

The BANDIT Mini™ is a legacy-to-IP converter and a VPN device. The BANDIT Mini solution provides a quick, reliable, cost-effective method of using IP without replacing legacy equipment. The BANDIT Mini is a miniature chassis that can sit in a small space on a desktop.

The BANDIT Mini provides protocol conversion and spoofing, resulting in higher performance, faster transaction response, and a more efficient use of bandwidth.

The BANDIT Mini's powerful ELIOS™ operating system and use of standards-based physical interfaces make it easy to integrate with other networking equipment, and allow it to interoperate with previously installed off-the-shelf IP routers and Ethernet switches.

The 10/100-Base-T autosensing RJ-45 Ethernet port handles WAN traffic and provides connectivity to the IP world, eliminating the need for costly point-to-point or multi-drop leased lines.

An RS-232 DB-25 serial port interfaces with different legacy applications. The serial port is by default DCE, but you can use the BANDIT software to make the port DTE. This port can also support an external dial backup modem.

An internal CDMA or GSM card provides radiofrequency connection to wireless networks. The customer must supply a dedicated supervisory console, such as a PC, to use for remote management and configuration.

Figure 2-12 shows the front of the BANDIT Mini chassis. The front contains the Supervisory port and LEDs for power, alarm, WAN port, serial port, and cellular wireless connection.

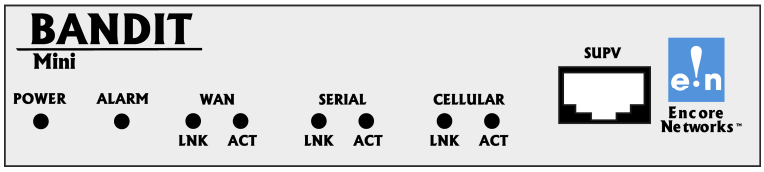

Figure 2-14. BANDIT Mini Chassis, Front

Figure 2-13 shows the rear of the BANDIT Mini chassis. It has an RS-232 DB-25 serial port, a connector for an antenna that provides range for cellular wireless connections, a WAN Ethernet port, and a connector for the external DC input power supply.

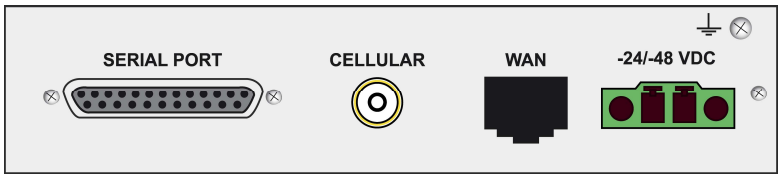

Figure 2-15. BANDIT Mini Chassis, Rear

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For specifications of the BANDIT Mini chassis, see Appendix A, *Specifications*. For the pin mapping of the DTE cable for the RS-232 DB-25 serial port, see Table A-9.

The BANDIT Mini has one model, fully loaded—Ethernet port, serial port, IPsec VPN with encryption, and CDMA or GSM wireless card. The BANDIT Mini accepts -22 to -56 volts DC (normally -24/-48 VDC) input power.

2.1.1.7 The VSR-30

Encore Networks' VPN Satellite Router 30™ (VSR-30™) is a dedicated provider of virtual private networks; it uses Selective Layer Encryption™ (SLE) to support IPsec VPN connections over satellite networks. The VSR-30 can initiate or terminate up to 30 VPN tunnels. It is typically placed as a VPN solution at remote sites of small and medium-size enterprises. (For more information on SLE and satellite networks, see the *BANDIT Products Software Configuration and Maintenance Guide*.)

The VSR-30 does not provide legacy-to-IP support.

Figure 2-16 shows the front of the VSR-30 chassis. The front contains the Supervisory port and LEDs for power, alarm, LAN port, WAN port, and Expansion port.

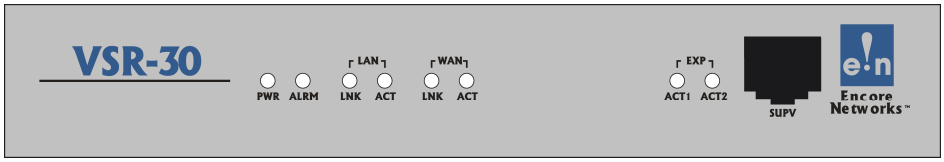

Figure 2-16. VSR-30 Chassis, Front

Figure 2-17 shows the rear of the VSR-30 chassis. It has an expansion slot, a LAN Ethernet port, a WAN Ethernet port, and a connector for the external power supply.

Figure 2-17. VSR-30 Chassis, Rear

The expansion slot can hold an expansion port. For more information, see Section 2.1.5, *Expansion Ports*.

2.1.2 Power Supply

The power supply for the BANDIT Mini accepts input power from a DC source. The power supplies in the chassis for the original BANDIT, BANDIT IP, BANDIT Plus, IBR-10, ILR-100, and VSR-30 accept input power from an AC source.

An external AC power supply connects to the original BANDIT, BANDIT IP, IBR-10, or VSR-30. The external power supply has an outlet for connecting a power cable to the AC power source. (Contact Encore Networks, Inc., for information on this external power supply and the connector between the chassis and the external power supply.)

The ILR-100 has an industry-standard AC adapter that accepts power from an AC source.

The power supply for the BANDIT Plus is internal—contained within the chassis. The RDU, a peripheral unit that supports a BANDIT Plus or a VSR-1200, also has an internal power supply. Each internal power supply has a connector in the chassis for a power cable to an external AC power source.

Each BANDIT power supply for AC sources, whether internal or external, is autosensing to receive universal 100–240 VAC input at 47–63 Hz.

Each AC power supply converts the AC input power to 5 VDC at 3 amps output for use by the BANDIT chassis.

Note: A power cable for AC models is included in shipments within North America. In other locations, the local or regional distributor is responsible for supplying a power cable that meets the specifications of the country in which the BANDIT product will be used.

2.1.3 Supervisory Port

A Supervisory cable and an adapter connect the BANDIT product's Supervisory port to a control console (such as a PC). On all models except the BANDIT II and the BANDIT III, the Supervisory port is RS-232 on an EIA-561 eight-pin modular (RJ45) connector. Figure 2-18 shows the RJ45 pin configuration for the Supervisory connection of other BANDIT models.

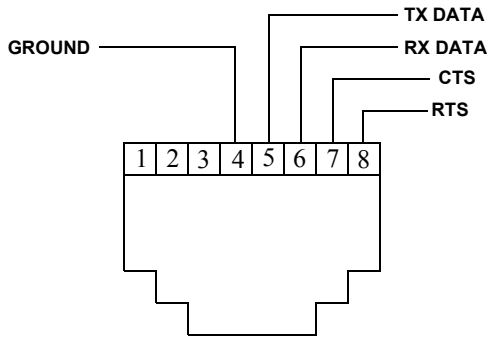

Figure 2-18. Socket View of RJ45 Supervisory Port

The Supervisory port is DCE in the connection. The following adapters can connect the RJ45 Supervisory cable to your control console's DB9 COM1 port.

- For a PC connection, use an RJ45-to-DB9 adapter. This is the adapter used for most BANDIT Supervisory port connections. (For this adapter's pin configuration, see Table A-14.)
- For an async terminal connection, use an RJ45-to-DB25 adapter. (For this adapter's pin configuration, see Table A-15.)
- For a modem connection, use an RJ45-to-DB25 modem adapter. (For this adapter's pin configuration, see Table A-16.)

2.1.4 Standard Network Ports

The following sections discuss the BANDIT products' port connections to network devices.

- Section 2.1.4.1, *Ethernet Ports*
- Section 2.1.4.2, *Modem Port*
- Section 2.1.4.3, *HD26 Serial Port*

Also see Section 2.1.5, *Expansion Ports*.

Note: The BANDIT's data ports can be remotely configured in the software. The data rates for synchronous and asynchronous data ports are shown in Table A-19 and Table A-20.

2.1.4.1 Ethernet Ports

Each 10-Base-T, 10/100-Base-T, or 100/1000-Base-T Ethernet connection is implemented over unshielded twisted-pair (UTP) wire, using a standard RJ45 connector. Table A-17 lists the RJ45 pin configuration. Figure A-4 shows the connector pins (looking into the connector).

See the following sections:

- Section 2.1.4.1.1, *The WAN Ethernet Port*
- Section 2.1.4.1.2, *The LAN Ethernet Port*
- Section 2.1.5.1, *Ethernet DMZ Port for Expansion Slot*

Note: Because the BANDIT is not a hub, it does not use a hub pinout, and therefore requires a crossover cable to connect an Ethernet port directly to a router or a PC.

To build a 10-Base-T crossover cable for the BANDIT, use the pinout shown in Table A-18.

2.1.4.1.1 The WAN Ethernet Port

The WAN Ethernet port is available on all BANDIT models. Table 2-2 lists the WAN port's interface options.

Table 2-2. WAN Port Interface Options

Standard
• Ethernet 10-Base-T, with an RJ45 connector

2.1.4.1.2 The LAN Ethernet Port

The LAN Ethernet port is available on all BANDIT models. Table 2-3 shows the interface options for the LAN port.

Table 2-3. LAN Port Interface Options

Standard
• Ethernet 10-Base-T, with an RJ45 connector

The LAN Port has the following IP features:

- Throughput: 512 kbps to 2 Mbps (depending on encryption type)
- Static routing
- RIP V1, V2 routing
- Prioritization on Layers 3, 4, 5
- Fragmentation (MTU) LAN
- 256–4096 and LAN 256–1500
- DHCP/Bootp; DHCP Agent
- RFC 1592
- ARP; Proxy ARP

2.1.4.2 Modem Port

An internal modem resides in the original BANDIT, the BANDIT Plus, and the VSR-1200. Connect the modem port to a telephone jack.

2.1.4.3 HD26 Serial Port

The serial port is an option for the original BANDIT and the BANDIT Plus; this optional serial port uses an HD26 connector. The serial port on all other BANDIT models is a DB25 serial port.

The serial port for the expansion module is HD26.

Table 2-4 lists the serial port's interface options. Table 2-5 lists its protocol options. For the serial port's pin configuration, see Table A-4.

Table 2-4. Serial Port Interface Options

Standard
• Serial with a V.35, EIA-530, RS-232, X.21/V.11, or RS-449 connector - RS-232: serial - V.35: binary - X.21 following EIA-530 on DB25 with an optional adapter cable to M-34: asynchronous data
Optional
• Serial: - 2 Mbps (DCE) - V.35 (EIA-530) - RS-232 (128 kbps sync, 115.2 kbps async) - RS-449/422/423

Table 2-5. Serial Port Protocols

Protocol	Features Supported
Frame Relay	• Link Management - LMI, CCITT, Q.933 Annex A; - ANSI T1.617 Annex D • IP over Frame Relay • CIR Enforcement • Fragmentation FRF12 • Fast Connection • Prioritization • Unicasting • Multicasting
PPP, Multilink PPP	• Sync PPP • Async PPP • PAP • CHAP • IP over PPP
IP	• All standard IP features
X.25	• All standard X.25 features

The cable for the serial port provides the proper V.35, RS-449, or RS-232 electrical interface. In addition, the cable provides the port's physical DCE or DTE interface. Make sure you have the correct cable for your network needs. (For cable options, see Table A-5 and Table A-6. Table A-5 lists the cable pin settings for the port to be a physical DCE or DTE. Table A-6 lists the cable pin settings for the serial port's electrical interface.)

2.1.5 Expansion Ports

An expansion slot on the BANDIT, BANDIT IP, BANDIT Plus, and VSR-30 can hold one of several expansion ports. The ports available for the expansion slot depend on the BANDIT model you are using. (You select an expansion port when you order your BANDIT product.)

Table 2-6 lists the expansion ports available for each model of the BANDIT.

Table 2-6. Expansion Port Options for the BANDIT Products *(1 of 2)*

Expansion Port	Model[1]							Section
	BANDIT (Original)	BANDIT IP	BANDIT Mini[2]	BANDIT Plus	IBR-10[2]	ILR-100[2]	VSR-30	
10-Base-T Ethernet port[3]	•	•		•			•	Section 2.1.5.1, *Ethernet DMZ Port for Expansion Slot*
Universal HD26 serial port	•			•				Section 2.1.5.2, *HD26 Serial Port for Expansion Slot*
56/64 kbps internal CSU/DSU port	•	•		•				Section 2.1.5.3, *56/64 kbps CSU/DSU Port for Expansion Slot*
Single T1/E1 CSU/DSU port	•			•				Section 2.1.5.4, *Single T1/E1 CSU/DSU Port for the Expansion Slot*
Single T1/E1 channelized CSU/DSU port	•			•				Section 2.1.5.4, *Single T1/E1 CSU/DSU Port for the Expansion Slot*

Table 2-6. Expansion Port Options for the BANDIT Products (2 of 2)

Expansion Port	Model[1]							Section
	BANDIT (Original)	BANDIT IP	BANDIT Mini[2]	BANDIT Plus	IBR-10[2]	ILR-100[2]	VSR-30	
Dual T1/E1 CSU/DSU ports				•				Section 2.1.5.5, *Dual T1/E1 Port for the Expansion Slot*
Dual T1/E1 channelized CSU/DSU ports				•				Section 2.1.5.5, *Dual T1/E1 Port for the Expansion Slot*
CDMA wireless port	•	•	•[4]	•		•[4]	•	Section 2.1.5.6.1, *The CDMA Wireless Card*
GSM wireless port	•	•	•[4]	•		•[4]	•	Section 2.1.5.6.2, *The GSM Wireless Card*

1. For information on the BANDIT II, the BANDIT III, or the VSR-1200, see the *BANDIT II™, BANDIT III™, and VSR-1200™ Document Set*.
2. This product does not have an external expansion slot.
3. The Ethernet expansion port can be used as a DMZ port or as a second LAN port.
4. Although this product does not have an external expansion slot, an internal wireless card can be installed when the chassis is ordered.

Note: If you wish to change the expansion port your BANDIT product uses, contact your Encore Networks representative. See the *Guide to Changing the Expansion Port Module in VPN Products* for the procedure for installing an expansion port module. The *BANDIT Products Software Configuration and Maintenance Guide* also contains this procedure.

2.1.5.1 Ethernet DMZ Port for Expansion Slot

The Ethernet DMZ port (Figure 2-19) is the connection to the LAN's "demilitarized zone" (DMZ). A DMZ is an area that allows public access to limited information—for example, an organization's public website. This Ethernet port functions exactly like any other Ethernet port. See Section 2.1.4.1, *Ethernet Ports*.

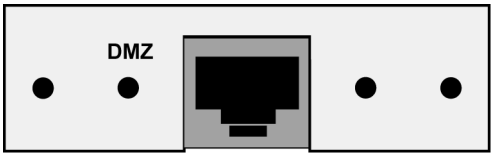

Figure 2-19. Panel for Ethernet DMZ Expansion Port

2.1.5.2 HD26 Serial Port for Expansion Slot

The expansion slot's HD26 serial port (Figure 2-20) functions exactly like the optional serial port. See Section 2.1.4.3, *HD26 Serial Port*.

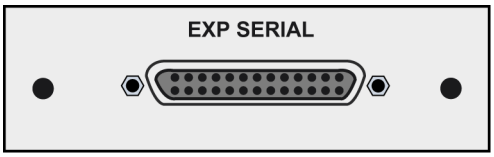

Figure 2-20. Panel for HD26 Serial Expansion Port

2.1.5.3 56/64 kbps CSU/DSU Port for Expansion Slot

The 56/64 kbps CSU/DSU port uses an RJ48S connector (Figure 2-21). Table 2-7 lists the 56/64 kbps CSU/DSU port interface.

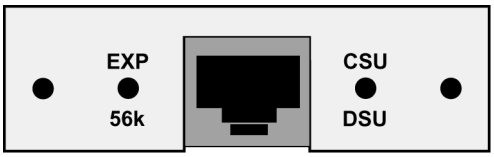

Figure 2-21. Panel for 56/64 kbps CSU/DSU Expansion Port

Table 2-7. 56/64 kbps CSU/DSU Port Interface

Port	Connector
• 56/64 kbps internal CSU/DSU	• RJ48S connector - Bipolar Return-to-Zero using an eight-position modular RJ48S or CA48S (Canada) jack, to allow easy installation

The CSU/DSU port operating range, with unloaded twisted-pair 24-AWG gauge cables, is 56/64 kbps at a distance of 4.5 miles (7.24 km). To exceed this distance, use a heavier gauge cable.

Note: When this port's speed is 64 kbps, the port must be in Line mode (that is, it must get its synchronizing clock externally, from the line). When this port's speed is 56 kbps, the port can get its clock internally or externally.

The 56/64 kbps CSU/DSU port can carry Frame Relay, IP over Frame Relay, X.25, or SDLC. Table A-1 lists the port's pin configuration. Figure A-1 shows the connector pins.

2.1.5.4 Single T1/E1 CSU/DSU Port for the Expansion Slot

The T1/E1 CSU/DSU port (Figure 2-22) can carry Frame Relay, IP over Frame Relay, X.25, or SDLC—in short, the protocols that any CSU/DSU port can carry. However, the T1/E1 port can carry the protocols at high speeds—T1 can carry traffic at 1.544 Mbps; E1 can carry traffic at 2.048 Mbps.

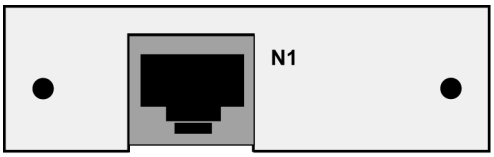

Figure 2-22. Panel for Single T1/E1 Expansion Port

The BANDIT's T1/E1 CSU/DSU port supports the following:

- HDB3 or AMI line encoding
- Multiframe CAS, CRC4
- Internal or external clocking
- Single or multiple Logical Ports, with HDLC-based protocols such as Frame Relay, X.25, and point-to-point (PPP)
- Fractional bitstreams with user-configurable bit rates of 48 kbps, 56 kbps, and 64 bps
- Alarms and maintenance information

The T1/E1 port uses an RJ48C connector. Table 2-8 lists the specifications for the T1/E1 CSU/DSU port. Table A-2 lists the pin configuration for the T1/E1 port.

You can configure the T1/E1 CSU/DSU port to be channelized or unchannelized.

Table 2-8. T1/E1 CSU/DSU RJ48C Port Specifications

Specification	T1	E1
Line speed	1.544 Mbps	2.048 Mbps
Data speed	1.536 Mbps (24 channels at 64 kbps each)	1.920 Mbps (30 channels at 64 kbps each)
Resistance	100 ohms, balanced	120 ohms, balanced
Standards	G.703, G.704 ANSI T1.408	G.703, G.704, G.732
	Channelized or Unchannelized	Channelized or Unchannelized

2.1.5.5 Dual T1/E1 Port for the Expansion Slot

The dual T1/E1 expansion port (Figure 2-23) provides two T1 ports or two E1 ports. Each port in the dual T1/E1 port has the same properties as any single T1/E1 port. (See Section 2.1.5.4, *Single T1/E1 CSU/DSU Port for the Expansion Slot*.) However, in addition to providing doubled capacity for T1 or E1 transmissions, the dual T1/E1 port can perform drop and insert of data or voice timeslots.

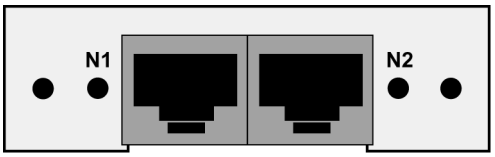

Figure 2-23. Panel for Dual T1/E1 Expansion Port

2.1.5.6 Wireless Cards for the Expansion Slot

Wireless connections use radiofrequencies through airwaves instead of electrical signals through cables. A cellular wireless connection allows free physical movement within the broadcast radius of a cell's wireless access point (AP)—for example, a cell tower. Each wireless AP provides a direct or indirect cabled connection to the core of the wireless network.

The BANDIT's expansion port can hold a card for access to a cellular wireless network. The BANDIT can have access to one of the following networks:

- Code Division Multiple Access (CDMA) wireless network
- Global System for Mobile Communications (GSM) wireless network

The card installed depends on the wireless carrier and network you wish to use; you order a GSM or CDMA card according to the technology the carrier uses.

Note: When you order a CDMA wireless card for the BANDIT, the carrier-specific software is loaded on the wireless card before shipment.

A GSM carrier provides a Subscriber Identity Module (SIM) to insert into the GSM wireless card.

The BANDIT products have been certified by major carriers as compatible with and acceptable to commercial cellular networks.

A wireless network card provides a wireless connection to a wireless access point, supporting the BANDIT as a wireless terminal. (The BANDIT does not act as a gateway or AP for other wireless devices. That is, it does not provide a connection through which other terminal wireless devices, such as a cellphone or a wireless laptop computer, can reach a wireless network.)

You can set the BANDIT up to provide a connection between a cabled network and a wireless network. All features of the BANDIT are available for wireless and wired connections.

Figure 2-24 illustrates the BANDIT's wireless and wired connections. The BANDIT can send a transmission through a wireless carrier or through a wired network.

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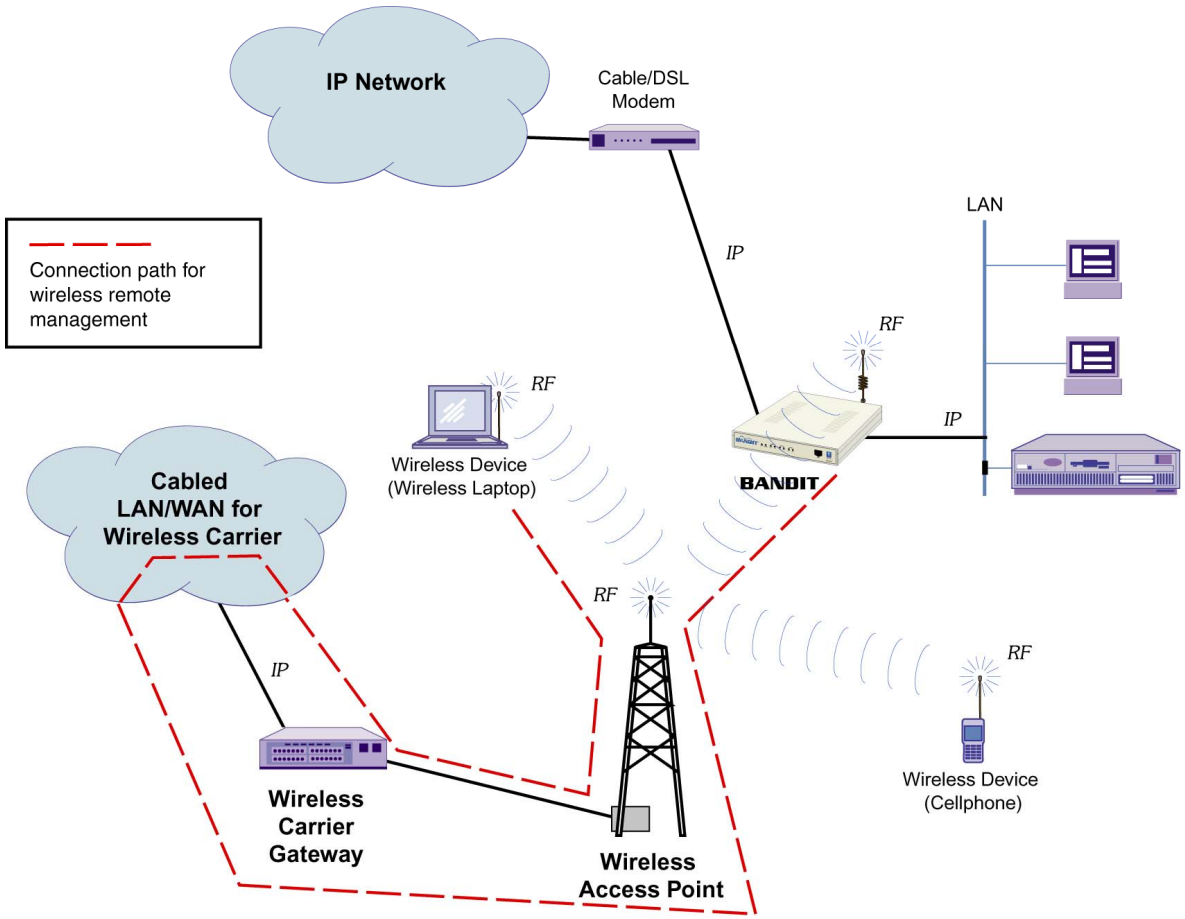

Figure 2-24. BANDIT Connections to External Wireless Carrier, to Internal Wired LAN, and to External Wired IP Network

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Note: A remote terminal can be set up to manage the BANDIT from any location over any network. For example, a wireless laptop can manage the BANDIT remotely, if you configure the BANDIT's firewall to accept the connection. As in any other remote connection, the wireless laptop's packets go through the wireless carrier's network to be routed to the BANDIT (see Figure 2-24).

Figure 2-25 shows a BANDIT wireless card's faceplate with a connector port for an antenna. Figure 2-26 shows a wireless module, with attachable antenna, installed in the BANDIT chassis. Figure 2-27 shows an antenna attached to the wireless module via cable. (A cable permits optimal placement of the antenna.)

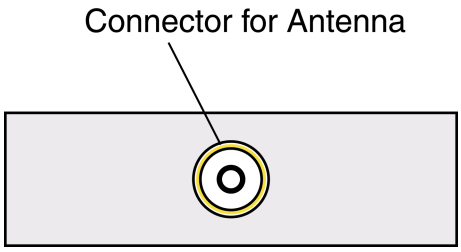

Figure 2-25. Wireless Module Faceplate

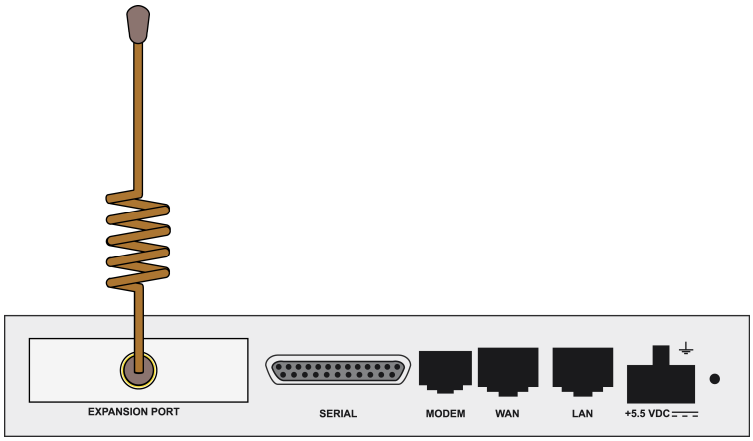

Figure 2-26. BANDIT Using Wireless Module, with Antenna Connected to Module

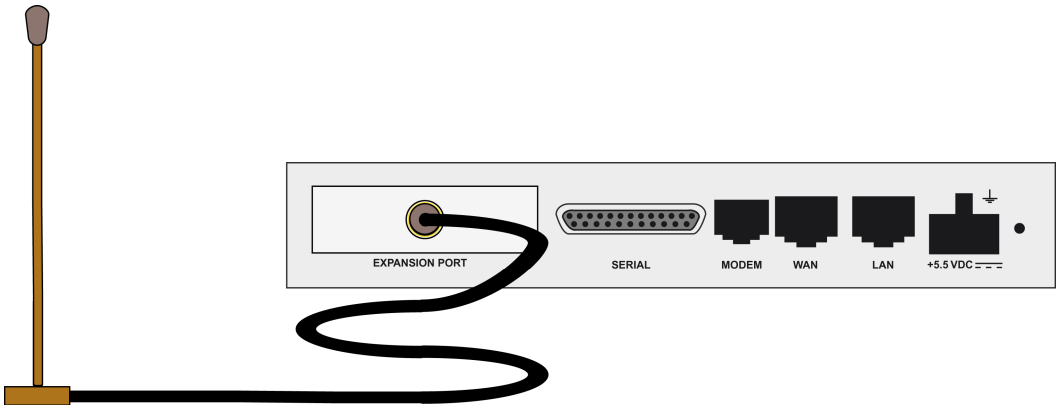

Figure 2-27. BANDIT Using Wireless Module, with Antenna and Cable Connected to Module

Note: The standard antenna for the BANDIT's wireless modules ships with a 12 ft. (3.7 m) cable, and has 0 dB (no gain). The cable permits optimal placement of the antenna. Contact your Encore Networks sales representative if you would like an optional antenna that has a +3 dB gain.

Warning: It is extremely important to set up security measures, including firewall protection, for each wireless device. Use the BANDIT's firewall to protect the BANDIT and its connection to the wireless network. See the *BANDIT Products Software Configuration and Maintenance Guide*.

The BANDIT uses spoofing to handle legacy protocols that are sensitive to delay. It receives packets from the sender and replies with acknowledgment packets as if it were the remote terminal at the end of the connection. At the same time, the BANDIT sends the received data across the wireless network to a remote BANDIT, connected to the real remote terminal. In its transmissions to the remote terminal, the remote BANDIT spoofs as if it were the original sender.

The same process occurs in reverse when the remote terminal sends reply packets.

See the following sections:

- Section 2.1.5.6.1, *The CDMA Wireless Card*
- Section 2.1.5.6.2, *The GSM Wireless Card*

2.1.5.6.1 The CDMA Wireless Card

The BANDIT uses the CDMA Module to provide CDMA wireless connections. CDMA uses spread-spectrum technology.

Table 2-9 lists the specifications for the BANDIT's CDMA wireless expansion module.

Table 2-9. Specifications for the CDMA Wireless Card

Specification	CDMA Module
Power supply's maximum voltage	4.2 VDC
Number of ports	One wireless port
Wireless interface	CDMA 2000 (IS-2000)
Data rate per port	Up to 153 kbps
Throughput	Up to 153 kbps
Dimensions (L x W x H)	2.3 in. x 1.3 in. x 0.2 in. (58 mm x 32.6 mm x 3.9 mm)
Weight	0.005 lb. (11 g)
Operating temperature	-22°F to 140°F (-30°C to 60°C)
Storage temperature	-40°F to 185°F (-40°C to 85°C)
Antenna Interface	50-ohm SMA[1] female connector
Band of Operating Frequencies	Dual band: Band class 0: Tx 824–849 MHz, Rx 869–894 MHz Band class 1: Tx 1850–1910 MHz, Rx 1930–1990 MHz

1. sub-miniature coaxial connector, type A

2.1.5.6.2 The GSM Wireless Card

The BANDIT uses the GSM Module to provide GSM wireless connections. GSM is based on TDMA technology. The GSM card supports General Packet Radio Service (GPRS) for data transfer.

Table 2-10 lists the specifications for the BANDIT's GSM wireless expansion module.

Table 2-10. Specifications for the GSM Wireless Card

Specification	GSM Module
Power supply's maximum voltage	4.5 VDC
Number of ports	One wireless port
Wireless interface	GSM
Data rate per port	Up to 144 kbps
Throughput	Up to 144 kbps
Dimensions (L x W x H)	2.3 in. x 1.3 in. x 0.2 in. (58.4 x 32.2 x 3.9 mm)
Weight	0.005 lb. (11 g)
Operating temperature	-22°F to 140°F (-30°C to 60°C)
Storage temperature	-40°F to 185°F (-40°C to 85°C)
Band of Operating Frequencies	Dual Band E-GSM/GPRS: E-GSM 900: Rx 925–960 MHz, Tx 880–915 MHz DCS 1800: Rx 1805–1880 MHz, Tx 1710–1785 MHz GSM 850: Rx 869–894 MHz, Tx 824–849 MHz PCS 1900: Rx 1930–1990 MHz, Tx 1850–1910 MHz

2.2 Status LEDs

LEDs on the front of the BANDIT product indicate the status of connections. The following sections describe the LEDs.

2.2.1 General Status

The following general rules apply to the BANDIT products' LEDs:

- A lit green Power LED indicates that the unit is being supplied with power.

- A lit red Alarm LED indicates that the BANDIT has detected an alarm.
- A lit green Link LED indicates that there is a connection to another device.
- A flashing green Activity LED on an Ethernet WAN, LAN, or DMZ port indicates that data is being received.
- A flashing green Activity LED on a serial port, modem port, 56/64 kbps CSU/DSU port, or T1/E1 CSU/DSU port indicates that data is being exchanged.

Table 2-11 describes the BANDIT products' LEDs.

Table 2-11. BANDIT LEDs *(1 of 2)*

LED	Location (from left side)	Color	Description
Power	First	Green	Unit is receiving power.
		Off	Unit is not receiving power.
Alarm	Second	Red	System has an alarm.
		Off	There are no alarms.
LAN Link	Third	Green	Connection to LAN has been made.
		Off	Connection to LAN has failed.
LAN Activity	Fourth	Green flashing	Data is being received.
WAN Link	Fifth	Green	Connection to WAN gateway has been made.
		Off	Connection to WAN gateway has failed.
WAN Activity	Sixth	Green flashing[1]	Data is being received.
Modem Link[2]	Seventh	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.
Modem Activity[2]	Eighth	Green flashing	Data is being transmitted or received.

Table 2-11. BANDIT LEDs *(2 of 2)*

LED	Location (from left side)	Color	Description
Serial Port Link[3]	Ninth	Green	Connection to device has been made.
		Off	Connection to device has failed.
Serial Port Activity[3]	Tenth	Green flashing	Data is being transmitted or received.
Expansion Port 1 Activity[2]	Eleventh	Green flashing	Data is being transmitted or received over expansion port.
Expansion Port 2 Activity[4]	Twelfth	Green flashing	Data is being transmitted or received over second expansion port.[4]

1. If the transmit and receive pairs are accidentally reversed at the service provider's connector, the WAN port's Activity LED stays on (not flashing). This is because the reversed connection reverses the sealing current and sends the unit into test mode (i.e., analog loopback).
2. This LED appears only in the BANDIT's expansion port models.
3. This LED appears only in the BANDIT's serial-port models.
4. This LED applies only to the dual T1/E1 CSU/DSU port, available only in the BANDIT Plus.

2.2.2 Protocol Status

In addition to indicating general status, each port's Activity LED indicates conditions for the protocol configured on that port. Table 2-12 describes the LEDs for protocols the BANDIT supports.

Table 2-12. Protocol LED Definitions *(1 of 2)*

Protocol	Green Activity LED
Frame Relay	If a Frame Relay Management protocol connection is up, the LED lights after 15–20 seconds. (If there is no connection, the Activity LED remains unlit.)
Async Encapsulation	Characters, bi-directional TD/RD
Bit Sync Encapsulation	Frames in either direction

Table 2-12. Protocol LED Definitions (2 of 2)

Protocol	Green Activity LED
Async/Sync PPP	Frames to/from port
SLIP	Frames to/from port
SDLC Emulation—Terminal[1]	Sending or receiving data
SDLC Emulation—Host[1]	The host has a transport layer connection with a terminal listed in the device table.
SDLC Routing	Frames to/from port
Annex G	Good frames are passing through.
Byte Sync Encapsulation	Good frames are passing through.
X.25	Level II connection exists.
Telnet Terminal	Data transfer in either direction

1. When using spoofed protocols such as SDLC, both LEDs can light up at the same time. On a terminal unit, both LEDs may be lit if some terminals are responding and some are not. On a host unit, both LEDs may light up if some terminals are being polled and some are not.

2.3 The Remote Data Unit

The Remote Data Unit (RDU), an external module with 12 DB25 serial ports, is available for use with the BANDIT Plus and the VSR-1200. The BANDIT Plus can support one RDU; the VSR-1200 can support one or two RDUs. Each serial port on the RDU can support any protocol listed for serial ports in Section 2.1.4.3, *HD26 Serial Port*.

The RDU's Ethernet port connects to the Ethernet LAN port on the BANDIT Plus or to an Ethernet port in the DMZ switch on the VSR-1200, supplying a connection within the BANDIT chassis.

The RDU is 1U (1.75", 4.4 cm) high and 19" (48.3 cm) wide. Because it is a peripheral unit, the RDU can sit in any location. It is usually convenient to install the RDU in an equipment rack above or below its BANDIT Plus or VSR-1200.

Figure 2-28 shows the front of the RDU; Figure 2-29 shows the rear of the RDU. (Note that the RDU has its own AC power connection. The RDU's power consumption is 10 watts AC; its power supply delivers 3.3 volts DC to the RDU.)

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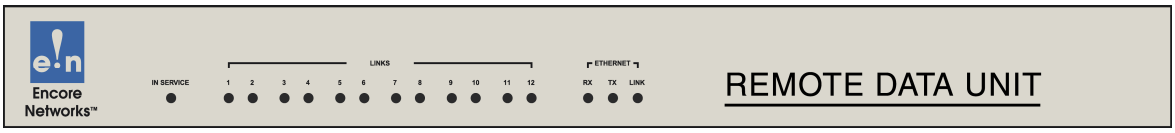

Figure 2-28. Remote Data Unit, Front

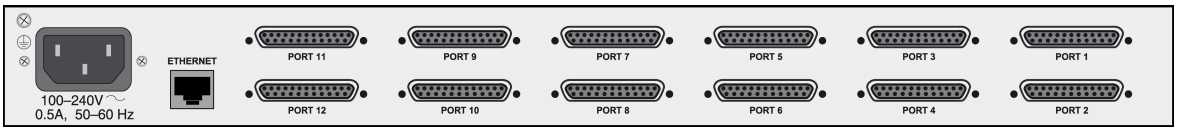

Figure 2-29. Remote Data Unit, Rear

Each serial port on the RDU is a DB25 female connector, physical DCE RS-232. If you want a port to be a physical DTE, use a DB25-to-DB25 crossover conversion cable.

The front of the RDU has 12 LEDs, one for each serial port. Table 2-13 describes the LED states for the RDU's serial ports.

Table 2-13. Remote Data Unit's LEDs

LED	State	Description
In Service	On	RDU system is up and operational.
	Off	RDU system is not yet fully operational. (System is off or is starting up.)
Links 1–12	On	Link is up. (Cable is connected properly.)[1]
	Blinking	Activity on port.[1]
	Off	Link is not up.[1]
Ethernet		
Rx	Blinking	Activity
Tx	Blinking	Activity
Link	On	Link is up. (Cable is connected properly.)
	Off	Link is not up.

1. The exact meaning of an LED state for Links 1–12 depends on the protocol the port carries.