

BANDIT III Hardware Description

1st of 3 QuickStart Guides for the BANDIT III

This chapter provides information on the hardware for the BANDIT III™. The BANDIT III is a high-end model in the BANDIT™ products, optimized for utility applications and protocols.

The BANDIT III complies with the European Union's directive on restriction of hazardous substances (ROHS). This directive places strict controls on pollutants, including the elimination of lead in the manufacturing process.

The BANDIT III is available in a commercial chassis, with a standard hard plastic cover, or an environmentally hardened chassis, with a metal cover. Hardened construction allows the BANDIT III to operate over wide temperature ranges at remote sites that do not use environmental control.

The BANDIT III, like all products in the BANDIT family, uses the ELIOS™ operating system.

In addition to its support of virtual private networks (VPNs) and its support of legacy protocols, the BANDIT III can handle all variants of the Supervisory Control and Data Acquisition (SCADA) protocol, both bit- and byte-oriented, with strong encryption of all traffic and complete remote management capabilities after a simple plug-and-play installation.

Figure 1-1 shows the outer shell of a BANDIT III chassis. (Also see [Section A.3.1, Physical Specifications](#).)

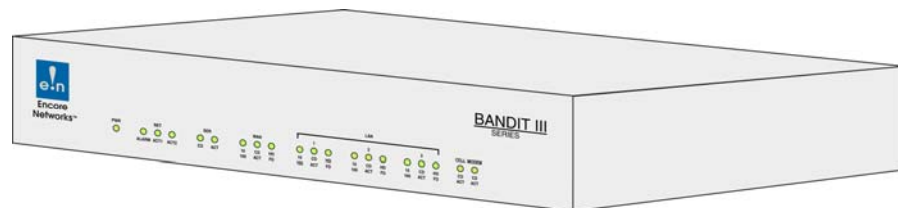


Figure 1-1. BANDIT III Chassis

See the following sections:

- [The BANDIT III Chassis](#)
- [Status LEDs](#)

1.1 The BANDIT III Chassis

The BANDIT III is a full-featured tabletop model in the BANDIT family, providing both IPsec/SLE VPNs and legacy-protocol support. The BANDIT III offers enhanced performance features, a full choice of connections for the expansion port, and support of up to 30 simultaneous VPN tunnels. Like other BANDIT VPN devices, the BANDIT III's VPNs support DES and 3DES; in addition, the BANDIT II, the BANDIT III, and the VSR-1200 can also support AES.

Note: For chassis and port specifications, see [BANDIT III Hardware Specifications](#).

The BANDIT III is available in a basic chassis, a chassis with an Ethernet Switch Module, or an E&M Signaling chassis, each with one DB25 serial port. The BANDIT III is also available in an expanded chassis with four additional DB25 serial ports. See the following:

- [Standard BANDIT III Chassis](#)
- [BANDIT III Chassis with Ethernet Switch Module](#)
- [Expanded BANDIT III Chassis with Internal Data Unit](#)
- [BANDIT III E&M Signaling Chassis](#)

1.1.1 Standard BANDIT III Chassis

The basic BANDIT III chassis ([Figure 1-2](#)) contains LED indicators for the following items:

- Power
- Alarm state
- Network Activity for the port on a card in the expansion port
- Network Activity for port 2 of a two-port card in the expansion slot¹
- Carrier detect (CD) and activity (ACT) on the DB25 serial port
- 10base-T/100base-T (10/100), CD/ACT, and half-duplex/full-duplex (HD/FD) on the WAN port
- 10/100, CD/ACT, and HD/FD on three LAN ports
- CD/ACT on the internal (cellular) wireless card's internal port
- CD/ACT on the modem

The BANDIT III can hold one or two wireless cards for CDMA, EVDO CDMA, GPRS GSM, or EDGE GSM wireless networks. One card is internal; the other can be installed in the external expansion slot. Each wireless card for the BANDIT III includes an antenna. (A plastic chassis can use an internal antenna or an external antenna but not both; a metal chassis uses only an external antenna.)

1. The Network Activity 2 LED applies only to the dual T1/E1 CSU/DSU port.

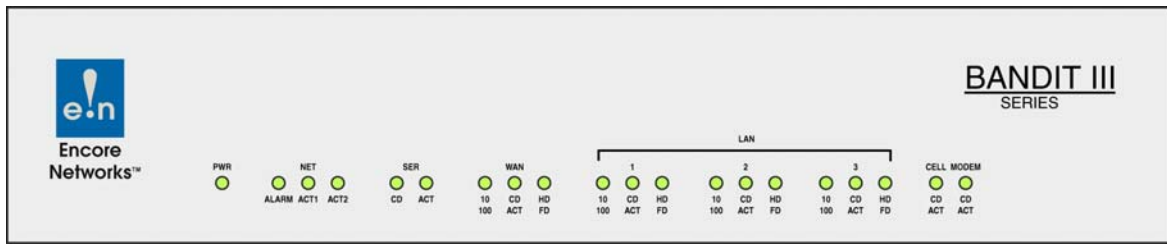


Figure 1-2. BANDIT III Chassis, Front Panel, Basic Model

The BANDIT III is also available in an expanded model, with four additional DB25 RS232 serial ports. The expanded model includes all features of the basic BANDIT III, plus an Internal Data Unit (IDU) consisting of four DB25 serial ports. The IDU provides additional support for legacy functionality without the need for a peripheral device.

Figure 1-3 shows the expanded model, with individual Link LEDs near the top of the faceplate for the four DB25 serial ports of the IDU and with one set of Link and Activity LEDs for the IDU as a whole.

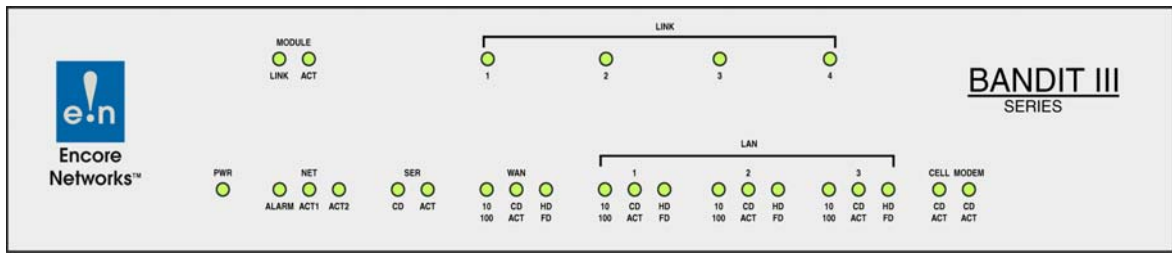


Figure 1-3. BANDIT III Chassis, Front Panel, Expanded Model

The basic BANDIT III chassis is available for 110/220 volts AC input power (Figure 1-4), for -24/-48 volts DC input power (Figure 1-5), or for -12/-24 volts DC input power (Figure 1-6). When you order a BANDIT III, you specify the type of input power it will use.

Note: Each DC-powered BANDIT III chassis also has a port for AC input power; you can choose to connect or not to connect an AC power supply to the AC port. If you connect both the DC port and the AC port to input power sources, the chassis will use the power source that you connect first as the primary power source. The other power connection will be on standby; it will provide power only if the primary power source fails.

If the primary power source fails, the standby power source immediately provides power to the chassis and becomes the new primary power source. When the original primary power source is restored, it becomes the new standby power source.

Consult your network administrator to determine whether your BANDIT III DC-powered chassis will use only a DC input power configuration or will use a failover DC and AC input power configuration.

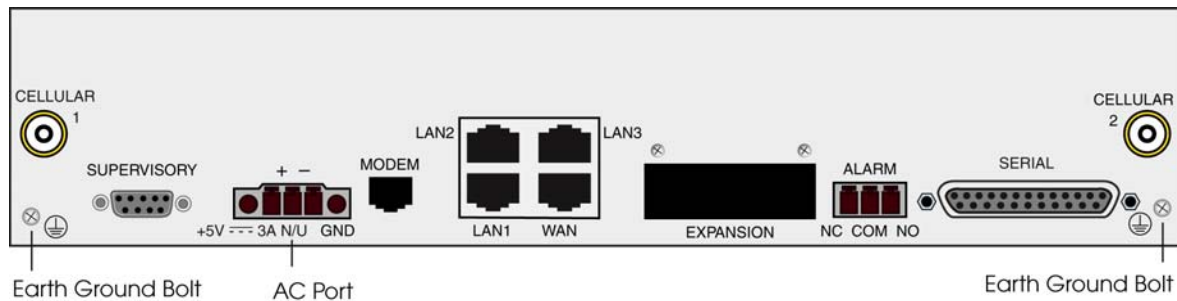


Figure 1-4. BANDIT III Chassis, Rear Panel, Basic Model,
110/220 VAC Input Power

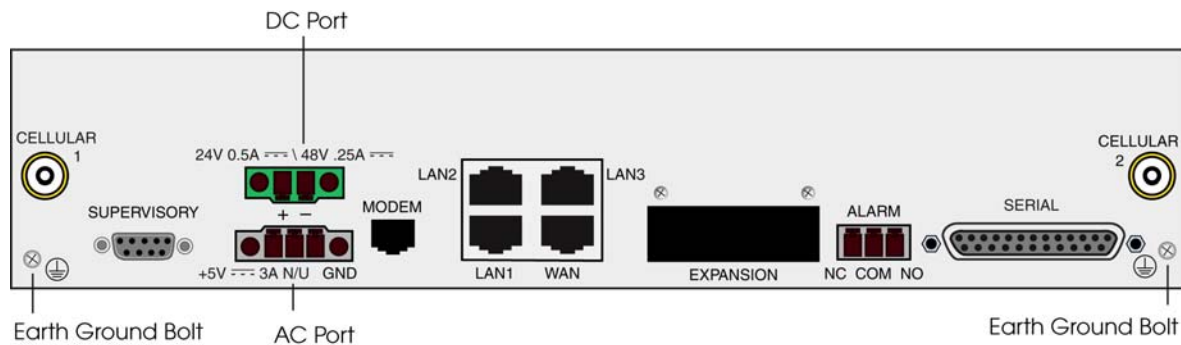


Figure 1-5. BANDIT III Chassis, Rear Panel, Basic Model,
-24/-48 VDC Input Power
(or Failover -24/-48 VDC and 110/220 VAC Input Power)

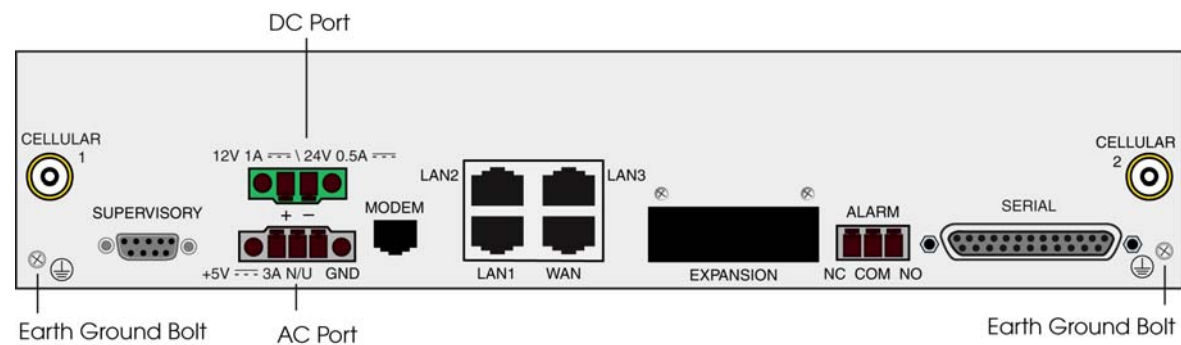


Figure 1-6. BANDIT III Chassis, Rear Panel, Basic Model,
-12/-24 VDC Input Power
(or Failover -12/-24 VDC and 110/220 VAC Input Power)

The following items are on the back of the basic BANDIT III chassis (Figure 1-4, Figure 1-5, or Figure 1-6):

- Two ports (labeled “Cellular”) for antennas for wireless cards, for connection to wireless networks
- Two earth ground connection screws
- A DB9 supervisory port for management
- A connector for AC input power

- If you ordered a chassis for DC power: A connector for DC input power (in addition to a connector for AC input power)
- A V.90/V.92 modem port
- Four RJ45 10/100-Base-T Ethernet ports:
 - One WAN port, typically used as the network uplink to the host
 - Three LAN ports, typically connected to local IP devices

Note: The three Ethernet LAN ports on the BANDIT III constitute a LAN switch; you can use them to create a small network.

- An expansion slot for a card that provides an additional port. The expansion slot accepts one of several expansion cards for specific interfaces:
 - Ethernet port, for a DMZ LAN
 - DB25 serial port, configurable as RS-232, RS-449, V.35, or X.21
 - 56k CSU/DSU port
 - T1/E1 CSU/DSU port
 - Dual-port T1/E1 CSU/DSU port, with drop-and-insert capability
 - A second wireless card; this can be the same type (CDMA, EVDO CDMA, GPRS GSM, or EDGE GSM) as the internal wireless card or a different type from the internal wireless card.

Note: For more information about ports for the expansion slot, see [Ports in the BANDIT Products](#).

- An alarm port
- A DB25 serial port

1.1.2 BANDIT III Chassis with Ethernet Switch Module

The BANDIT III is also available with an Ethernet Switch Module (ESM) comprising six LAN ports. This BANDIT III chassis is available for -12/-24 volts direct DC input power (Figure 1-7) or for 5 volts DC input power via the AC power adapter. The DC chassis can use a failover DC and AC input power configuration.

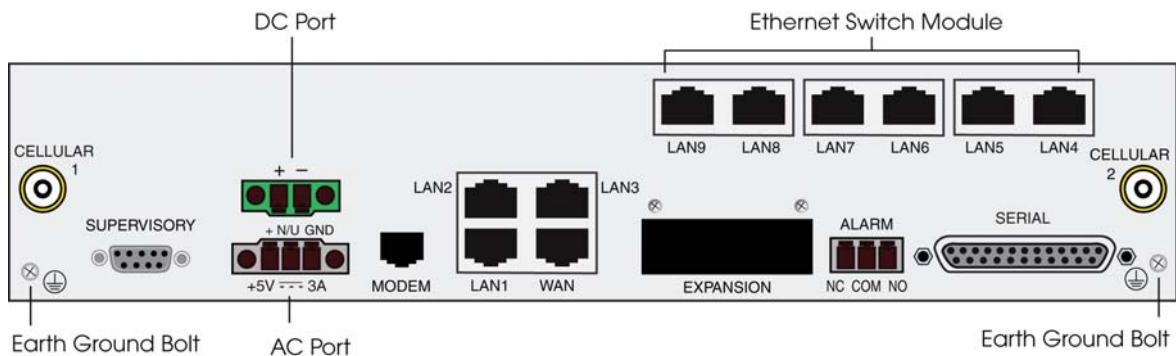


Figure 1-7. BANDIT III Chassis, Rear Panel, Basic Model, with Ethernet Switch Module, -12/-24 VDC Input Power (or Failover -12/-24 VDC and 110/220 VAC Input Power)

The BANDIT III chassis with an ESM provides all features of the standard BANDIT III chassis, plus 6 additional LAN ports (the ESM).

The ESM ports are configured by selecting the LAN port in the menus for port configuration. (See the [Port Configuration](#) Module.) The ESM functions as a unit, in conjunction with the LAN DMZ switch.

1.1.3 Expanded BANDIT III Chassis with Internal Data Unit

As stated earlier, the BANDIT III is also available in an expanded model, with an Internal Data Unit (IDU) comprising four DB25 serial ports, for additional VPN functionality. The expanded BANDIT III chassis is available for 110/220 AC volts input power ([Figure 1-8](#)), for -24/-48 volts DC input power ([Figure 1-9](#)), or for -12/-24 volts DC input power ([Figure 1-10](#)). As stated earlier, each DC chassis can use a failover DC and AC input power configuration.

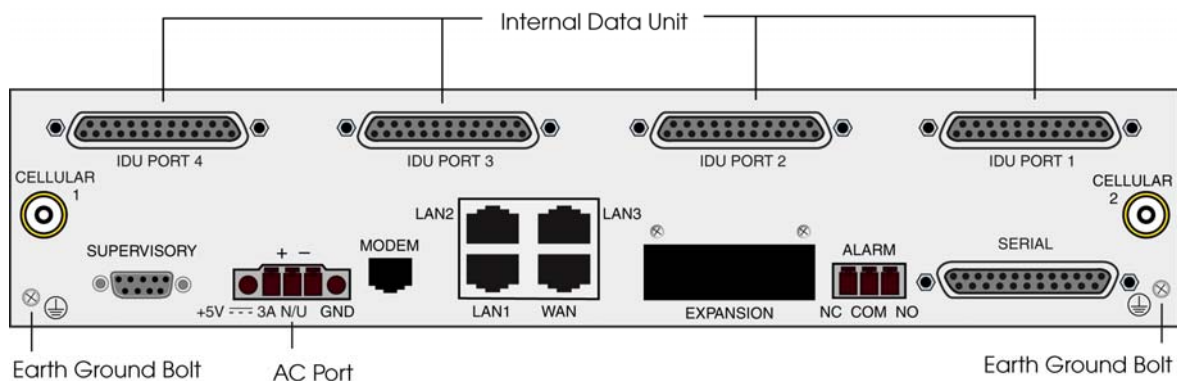


Figure 1-8. BANDIT III Chassis, Rear Panel, Expanded Model, 110/220 VAC Input Power

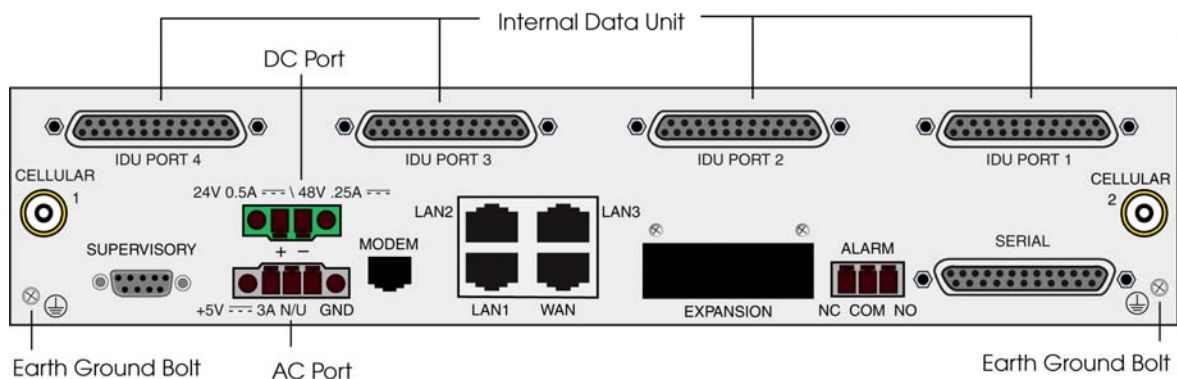


Figure 1-9. BANDIT III Chassis, Rear Panel, Expanded Model, -24/-48 VDC Input Power (or Failover -24/-48 VDC and 110/220 VAC Input Power)

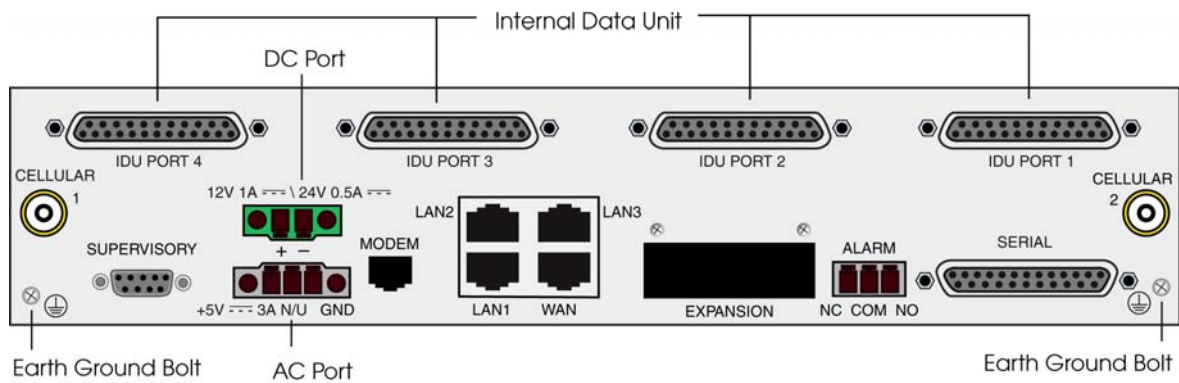


Figure 1-10. BANDIT III Chassis, Rear Panel, Expanded Model,
-12/-24VDC Input Power
(or Failover -12/-24 VDC and 110/220 VAC Input Power)

In summary, there are two chassis models:

- Basic (Figure 1-2) or expanded (Figure 1-3). For each chassis model, there are:
 - Three standard input-power port configurations (110/220 VAC, -24/-48 VDC, or -12/-24 VDC). The three configurations for the basic model are shown in Figure 1-4, Figure 1-5, and Figure 1-6. The three configurations for the expanded model (with four IDU serial ports) are shown in Figure 1-8, Figure 1-9, and Figure 1-10. These total six physical port configurations for the BANDIT III chassis.
 - Two failover input-power configurations (-24/-48 VDC with 110/220 VAC or -12/-24 VDC with 110/220 VAC). Each BANDIT III chassis that uses DC input power—basic (Figure 1-4 and Figure 1-5) and expanded (Figure 1-9 and Figure 1-10)—can instead use a failover DC and AC power option. This failover power capability adds four power configuration options for the BANDIT III chassis.
- The six port configurations and the four additional power configurations total ten standard port and power configurations for the BANDIT III chassis.

1.1.4 BANDIT III E&M Signaling Chassis

For information on this chassis and its functions, see [The BANDIT III E&M Signaling Chassis](#).

1.1.5 BANDIT III Port and Power Configurations

Table 1-1 lists the BANDIT III's standard port and power configurations.

Note: Also see [The BANDIT III E&M Signaling Chassis](#).


Table 1-1. BANDIT III Chassis Standard Port and Power Configurations

Chassis Model	IDU Serial Ports	Input Power Configuration	Input Power Details		
			110/220 V AC	-24/-48 V DC	-12/-24 V DC
Basic and ESM		AC	•		
		DC		•	•
		Failover DC and AC ^a	•	•	•
Expanded	•	AC	•		
	•	DC		•	
	•				•
	•	Failover DC and AC ^b	•	•	
•	•			•	

a. This is a basic DC chassis (-24/-48 VDC or -12/-24 VDC), with standby AC power.

b. This is an expanded DC chassis (-24/-48 VDC or -12/-24 VDC), with standby AC power.

Note: For chassis and port specifications, see [BANDIT III Hardware Specifications](#).

 **Warning:** Always follow safety procedures when working with electrical equipment. See [Basic Safety Guidelines](#).

1.1.6 Throughput

The BANDIT III chassis has the following system throughput:

- LAN to WAN, without encryption: 9,000 packets/second, with incoming and outgoing traffic at 64 bytes/packet
- LAN to WAN, with encryption and decryption: 1,800 packets/second, with incoming traffic at 50 bytes/packet and outgoing traffic at 100 bytes/packet

1.1.7 Power Supply

The BANDIT III is available in models that accept power from a DC power source (at -24/-48 VDC or -12/-24 VDC) or in models that accept power from an industry-standard autosensing 100/240 VAC adapter connected to an AC power source. A BANDIT III DC-powered chassis will also accept input from an AC power supply. The BANDIT III's AC power supply converts the AC input power to 5 VDC at 3 amps output for use by the BANDIT III chassis.

1.1.8 Supervisory Port

A Supervisory cable connects the BANDIT III's DB9 Supervisory port to the DB9 serial port of a computer with a control console (such as a PC).

Note: If the Supervisory connection is through a Universal Serial Bus (USB) port on the control console computer (such as a personal computer, PC), use an appropriate adapter—for example, a DB9-to-USB adapter.

If you wish, you can give the BANDIT III an IP address; then you can configure and monitor the BANDIT III over the LAN. This frees the DB9 Supervisory port for use as an additional serial port for legacy applications.

For specifications of the DB9 serial port, see [Section A.1.1, DB9 Supervisory Port](#), in *BANDIT III Hardware Specifications*.

1.1.9 Standard Network Ports

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

- [Section 1.1.9.1, Ethernet Ports](#)
- [Section 1.1.9.2, Modem Port](#)
- [Section 1.1.9.3, Serial Port](#)
- [Section 1.1.9.4, Wireless Ports](#)

Also see [Section 1.1.10, Expansion Ports](#).

Note: The BANDIT's data ports can be configured in the software. The data rates for synchronous and asynchronous data ports are shown in [Table A-10](#) and [Table A-11](#).

1.1.9.1 Ethernet Ports

The BANDIT III has one WAN Ethernet port and three LAN Ethernet ports. The external expansion slot can hold an additional Ethernet port. Each 10/100-Base-T Ethernet connection is implemented over unshielded twisted-pair (UTP) wire, using a standard RJ45 connector. [Figure A-3](#) shows the RJ45 connector pins. [Table A-3](#) lists the RJ45 pin configuration.

See the following sections:

- [Section 1.1.9.1.1, The WAN Ethernet Port](#)
- [Section 1.1.9.1.2, The LAN Ethernet Port](#)
- [Section 1.2.1, Ethernet DMZ Port for the Expansion Slot](#)

1.1.9.1.1 The WAN Ethernet Port

[Table 1-2](#) lists the WAN port's interface options.

Table 1-2. WAN Port Interface Options

Standard
• BANDIT III: 10/100-Base-T, with an RJ45 connector

1.1.9.1.2 The LAN Ethernet Port

Table 1-3 shows the interface options for the LAN port.

Table 1-3. LAN Port Interface Options

Standard
<ul style="list-style-type: none">BANDIT III: 10/100-Base-T, with an RJ45 connector

The LAN Port has the following IP features:

- Static routing
- Standard RIP V1, V2 routing
- Prioritization on Layers 2 and 3
- DiffServ marking and classification for end-to-end prioritization
- IP Quality of Service
- Dynamic bandwidth allocation
- 802.1q VLAN tagging
- VRRP (RFC 3768)
- Fragmentation and reassembly (MTU) LAN
- DHCP server, client, relay; Bootp
- SNMP, MIB II
- ARP; Proxy ARP
- Routing over VPN tunnels

1.1.9.2 Modem Port

An internal modem resides in the BANDIT III. Connect the modem port to an RJ11 telephone jack.

1.1.9.3 Serial Port

The BANDIT III uses a DB25 serial port.

Table 1-4 lists the BANDIT III's DB25 serial port interface options. Table 1-5 lists the BANDIT III's DB25 serial port protocol options. For the BANDIT III's DB25 serial port pin configuration, see Table A-5. Use the BANDIT III software to set the DB25 serial port as DCE or DTE.

Table 1-4. BANDIT III DB25 Serial Port Interface Options

Standard
<ul style="list-style-type: none">Serial:<ul style="list-style-type: none">- RS-232 (256 kbps sync, 230 kbps async)

Table 1-5. Serial Port Protocols

Protocol	Features Supported
Frame Relay	<ul style="list-style-type: none"> • Link Management <ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> • Sync PPP • Async PPP • PAP • CHAP
IP	<ul style="list-style-type: none"> • All standard IP features
X.25	<ul style="list-style-type: none"> • All standard X.25 features

1.1.9.4 Wireless Ports

The BANDIT III has one internal wireless port, and you can put a second wireless card into the BANDIT III's expansion slot. (Although that second card will be in the external expansion slot, its wireless port is internal.)

The BANDIT III can use CDMA, EVDO, GSM HSPA, GSM GPRS, or GSM EDGE wireless cards, in any combination of two cards. For more information, see [Wireless Cards for BANDIT Products](#).

1.1.10 Expansion Ports

For information on the expansion ports available in the BANDIT III, see [Ports in the BANDIT Products](#). If the expansion port is for a wireless connection, also see [Wireless Cards for BANDIT Products](#).

1.2 Status LEDs

Light-emitting diodes (LEDs) on the front of the BANDIT III indicate the status of connections. The following sections describe the LEDs. See the following:

- [General Status LEDs](#)
- [Protocol Status LEDs](#)

1.2.1 General Status LEDs

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.

On the expanded version of the BANDIT III, the Module Link LED indicates that the BANDIT III's four additional serial ports (sometimes called the BANDIT III's RDU ports) are up. The Module Activity LED indicates that there is communication between the BANDIT III's motherboard and its RDU ports. Each RDU Link LED (1, 2, 3, and 4) indicates that the connection is up between that serial port and its connected device.

Table 1-6 describes the BANDIT III's LEDs.

Table 1-6. BANDIT III General Status LED Definitions (Sheet 1 of 3)

LED	Location (from left side) ¹	Color	Description
Power	First	Green	Unit is receiving power.
		Off	Unit is not receiving power.
Network Alarm	Second	Red	Cellular (wireless) port has an alarm.
		Off	Cellular (wireless) port has no alarm.
Network Port 1 Activity ²	Third	Green flashing	Data is being transmitted or received over the port on the expansion card.
Network Port 2 Activity ³	Fourth	Green flashing	Data is being transmitted or received over the second port on the expansion card. ³
Serial Port Carrier Detect	Fifth	Green	Connection to device has been made.
		Off	Connection to device has failed.
Serial Port Activity	Sixth	Green flashing	Data is being transmitted or received.
WAN 10/100	Seventh	Green	100Base-T
		Off	10Base-T
WAN Carrier Detect/Activity	Eighth	Green	Connection to WAN gateway has been made.
		Off	Connection to WAN gateway has failed.
		Green flashing ⁴	Data is being transmitted or received.
WAN Half Duplex/Full Duplex	Ninth	Green	Full Duplex
		Off	Half Duplex

Table 1-6. BANDIT III General Status LED Definitions (Sheet 3 of 3)

LED	Location (from left side) ¹	Color	Description
Modem Carrier Detect/Activity	Twentieth	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.
		Green flashing	Data is being transmitted or received.
Module Link ⁵	Top row, first from left	Green	Connection has been made.
Module Activity ⁵	Top row, second from left	Off	Connection has failed.
		Green flashing	Data is being transmitted between the Internal Data Unit (IDU) ports and the BANDIT III base system (the lower row of ports).
Link for IDU Port 1 ⁵	Top row, third from left	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.
Link for IDU Port 2 ⁵	Top row, fourth from left	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.
Link for IDU Port 3 ⁵	Top row, fifth from left	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.
Link for IDU Port 4 ⁵	Top row, sixth from left	Green	Connection has been made to carrier.
		Off	Connection to carrier has failed.

1. LEDs are on the base (bottom) row unless otherwise indicated.
2. This LED functions only for the BANDIT's expansion-port cards.
3. This LED functions only for the dual T1/E1 CSU/DSU port.
4. 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).
5. This LED is only for a BANDIT III chassis with an Internal Data Unit (IDU).

1.2.2 Protocol Status LEDs

In addition to indicating general status, each port's Activity LED indicates conditions for the protocol configured on that port. [Table 1-7](#) describes the LEDs for protocols the BANDIT supports.

Table 1-7. BANDIT III Protocol Status LED Definitions (Sheet 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, bidirectional TD/RD
Bit Sync Encapsulation	Frames in either direction

Table 1-7. BANDIT III Protocol Status LED Definitions (Sheet 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.

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