BlueSecure™ Access Point 1500
Installation Guide

bluesocket

Contents

Contents

Overview

The BlueSecure Access Point 1500 is a next-generation, "thin" access point that works in conjunction with BlueSecure Controllers (BSCs) for enterprise wireless LAN (WLAN) deployments. BlueSecure Access Points (BSAPs) feature dual radios supporting 802.11a and 802.11b/g in a plenum-rated housing with fixed omni-directional antennas.

BSAPs are simple to configure and require only minimal provisioning to make them fully operational on a WLAN secured and managed by a BlueSecure Controller.

BSAPs can be directly attached to any existing Layer-2 or Layer-3 Ethernet switch and communicate with the BSC across any subnet boundary. Once the BSAP has discovered and established Layer-2 or Layer-3 communication with its home (i.e., host) BlueSecure Controller, advanced configuration and provisioning may be applied either to individual BSAPs or globally across the entire WLAN using the BSC's web-based Administrator Console.
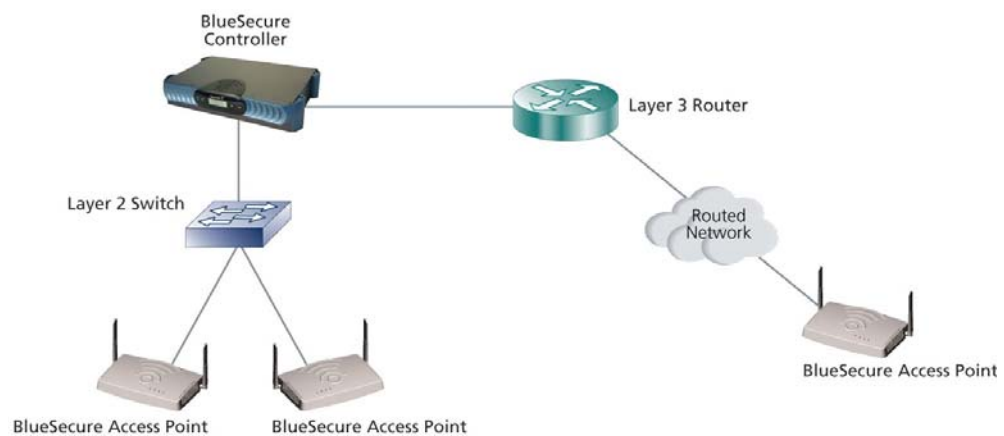
Figure 1: BSAPs Automatically Discover BSCs Across L2/L3 Networks

Once a BlueSecure Access Point has downloaded its configuration from its home BlueSecure Controller, the BSAP and the BSC will establish a tunnel through which all wireless client traffic received by the BSAP will pass for the application of policy by the BSC.

You can configure BSAPs to function as access points or RF sensors. The BSC manages and configures BSAPs operating in AP-only mode, AP/sensor mode, or sensor-only mode, and uses BSAPs operating in AP/sensor and sensor mode to perform RF intrusion detection and containment.

This guide provides complete installation procedures for your BSAP including:

- familiarizing yourself with the BSAP hardware
- provisioning your Bluesocket WLAN for BSAPs
- selecting a BSAP installation location
- connecting and powering the BSAP
- using the BSAP command line interface (CLI)

Familiarizing Yourself with the BSAP Hardware

Figure 2 illustrates the BSAP hardware. Familiarize yourself with the labeled components before attempting to install the BSAP.

PWR   Ethernet   .11a   .11b/g
       Link

Fixed Antennas

LED Indicators

Captive Mounting Bracket Screw

DC48V/0.38A   POE In   Reset   Console

Power Supply Connector

Ethernet/PoE Connector

Reset Button

Serial Console Connector

Kensington Security Slot

Figure 2: BSAP Hardware Components

bluesocket

Fixed Antennas

The BSAP includes two omni-directional antennas for wireless communications. The antennas support diversity whereby the signal transmitted from both antennas is identical, but only the best signal received on one of the antennas is used. The antennas transmit the outgoing signal along a horizontal plane perpendicular to the antenna (in the shape of a toroidal sphere). Therefore, you may want to position the antennas in a range of 45 to 90 degrees from each other to provide better coverage.

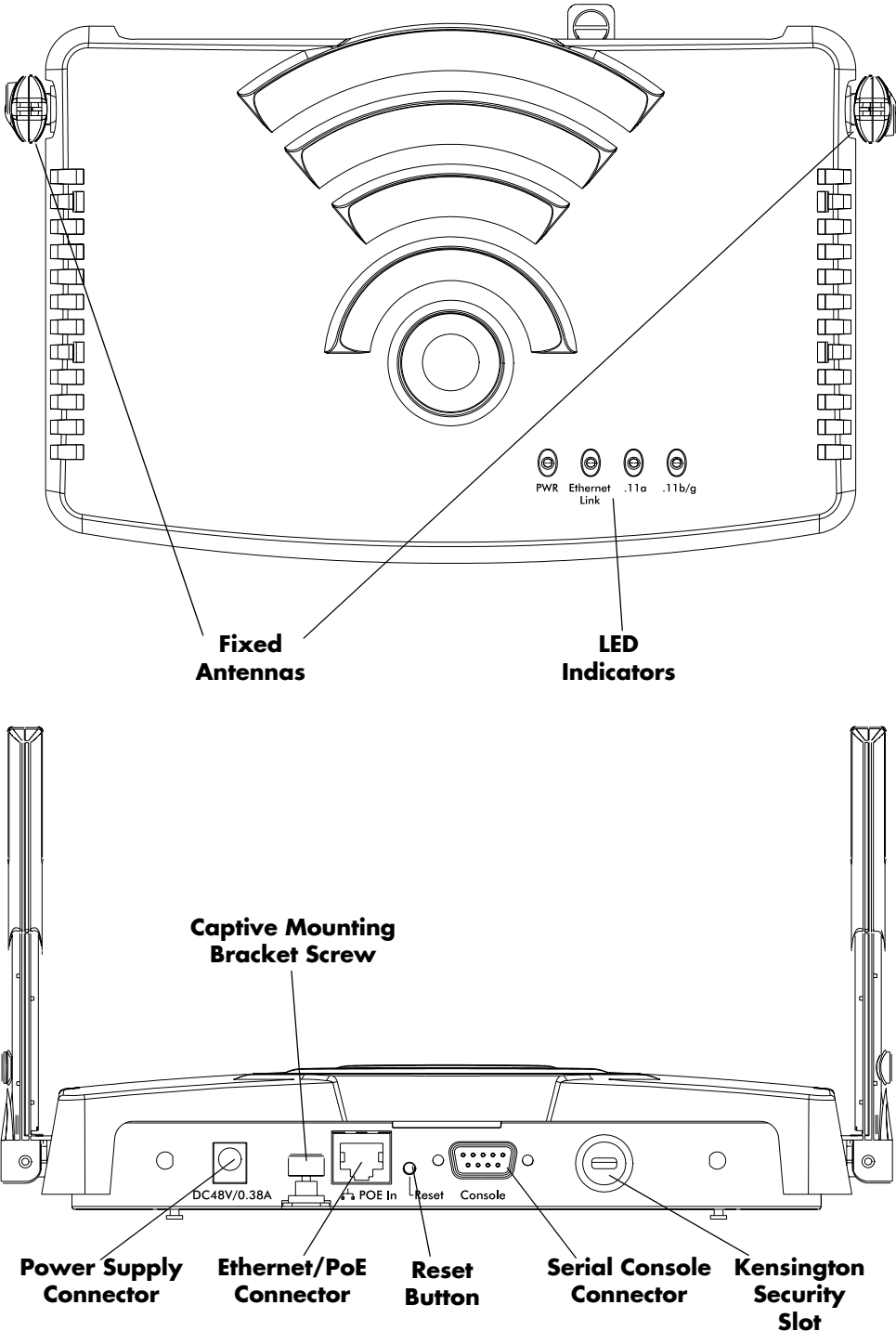### LED Indicators

The BSAP provides four status light-emitting diodes (LEDs). These status LEDs are illustrated at right and described in Table 1.

PWR   Ethernet   .11a   .11b/g
Link

Power   **Ethernet Link/Activity**   **802.11a Link/Activity**   **802.11b/g Link/Activity**
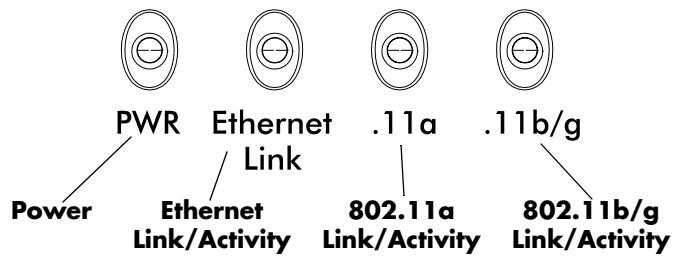
Table 1: BSAP Status LEDs

LED	Status	Indicates
PWR	On	Power is supplied to the BSAP
	Flashing	Self-test is running, or firmware is being loaded
	Flashing (Prolonged)	System Errors
Ethernet Link	On	Valid 10/100 Mbps Ethernet link
	Flashing	Data activity on Ethernet link
.11a	On	Valid 802.11a wireless link
	Very Slow Flashing	Searching for 802.11a network association
	Slow Flashing	Associated with 802.11a network but no activity
	Fast Flashing	BSAP is transmitting/receiving data on its 802.11a wireless link
.11b/g	On	Valid 802.11b or 802.11g wireless link
	Very Slow Flashing	Searching for 802.11b/g network association
	Slow Flashing	Associated with 802.11b/g network but no activity
	Fast Flashing	BSAP is transmitting/receiving data on its 802.11b/g wireless link

Power Supply Connector

The BSAP does not have a power switch. It is powered on when connected to the supplied AC power adapter, and the power adapter is connected to a power source. The BSAP automatically adjusts to any voltage between 100-240 volts at 50 or 60 Hz. No voltage range settings are required.

The BSAP may also receive Power over Ethernet (PoE) from a model BSC-400 Controller, switch or other network device that supplies power over the network cable based on the IEEE 802.3af standard.

Note that if the BSAP is connected to a PoE source device and also connected to a local power source through its AC power adapter, PoE will be disabled.

Mounting Bracket Screw

If you are wall-mounting the BSAP, use this captive screw to secure the BSAP to its mounting bracket.

Ethernet/PoE Connector

The BSAP has one 10BASE-T/100BASE-TX RJ-45 connector that can be attached directly to 10BASE-T/100BASE-TX LAN segments to provide a full-duplex link. These segments must conform to the IEEE 802.3 or 802.3u specifications.

This connector uses an MDI (i.e., internal straight-through) pin configuration. You can therefore use straight-through twisted-pair cable to connect this port to most network interconnection devices such as a switch or router that provide MDI-X ports.

However, when connecting the BSAP to a workstation or other device that does not have MDI-X ports, you must use crossover twisted-pair cable.

The BSAP appears as an Ethernet node and performs a bridging function by moving packets from the wired LAN to remote workstations on the wireless infrastructure.

The Ethernet/PoE RJ-45 connector also supports Power over Ethernet (PoE) based on the IEEE 802.3af standard. Note that if the BSAP is connected to a PoE source device and also connected to a local power source through the AC power adapter, PoE will be disabled.

Reset Button

Use this button to reset the BSAP or restore its factory default configuration. If you hold down the button for less than 5 seconds, the BSAP will perform a hardware reset. If you hold down the button for 5 seconds or more, any configuration changes you may have made are removed, and the factory default configuration is restored to the BSAP.

Serial Console Port

Use this port to connect a console device to the BSAP via a serial cable. The console device can be a laptop PC or workstation running a VT-100 terminal emulation program, or a VT-100 terminal.

bluesocket

Kensington Security Slot

The BSAP includes a Kensington security slot on the rear panel. You can prevent unauthorized removal of the BSAP by wrapping a Kensington security cable (not provided) around an unmovable object, inserting the lock into the slot, and turning the key.

Provisioning Your Bluesocket WLAN for BSAPs

There are prerequisites that must be met before deploying BSAPs in a live network environment. These prerequisites ensure that the BSAPs are able to discover and connect to a host BlueSecure Controller. Implementing these prerequisites also relieves you from the need to manually configure each deployed BSAP.

The deployment prerequisites for BSAPs are:

- **BSAP IP Address** - Each BSAP requires a unique IP address.
- **Host BlueSecure Controller IP Address** - Each BSAP also needs the IP address of the host BSC to which it will connect and from which it will obtain its software image and configuration.

This section describes how to provision your Bluesocket WLAN when deploying BSAPs:

- on the same Layer-2 subnet as the BSC
- across a routed network with Layer-3 connectivity to the BSC

Deploying BSAPs on the Same Layer-2 Subnet as the BSC

If the BSAPs are on the same subnet as the home BlueSecure Controller as shown in Figure 3, you can run a DHCP server on the BSC to manage IP address assignment to BSAPs. In this scenario, the BlueSecure Controller must be the only DHCP server for the subnet.

Alternatively, you can configure the BlueSecure Controller to run a DHCP relay agent to relay DHCP communications between the BSAPs and a DHCP server on your network.
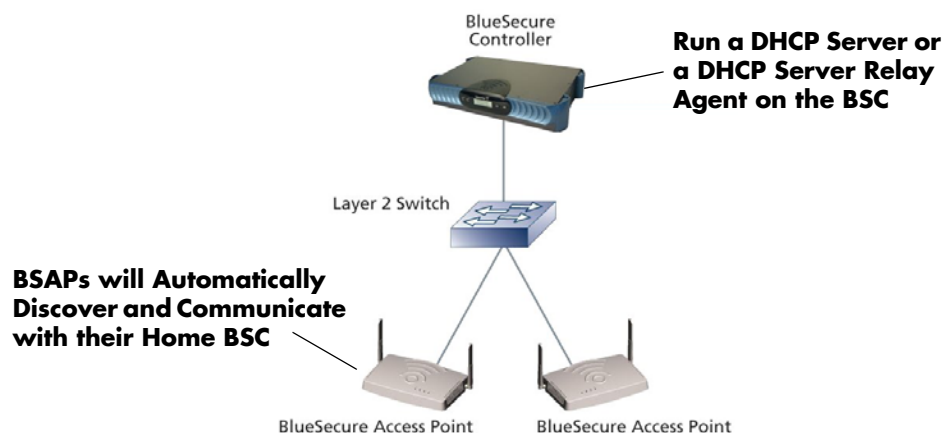

Figure 3: Deploying BSAPs on the Same Layer-2 Subnet as the BSC

When you run a DHCP server or a DHCP relay agent on the BSC to assign IP addresses to BSAPs on the managed side, the BSC will also pass its IP address to the BSAPs automatically using vendor-specific option 43. In this way, the BSAPs will learn the home BSC to which they should connect.

See the *BlueSecure Controller Setup and Administration Guide* for detailed DHCP server and DHCP relay agent configuration procedures.

In this deployment scenario, simply connect and power on the BSAPs. They will automatically discover and communicate with their home BSC.

Deploying BSAPs with Layer-3 Connectivity to the BSC

You can also deploy BSAPs on a routed network with Layer-3 connectivity to the BSC as shown in Figure 4.
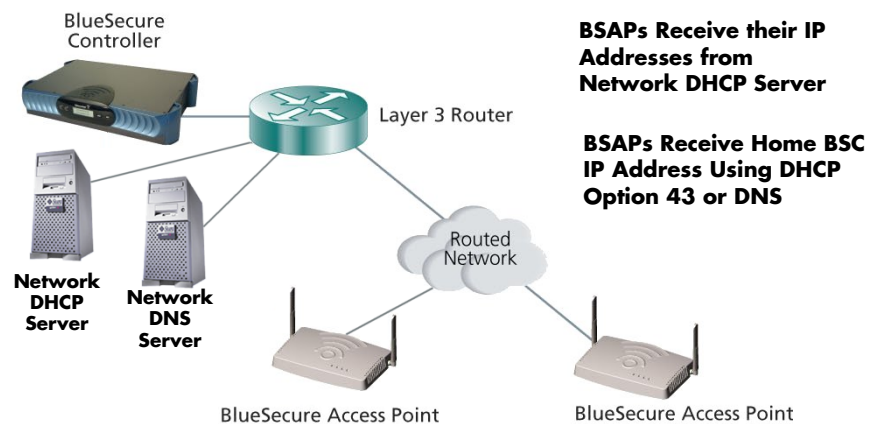
Figure 4: Deploying BSAPs Across a Routed Network

In this deployment scenario, you must ensure that each BSAP is able to communicate with the BSC across the routed network by verifying that:

• there are no NAT devices between the BSAPs and the BSC

• Protocol 97 and TCP/UDP Port 33333 traffic is allowed between the BSAPs and the BSC

Each BSAP will receive its IP address from your existing network DHCP server.

The BSAP also needs the IP address of the home BSC to which it will connect and from which it will obtain its software image and configuration. You can provide the home BSC IP address to a BSAP using one of the following methods:

• **DHCP Server Option 43** - You can manually configure the DHCP server on your network to send BSC IP addresses to BSAPs using DHCP vendor-specific option 43.

In DHCP requests sent from the BSAP, the BSAP uses option 60 Vendor class identifier with a value of **BlueSecure.AP1500** to identify itself to the DHCP server.

Refer to the documentation supplied with your DHCP server when configuring vendor-specific option 43

bluesocket

- **DNS Server Configuration** - BSAPs are factory configured with **apdiscovery** as the DNS hostname. You can configure a DNS server on your network with an entry for apdiscovery with the home BSC Controller IP address as the resolution.

  To configure this, add a NAME record to the DNS server for apdiscovery (at the domain server that the BAP will receive). Point this name to one or more BSC IP addresses (managed, protected or VLAN depending on the network configuration).

  So for example, if there are two BSCs (192.168.100.23 and 192.168.100.28), and the domain is customer.com, add two NAME records to customer.com, for the name apdiscovery.customer.com. One should resolve to 192.168.100.23 and one to 192.168.100.28. PTR (i.e., pointer) records are not needed for this portion of discovery.

Selecting a BSAP Installation Location

BlueSecure Access Points should be positioned for maximum throughput and range between other BSAPs and wireless client devices. Normally, you should locate the BSAP on the ceiling away from obstructions.

Range and performance are dictated by the distance between the BSAP and client radios, and by obstacles that may be present in a specific building or office environment. The following positioning guidelines are suggested:

- Make a chart documenting all the BSAPs and client devices you wish to include in your wireless network. Record the MAC address, serial number, and placement of each BSAP on the chart.

- Wired LAN and power connections must be available for each BSAP at the desired installation location.

- If building blueprints or floor plans are available, use them to define potential client device locations and likely roaming areas.

- Identify possible obstacles or sources of interference that could affect signal strength (for example, walls, metal objects).

- Install the BSAP in an area where large steel structures such as beams, pillars, shelving units, bookcases, and filing cabinets do not obstruct radio signals to and from the BSAP.

- Define preliminary BSAP positioning based on the range of BSAPs and client devices, which is approximately 65 to 75 feet (20 to 23 meters) indoors (for maximum throughput).

- Once BSAPs have been installed and configured, use site survey and monitoring utilities supplied with the client adapters to test signal strength at various locations. Modify the positioning of the BSAPs and client stations as required for optimum performance.

Connecting and Powering the BSAP

Follow these instructions to connect your BlueSecure BSAP to your Bluesocket WLAN and then power it up:

1. Make a note of the 12-character MAC address and the serial number listed on the bottom of the BSAP before mounting the BSAP to a wall or other surface. You will need this information during configuration.

2. Mount the BSAP to a horizontal surface or wall.

   <u>Mounting on a Horizontal Surface</u>

   To keep the BSAP from sliding on the surface, attach the four rubber feet supplied with your BSAP distribution to the embossed circles on the bottom of the BSAP chassis.

   <u>Mounting on a Wall</u>

   Mount the BSAP to a wall or other vertical surface using the BSAP mounting bracket, and the four screws and screw anchors supplied with your BSAP distribution.

   You may use the wall mounting template found on the back page (page 16) of this document to guide you when drilling the four holes required to anchor the mounting bracket to the wall.

   Secure the BSAP to its mounting bracket using its captive mounting bracket screw.

3. Position the BSAP's antennas for best radio performance.

   The antennas emit signals along a plane perpendicular to the antenna (with the propagation pattern shaped as a toroidal sphere), and thus provide more effective coverage when positioned along different axes. Therefore, you may want to position the antennas from 45 to 90 degrees from each other.

   The BSAP also compares the strength of an incoming signal on both antennas, and uses the antenna receiving the stronger signal to communicate with a wireless client.

4. Connect the supplied power adapter to the BSAP, and its power cord to an AC power outlet.

   Otherwise, the BSAP can derive its operating power directly from the RJ-45 connector when connected to a device that provides IEEE 802.3af compliant Power over Ethernet (PoE).

   ☞ **Note:** If the BSAP is connected to both a PoE source device and an AC power source, PoE will be disabled.

   ⚠ **Caution:** Use only the power adapter supplied with the BSAP. Otherwise, the product may be damaged.

5. Verify that the PWR LED stops flashing and remains on, and that the other status LEDs start functioning as described in the section entitled "LED Indicators" on page 3.

6. Connect the BSAP to your Bluesocket WLAN.

   You can wire the BSAP to a 10/100 Mbps Ethernet through a network device such as a hub or a switch. Connect the RJ-45 Ethernet connector on the

bluesocket))

BSAP's back panel to your network using category 3, 4, or 5 UTP Ethernet cable. When the BSAP and the connected device are powered on, the BSAP's Ethernet Link LED should light indicating a valid network connection.

☞ **Note:** The RJ-45 port on the BSAP provides a full-duplex Ethernet connection using an MDI pin configuration, so you must use a straight-through cable for network connections to hubs or switches that only have MDI-X ports, and a crossover cable for direct network connections to BSC-400s, PCs, servers or other end nodes that only have MDI ports. However, if the device to which you are connecting supports auto-MDI/MDI-X operation, you can use either a straight-through or crossover cable.

Using the BSAP Command Line Interface (CLI)

☞ **Note:** Normally you will not need to access the BSAP CLI. In a properly provisioned Bluesocket WLAN, the BSAP will automatically discover and communicate with its home BSC. We recommend that you use the CLI to configure the BSAP only in a lab or test environment, or where a pre-defined static IP address is desired.

You can connect a console to the BSAP's serial console connector to perform local configuration of the BSAP using its command line interface (CLI). You can use the BSAP's CLI to manually configure:

- the BSAP's IP address
- the IP address of the home BSC from which the BSAP will download its configuration and software image

Accessing the BSAP CLI

To access the BSAP CLI:

1. Connect a nine-pin null-modem serial cable between the nine-pin serial port on the back of the BSAP and your laptop computer.

2. Run a terminal emulation program on your laptop computer configured with the following settings:
   - Port - COM1
   - bps - 9600
   - Data bits - 8
   - Parity - None
   - Stop bits - 1
   - Flow control - None

3. Initiate the connection to the BSAP CLI.

4. Enter the following username and password in lowercase at the displayed CLI login prompts:

   `BlueAP login:` **`adm1n`**   (i.e., adm "one" n)

   `Password:` **`blue1socket`**   (i.e., blue "one" socket)

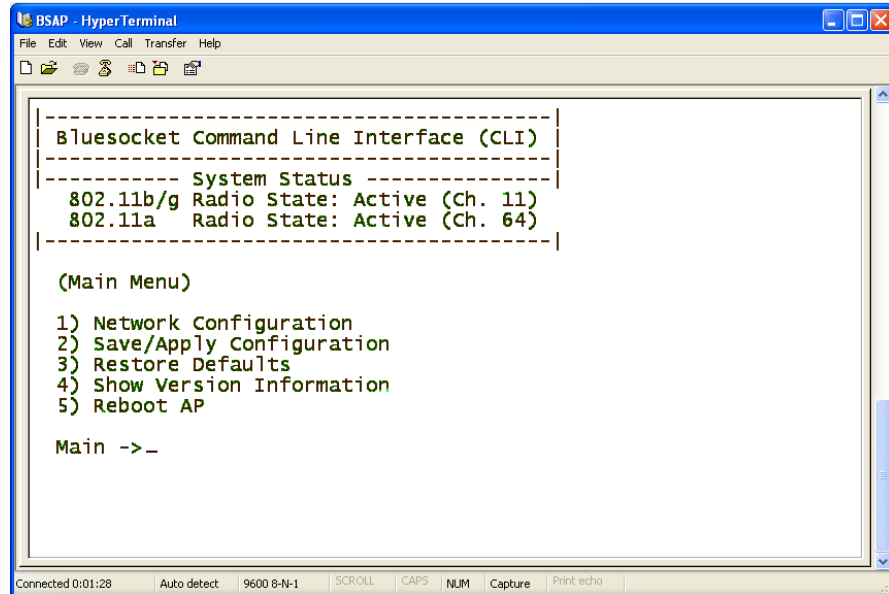   The BSAP CLI main menu appears as shown in Figure 5.

Figure 5: BSAP CLI Main Menu

Navigating the BSAP CLI

The BSAP CLI main menu provides access to these options:

- **Network Configuration** - Configure the BSAP's network settings including its IP address and the IP address of the BSC to which it will connect.

- **Save/Apply Configuration** - After you have configured the BSAP's network settings, you must apply them before they become active.

- **Restore Defaults** - Restore the BSAP to its default settings.

- **Show Version Information -** Display BSAP version information.

- **Reboot AP** - After applying the BSAP's configuration settings, you must reboot the BSAP to effect the new configuration.

When operating in a submenu, press **h** to return directly to the main menu (or home menu). Press **p** to return to the previous menu.

BSAP Default Configuration

The BSAP is shipped with the following default configuration.

```
IP_ADDR_MODE:      DHCP (0)
IP_ADDR            0.0.0.0
NETMASK            0.0.0.0
GW_ADDR            0.0.0.0
DNS_ADDR           0.0.0.0
WG_ADDR_MODE       Discover BSC (0)
WG_ADDR            0.0.0.0
```

bluesocket

The two options for IP address mode are:

- (0) DHCP - The BSAP runs a DHCP client and receives its IP address from a DHCP server.
- (1) Static IP - You assign the BSAP a static IP address via its CLI.

The two options for WG address mode are:

- (0) Discover - The BSAP automatically discovers the IP address of the BSC to which it is to connect.
- (1) Static Configuration - Using the BSAP CLI, you will configure the IP address of the BSC to which the BSAP is to connect.

Setting the BSAP and Home BSC IP Addresses Using the CLI

To set the BSAP and Home BSC IP addresses using the CLI:

1. Enter **1** at the BSAP CLI main menu command prompt.

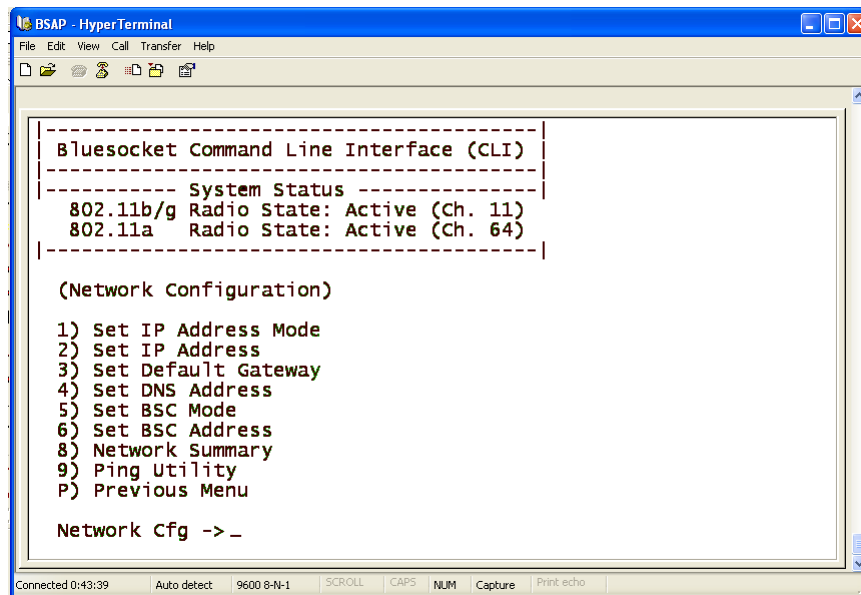   The BSAP CLI network configuration menu appears as shown in Figure 6.

Figure 6: BSAP CLI Network Configuration Menu

2. Enter **1** at the Network Cfg prompt to set the IP address mode.

   Enter 1 to set the BSAP IP address mode to **static**.

3. Enter **2** at the Network Cfg prompt to set the BSAP's IP address.

   Enter the BSAP IP address and subnet mask using the format:

   `<address> netmask <netmask>`

4. Enter **3** at the Network Cfg prompt to specify the BSAP's default IP gateway.

5. Enter **4** at the Network Cfg prompt to specify the IP address of the BSAP's primary DNS server.

6. Enter **5** at the Network Cfg prompt to specify the BSC mode, i.e. how the BSAP is to obtain the IP address of its home BSC.

You can set the BSC mode to either **Discover** or **Static BSC**.

Enter 1 to set the BSC mode to Static BSC.

7. Enter **6** at the Network Cfg prompt to specify the IP address of the BSAP's home BSC.

8. Enter **8** at the Network Cfg prompt to review the BSAP network configuration settings you have made.

The network summary includes the MAC addresses of the BSAP's Ethernet and wireless interfaces.

9. Enter **p** at the CLI prompt to return to the main menu.

Enter **2** at the main menu to apply your configuration changes, reboot the BSAP, and put the new configuration settings into effect.

When the BSAP completes its reboot, it will connect to and download its configuration from the home BSC you have configured via the CLI.

bluesocket

General Specifications

Power Supply

Input: 100-240 AC, 50-60 Hz
Output: 48 VDC, 0.38A
Power consumption: 13.2 watts

PoE (DC)

Input voltage: 48 volts, 0.2 A, 9.6 watts

Note: Power can also be provided to the access point through the Ethernet port based on IEEE 802.3af Power over Ethernet (PoE) specifications. When both PoE is provided and the adapter is plugged in, PoE will be turned off.

Dimensions

Length: 9.75 in. (24.17 cm)
Width: 6.14 in. (15.60 cm)
Height: 1.56 in. (3.96 cm)

Weight

1.5 lbs. (0.68 kg)

LED Indicators

PWR (Power), Ethernet Link (Ethernet Link/Activity), .11a and .11b/g (Wireless Link/Activity)

Network Management

Via BlueSecure Controller web-based Administrator Console and local RS232 console

Temperature

Operating: 0 to 50 °C (32 to 122 °F)

Storage: 0 to 70 °C (32 to 158 °F)

Wireless Communications

Wireless Speeds:

1/2/5.5/6/9/11/12/18/24/36/48/54Mbps (for 2.4GHz Band)
6 to 54 Mbps (for 5GHz Band)

Modulation Type: DSSS, OFDM,BPSK, QPSK, CCK, 16QAM, 64QAM

Operating Frequency: 2.400~2.4835GHz, 5.25~5.35GHz & 5.725~5.850GHz

Channel Numbers: 11 (for 2.4GHz Band); 8 for normal mode (for 5GHz Band)

Transmitter Output Power:

28.74dBm (for 2.4GHz Band)
6.66dBm (for 5.25~5.35GHz Band)
29.54dBm (for 5.725~5.850GHz Band)

Fixed Omni Antennas

Antenna Model	Antenna Type	Antenna Connector Type
FDS_2FED01+I3W FDS_2FED02+I3W	Dipole	MMCX Connector

Compliance

Electrical/Safety

UL 60950
CAN/CSA-C22.2
IEC 60950
EN 60950

Radio Signal Certification

FCC Part 15.247, 15.407
RSS-210 (Canada)
EN 300.328, EN 301.893 (Europe)

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters (8 inches) between the radiator (antenna) and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

For operation within 5.15 ~ 5.25GHz frequency range, it is restricted to indoor environment.

Industry Canada Statement

Operation is subject to the following two conditions:

1) This device may not cause interference, and

2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device has been designed to operate with an antenna having a maximum gain of 2 dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP is not more than required for successful communication.

Because high power radars are allocated as primary users (meaning they have priority) in 5250-5350 MHz, these radars could cause interference and/or damage to license exempt LAN devices.

BSAP Wall Mounting Template

Photocopy this page, and then use the template below to position and drill the four holes required to secure the BSAP mounting bracket to a wall.

Use the four screws and screws anchors supplied with the BSAP to anchor the mounting bracket in place.
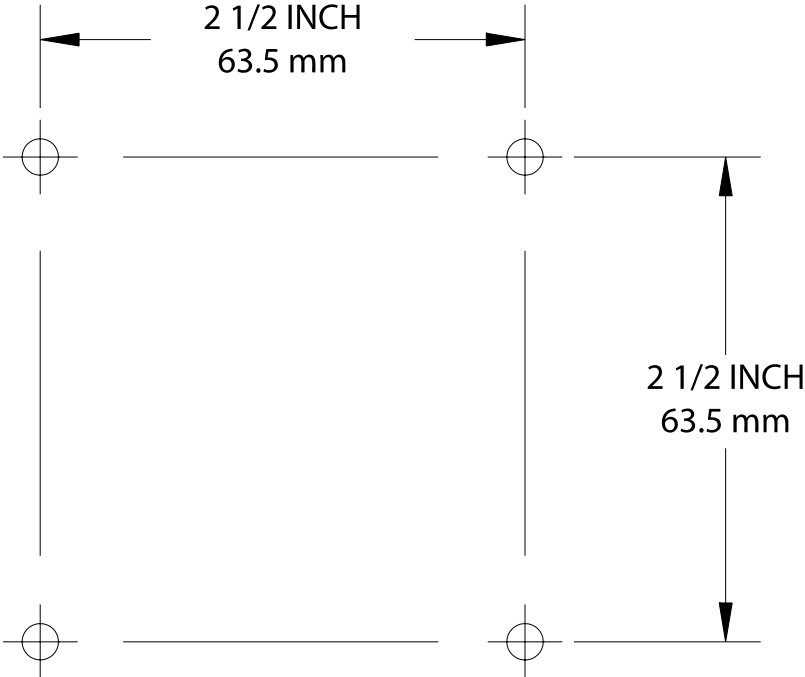
2 1/2 INCH
63.5 mm

2 1/2 INCH
63.5 mm

Figure 7: BSAP Wall Mounting Template

bluesocket