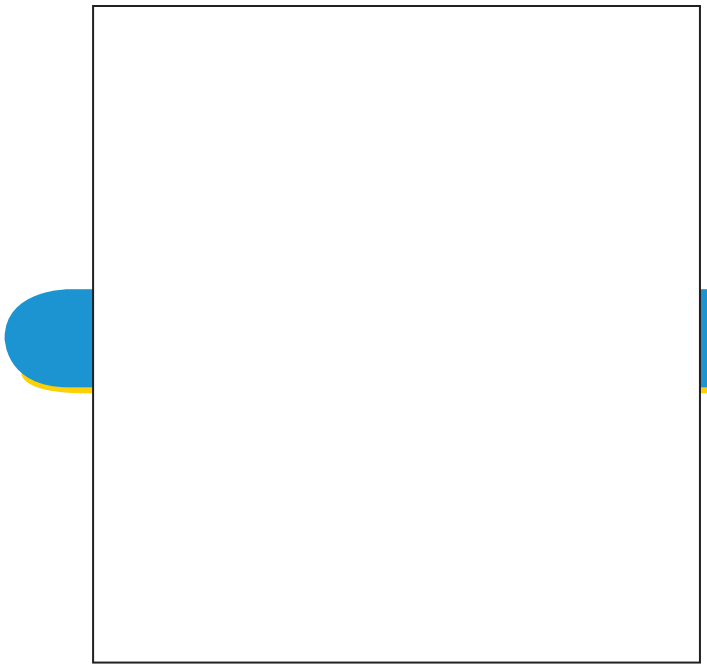
TECHNOLOGY, INC.



XMax® Base Station Node 250
Configuration Guide
Part #/Docu.

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INTRODUCTION

The xMAX BSN-250 VoIP Base Station is a three-sector, 18-channel system used to communicate with xMAX handsets and modems operating in the 900 MHz band. The BSN-250 is preconfigured with all software required to transmit and receive voice and data to and from xMAX handsets and modems. This guide provides basic information on how to install, configure, and operate the base station.

ATTENTION: This symbol is used in this guide to draw attention to precautionary steps and safety-related instructions. Failure to follow these instructions may result in a safety hazard and/or damage to equipment.

PHYSICAL SYSTEM

As shown in Figure 1, the xMAX BSN -250 includes the following components, each packaged separately:

- One control unit (labeled "CU")
- One RF unit ("RU")
- Three sector units ("SU1", "SU2", and "SU3")
- One power supply unit ("PSU")

[Needed from xG: New image to reflect current design/labeling of the units.]

Figure 1: Base Station Components – Front/Side View

INSTALLING THE XMAX BSN-250

To install the six units that comprise the xMAX BSN-250 Base Station:

1. Mount the six components of the base station as shown in Figure 1, into a standard 19-inch (480 mm) rack that is at least 18 inches deep and 15U high.

ATTENTION: Be sure to follow proper safety precautions when lifting heavy equipment.

2. Two 10/100 Mbps RJ-45 Ethernet connectors are installed on the rear of the control unit. The Ethernet ports are used to connect the base station to the backhaul network and the xMSC. Connect the Ethernet cable to the control unit, as shown in Figure 2.

The location, colors, and meanings of the Ethernet indicator LEDs are shown in Table 1.

Table 1: Ethernet Port LEDs

LED Position	Color	LED Label	ON means	Other meaning
Top	Yellow	10/100	• Ethernet connection is 100BaseT	OFF: Ethernet connection is 10BaseT
Bottom	Green	Ethernet/Link	• Ethernet connection is available • Flashing (¼ sec on, ¼ sec off): traffic on the Ethernet link	OFF: No Ethernet connection

3. Install the 36 RF cables as shown in Figure 2.

4. Install the six Digital RF Interface (RJ-50) cables as shown in Figure 2.

5. Install the 18 cables from the RF unit to the three sector units as shown in Figure 2.

6. Connect the DC power cables from the power supply unit to the corresponding ports on the control unit and the RF unit as shown in Figure 2.

7. Connect the N-Type connectors for the antenna leads as shown in Figure 2.

This system has four antenna ports, one for each of the three sector units and one for the GPS antenna. The ports for the sector units are located in the center of the back panel of each unit. The GPS antenna port is located on the lower right corner of the back panel of the control unit.

The antenna port for sector unit 1 must be connected to the antenna pointing south of the tower. The antenna port for sector unit 2 must be connected to the antenna pointing toward azimuth 60°, and the port for sector unit 3 must be connected to the antenna pointing toward azimuth 300°.The GPS antenna port must be connected to a GPS antenna.

The impedance of the chassis mount BNC female connector is 50 ohms. For proper operation of this device, this connector should be connected to a 50 ohms coaxial cable with BNC male connector. Any 50 ohms coaxial cable with a male BNC connector on one end and antenna on the other end can be used. However, the recommended coaxial cable is LMR-900. The recommended antennas for 3 sectors are 900MHz 90° antennas vertical with gain better than 6 dBi. The antenna for the GPS is not required at this point. Additional details are included in xG Network Implementation Guide. Please contact your xG sales representative for access to this document.

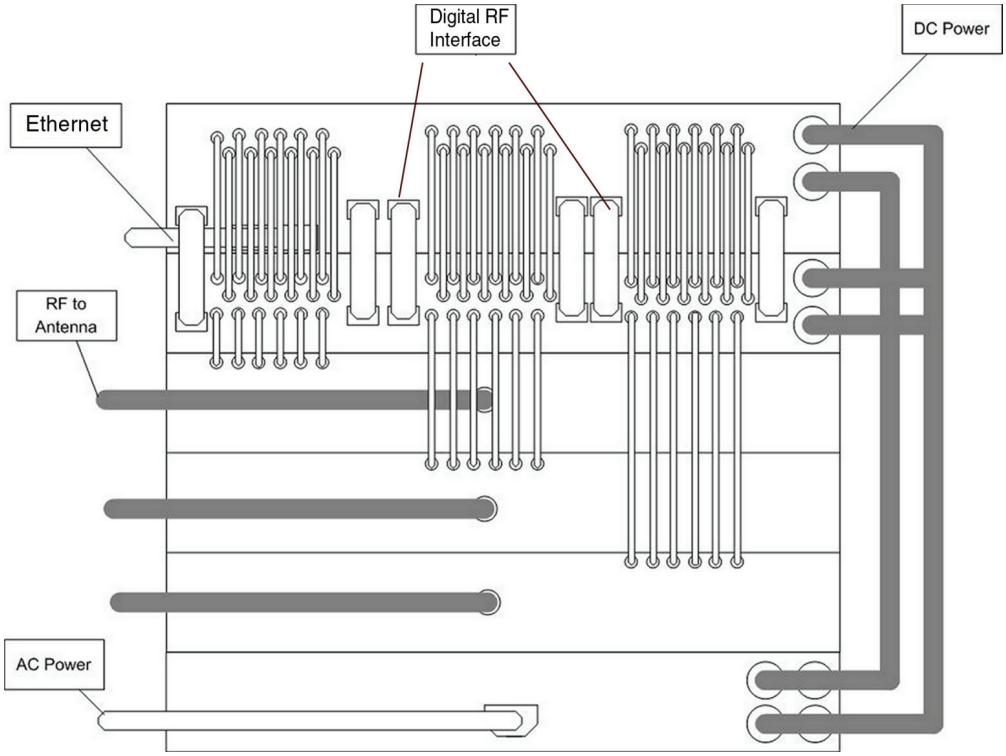

Figure 2: Cabling and Wiring – Back View

8. Connect the AC power cable to back of the power supply unit before connecting to the power outlet. The BSN-250 operates on 100V/240V AC, 50/60Hz and single-phase AC power line. The device is connected to the AC power line using a standard 3-prongs power connector. This is shown in Figure 3.

ATTENTION: Be sure to follow proper safety precautions when working with electric power cables.

9. Toggle the back power switch to ON, as shown in Figure 3.

Figure 3: Power Connector and Rear Power Switch

ATTENTION: Before turning ON the system, be sure you have connected the antennas using the recommended coaxial cable to the chassis mount BNC connectors installed on the rear of the unit. The cables and antennas serve as a load to the xMAX BSN-250. Never turn the system ON without first installing the cable and antennas.

10. The system is now ready for operation.

POWERING ON THE XMAX BSN-250

After the components of the base station are correctly mounted in the rack, follow these steps to turn the system ON:

1. Make sure the data, DC power, and antenna cables are connected to all units, the AC power cable (240 V main line) is connected, and the back power toggle switch is flipped ON, as detailed in the section **Installing the xMAX BSN-250**.

2. Flip the front power switch to the ON position. The red AC power lights on the power supply unit indicate when the AC power is ON.

ATTENTION: Before turning the device ON, connect the antennas using the recommended coaxial cable to the chassis mount connectors installed on the rear of the sector units. The cables and antennas serve as a load to the xMAX BSN-250. Never turn the unit ON before installing the cables and antennas.

3. During power up, all LED indicators are turned on. As the control unit goes into boot mode, the System LED will remain yellow while the other LEDs are turned off. When the control unit processor enters run-time mode, the System LED turns green if no faults are detected. Otherwise, the System LED turns red if faults are detected or if the control unit processor is unable to communicate with the i.MX. See the section Front Panel Status Indicators for the possible colors and meanings of the LEDs on each unit.

4. Verify that both the System LED and Link LED indicator lights on the control unit are green. The base station is now ready for initial configuration.

CONFIGURING THE XMAX BSN-250

Upon initial installation, the base station must be configured manually to work with the network. This section describes how to connect to the base station and use the base station's command line interface to perform initial configuration of the Ethernet network interface and the serial interface. After performing these steps, the base station provides a Web-based interface that is used to finish configuration of network, make cable and channel settings, and to make adjustments for optimal performance.

A serial port on the front of the control unit allows for connection to a VT100-compatible terminal or other device through any terminal emulator that supports VT100 terminals. To connect to the base station:

1. With the base station ON or OFF, connect the serial cable to the VT100-compatible terminal or other device.

2. With the base station ON, turn the VT100-compatible terminal ON or start the terminal emulation program on the device.

3. Select the COM port and port speed.

4. At the command prompt, use the **ifconfig** command to enter the base monitoring entity (BME) IP address, which is the IP address for the base station: **ifconfig eth0 <BME IP address>**

   Consult your network administrator for the IP address assigned to this BSN-250.

5. Use **ifconfig** again to enter the subnet mask for the Ethernet interface. Consult your network administrator for the subnet mask assigned to the network.

6. Use **ifconfig** to enter the IP address of the gateway device on the backhaul metropolitan network that provides access to other devices on the network, such as the xMSC. Consult your network administrator for the IP address of the gateway.

7. Use **stty** to configure the following parameters:

   - Speed in bits per second
   - Parity
   - Number of stop bits
   - Modem control signals
   - Flow control
   - Break signal
   - End-of-line markers
   - Beep if buffer overrun
   - Echo what you type on screen
   - Define special (control) characters (such as what key to press for interrupt)

Configuring Network, Cable, and Channel Settings

Open a Web browser program and go to https://<BME IP address>, where the BME IP address is the address entered in Step 4 of the section **Configure the Ethernet Network Interface**. The BSN-250 Web configuration interface opens to the Information screen, as shown in Figure 4.

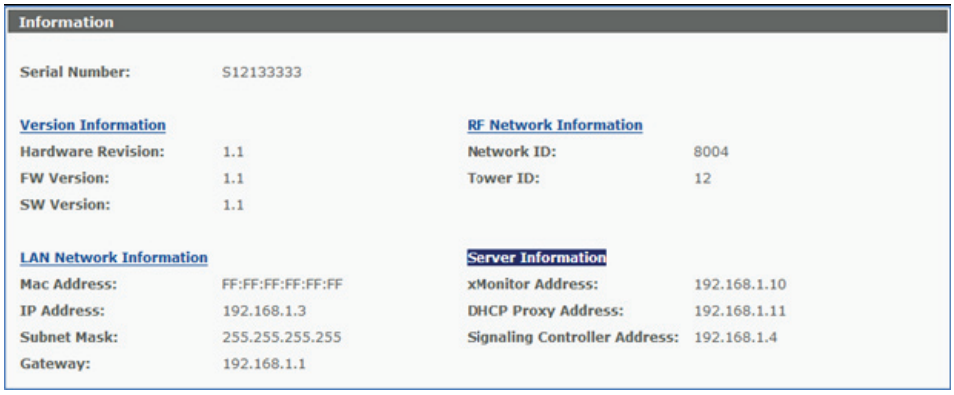

Figure 4: Web Configuration Interface - Information Screen

NOTE: If the Web configuration interface does not start, open the base station's command line and use the ps command to confirm that the Web server module is running. See **Diagnostics and Troubleshooting** for more information.

The Information screen shows some of the base station's fixed and configurable settings. Fixed factory settings include version and server information. Use the menu on the left side of the interface to configure network, cable, and channel settings and to run diagnostics, view logs, and upgrade software.

Network Settings

Using the Web configuration interface menu, click **Network Settings**. This screen is used to enter IP addresses and information about the xMAX network, enable field testing, and to set the time zone for handsets (see Figure 5). After entering the appropriate values on this screen, click **Apply** to save settings, or **Cancel** to return to the prior settings.

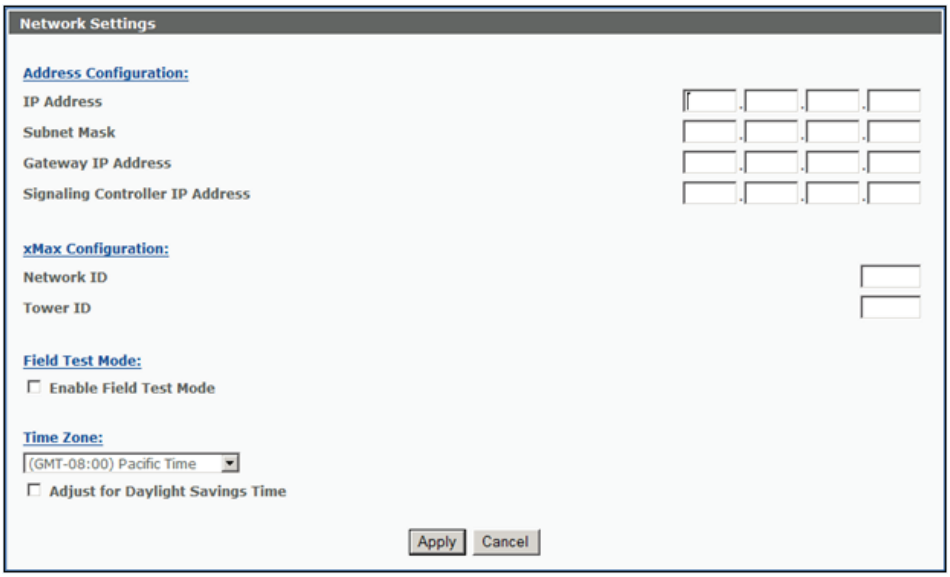

Figure 5: Web Configuration Interface – Network Settings Screen

Address Configuration

In the Address Configuration section, enter the following information:

IP Address: Enter the planned IP address of the BSN-250 on the Ethernet interface. This address is static and the format is per IETF conventions: 111.222.333.444. Consult your network administrator for the IP address assigned to this BSN-250.

Subnet Mask: Enter the subnet mask for the Ethernet interface. Consult your network administrator for the subnet mask assigned to the network.

Gateway IP Address: Enter the IP address of the gateway device on the backhaul metropolitan network that provides access to other devices on the network, such as the xMSC. This address is static and the format is per IETF conventions: 111.222.333.444. Consult your network administrator for the IP address of the gateway.

Signaling Controller IP Address: The Signaling Controller controls SIP signaling between handsets or other voice devices, and the VoIP core. Enter the default virtual IP address for the Signaling Controller, as recommended by xG Technology (for example, 10.0.16.15). Consult your network administrator to confirm the IP address of the Signaling Controller.

xMAX Configuration

In the xMAX Configuration section, enter the network and tower IDs:

Network ID: Enter the network ID allocated by xG Technology to this network.

Tower ID: Enter the tower ID allocated by local network planning to this BSN-250. Consult your local network planner for the tower ID.

Field Test Mode

To enable field testing, select **Enable Field Test Mode**. This will prevent handsets from associating with the base station.

Time Zone

To set the correct time for handsets, select the time zone of the physical site where the base station is located. Optionally, specify that the time should be adjusted for Daylight Savings Time.

Cable Settings

The xMAX BSN-250 VoIP Base Station is a three-sector, 18-channel system. Using the Web configuration interface menu, click **RF Cable Settings** to configure cable length and cable loss for each sector in order to calibrate the TX Power correctly. This screen is shown in Figure 6. After entering the appropriate values, click **Apply** to save settings, or **Cancel** to return to the prior settings.

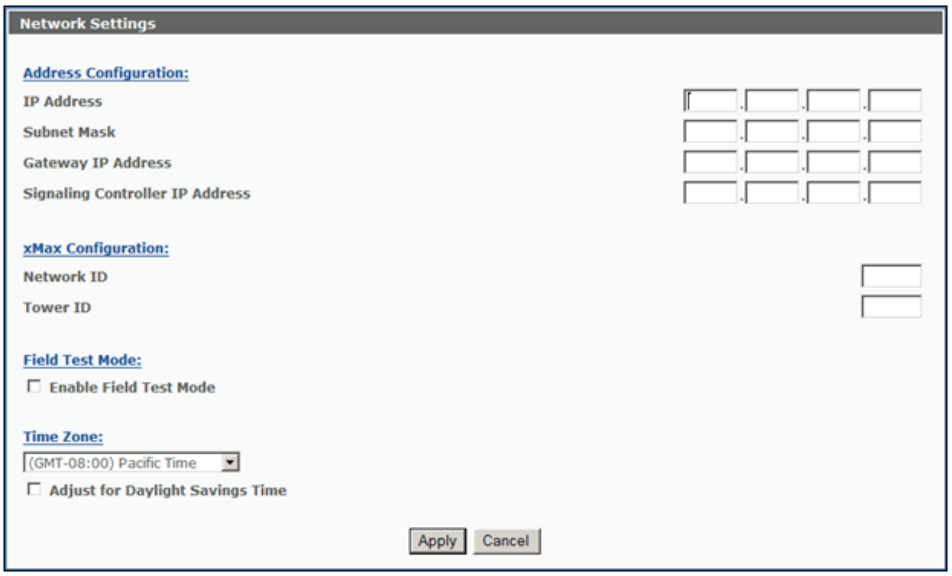

Figure 6: Web Configuration Interface – Cable Settings Screen

RF Cable Length (ft): Specify the distance, in feet, from the RF connectors on the back of the BSN-250 to the antenna.

RF Cable Loss (dB/100ft): Specify the loss factor/multiplier in the cable.

Total Cable Loss (dB): Specify the total loss in the cable. This field is automatically populated when the RF cable length and loss have been entered.

Channel Settings

Using the Web configuration interface menu, click **RF Channel Settings** to activate or to disable channels. The screen shows each sector, the available channels, and the channel frequencies, as shown in Figure 7. You can enable up to six channels for each sector, and disable channels in order to avoid sources of interference.

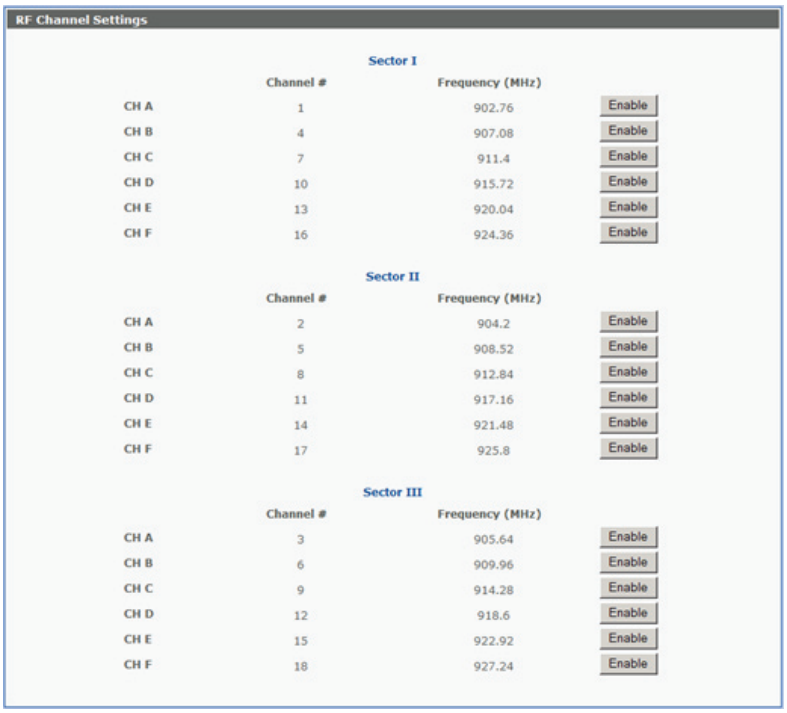

Figure 7: Web Configuration Interface – RF Channel Settings Screen

- To enable a channel, click **Enable**.
- To disable an active channel, click **Disable**.

In both cases, you are prompted for the number of minutes to delay before the channel will become active or disabled.

DIAGNOSTICS AND TROUBLESHOOTING

The Web configuration interface provides a **Diagnostics** screen that you can use to test base station connectivity with a device in the network, such as the Signaling Controller or the xMonitor. To run a diagnostics test:

1. Enter a host name or IP address in the text box.
2. Click **Ping**.
3. The results are displayed in the **Results** area.

The command line interface can also be used to perform basic diagnostics, and troubleshooting if the Web configuration interface does not start. The Linux commands **ping** and **traceroute** are supported, as well as the **ps** command, which can be used to confirm if the Web server module is running, can receive queries, and can send responses:

- To confirm that the Web server module is running:
- To confirm that the Web server module can receive queries:
- To confirm that the Web server module can send responses:

VIEWING THE BASE STATION ACTIVITY LOG

A log of base station activity, such as update requests and errors, can be viewed using the **Logs** screen of the Web configuration interface.

The screen shows the log on the base station at the time when the page was loaded.

- **Refresh**.
- **Clear Log**.

UPDATING THE XMAX BSN-250 FIRMWARE

The firmware on the base station can be updated using the **SW Upgrade** screen of the Web configuration interface.

The screen shows current firmware version information for the BSN-250. If an update is available, the screen lists these as alternate versions.

- **Browse** to select the upgrade file, then click **Update**. First, the file will be uploaded to the base station, then the update process will begin.
- **Cancel**. After the upload has completed and the update process started, the operation cannot be canceled.

POWERING OFF THE BSN-250

Use the following steps to turn OFF the system:

1. will change from green to red.
2. Flip the back toggle switch to the OFF position.

APPENDIX: XMAX BSN-250 FRONT PANEL STATUS INDICATORS

Some units in the xMAX BSN-250 provide LED indicator lights. There are 12 LEDs installed on the front panel of the control unit, two on the RF unit, and four on the power supply unit, for a total of 18 indicator LEDs.

Control Unit LEDs

The possible colors and meanings of the control unit LEDs are shown in Table 2.

Table 2: Control Unit LEDs

Front Panel	Type	Color	Function	Source
System	LED (Tri-color)	Yellow	Power ON	Control Unit CPU
		Green	Normal operation	
		Red	Fault	
Link	LED	Green	Ethernet link	Ethernet Controller
Activity	LED	Amber	Ethernet activity	Ethernet Controller
TX1	LED	Green	Transmitting on Sector 1	Control Unit CPU
RX1	LED	Green	Receiving on Sector 1	Control Unit CPU
TX2	LED	Green	Transmitting on Sector 2	Control Unit CPU
RX2	LED	Green	Receiving on Sector 2	Control Unit CPU
TX3	LED	Green	Transmitting on Sector 3	Control Unit CPU
RX3	LED	Green	Receiving on Sector 3	Control Unit CPU
GPS	LED (Tri-color)	Yellow	GPS searching for lock	Control Unit CPU
		Green	GPS lock	
		Red	No communication with GPS	
Processor	LED (Tri-color)	Yellow	**[Needed from xG]**	Control Unit CPU
		Green	No alarm	
		Red	Alarm status report	
Controller	LED (Tri-color)	Yellow	**[Needed from xG]**	i.MX31
		Green	No alarm	
		Red	Alarm status report	

RF Unit LEDs

The possible colors and meanings of the RF unit LEDs are shown in Table 3.

Table 3: RF Unit LEDs

Front Panel	Type	Color	Function	Source
12VL (Linear)	LED (Bi-color)	Green	ON	RF Unit
		Red	OFF	
12VS (Digital)	LED (Bi-color)	Red	ON	RF Unit
		Green	OFF	

Power Supply Unit LEDs

The possible colors and meanings of the power supply unit LEDs are shown in Table 4.

Table 4: Power Supply Unit LEDs

Front Panel	Type	Color	Function	Source
12VL (Linear)	LED (Bi-color)	Green	ON	Power Supply Unit
		Red	OFF	
12VS (Digital)	LED (Bi-color)	Green	ON	Power Supply Unit
		Red	OFF	
5V (Digital and Linear)	LED (Tri-color)	Green	Digital and linear outputs ON	Power Supply Unit
		Red	Digital output OFF	
		Yellow	Linear output OFF	
		None	Digital and linear outputs OFF	
3.3V (Digital)	LED (Bi-color)	Green	ON	Power Supply Unit
		Red	OFF	

TECHNICAL SUPPORT

For technical support, please contact xG Technology, Inc. using any of the following:

Telephone: 954 332-1138
Fax: 954 572-0397
Email: support@xgtechnology.com

CERTIFICATION

The xMAX BSN-250 complies with the U.S. Federal Communications Commission (FCC), Code of Federal Regulations (CFR), Title 47 - Telecommunication, FCC Part 15 Subpart B- Class A Requirements.

A copy of the certification can be requested from xG Technology, Inc. by submitting your request in writing. Our address is:

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