- Install the BSU first before installing any SUs.

- Once a link has been established, check the RSL at the SU, and if too high, miss-point the antenna slightly to reduce the receive power.

Configuring the Base Station

Keep in mind the following when configuring a BSU:

- The configuration commands are NOT case-sensitive.

- Refer to the **Operator Commands** section of the software's Help menu (or the Reference manual) for additional information on command syntax.

- The BSU does not provide an on-screen response to many of the available commands.

- The BSU saves the configuration settings periodically (approximately every two minutes). Therefore, after issuing the last configuration change, wait two minutes before recycling power or turning off the unit to ensure that all of your changes take effect.

To configure the Base Station:

1. On the computer that has the Base Station Configuration Software installed, change the IP address for its Ethernet card to 192.168.20.xx with a 255.255.255.0 subnet mask (xx can be any number between 1 and 255 with the exception of 254). The computer and BSU must be members of the same IP subnet to communicate. When using the Multi-BSU software, the BSU and SU can be on different subnets (see "Using the Multi-BSU Configuration Software" in the *Tsunami Multipoint Version 1.3 Reference Manual* for information).

   Note: The BSU's default IP address is 192.168.20.253 with a subnet mask of 255.255.255.0.

2. Run the Base Station Configuration Software on the computer. To do this, from the Windows **Start** menu, select **Programs → Base Station Configuration Software**.

   Note: The menu bar reads "Base Station Configuration Software" when the computer and BSU are connected to the same physical network. If the menu bar reads "Configuration Software" only, the two devices are not on the same physical network; confirm that they are connected to the same Ethernet network, check the Ethernet cables, and confirm that the BSU is powered on before continuing.

   º Type **dspconf** and press the **Enter** key to view the BSU's current configuration settings. If you do not get a response to this command, confirm that the computer and BSU are on the same IP subnet.

3. Configure the BSU's IP settings:

   Type **setIP <IP address>** and press **Enter**, where <IP address> is the new IP address you want to assign to the unit. For example, type **setIP 192.168.20.20** to assign this IP address to the BSU.

   A. Close the Base Station Configuration Software and change the IP address of the computer's Ethernet card so that it is in the same IP network as the BSU's new IP address; restart the computer if necessary.

   B. Open the Base Station Configuration Software and use the **dspconf** command to verify that the BSU and computer can communicate.

   C. Enter **setSubnet <subnet mask>** where <subnet mask> designates a subnet mask. Proxim does not recommend using a subnet mask wider than 255.255.248.0.

   D. If desired enter **gateway <gateway address>** where <gateway address> designates the IP address of the network's gateway.

4. To set the BSU's Terminal ID, enter **setID <Terminal ID>** where <Terminal ID> is a number between 1 and 2048). For example, **setID 1** sets the unit's Terminal ID to 1.

   Note: Each BSU and Subscriber Unit (SU) in a cell must have a unique Terminal ID.

5. Use the setFrameSync command to set the proper GPS operating mode.

   º When performing indoor tests, Frame Sync must be set to Independent mode (**setFrameSync 1**). A BSU's transmitter does not turn on if Frame Sync is set to Multi Sector while indoors. Frame Sync should be set to one of the Multi Sector modes only when multiple BSUs are installed in the field; these modes enable a BSU's GPS receiver so it can synchronize its frame timing with other BSUs. See "Configuring the System for Multi-Sector Mode" on page 29 for details about configuring and testing multi-sector operation.

6. If Range Security is enabled (set to 1), enter **rangeSecurity 0** (zero) to disable this feature. You can enable it later once the SUs have been installed in the field.

7. Set the desired data rate using the **modulation** command (modulation <0 (60Mbps) | 1 (40 Mbps) | 2 (30 Mbps) | 3 (20 Mbps)>)**.** This step is not applicable for BSUs that support 20 Mbps operation only.

   º Set the desired frequency plan using the freqPlan command. (**freqPlan** < 4 (four channel | 5 (channel) | 6 (channel)>). Tsunami Multipoint offers several frequency plans and operating frequencies to provide a means for overcoming interference. If one part of the 5.8 GHz spectrum is occupied when you deploy the product, you can select a different frequency plan to bypass the interfering frequency.

8. Set the desired frequency plan using the frequency command. (**frequency** < a | b | c | d | e| f >; with e being available for the 5 and 6 channel plans and f being available for the 6 channel plans only.

9. Set the BSU's desired transmit power level using the txPowerLevel command.

> **Note:** Typically the power level is set to 18 dBm in the field (maximum setting) and 6 dBm for indoor range testing (minimum level).

10. Set the desired transmit power auto-enable mode with the **txPowerAutoEnable** command (txPowerAutoEnable < 0 (off) | 1 (on)>. When auto-enable is set to on the BSU will automatically start transmitting after any power cycle.

11. Set the desired routing mode with the **routingMode** command. (**routingMode** < 0 (IP routing | 1 (Bridging)>).

> **Note:** After you issue the routingMode command, you may need to clear the PC's arp table. (restarting the PC used to configure the BSU will do this).

12. Turn on the BSU using the **txPower** command (**txPower** <0 (off) | 1 (on)>).

At this point the BSU is configured and ready to operate. Also, see "Advanced Configuration Options" and "Command Reference" in the *Tsunami Multipoint Version 1.3 Reference Manual* for information about the other commands used to configure the BSU (such as setting proxy, RIP, static IPs, and so on).

Adding Subscribers to the BSU Database

Subscriber units will not be able to enter the network until they are added to the BSU database.

1. Identify the Subscriber Units (SUs) you intend to use with this BSU and write down each device's MAC address (which is printed on the product label).

2. Add the first SU to the BSU's database by entering **addSU <MAC address> <Terminal ID>**.

   º When typing the MAC address, separate each pair of digits with a colon or a blank space.

   º The Terminal IDs range from 1 to 1023; assign a unique ID to each BSU and SU in a cell. For example, if the SU's MAC address is 00-04-44-12-34-56 and you want to assign Terminal ID 2 to this SU, enter **addSU 00:04:44:12:34:56 2**.

   > **Note:** Add an SU to the BSU's database before installing or turning on the SU.

3. Configure the SU's IP settings:

    o   Enter **setSUIP <Terminal ID> <IP address>** to set the SU's IP address. Proxim suggests that you configure each SU with a unique IP address in the same IP subnet as the BSU in Bridging mode and configure each SU with a specific subnet in IP routing mode.

    o   Enter **setSUSubnet <Terminal ID> <subnet mask>** to set the SU's subnet mask.

4. Repeat Steps 2 and 3 for each SU that you want to add to the Tsunami Multipoint system.

5. Enter **dspSU** to view the list of SUs that have been added to the BSU's database.

6. Install the SUs as described in "Chapter 3. Deploying the Subscriber Unit" on page 31.

Configuring the System for Multi Sector Mode

If you are installing the BSU in the same geographical location as other BSUs, i.e., in a location where one BSU may interfere with another, set the unit to **Multi Sector** mode; this enables the GPS receiver. GPS is used to ensure that all BSUs in the same geographical region transmit and receive at the same time.   In additional, the ratio of downlink to uplink slots must be the same for all BSU's that may interfere with each other. Together, these eliminate the possibility of a BSU transmitting while a co-located BSU is receiving. This synchronization is achieved using the timing signal supplied by the GPS receiver. The GPS receiver needs to see four satellites to obtain an accurate time. Once time has been initialized, the receiver can keep accurate time even if it sees only a single satellite.

There are two multi-sectors modes; auto-restart and auto-resync. The difference between these modes has to do with how the BSU synchronizes its timing to gps after an outage. The reader is referred to the TMP reference manual for more details. To configure the BSU for Multi Sector Mode, use the **setFrameSync** command (setFrameSync <0 (Multi-sector with auto-restart | 1 (independent – NOT multisector) | 2 (multi-sector with auto-resync). Multi-sector mode with auto-resync is the recommended mod). To turn off Multi Sector Mode, enter **setFrameSync 1**, indicating Independent (GPS is not used).

Testing the GPS Receiver

The GPS Receiver Test examines the quality of the GPS signal. This test is for use only in the field by customers who have installed multiple Base Station Units (BSUs) in the same location (with the Frame Sync parameter set to Multi Sector).

This tool tests the GPS quality for BSUs that receive timing information from GPS satellites.

Note: The BSU must have the GPS antenna connected to receive GPS signals. See "Mounting the GPS Antenna."

Follow these steps to run the test:

1. Open the Base Station Configuration Software.

2. Enter **BSUlog 1 1**.

3. The second output column is GPS sync, which will read –1 until the GPS can acquire the requisite number of satellites. When this number reads 0, GPS has acquired at least one satellite; when it reads 4, at least four satellites have been acquired and GPS is functional.

4. Enter **BSUlog 0** to turn off BSU log.

5. Enter **pp3d 1** to start the GPS test.

   º The Base Station Configuration Software reports the following values (from left to right):

      Column 1: Time error in half-chip; this value should be less than 80
      Column 2: Frequency error
      Column 3: Synchronize filter; this value must equal 20
      Column 4: Not applicable
      Column 5: GPS message; this value must be 4
      Column 6: Visible sat; this value must be 4
      Column 7: Time of week in 10 ms
      Columns 8 & 9: Not applicable

   º Column 1 provides information concerning the level of frame synchronization and Column 6 provide information about the number of visible satellites.

6. Enter **pp3d 0** (zero) to end the GPS test.

Chapter 3. Deploying the Subscriber Unit

Mounting the Subscriber Unit (SU)

The outdoor component of the Subscriber Unit (SU) is designed to directly mount to a pole. Using the supplied U-bolts, you can mount the SU to a 1-1/4 inch to 1-3/4 inch pole (outside diameter). Using optional mounting brackets, you can mount the SU to a wall or other flat surface.

Figure 16. Subscriber Unit Installation Kit

Tsunami Subscriber Unit System		
Title	**Part Number**	**Quantity**
SU Installation Kit, consisting of the following: Power Supply, LINEAR, 24 WATT, 24V @ 1A[a] Cable Assembly, Cat 5, WRR Outdoor, 25M Mounting hardware (see the following table)	6H0-00716-00 100-00737-01	1 each 1 each 1 set
[a] 220V, SWITCHING, 28V @ 1A REGULATED power supply and international power cord available.		

SU Mounting Hardware		
Mounting Hardware	**Part Number**	**Quantity**
Mounting Clamp Housing, WRR	200-00775-00	1 each
U-Bolt 1 ½" SCH 40 PIPE 5/16-18	720-01132-02	2 each
Nut, KEP, @5/16, with Lock Washer, CRES	740-00451-00	4 each
Washer, Flat, 5/16, CRES	730-00450-00	4 each
Screw, Machine, SEM, @10-32 x .5, Ext Star, CRES	720-00937-00	2 each
Nut, KEP, #10-32, CRES	740-00938-00	2 each
Screw, #10-16x3/8 Type B, Pan Head Phillips, SS18-8	720-01133-00	1 each
O-Ring, 1.00" Idx1.14" OD	720-00769-00	1 each

Note: The following instructions assume that you will slide the SU's mounting bracket/pole assembly onto a pole. If this is not practical (for example, the pole is too tall or its top and bottom are permanently mounted to structures), follow the steps below, but assemble the mounting bracket/pole assembly around the pole.

1. Insert the two U-bolts into the mounting clamp housing and attach the two #5/16 nuts and 5/16 flat washers.
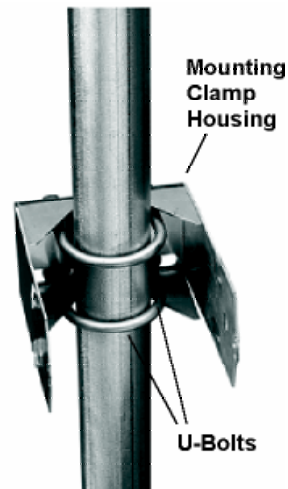
2. Slide the mounting clamp housing/pole clamp assembly down the pole.

Figure 17. Mounting Clamp Housing and U-Bolts Attached

3. Squeeze the sides of the mounting clamp housing and slide it inside the flange protruding from the back of the SU until the pins extend into the holes on the side of the flange.

Figure 18. Mounting Bracket Attached to SU

4. Insert the two #10-32 screws in the sides of the mounting clamp housing/pole clamp assembly and loosely attach the two #10-32 nuts.

Figure 19. Mounted SU

5. After you aim the SU (see "Aiming the SU" on page 35), tighten the two #10-32 screws and nuts to secure the SU in position.

6. Insert the O-ring into the SU's Power and Ethernet port.

7. Connect one end of the supplied Cat 5 cable to the SU's Power & Ethernet port and screw on the outer ring to secure the cable in place.
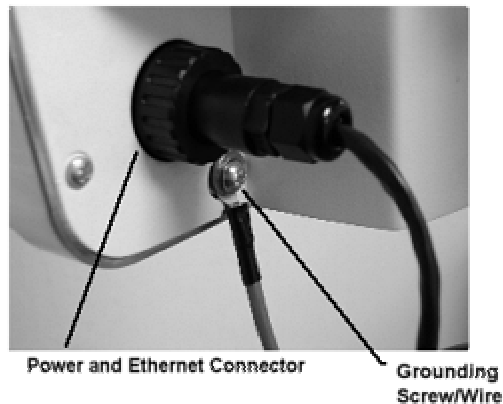

Power and Ethernet Connector   Grounding Screw/Wire

Figure 20. SU's Power and Ethernet Connector and Grounding Screw

Note: To ensure proper grounding, use the hole on the back of each SU and the provided grounding screws to attach a ground wire to each radio. Use wire grounding techniques in accordance with your local electrical codes.

8. Connect the other end of the Cat 5 cable to the SU's power supply. Be sure the Tsunami Multipoint Subscriber Unit connector is properly "contacted" or the unit may fail; you should hear a "click" when installing the cable connector to its chassis. The proper way to install is as follows:

A) Insert the O-ring into the SU's Power and Ethernet port.

B) Loosen the rear nut on the end of connector cable.

C) Pull the RJ-45 head out a few millimeters from the connector body.

D) Push the RJ-45 head into the chassis connector and listen for a solid "click."

E) Push the water seal cap back and tighten the cap.

F) Tighten the rear nut.

Note:	While not necessary, it is advisable to implement additional external weatherproofing, such as weatherproof tape and silicon at the inside base of the threaded part of the connector.

9. Connect one end of a Cat 5 cable to the SU's power supply's RJ-45 port and the other end to a switch or directly to the computer onto which you installed the Subscriber Utility.

10. Plug the SU's power supply into an electrical outlet.

Installing the Subscriber Utility Software

The subscriber utility is used in the antenna pointing process and must be installed to finish the SU installation.

1. Identify the computer on which you plan to run the Subscriber Utility.

Note:	See "System Requirements for Base Station Configuration Software" on page 51 for operating system and hardware requirements.

2. Insert the Tsunami MP CD (provided with the product) into the computer's CD-ROM drive and open the CD's **config software** folder.

Note:	If the computer has Microsoft IIS (Internet Information Services) running, disable or uninstall it before running the Subscriber Utility.

3. Double-click SUSETUP.HTM or use a Web browser to open the file.

4. Place a checkmark next to the **Include VM in download** option to install Java Virtual Machine (VM).

Note:	You need not add VM if your computer already has a version of VM installed.

5. Click the **Start Installer for Windows** button to begin the software installation.

6.   Follow the on-screen instructions to install the software.

7.   Click **Done** when the installation is finished to close the installer.

Aiming the SU
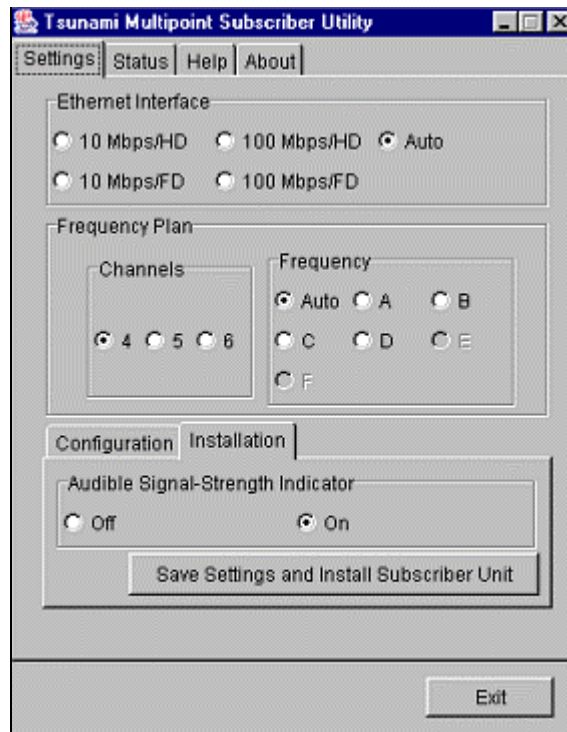
1.   Launch the Subscriber Utility.

Figure 21. Settings Page in Subscriber Utility

2.   Choose the desired frequency plan and operating frequency. The factory default is the 4 channel frequency plan and frequency auto (the SU looks through all frequencies). Selecting a specific frequency forces the SU to search for a BSU on that specific frequency only. When the Auto option is selected, the SU searches all frequency channels for a given plan until it finds the strongest signal.

3.   Turn on the **Audible Signal-Strength Indicator** (if not already set to **On**).

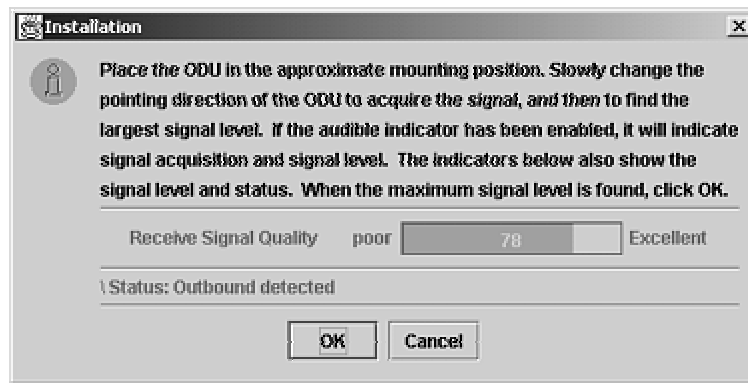4. Click **Save Settings and Install Subscriber Unit** to launch the aiming tool.

Figure 22. Aiming Tool in Subscriber Utility

5. Slowly adjust the position of the SU until you have maximized the strength of the radio signal.

   º The SU beeps after it has detected a signal from the BSU. The beeps increase in frequency as the strength of the signal received from the BSU increases.

   º The Receive Signal Quality indicator within the Subscriber Utility's Installation window reports the strength of the radio signal.

6. Click **OK** to close the aiming tool.

7. If you have left the Base Station Configuration Software running on the computer connected to the BSU, a notification is displayed once the SU has successfully joined the network (this is known as a "net entry" notification).

Displaying Link Status Information

The **Status** window displays the current information at the SU, as well as information about the link between the BSU and the local SU. The information is described following the figure. To display the **Status** window, launch the Subscriber Utility and then select the **Status** tab.

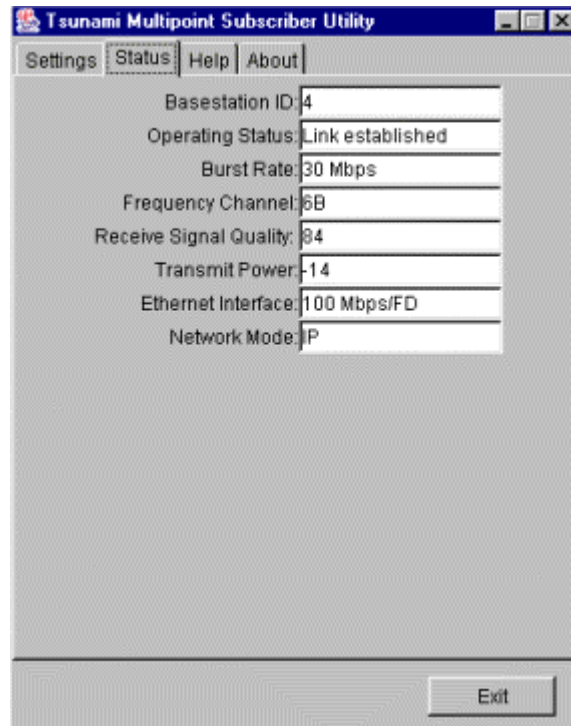The **Status** window is displayed, as shown in the following figure.

Figure 23. Subscriber Utility Status Window

Base Station ID

Displays the Terminal ID assigned to the BSU with which the SU communicates.

Operating Status

When the link status between the BSU and local SU changes (for example, when you first power up the units, change their configuration, and so on) the following status messages appear in this field:

Searching for Outbound

SU searches for an outbound signal (that is, a signal transmitted from the BSU)

Inbound fine sync

Indicates outbound signal detected and the SU is attempting to synchronize with the inbound signal

Link established

Indicates the link is established between the BSU and local SU.

Note: The **No connection** message indicates that the software is unable to establish a link between the BSU and local SU. Also, the **ODU Not Connected** message indicates that the PC used to configure the SU is not communicating with it. See "Troubleshooting" in the *Tsunami Multipoint Version 1.3 Reference Manual* for possible causes and solutions to these problems.

Burst Rate

Shows the current Modulation setting. See "Specify the Desired Modulation (Data Rate)" on page 49 for information.

Frequency Channel

Shows the current channel plan/frequency setting (for example, 4C).   See "Change the Frequency Plan and Operating Frequency" on page 50 for information. By default, the SU is set to automatically search for the correct frequency channel.

Receive Signal Quality (dBm)

Shows the quality of signal received by the local SU (in dBm). This value represents the estimated received signal level, plus an offset of 120 dB. A received signal quality level over 40 (which represents a signal level of -80 dBm) shows an acceptable signal quality.

º   You can use this field to fine tune BSU/SU alignment. After you mount the units outdoors, check the Receive Signal Quality value as you make fine adjustments to the BSU/SU alignment until you obtain optimal signal quality.

Transmitter Power

Shows the SU's current transmitter power (-30 to +36).

Ethernet Interface

Shows the current Ethernet interface setting. If the Ethernet interface was set to auto-netotiate, this entry contains the results of the auto-negotiation.

Network Mode

Shows the current network mode: Bridging, VPN, or IP Routing.

Confirming Network Activity

Attempt to ping from a computer connected to:

- An SU to the BS (BSU and SU must have different IP addresses to do this. If the BSU and SU are configured with the same IP address, the local unit responds to the ping (that is, if the BSU and SU have the same IP address and you ping the BSU from a host connected to the SU, the SU responds to the ping).

- The BSU to the SU. (BSU and SU must have different IP addresses to do this. If the BSU and SU are configured with the same IP address, the local unit responds to the ping (that is, if the BSU and SU have the same IP address and you ping the BSU from a host connected to the SU, the SU responds to the ping).

If successful and possible, attempt to ping from a computer on the SU side of the network to a computer on the BSU side of the network.

If the ping tests are unsuccessful, attempt the following:

- Check all IP and computer configurations (for example, if you attempt to ping the BSU from the SU configuration computer and the BSU and SU's are in separate networks you must have the configurations computers gateway set to the SU for the ping to work.)

- Adjust the network's IP settings, if necessary, to achieve IP connectivity.

If the above fails refer to "System Diagnostics" to help debug possible link problems.

Note: See "Chapter 4. System Diagnostics and Operating Tips" on page 40 for information about running system diagnostics to make sure the equipment is operating as expected .

Chapter 4. System Diagnostics and Operating Tips

This section describes several diagnostic tests you can perform once the Tsunami MP equipment is installed. These tests assist you in determining whether the equipment is functioning as expected.   In addition, we include some miscellaneous useful information for deploying a Multipoint network.

Radio Diagnostics

Use the diagnostic tools described in this section to determine if your wireless link is stable. You can also use these tools to help fine-tune antenna positions to establish a good link.

BSU and SU Logs

You can display BSU and SU logs to help troubleshoot possible link reliability and interference issues. These tools have no impact on data traffic, and can be used in conjunction with configuration parameters (such as IPC settings, modulation modes, and operating frequencies) and possible antenna relocation to obtain the best possible path. The goal is to maximize the Es/N0 ratio.

Displaying the BSU Log

Follow these steps to enable the BSU log:

1. Enter **BSUlog (Terminal ID> <time>** where <Terminal ID> is the Terminal ID of the SU to be monitored and <time> specifies the polling period (in seconds).
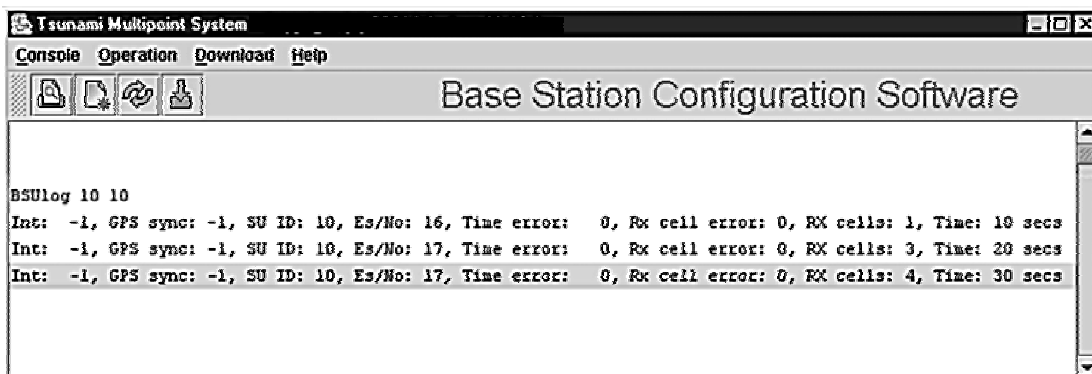

Figure 24. BSU Log in the Base Station Configuration Software

2. When finished, disable the BSU log by entering **BSUlog 0** (zero).