Macro Base Station Installation Procedures (NPM-2000)

Release 2.1

Part ####### revision 001-Prelim
August 3, 2006

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifiations and approvals.

PREFACE

This book explains how to install a SOMA NPM-2000 macro base station. Installation includes installing the rack, connecting the base station to the network core, and powering on the system.

This book is intended for field technicians with experience installing and configuring telecommunications equipment at cellular base stations and network operations centers.

Related Documentation

SOMA Documentation Suite

Table 1 shows the guides in the SOMA service provider documentation suite.

Book	Description
Alarms and Events Reference	Comprehensive list of alarms and events
Core Server Installation Procedures	Procedures for installing and maintaining a core server
Diagnostics Reference	Description of the diagnostics
Macro Base Station Installation Procedures	Procedures for installing a base station
Macro Base Station Maintenance Procedures	Procedures for performing preventive and corrective maintenance on a base station
Macro Base Station Provisioning Procedures	Procedures for provisioning base station equipment after installation
Network Core Provisioning Procedures	Procedures for provisioning core equipment after installation
SIG Installation and Configuration Procedures	Procedures for installing and configuring SOMA home agent and access servers
System Administration Reference	Description of utilities and administration activities
System Deployment Planning Guide	Information required when deploying the system
System Overview	Complete solution overview

Table 1   Customer Documentation Components

Third-Party Documentation

Table 2 shows third-party documents that provide additional information which may be useful when installing the base station.

Document	Description
Central Office Environment Installation/Removal Generic Requirements (GR-1275-CORE)	Available from Telcordia Technologies, Inc. Provides generic installation requirements for telecommunication suppliers and carriers.
Flex21 System User Manual	Available from Continuous Computing Corporation. Provides installation, configuration, and operational information about the digital shelf.
FlexCompute cPCI-OCM1113 User Manual	Available from Continuous Computing Corporation. The manual describes the processor cards in detail.

Table 2   Third-Party Documentation

Conventions

This section outlines the conventions used in this guide.

Measurement Conventions

Measurements in this guide are expressed according to the System International d'Unites (SI) standards for metric units and abbreviation. Equivalent Imperial measurement (used in the United States) are provided in parentheses, except when Imperial is the international standard.

Bits and Bytes

For clarity, bits and bytes are not abbreviated in this document, but their prefixes are. SOMA Networks follows the common practice of using SI prefixes (base 10) with these terms. Thus, 1 kbit/s (kilobit per second) is equivalent to 1000 bits/s; it should not be confused with 1 Kibit/s (kilobinary bit per second) or $1 \times 2^{10} = 1024$ bits/s.

Unless otherwise specified, SI prefixes with bits and bytes in this document refer to a power of 10.

Typographical Conventions

Table 3 shows how different fonts are used throughout this guide.

Font	Usage	Example
Courier	System output and all things involving source code (commands, samples, methods, functions, objects, variables, types, constants, fields, properties, and structures)	echo "NETWORKING=yes HOSTNAME=soma GATEWAY=10.110.0.1"
Courier bold	User-keyed commands	**eject cdrom**
Arial gray	Interface objects: buttons, links, fields, and drop-down list names	Click **OK**.
Italics	Anything that appears as part of the file system, such as files, applications, paths, directories, libraries, scripts, daemons, devices, and commands with parameters when used as a noun	Data is in *subscribers/billing* All devices use *devfs*.
Courier bold italic	Placeholders in commands	**boot cdrom -install arg**
Courier italic	Placeholders in code	n urn:soma:dialplan:*domain*

Table 3   Display Font Usage

Table 4 shows the meaning of symbols used in procedures throughout this guide.

Symbol	Meaning	Example
↵	Indicates that you should press the Return, or Enter, key	`su admin` ↵
+	In a keystroke combination, indicates that you should press the keys simultaneously	Control+Alt+Delete
,	In a keystroke combination, indicates that you should press the keys consecutively	Control, Shift, q
→	Indicates that you should choose a menu option or a sub-menu	Choose File→Import→Formats

Table 4   Symbols Used in Procedures

Special Information

Information of special importance is highlighted in the text using indentation and icons. The following examples show the special information types used in the document. They are listed in ascending order of importance.

NOTE: A note contains information of special interest.

CAUTION: A general caution is shown when there is a risk of affecting service.

WARNING: A general warning is shown when there is a risk of personal injury from a nonelectrical hazard or a risk of irreversible damage to data, software, or the operating system.

WARNING: An electrical warning is shown when there is danger of physical harm to a person or damage to equipment due to electrical hazard.

Part ###### revision 001   2006/8/3

Document Change History

Table 5 shows the change history for this document.

Revision	Date	Change Summary
001-Draft	July 14, 2006	R2.1 Initial release. Revision from R2.0
		Added 700Mhz configuration and mechanical info.
001-Prelim	August 3, 2006	Added FCC warning

Table 5   Document Change History

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INSTALLATION OVERVIEW

This chapter provides an overview of the installation process. Please familiarize yourself with the installation process in general before proceeding to the next chapter.

Contents

INSTALLATION PROCESS SUMMARY

Installation of a NPM2000 base station should take approximately two to three days, assuming the site already meets the requirements specified in Chapter 2, "Site Preparation".

Three people should be present during the installation, especially when moving the NPM2000 equipment.

 lists the procedures to install the base station.

Step	Chapter	Page	Procedures
1	Installation Overview	13	Ensure that the installation site is equipped to handle the base station. Collect information and add additional infrastructure if necessary.
2	Site Preparation	17	Unpack the rack. Review checklists to ensure you have the required equipment, software, and tools to perform an installation.
3	Base Station Installation Procedures	39	Install the rack. Connect ground and power. Add components to their respective shelves. Attach cables. Install the main and diversity antennas.
4	Antenna Installation Procedures	83	Install and test the required antennas, such as main and diversity.
5	Power On the Base Station	92	Apply power to the base station. Perform basic system verification tests.
6	On-Site Configuration Procedures	91	Configure software on the base station.

Table 1.1   Installation Process Summary

REQUIREMENTS FOR INSTALLATION

The installation procedures in this manual assume that the following conditions have been met:

■ The core servers located at the network operations center (NOC) are operational and connected to the backhaul.

■ The backhaul has been tested.

■ The management controllers and sector controller are separately configured in their BIOS to boot from the correct source.

■ At least one of the hard disk drives on the management controllers contains a software image.

■ A power supply that meets the specifications listed in "Electrical Requirements" on Page 23 has been installed.

NOTE: If these conditions are not met, it is still possible to complete the physical installation of the base station. However, you will not be able to boot the base station and provide cell coverage until you satisfy these conditions.

SITE PREPARATION

This chapter identifies the requirements that your site needs to meet before you proceed with the installation of the NPM2000 base station. Please review these requirements before proceeding to the next chapter.

Contents

PHYSICAL REQUIREMENTS

Before you begin installing the base station, read the following physical requirements. Ensure that each requirement is met before proceeding with the installation.

WARNING: Failure to meet the following requirements may result in personal injury and cause damage to or destruction of the base station and surrounding equipment.

Space

Three people should be present during the installation, especially when moving the NPM2000 equipment.

Table 2.1 and Figure 2.1 show the physical dimensions of the rack. These dimensions do not include space for cabling, the insertion and removal of modules, or adequate airflow.

	Width	Height	Depth
Type-1	600 mm (23.6 inches)	1600 mm (63.0 inches)	600 mm (23 6 inches)

Table 2.1 Rack Dimensions
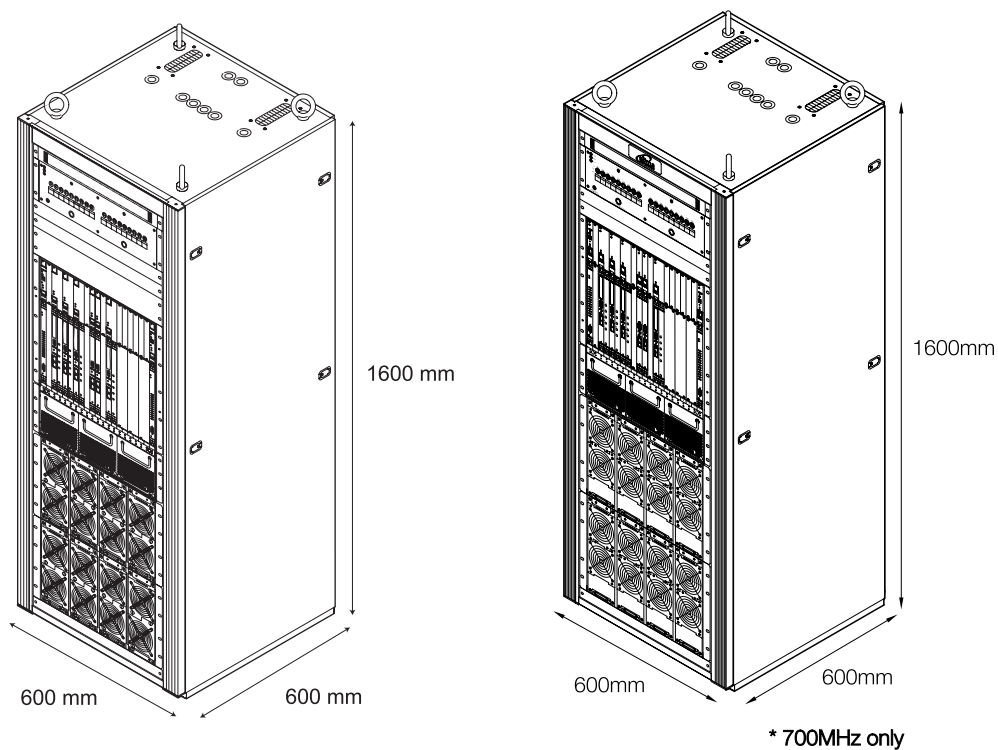
Figure 2.1 Rack Dimensions

Weight

The total weight of a full-sector base station is approximately 250 kg (560 pounds) (exclusive cables and antennas). A dolly or crane is required to move the rack.

Table 2.2 shows the weight of the different base station components.

Component	Weight
Empty Rack	86 kg (189.6 pounds)
PDP	12 kg (26.5 pounds)
Digital Shelf (4 sector)	44 kg (97 pounds)
Radio Module Shelf (filled to capacity)	6.8 kg (15 pounds) 9.5 kg (20.9 pounds) … 700MHz only
Radio Module	11 kg (24.3 pounds) 12.4 kg (27.3 pounds) … 700MHz only

Table 2.2   Weight of Base Station Components

Floor Loading

Table 2.3 shows the floor loading for the base station.

Version	Floor Loading
MMDS	317.2 kg/m^2 (64.6 pounds/foot^2)
700MHz	338.8 kg/m^2 (69.0 pounds/foot^2)
1098	317.2 kg/m^2 (64.6 pounds/foot^2)
PCS	TBD
WCS	TBD
3.5GHz	TBD
3.3GHz	TBD

Table 2.3   Base Station Floor Loading

> **NOTE:** Floor-loading values are calculated as per *Telcordia Technologies GR-63-CORE*.

Torque Values

Table 2.4 shows the recommended torque values for the different sizes of fasteners used in the rack.

Fastener Size	Recommended Torque
5/16 inch compression lug nuts on PDP	6.20 N•m (54.9 inch-pounds)
M5 screw	3.00 N•m (26.6 inch-pounds)
M4 screw	1.50 N•m (13.3 inch-pounds)
M3 screw	0.63 N•m (5.6 inch-pounds)
M2.5 screw	0.36 N•m (3.2 inch-pounds)
SMA connector	0.98 N•m (8.67 inch-pounds)
Type-N connector	0.98 N•m (8.67 inch-pounds) (hand-tightening)
	2.45 N•m (21.7 inch-pounds) (hex-connector)
7/16 DIN connector	28.0 N•m (247.8 inch-pounds)
Radio Module thumb screws (M4 screw)	1.5 N•m (13.3 inch-pounds)
Power cable screws	TBD N•m (inch-pounds)

Table 2.4   Torque Values of Threaded Fasteners

> **N O T E :** Unless otherwise specified, torque tolerances are ±0.2 N•m (±1.8 inch-pounds).

ENVIRONMENTAL REQUIREMENTS

Before you begin installing the base station, read the following environmental requirements. Ensure that each requirement is met before proceeding with the installation and consult your MOPs for procedures concerning building requirements, hazardous materials and waste, and environmental systems.

WARNING: Failure to meet the following requirements may result in personal injury and cause damage to or destruction of the base station and surrounding equipment.

Temperature

The base station is designed to be installed in a temperature-controlled environment.

Table 2.5 shows the ambient temperature requirements for the base station.

Operational State	Temperature Requirement
Operating	+5°C to + 40°C (+41°F to +104°F)
Short-term operation (less than 96 hours / year)	−5°C to + 50°C (+23°F to +122°F)
Storage	−40°C to + 60°C (−40°F to +140°F)

Table 2.5 Temperature Requirements

Humidity

The base station is designed to be installed in a humidity-controlled environment.

Table 2.6 shows the humidity requirements for the base station.

Operational State	Humidity Requirement
Operating	5% to 85%
Short-term operation (less than 96 hours / year9	5% to 90%
Storage	5% to 95%

Table 2.6 Humidity Requirements

Altitude

Certain components in the base station are sensitive to altitude. Table 2.7 shows the altitude requirements for the base station.

Operational State	Altitude Requirement
Operating	−60 m to +1800 m (−197 feet to +5904 feet)

Table 2.7 Altitude Requirements

Airflow

The base station rack requires 600 mm of open space in front of and behind it to allow suitable airflow for cooling.

Heat Output

Table 2.8 shows the amount of heat produced by the base station.

Configuration	Heat Output (W)	Heat Output (BTU / h)
1 sector	1392 1104 (700MHz)	4750 3767 (700MHz)
2 sector	2304 1728 (700MHz)	7862 5896 (700MHz)
3 sector	3216 2352 (700MHz)	10973 8025 (700MHz)
4 sector	4128 2976 (700MHz)	14085 10155 (700MHz)

Table 2.8   Heat Output

ELECTRICAL REQUIREMENTS

Before you begin installing the base station, read the following requirements. Ensure that each requirement is met before proceeding with the installation.

⚠️ **WARNING:** Failure to meet the following requirements may result in personal injury and cause damage to or destruction of the base station and surrounding equipment

Main Power

The base station requires a –48 V DC power supply.

The allowable DC input voltage at the PDP ranges from –46 V to –56 V. The input power noise level should not exceed a maximum of 100 mV peak-to peak, DC to 20 MHz.

NOTE: The minimum gauge for the wires connecting the base station to the main power source is #2 AWG. The maximum loop length of #2 AWG wire is 19.8 m. #2 AWG wire that is less than this length will not be damaged or overheat in the event of a current overload or short-circuit condition.

Figure 2.2 shows the base satation's power and grounding cabling.
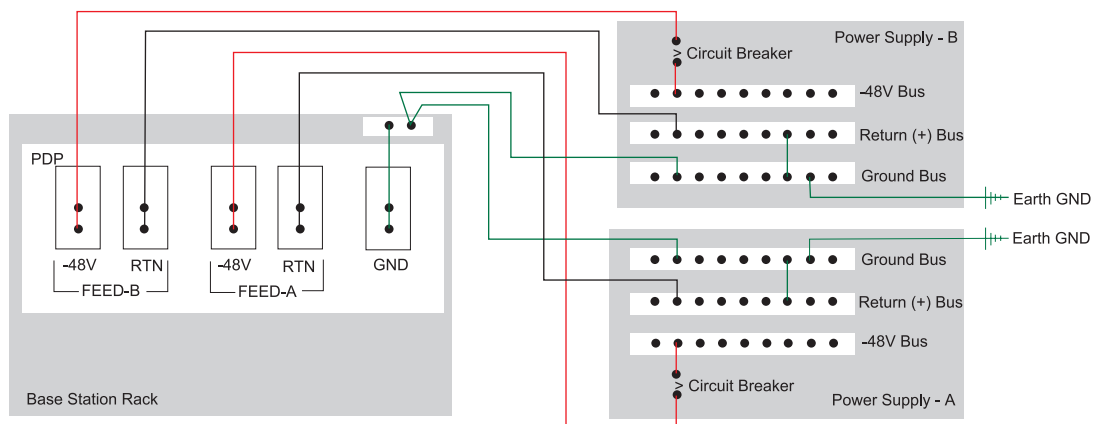
Figure 2.2   Power and Grounding Cabling

Table 2.9 and Table 2.10 shows the power consumption for the base station when receiving –48V DC at the PDP.

Configuration		Digital Shelf (A)	Fan Max Speed (A)	Radio Module (A)	Each Feed (A)	Total (A)	Total (W)
1 sector	FEED-A			9	20		
	FEED-B	8	3	9	20	29	1392
2 sector	FEED-A			18	30		
	FEED-B	9	3	18	30	48	2304
3 sector	FEED-A			27	40		
	FEED-B	10	3	27	40	67	3216
4 sector	FEED-A			36	50		
	FEED-B	11	3	36	50	86	4128

Table 2.9 Power Consumption Values without Routers

Configuration		Digital Shelf (A)	Fan Max Spped (A)	Radio Module (A)	Each Feed (A)	Total (A)	Total (W)
1 sector	FEED-A			6	17		
	FEED-B	8	3	6	17	23	1104
2 sector	FEED-A			12	24		
	FEED-B	9	3	12	24	36	1728
3 sector	FEED-A			18	31		
	FEED-B	10	3	18	31	49	2352
4 sector	FEED-A			24	38		
	FEED-B	11	3	24	38	62	2976

Table 2.10 Power Consumption Values without Routers (700MHz)

N O T E : Each radio module draws 9A at –48V DC
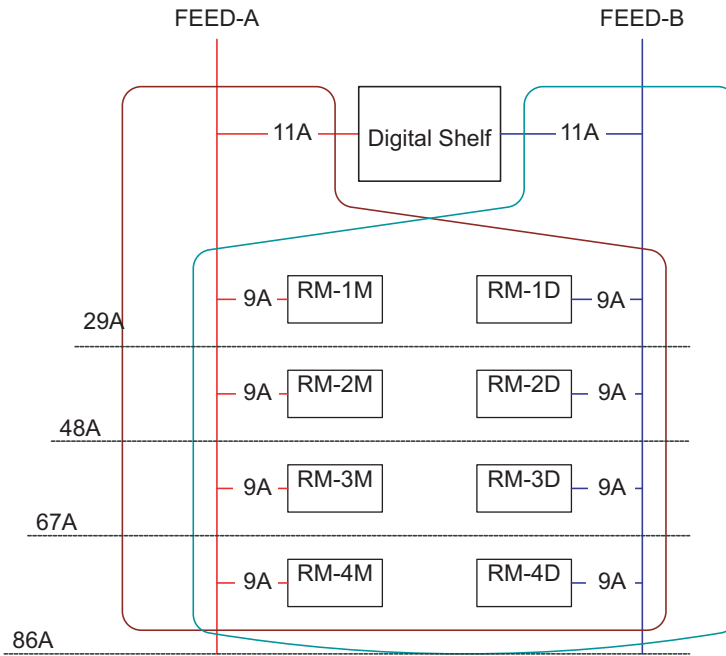
Figure 2.3   Power Consumption

Main Power Bay Circuit Breaker Size

The base station rack is connected to the main power bay by two power cables. The circuit breaker size for the power supply should be 60A per feed to protect the power cables in the event of a current over-load or short-circuit condition.Power Bay Ground and Voltage Levels

Table 2.11 shows the required electrical levels as measured at the PDP terminals.

Unit	Measurement	Specification
Voltage	–48V DC to return	–48V DC nominal (–46V DC to –56V DC)
Power	–48V DC to return	Dual Supply 2 kW maximum (each power supply) Single Supply 5.3 kW maximum
Voltage	Return to ground	0.5V DC maximum
Resistance	Return to ground	0.1Ω maximum
Voltage	–48V DC to ground	–46 DC to –56V DC

Table 2.11   Required Ground and Voltage Levels

Base Station Circuit Breaker Current Loads

The rack contains a power distribution panel (PDP). The PDP has up to 18 circuit breakers (CBs). Each breaker switch controls the power to a specific base station component. Individual base station component can be powered off by setting the appropriate breaker switch to the OFF (down) position.

Table 2.12 shows the maximum current loading of the circuit breakers in the rack PDP.

Circuit Breaker		Circuit Breaker	
CBA1	15A	CBB1	15A
CBA2	15A	CBB2	15A
CBA3	15A	CBB3	15A
CBA4	15A	CBB4	15A
CBA5	15A	CBB5	15A
CBA6	15A	CBB6	15A
CBA7	15A	CBB7	15A
CBA8	15A	CBB8	15A
CBA9	7.5A	CBB9	7.5A

Table 2.12 Circuit Breaker Current Loads

Backup Power

The base station does not contain any internal battery backup systems. Ensure that your main power source has a backup power system in case of a power failure.

Fuses

Each radio module contains one 30A, 250V, fast-blowing fuse to protect the RF components from damage in the event of an electrical overload.

Rack Grounds

Table 2.13 shows the grounding requirements for each rack.

Ground Type	Requirement
Frame ground	The rack requires one connection to its frame assembly for use as a frame ground. The frame ground cable uses #6 AWG wire.
Main ground	The rack requires one connection to the main building ground, such as the master ground bar (MGB). The ground cable uses #6 AWG wire.

Table 2.13 Grounding Requirements

Compression Lug Color Codes

Table 2.14 shows the compression lug color codes for common wire gauges.

Wire Gauge (AWG)	Color Code
#6 (used for NPM2000 ground cables)	Blue
#4	Gray
#2 (used for NPM2000 main and return power cables)	Brown
#1	Green
1/0	Pink
2/0	Black

Table 2.14 Compression Lug Color Codes

NETWORK AND BACKHAUL REQUIREMENTS

Before you begin installing the base station, read the following network requirements. See the following documents for detailed information about network and backhaul requirements:

- Network Deployment Planning Guide–describes site, network, and backhaul requirements.
- System Overview–describes the role and function of equipment in the network core.

Edge Routers

The base station requires a 100-Mbit/s Ethernet connection to at least one edge router configured to direct packets between the base station and the network core. Ensure that your base station site can accommodate the electrical, environmental, and physical requirements of the edge routers.

Backhaul Circuits

Multiple T1, DS3/E3, or other interfaces connect the edge routers at the base station site to the network core. See your field engineering package information about your site's backhaul circuits and the configuration of any necessary customer service units (CSUs).

> **N O T E :** Backhaul circuits must be tested by qualified personnel before the base station is placed into operation in order to ensure connectivity with the core servers

PSTN Gateway

The base station does not connect directly to the PSTN. A PSTN gateway located in the network core connects the IP-based equipment to the circuit-switched PSTN.

> **N O T E :** Ensure that any equipment connecting the base station to the PSTN is UL-listed.

General Site Requirements

Each site has unique requirements and characteristics. The field engineering package contains the site's floor plan, cabling routing and termination, and other site-specific.

Restricted Access

Access to the site must be controlled by the authority for that location and granted through the use of special tools, locks and keys, or other means of security. Access should be limited to service personnel who have been instructed about the reasons for the access restrictions and about any precautions that must be taken while at the location.

Mounting Surface

The base station is suitable for mounting on concrete or other noncombustible surfaces only.

Equipment Entrance and Unloading Area

A route must be provided between the unloading area and the equipment room where no restrictions will be encountered with a clearance less than 900 mm wide (side-to-side), and 2000 mm high (floor-to-obstruction).

All turns along the route must allow sufficient clearance to turn or tilt an object 600 mm wide, 600 mm deep, and 1600 mm high.

AC Outlets

The site must have at least two duplex AC receptacles located within a convenient distance to facilitate installation and maintenance of the base station.

Fire Protection System

It is recommended that a fire protection system is provided for the site.

Lighting

The site must have sufficient lighting to conduct work in a safe manner. Emergency lighting is recommended. Lighting must meet local and other applicable regulations.

Tower Lights

Depending on its height and applicable regulations, the tower may require aviation safety lights. Consult the aviation, environmental, and communication regulations applicable to your site for information.

Antenna Mounting Locations

The base station uses two antennas (main and diversity) per sector.

Cabling Requirements

Ensure that your site has the necessary cable racks and ladders to accommodate the base station and that your site has external cable access ports for the RF antenna cabling.

Isolated Ground Plane Environment

Ensure that the base station will be installed in an isolated ground plane environment as defined in Telcordia Technologies GR-1275-CORE.

Master Ground Bar Requirements

The site's master ground bar (MGB) must be connected to the building principal ground's electrode system. The building principal ground is the point where grounding conductors of the building (such as air-conditioning, communication systems, and structure) are bonded together.

Ground Riser Cable

The ground riser cable (the cable connecting the MGB to the building principal ground) must have a minimum conductor sizing of 2/0 AWG. If any equipment cables at the site are larger than 2/0 AWG (such as to compensate for voltage drop), the size of the ground riser cable must be adjusted.

Ground Resistance

The resistance of the building principal ground shall be as low as possible. AN objective of 5Ω is a telecommunications industry standard. In no case should resistance be allowed to exceed the local electrical utility limits of 25Ω (NEC article 256-56).

PRE-INSTALLATION PROCEDURES

This chapter lists the tools and equipment required for installing and testing the equipment. It also provides procedures for unpacking the rack and configuring individual cards and shelves.

Contents

PREPARING FOR INSTALLATION

This section describes precautions, equipment, and tasks that should be reviewed or performed prior to beginning the NPM2000 base station installation.

Table 3.1 shows the topics described in this section.

Table 3.1 Pre-Installation Requirement

Antistatic Precautions

WARNING: Components in the base station are highly sensitive to electrostatic discharges (ESD). Follow the procedures described below to prevent unseen damage from occurring.

To prevent damage to the base station components from static electricity:

- Do not handle circuit boards unless you are using the appropriate antistatic protection, such as wrist straps, boot straps, boots, or a conductive mat. Wrist straps must have snug but comfortable contact with your skin, and they must be   connected to a grounding point on the rack.

- Handle circuit boards by the faceplate, handles, or edges. Do not touch any integrated circuits, connections, pins, or soldered surfaces.

Wrist-Strap Grounding Point

The rack contains a wrist-strap grounding point in the bottom-left corner of the power distribution panel (PDP). The grounding point is connected to the frame ground and provides antistatic protection when technicians work with circuit cards.

> **N O T E :** The rack must be grounded for the wrist-strap grounding point to be effective.

Figure 3.1 shows the location of the Wrist-Strap grounding point to be connected to the frame ground.
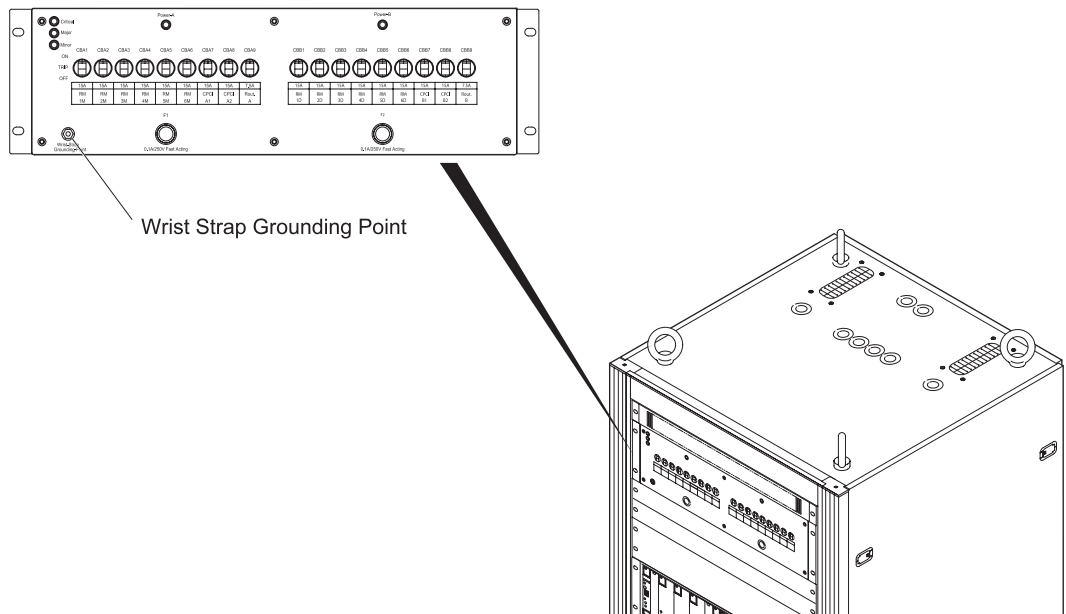

Wrist Strap Grounding Point

Figure 3.1   Wrist-Strap Grounding Point

Equipment, Tools, and Supplies Checklists

Tools

The following tools are recommended for a typical base station installation:

- Allen key set
- Bolt cutter
- Cable ties
- Chalk line
- Drill bits (metal and masonry)
- Electrical tape
- Extension cord
- Flat file
- Framing square
- Hacksaw (with blades)
- Torpedo level
- Torque wrenches
- Wrench sets (imperial and metric)
- Utility knife
- Platform stepladder (6-feet)
- Plum bob
- Portable band saw kit
- Scissors
- Scratch awl
- Shims (for leveling NPM2000)
- Socket sets (Imperial and metric)
- Strap (with buckle)
- Tape measures (linen and metal)
- Hammer drill
- Heat gun (with heat shrink roll)
- Label maker
- Marking pencil
- Oxide-inhibiting compound
- Vacuum Cleaner with high-efficiency particulate air (HEPA) filter.

> **NOTE:** Ensure that your torque wrenches are correctly calibrated according to the methods and schedule specified by the manufacturer. The calibration date should be indicated on each wrench.

Safety Equipment

The following safety equipment is recommended for a typical base station installation.

- Ear plugs
- Electrical gloves
- ESD straps
- First aid kit
- Flashlight
- Portable eye-wash station
- Safety glasses
- Safety shoes

Test Equipment

Table 3.2 shows the equipment recommended for testing base station functionality.

Equipment	
Digital multimeter	Checking continuity and electrical characteristics.
Sunset OCx	Testing SONET and T-carrier network and services.
Workstation, terminal, or laptop	Installing, configuring, and verifying software.
Cable sweep generator	Testing the electrical integrity of antenna and RF cables.
Spectrum analyzer	Monitoring RF signal output.
Ethernet cable tester	Testing the type and integrity of Ethernet cables
Oscilloscope	Checking input power noise levels

Table 3.2 Recommended Test Equipment

> **N O T E :** Ensure that your test equipment is correctly calibrated according to the methods and schedule specified by the manufacturer. The calibration date should be indicated on each piece of test equipment.

Software

Table 3.3 shows the software recommended to be installed on your laptop or workstation.

Software	Purpose
TCI/IP drivers	Accessing the individual systems over TCP/IP
SSH, SCP	Creating secure shell (SSH) sessions with the cards in the base station. For UNIX-like operating systems, you can type `ssh` at the command line. For Windows operating systems, use putty.exe or another SSH client.
	Secure copy (SCP) is required for transferring files securely across the network.
Telnet, FTP	Establishing sessions and transferring files with devices in the network.
Serial terminal	Communicating with management controllers, sector controllers.
Text editor	Viewing and editing text and configuration files. Must support UNIX-style text files.
Web browser	Displaying the Configuration Management (CM) tool and other Web-based tools

Table 3.3 Recommended Software

Unpack the Equipment

The rack is delivered on shipping pallets. The rack is secured in an upright position and is bolted to the pallet. Additional equipment is delivered in separate shipping boxes.

▶ **To unpack the base station equipment**

  1 Transport the shipping boxes to the installation area using a dolly or pallet jack.

  2 Inspect the exterior packaging for any noticeable damage that may have occurred during shipment.

  3 Verify that the shipment is complete by checking the contents of each box against the bill of materials (BOM) or shipping invoice that arrives with each box. The BOM for each box may be located on the outside or inside of the box.

  4 Report any missing or damaged components to the field support coordinator as soon as possible.

  5 Cut the packaging tape on each box using scissors or a utility knife.

  6 Remove the cardboard packaging from the rack:

   i Remove the top of the cardboard packaging.

   ii Remove the cardboard sides. The cardboard sides are bolted to the shipping pallet and pull off with minimal effort.

  7 Remove the protective bags covering the rack.

  8 Check the rack for extra mounting hardware or invoices. If there are additional items, remove them and keep them for future use.

  9 Verify the contents of the other boxes by examining their BOMs.

> **N O T E :** Do not remove any items from their antistatic bags until you are ready to install them.

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  10 Save the packaging material and the BOMs in case any of the equipment needs to be returned or moved in the future.

Review Site Deliverables List

Table 3.4 shows the paperwork that ships with each base station.

Document	Description
Anchor kit	Lists installation kit contents
BOM	Lists every component in the base station
Shelf inspection checklist	Factory inspection of each utility and radio shelf

Table 3.4   Inventory Checklists

▹ To check the inventory

1   Perform an inventory check using the site deliverables list provided with the TBD package and BOMs.

2   Ensure that all equipment and accessories have been shipped.

3   Document any shortages and report them to the field support coordinator so that any missing equipment may be produced and delivered to the site as soon as possible.

4   Ensure that the serial number for each piece of equipment is recorded in the base station's on-site documentation.