6 OneRAN Low Power (PicoCell/MiniCell) Cabling

The following connections are required for OneRAN stand-alone applications, including PicoCell and MiniCell. OneRAN units for these applications are normally configured for 50mW power output and are equipped with an internal duplexer function which requires only a single antenna for normal operation. A second diversity receiver connection is provided if required for the application

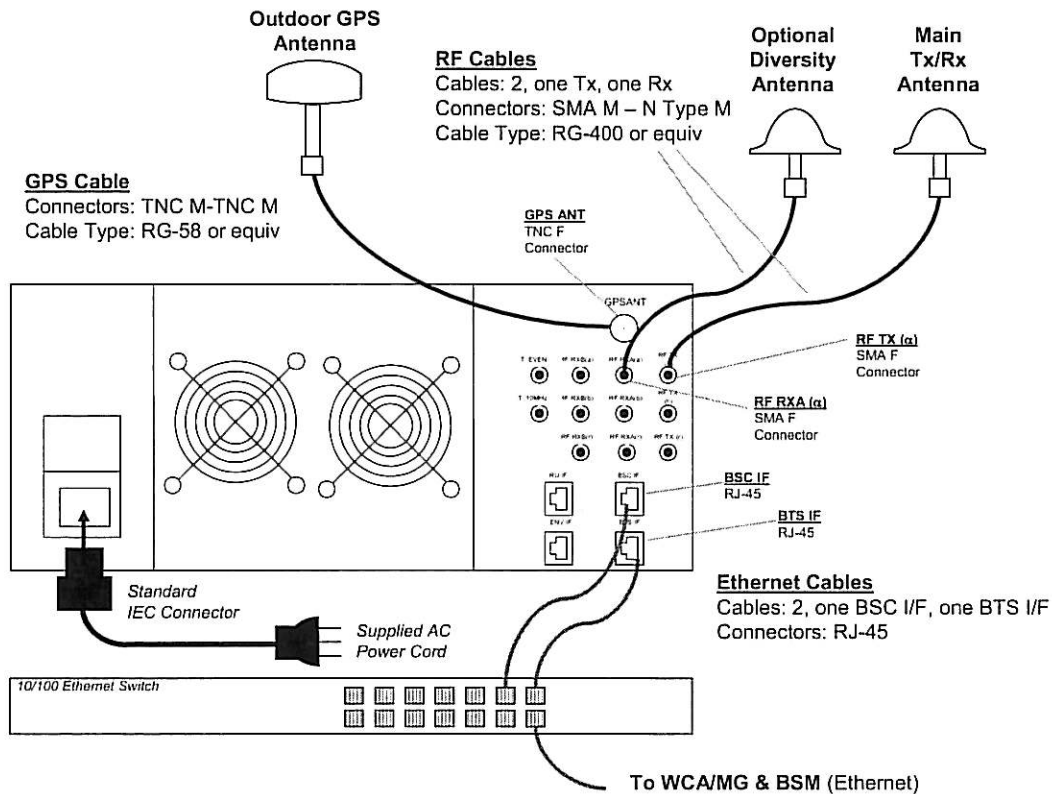Connect power, Ethernet, GPS and RF antenna cables as shown in Figure 6-1.

Figure 6-1 PicoCell/MiniCell Cable Connections

Use only the AC power cables provided with OneRAN unit to ensure continued safe operation.

Use recommended RF and Ethernet cables or equivalent.

Use the optional AirWalk GPS antenna kit (AWANC001GPCA01) when GPS is required for the application. This kit includes a GPS antenna, mounting hardware and a 25m cable.

Note the GPS antenna must located outside in a position to see the general sky. The GPS antenna must see at least 4 GPS satellites in the sky to receive enough time information for proper system operation when GPS is required.

7 Frequency Setting Procedures

NOTE: This section provided to meet regulatory requirements in certain jurisdictions which require local frequency setting procedures. Normally frequency settings should be made only in the BSM system which will subsequently download them to the base station. Refer to the BSM manuals for configuration and operating instructions.

7.1 BSM Management

The OneRAN series base stations are normally managed by the centrally located BSM (Base Station Manager) system which communicates with the OneRAN over an IP connection.

The BSM will download system software and configuration information which includes the physical FA (Frequency Assignment) for each base station. The base station will tune to the correct frequency as defined by the BSM configuration files.

Refer to the BSM operations manual for instructions on base station remote configuration.

7.2 Local FA Setting

It may required to set the OneRAN series base station physical FA (frequency assignment) locally for specialized test purposes or when the BSM connection is unavailable (for example during early BTS installations). This can be done using the local MMI (Man Machine Interface) port and a local PC.
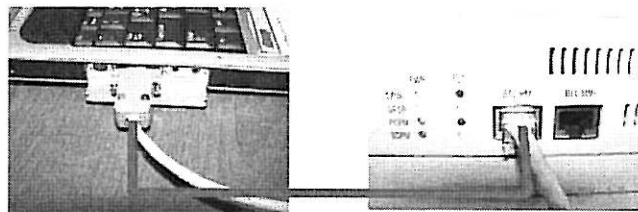
The configuration data downloaded from the BSM will override local settings when BSM connections are established.

Refer to the MMI instruction manual for further information on other commands.

7.2.1 MMI Connection

Connect the serial port of the PC to the "BTS MMI" port on the OneRAN front panel. Use only the Serial MMI cable provided by AirWalk and the following port settings:

115200 baud
8 bit
No Parity
1 stop bit
No flow control

7.2.2 FA Change Procedure

The following menu driven commands will permit local change of the FA.

Step 1

At the prompt enter the following:

> pn3383   // this will take you to the menu screen which looks something like this:

================== PN 3383 ====================

   1. Tx Test

   2. Rx Test

   3. ParameterSetup

   4. Rf Gain Display

   5. xcvbSetup

   6. ampSetup

   7. Normal Gain Display

   8. MakeTestCall

   9. callClear

   10. Overhead Calibration Control

   11. Test Phone Setup (619 2221001)

   12. Handoff Test

   0. Exit

   Select Number ===>

Step 2

Enter the following:

Select number => 5   // it will take you to the below menu screen.

================== Xcvb Setup ====================

   1. Change Ch

   2. Tx On

   3. Tx Off

   4. Rx_Main_AGC ON

   5. Rx_Main_AGC OFF

   6. Rx_Sub_AGC ON

7. Rx_Sub_AGC OFF

8. Set RxMain ATT

9. Set RxSub ATT

10. Set Tx Att

11. Xcvb Status

12. showXcvrAttGain

0. Exit

Select Input Number =====>

Step 3

Enter the following:

Select Input Number => 1 // choosing 1 will take you to the below menu.

ALPHA : xcvrChangeCh Num [001 ~ 1500] [1175] [/0:Exit]==>

Step 4

From the above menu, type the new channel desired (CDMA channels from 1 to 1500) and 0 to exit. Note that for 3 sector base stations Step 3 must be repeated for each sector (alpha, beta, and gamma).

Note that only standard CDMA channel numbers within the designated band capability of the radio will be accepted by the base station.

8 Installation Procedures

This Section gives instructions for installing the OneRAN Series IP-RAN and for connecting it to the wireless infrastructure.

Always refer to the Cell Site Installation documents provided by the Project Engineer for the specific project. These instructions will include site specific installation requirements in addition to generic installation practices. Site specific installation instructions could also include special arrangements for power supplies, cabling, backhaul equipment connections and other specific requirements.

Prior to installation, it is necessary to assign IP addresses and a permanent base station ID for each IP-RAN system installed. The IP address of the managing BSM system is also required. This essential information is needed for site configuration prior to leaving the site. Once the IP-RAN ID, IP addresses and managing BSM IP address are installed in the OneRAN Series IP-RAN base station, the base station can then establish a link to the BSM and download the site specific configuration information in addition to any updated software loads.

It is recommended that the central managing BSM system be installed and each base station configuration exists in the BSM prior to installation of the site. If this prteparation is done then each installed base station will obtain a correct configuration immediately after installation and proper operation can be verified by the installer vefore leaving the site.

If the managing BSM is not present prior to installation, then the IP-RAN can be installed and will continuously attempt communication with the BSM until found and a configuration downloaded. This allows base stations to be installed prior to the installation of a central managing BSM system installation if the project schedule requires this.

8.1 Installation Verification

Before installing the equipment, it is necessary to verify the following:

8.1.1 Verify Customer Contact & Equipment location

1) Verify customer and installer contact names for the installation. Contacts names should be provided for all persons or groups involve in site preparation or planning.

2) Verify a site specific installation plan is available and includes details on power connections, backhaul and LAN connections, RF antenna system connections.

3) Ensure Installation team (if more than one person on team).

4) Determine when contacts are available for help (e.g.; Time of day, day of week.) for customer, installation teams and persons involved in the site planning.

5) Obtain any site access or security requirements (e.g.: ID Badges, Card-keys, Keys, Access codes) required to access installation site.

6) Locate the CoreCell™ IP-RAN equipment and any required support equipment. Arrange transportation of equipment to the site, if required.

7) Check for any visible shipment damage to the equipment prior to transportation or installation. If any damage is observed, then notify the carrier or responsible party to resolve any insurance inspection issues prior to handling or opening the packages.

8) Determine where the IP-RAN equipment is to be installed. Obtain and review site documentation including diagrams, floor plans and connection requirements before visiting the site.

9) Visit the site and verify that there is enough space to safely install the equipment and connections.

8.1.2 Uncrate and arrange for packing material disposal

1) Carefully unpack the OneRAN Series IP-RAN and related components from packing material.

2) Check for any equipment damaged during shipment that was not visible from the outside. If any damage is observed, then notify the carrier or responsible party to resolve any insurance inspection issues prior to handling

3) Verify all components required for the site installation are provided. Any discrepancies or shipment errors must be resolved with the installations co-coordinators as required.

4) Make arrangements for the disposal of all packing material discarded during installation. Note that some crating materials may require return to the manufacturer or warehouse for reuse and therefore suitable arrangements must be made.

8.1.3 Verify location of power distribution points

1) Locate the customer or site provided power connection points and verify adequacy.

2) AC powered models require a designated 120 VAC minimum 15A or 240 VAC minimum 7A outlet. No other equipment or receptacles should be connected to this outlet, other than low power accessories needed to support the IP-RAN operation such as an Ethernet switch. Use only the 6' power cord supplied with the IP-RAN unit.

3) +24 VDC Models require a rectified and filtered nominal 24V DC power source. Voltage can range from 22 VDC to 28 VDC to allow use with a float charged battery system. A designated 50A source with independent over current protection is required for each IP-RAN unit (fused or circuit breaker). No other equipment should be connected to the designated circuit breaker.

4) DC powered models require suitable cables with connector lugs to be supplied by the installer for connection to the DC power source. A #4 or a #2 AWG gauge fine stranded cable is recommended. Other gauges may be required depending on the calculated voltage drop. The recommended bolted bus bar connection is a Blackburn p/n CLT2-2516 or equivalent. Use the bolts supplied with the IP-RAN to connect to the bus bar.

5) Proper ground connections are essential for both safety and for proper RF performance. Racks must be equipped with either a grounded bus bar running the height of the rack, or a common bonding point with a dedicated ground cable connected to a common cell site ground system. Installation requires that both the IP-

RAN main unit and the RU amplifier system be connected to a common site ground using ground straps provided with the system. The site ground system must be independently tested and verified for low resistance to ground.

8.1.4 Verify location of LAN facilities and connection points

1) Locate the customer provided LAN connection points. This could be a dedicated Ethernet switch, or a set of Ethernet connection points on an IP transport system terminal.

2) The IP-RAN system requires two independent IP addresses for proper operation (BSC IP Address and BTS IP Address. It is essential that the BSC and BTS be able to communicate with each other through the closest IP transport device. Therefore it is recommended that a local Ethernet Layer 2 switch be provided at each base station site to support this local communication requirement. This must be provided either by the local IP transport terminal equipment, or by using a small local Ethernet switch.

3) DC powered site requiring a small local Ethernet switch can obtain +12VDC power to operate the Ethernet switch from the optional DC out connection on the rear power connection panel of the IP-RAN main unit.

4) All Ethernet connection should be made using RJ-45 connectors and Category 5 or 6 Ethernet cables capable of supporting 10/100BaseT operation.

5) The static IP Address setting for the IP-RAN will be done after power up using the web server tool (ref BSM Operations Manual). A site connection and IP addressing diagram should be prepared for each site and posted at the site after installation.

6) It is strongly recommended that a copy of local site IP routing and addressing diagrams be sent to AirWalk at the following address to support any remote diagnostics needed.

> AirWalk Customer Service Centre
> 1830 North Greenville Ave.,
> Richardson, Texas   75081

8.1.5 Verify location of RF Antenna systems, including GPS

1) Locate the site antenna systems, transmission lines and interconnection jumpers. Follow the site interconnection diagrams provided by the RF Systems Engineer. It is essential both for proper system operation and for regulatory or licensing requirements that the antennas are connected to the correct sectors using the correct jumper cables.

2) Any discrepancies or problems must be clarified and changes approved by the designated RF Systems Engineer prior to powering up any base station.

3) Locate the GPS antenna cables and verify the cable is equipped with a TNC connector for connection to the IP-RAN base station. Note that base station operation is still possible without a GPS connection, however it will not be possible to implement soft handoff and related features. In cases where GPS is not provided, the base station will obtain local time from the BSM time server to ensure mobile handset display is correct.

8.1.6 Verify physical mounting racks are present and suitable

1) Rack mounted IP-RAN systems must be mounted in a suitable 19" EAI standard rack system that can support the weight of the IP-RAN and also provide adequate rear support for the power supply. Mounting height requirements are as follows:

    a. Main Unit   4 RU (Rack Units) [1 RU = 1.75" (44mm)]

    b. RU System   8 RU (Rack Units) [3 Secotr RU system]

    c. AC PSU   2 RU [AC models only]

    d. DC RPSU   1 RU [DC models only]

2) The normal unit stacking line up is (from bottom to top): PSU/RPSU; RU; Main Unit. Do not change this lineup since all the factory supplied cables are sized for this stack up.

3) It is MANDATORY that suitable rear support be provided at the bottom of the IP-RAN stack.

    a. In the case of 4 post racks, provide rear support using either a rear cross bar support, a shelf, or mounting brackets for the rear of the chassis.

    b. In the case of 2 post racks, provide a suitable heavy duty shelf capable of holding at least 100 lbs (45 kg). Other options include using a centre balanced shelf or installing a 4 post conversion kit with a support shelf.

4) Rack mounting screws are to be supplied by the installer as required.

8.2 IP-RAN Installation Procedures

8.2.1 IP-RAN System Physical Installation

1) First, install any support shelves or brackets required to provide rear support.

2) Locate the correct holes and install the heaviest rack unit first, which will normally be the RU system. Installation normally requires at least 2 people to lift a located the unit due to the heavy weight. Secure the RU system to the rack using appropriate rack mounting screws. Install a screw for each RU rack mounting hole to ensure enough physical support is provided.

    NOTE: The RU is heavy; At least 2 people are required to lift and position the RU.

3) Install the PSU (AC models only) or the RPSU (DC models only) below the RU system. Ensure the PSU or RPSU engages with the rear weight support mechanism (shelf or brackets). Secure the PSU or RPSU using suitable rack mounting screws.

4) Install the IP-RAN main unit above the RU system. Secure the IP-RAN main unit using suitable rack mounting screws.

8.2.2 Internal System Cable Connections

1) Install the RU control interface cable between the IP-RAN main unit and RU.

2) Install the alarm interface cable between the PSU or the RPSU and the RU.