UTStarcom

MovingMedia® 2000

.

iCell CDMA2000 1X

Pico BTS

BASIC INSTALLATION GUIDE

RELEASE 4.5
DRAFT 0.1
PART NUMBER NXX0306XXX

Regulatory

This device complies with Part 15 of the FCC Rules. Operation of this device 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.

Where appropriate, the use of the equipment is subject to the following conditions:

CAUTION! Unauthorized modifications or changes not expressly approved by UTStarcom could void compliance with regulatory rules, and thereby your authority to use this equipment.

WARNING (EMI) - United States FCC Information - This equipment has been tested and found to comply with the limits pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in an appropriate 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 communication. 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 or more 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

To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite output from the antenna cannot exceed 1.26 Watts EIRP and the antenna must be permanently installed in a fixed location that provides at least 13 cm of separation from all persons.

1 PREFACE

1.1 Objective

This document provides installation and configuration instructions for setting up an iCell-CDMA2000 1X system. It covers physical installation, software installation for the various iCell components (sBSC and BTS), configuration, and initial system operation.

1.2 Organization

The major sections of this guide are as follows:

Table 1-1: Organization Table

Chapter	Title	Description
Chapter 1	Preface	Introduction to the Installation Guide.
Chapter 2	iCell System Description	Describes the System components
Chapter 3	BTS Physical Installation	Provides mechanical installation and wiring instructions.

1.3 Reference Documents

The following table summarizes the applicable reference documents.

Table 1-2: Reference Documents

Ref.	Title	Number
1	iCell CDMA2000 1X Alarms and Statistics	
2	iCell CDMA2000 1X Configuration Guide	

1.4 Acronyms and Abbreviations

The following table summarizes the acronyms and abbreviations used throughout the document.

Table 1 -3: Acronyms and Abbreviations

1PPS	One Pulse Per Second
AAA	Authentication, Authorization, and Accounting function
Abis	Protocol interface between sBSC and BTS
ASN.1	The language used to define the MIB of the NE
EM	Element Manager
GPS	Global Positioning System
HLR	Home Location Register
sBSC	iCell Base Station Controller
BTS	iCell Base Station Transceiver Subsystem
iMB	iCell Main Board
IOS	Inter-Operability Standard; A-Interface between sBSC and MSC
IP	Internet Protocol
iPA	iCell Power Amplifier
MIB	Management Information Base
MS	Mobile Station (phone)
MSC	Mobile Switching Center
NE	Network Element or agent
NOC	Network Operations Center
OID	Object Identifier
OMC	Operations & Maintenance Center
PA	Power Amplifier

PDSN	Packet Data Serving Node
PSTN	Public Switch Telephone Network
RF	Radio Frequency
SMSC	Short Message Service Center
SNMP	Simple Network Management Protocol
SNTP	Simple Network Timing Protocol To Be
TBD	Defined
TCP	Transmission Control Protocol
TOD	Time Of Day

2 iCell SYSTEM DESCRIPTION

This chapter provides an iCell system description.

2.1 Introduction

The iCell is an IP-based solution for CDMA2000 1X radio access networks.
The iCell system provides the overall functionality of a CDMA2000 1X Base station transceiver subsystem (BTS) and soft base station controller (sBSC), providing an IP over Ethernet interface to the core network. Figure 2-1 shows the system architecture.
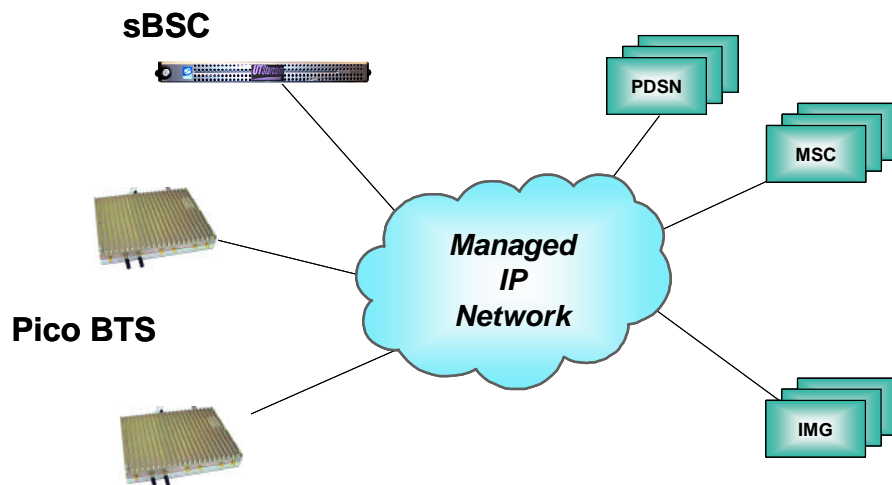

Figure 2-1: iCell System Block Diagram

2.2 System Components

The main iCell system network components are explained in this section.

2.2.1 BTS

The BTS is the iCell Base Station Transceiver Subsystem. There can be several BTS units per sBSC.

The BTS is the radio transmitter/receiver that maintains communication with Mobile phones. It can be configured as Omni, two sectors or 3 sectors.

The BTS is connected through a Fast Ethernet Switch to the sBSC.

Normally in an enterprise installation, the first BTS unit is connected to the GPS receiver and serves as an SNTP server for the sBSC and the other BTS units served by the sBSC. This BTS distributes the TOD protocol messages to other BTS units. The SNTP server on the first BTS is defined by an IP address. Each additional BTS unit served by the sBSC is configured to refer to the IP address of the SNTP server.

For single isolated Pico installation where GPS synchronization for handoff is not required, there is also an option to use an external SNTP server for correct TOD eliminating the need to install a GPS unit. (see Figure 2.3)

2.2.2 sBSC
The sBSC has the following features:
- The sBSC is the iCell Soft Base Station Controller which can support several BTS units
- The sBSC must be identified by the MSC
- The sBSC is configured to refer to the IP address of the SNTP server

2.2.3 Global Positioning System (GPS)
The following GPS-produced signals are used for each BTS when Soft or Hard Handoff is a requirement:
- Time Of Day (TOD) message
- Synchronized 1 PPS

2.2.3.1 Direct GPS and Daisy Chain of 1 PPS source

For in-building installations, the GPS receiver is connected to one BTS (the first BTS) in each cluster, directly through the 1 PPS IN SMA connector and the RS232 TOD port. The 1PPS signal can be extended via coax to other nearby BTS units using the "1PPS OUT" port of the first BTS going to the 1 PPS IN port of the next BTS.
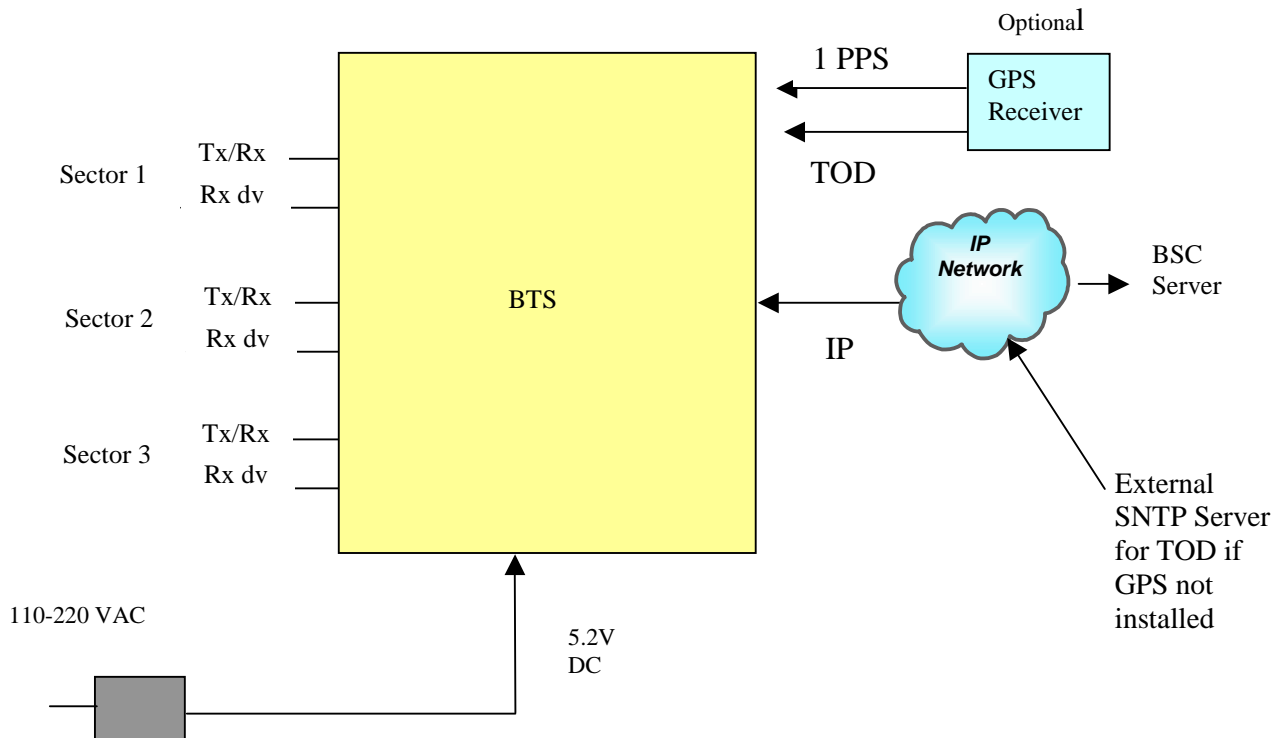

Figure 2-3: Optional GPS Signals

2.2.4 Simple Network Time Protocol (SNTP) Server

The SNTP server provides client and server services to obtain and set accurate date and time in network-connected devices. It operates in three selectable modes:

- Unicast:
  - ⇒ A client sends a request to a designated time server at its unicast address and receives a response from which it determines the time.
- Multicast:
  - ⇒ A time server periodically sends a message containing the current time to a designated multicast group address. The client listens on this multicast address.
- Anycast:
  - ⇒ A client sends a request to a designated local broadcast address or multicast group address. One or more time servers reply with their own unicast address and the client binds to the first one it receives. The client continues operation in unicast mode.

3 BTS PHYSICAL INSTALLATION

3.1 General

This chapter provides physical installation and wiring instructions for the BTS.

3.2 Unpacking

Upon receipt of, and before opening the iCell packages, inspect for any damage that might have occurred during shipping. If the package shows any signs of external damage or rough handling, notify your carrier's representative.

CAUTION
All modules are susceptible to electrostatic discharge (ESD) even while installed. Take the necessary precautions to minimize electrostatic damage while handling modules.

Carefully remove all parts and hardware out of the packages. Carry out a full inventory before installation procedure starts.

3.2.1 BTS 19" Rack Mount Packing List

The iCell 19" Rack Mount package includes the following:

1. 1U 19" Chassis complete with AC or DC power supply

2. Optional GPS Unit (Mandatory when CDMA Handoff is required)

1

3.2.2 BTS Wall Mount Packing list

The iCell wall mount package includes the following:
1. Pico BTS complete with cover
2. AC adapter unit
3. Wall Mounting bracket
4. Optional GPS unit (Mandatory when CDMA Handoff is required)

3.3 Mounting Instructions

The section provides instructions for the following:
- 19" rack mounting
- Wall mounting

3.3.1 BTS 19" Rack Mount

See Figure 3-1 and Figure 3-2.
1. Insert the BTS 1X 19" unit into a 19" rack. Secure with four NF10 screws.
2. Connect BTS 19" Rack Mount according to paragraph 3.4.2.

Figure 3-1: BTS 19' Rack Mont Rear View

Figure 3.2: BTS 19" Rack Mount Front View

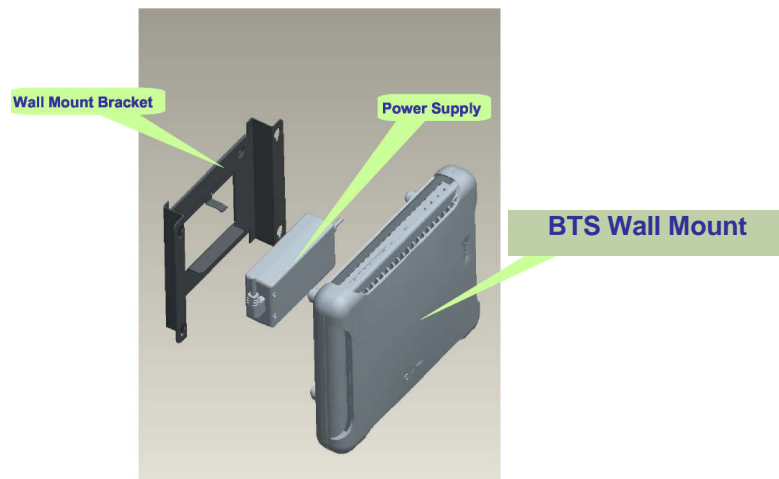### 3.3.2 BTS Wall Mount

See Figure 3-3.

Figure 3-3: iBTS Wall Mount

Perform the wall mounting. Mark the location of the drilling holes according to Figure 3-4. Drill three holes

Hang the Mounting Bracket in the marked location and fasten with three screws.

Mount the Power Supply onto the Wall Mount Bracket. Assemble the iCell unit to the bracket on the spacers. Connect a BTS module according to section 3.4.2.
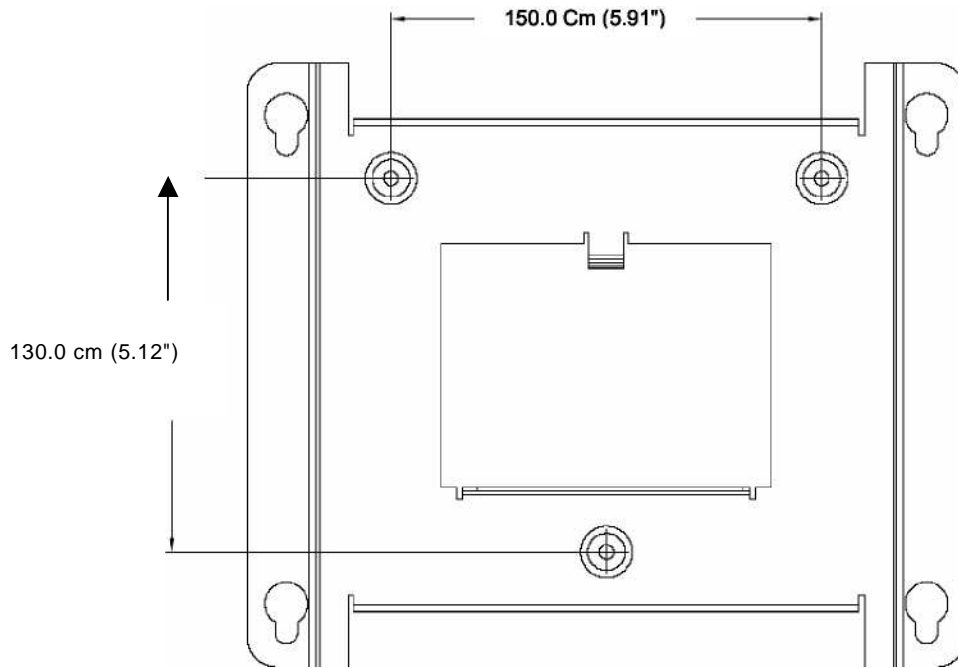
Figure 3-4: Hole Location for Mounting Bracket

To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite EIRP output from the antenna cannot exceed 1.26 Watts EIRP and the antenna must be permanently installed in a fixed location that provides at least 13 cm of separation from all persons. This is maximum separation based on the possibility of connecting the Pico to a very high gain directional antenna of 11 dBi. A more typical 3 dBi gain antenna would result in a separation distance of 5 cm.

3.4 Interface Connections

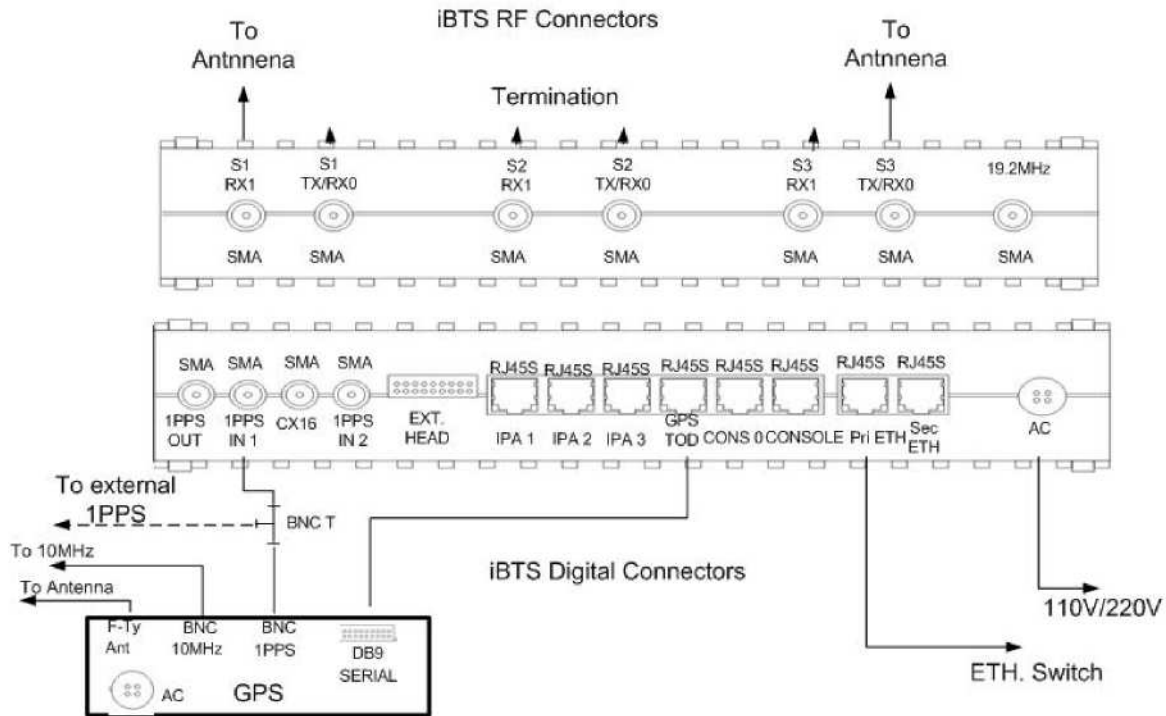### 3.4.1 BTS Interface Connections

Verify that the power switch is off and the external AC power line is disconnected.

3.4.2 BTS Interface Connection

Figure 3-7 illustrates the wiring diagram of the wall mount configuration and Table 3-4 provides the wiring parameters.

Figure 3-7: Wall Mount Wiring Diagram

Table 3-4: iBTS Wall Mount–Wiring

BTS		MCN	Destination	
Name	Type		Name	Type
Pri Eth	RJ45S	Standard CAT5	Ethernet Switch	RJ45S
GPS TOD	RJ45S	45-89332-M3	GPS	DB9
Console	RJ45S	45-89330-M3	PC	DB9
1 PPS IN 1	SMA	TBD	GPS 1 PPS	BNC
Power Supply Switching	AC Power	363-02155-0002 or 363-06097-0015	External Source Power	

NOTE

All SMA connectors that are not connected should be terminated.

3.4.2.1 Connecting to GPS

To Connect GPS:

- Connect the GPS receiver ANT F-Type connector the GPS antenna cable.
- Connect the GPS receiver SERIAL DB9 connector the BTS GPS TOD connector with cable MCN 45-89332.
- Connect the BNC T receiver adaptor (female) to the BTS 1 PPS IN SMA connector with cable MCN 45-89800-1.

3.4.2.2 Miscellaneous Connections

To connect the remainder connections:

- Connect BTS Primary Ethernet port through Internet switch to BTS.
- Connect BTS S1 Tx/RX1 to external antenna or to DAS for typical omni configuration.
- Rx diversity is not normally required for Pico in-building deployments.
- All unused SMA connectors should be terminated.
- For wall mount Pico, connect 4 pin DIN cable from AC adapter output to BTS 5.2VDC input and connect AC adapter to 110 or 220 V AC supply
- For AC Rack mount version, just connect the AC cord to 110 or 220 V AC supply.
- For DC Rack Mount version, make sure the main rack breaker is off and the BTS power switch is in the off position. Connect the –48v wire as indicated on the rear of the unit marked "–" or "–48v" and the positive (Bat. Rtn) wire to the terminal marked "+" or Bat Return.

The BTS unit is now ready for configuration and testing.