Base Station Quick Installation Guide

This Quick Installation Guide is intended for experienced installers. For more information refer to the relevant sections in the System Manual.

Packing List

Check that the package contains:

BS-SH Base Station Chassis

The BS-SH installation kit includes the following components:

- BS-SH chassis with blank panels
- Rubber legs for optional desktop installation

AU-E-BS Access Unit(s)

Up to six AUs can be installed in each Base Station. Each AU includes:

- BS-AU Network Interface module
- AU-E-BS-ODU outdoor unit
- Pole mounting kit for the ODU

BS-PS-AC Power Supply Module(s)

Up to two BS-PS-AC power supply modules can be installed in each Base Station chassis. The BS-PS-AC installation kit includes the following components:

- BS-PS-AC power supply module
- Mains power cord

BS-PS-DC Power Supply Module(s)

Up to two BS-PS-DC power supply modules can be installed in each Base Station chassis. The BS-PS-DC installation kit includes the following components:

- BS-PS-DC power supply module
- DC power cable

Additional Installation Requirements

For each AU:

- Indoor-to-outdoor Category 5E Ethernet cable and two shielded RJ-45 connectors (for 3rd party cables use only Category 5E cables approved by the supplier). The length of the Indoor-to-Outdoor cable should not exceed 90 meters. The length of the Indoor-to-Outdoor cable, together with the length of the Ethernet cable connecting the IDU to the data equipment, should not exceed 100 meters.
- Ethernet cable (straight for connecting to a hub/switch etc., crossed for connecting directly to a PC's NIC)
- Crimping tool for RJ-45 connectors
- Antenna and RF cable
- Ground cables with an appropriate termination

General:

- Mains plug adapter or termination plug (For AC power supplies, if the power plug on the supplied AC power cord does not fit local power outlets)
- Portable PC with Ethernet card and Telnet software or configuration utility SW and a crossed Ethernet cable
- Installation tools and materials, including appropriate means (e.g. a pole) for installing the outdoor unit.

Equipment Positioning Guidelines

WARNING:	ONLY experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor units and antennas. Failure to do so may void the equipment warranty and may expose the end user or Service Provider to legal and financial liabilities. The manufacturer and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of Outdoor Units or antennas.

ATTENZIONE:	SOLO professionisti esperti che hanno familiarità con le norme di costruzione locali e coi codici di sicurezza e, ove applicabile, sono autorizzati dalle autorità governative competenti possono installare unità esterne ed antenne. Assicurarsi che le unità esterne, antenne e strutture di supporto siano installate correttamente per eliminare ogni pericolo fisico a persone o cose. In caso contrario, ciò può invalidare la garanzia del prodotto e può esporre l'utente finale o il fornitore di servizi a responsabilità legali ed economiche. Anche quando la messa a terra non è obbligatoria in base alla normativa regolatoria applicabile e ai codici nazionali, è obbligatorio garantire che l'unità esterna e il palo dell'antenna siano messi a terra e idonei dispositivi di protezione contro i fulmini siano utilizzati in modo da fornire protezione contro le sovratensioni e le scariche statiche. In ogni caso, il Fornitore e i suoi rivenditori non sono responsabili per eventuali danni fisici, danni ad oggetti o violazioni del regolamento associati con o causati dall' installazione, la messa a terra o di protezione contro i fulmini.

Select the optimal locations for the equipment using the following guidelines:

- The outdoor unit can be either pole or wall mounted. Its location should enable easy access to the unit for installation and testing.
- The higher the placement of the antenna, the better the achievable link quality.
- AU-ODU units should be installed as close as possible to the antenna (to ensure that the antenna's characteristics are not affected the distance must be higher than 10 cm).

- The antenna connected to the AU-ODU unit, should be installed so as to provide coverage to all Subscriber Units (SUs) within its service area.

NOTE: The recommended minimum distance between any two antennas serving adjacent sectors is 2 meters. The recommended minimum distance between two antennas serving opposite cells (installed back-to-back) is 5 meters.

- The indoor equipment should be installed as close as possible to the location where the indoor-to-outdoor cable enters the building. The location of the indoor equipment should take into account its connection to a power outlet and the customer's equipment.

Installing the ODUs

NOTE: Ensure that outdoor units, antennas and supporting structures are properly installed to eliminate any physical hazard to either people or property. Make sure that the installation of the outdoor unit, antenna and cables is performed in accordance with all relevant national and local building and safety codes. Even where grounding is not mandatory according to applicable regulation and national codes, it is highly recommended to ensure that the outdoor unit and the antenna pole (when using external antenna) are grounded and suitable lightning protection devices are used so as to provide protection against voltage surges and static charges. In any event, the supplier is not liable for any injury, damage or regulation violations associated with or caused by installation, grounding or lightning protection.

The Outdoor Unit can be mounted on a pole using one of the following options:

- Special clamps and threaded rods are supplied with each unit. There are two pairs of threaded holes on the back of the unit, enabling to use the special clamps for mounting the unit on diverse pole diameters.
- ODU HW Revision D and lower: Special grooves on the sides of the unit enable the use of metal bands (not included in the package) to secure the unit to a pole. The bands must be 9/16 inches wide and at least 12 inches long.

NOTE: Mount the unit with the bottom panel, which includes the LED indicators, facing downward. Insert the threaded rods with the grooves pointing outward, as these grooves enable you to use a screwdriver to fasten the rods to the unit.

Connecting the Cables to the ODUs

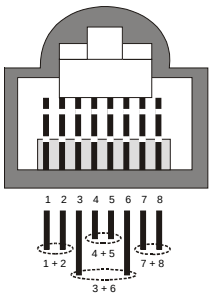
1. Use appropriate sealing material to protect the ODU connections against moisture and humidity. Use removable sealing material, such as a tar seal, to enable future access to the connector. Use high quality sealing material such as Scotch® 130C Linerless Rubber Splicing Tape from 3M to ensure protection against dust and water. Loop & tie the cables near the unit for strain relief and for routing water away from the unit: use additional cable strips to route the cable such that water can accumulate on the cable bends, away from the unit.
2. Connect a grounding cable between the ground terminal of the ODU (marked ⏚) and a good ground connection. Connect the RF connector (marked ⍑) to the antenna. The RF connectors should be properly sealed to protect against rain and moisture.

Preparing the IDU-ODU Cable

Use a crimp tool for RJ-45 connectors to prepare the wires. Insert them into the appropriate pins and use the tool to crimp the connector. Make sure to do the following:

- Remove as small a length as possible of the external jacket. Verify that the external jacket is well inside the sealing cover when connected to the unit, to ensure good sealing.
- Pull back the shield drain wire before inserting the cable into the RJ-45 connector, to ensure a good connection with the connector's shield after crimping.

The following diagram and table show the required wire pair pin-to-pin connections, including the color codes used in cables supplied by the manufacturer.



Wire color	Pin		Wire color	Pin
Blue	1		Brown	4
Blue/white	2		Brown/white	5
Orange	3		Green	7
Orange/white	6	⇔	Green/white	8

For ODU with HW Revision D or lower:

1. Remove the two screws holding the waterproof seal to the ODU and remove the waterproof seal. Unscrew the top nut from the waterproof seal.
2. Route a straight Category 5E Ethernet cable (8-wire, 24 AWG) through both the top nut and the waterproof seal. Insert and crimp the RJ-45 connector. Connect the Ethernet cable to the ODU's RJ-45 connector.
3. Replace the waterproof seal and tighten the top nut. Make sure that the external jack of the cable is well inside the waterproof seal to guarantee a good seal.
4. Route the cable to the location selected for the indoor equipment. Assemble an RJ-45 connector with a protective cover on the indoor end of the cable.

For ODU with HW Revision E or higher:

1. Remove the sealing cap of the IDU COM connector.

2. The sealing cap has a special groove allowing insertion of an Ethernet cable with an already assembled RJ-45 connector through the cap. To expose the groove, lightly squeeze the cap. Carefully insert the cable with the assembled connector through the groove.
3. Put the sealing cap back in its place to ensure protection against moisture. Make sure that the small protrusion on the side of the cap fits inside the hole on the connector's protective body.
4. Route the cable to the location selected for the indoor equipment. Assemble an RJ-45 connector with a protective cover on the indoor end of the cable.

Installing the BS-SH Chassis and Modules

1. Install the BS-SH chassis in a 19" cabinet. To prevent over-heating, leave a free space of at least 1U between the upper/lower covers of the BS-SH chassis and other units in the cabinet.
1. OR:
2. Place the BS-SH chassis on an appropriate shelf or table. When mounting the BS-SH on a shelf or table, attach the rubber legs supplied with the unit.
3. Connect one end of a grounding cable to the ground terminal located on the rear panel of the BS-SH chassis and firmly tighten the grounding screw. Connect the opposite end of the grounding cable to a ground connection or to the cabinet, if applicable.
4. Carefully insert the BS-PS power supply and the BS-AU modules into the relevant slots and push firmly until they are securely locked. Before insertion, verify that the switches of all BS-PS modules are in the OFF position. Close the captive screws attached to each module. Place blank covers over all of the unused slots.
5. Connect the indoor-to outdoor cable(s) to the RADIO connector(s) of the BS AU module(s).
6. If a BS-PS-DC power supply is used, connect the DC power cord to the -48 VDC IN jack of the BS-PS-DC power supply. If a redundant power supply module is installed, connect a DC power cord also to the second DC power module. Connect the power cord(s) to the -48 VDC power source, as follows:
   a. Connect the black wire to the 48 VDC contact of the power source.
   b. Connect the white wire to the + (Return) contact.
   c. Connect the shield to the ground.
7. If a BS-PS-AC power supply is used, connect the AC power cord to the AC IN jack of the BS-PS-AC power supply. If a redundant power supply module is installed, connect an AC power cord also to the second AC power module. Connect the power cord(s) to the mains outlet.
8. Switch the BS-PS-AC/DC power supplies to ON. Verify that all power indicator LEDs on the BS-PS-AC/DC front panel are ON and that the OVERTEMP alarm indicator is off.
9. Configure the basic parameters in all BS-AU modules as described below.
10. Connect the 10/100 BaseT LAN connector(s) to the network. The cable connection should be straight Ethernet if connecting the indoor unit to a hub/switch and a crossed cable if connecting it directly to a PC Network Interface Card (NIC).

NOTE:
- The length of each of the Ethernet cables (the cable connecting the indoor unit to the user's equipment and the Indoor-to-Outdoor cable) should not exceed 100 meters.
- Reset the unit using the RESET button after connecting or reconnecting the indoor and outdoor units with the indoor-to-outdoor cable.

Configuring Basic Parameters of AUs

Initial configuration can be performed either via Telnet or using the configuration utility.
Connect a PC to the Ethernet port, using a crossed cable. The default IP address is 10.0.0.1.
If you use Telnet for initial configuration, run the Telnet program. Select your permitted access level and enter your password (the default Installer password is "user"). Access the Basic Configuration menu and configure the basic parameters required to allow connectivity with the Subscriber Units and to support remote management of the unit. In many installations, most of these parameters should not be changed from their default values. The following list includes the basic parameters and their default values:

Basic Parameters

Parameter	Default Value	Comment
Ethernet Port Negotiation Mode (in Unit Control Parameters)	Auto Negotiation	
IP Address	10.0.0.1	
Subnet Mask	255.0.0.0	
Default Gateway Address	0.0.0.0	
DHCP Options	Disable	
Access to DHCP	From Ethernet Only	
ESSID	ESSID1	
Hidden ESSID Option	Disable	
Operator ESSID Option	Enable	
Operator ESSID	ESSID1	
Country Code Select	Depends on factory configuration	Applicable only for 5.4 and 5.8 GHz units. Country Code must comply with local regulations.
Sub-Band Select	1	

Parameter	Default Value	Comment
Frequency	The lowest frequency in the selected Sub-Band	
DFS Required By Regulation (if DFS is supported by Country Code)	Depends on Country Code	
Frequency Subset Definition (if DFS is supported)	All frequencies	Applicable only if DFS is enabled
DFS Detection Algorithm (AU using Universal Country Code in 5.4 or 5.8 GHz band)	ETSI	Applicable only if DFS is enabled
Transmit Power	Dependent on HW revision, unit type, Sub-Band and Antenna Gain.	
Tx Power	On	
Antenna Gain	According to the antenna supplied with the unit and the Sub-Band.	If set to “Not Set Yet”, must be configured according to actual value, taking into account cable’s attenuation (otherwise the unit will not transmit).
ATPC Option	Enable	
Cell Distance Mode	Automatic	
Maximum Cell Distance	0 (No Compensation)	
Per SU Distance Learning	Disable	
VLAN ID-Management	65535	
Authentication Algorithm	Open System	Availability of security parameters depends on support according to the country code.
Data Encryption Option	Disable	
Security Mode	WEP	
Default Multicast Key	Key 1	
Key 1 to Key 4	00……0 (32 zeros, meaning no key)	

NOTE: Some parameters are changed to their new values only after reset. After the basic parameters are configured, the unit should be reset in order to activate the new configuration.

Operation Verification

Outdoor and Indoor Units

To verify the correct operation of the units, examine the LED indicators located on the bottom panel of the outdoor unit and on the front panels of the indoor modules:

AU-ODU LEDs

Name		Description	Functionality
W-LINK		Wireless Link Indictor	■ Green – Unit is associated with one or more SUs ■ Blinking red – No associations ■ Off – Wireless link is disabled
Status		Self-test and power indication	■ Green – Power is available and self-test passed. ■ Blinking Amber – Testing (not ready for operation) ■ Red – Self-test failed – fatal error
ETH		Ethernet activity/ connectivity indication	■ Green –Ethernet link detected. ■ Amber – No Ethernet connectivity between the indoor and outdoor units.

BS-AU LEDs

Name	Description	Functionality
W-LINK	Wireless link activity	■ Green - At least one SU is associated. ■ Blinking Red - No SU is associated. ■ Off - Wireless link is disabled.
ODU CURRENT CONSUMPTION	Current Consumption of the Outdoor Unit	■ Red - over current. ■ Blinking Red - open circuit or below anticipated current consumption. ■ Green - within tolerance.
ODU STATUS	Outdoor Unit Self-test	■ Green - Self-test passed and ODU ready for operation. ■ Blinking Amber - Testing (not ready for operation) ■ Red - fatal failure.
IDU PWR	Power indication for the Indoor Unit	■ Green - IDU power is OK. ■ Off - no power is supplied to the IDU.
ALARM	Indoor Unit Alarm Indication	■ Red - a fatal failure indication. ■ Off - IDU is functioning properly.

BS-PS LEDs

Name	Description
54V	Green LED. Indicates that the 54V power supply module is OK
3.3V	Green LED. Indicates that the 3.3V power supply module is OK
OVER TEMP	Red LED. Indicates an over temperature condition in the power supply module

Verifying the Ethernet Connection

After connecting the unit to an Ethernet outlet, verify that the Ethernet Integrity Indicator, which is the yellow LED embedded in the 10/100 BaseT connector, is on. This indicates that the unit is connected to an Ethernet segment. The Ethernet Activity Indicator, which is the green embedded LED, should blink whenever the unit receives or transmits traffic on the 10/100 BaseT port.

Verifying the Indoor-to-Outdoor Connection

After connecting the unit to an Ethernet outlet, verify that the Ethernet Integrity Indicator, which is the yellow LED embedded in the RADIO connector, is on. This indicates that the unit has detected an Ethernet link connection. The Ethernet Activity Indicator, which is the green embedded LED, should blink whenever the unit receives or transmits traffic on the RADIO port.

Electronic Emission Notices

This device complies with Part 15 of the FCC rules.
Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference Statement

The Base Station 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 and to EN 301 489-1 rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial, business and industrial environments. 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 the user's own expense.

FCC Radiation Hazard Warning

To comply with FCC RF exposure requirement, the antenna used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meter from al persons for antennas with a gain up to 28 dBi.

R&TTE Compliance Statement

This equipment complies with the appropriate essential requirements of Article 3 of the R&TTE Directive 1999/5/EC.