3.4 MA 850 Installations

MA 850 may be integrated into the MA 2000 system using one of the following installations:

- Installing it directly on the MA 2000 RC top panel (using the supplied plate);
- Mounting it on a rack (using the supplied plate);
- Wall mount near the MA 2000 cabinet.

The coax outputs of the cabinet are connected to the appropriate ports on the MA 850 and the **antennas are connected directly to the MA 850 module.**

3.4.1 MA 850 RC 2000 Assembly

1. Assemble two side brackets to the plate sides as illustrated in Figure 3-10.
2. Assemble the MA 850 module to the supplied bracket using the four screws and washers as illustrated below.

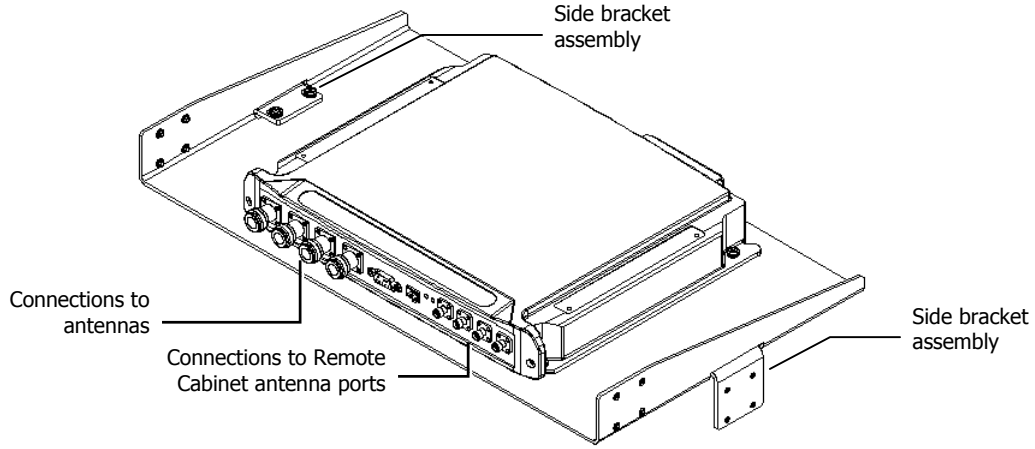


Figure 3-10. MA 850 Rack Installation

3. Assemble the plate to the MA 2000 RC by securing the brackets to the cabinet sides as illustrated below.

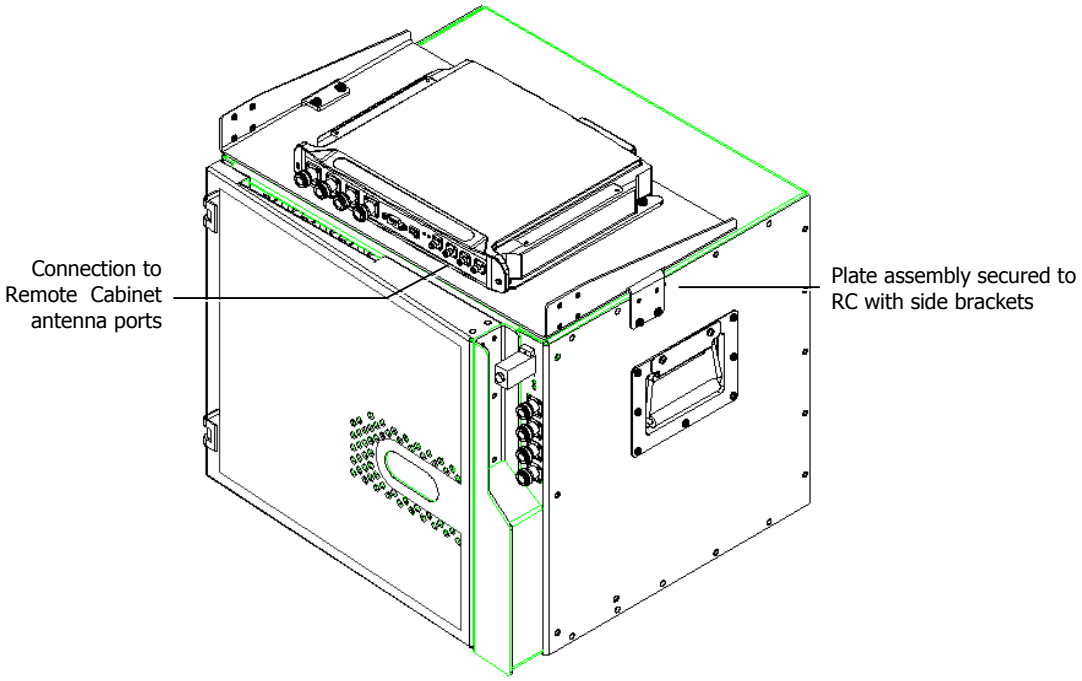


Figure 3-11. Illustration of MA 850 Mounted on MA 2000 RC

4. Connect the RC antenna ports to the MA 850 front panel port connectors as illustrated below.

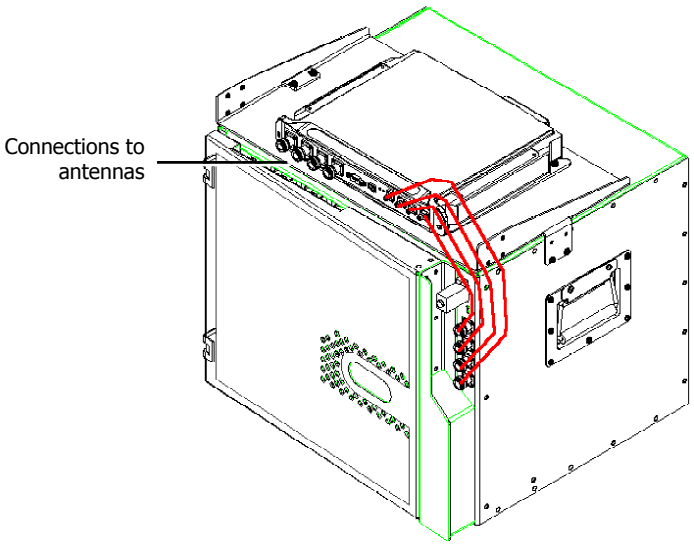


Figure 3-12. Illustration of RC Antenna port connections

5. Connect the antennas to the **MA 850 antenna ports**.

3.4.2 MA 850 Rack Mount

1. Assemble the side brackets as illustrated in Figure 3-10.
2. Assemble the MA 850 module to the supplied bracket using the four screws and washers.
3. Mount the assembly in the rack using the side brackets.

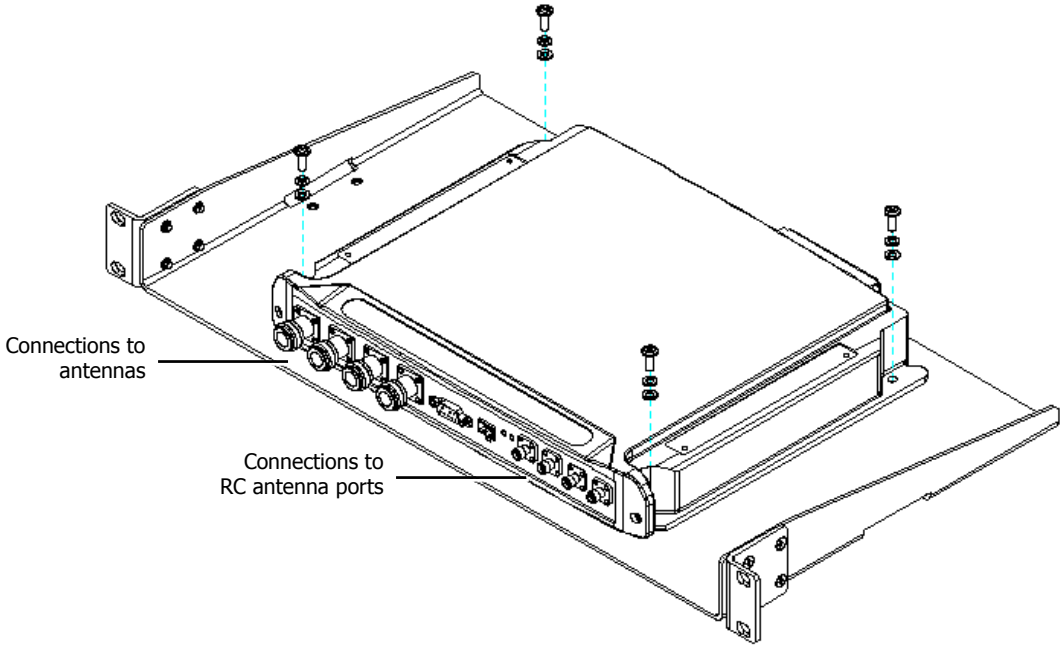


Figure 3-13. MA 850 to Bracket Installation

4. Connect the RC antenna ports to the SMA connectors on the MA 850 front panel.
5. Connect the antenna to the **MA 850** antenna ports.

3.4.3 MA 850 Wall Mount Installation

The MA 850 may be mounted independently on the wall near the RC cabinet.

1. Connect the RC antenna ports to the SMA connectors on the MA 850 front panel.
2. Connect the antenna to the **MA 850** antenna ports.

3.5 2000 Lite Installation and Connections

MA 2000 Lite is designed to be a wall mounted device. It is usually installed in the communication shaft of the corresponding floor and is powered from an external power source. It may also be connected to a backup battery.

The remote units are mounted externally to the 2000 Lite device and their antenna outputs are connected to either side of the 2000 Lite device. The combined outputs are then connected to the antennas in the covered area.

2000 Lite is capable of supporting two types of remote units: **RU 2000** and **MA 850** (wireless 802.11a/b/g coverage). A **MA 1200 add-on** module can be connected to each RU 2000 module to provide additional services.

The MA 2000 Lite connections are shown in the following figures. Note that the power connections are on the underside, and the coax connections are at the sides of the modules.

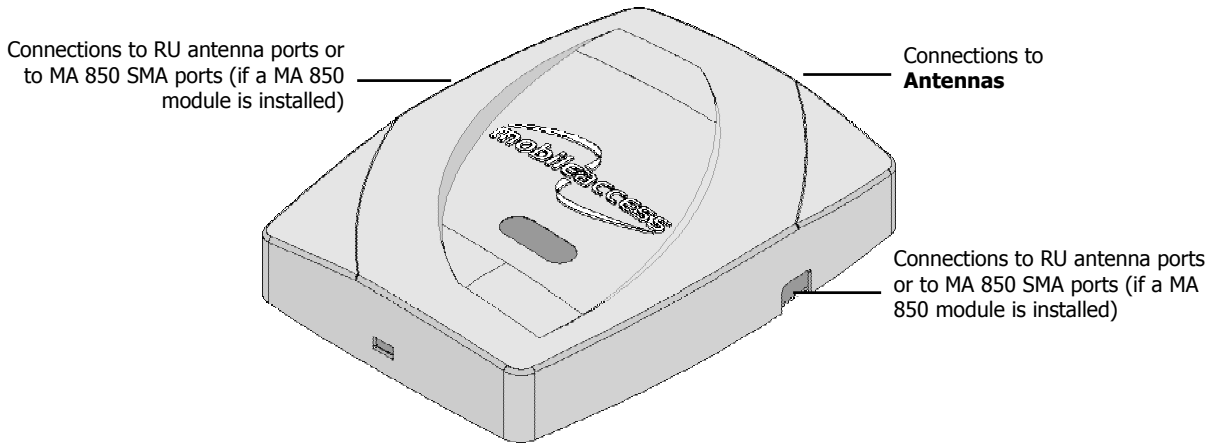


Figure 3-14. 2000 Lite System coax connections

3.5.1 MA 2000 Lite Coax Connections

1. Connect the RU 2000 antenna ports to the appropriate connectors at the side of the MA 2000 Lite module.

   NOTE: *The additional require RU 2000 connections are described in section 4.4.1.*

2. Connect the antennas to the **MA 2000 Lite** antenna ports.

3.5.2 MA 850 Installation Connections

1. Connect the **2000 Lite antenna ports** to the MA 850 **From Mobile Services** connectors on the MA 850 front panel.
2. Connect the **antennas** to the **MA 850 Antenna ports.**

4 System Elements

4.1 Overview

This chapter describes each of the system elements, and their individual connections. It can be used as reference to verify the connections of each module or to upgrade your system. In order to describe the installation process clearly, it will be described as consisting of two logical parts:

A. **Telecommunications room** – installing the **RIU**s, **BUs**, **MA 410/430 controllers**, and the required *passive equipment* in the telecommunication room close to the RF signal source. This installation may differ between single and multi-building topologies.

B. **Remote locations** – **RC** installations and connections. These are *usually* wall mounts.

The installations for two basic topologies are described in detail: for single building and for multi-building. By understanding the two generic installations you will be able to address any variations in system deployment.

NOTE: For installations that include the MA NMS: *Once the installation has been completed, it can be verified using the* ***MCT*** *application (NMS User's Guide) and the devices monitored using the* ***NMS Manager*** *(NMS User's Guide).*

4.2 MA 2000 Remote Cabinet

The MA 2000 Remote Cabinet can house various combinations of up to five RU 2000 and MA 1200 add-on modules. The number of modules depends on the models, required filtering, etc. In addition, a MA 850 module may be installed externally. The Remote Cabinet provides the filtering, combining, power interface and antenna interface functions.

NOTE: *If an MA 860 module is installed as well, the antenna outputs are further connected to the appropriate connections on the MA 850 and the antennas then connected to the MA 850 antenna connections.*

The optic connection from the BUs are routed internally and connected directly to the corresponding RU 2000 module.

The MA 2000 Remote Cabinet is provided in two power configurations:

- Integrated power supply – a power supply is integrated into the cabinet and fed from an external AC power source. The individual modules are internally connected to the power supply. This model includes a battery connection as well.
- External power supplies – the power source is external to the cabinet: it can be from a central remote source (most common configuration) or from local installed dedicated power supplies. Power is routed to external connectors on the Remote Cabinet, where each external power connector is internally connected to a specific module.

The cabinet may be mounted on a wall or in a 19" rack. The appropriate brackets are provided with each type of installation.

The MA 2000 remote cabinet is illustrated below:

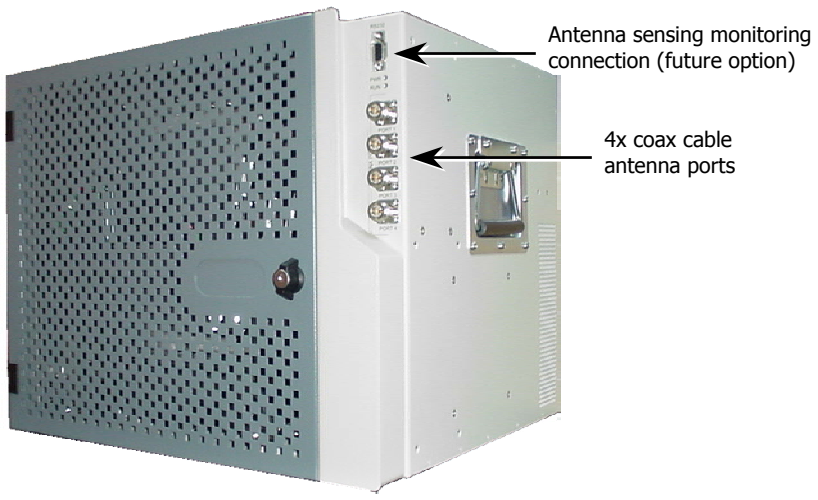


Figure 4-1. RC 2000 Closed Cabinet View

The following figure shows an open RC 2000 cabinet, integrated power supply model, with four RU 2000 modules and four filters. (For clarity, the internal connections are not included).

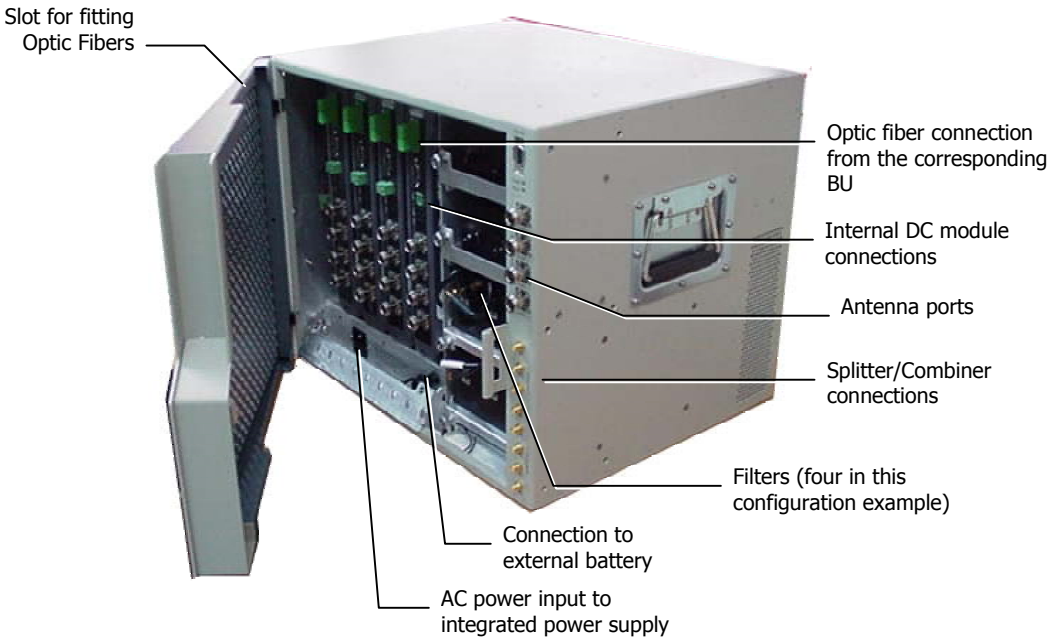


Figure 4-2. RC 2000 Open Cabinet View (without internal connections)

The following image shows the MA 2000 RC with the cabling. Note that the antenna ports of the individual modules are connected to the internal RF connections (under the antenna ports) and the filters as required. The PS connections of each module are also connected to cables that are internally routed to the integrated PS.

NOTE: *The fiber optic connections are not displayed.*

Figure 4-3. RC Open Cabinet with Internal Cabling

4.3 MA 2000 2000 Lite Installation

The 2000 Lite provides the required interface and filtering required to support two RU 2000 modules to which MA 1200 add-on modules can be connected for additional services. This MA 2000 configuration is fed from external power supplies. The RU 2000 modules, the dedicated power supplies and any MA 1200 add-on modules are installed externally to the 2000 Lite.

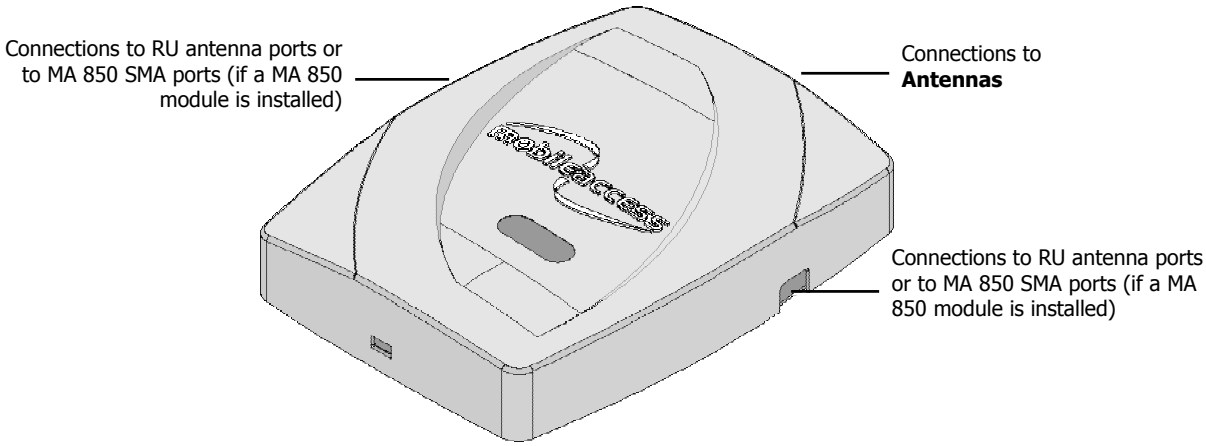


Figure 4-4. 2000 Lite System coax connections

4.3.1 Connections

1. Connect the power connections to the 2000 Lite, the MA 2000 RUs and any other connected MA 1200 add-on modules.
2. Connect the antenna ports of each RU 2000 module to the appropriate connector on the 2000 Lite.
3. Connect the remote module optic fiber connections.
4. Connect the antenna coax infrastructure cables to the 2000 Lite connectors.

4.4 Remote Modules

The Optical to RF conversion of each service at the individual building floors is performed by Remote Units (RU) 2000 modules corresponding to the service types. These consist of MA 2000 RUs and in addition, may include MA 1200 and MA 850 modules.

The location installations may be performed in various configurations depending on the requirements of the site and the supported services. If a Remote Cabinet installation is performed, the RU 2000 and MA 1200 modules are housed inside the cabinet while the MA 850 module is installed externally and integrated into the system. If a 2000 Lite installation is performed, the modules are installed externally to the enclosure.

The following sections describe each of the elements and the connections as they relate to the MA 2000 system.

4.4.1 Remote Units 2000

Each RU supports two different services (one high-band and one low-band). All RUs are add-on ready, meaning that an additional (high-power) service can be added by connecting a **1200 add-on** module to the RU.

A fiber optic connection is implemented between each RU 2000 and corresponding BU. The RU may be remotely monitored through the corresponding BU connection to the MA NMS.

The RU 2000 services, MA 1200 add-on service and MA 850 data services at each location are combined prior to transmission to strategically placed antennas.

RU 2000 Front Panel

The RU 2000 front panel contains the fiber optic connections to the BU, four coax connections to the antennas, power connections and status indicators.

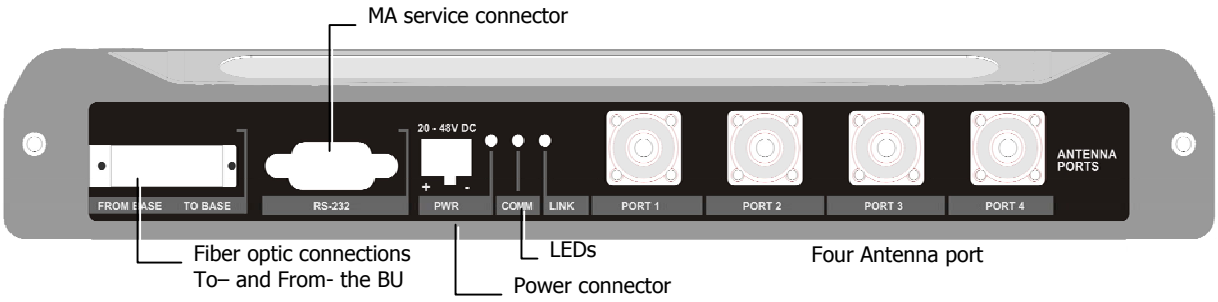


Figure 4-5. RU 2000 Front Panel

Table 4-1. RU 2000 Front Panel Indicators

LED	Description
COMM	Active communication detected
LINK	Optical link to BU detected
PWR	DC power connected

RU 2000 Rear Panel

The RU 2000 rear-panel provides the control, RF interface and optic interface ports that enable connecting an MA 1200 add-on unit to the RU 2000 module.

In addition, the RU rear panel contains the Infrared (IR) sensor used for internal information exchange between the RU 2000 modules and the cabinet in which they are installed (Remote Cabinet configuration only).

Figure 4-6. RU 2000 Rear

Table 4-2. RU 2000 Rear Panel Connectors

Add-on control	Transmits the control signals from MA 1200 add-on module to the RU 2000 module. The **Add-on Control** port is connected to the MA 1200 add-on **From** port.
DL, UL	Transmit the RF signals to- and from- the MA 1200 add-on module. These ports are connected to the corresponding ports on the MA 1200 rear panel: DL to DL, UL to UL.

Connections

1. Install splice box near Remote Cabinet.
2. Connect fiber optic cable to splice box and the SC/APC pigtails to the RU 2000.
3. For the **downlink**, connect the fiber optic cable pigtails from splice box coming from the **BU** port to the corresponding **RU** port.
4. For the **uplink**, connect the fiber optic cable pigtails from splice box from the **RU** to the **uplink port** that connects to the **BU**.
5. Connect the **power** according to power design planning: external (central or dedicated) or integrated power supply (internal connections).

ATTENTION: Verify that 50 ohm terminators are placed on the unused uplink and downlink connectors.

4.4.2 MA 1200 Add-on

The MobileAccess 1200 Add-on module is a high power module, supporting a single frequency band (low or high). It is designed to be integrated with a RU 2000 module.

The RHU 1200 add-on is housed in the MA 2000 cabinet and connected to a RU 2000 that provides the interface to the optical, RF and control signals for both modules.

RHU 1200 Front Panel

The RHU 1200 front panel contains the power connection and status LEDs (the RS-232 connector is reserved for MA service personnel).

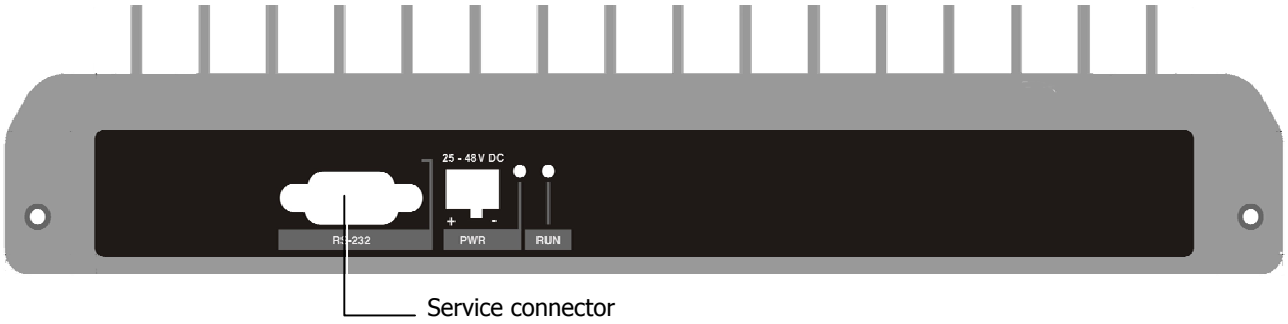


Figure 4-7. RHU 1200 Front panels

Table 4-3. MobileAccess 1200 Front Panel Indicators

LED	Description
RUN	When blinking, indicates that the RHU is in normal operating mode.
PWR	Power ON

RHU 1200 Rear Panel

The RHU 1200 rear panel contains the control connectors and the RF connections to the RU 2000 and MA 850.

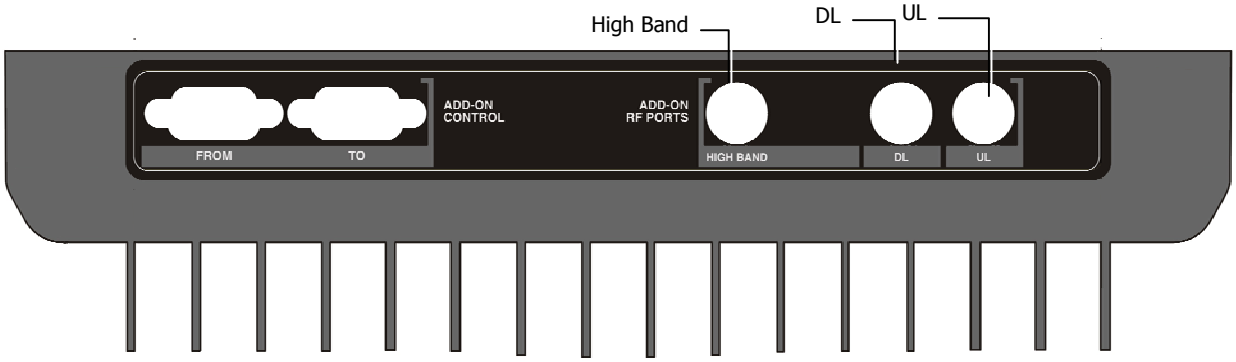


Figure 4-8. RHU 1200 Rear Panel

Table 4-4. RU 1200 Rear Panel Connectors

Add-on Control	Transmits the control signals between the MA 1200 module and the MA 850 and RU 2000 modules. **From –** receives control signals from the RU 2000. Connected to the RU 2000 **Add-on Control** connector.
DL, UL	Transmit the RF signals to- and from- the MA 1200 add-on module. These ports are connected to the corresponding ports on the MA 2000 rear panel: DL to DL, UL to UL.
High	Service RF output port. Connected to combiner/splitter to be combined with other services supported by the MA 2000 system.

Connections

1. Connect the power to the **DC** connector on the front panel.
2. Connect the **MA 1200 From** connector to the **Add-on Control** connector of the corresponding MA 2000 RU.
3. Connect the **High Band** port to the Combiner connectors.
4. Connect the **DL, UL** connectors to the corresponding connectors on the MA 2000 module.

4.4.3 MA-850 Module

MobileAccess 850 provides a *secure* and *centralized* connection for 802.11a/b/g Access Points. It significantly expands 802.11 coverage and enables distributing data and voice services over the same coax and antenna infrastructure used by MA 2000 system.

MA 850 may be assembled on the MA 2000 cabinet top panel, or adjacent to the MA 2000 system (either Remote Cabinet or 2000 Lite configuration). It is integrated into the MA 2000 system by interconnecting the appropriate connectors. The combined signals of the MA 2000 system input to the MA 850 module and then distributed through the same coax broadband antenna infrastructure *connected to the MA 850.*

MA 850 may be remotely monitored through the RU 2000 system to which it is integrated, and remotely configured through a point-to-point Ethernet connection.

The MA 850 front and rear panels, connectors and connections are described in detail in the following sections.

MA 850 Front Panel

The MA 850 front panel contains the antenna ports interfaces, local configuration interface and power connection.

The following figure shows the MA 850 front panel.

Figure 4-9. MobileAccess 850 Front View

Table 4-5. MA 850 Front Panel Connections

Front Panel	Description
Mobile Services	Four SMA female connections to which the antenna port of the MA 2000 system are connected. To be terminated with 50 ohm terminations when not in use
Antenna Ports	Four n-type female antenna connections
Local	Local connection for setup
DC	Power connection: 20V to 48V from a standard power supply

MA 850 Rear Panel

The MA 850 rear panel contains the connections to the APs, the Ethernet port for remote configuration and the connection to the MA 1200 add-on control (if an MA 1200 add-on unit is installed)

Figure 4-10. MobileAccess 850 Rear View

Table 4-6. MA 850 Reart Panel Connections

Rear Panel	Description
802.11b,g APs	Connection to up to four 802.11**b/g** APs, where associated LED Lite under the following conditions: • Green: indicates where AP should be connected after configuration • Green flickering: Link with AP established but no data is received • Red: AP transmitting data
802.11a APs	Connection to up to four 802.11**a** APs
Connection to control	Connection to MA 1200 **To** connector on the rear panel. Used for viewing antenna status
Ethernet port	Connection to network for Web configuration

4.5 Radio Interface Unit (RIU)

The RIU is an operator dedicated unit that interfaces to up to three BTS sources and automatically adjusts the signal output according to changing environmental conditions in order to provide optimal coverage for the site. The RIU is remotely monitored and managed.

Each RIU can support up to three **BTS Conditioner (BTSC)** sub-modules, where each sub-module provides interface to a BTS or BDA of *the same type of service*.

Each RIU can be connected to *four* 8-port Base Units (real panel connections) or to *eight* 4-port Base Units.

Additional BUs can be supported by using splitters and combiners connected to the front panel **Expansion** connectors.

The following figures shows an RIU with three BTSC sub-modules.

Figure 4-11. RIU

Note: *All connections are via RG223 coax cables with 1/2" N-type male connectors*

ATTENTION

1. **The RIU is factory set to 0dB gain on the uplink and downlink. In order to operate properly, an ADJUSTMENT process is required in the field.**
2. **Any unused input and output connectors MUST be terminated with 50 ohms – otherwise the ADJUSMENT procedure results may be affected.**

RIU Front Panel

The RIU front panel contains the indicators and expansion connectors for the connection of additional BUs.

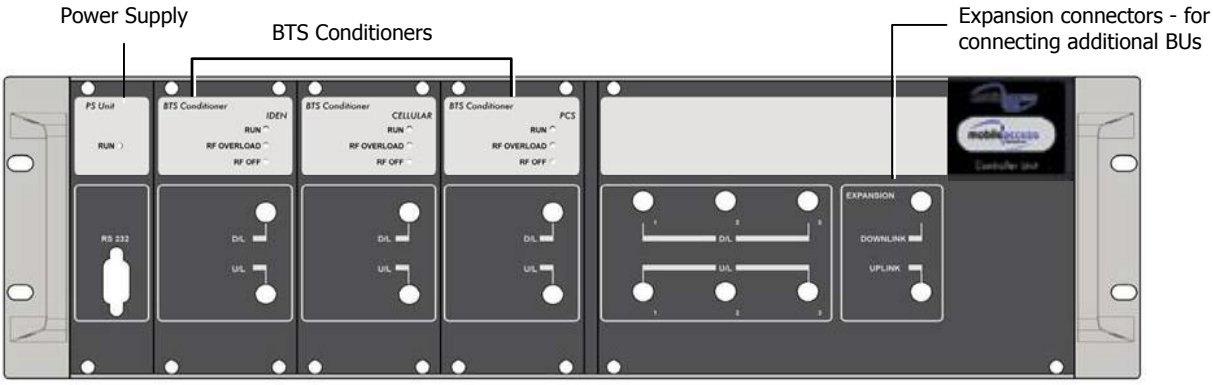


Figure 4-12. RIU Front Panel

Table 4-7. RIU Front Panel Indicators

LED	Description
P.S UNIT **PWR**	ON – input signal is at the required level.
BTS CONDITIONER **RUN**	Flashing -- CPU is running and software loaded
BTS CONDITIONER **DL OVERLOAD**	Continuous Red – RF switch is disconnected to protect the system. This may be due to: • Unpredicted power rise for which the attenuation response was insufficient to compensate and reduce the power to the required level. • Software problem detected. Flashing: When the BTSC DL output power is more than 3dB of the calibrated value.
BTS CONDITIONER **DL LOW**	Continuous Red – if the BTSC DL power is at least 15dB lower than the calibrated BTSC max power level. This condition also triggers an event.

RIU Rear Panel

The rear-panel provides all the connections on the BTS side and on the BU side as well as connections to the MobileAccess 410/430 controller and the power connection. Two types of BTS side connections are available for each BTS conditioner: simplex and duplex.

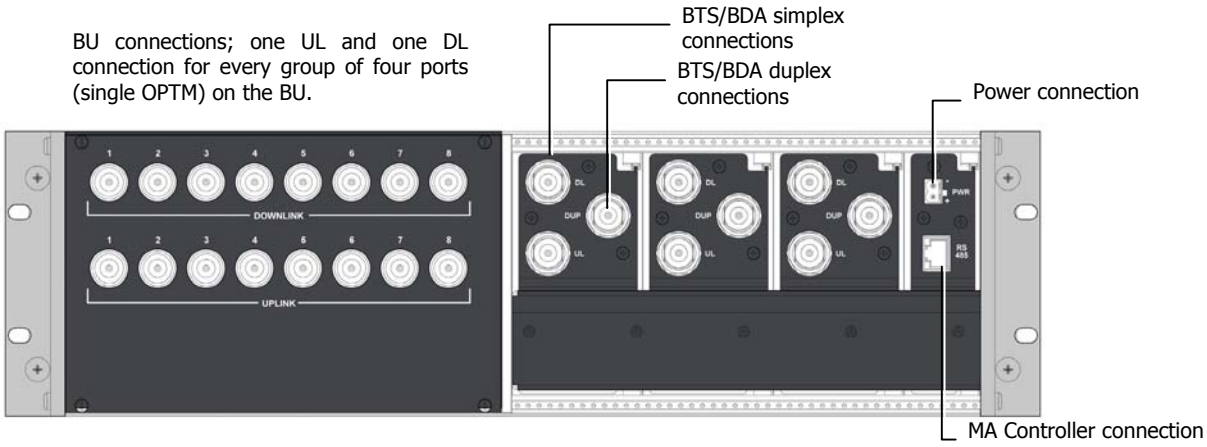


Figure 4-13. RIU Rear Panel showing the RF Connection

RIU Connections

1. Connect each **BU** to the corresponding RF **Uplink** and **Downlink** connectors on the **RIU** *rear panel*. Note that *one uplink* and *one downlink* RIU rear-panel ports are used to connect *one OPTM* (four ports from the BU); two uplink and two downlink ports are used to connect an 8-port BU (two OPTMs).

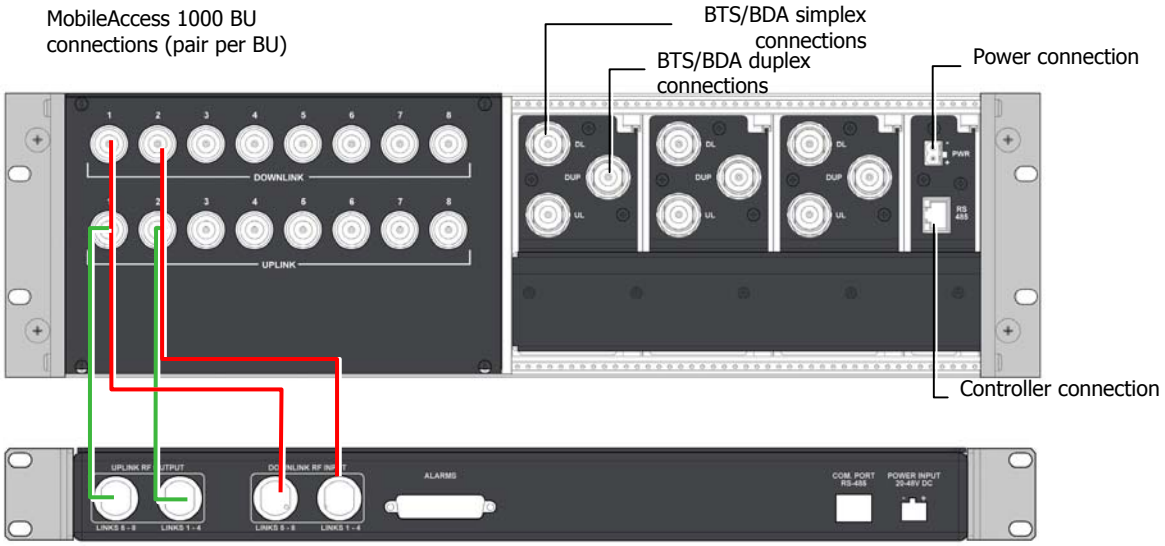


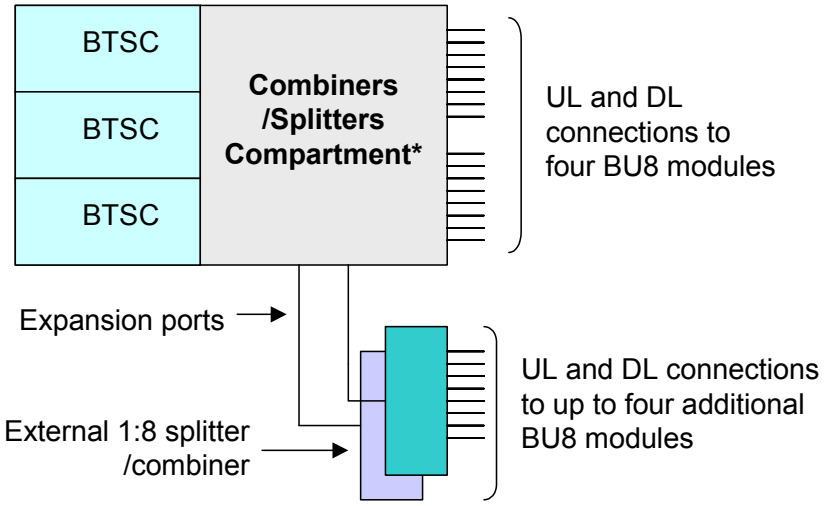
Figure 4-14. RIU Rear Panel showing the RF Connection

NOTE: *Up to four 8-port BU may be connected. Additional BUs may be connected through the* ***Extension*** *connector on the front panel. Refer to section Connections to Additional BUs, page 38.*

2. Connect each BTS/BDA to the corresponding rear panel **BTSC** connectors. For each BTSC connection, both simplex and duplex connections are available:
   - For a duplex connection, connect to the BTSC **DUP** port;
   - For a simplex connection, connect to the BTSC **UL** and **DL** ports;
3. Connect the **Power** connections on the RIU rear panel.
4. If your system includes a MA 410/430 controller, connect the **RS485** port on the RIU rear panel to the controller.

Connections to Additional BUs

To connect more than four 8-port BUs or more than eight 4-port BUs to the RIU, Connect an 8W splitter to the **Downlink** connector on the RIU front panel and an 8W combiner to the **Uplink** connector on the RIU front panel and connect additional BUs to the uplink and downlink connections.



4.6 MA Base Units

The BUs (Base Units) perform RF to optical conversion of the signal on the BTS/BDA side. Each can support up to two services (provided by the same operator). Two models of MA BUs are available: four-port unit – supporting four RUs, and eight-port unit supporting up to eight RUs. The RU models correspond to the services supplied through the BUs.

The BU (and all the corresponding remote units) may be remotely monitored and managed via the **MA NMS** (Network Management System).

The BUs are usually installed in the telecom room adjacent to the BTS/BDA signal source. RF ports on the rear panel provide interface to the BTS side (through connection to RIU or passive interface), while optic ports on the front panel provide interface to the RUs (Remote Units).

This following sections describe the MA BU front and rear panels, including indicators and connectors.

MA BU Front Panel

The front panel contains the optical connections and indicators. The BU is available in two configurations: Four-port - and Eight-port BUs. The eight-port BU consists of two four-port elements where each four-port element has a dedicated set of indicators (PWR, LSR and Link 1 to Link 4 or Link 5 to Link 8).

Figure 4-15. Eight-Port MA BU Front Panel

Figure 4-16. Four-Port BU Front Panel

Table 4-8. MA BU Front Panel Indicators

LED	Description
PWR	Power input detected for the corresponding unit.
LSR	ON - laser circuitry for the corresponding element (group of four ports) is functioning correctly.
Link 1-4, 5-8	ON - the optical link to/from the connected remote functions within the specifications in both directions. Blinking - optical power from remote is lower than expected by at least 2dBm

BU Rear Panel

The BU rear panel contains the RF, Alarms, NMS and power connections. Note that there are two uplink and two downlink RF connections to the BTS side (to an Interface Box or RIU) - each individual uplink and downlink connection corresponds to a four-port BU element. For a four-port BU, one uplink and one downlink port is connected; for an eight-port BU, two uplink and two downlink ports are connected.

For systems that include MA 430 controllers, the **RS 485** port is connected to the MA 410/430 controller to enable remote monitoring and management of the BU from a central location. For systems without remote management, the **Alarms** dry-contact connector pins can be connected to the BTS to provide alarms functionality.

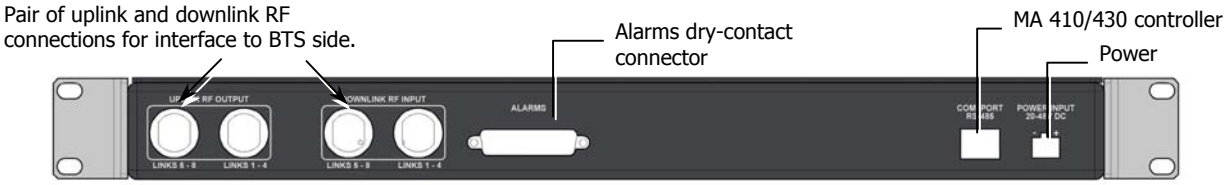


Figure 4-17. MA BU Rear Panel (RF Connections)

Table 4-9. MobileAccess 1000 Rear Panel Connections

Connector	Description
Uplink output	Uplink connectors to be connected on BTS side.
Downlink input	Downlink connectors to be connected on the BTS side.
Com Port RS485	Connection to MobileAccess 410/430 controller.
PWR	Power connection
Alarms	Dry-contact connections to BTS/BDA (normally closed). Relevant only for system without MA 410/430 controllers.

BU connections

1. It is assumed that the patch panel cabinet (SC/APC adaptors) for fiber optic cable connections is installed in the rack near the BUs.
2. Connect (3/125/900) pigtail with SC/APC connectors between splice tray and patch panel cabinet.
3. Connect (3/125/3000) SC/APC jumpers between the corresponding BU and patch panel.
4. Connect the fiber optic cables from the BU to the RUs through the patch panel cabinet.
5. Connect the UL RF Output and DL RF Input connectors to the RIU or UL and DL connectors or to the passive interface (such as Interface Box) in topologies that do not include RIUs.

4.7 MobileAccess NMS System

NOTE: *This section provides general information on the MobileAccess 410/430 Controller. For detailed information on the controller, configuration and connections refer to the Mobile Access NMS User's Guide.*

The MobileAccess controllers enable managing and controlling the MobileAccess system elements. All the monitoring and control operations can be performed from the Master's location.

Two MobileAccess controller configurations are provided: MobileAccess 410 and MobileAccess 430. The models differ in their remote access capabilities:

- MobileAccess 410 provides point-to-point connectivity implemented via either direct RS232 connection or via connection to a DSPN phone line
- MobileAccess 430 provides client/server management capability over TCP/IP network with enhanced monitoring and control capabilities (in addition to the connectivity options provided by MobileAccess 410).

NOTE: *The MobileAccess 430 front panel is differentiated from the MobileAccess 410 front panel by the SNMP Agent Card that provides TCP/IP management capabilities.*

Controller Front Panel

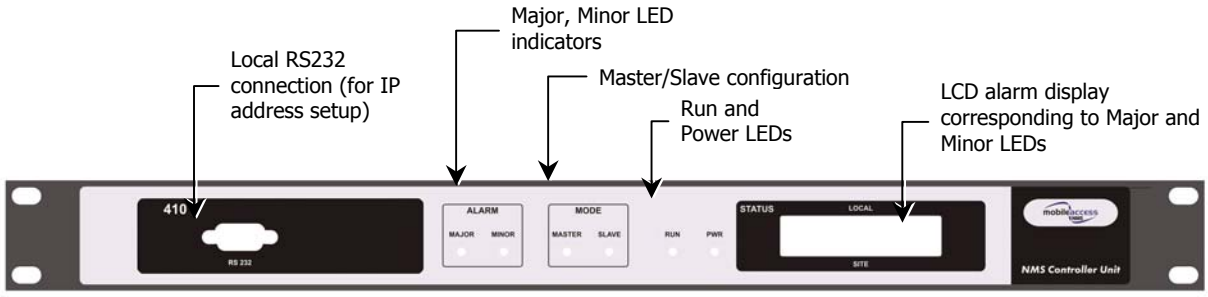


Figure 4-18. MobileAccess 410 Front Panel

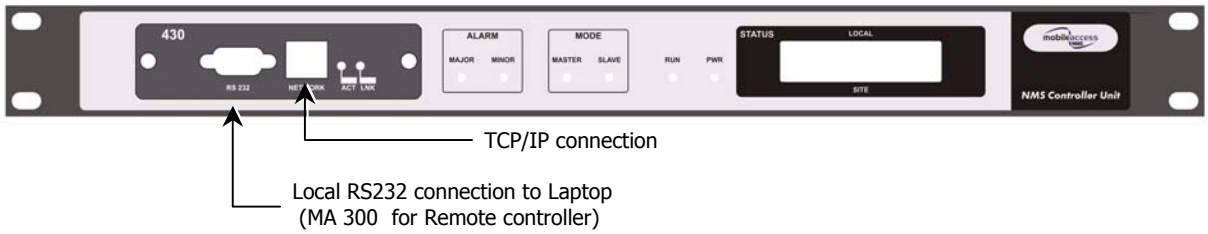


Figure 4-19. MobileAccess 430 Front Panel

Controller Rear Panel

Note: *The rear panels for the MobileAccess 410 and MobileAccess 430 are the same.*

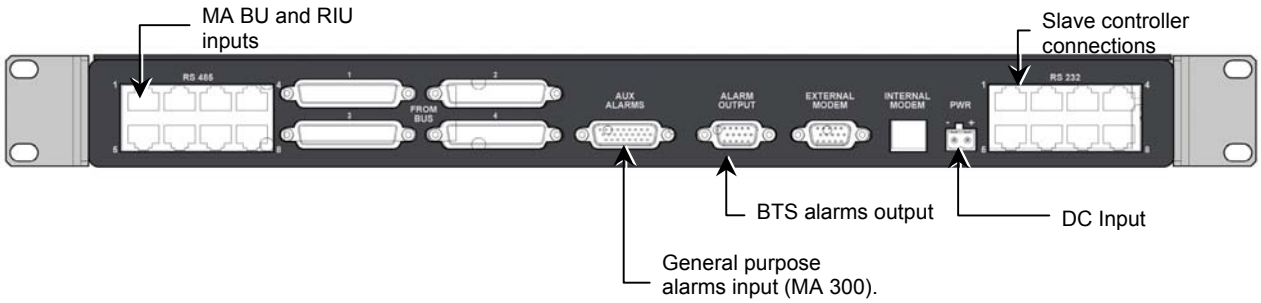


Figure 4-20. MobileAccess 410/430 Rear Panel

5 Appendix I: Optical Test Procedures

5.1 General

Two parameters are of prime importance when testing optical cables or jumpers for use with Mobile Access products:

- **Optical Loss** – the difference between the optical power at the input and output of an optical cable. It must be measured (usually in dB units) at 1310 nm. The maximum allowable loss should be < 0.5 dB/km for Single Mode (SM) cables and < 0.5 dB for every mated pair of connectors.
- **Optical Backreflection** – the percentage of light backreflected from the fiber input (dB units). The maximum allowable backreflection should be < –55 dB for all jumper cables.

The methods to test these parameters will be described below.

5.2 Optical Loss Testing of a Single Mode Cable with SC/APC connectors at each end

5.2.1 Required Test Equipment

- 1310 nm Stabilized Laser Source
- 1310 nm Optical Power Meter
- Two Fiber Optic Test Jumpers with SC/APC connectors at each end
- Two SC/APC Adapters

5.2.2 Test Procedure

1. Set up the Laser Source, Optical Power Meter, and Test Jumper as shown below.

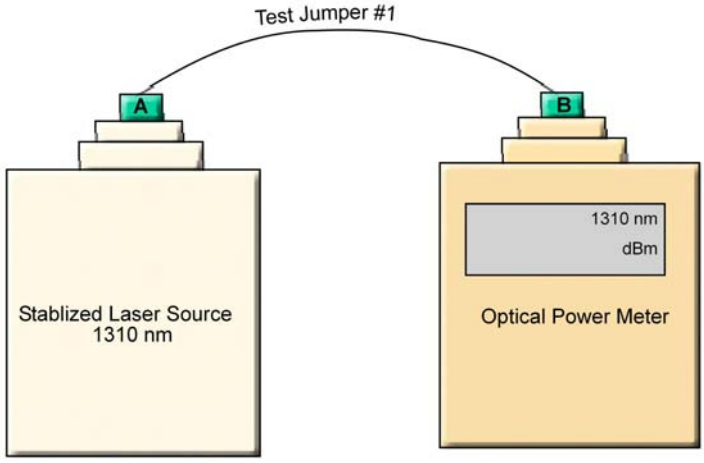


Figure 5-1. Set Up

2. Record reading as **P1** in dBm units.
3. Serially connect the second Test Jumper as shown below.

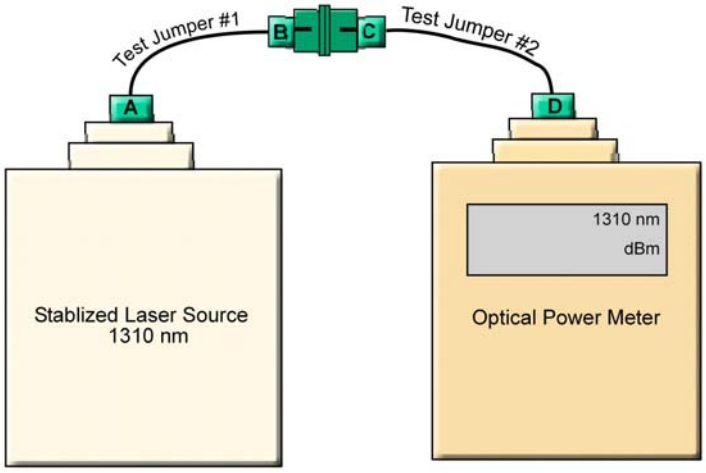


Figure 5-2. Serial Connection of Second Jumper

4. Record the Power Meter Reading as **P2** in dBm units.
5. Calculate Loss **L12** according to the equation: **L12** = **P1** - **P2**
6. If **L12** is lower than 0.5 dB continue to Step-7; otherwise replace these test cables and repeat from Step-1.

7. Disconnect connectors **B** and **C**. Connect the **Cable Under Test** (CUT) between connector **B** and **C** as shown below.

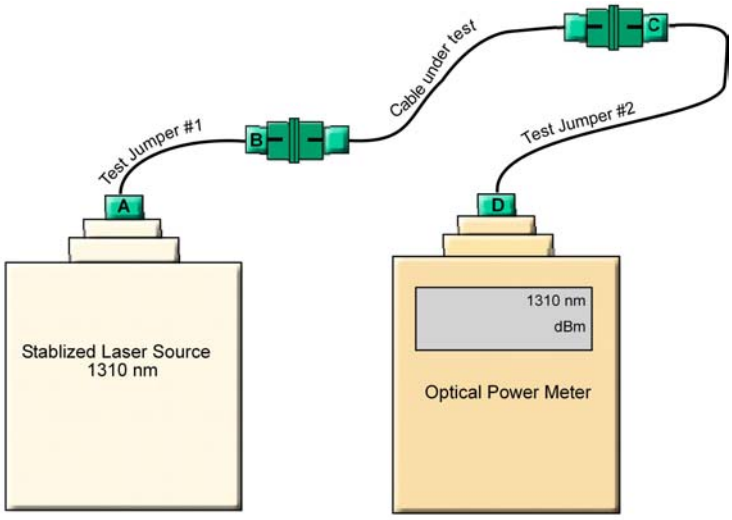


Figure 5-3. Connecting CUT

8. Record Power Meter reading as **Pcut** in dBm units.
9. Calculate Cable Loss **Ldut** from the equation **Lcut** = P2- Pcut.
10. The maximum allowable loss should be < 0.5 dB/km for SM cables and < 0.5 dB for every mated pair of connectors.

5.2.3 Example

Testing a 50 meter cable with SC/APC connectors at each end.

- **P1** = -1dBm
- **P2** = -1.5dBm
- **L12**= **P1** – **P2** = -1dBm - (-1.5) = 0.5 dB

Conclusion: the test cables are of sufficient quality to continue testing.

- **Pcut** = -2dBm
- **Lcut** = **P2** - **Pcut**= -1.5dBm - (-2dBm) = 0.5 dB

This is acceptable since a mated connector pair was added along with the CUT and a loss of -0.5 dB is allowed for every mated pair of connectors.

5.3 Optical Backreflection Testing of SM SC/APC connectors at each end of an optical cable

5.3.1 Required Test Equipment

1. Adjustable1310 nm Stabilized Laser Source with output power greater than 7dBm.
2. 1310 nm Optical Power Meter with a measurement range of up to -70 dBm.
3. One low loss Singlemode 1310 nm 2x2 50%/50% Fiber Optic Coupler with SC/APC connectors at all four fiber pigtailed ports. Pigtail length should be 50 cm.
4. One SC/APC Adapter

5.3.2 Test Procedure

1. Refer to the following figure for port definitions of the Fiber Optic Coupler. The coupler is symmetrical but for our purposes, each port should be identified as shown in Figure 1-4.

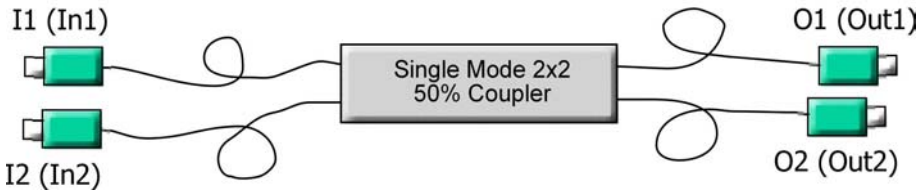


Figure 5-4. Port Identification

2. Measure the loss from port **I1** to **O1** according to the insertion loss method described in the previous section. This loss will be referred to as **LI1O1**. It should be approximately 3.5 dB.
3. Measure the loss from port **O1** to **I2** in a similar manner. This loss will be referred to as **LO1I2**. It should also be approximately 3.5 dB.
4. Calculate Total Loss, **TL** where **TL**= **LI1O1 + LO1I2**. **TL** should approximately 7dB.
5. Adjust the laser output power in dBm to the same value as **TL**.

   For example, if **TL** = 7dB, adjust the laser output to 7 dBm.

6. Connect the laser to port **I1** of the coupler as shown in Figure 5-5.

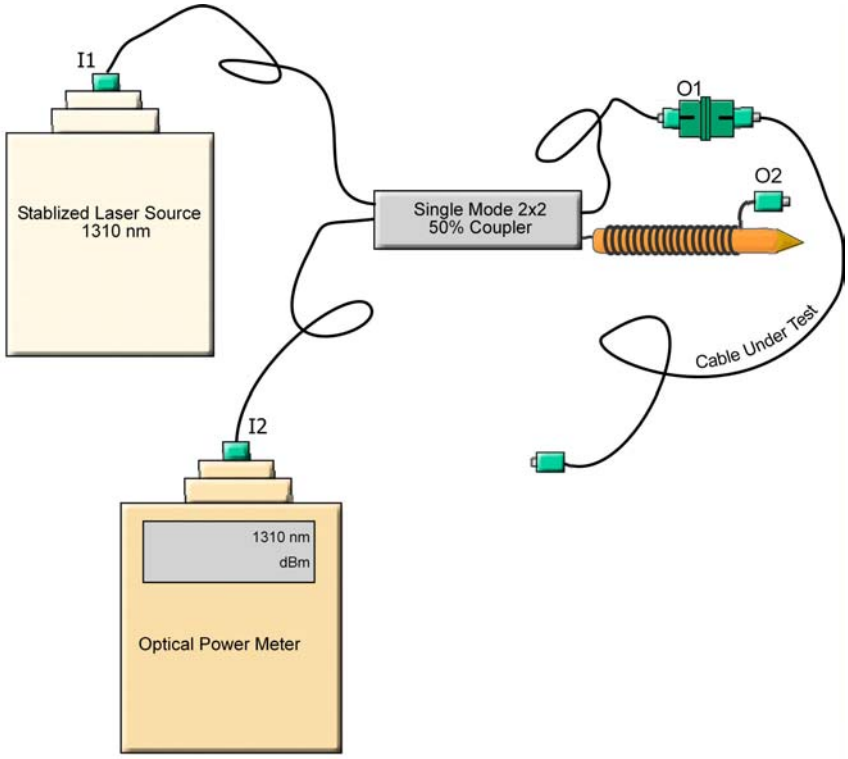


Figure 5-5. Test Procedure Connections

7. Connect the Power Meter to port I2 of the coupler as shown in Figure 5-5.
8. Wrap the **O2** pigtail around a pencil of diameter 7 to 8 mm as illustrated.
9. The power meter readings should be < –58 dBm; otherwise, clean connector **O1** and measure again.
10. Connect the cable under test to connector O1.
11. Record Power Meter Reading as Backreflection, **BRcut**, of the cable under test. The power is measured in dBm units. This is the same value as the backreflection.

    For example, if the power meter shows –58 dBm, the backreflection is –58 dB. The maximum backreflection from the SC/APC connectors should be < –57 dB.

Long cables will have a higher BR since the cable itself reflects a small amount of light. This small amount can grow to a considerable amount over a long length of fiber. To factor out this cable backreflection, perform a mandrel wrap on the cable adjacent to the connector under test and perform all measurements with the mandrel wrap.