

RA-5700 TRI-BAND DISTRIBUTED ANTENNA SYSTEM

USER MANUAL



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0.4 HISTORY

Change No.	ENU	Details Of Change
1	1-0-0	This user manual first created on 28May2010 which referred to its Chinese manual RA-5700-1001YH released in May 2010.
2	1-1-0	Updated Web OMT, added BUS layout in this document in Oct 2010.
3	1-1-1	Update the user manual based on the requirement in Dec 2010.

0.5 GLOSSARY OF TERMS

ALC	Automatic Level Control
ATT	Attenuation
BS	Base Station
BTS	Base Transceiver Station
dB	Decibel
dBm	Decibels relative to 1 milliwatt
DL	Downlink
DPX	Duplexer
DT	Donor Terminal
EEPROM	Electrically Erasable Programmable Read Only Memory
E/O,O/E	Electrical/Optical, Optical/Electrical
Hz	Hertz
ID	Identification
LNA	Low Noise Amplifier
MCU	Main Control Unit
MHz	Megahertz
MT	Mobile Terminal
MTBF	Mean Time Between Failures
NC	Normally Closed
NF	Noise Figure
NO	Normally Open
OMC	Operation & Maintenance Center
OMT	Operation & Maintenance Terminal
OP	Optical Fiber
PA	Power Amplifier
PLL	Phase Locked Loop
POI	Point of Interconnects
PSU	Power Supply Unit
RF	Radio Frequency
RX	Receive
SMA	Sub-Miniature "A" Connector
TX/RX	Transmit/Receive
UL	Uplink
VAC	Volts Alternating Current
VSWR	Voltage Standing Wave Ratio
WCDMA	Wideband Code Division Multiple Access
WDM	Wavelength Division Multiplexer

0.6 FCC SAFETY COMPLIANCE

Comaba Tri-band Distributed Antenna System (DAS) has been tested and complies with the FCC rules.

FCC ID: PX8RA-5700-R

Environmental evaluation and exposure limit according to FCC CFR 47part 1, §1.1307, §1.1310

The below table shows the RF exposure for fixed repeater

	Antenna Type	Safe Distance (cm)	Antenna EIRP(mW)	Antenna Input Power(dBm)	Antenna Gain(dBi)	Requirement (mW/cm ²)	Frequency(MHz)
1	IXD-120V06K0-2(1710-2500MHz)	17.80	3981.07	30	6	1.00	1960
2	IXD-120V06N0-3(806-960/1710-2500MHz)	23.22	3981.07	30	6	0.59	881
		17.80	3981.07	30	6	1.00	1960
3	IXD-360V03K0-2(1710-2500MHz)	11.36	1621.81	30	2.1	1.00	1960
4	IXD-360V03N0-2(806-960/1710-2500MHz)	18.45	2511.89	30	4	0.59	881
		14.14	2511.89	30	4	1.00	1960
5	IXD-360V03N0-3(806-960/1710-2500MHz)	20.00	2951.21	30	4.7	0.59	881
		15.32	2951.21	30	4.7	1.00	1960
6	IXD-360V03N0-33(698-896/1710-2700MHz)	25.39	3981.07	30	6	0.49	737
		25.15	3981.07	30	6	0.50	751
		23.22	3981.07	30	6	0.59	881
		17.80	3981.07	30	6	1.00	1960
7	IXD-360V03N0-52(806-960/1710-2700MHz)	20.00	2951.21	30	4.7	0.59	881
		15.32	2951.21	30	4.7	1.00	1960
8	IXD-360V03N0-54(698-960/1710-2700MHz)	20.17	2511.89	30	4	0.49	737
		19.98	2511.89	30	4	0.50	751
		18.45	2511.89	30	4	0.59	881
		14.14	2511.89	30	4	1.00	1960

	Antenna Type	Safe Distance (cm)	Antenna EIRP(mW)	Antenna Input Power(dBm)	Antenna Gain(dBi)	Requirement (mW/cm2)	Frequency(MHz)
9	IXD-360V03N0-6(806-960/1710-2500MHz)	20.00	2951.21	30	4.7	0.59	881
		15.32	2951.21	30	4.7	1.00	1900
10	IWH-090V08N0-2(806-960/1710-2700MHz)	29.45	6309.57	30	8	0.58	869
		22.41	6309.57	30	8	1.00	1900
11	IWH-120V06N0-1(806-960/1710-2500MHz)	23.22	3981.07	30	6	0.59	881
		17.80	3981.07	30	6	1.00	1900

*Antenna type: contact Comba US office if any questions regarding out antenna product and service.

FCC ID: PX8RA-5700-D

PX8RA-5700-D is connected to BTS output via RF cable and coupler, the RF output power is less than 1 mW and far below the BTS output power, so the safety exposure distance is short than BTS safety exposure distance, no additional notice for safety exposure distance.

0.7 SAFETY NOTICES AND ADMONISHMENTS

This document contains safety notices in accordance with appropriate standards. In the interests of conformity with the territory standards for the country concerned, the equivalent territorial admonishments are also shown.

Any installation, adjustment, maintenance and repair of the equipment must only be carried out by trained, authorized personnel. At all times, personnel must comply with any safety notices and instructions.

Specific hazards are indicated by symbol labels on or near the affected parts of the equipment. The labels conform to international standards, are triangular in shape, and are coloured black on a yellow background. An informative text label may accompany the symbol label.

Hazard labeling is supplemented by safety notices in the appropriate equipment manual. These notices contain additional information on the nature of the hazard and may also specify precautions.

Warning:

These draw the attention of personnel to hazards that may cause death or injury to the operator or others. Examples of use are cases of high voltage, laser emission, toxic substances, point of high temperature, etc.

Alert:

These draw the attention of personnel to hazards that may cause damage to the equipment. An example of use is the case of static electricity hazard.

Caution notices may also be used in the handbook to draw attention to matters that do not constitute a risk of causing damage to the equipment but where there is a possibility of seriously impairing its performance, e.g. by mishandling or gross maladjustment. Warnings and Cautions within the main text do not incorporate labels and may be in shortened form.

End of Section

1 GENERAL INFORMATION

The RA-5700 Tri-Band Distributed Antenna System (hereinafter called “RA-5700”) is designed for working on 700MHz, 850MHz and 1900MHz networks. It provides flexible and scalable solution of multi-band, multi-operator coverage extension applications. It is the ideal solution to both indoor and outdoor as well.

RA-5700 consists of Master Unit (MU) RA-5700-D and Remote Unit (RU) RA-5700-R.

The low signal transmission loss of optical fiber is applicable for long distance transmission. RA-5700 can support the optical transmission of up to 5dB signal transmission loss. It can extend BTS coverage and eliminate blindspot, shadow area and weak-signal area to improve call quality.

Main feature:

- High output power with high linearity, which supports multiple carrier operation and ensures the signal source is of good quality.
- Optical fiber transmission with long distance transition at the most path loss of 5dB.
- Local Operation and Maintenance Terminal (OMT): operating status and parameters can be set or monitored by OMT PC locally. And the point-to-point setting and inquiry between MU and RU is realizable through the integrated wireline/wireless modem, which makes it convenient for on-site configuration.
- Operation Maintenance Center (OMC): system working parameters and communication configuration can be set or inquired remotely through the integrated Ethernet adaptor. If alarm is generated, the equipment will dial up to OMC automatically in the mode of GPRS.
- Build-in Li-ion battery ensures that alarm information can automatically report to OMC in case of equipment power failure.
- RU is designed for all-weather outdoor operation - waterproof, damp-proof and omni-sealed.

The figures below show the equipment enclosure layout of RA-5700 MU and RU:

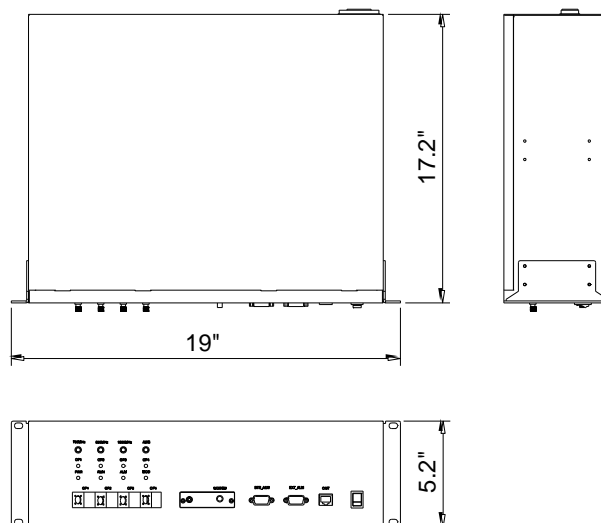


Figure 1: View of MU Fully Equipped Shelf

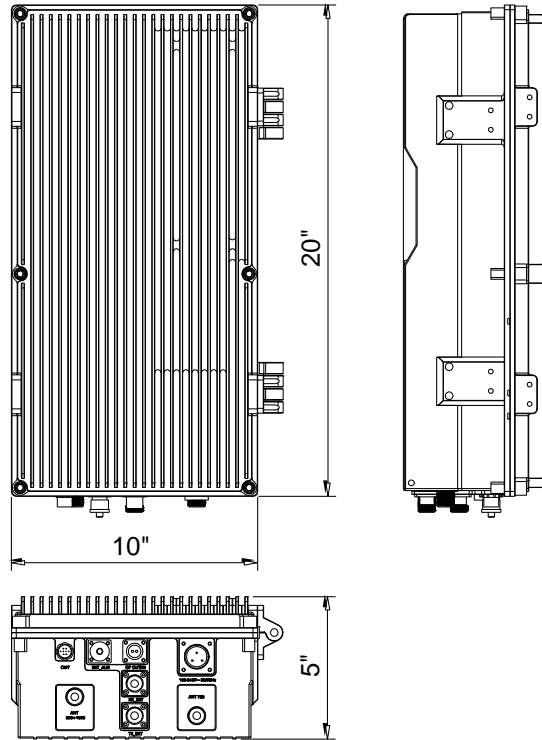


Figure 2: Front, Side and Bottom Views of RU Enclosure

End of Section

2 EQUIPMENT DESCRIPTION

2.1 SYSTEM DIAGRAM

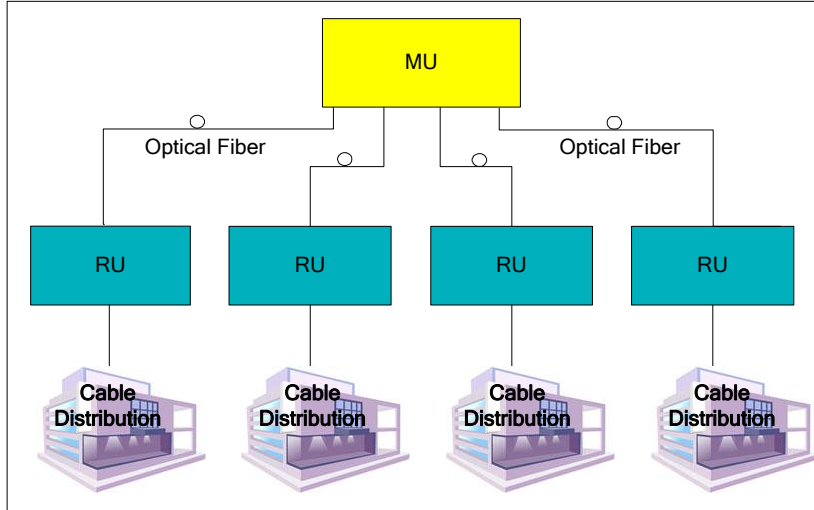


Figure 3: System Diagram

On the DL, combined signals as 700MHz, 850MHz and 1900MHz from the BTSs converted into optical signals after amplification in the MU. Then the optical signals are transmitted to the RU via optical fiber. The Optical TX/RX Module of RU converts the DL optical signals into RF signals. After amplification, the signals are transmitted at the MT port to the service antenna.

On the UL, the signals transmitted by the mobile are converted into optical signals, and then via the UL optical fiber. The signals are transmitted to MU, which then converts the optical signals back to RF signals.

2.2 TYPICAL APPLICATION

2.2.1 SINGLE FIBER CONFIGURATION

For equipments with WDM Unit, the single fiber configuration is applicable. Through using WDM technique, one fiber is shared between optical signals.

Refer to the following two applications of single fiber configuration:

2.2.1.1 Typical Application of Single Fiber Configuration

Shown below is a typical application showing the ability to interwork RA-5700.

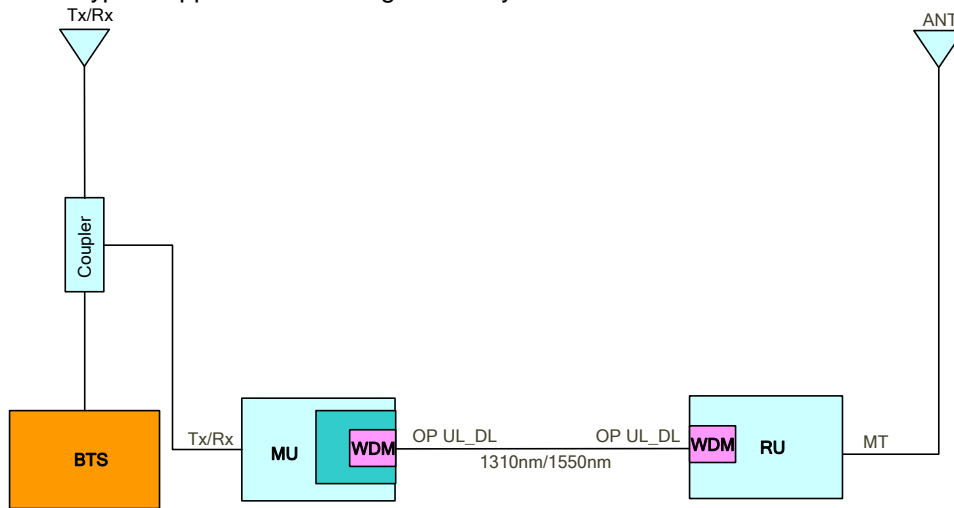


Figure 4: Application of One MU with One RU through One Optical Module with WDM

2.2.1.2 Extension Application of Single Fiber Configuration

A fully equipped MU can host up to four RU (s) through optical module. This can be achieved by accommodating four Optical Modules with WDM. Refer to the figure below:

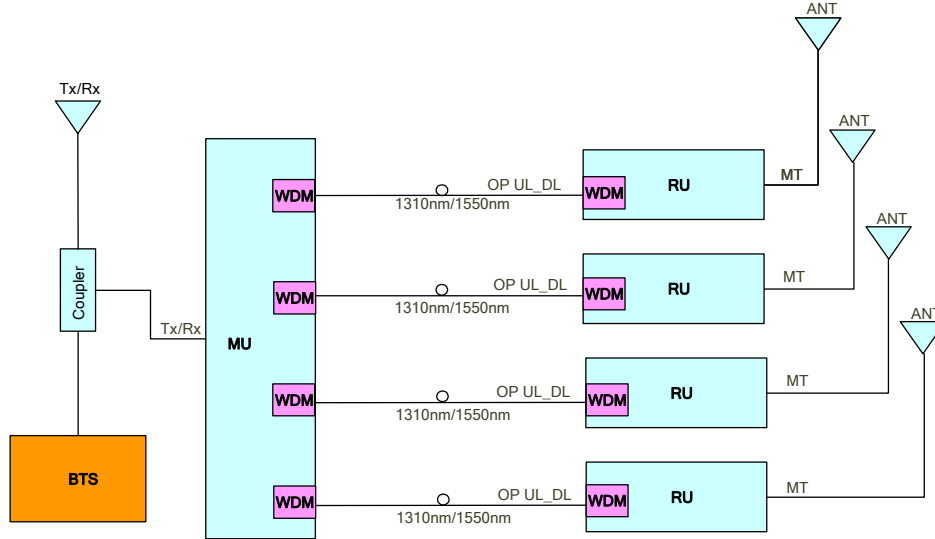


Figure 5: Application of One MU with Four RUs through four Optical Modules with WDM

2.3 EQUIPMENT LAYOUT

The MU RA-5700-D is constructed into a 19" shelf. It is connected via the connectors located on the front panel. The RU RA-5700-R is designed for all cables entries from the bottom of the enclosure.

The internal layout for the MU is shown below:

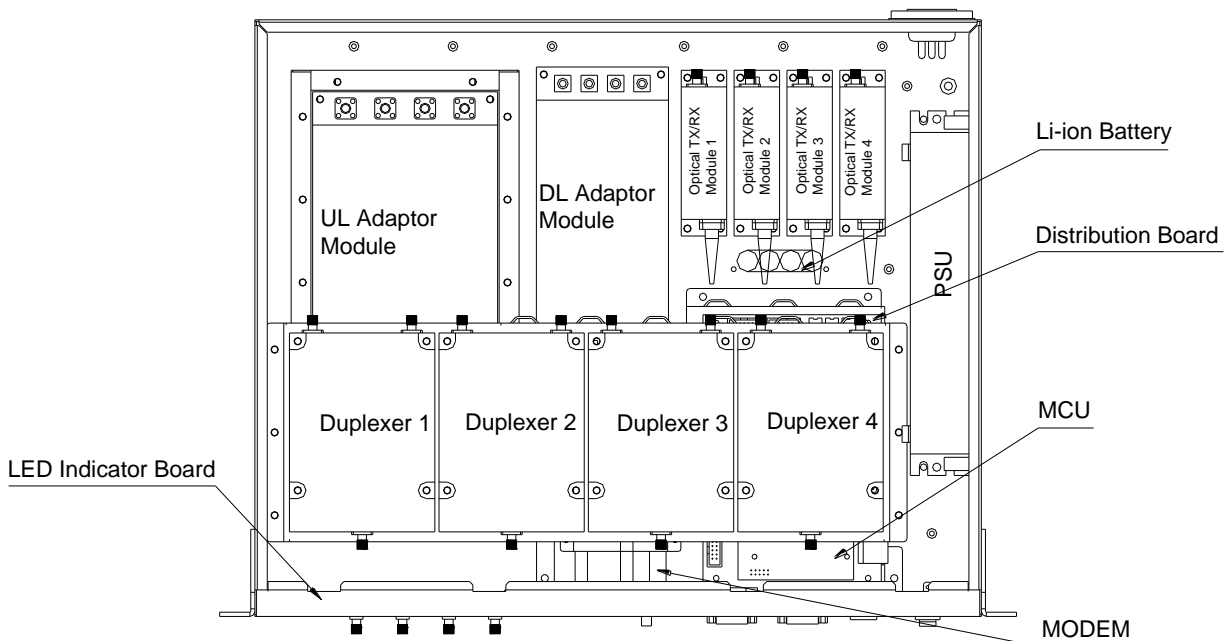


Figure 6: MU Equipment Layout

The internal layout for the RU is shown below:

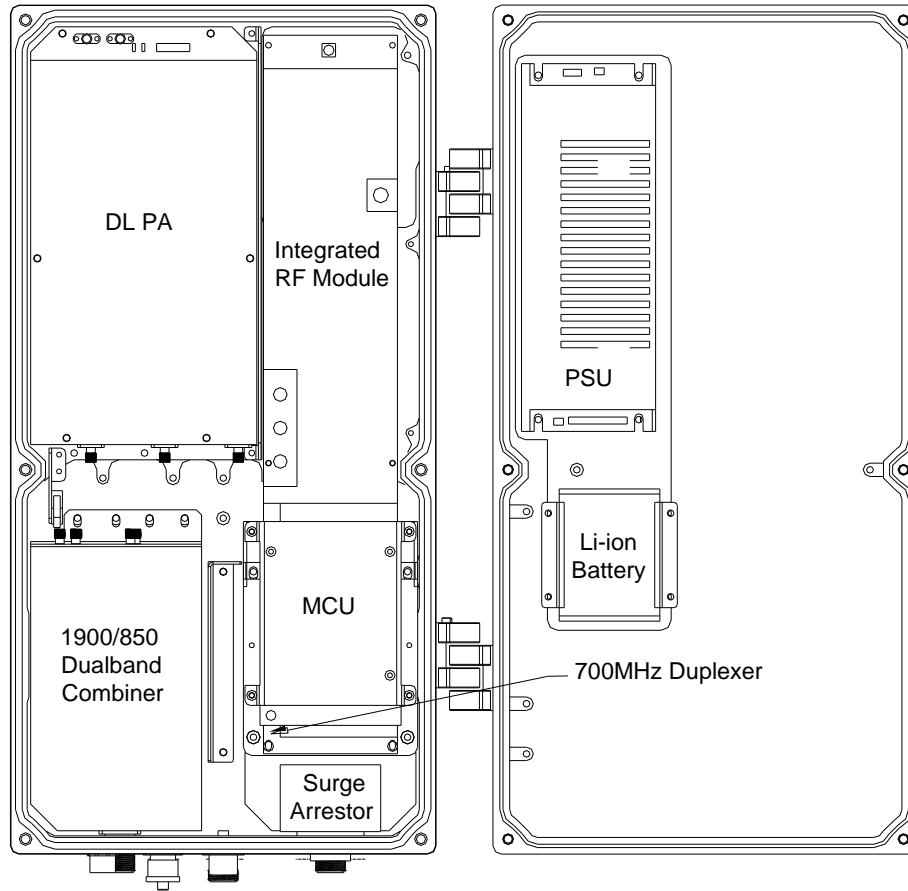


Figure 7: RU Equipment Layout

2.4 EQUIPMENT CONSTITUTION

RA-5700 consists of MU and RU that consists of the modules described below:

The MU consists of:

Identifier	Functional Description
UL/DL Adaptor Module	Supports tri-band UL/DLRF Module, it splits and combines UL/DL signal to complete filter, gain control and power control.
Duplexer	Completes signal conversion.
Optical TX/RX Module	Completes optical signal and RF signal conversion.
Main Control Unit (MCU)	Is used to control and monitor the operation parameters of the MU and provides telecommunication interface for local monitoring.
Distribution Board	Connects with modules and MCU; local commissioning via RJ45 port.
Power Supply Unit (PSU)	Converts the input voltage into stable DC to supply power for other modules and to charge the internal Li-ion battery.
Li-ion Battery	Will supply power to MCU after power failure.

Table 1: MU Constitution

The RU consists of:

Identifier	Functional Description
Power Supply Unit (PSU)	Converts the input voltage into stable DC to supply power for other modules and to charge the internal Li-ion battery.
700MHz Duplexer	Fulfills 700MHz signal conversion.
1900/850 Dualband Combiner	Duplexes and combines both 1900MHz and 850MHz signals.
Optical TX/RX Module	Completes optical signal and RF signal conversion.
Integrated RF Module	Combines the UL LNA and pre-amplifies the DL signals.
DL PA Module	Amplifies the desired signal.
MCU	Is used to control and monitor the operation parameters of the RU and provides telecommunication interface for local monitoring.
Li-ion Battery	Will supply power to MCU after power failure.

Table 2: RU Constitution

2.5 KIT OF PARTS

For this system, the following are shipped:

Product Identifier	Description	Quantity
Fuse	N/A	2
N to SMA Connector	N female to SMA male	1
Modem Antenna	OOA-360/V02-SD	1
Feeder Cable	N male to N male; customized length accordingly	1
Field Commissioning Cable	N/A	1
Optical Jumper	FC/APC, 1m	1
Power Supply Cable	N/A	1
Philips Pan Head Screw	GB/T818, M5x10	4

Table 3: MU KOP

Product Identifier	Description	Quantity
Allen Key	5mm	1
Clamp	T3-099901-5202	2
Carriage Bolt (L>120)	M12x160	4
External Alarm Cable	N/A	1
Field Commissioning Cable	N/A	1
Fuse	N/A	2
Hex Bolt	M8x12	4
Mounting Rack	RA-5700-5825	1
Masonry Bolt	M10x110	4
Nut	M12	8
Optical Jumper		1
Power Supply Cable	N/A	1
Plain Washer	Φ8	4
Spring Washer	Φ8	4
Factory Test Report		1
This manual on CD		1

Table 4: RU KOP

End of Section

3 INSTALLATION

3.1 WARNINGS AND ALERTS

Laser

Laser light can cause damage to eyes. Laser light is not visible. Viewing it directly does not cause pain. The iris of the eye will not close when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. NEVER LOOK INTO THE END OF A FIBER WHICH MAY HAVE A LASER COUPLED TO IT.

Radio Frequency Energies

There may be situations, particularly for workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions may be necessary to ensure the safe use of RF energy.

High Voltage

The equipment has been designed and constructed to prevent, as far as reasonably, practicable danger. Any work activity on or near equipment involving installation, operation or maintenance must be, as far as reasonably, free from danger.

Where there is a risk of damage to electrical systems involving adverse weather, extreme temperatures, wet, corrosive or dirty conditions, flammable or explosive atmospheres, the system must be suitably installed to prevent danger.

Protective Earthing

Equipment provided for the purpose of protecting individuals from electrical risk must be suitable for the purpose and properly maintained and used.

Handling Precautions

This covers a range of activities including lifting, lowering, pushing, pulling, carrying, moving, holding or restraining an object, animal or person. It also covers activities that require the use of force or effort, such as pulling a lever, or operating power tools.

Electrostatic Discharge (ESD)

Observe standard precautions for handling ESD-sensitive devices. Assume that all solid-state electronic devices are ESD-sensitive. Ensure the use of a grounded wrist strap or equivalent while working with ESD-sensitive devices. Transport, store, and handle ESD-sensitive devices in static-safe environments.

3.2 SITE PLANNING CONSIDERATIONS

Site Considerations

The MU can be located indoors to facilitate coupling of BTS signals and power supply connections. The ALC range of received BTS signal is -10~10 dBm. Hence, an appropriate coupler must be used according to the BTS output power.

The site consideration for RU is listed below:

- The distance between the service antenna of RU and coverage area should satisfy line of sight requirements for maximum coverage area.
- The maximum fiber length is 13km, with a maximum path loss of 5dB.
- The system delay of the optical system must be taken into consideration when there are neighboring BTS sites overlapping in coverage.

Installation Location

Mounting surface shall be capable of supporting the weight of the equipment.

In order to avoid electromagnetic interference, a proper mounting location must be selected to minimize interference from electromagnetic sources such as large electrical equipment.

Environmental

Humidity has an adverse effect on the reliability of the equipment. It is recommended to install the equipment in locations having stable temperature and unrestricted air-flow.

The installation location for the system should be well ventilated. The equipment has been designed to operate at the temperature range and humidity level as stated in the product specifications that of temperature ranges from 32~104°F (MU)/ -27~122°F (RU) and the relative humidity is at most 85%(MU)/95%(RU).

Direct day light to the RU should be avoided. If the direct day light temperature exceeds 104°F, a shelter should be provided for it.

Powering

The power supply unit (PSU) provides power to all modules within the equipment. Depending on the product variant, it is recommended that the PSU operates on a dedicated AC circuit breaker or fused circuit.

Grounding Requirement

Verify that the equipment has been well grounded. This includes antennas and all cables connected to the system. Ensure lightning protection for the antennas is properly grounded.

Cable Routing

Depending on equipment configuration, a variety of types of cables are connected to the MU and RU: coaxial cables, optical fibers, power cable, communication cable, and commissioning cable. Where applicable, ensure cables are properly routed and secured so that they are not damaged.

Manual Handling

During transportation and installation, take necessary handling precautions to avoid potential physical injury to the installation personnel and the equipment.

3.2.1 SYSTEM INSTALLATION CHECKLIST

- Working space available for installation and maintenance for each mounting arrangement. Ensure unrestricted airflow.
- Ensure earthing point is within reach of the ground wire.
- Ensure a power source is within reach of the power cord and the power source has sufficient capacity.
- Where appropriate, ensure unused RF connectors are terminated.
- Where appropriate, ensure unused optical fiber connectors are protected.
- Do not locate the equipment near large transformers or motors that may cause electromagnetic interference.
- Reduce signal loss in feeder cable by minimizing the length and number of RF connections.
- Ensure the equipment will be operated within the stated environment (refer to datasheet).
- Where needed, couple BTS RF signal with a coupler to prevent damaging the equipment.
- Where appropriate, confirm availability of suitably terminated grade of RF and optical fiber.
- Observe handling of all cables to prevent damage.

3.3 INSTALLATION PROCEDURES

3.3.1 GOODS INWARDS INSPECTION

RA-5700 was factory tested, inspected, packed, and delivered to the carrier with utmost care. Do not accept shipment from carrier which shows damage or shortage until the carrier's agent endorses a statement of the irregularity on the face of the carrier's receipt. Without documentary evidence, a claim cannot be processed.

Open and check each package against the packing list. For any shortage, contact Comba Telecom Systems. Do not remove items from packing materials until installation.

3.3.2 TOOLS

See Appendix B for a full list of tools required for installation and maintenance.

3.3.3 PREPARATION

Optical Fiber:

- Fiber optic cables require proper handling. Do not stretch, puncture, or crush the fiber cable(s) with staples, heavy equipment, doors, etc.
- Always maintain the minimum bending radius specified by the cable manufacturer. The minimum bend radius is usually 10 times as the cable's outer diameter. In the case of single optical fiber that is not in a cable, the minimum bending radius to be observed is 1.181inch.

3.3.4 CABINET MOUNTING OF MU

Depending on the installation, should 2-post open-rack are to be used, the mid-mounting brackets are to be used. For rack or cabinet mounting, the mid-mounting brackets are to be removed from the 4U shelf. Cage nut and screws are not supplied. Unless being recommended by rack manufacturer, M5 cage nut / bolt are to be used.

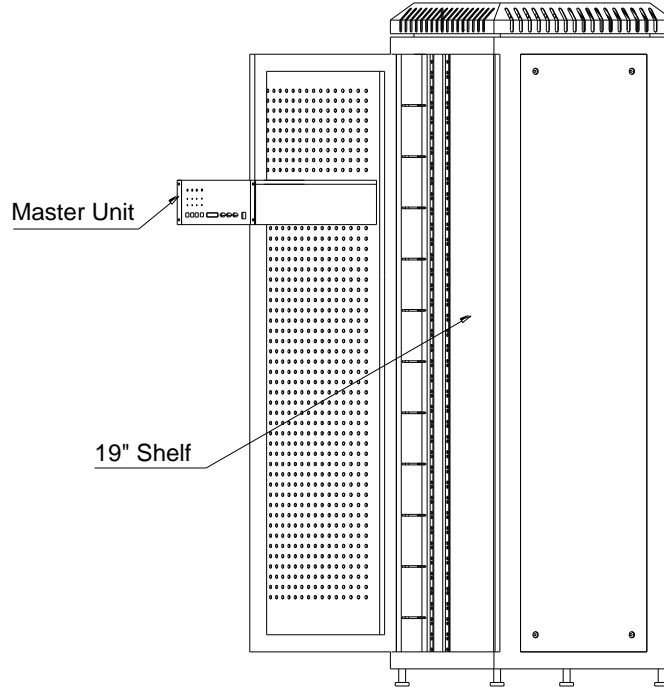


Figure 8: Cabinet Mounting of 19" Shelf

3.3.5 RU MOUNTING RACK DIMENSION

The mounting arrangement of the RU is used for mounting the RU to a wall. The figure below shows the location of the holes for the mounting tabs.

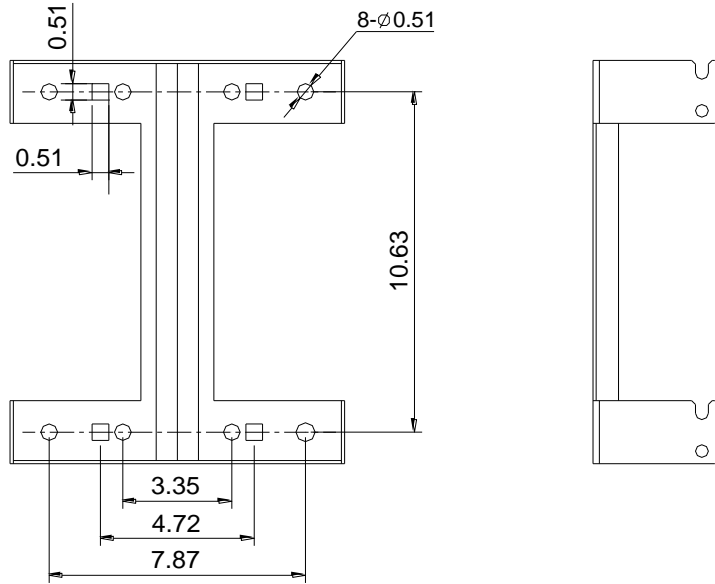


Figure 9: RU Mounting Rack Dimension

3.3.6 WALL MOUNTING OF RU

Hereinafter are the mounting steps for wall mounting:

- Drill holes on the wall for masonry bolts according to the dimension of the upper/lower mounting tabs indicated above.
- Insert the masonry bolts (M10x110) to the wall.
- Hook the enclosure onto the masonry bolts, and then lower the whole enclosure to make sure that the bolts are fastened into the narrow slots of the mounting tabs.
- Tighten nuts to secure the hex bolts and enclosure onto the wall.

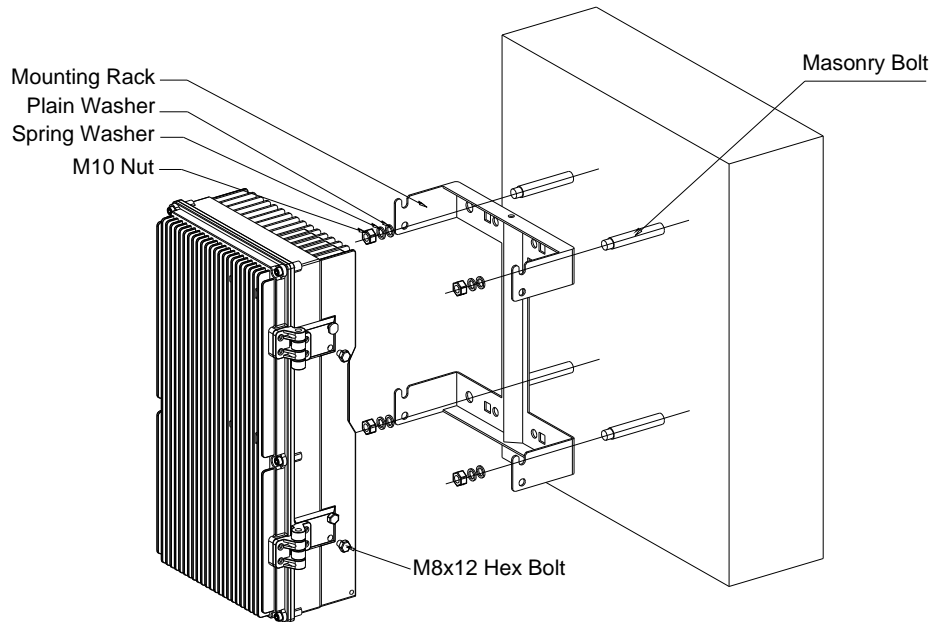


Figure 10: RU Wall Mounting

3.3.7 POLE MOUNTING OF RU

- Secure the Mounting rack onto the pole using U bolt.
- Hook the enclosure up onto the mounting rack and align the hole positions to that of the mounting rack, then installed the rack bolts.
- Use spanner to tighten hex bolts (M8x12) to mounting rack to complete the installation.

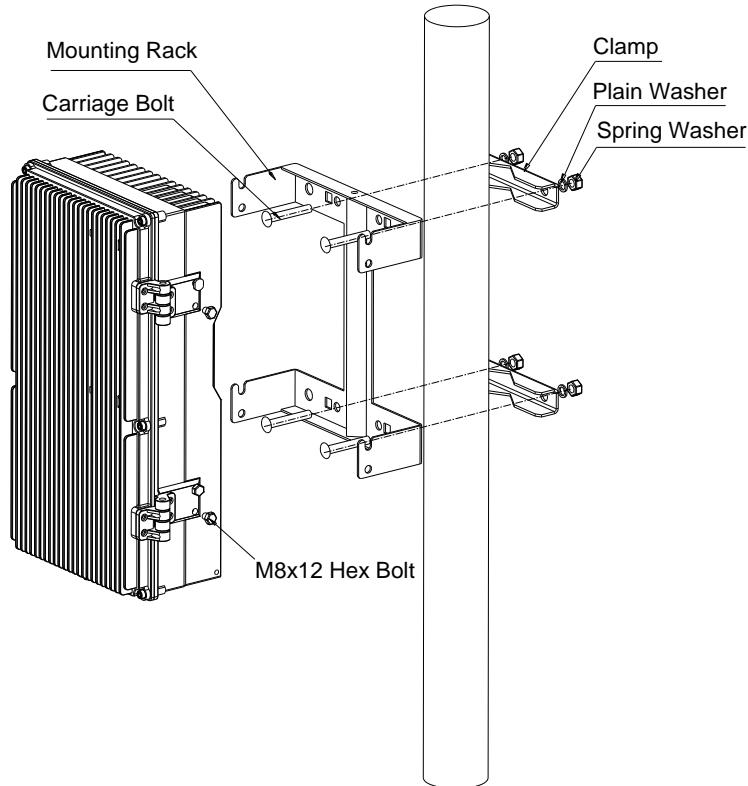


Figure 11: Pole Mounting of RU

3.3.8 DRIP-LOOP

Comba recommends that every horizontal cable entry to the equipment forms a 'U' before it's entry to the equipment. Any accumulated water on the cable will drip down at the bottom of the loop and will not climb up to the equipment.

3.4 EQUIPMENT CONNECTORS

The MU is connected via the connectors located on the front and back panel. The RU is designed for all cables entries from the bottom of the enclosure. The figures below present the connectors of MU and RU.

3.4.1 MU CONNECTORS

Connectors on the MU are identified as below:

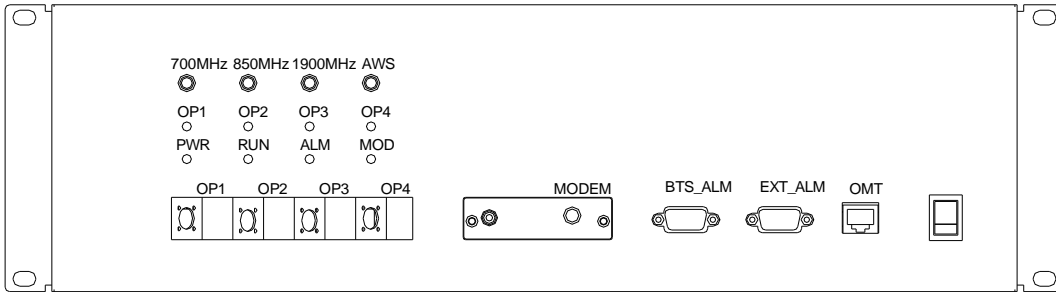


Figure 12: MU Front Panel Connectors

Identifier	Functional Description
700MHz, 850MHz, 1900MHz, AWS	RF connector for various network systems.
EXT_ALM	DB9 (female) connector, for external alarm.
OP1-OP4	FC/APC optic interface, each interface is used to connect with a RU.
MODEM	Includes SIM inserter, MODEM indicator and MODEM RF connector.
BTS_ALM	DB9 (female) connector.BTS external alarm reporting,
OMT	RJ45 connector, local OMT commissioning port, connects with PC to realize local commissioning.

Table 5: MU Front Panel Connections

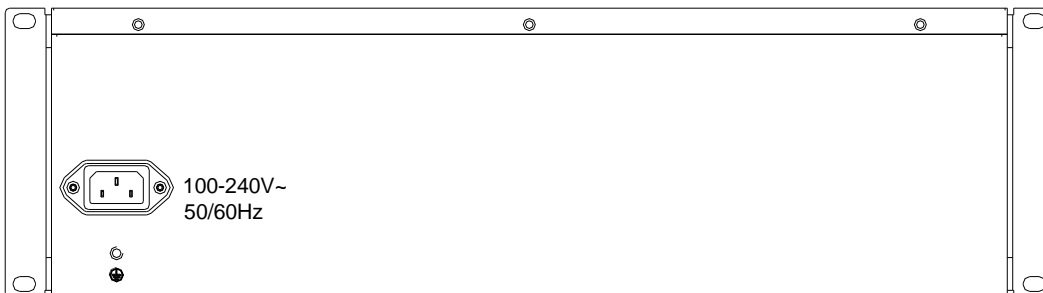


Figure 13: MU Back Panel Connectors

Identifier	Functional Description
100-240V~50/60Hz ¹	A power supply cable for power supply

Table 6: MU Back Panel Connections

¹ The voltage identification is a variant due to electricity system diversity of global regions. The power cable gland might be identified for AC 220V, AC 110V, AC 220V/110V, DC -48V, or DC +24V respectively. Please refer to specific product or contact local sales if any doubt.

3.4.2 RU CONNECTORS

Connectors on the RU are identified below:

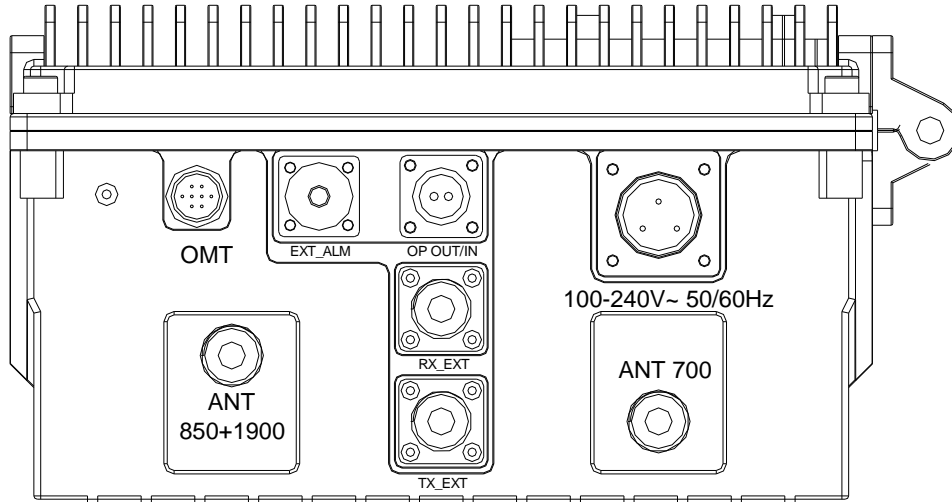


Figure 14: RU Connectors

Identifier	Functional Description
100-240V~50/60Hz	A power supply cable for power supply
ANT 850+1900, ANT700	Connect with TX/RX antenna via coaxial cable.
OP OUT/IN	OP uplink/downlink FC/APC optic connector, connects with MU OP connector via optical fiber.
OMT	Connects with PC to fulfill local commissioning.
EXT_ALM	7-pin CPC connector, for external alarm..
TX_EXT	N-female connector, for TX output extension of a new band.
RX_EXT	N-female connector, for RX input extension of a new band.
ALM LED Indicator	Synchronized indicator of LED4 on MCU

Table 7: RU Connections

3.5 EQUIPMENT CONNECTION

3.5.1 GROUNDING CONNECTION

Ground connection

To ensure safe operation of the product, a ground (earth) connection is required. For single phase AC power source, the product must be grounded by connecting the “earth wire” of the power cord to the ground terminal of the AC supply. For operating this product with DC power system (such as rectifiers), the product should not be connected to power systems that switch open the return lead because the return lead could function as the ground (earth) connection for the equipment.

Protective Ground Connection

The enclosure must be grounded securely by connecting a copper wire (CSA 16mm²) to the grounding terminal on the equipment/rack, and the other end to a protective ground (i.e. building earth point). An internationally acceptable colour code of the ground connection wire is green/yellow.

Such a ground connection implements the “Protective Ground Connection”, and must be connected to the equipment at the designated ground point. In general, do not connect the supply before establishing an adequate ground (earth) connection.

MU Grounding Connection

Connect the grounding terminal located on the back panel of MU to a protective ground (i.e. building earth point).

RU Grounding Connection

The equipment must be grounded securely. Connect a copper wire to the grounding terminal on the mounting tab/enclosure, and connect the other end to a protective ground (i.e. building earth point). An internationally acceptable coloring code of the ground connection wire is green/yellow.

3.5.2 LI-ION BATTERY CONNECTION

Li-ion battery is provided with this system to ensure power is supplied to the system monitoring unit and MCU and to ensure the alarm message could be sent to OMC effectively in case of mains power failure.

Caution: Be careful of the risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

3.5.3 OPTICAL CONNECTION

MU is connected to RU via optical fiber (length<13km). Connect MU front panel’s OP1-OP4 with RU’s OP interfaces respectively.

Refer to the following connection:

USER MANUAL FOR RA-5700

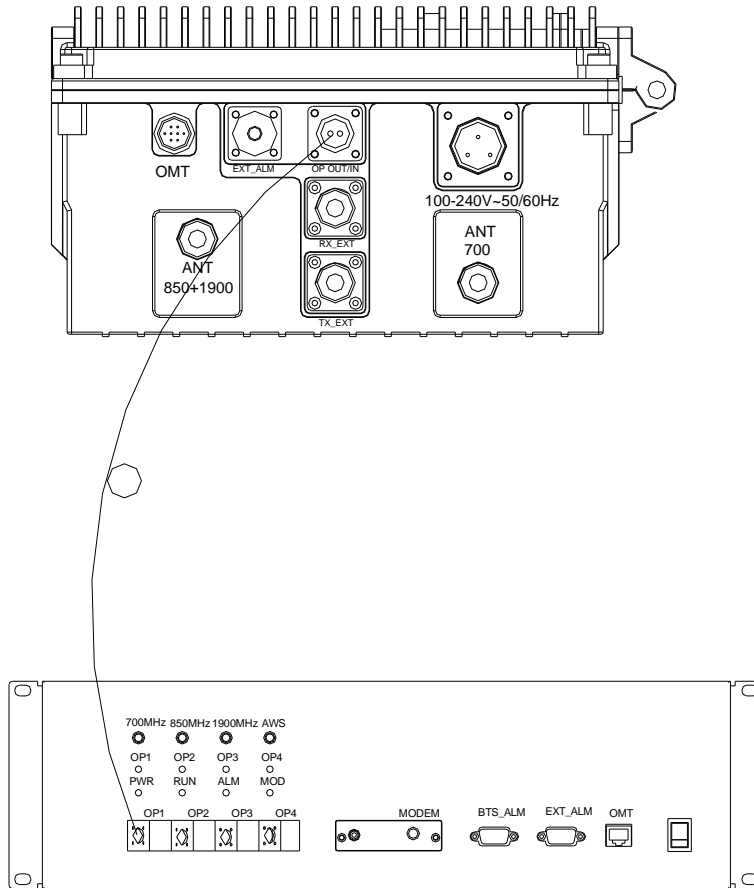


Figure 15: Optical Connection

3.5.4 EXTERNAL ALARM CONNECTION

For MU, this is a DB9 connector. The following figure and table show the pin allocation and definition. Pin numbering are shown looking-into the connector on the enclosure.

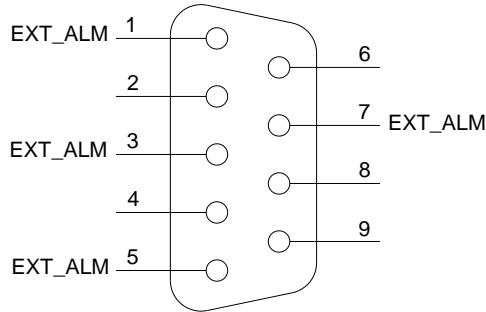


Figure 16: Pins Allocation for “EXT_ALM” Port for MU

Pin number	1	2	3	4	5	6	7	8~9
Alarm definition	EXT. Alarm 1	Reserved	EXT. Alarm 2	Reserved	EXT. Alarm 3	Reserved	EXT. Alarm 4	Reserved

Table 8: Pin Definition of “EXT_ALM” Port for MU

For RU, this is a 7-pin CPC connector. The following figure and table show the pin allocation and definition. Pin numbering are shown looking-into the connector on the enclosure.

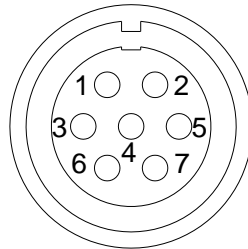


Figure 17: Pins Allocation for “EXT_ALM” Port for RU

Pin number	1	2	3	4	5	6	7
Alarm definition	EXT. Alarm 1	EXT. Alarm 2	EXT. Alarm 3	GND	Reserved	Reserved	Reserved

Table 9: Pin Definition of “EXT_ALM” Port for RU

3.5.5 BTS ALARM CONNECTION

The equipment alarms can be signaled to the BTS via voltage-free relay contacts. The voltage-free relay connections are connected to the DB-9 port “BTS_ALAM” located on the MCU of MU. The following figure and table shows the pin allocation and definition.

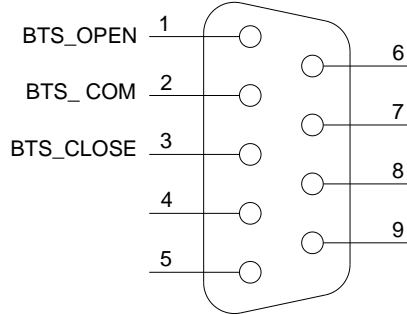


Figure 18: Pins Allocation for “BTS_ALM” Port

Pin Number	Definition	Description
1	BTS_OPEN	Connects to the open terminal of the voltage free relay.
2	BTS_COM	Connects to the common terminal of the voltage free relay.
3	BTS_CLOSE	Connects to the close terminal of the voltage free relay.
4 ~ 9	NC	Reserved.

Depending on OMT/OMC configuration, alarm to BTS can be signalled equipment by either: a) pin1 and pin2 ‘open’ or b) Pin2 and Pin3 ‘close’.

3.5.6 CONNECT TO PC

The local commissioning and management for MU and RU is achieved through connecting to the OMT PC locally.

Connect MU to PC

Connect "OMT" port (RJ45) to the serial port of PC with ethernet cable supplied to achieve local monitoring and management. A build-in wireless modem is available for OMC connection to realize remote commissioning.

Connect RU to PC

Local commissioning and management of RU is achieved through "OMT" port and the OMT PC via field commissioning cable supplied.

With the equipment enclosure opened, the engineering OMT can be used to connect internally.

End of Section

4 COMMISSIONING

4.1 PRE-COMMISSIONING TASKS

After equipment installation, perform the following steps before equipment powering and commissioning, check that the expected voltage, current, and power levels do not violate any ratings. Double check all connections including ground before applying power. Do not manipulate circuits or make changes when power is applied:

- Visually inspect the power connection within the equipment. Ensure that the power cable is correctly and securely connected, including grounding wire, RF cable and optical cable.
- Check grounding connection and verify that the ground resistance is less than 5Ω.
- Connect the equipment to the PC installed with OMT software.
- With the MU switched on, RU installed and all cablings connected, apply power to the RU by switching on the PSU switch on the integrated PSU.
- Monitor the initialization of the MU through the LEDs on the front panel of MCU unit, while for RU, it is through the LEDs on the MCU unit integrated. Refer to detailed LEDs information in the next section.

4.2 MU/RU RESET TIME DURATION

To reset the MU and RU, system takes MU<90s and RU<50s.

4.3 LED INDICATORS

4.3.1 MU LED INDICATORS

Diagnostic LEDs are located on the MU; each indicates the status of a particular function:

Identifier	Color	Indication
POWER	Green	It stands in green when power on.
RUN	Green	Operation indicator – power is supplied to the MU. Flashes once every second to indicate normal system operation.
ALM	Red	Alarm indicator. ON = alarm; OFF = no alarm
MOD	Red	Diagnostic LED for FSK communication and MODEM operation. Flashes once every two seconds to indicate normal communication between MU and RU.
OP1-OP4	Green	When the green indicators are on, the relative optical channel is in normal reception.

Table 10: MU LED Indicators

4.3.2 RU LED INDICATORS

LED Diagnostic indicators are located on the MCU integrated in the RU; each indicates the status of a particular function.

Identifier	Colour	Indication
ALM (on bottom panel)	Red	Synchronized LED indicator of LED4 on MCU. Alarm indicator. ON = alarm; OFF = no alarm
LED 5	Green	Operation indicator – power is supplied to the RU. Flashes twice every 2 seconds to indicate normal system operation.
LED 4	Red	Alarm indicator. ON = alarm; OFF = no alarm
LED 3	Red	Diagnostic LED for FSK communication. Flashes once every two seconds to indicate normal communication between MU and RU.

Table 11: RU LED Indicators

All LEDs in MU (except power indicator) will flash simultaneously 3 times after equipment power-up. Then RUN indicator flashes every second to indicate system normal operation.

The LEDs LED5, LED4, LED3 will flash simultaneously 3 times after equipment power-up. During system self-checking, LED5 flashes slowly. Then it flashes every second to indicate system commissioning can be proceeded with.

4.4 WEB OMT

4.4.1 CONNECTION FROM PC TO EQUIPMENT

Before accessing to the OMT, physical connection between the PC and the equipment must be made. A straight-through RJ45 cable shall be applied for the connection.

Comba recommends an IE8 browser to connect with Web OMT.

The default IP address of RA-5700 MU is 192.168.8.101 and RU is 192.168.8.102. Subnet mask is 255.255.255.0.

Execute the IE browser and enter 192.168.8.101/102 in the address bar. A pop-up window will be shown, requiring user name and password. The default user is *admin* and password is *123456*.

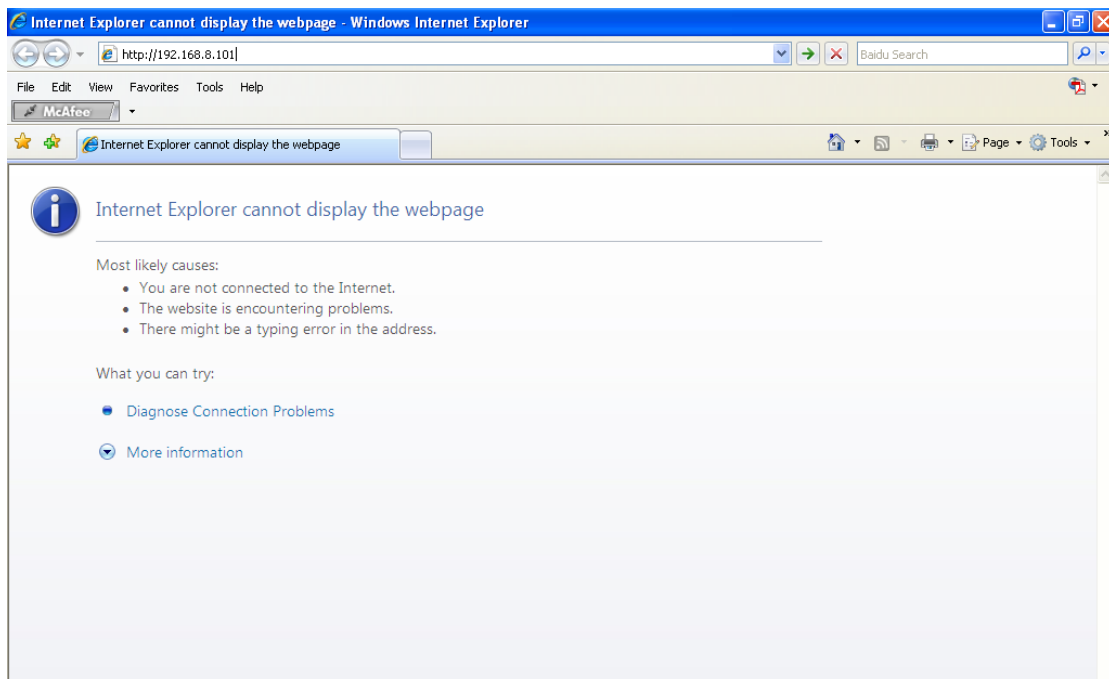


Figure 19: Web OMT Access



Figure 20: Log in

Items	Default Value
PC IP Address	Automatically distributed by system
PC Subnet Mask	255.255.255.0
PC Gateway	Automatically distributed by system
System IP Address	192.168.8.101 (for MU) / 192.168.8.102 (for RU)
System Subnet Mask	255.255.255.0
User name	admin
Password	123456

Table 12: IP Setting Quick Look-up Table

4.4.2 OMT CONFIGURATION

OMT parameters include: Common Information, RF Information, Alarm Information, Properties Information, User Manager and Help.

4.4.3 SYSTEM INFORMATION

Click on [System Information], system information will be displayed in the right interface of the OMT screen. In the interface the site ID of MU is described and the currently accessed unit is indicated.

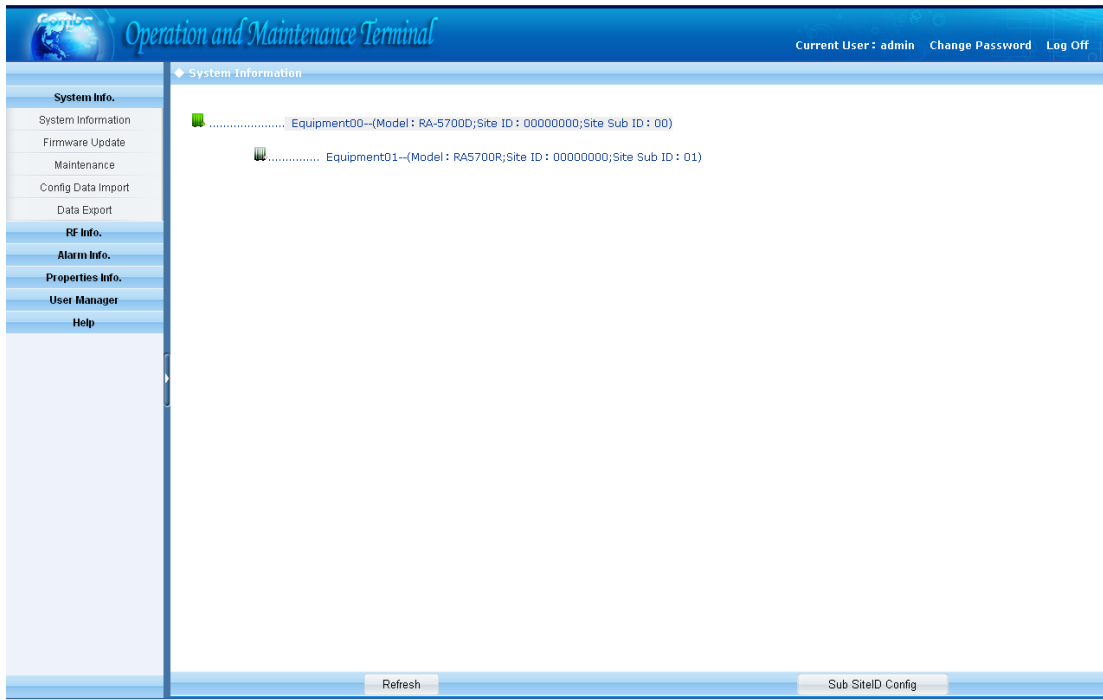


Figure 21: System Information

As illustrated, MU in green is under monitoring,

- To switch to the RU or other sites, customer can choose RU (in grey) or other site by clicking to switch to RU or other sites. It usually takes less than 40s.

Firmware Update

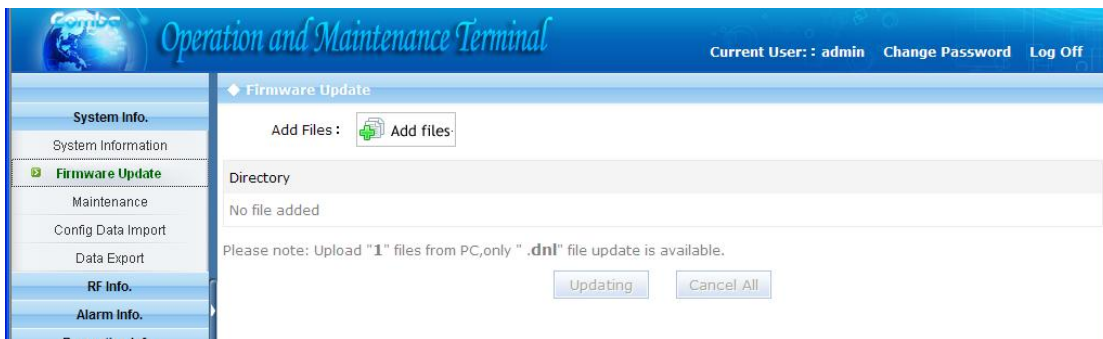


Figure 22: Firmware Update

- For firmware update, system takes approx 10mins based on the current version. Normally it takes less than 3mins.

Maintenance

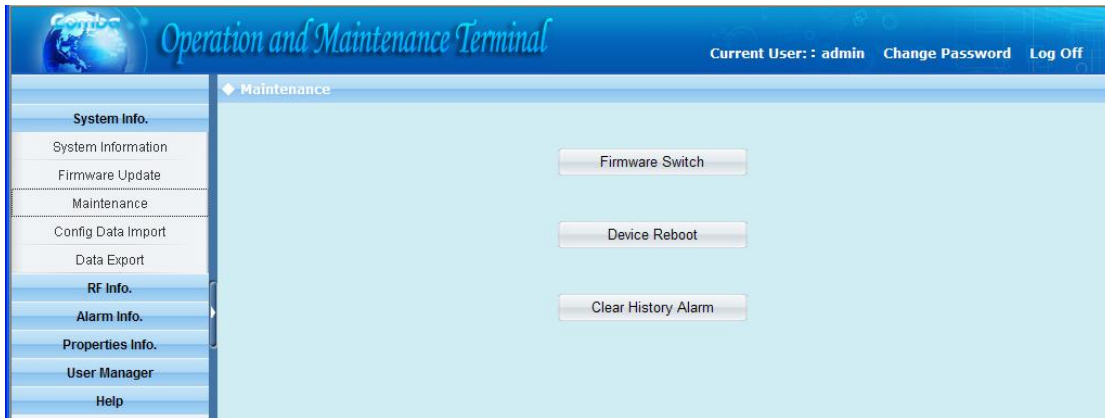


Figure 23: Maintenance

- 1> Firmware Switch: can switch to the previous firmware version which was saved in the system when update to current firmware. It is to say there are 2 firmware versions available in same system. This function is not available in current phase.
- 2> Device Reboot: restart the device
- 3> Clear History Alarm: delete all history alarm records

Config. Data Import

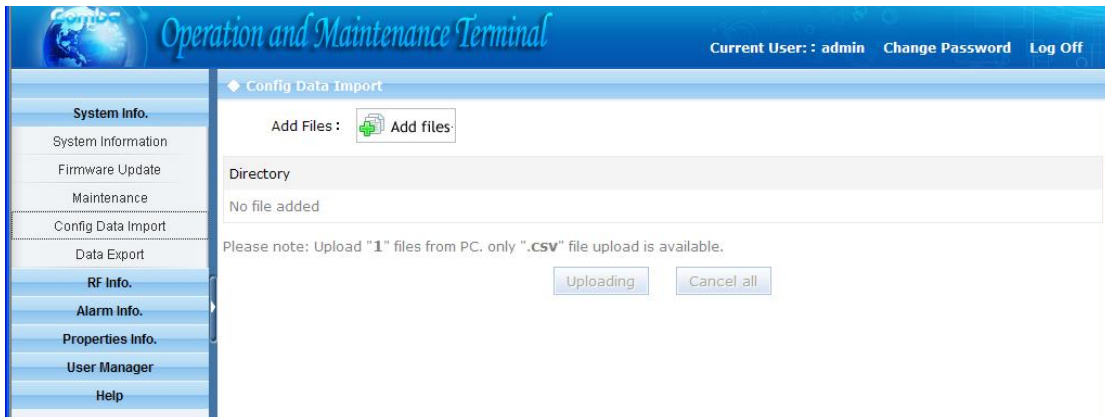


Figure 24: Data Import

Data Export

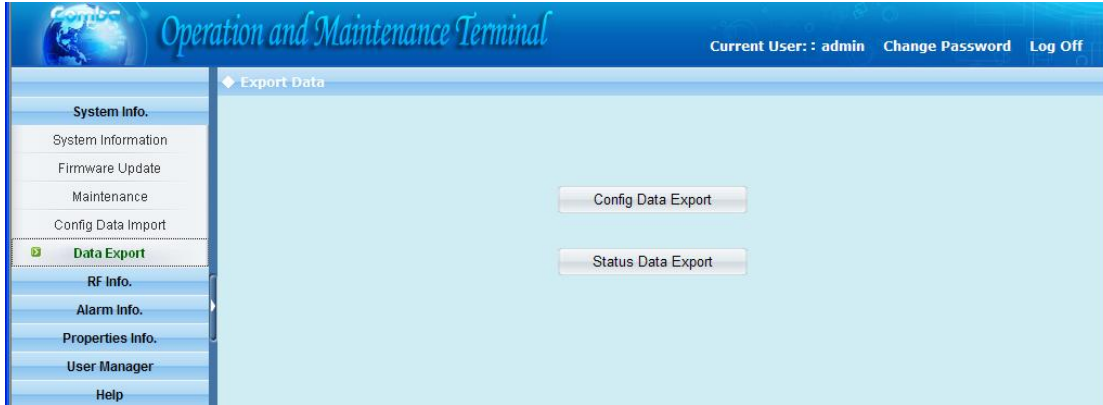


Figure 25: Data Export

[Export]: Export all site records. The records can be exported to a CSV file.

- 1> Config Data Export: can export the config. data and save in PC. The exported data can be input to the same kind of equipment if necessary.
- 2> Status Data Export: can export status data and save in PC. The data is save-only, can not import.
- 3> Usally, cofig a data import and export, it takes less than 5s.

4.4.4 RF INFORMATION

It is recommended to configure the following RF parameters for the first installation.

Switch

Switch is to enable/disable power for internal modules. When user checks and sets non-RF parameters, such as checking physical antenna connection, switching off will disable equipment power temporarily to protect PA in operation.



Figure 26: Switch

Config:

Select the required state in setting columns of RF information window for RF switch, then press [ON] or [OFF] button to finish the configuration operation.

Alarm Threshold

Users can set alarm threshold according to the specific situation. If the measured value is lower than the threshold lower limit or more than the threshold upper limit, the appropriate alarm will be generated.

All	Parameter Name	Status	Setting	MinValue	MaxValue	Unit
<input type="checkbox"/>	Over-Temperature Threshold	176		-40	257	°
<input type="checkbox"/>	700MHz DL Input Power Overload Threshold	10		-10	10	dBm
<input type="checkbox"/>	850MHz DL Input Power Overload Threshold	10		-10	10	dBm
<input type="checkbox"/>	1900MHz DL Input Power Overload Threshold	10		-10	10	dBm

Figure 27: Alarm Threshold

Temperature

All	Parameter Name	Status	Setting	MinValue	MaxValue	Unit
<input type="checkbox"/>	Device Temperature	120	Read only			°

Figure 28: Temperature

ATT

Operation and Maintenance Terminal									
							Current User : admin	Change Password	Log Off
ATT									
All	<input type="checkbox"/>	Parameter Name	Status	Setting	MinValue	MaxValue	Unit		
1	<input type="checkbox"/>	700MHz UL ATT	0	Read only			dB		
2	<input type="checkbox"/>	850MHz UL ATT	0	Read only			dB		
3	<input type="checkbox"/>	1900MHz UL ATT	0	Read only			dB		
4	<input type="checkbox"/>	700MHz DL ATT	0	Read only			dB		
5	<input type="checkbox"/>	850MHz DL ATT	0	Read only			dB		
6	<input type="checkbox"/>	1900MHz DL ATT	0	Read only			dB		

Figure 29: ATT

[ATT]: read-only parameters. ATT = Rating Gain - Gain

Power

Operation and Maintenance Terminal									
							Current User : admin	Change Password	Log Off
Power									
All	<input type="checkbox"/>	Parameter Name	Status	Setting	MinValue	MaxValue	Unit		
1	<input type="checkbox"/>	Optical RX Power 01	0	Read only			dBm		
2	<input type="checkbox"/>	Optical TX Power 01	5	Read only			dBm		
3	<input type="checkbox"/>	700MHz DL Input Power	--	Read only			dBm		
4	<input type="checkbox"/>	850MHz DL Input Power	--	Read only			dBm		
5	<input type="checkbox"/>	1900MHz DL Input Power	--	Read only			dBm		

Figure 30: Power

Gain

Gain							
All	<input type="checkbox"/>	Parameter Name	Status	Setting	MinValue	MaxValue	Unit
1	<input type="checkbox"/>	700MHz UL Gain	0		-50	-10	dB
2	<input type="checkbox"/>	850MHz UL Gain	0		-50	-10	dB
3	<input type="checkbox"/>	1900MHz UL Gain	0		-50	-10	dB
4	<input type="checkbox"/>	700MHz DL Gain	0		-50	-7	dB
5	<input type="checkbox"/>	850MHz DL Gain	0		-50	-7	dB
6	<input type="checkbox"/>	1900MHz DL Gain	0		-50	-7	dB
7	<input type="checkbox"/>	700MHz UL Rating Gain	-10		-20	20	dB
8	<input type="checkbox"/>	850MHz UL Rating Gain	-10		-20	20	dB
9	<input type="checkbox"/>	1900MHz UL Rating Gain	-10		-20	20	dB
10	<input type="checkbox"/>	700MHz DL Rating Gain	-7		-20	20	dB
11	<input type="checkbox"/>	850MHz DL Rating Gain	-7		-20	20	dB
12	<input type="checkbox"/>	1900MHz DL Rating Gain	-7		-20	20	dB

Figure 31: Gain

Rating Gain: be set before delivery. Comba recommends no change of rating gain value.

Gain: User can set according to the real application.

Miscellaneous

Miscellaneous							
All	<input type="checkbox"/>	Parameter Name	Status	Setting	MinValue	MaxValue	Unit
1	<input type="checkbox"/>	Equipment Response Overtime	8	Read only			S
2	<input type="checkbox"/>	Transmit Interval	100	Read only			mS
3	<input type="checkbox"/>	Transmit Pause Waiting Time	2	Read only			S
4	<input type="checkbox"/>	Firmware Update Waiting Time	2	Read only			S
5	<input type="checkbox"/>	700MHz BS Coupling Loss	0		0	60	dB
6	<input type="checkbox"/>	850MHz BS Coupling Loss	0		0	60	dB
7	<input type="checkbox"/>	1900MHz BS Coupling Loss	0		0	60	dB
8	<input type="checkbox"/>	Modem Operating Frequency Band	MONO1900				

Figure 32: Miscellaneous

4.4.5 ALARM INFORMATION

Click any tree node in [Alarm Info] group, [Alarm Information] window will appear in the right side. The figures below show the alarm information.

Master Alarm

Master Alarm				
All	<input type="checkbox"/>	Parameter Name	Status	Enable <input type="checkbox"/>
1	<input type="checkbox"/>	AC Power Failure Alarm	Normal	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	DC Power Fault Alarm	Normal	<input checked="" type="checkbox"/>
3	<input type="checkbox"/>	Li-ion Battery Fault Alarm	Normal	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	Over-Temperature Alarm	Alarm	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>	Door Open Alarm	Normal	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>	700MHz ALC Alarm	Normal	<input checked="" type="checkbox"/>
7	<input type="checkbox"/>	850MHz ALC Alarm	Normal	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	1900MHz ALC Alarm	Normal	<input checked="" type="checkbox"/>
9	<input type="checkbox"/>	700MHz Shutdown Alarm	Normal	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>	850MHz Shutdown Alarm	Normal	<input checked="" type="checkbox"/>
11	<input type="checkbox"/>	1900MHz Shutdown Alarm	Normal	<input checked="" type="checkbox"/>
12	<input type="checkbox"/>	Module Software Alarm	Normal	<input checked="" type="checkbox"/>

Figure 33: Master Alarm

Channel Alarm

Channel Alarm				
All	<input type="checkbox"/>	Parameter Name	Status	Enable <input type="checkbox"/>
1	<input type="checkbox"/>	Optical RX Alarm	Normal	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	Optical TX Alarm	Normal	<input checked="" type="checkbox"/>
3	<input type="checkbox"/>	700MHz UL LNA Alarm	Normal	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	850MHz UL LNA Alarm	Normal	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>	1900MHz UL LNA Alarm	Normal	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>	700MHz DL PA Alarm	Normal	<input checked="" type="checkbox"/>
7	<input type="checkbox"/>	850MHz DL PA Alarm	Normal	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	1900MHz DL PA Alarm	Normal	<input checked="" type="checkbox"/>
9	<input type="checkbox"/>	700MHz DL Output Power Overload Alarm	Normal	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>	850MHz DL Output Power Overload Alarm	Normal	<input checked="" type="checkbox"/>
11	<input type="checkbox"/>	1900MHz DL Output Power Overload Alarm	Normal	<input checked="" type="checkbox"/>
12	<input type="checkbox"/>	700MHz DL Output Power Low Alarm	Normal	<input checked="" type="checkbox"/>
13	<input type="checkbox"/>	850MHz DL Output Power Low Alarm	Normal	<input checked="" type="checkbox"/>
14	<input type="checkbox"/>	1900MHz DL Output Power Low Alarm	Normal	<input checked="" type="checkbox"/>

Figure 34: Channel Alarm

External Alarm

External Alarm				
All	<input type="checkbox"/>	Parameter Name	Status	Enable <input type="checkbox"/>
1	<input type="checkbox"/>	External Alarm 01	Normal	<input type="checkbox"/>
2	<input type="checkbox"/>	External Alarm 02	Normal	<input type="checkbox"/>
3	<input type="checkbox"/>	External Alarm 03	Normal	<input type="checkbox"/>
4	<input type="checkbox"/>	External Alarm 04	Normal	<input type="checkbox"/>

Figure 35: External Alarm

4.4.6 PROPERTIES INFORMATION

Equipment ID

Equipment ID is to be configured after local commission has been completed, which includes Site ID and Site Sub ID.

Item	Description
Site ID	Site ID is the unique equipment identification. It is a hexadecimal string of eight characters in the range of [0x00000000-0xFFFFFFFF]. e.g. 12345678
Site Sub ID	Site Sub ID is used for Master-Slave System. It is the unique identification of each Master/ Slave Unit and is a hexadecimal string of two characters in the range of [0x00-0xFF] For the system located with single equipment, the Site Sub ID should be 0xFF. e.g. 00 For Master-Slave system, the Site Sub ID for Master Unit is 0x00, and the Site Sub ID for each Slave Unit is represented in the range of [0x00-0xFE] in ascending order. e.g. Master Site ID: 00 Slave Site ID: 01

Table 13: Equipment ID

Equipment ID					
All	<input type="checkbox"/>	Parameter Name	Status	Setting	Remark
1	<input type="checkbox"/>	Site ID	00000000		
2	<input type="checkbox"/>	Site Sub ID	00	Read only	00---site ID
3	<input type="checkbox"/>	Slave Site Sub ID 01	01		
4	<input type="checkbox"/>	Slave Site Sub ID 02	FF		FF is invalid site
5	<input type="checkbox"/>	Slave Site Sub ID 03	FF		FF is invalid site
6	<input type="checkbox"/>	Slave Site Sub ID 04	FF		FF is invalid site

Figure 36: Equipment ID

Equipment Info.

Equipment Info.					
All	<input type="checkbox"/>	Parameter Name	Status	Setting	Remark
1	<input type="checkbox"/>	Vendor ID	Comba	Read only	
2	<input type="checkbox"/>	Equipment Type	Fiber Optic Master Unit	Read only	
3	<input type="checkbox"/>	Equipment Model	RA5700D		
4	<input type="checkbox"/>	Serial No.	09091158		
5	<input type="checkbox"/>	Firmware Run Mode	Normal	Read only	

Figure 37: Equipment Info.

Site Location

Site Location					
All	<input type="checkbox"/>	Parameter Name	Status	Setting	Remark
1	<input type="checkbox"/>	Longitude	--		
2	<input type="checkbox"/>	Latitude	--		

Figure 38: Site Location

[Site Location]: input the current longitude and latitude in the blank.

System Clock

System Clock					
All	<input type="checkbox"/>	Parameter Name	Status	Setting	Remark
1	<input type="checkbox"/>	Date/Time	2009-07-22 04:41:50		

Figure 39: System Clock

[System Clock]: it shows the current time/date information. It is settable.

Comm. Config

The Comm. Config information requires to be manually entered by users after successful connection to the equipment.

Comm. Config					
All	<input type="checkbox"/>	Parameter Name	Status	Setting	Remark
1	<input type="checkbox"/>	AP:C Protocol Max. Length	920	Read only	
2	<input type="checkbox"/>	MCP:B Data Frame	Single-ACK	Read only	
3	<input type="checkbox"/>	Continuous Transmit Coefficient	3	Read only	
4	<input type="checkbox"/>	SMSC No.(Equipment SIM Card)	+8613800200500		
5	<input type="checkbox"/>	OMC Server IP	192.168.8.104		
6	<input type="checkbox"/>	OMC Server IP Port	161		
7	<input type="checkbox"/>	GPRS User Name	**		
8	<input type="checkbox"/>	GPRS Password	**		
9	<input type="checkbox"/>	Alarm Notice Phone No. 1	**		
10	<input type="checkbox"/>	Alarm Notice Phone No. 2	**		
11	<input type="checkbox"/>	Alarm Notice Phone No. 3	**		
12	<input type="checkbox"/>	Alarm Notice Phone No. 1 Enable	OFF		
13	<input type="checkbox"/>	Alarm Notice Phone No. 2 Enable	OFF		
14	<input type="checkbox"/>	Alarm Notice Phone No. 3 Enable	OFF		

Figure 40: Comm. Config.

SMSC NO. (Equipment SIM Card)	The SMS centre number of SIM card in equipment.
OMC Server IP	OMC IP Address. For equipment which support TCP/IP.
OMC IP Port No.	OMC IP Port No. For equipment which support TCP/IP.
GPRS User Name	Login GPRS network user name.
GPRS Password	Login GPRS network password.
Alarm Notice Phone NO.	The telephone number of alarm receiver.
Alarm Notice Phone NO. Enable	Enable the telephone number of alarm receiver.

Firmware Information

Firmware Info.				
All	Parameter Name	Status	Setting	Remark
1	Firmware Version	M63RA5700D3GH10V7001	Read only	

Figure 41: Firmware Information

4.4.7 USER MANAGEMENT

User Info.

User Information			
All	User Name	User Group	Connect Status
1	admin	admin	online

Figure 42: User Information

Set Session Time

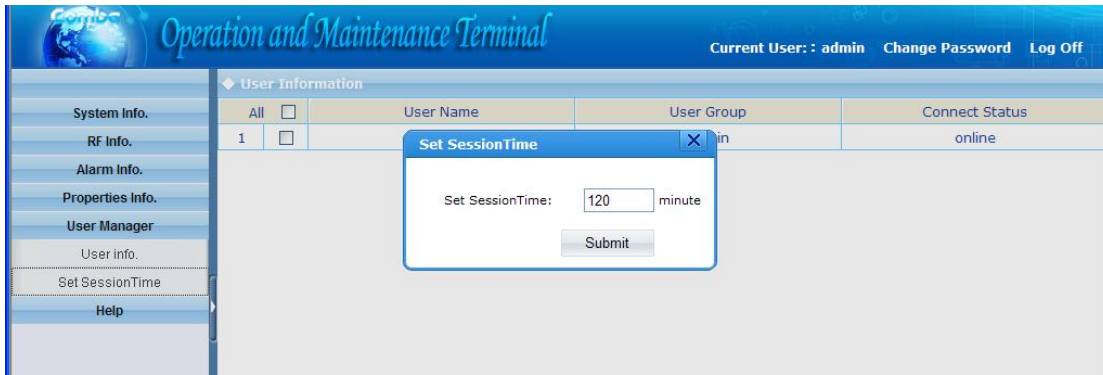


Figure 43: Set Session Time

[Set Session Time] is to set the automatic log-off time.

4.4.8 HELP

Help

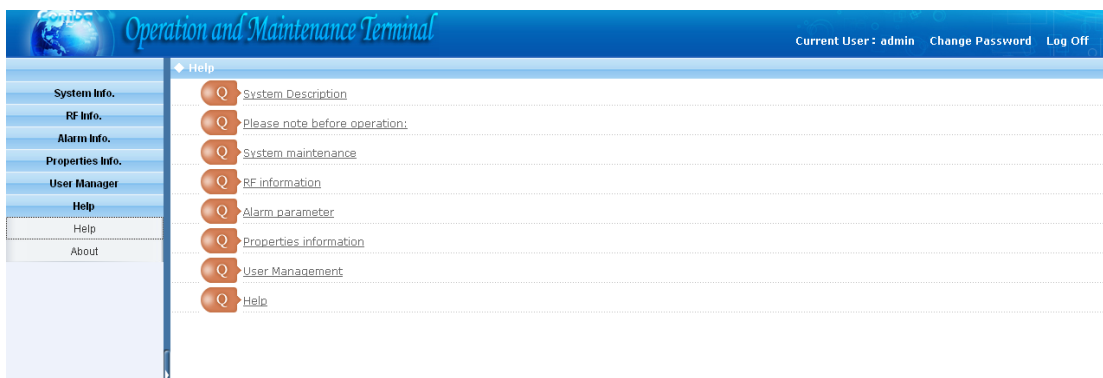


Figure 44: Help

About



Figure 45: About

4.4.9 CHANGE PASSWORD

Click [User Info.]-> select the wanted user as illustrated.



Figure 46: Password Configuration

Sumit the request of <Edit User> buttom in the bottom, a pop-up window might shown out to indicate an on-going step.

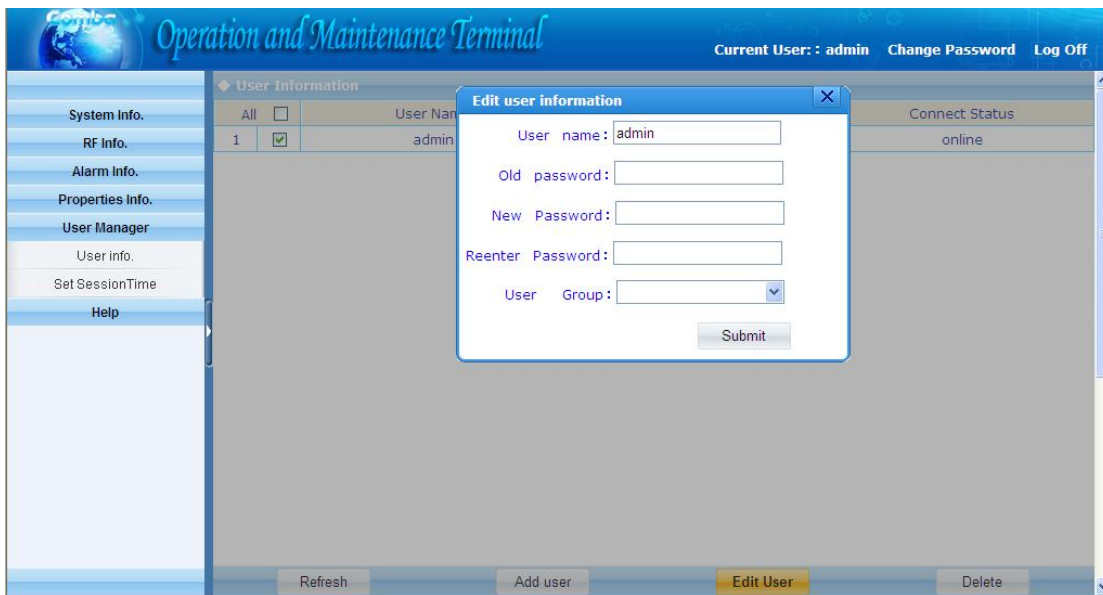


Figure 47: Change Password

End of section

5 TROUBLESHOOTING

Following installation and commissioning, occasional operation tasks to handle alarms may be required:

Alarm condition	Diagnosis
Power Failure Alarm/ DC Power Fault Alarm	Check AC power cable and verify AC mains supply is normal. During Power Fault alarm, DC power supply has no output. Check if DC output power is overloaded or short-circuited. The PSU could be faulty.
Li-ion Battery Fault Alarm	Check the connection between battery and power supply cable. Or replace the faulty modules and return it to the factory for repair.
DL Input Power Overload alarm	Check to make sure if the external device connected is working normally.
External Alarm	Eliminate alarm by correct setting of DL Input Power Overload threshold. If the setting is OK but alarm persists, the DL input power might be higher than the threshold. Increase the attenuator to reduce the input power or replace the coupler with a new one of high coupling effect. Check the cable connection of the DT port to the BTS.
Over-Temperature alarm	Eliminate alarm by correct setting of temperature threshold. If alarm can not be cleared, apply climatic protection to the system under severe environment.
Door Open Alarm	Check whether the enclosure door is closed.
ALC Alarm	Check to see if PA alarm or DL input power overload alarm occur via OMT/OMC. If so, adjust DL input power or replace a new PA.
Shutdown Alarm	Alarm occurs when automatically shut off the system. Turn on the system and check if the DL output power overload alarm persists, device connected is working normally.
Manual Shutdown Alarm	Alarm occurs when manually shut off the system. Turn on the system to eliminate the alarm.
Module Software Alarm	Alarm occurs when the module software failed. Reboot the system or update the software.
Optical TX Alarm	The optical power at the TX port of the Optical TX/RX Module is lower than the minimum requirement, which is resulted by the faulty of the optical TX part of Optical TX/RX Module or damaged optical fiber link. If so, replace the optical TX/RX module. If not, check the working status of the optical fiber to eliminate the alarm.
Li-ion Battery Fault Alarm	Replace the faulty modules and return it to the factory for repair.
Optical RX Alarm	The optical RX part of Optical TX/RX Module is faulty. Check and replace the faulty module and return it to the factory for repair.
UL LNA, DL PA alarms	Check power and signal connections of respective modules. If the power and signal wire connections are OK, then the respective modules may be faulty. Replace the faulty modules and return it to the factory for repair.
Over-Temperature alarm	Eliminate alarm by correct setting of temperature threshold, including normal and severe. If alarm can not be cleared, apply climatic protection to the equipment.
Master/Slave Unit Link Alarm	The communication between the MU and RU is abnormal. Check the working status of Optical TX/RX Module and FSK.
DL Input Power Overload Alarm	Eliminate alarm by correct setting of DL Input Power Overload threshold. If the setting is OK but alarm persists, the DL input power might be higher than the threshold. Decrease the gain to reduce the input power or replace the coupler with a new one of high coupling effect.
Optical TX Alarm	The optical TX part of Optical TX/RX Module is faulty. Check and replace the faulty module and return it to the factory for repair.
DL Output Power Overload Alarm	Eliminate alarm by correct setting of DL Output Power Overload threshold. If the setting is OK but alarm persists, the DL output power might be higher than the threshold. Decrease the gain to reduce the output power.
DL Output Power Low Alarm	Eliminate alarm by correct setting of DL Output Power Low

Optical RX Alarm

The optical power at the RX port of the Optical TX/RX Module is lower than the minimum requirement, which is resulted by the faulty of the optical TX part of Optical TX/RX Module or damaged optical fiber link. If so, replace the optical TX module. If not, check the working status of the optical fiber to eliminate the alarm.

	threshold. If the setting is OK but alarm persists, the DL output power might be lower than the threshold. Increase the gain to high up the output power.
External Alarm	Check to make sure if the external device connected is working normally

Table 14: Alarms Diagnosis

End of Section

6 MAINTENANCE

The RA-5700 system is designed for trouble-free operation and generally does not need maintenance. Maintenance activities should only be carried out by trained personnel.

The equipment operation status can be observed remotely through OMT/OMC.

Periodic inspection of the system is recommended. The recommended tasks include:

- Measurement of the return loss of the feeder system.
- Ensure the stable connection of cables, power cords and facilities located indoor.
- Inspect and record operation status and parameters, such as receive signal level, DL output power of the system, from OMC or OMT.
- Check the PSU voltage of MU.
- Verify that the actual coverage effects have not degraded.
- Check the working status of optical TX/RX power.
- Check the controlling and monitoring function.
- Verify lightning and grounding protection is in good condition.

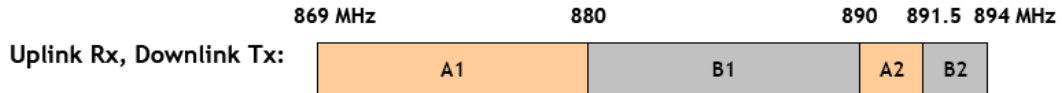
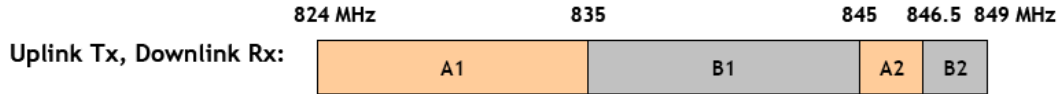
End of Section

7 APPENDICES

7.1 APPENDIX A: BAND SELECTIVE UNIT USER MANUAL

7.1.1 BS-8132 BSU (BAND SELECTIVE UNIT)

1) Working frequency:



1) Applications:

- 1> A1+A2
- 2> B1+B2
- 3> A band + B band

To realize the channel function, please refer to the following table;

	Channel 1
Channel 1/2 ON	A2+B2 (1.5MHz~4MHz set available)
Channel 1 ON, Channel 2 OFF	A band + B band (total 25MHz)

NOTE that **Channel 2** can only realize **A1 + B1 (1.5MHz~21MHz set available)** bandwidth.

2) Set channel No. as center channel number

Bandwidth= (Upper edge No. – Lower edge No.) x 30KHz + 1.23MHz

3) CDMA850 channel No.

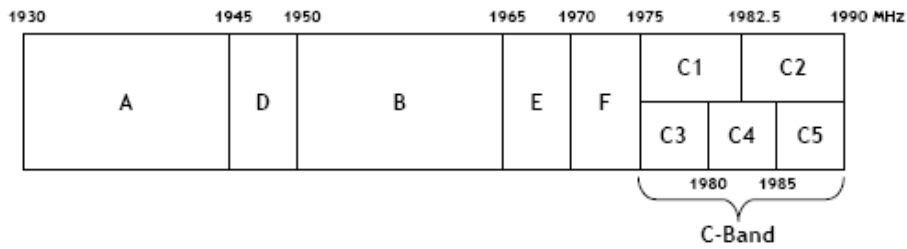
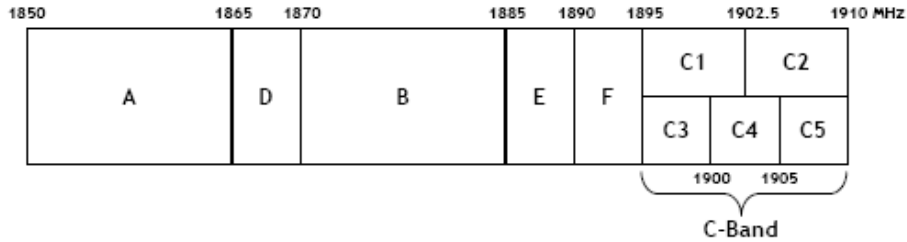
Working Band	Channel	DL Channel No.	UL Channel No.
A1	2	1011	314
B1	2	354	647
A2	1	687	697
B2	1	737	779
A band + B band	1	1011	779

Table 15: Bandwidth and Channel No.

7.1.2 BS-1933 BSU

1) Working frequency:

PCS Band (1850-1990 MHz): Up to 20 MHz of spectrum in no more than 3 non-contiguous PCS sub-bands of 5, 10 or 15 MHz each based on VZW's PCS licenses.



2) Applications:

Channel 1~3 is 5MHz~15MHz bandwidth settable while 60MHz can be set and which can not be iterant set.

The minimum interval between Lower edge No. and Upper edge No. is 75, while the maximum is 275.

3) Set channel No. as center channel number

Bandwidth= (Upper edge No. – Lower edge No.) x 50KHz + 1.25MHz

4) CDMA1900 channel No.

Working Band	DL Channel No.	UL Channel No.
A	13	288
D	313	388
B	413	688
E	713	788
F	813	888
C	913	1186
C1	913	1050

C2	1063	1188
C3	913	988
C4	1013	1088
C5	1113	1188

7.1.3 BS-8132&BS-1933 BSU LAYOUT

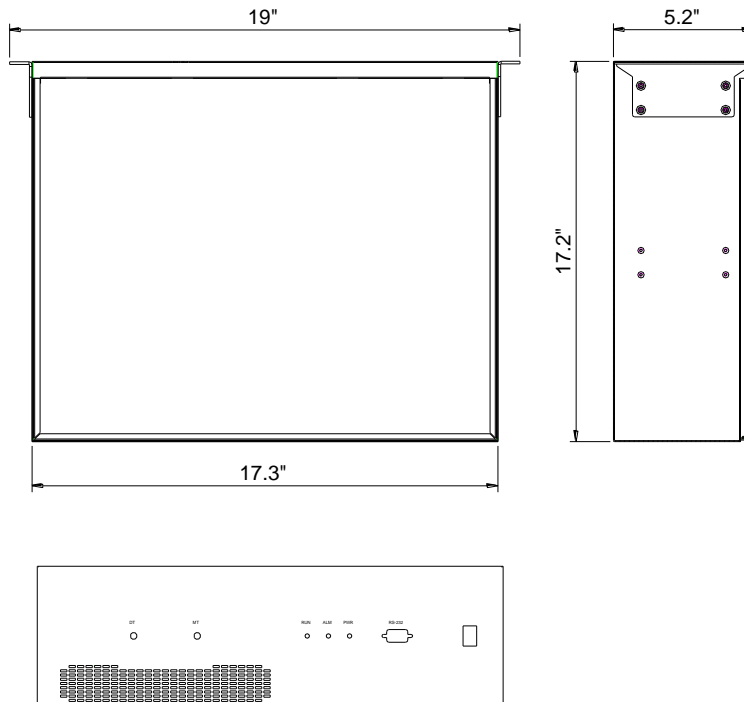


Figure 48: BSU Layout

7.1.4 BS-8132&BS-1933 KOP

For the system, the following are shipped.

Product Identifier	Description	Quantity
Power Supply Cable		1
Field Commissioning Cable	R-9122C/R-9122AC	1
RF Jumper		1
N to SMA Connector	N female to SMA male	1
Feeder Cable	N male to N male; customized length accordingly	1
Philips Pan Head Screw	GB/T818, M5x10	4

Table 16: BS-1933 KOP

Product Identifier	Description	Quantity
Power Supply Cable		1
Field Commissioning Cable	R-9122C/R-9122AC	1
RF Jumper		1
N to SMA Connector	N female to SMA male	1
Feeder Cable	N male to N male; customized length accordingly	1
Philips Pan Head Screw	GB/T818, M5x10	4

Table 17: BS-8132 KOP

7.1.5 BSU OMT

7.1.5.1 LOCAL TO OMT

After installing OMT software on the PC, connection to the equipment can be done locally.

Double click the OMT explorer icon, the OMT Explorer main screen window will appear.

7.1.5.2 LOCAL CONNECTION TO OMT

After database configuration is done successfully, the following window will pop up and select [Local connection via RS-232] for local connection.

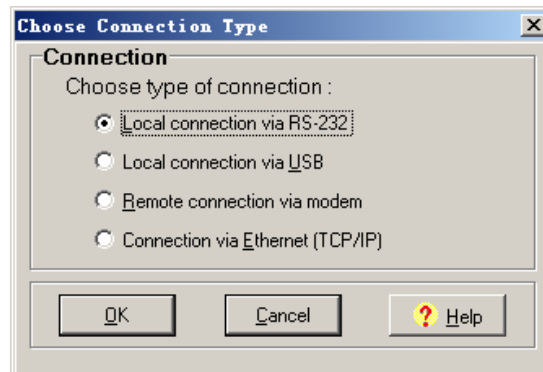


Figure 49: Connection Type

Select the desired communication port and click “OK”, it will enter into the main window of OMT.

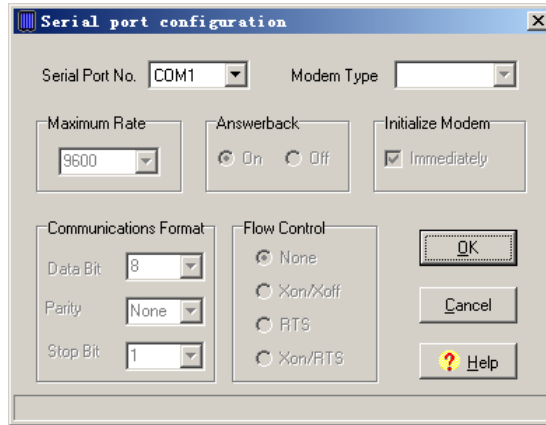


Figure 50: Serial Port Configuration

7.1.5.3 OMT CONFIGURATION

After entering the OMT main screen, click the “Connect” button on the toolbar, to connect the equipment to the OMT. Successful connection will be indicated by a message “Online Ok” and equipment parameters can be read and/or set.

Users can configure the parameters, and then offset the parameters according to desired coverage level and interference to other BTS signals.

OMT parameters include: Common Information, RF Information, Alarm Information, and Properties Information.

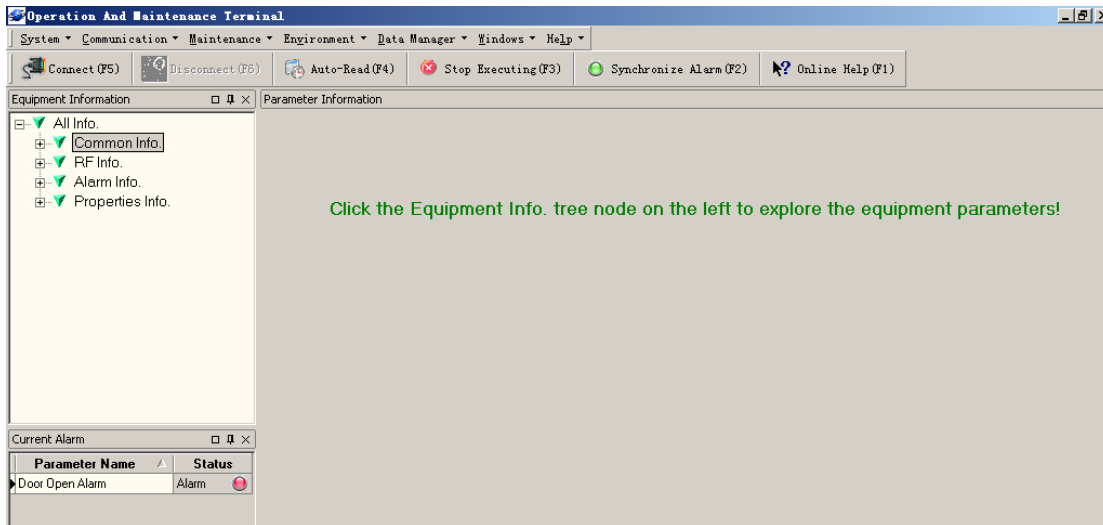


Figure 51: Main Window

7.1.6 BS-1933 OMT

7.1.6.1 Common Information

System Information

Click on [System Info.] within Equipment Information, system information will be displayed in the right interface of the OMT screen.

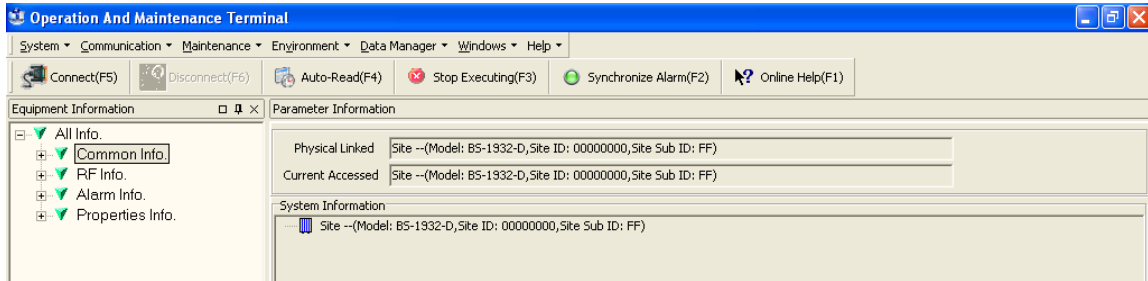


Figure 52: System Information

Auto-Read

Customer can set which parameters to be read automatically at a particular time interval.

Click on the [Auto-Read] node in the right interface the parameters will be displayed in the right interface. Select the desired parameters and click [Save] button. Input a number in the time interval field and click the adjacent [Save] button to admit the setting.

Example: If the time interval is 3 seconds, then the selected alarm parameters will be read automatically every 3-second.

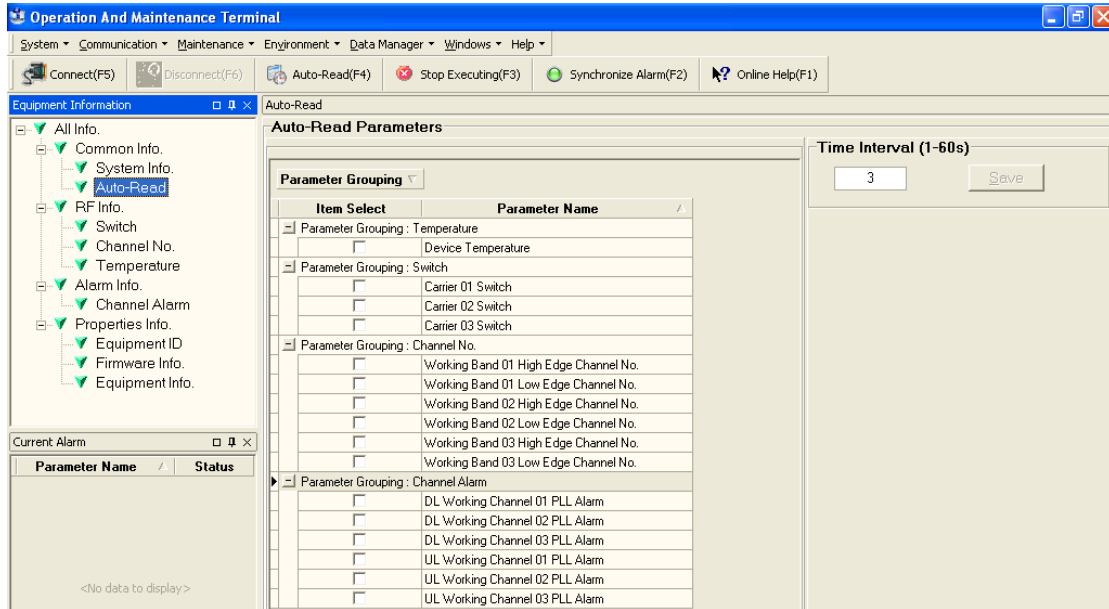


Figure 53: Auto-Read

7.1.6.2 RF Parameter

It is recommended to configure the following RF parameters for the first installation.

SWITCH

Switch is to enable/disable power for internal modules. When user checks and sets non-RF parameters, such as checking physical antenna connection, switching off will disable equipment power temporarily to protect PA in operation.

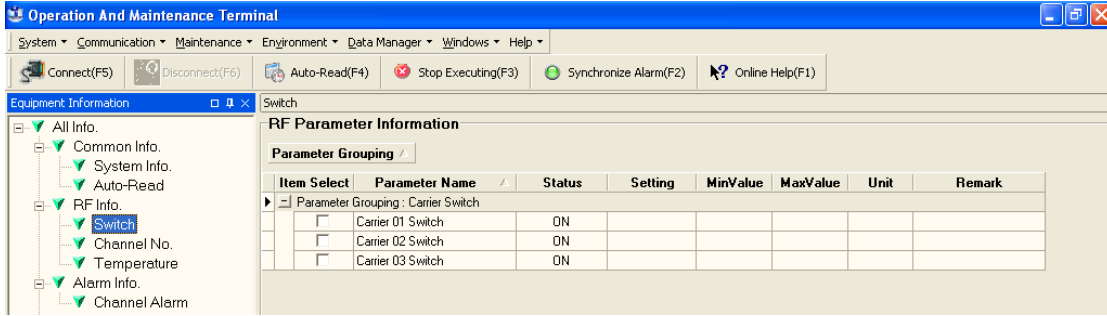


Figure 54: Switch

Config:

Select the required state in setting columns of RF information window for RF switch, then press [Enter] or [Config] button to finish the configuration operation.

CHANNEL NO.

Channel No. includes Low Edge Channel No. and High Edge Channel No. The value in [MaxValue] column is the upper limit of the range, while the value in [MinValue] column is the lower limit of the range.

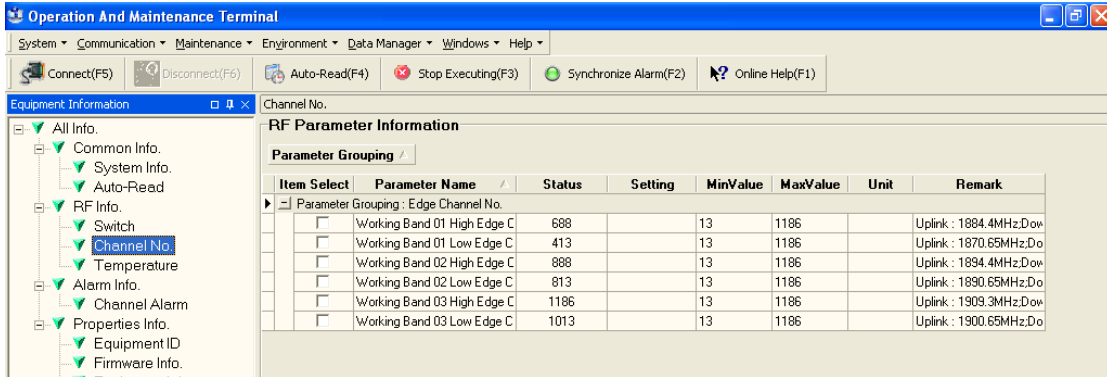


Figure 55: Channel NO.

7.1.6.3 Alarm Information

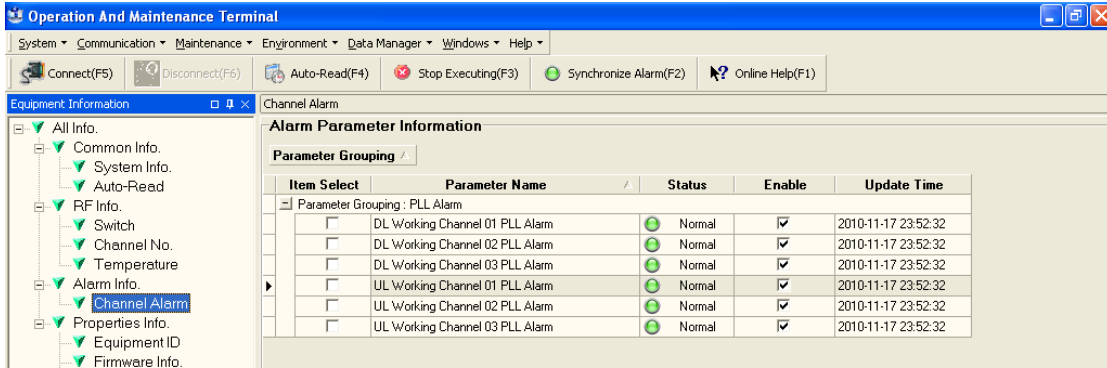


Figure 56: Channel Alarm

Config:

Tick the check box of [Item select] and [Enable] of the desired parameters and click [config] button to finish configuration operation.



Notice: [Enable] box is to enable the alarm monitoring for system. Only if users enable the alarm by ticking the [Enable] box, the alarms can be monitored by the OMT/OMC.

7.1.6.4 Properties Information

EQUIPMENT ID

Equipment ID is to be configured after local commission has been completed, which includes Site ID, and Site Sub ID.

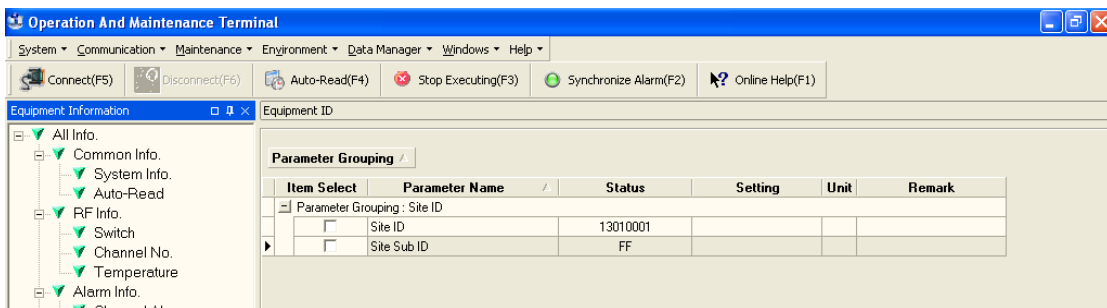


Figure 57: Equipment ID

See the table below for configuration details of each parameter.

Item	Description
Site ID	Site ID is the unique equipment identification. It is a hexadecimal string of eight characters in the range of [00000000~FFFFFFFF]. e.g. 00000000
Site Sub ID	Site Sub ID is used for Master-Slave System. It is the unique identification of each Master/ Slave Unit and is a hexadecimal string of two characters in the range of

	<p>[00~FF]. For the system located with single equipment, the Site Sub ID should be FF. For Master-Slave system, the Site Sub ID for Master Unit is 00, and the Site Sub ID for each Slave Unit is represented in the range of [01~FE] in ascending order. e.g. Master Site ID: 00, Slave Site ID: 01</p>
--	--

7.1.7 BS-8132 OMT

7.1.7.1 Common Information

System Information

Click on [System Info.] within Equipment Information, system information will be displayed in the right interface of the OMT screen.

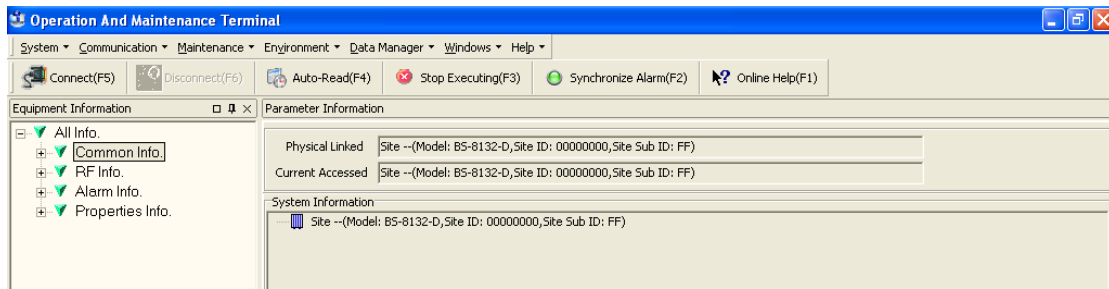


Figure 58: System Information

Auto-Read

Customer can set which parameters to be read automatically at a particular time interval.

Click on the [Auto-Read] node in the right interface the parameters will be displayed in the right interface. Select the desired parameters and click [Save] button. Input a number in the time interval field and click the adjacent [Save] button to admit the setting.

Example: If the time interval is 3 seconds, then the selected alarm parameters will be read automatically every 3-second.

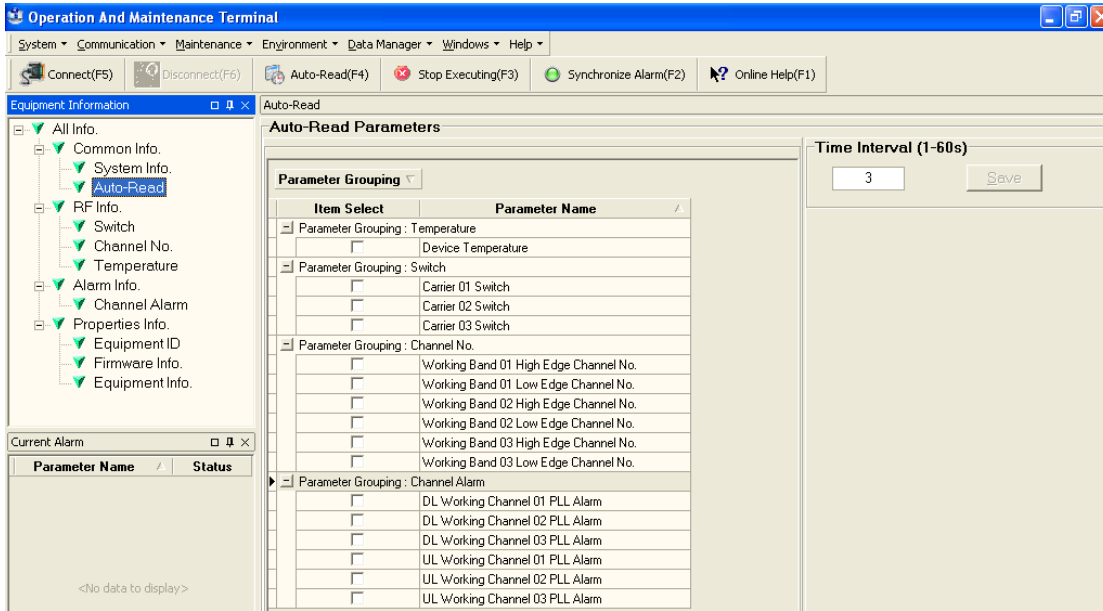


Figure 59: Auto-Read

7.1.7.2 RF Parameter

It is recommended to configure the following RF parameters for the first installation.

SWITCH

Switch is to enable/disable power for internal modules. When user checks and sets non-RF parameters, such as checking physical antenna connection, switching off will disable equipment power temporarily to protect PA in operation.

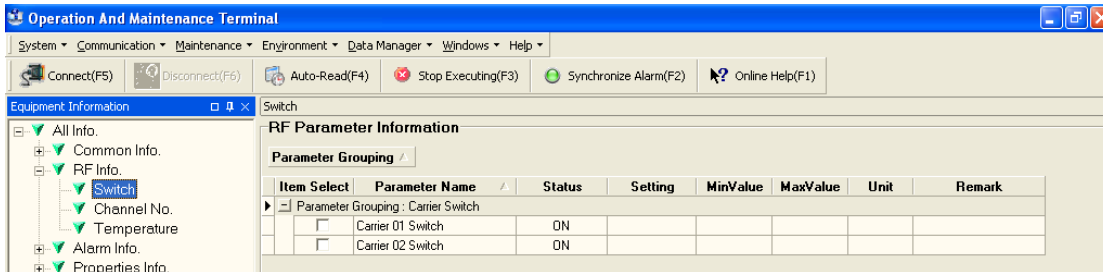


Figure 60: Switch

Config:

Select the required state in setting columns of RF information window for RF switch, then press [Enter] or [Config] button to finish the configuration operation.

CHANNEL NO.

Channel No. includes Low Edge Channel No. and High Edge Channel No. The value in [MaxValue] column is the upper limit of the range, while the value in [MinValue] column is the lower limit of the range.

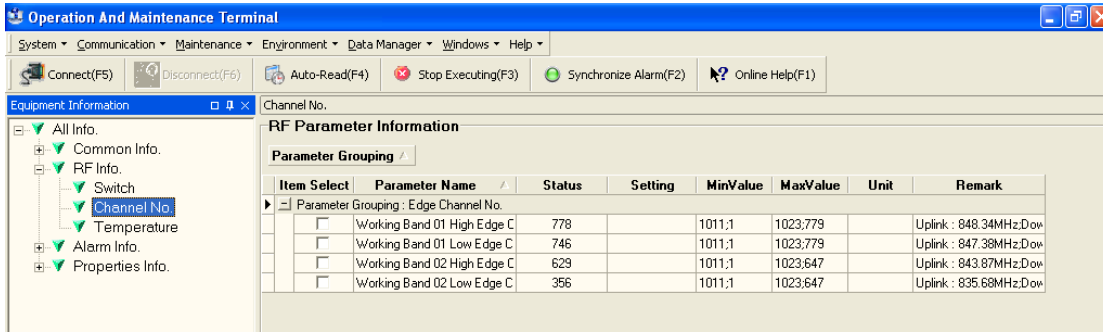


Figure 61: Channel NO.

7.1.7.3 Alarm Information

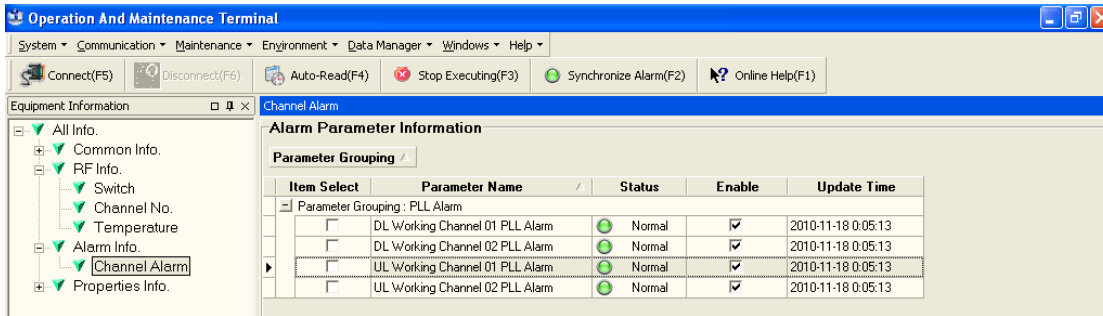


Figure 62: Channel Alarm

Config:

Tick the check box of [Item select] and [Enable] of the desired parameters and click [config] button to finish configuration operation.



Notice: [Enable] box is to enable the alarm monitoring for system. Only if users enable the alarm by ticking the [Enable] box, the alarms can be monitored by the OMT/OMC.

7.1.7.4 Properties Information

EQUIPMENT ID

Equipment ID is to be configured after local commission has been completed, which includes Site ID, and Site Sub ID.

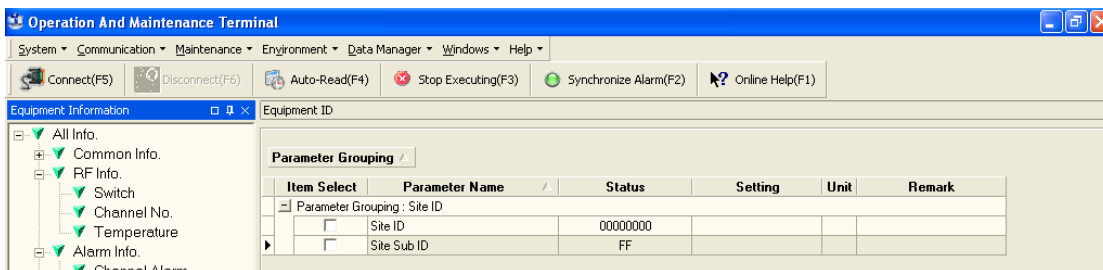


Figure 63: Equipment ID

See the table below for configuration details of each parameter.

Item	Description
Site ID	Site ID is the unique equipment identification. It is a hexadecimal string of eight characters in the range of [00000000~FFFFFFFF]. e.g. 00000000
Site Sub ID	Site Sub ID is used for Master-Slave System. It is the unique identification of each Master/ Slave Unit and is a hexadecimal string of two characters in the range of [00~FF]. For the system located with single equipment, the Site Sub ID should be FF. For Master-Slave system, the Site Sub ID for Master Unit is 00, and the Site Sub ID for each Slave Unit is represented in the range of [01~FE] in ascending order. e.g. Master Site ID: 00, Slave Site ID: 01

7.1.8 BS-8132&BS-1933 BSU CONNECTORS

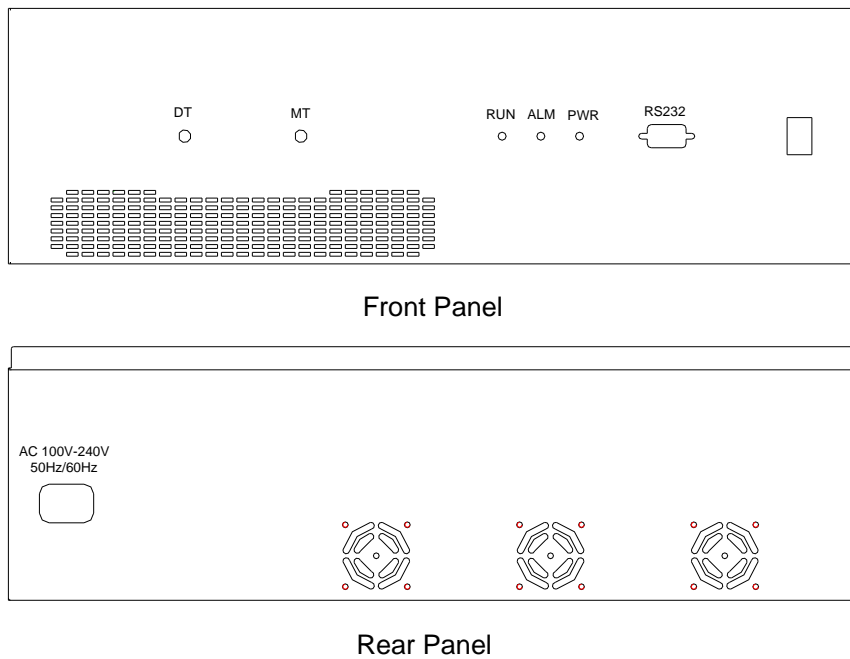


Figure 64: BSU Connectors

Identifier	Functional Description
DT	SMA connector, connects with BTS
MT	SMA connector, BS-8132_MT connects with RA-5700D_850MHz connector while BS-1933_MT connects with RA-5700D_1900MHz connector
RUN	Operation indicator
ALM	Alarm indicator
PWR	Power supply indicator
RS232	DB9 connector, connects to PC via engineering OMT.
AC 100-240V 50Hz~50Hz	Power supply

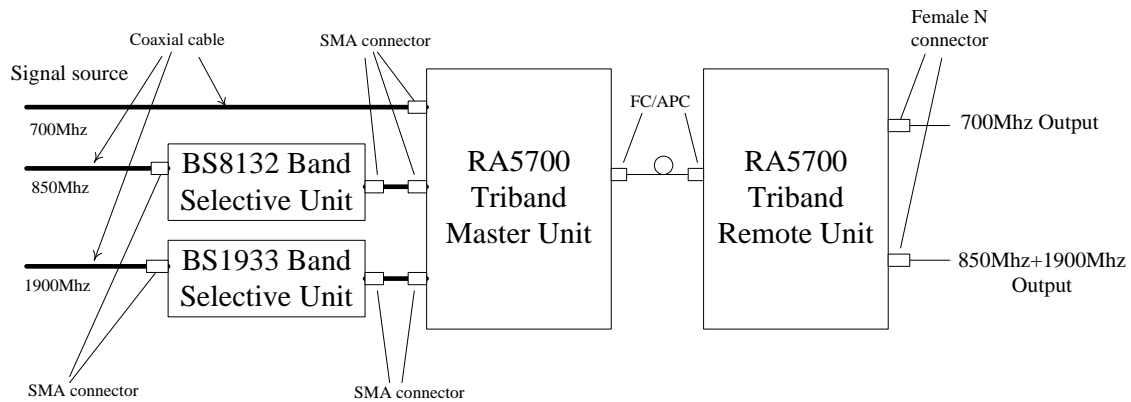


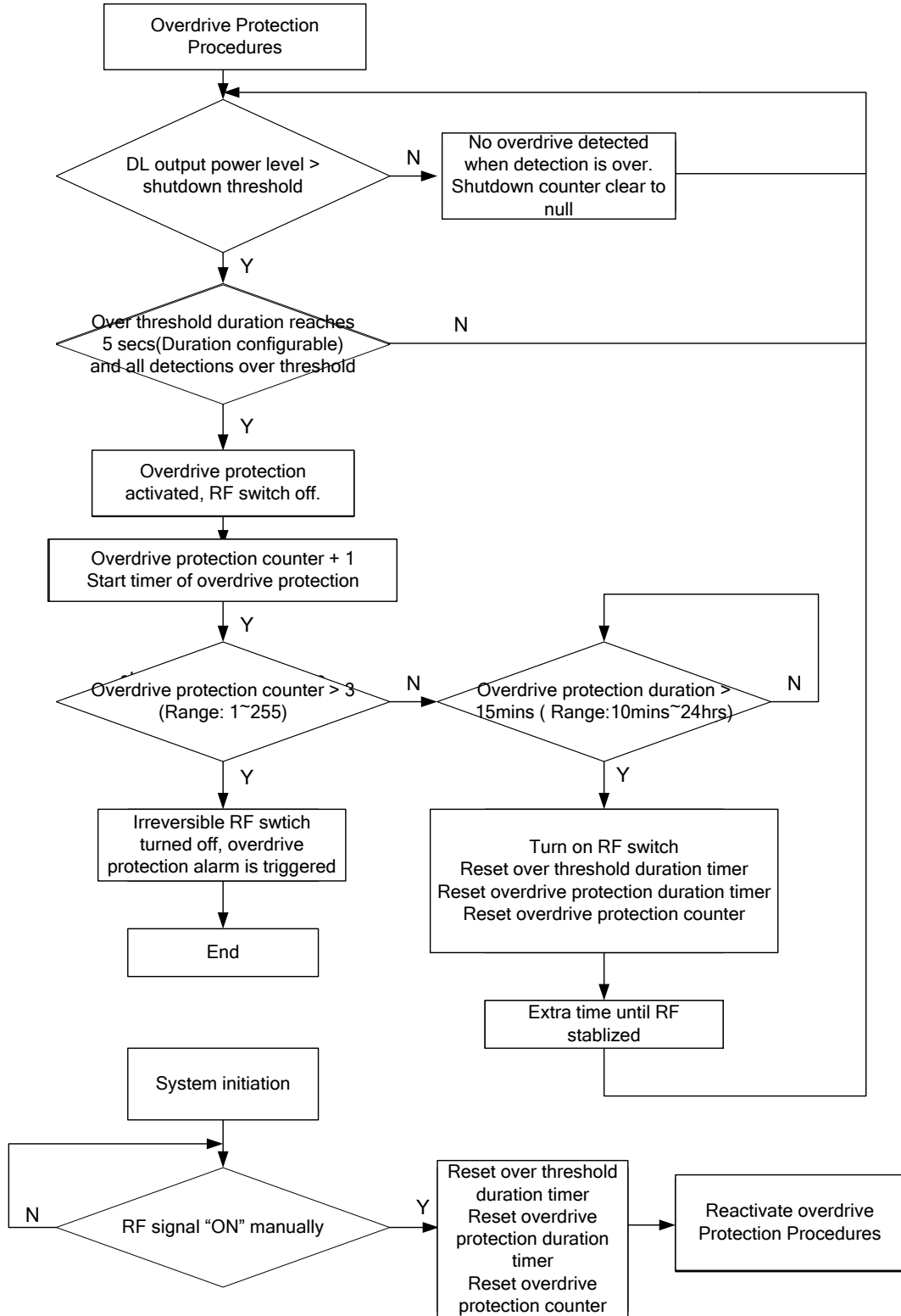
Figure 65: BSU Connection Overview

7.2 APPENDIX B: TOOLS FOR INSTALLATION AND MAINTENANCE

The following are the recommended list of tools new installation and routine maintenance:

- Electronic drill
- Allen Key
- Adjustable spanner (Assorted size: 0.31~0.79 inch)
- Philips Screwdriver

7.3 APPENDIX C: OVERDRIVE PROTECTION PROCEDURE



- NOTE:** 1. Independent control for each channel (850/1900/700)
 2. Activate RF signal switch manually when the system is under permanent shutdown.
 3. Overdrive protection procedures will be activated after manually turning on RF

7.4 APPENDIX D: SERVICING POLICY AND RETURN OF EQUIPMENT

The repair of individual units and modules of this equipment is not considered practicable without factory facilities. It is, therefore, the policy of Comba whereby faulty units or modules are returned to the local agent for repair.

To enable an efficient, prompt after sales service to be provided for the diagnosis, repair and return of any faulty equipment, please comply with the following requirements.

Items to be sent for repair should be packaged so as to provide both electrostatic and physical protection and a Repair Material Authorization (RMA) should be completed giving the required information. A sample RMA form is provided in Appendix.

This request must be included with the item for repair. Items for repair should be sent to the nearest Comba office:

COMBA TELECOM LTD.

Hong Kong Office

Address: 611 East Wing, No. 8 Science Park West Avenue, Hong Kong Science Park, Tai Po, Hong Kong.

Tel: +852 2636 6861 Fax: +852 2637 0966

Singapore Office

Address: No. 1 Kaki Bukit View, #02-10 Techview, Singapore 415941

Tel: + 65 6345 4908 Fax: + 65 6345 1186

Thailand Office

Address: 240/34 Ayothaya Tower 18th Floor, Ratchadapisek Road, Huaykwang, Bangkok 10320, Thailand

Tel: +66 2274 1618-9 Fax: +66 2274 1620

India Office

Address: Suite No. 2, E-172, TSH House, Greater Kailash – I, New Delhi – 110 048, India

Tel: + 91 11 4173 9997 / 8 Fax: + 91 11 4173 9996

Sweden Office

Address: Gustavslundsvagen 147, S- 167 51 Bromma, Stockholm, Sweden

Tel: +46 8 25 38 70 Fax: +46 8 25 38 71

Brazil Office

Address: Avenida Engenheiro Luiz Carlos Berrini 1297, cj 122, 04571-090 Brooklin Novo, São Paulo, Brazil

Tel: +55 11 35093700 Fax: +55 11 35093720

Dubai Office

Address: P.O. Box 450583, DUBAI, U.A.E.

Tel: +971 0 4 433 5320 Fax: +971 0 4 422 6774

US Office

Address: Comba Telecom Inc. 2390 Bering Drive, San Jose, CA 95131, USA


Tel: +1 408 526 0180 Fax: +1 408 526 0181

China Office

Address: No.10, Shenzhou Road, Guangzhou Science City, Guangzhou, China

Tel: + 86 20 2839 0000 Fax: + 86 20 2839 0136

7.5 APPENDIX E: RMA (RETURN MATERIAL AUTHORIZATION) FORM



Comba Telecom Ltd.
 611 East Wing, No. 8 Science Park West Avenue, Hong Kong Science Park, Tai Po, Hong Kong
 Tel: +852 2636 6861 Fax: +852 2637 0966

RMA Request Form
 Date: _____

From: _____
 Address: _____
 Tel: _____ Fax: _____
 E-Mail: _____
 ATTN: _____

Product Information:

Item	Model	Serial Number	Return Category	Qty	Problem Description
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Notes:
 1. For 'Return Category' column, please select from **A:** Return of Defective Product, **B:** Return of Trial Sample, or **C:** Return of New and Unused Product.
 2. If **A** or **C** category of return product is chosen, please give short description of the problem or reason for returning.

Transportation Information:
 Location of Product: _____
 Transportation Method: _____
 Shipping Forwarder: _____

Note: Location of Product must be stated, while 'Transportation Method' or 'Shipping Forwarder' can be left blank if not determined.

Signature:

For Comba Use (Only)
 Return Merchandise Authorization Number (RMA#): _____
 Recommended Action: _____
 Shipment and Handling Cost to be paid by: _____

Approved by: _____

 Date: _____

End of Section

End of Document