TC-2000
AWS BAND SELECTIVE BASE STATION POWER AMPLIFIER

USER MANUAL

The information contained herein is the responsibility of and is approved by the following, to whom all enquiries should be directed in the first instance:

Comba Telecom Ltd

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0.3 INDEX TO FIGURES

0.4 ISSUE CONTROL

Change No.	ENU	Details Of Change
1	1-0-0	This manual first created in June 2011 and referred to its Chinese manual TC-2000-1001YH released in June 2011.
2	1-1-0	Updated KOP, block diagram, equipment enclosure layout and OMT in September 2011.
3	1-1-1	Updated the HongKong office address and added frequency setting decription in section 4.5.7 in sep 2011.

0.5 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.

Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

To comply with FCC RF exposure requirements, the device and the antenna for this device must be installed to ensure a minimum separation distance of 5.2188 meters or more from a person's body. Other operating configurations should be avoided.

End of section

1 GENERAL INFORMATION

TC-2000 AWS Band Selective Base Station Amplifier (hereinafter called “TC-2000”) is designed to work for AWS band. It can improve BTS output power, effectively enlarge the coverage, reduce the investment and improve the network quality.It mainly uses in urban villages, rural areas, express ways and mountain areas, and also used in cellular merge, improve carrier utilization.

Main features

- Supports 1~4 carriers. Improves BTS output power and extends its coverage.
- High power output up to 120W.
- Spectrum TX module satisfies 3GPP.
- UL noise figure < 2.5dB.
- Multi-carrier power extend system adopts high efficiency technology, its efficiency is 2.5 times of traditional multi-carrier BS power extend system and is more energy saving and environment protection.
- With Form C Alarm.
- Can satisfy the current BTS antenna system and 2 in 1 out antenna way.
- TMA BATS function can cooperate with TMA.
- Automatic bypass switch, activate in case the equipment faults or power down to ensure BTS continous signal coverage.
- Local Operation and Maintenance Terminal (OMT): operating status and parameters can be set or monitored by OMT PC locally.
- Operation Maintenance Center (OMC): system working parameters and communication configuration can be set or inquired remotely through the build-in CDMA modem. If alarm is generated, the equipment will dial up to OMC automatically in the mode of SMS or datalink.

The following figure shows the enclosure of the TC-2000.

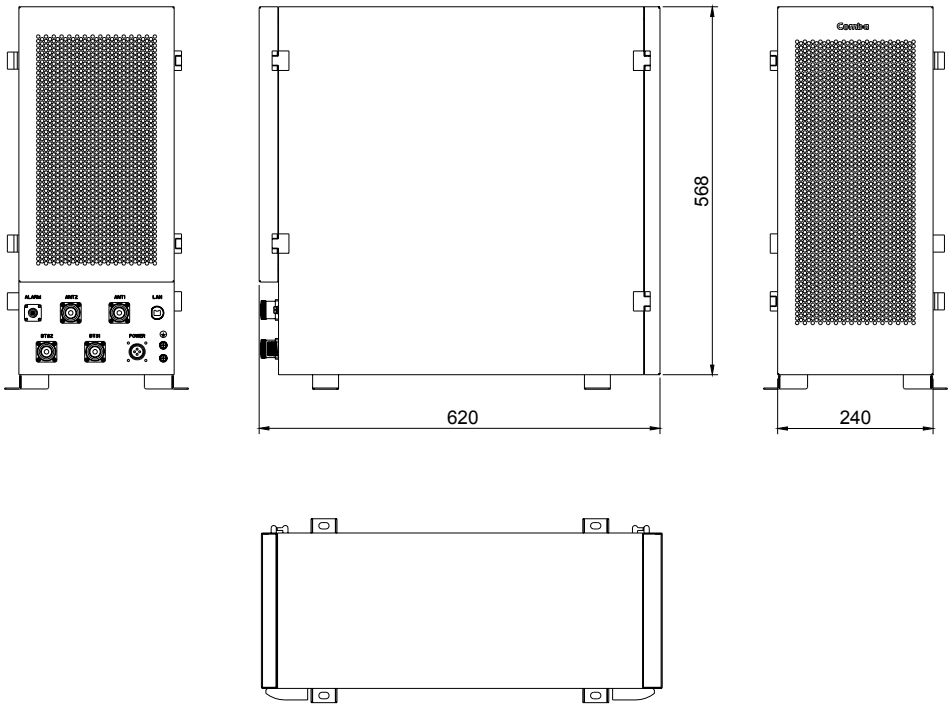


Figure 1: Equipment Enclosure Layout

End of section

2 EQUIPMENT DESCRIPTION

2.1 BLOCK DIAGRAM

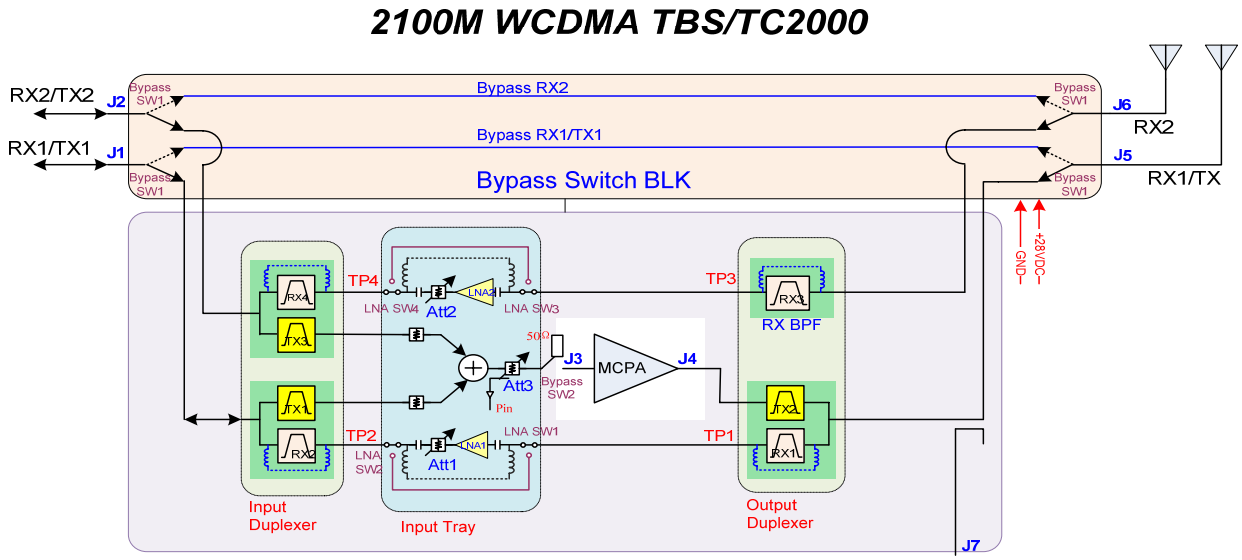


Figure 2: System Block Diagram

As it is show in figure2,the multi-channal carrier signal from BTS TX1/TX2 port goes into the system at the Input Duplexer. The duplexer filters out the out of band signals and combines the TX carriers in the Input Tray. The combiner signal is the sent through an adjustable attenuator that feeds into the MCPA for power amplification. The signal is then sent through the Output Duplexer and into the antenna at ANT1. In the event of a major fault in the PA or power failure, the bypass switch will be activated to ensure BTS continuous signal coverage.

The UL signal from antenna1 goes by ANT1 port into the Output Duplexer where the out-of-band signals get filtered out. The filtered signal then gets sent to the Input Tray where the user has the option of sending the signal through a LNA and adjustable attenuator or bypassing LNA altogether. The signal then gets sent out through the Input Duplexer to the base station.

2.2 EQUIPMENT INTERNAL LAYOUT

This system typically consists of the following sub modules.

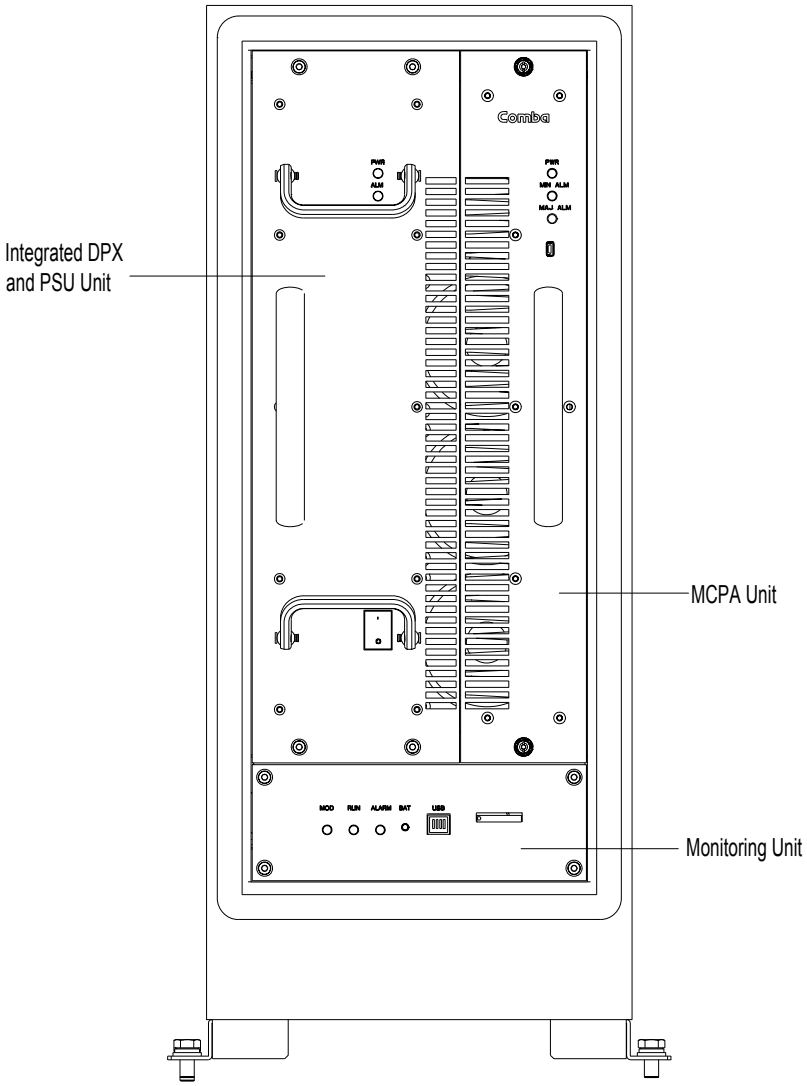


Figure 3: Equipment Internal Layout

2.3 KITS OF PART

For this system, the following are shipped:

Product Identifier	Description	Quantity
TC-2000	Enclosure	1
MCPA	PA-5350FCZ0	1
Mounting Rack	00-BPA1810M-3855	1
Power Supply Cable Connector Assembly		1
Grounding Cable	BVR10mm2,2m	1
Hex Socket Bolt	M8x20	4
Philips Pan Head Screw	M4x10	4
Massory Bolt	M8x10	
USB Cable	AM/BM,1.5m	1
N-M to N-M Cable	00-BPA1810M-3086	
Key	N/A	2
CD (Equipment manual & OMT software)		1
Power Supply Cable Connector Assembly Guide	N/A	1

End of section

3 INSTALLATION

3.1 INSTALLLATION CHECKLIST AND PREPARATION

3.1.1 INSTALLATION CHECKLIST

Installation Location Requirement	Considerations
Working Space required	Ample space on mounting wall surface or pole for unrestricted airflow, door opening and cable routing. Recommended wall surface: 1m x 1m x 1m
Power Supply	Provided power cord length is about 4m. Use a dedicated AC breaker or fuse circuit with good access to an earthing point. Here is the power supply：AC110/220V
EMC and Interference	Do not locate near large transformers or motors that may cause electromagnetic interference.
Suitable operating environment	-25 ^{o}C to +50 ^{o}C and maximum 95% relative humidity.

3.1.2 PREPARATIONS

- Open and check the content of the package received against the packing list. If any external damages, please report to shipping agent. If any items are missing, contact Comba Telecom System.

3.2 INSTALLATION PROCEDURE

3.2.1 SHELTER INSTALLATION

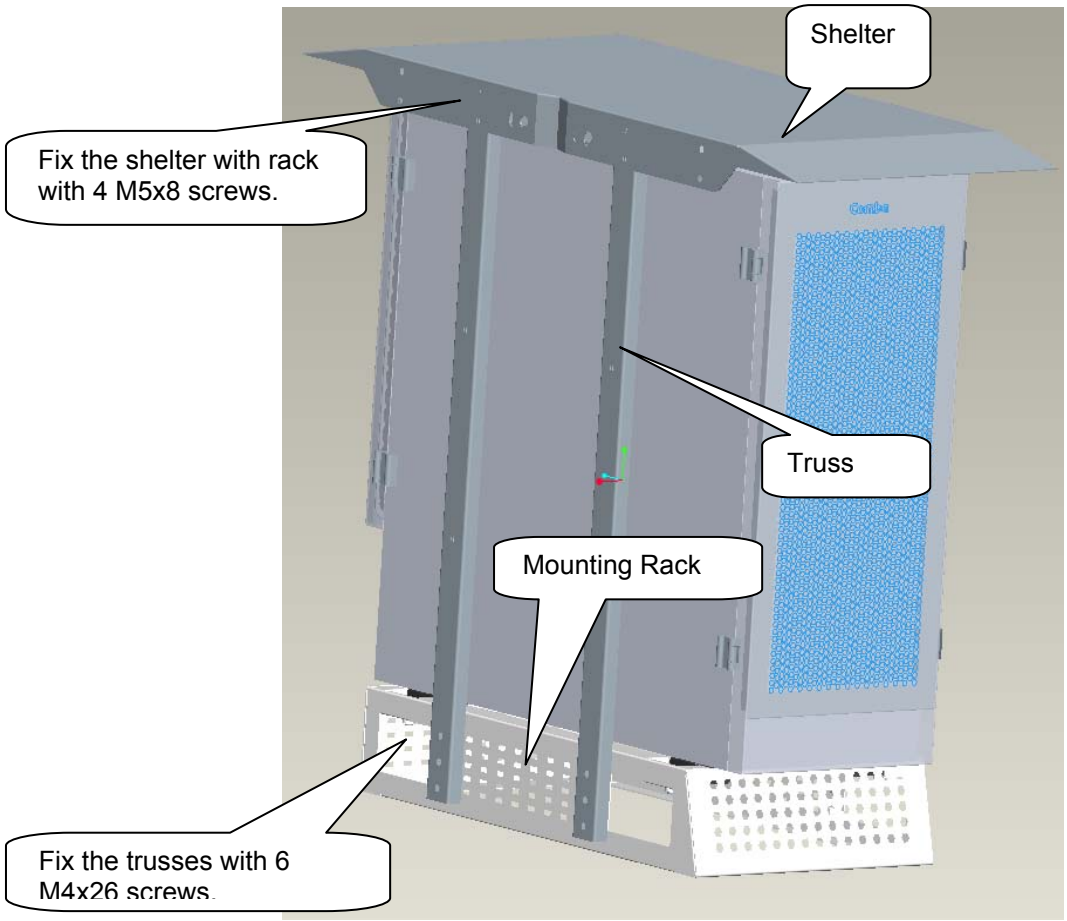


Figure 4: Shelter Installation1

There are 2 options to install the shelter to euiqpment as follow:

Option 1: use U bolt which available for <70mm diameter poles.

Option 2: use clamp for rountine poles

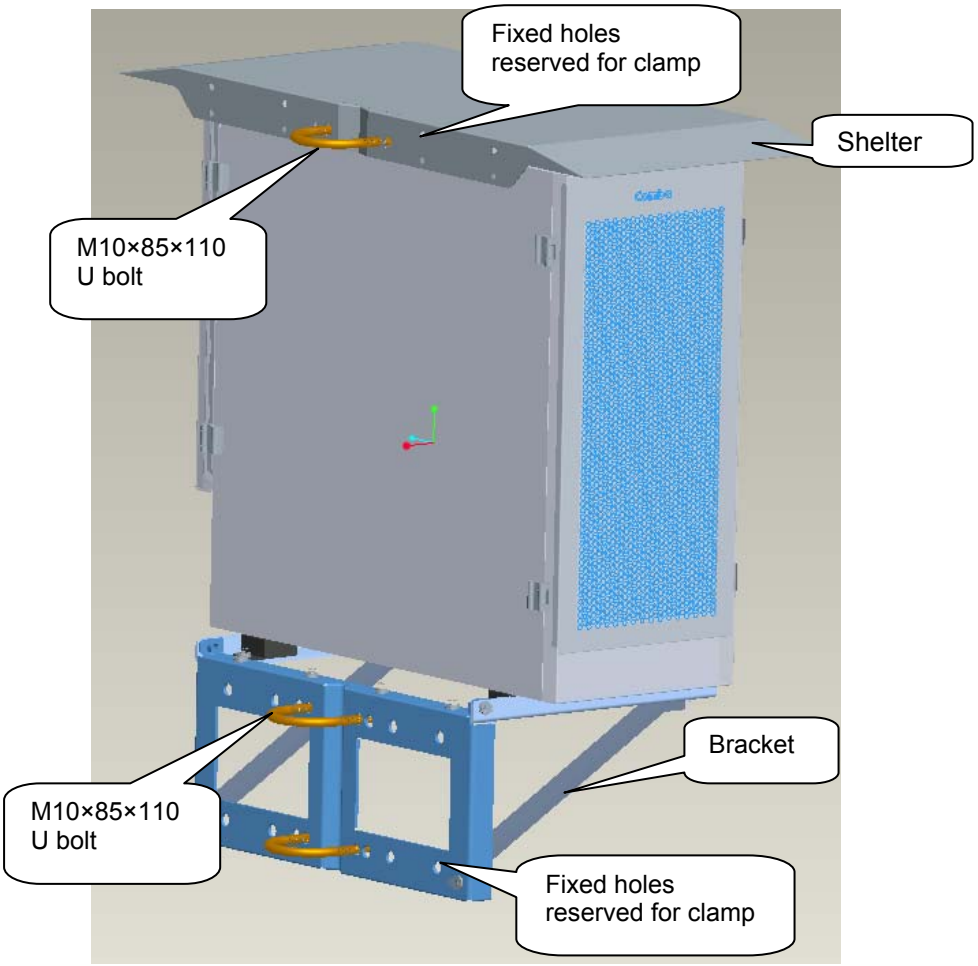


Figure 5: Shelter Installation2

3.2.2 EQUIPMENT GROUNDING INSTALLATION

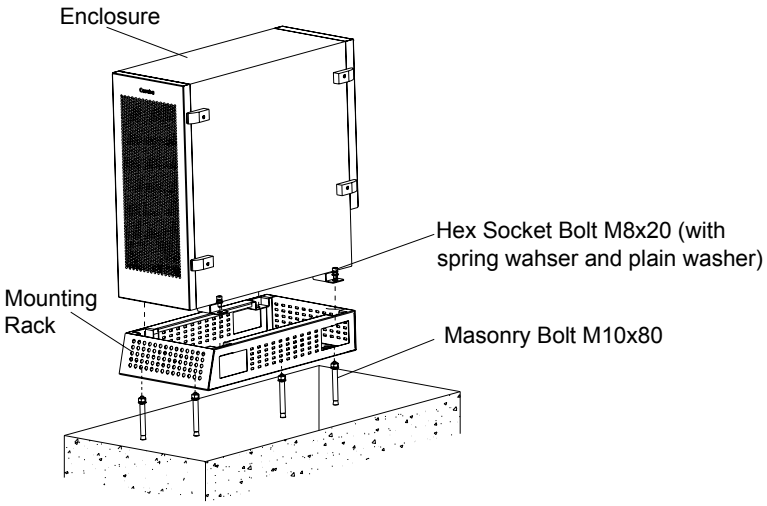


Figure 6: Equipment Installation

Comba recommends installs TC-2000 in a platform and near the BTS.

In the consideration of delivery purpose, equipment might be divided into 2 parts (MCPA unit departs from the rest of parts) within one package.

In this case, please follow by the steps below:

Step 1: open the enclosure cover and attach MCPA unit in, and then tighten two black knobs as illustrated.

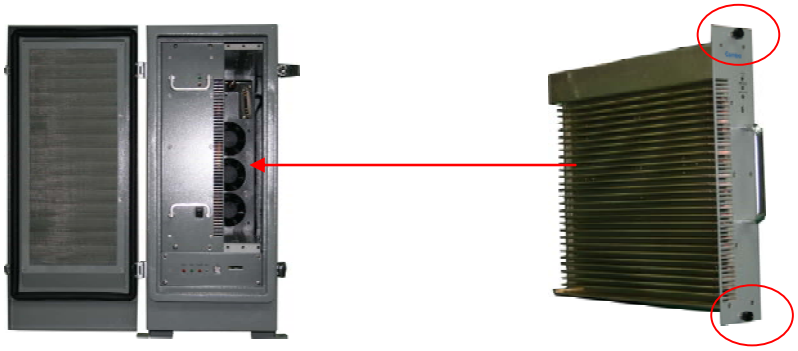


Figure 7: Attach MCPA Unit in Front Panel

Step 2: open the back panel, connect PA output port and DPX output port via high power cable, joint the system data port with MCPA unit.

Figure 8: Attach MCPA Unit in Back Panel

3.2.3 GROUNDING CONNECTION

The enclosure must be grounded securely by connecting a copper wire (CSA 16mm^2) to the grounding point on the mounting rack, and the other end to a protective ground (i.e. building earth point). The recommended grounding resistance is no more than 10Ω.

3.2.4 POWER CONNECTION

The system provides power supply options of DC-48 or AC220V. The red/blue wire from the ground gland is to connect with the DC power connectors of BTS: the red wire connects to “+” and the blue wire connects to “-“.

3.2.5 OMT CONNECTION

Without the door open, the local commissioning cable is used to connect the serial port of PC to the USB connector on the bottom of equipment.

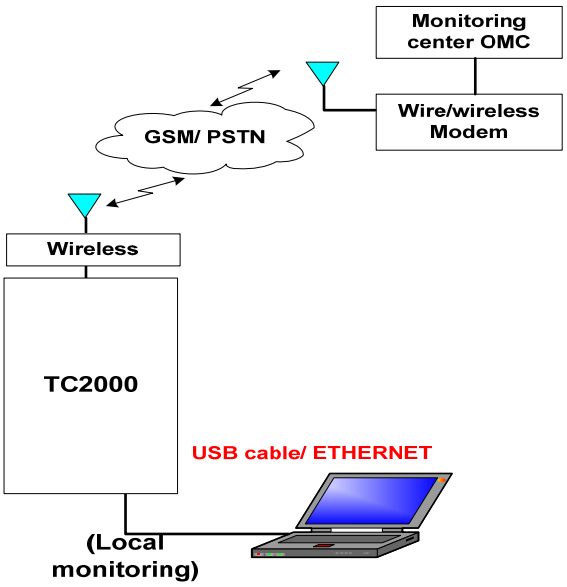


Figure 9: OMT Connection

3.2.6 DRIP-LOOP

Comba recommends that every horizontal cable entry to the equipment forms a 'U' before its 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.

4 OMT

The equipment can be monitored and controlled by OMT software running on a local PC with local commissioning cable, remote connection to the equipment via wireless GSM network.

- OMT software running on a local PC with serial connection to the equipment.
- OMC (optional) software with remote connection to the equipment over wireless GSM network.

This chapter is to introduce how to apply local and remote connection to OMT for the first installation, for the detailed OMT information, please refer to OMT user manual and other references.

Notice: The OMC software with remote connection to the equipment over wireless GSM network is optional for customers.

4.1 LOCAL AND REMOTE CONNECTIONS TO OMT

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

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

4.2 OMT LOGIN

When starting OMT, the following figure will show.

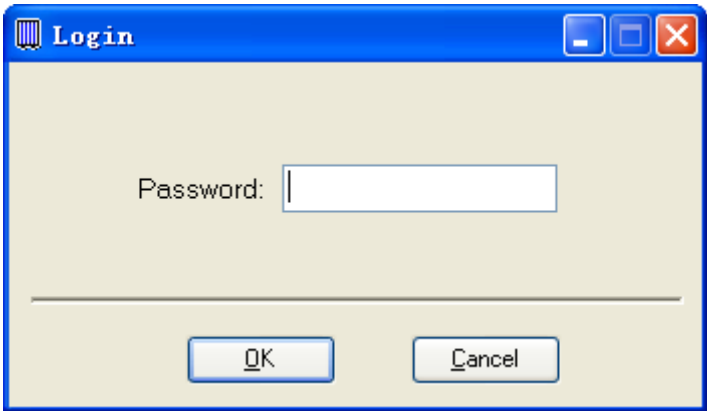


Figure 10: OMT Login

The default password is 888888.User can change it in the [set password] window.

4.3 OMT CONTROL PANEL

Click “Auto Connection” in the pop up window.

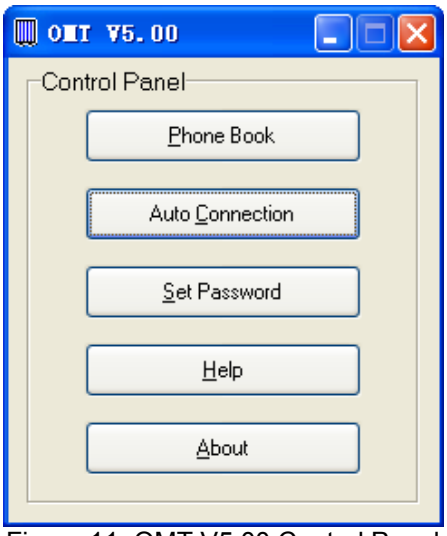


Figure 11: OMT V5.00 Control Panel

4.3.1 LOCAL CONNECTION TO OMT

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

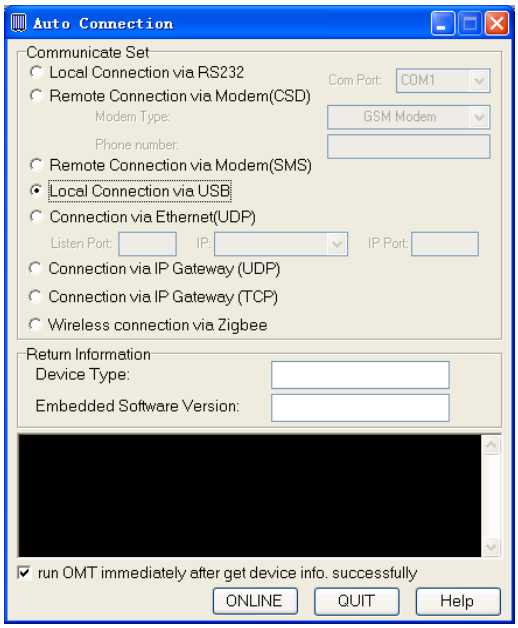


Figure 12: Connection Type

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

4.3.2 REMOTE CONNECTION TO OMT

If remote connection is needed, users can select [Remote connection via modem] in connection type window. Select desired serial port and click “OK” in [Serial Port Configuration] window to go to OMT main window and start modem initialization. Click “connect” and the [Remote Connection] window will show up.

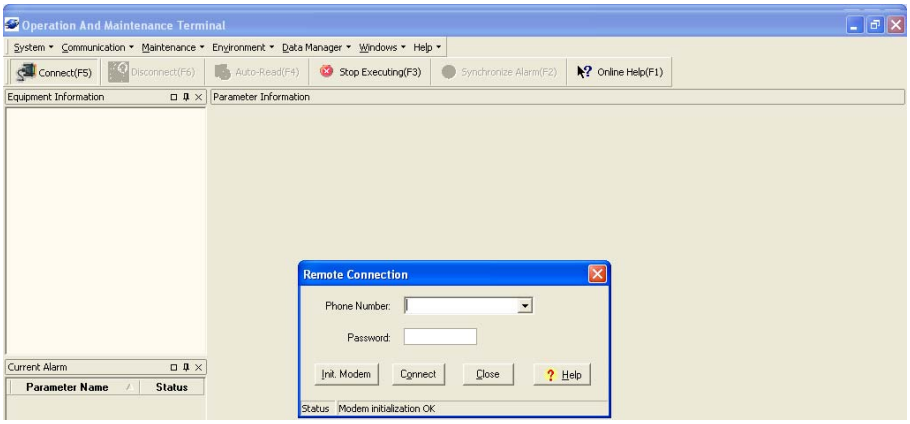


Figure 13: Remote Connection

Config: Enter the correct phone number (Users don't have to enter the password) and click “connect”, it will be connected remotely.

Notice: Please enable the SIM card to support Circuit Switch Data.

4.3.3 CONNECTION FROM PC TO EQUIPMENT

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

In order to access to equipment by IP protocol, the PC must be set with proper IP address, subnet mask and gateway.

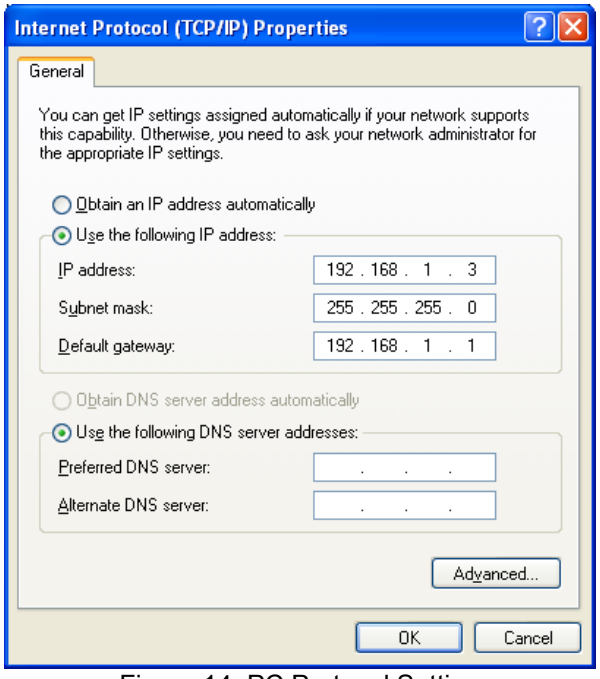


Figure 14: PC Protocol Setting

The default IP address of amplifier is 192.168.1.2, and default gateway is 192.168.1.1. To access the amplifier for the first time, the PC must be set with proper IP address: 192.168.1.X (X=3~254), subnet mask: 255.255.255.0, gateway: 192.168.1.1.

After the PC protocol has been properly set, please execute the IE browser and type 192.168.1.2 in the address bar. A pop-up window will be shown, requiring user name and password. The default user and password are the same: admin.

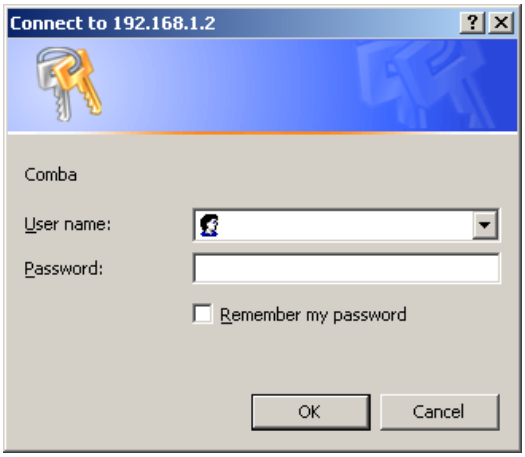


Figure 15: Log in

Items	Default Value
PC IP Address	192.168.1.X (X=3~254)
PC Subnet Mask	255.255.255.0
PC Gateway	192.168.1.1
Amplifier IP Address	192.168.1.2
Amplifier Gateway	192.168.1.1
User name	admin (Capital sensitive)
Password	admin (Capital sensitive)

Table 1: IP Setting Quick Look-up Table

4.4 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.

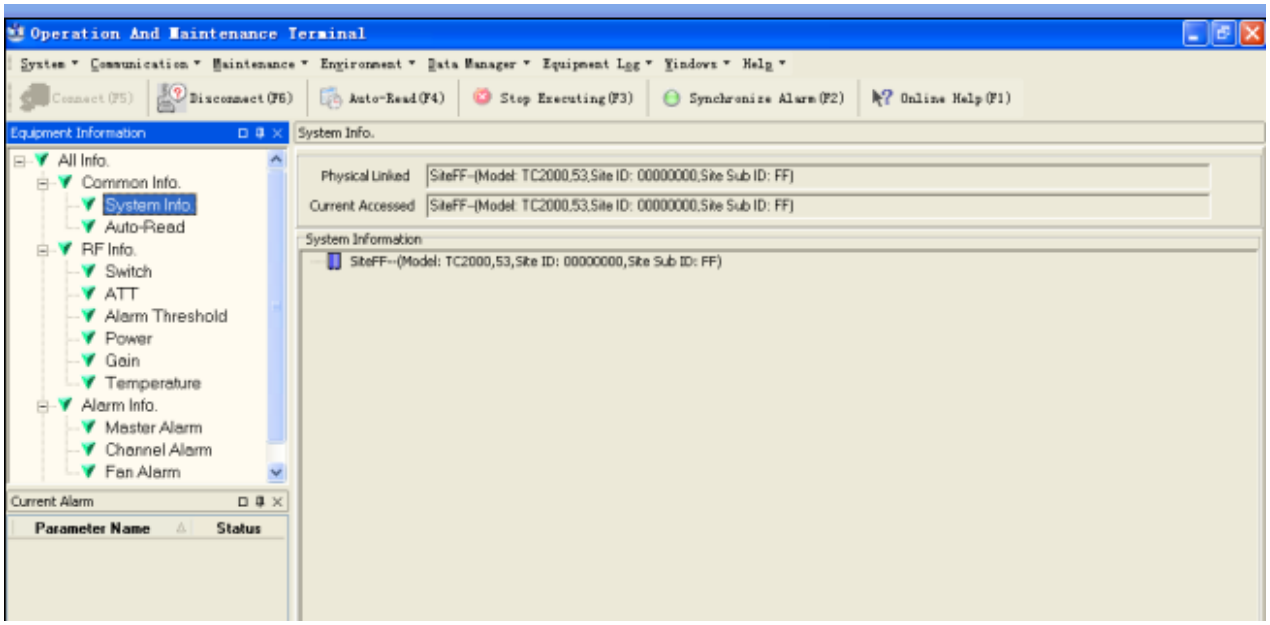


Figure 16: OMT Main Window

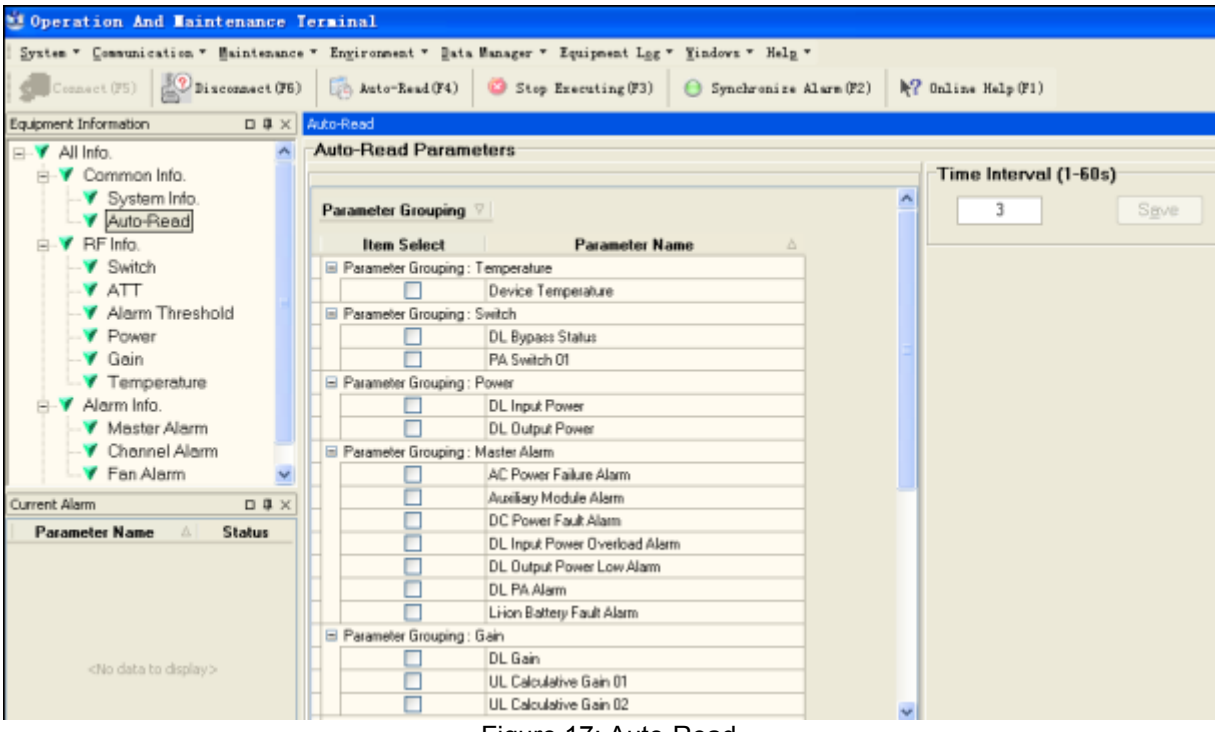


Figure 17: Auto-Read

4.5 RF PARAMETER

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

4.5.1 SWITCH

Switch is to enable/disable power for internal PA 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. Below is a demonstration by single PA module.

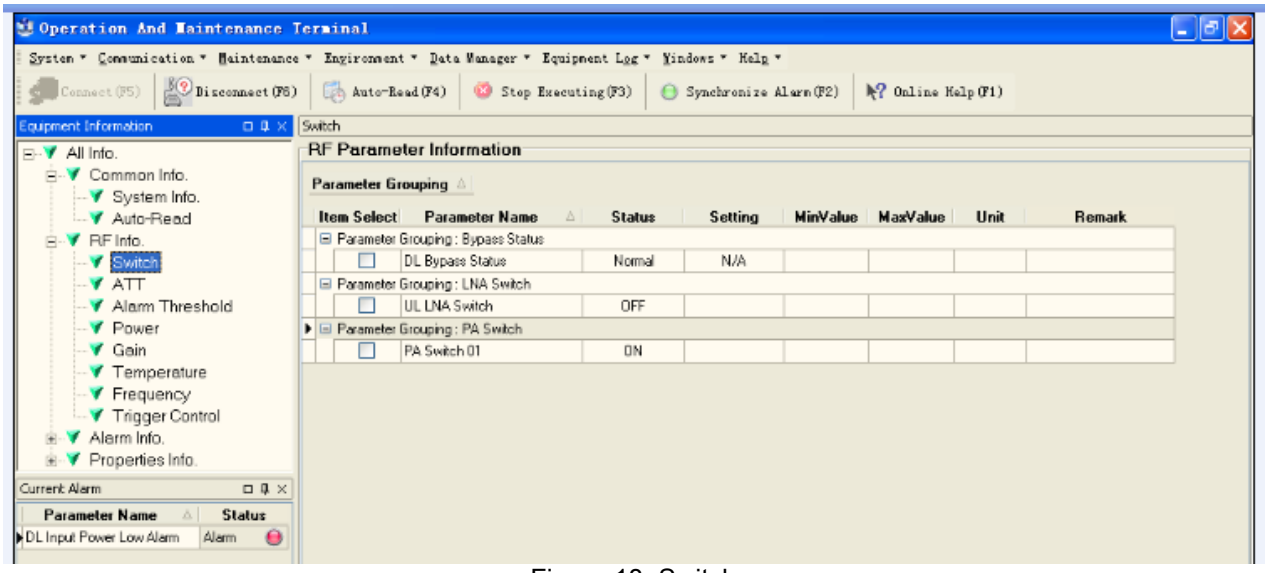


Figure 18: Switch

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.

4.5.2 ATT

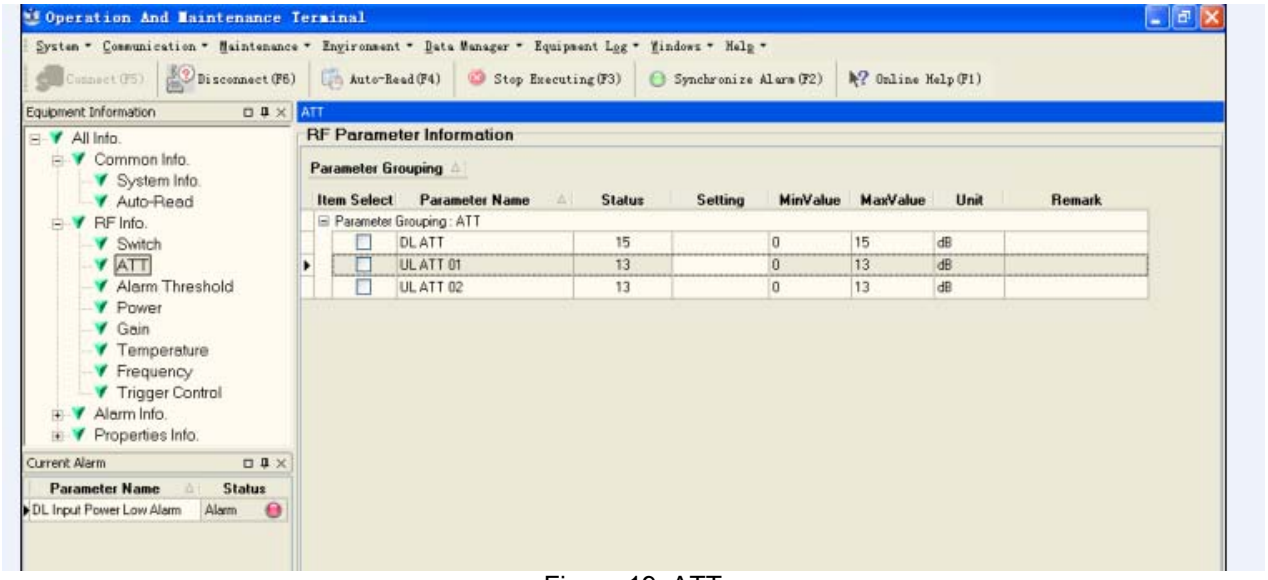


Figure 19: ATT

Config:
Select the required value in setting columns of RF information window for ATT, and press [Enter] or [Config] button to finish the configuration operation.

4.5.3 ALARM THRESHOLD

Alarm Threshold includes Power threshold, Temperature threshold and VSWR 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.

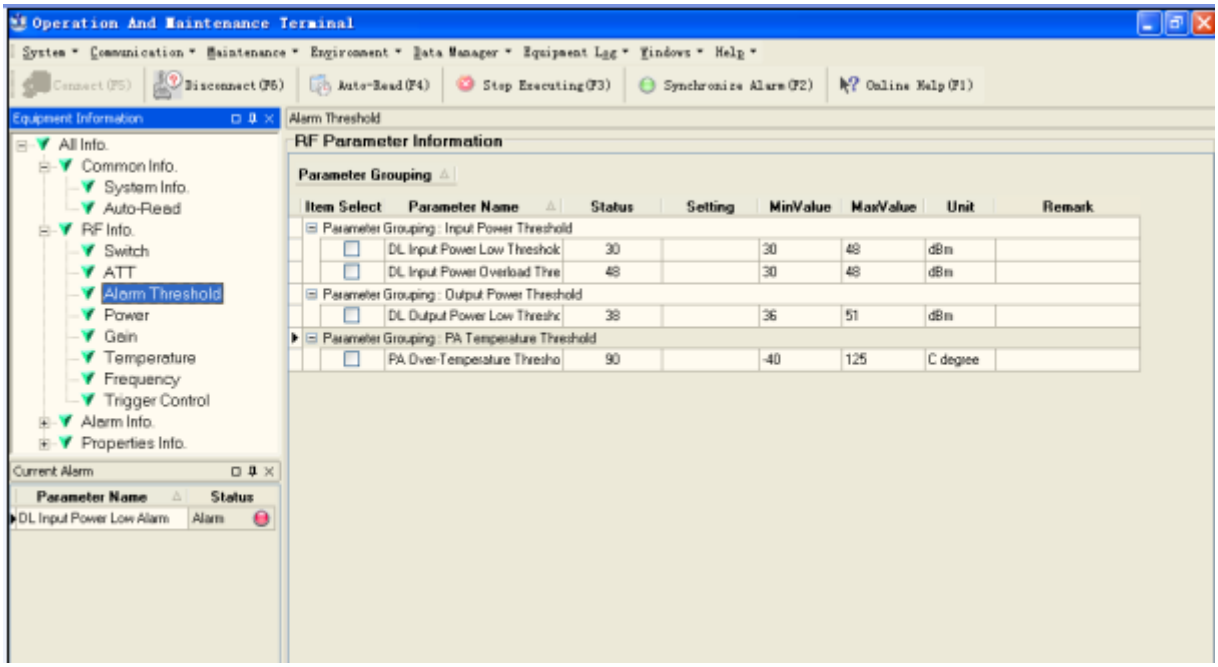


Figure 20: Alarm Threshold

Config:
Enter the required value in setting columns of RF information window for Alarm threshold, and press [Enter] or [Config] button to finish the configuration operation.

4.5.4 POWER

Power is referring to the reading of downlink input/output power.

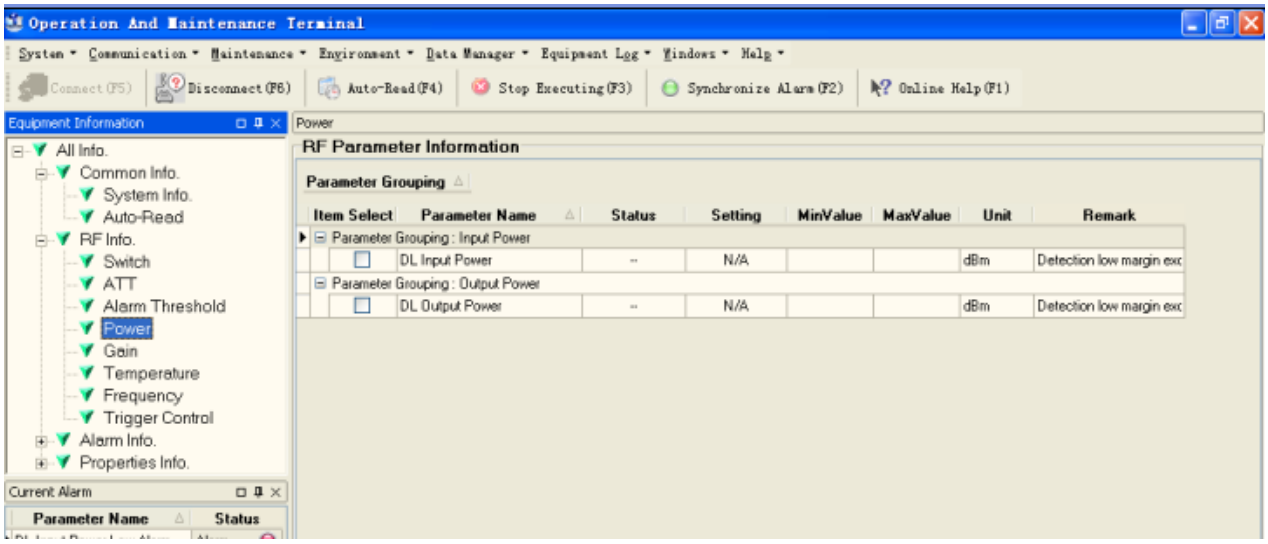


Figure 21: Power

4.5.5 GAIN

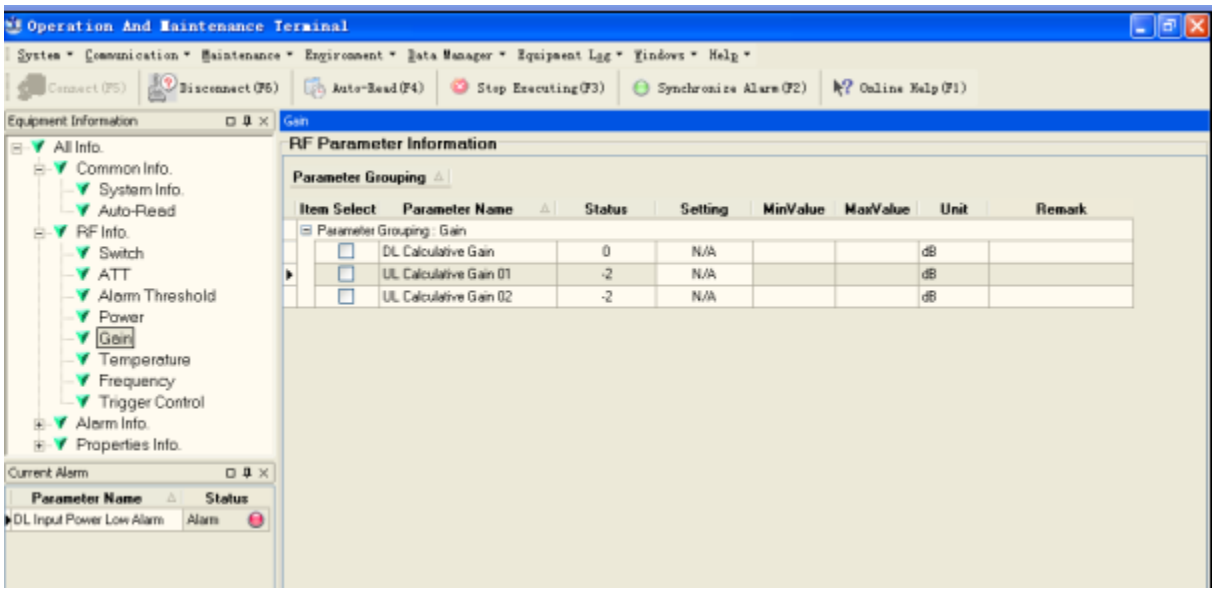


Figure 22: Gain

Rating Gain: be set before delivery. Comba recommends no change of rating gain value.
Gain: User can set according to the real application.

4.5.6 TEMPERATURE

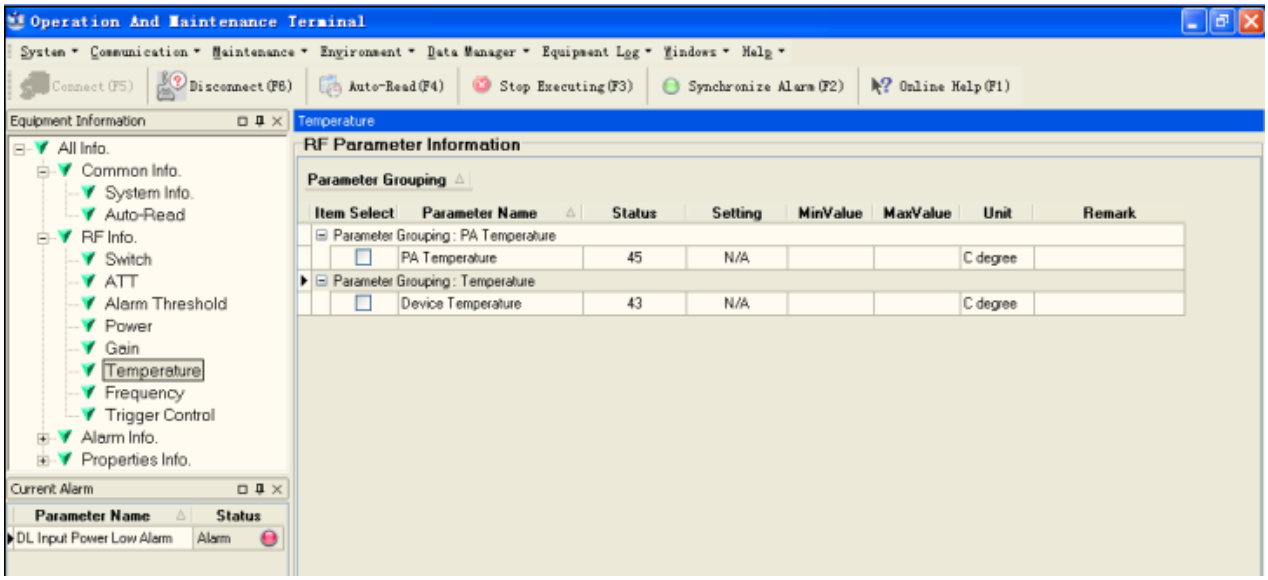


Figure 23: Teperature

4.5.7 FREQUENCY

Double click setting column can set the required frequency.

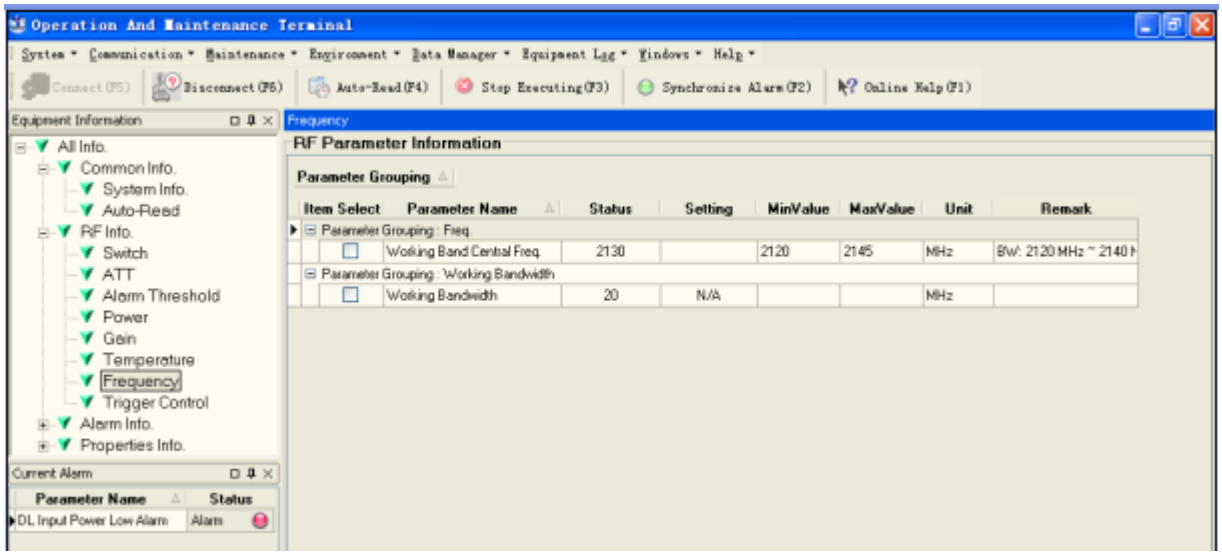


Figure 24: Frequency

The system instance working bandwidth is 20MHz, thus the setting frequency = system instance working center frequency (system working bandwith = center frequency ±10MHz).
e.g. setting frequency = 2120MHz, then the working bandwidth ranges from 2110MHz-2130MHz.

4.5.8 TRIGGER CONTROL

Click SET can reset MCPA.

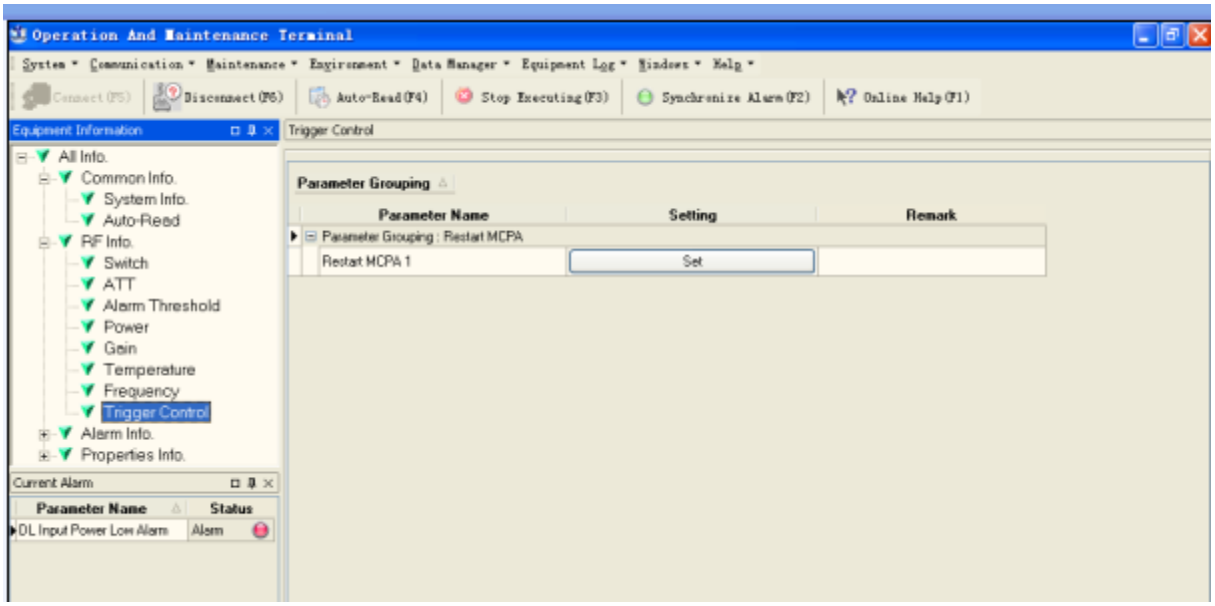


Figure 25: Trigger Control

4.6 ALARM INFO

4.6.1 MASTER ALARM

Alarm information operation is to select alarm parameters for monitoring. Alarm parameters include Master Alarm, Channel Alarm and Fan Alarm.

Click any tree node in [Alarm Info] group, [Alarm Parameter Information] window will appear in the right side. The picture below shows the master alarm information.

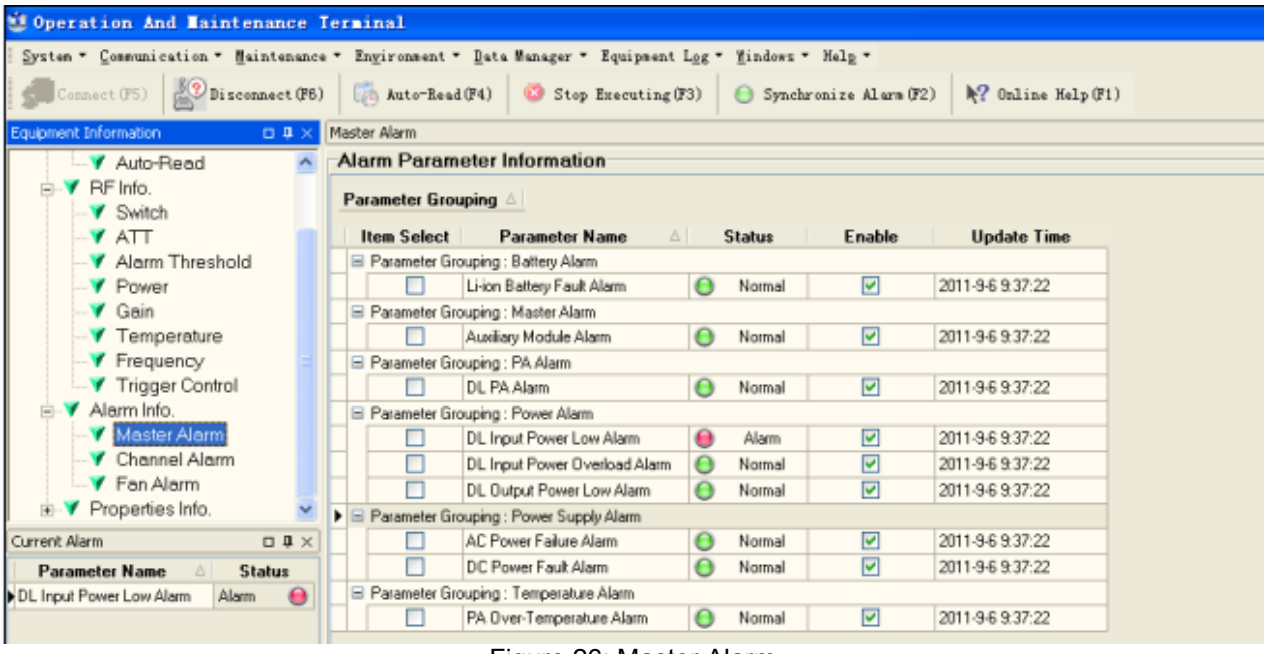


Figure 26: Master Alarm

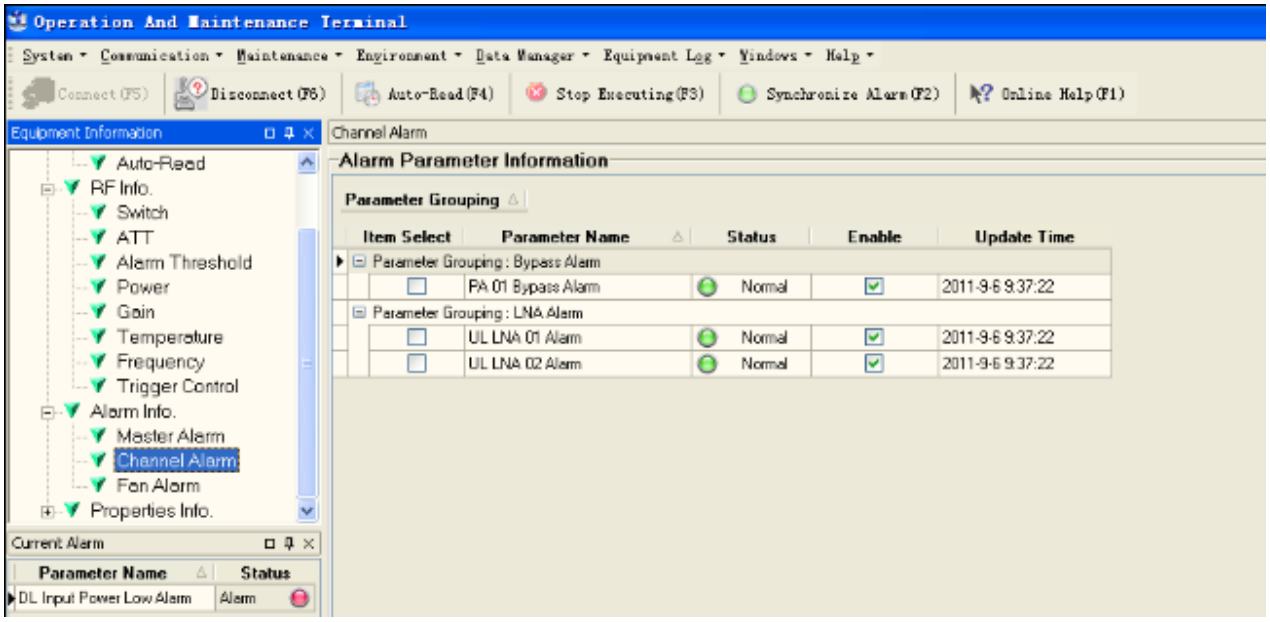


Figure 27: Channel Alarm

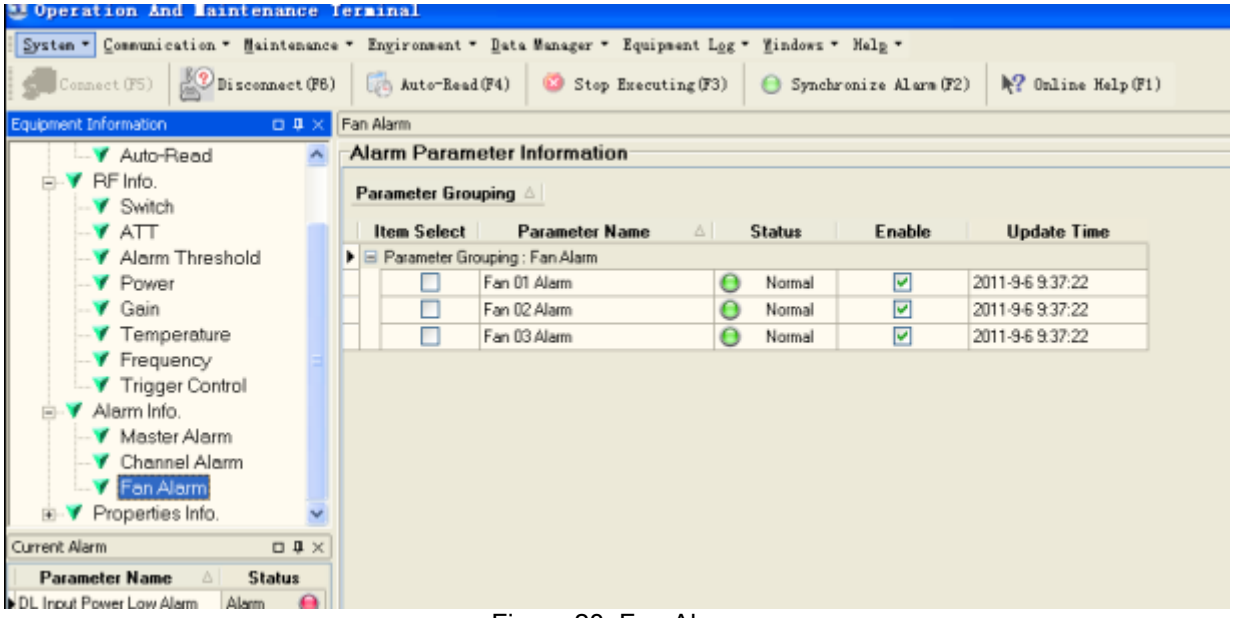


Figure 28: Fan Alarm

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.

On the MCU, if any alarm is generated and this alarm is also enabled in [Enable] box, LED ALM turns RED; while it is OFF when normal working. On the OMT/OMC window, [Alarm Status] indicator keeps GREEN if no alarm and turns RED if an alarm is generated.

Alarm report can be set, users can allow or prohit the report. When alarm happens, if it is already inquired, alarm will not report; if not, alarm will dial up to OMC automatically in the mode of SMS or datalink till OMC receive the alarm and reply; if the device hasn't received and replyed, then wait 3min and redial to OMC 3 times continuously, if still no reponse, report again after 3 hours.

The device has FORM C alarm port, specific definition as follows:
Adopt 9-pin CPC connector (XM22K09K), supplies battery arlarm PA faulty alarm and bypass alarm.
Terminal defined as:

Pin number	Name	Explanation
1	DC_NO	Power alarm open terminal
2	DC_COM	Power alarm public terminal
3	DC_NC	Power alarm closed terminal
4	PA_NO	PA alarm open terminal
5	PA_COM	PA alarm public terminal
6	PA_NC	PA alarm closed terninal
7	BYPASS_NO	Bypass alarm open terminal
8	BYPASS_COM	Bypass alarm public terminal
9	BYPASS_NC	Bypass alarm closed terminal

Remark: the system reset automatically every 24h, the alarm information is cleared after the reset.

Method of alarm report: there is a box on the right of the alarm indicator, it is used for select alarm to OMC, users can allow or prohibit the alarm report according to actual situation. Click the box on the right of the alarm, and the box shows "√" meaning selection. Click "setting" button to set. After that, if alarm occurs, the selected alarm will dial up to OMC in the mode of SMS or datalink.

Please notice that if the desired alarm is not enabled in [Enable] box, even if this alarm is generated, it keeps in GREEN in the OMT/OMC interface and LED H2 on MCU keeps OFF as well.

4.7 PROPERTIES INFO.

4.7.1 EQUIPMENT ID

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

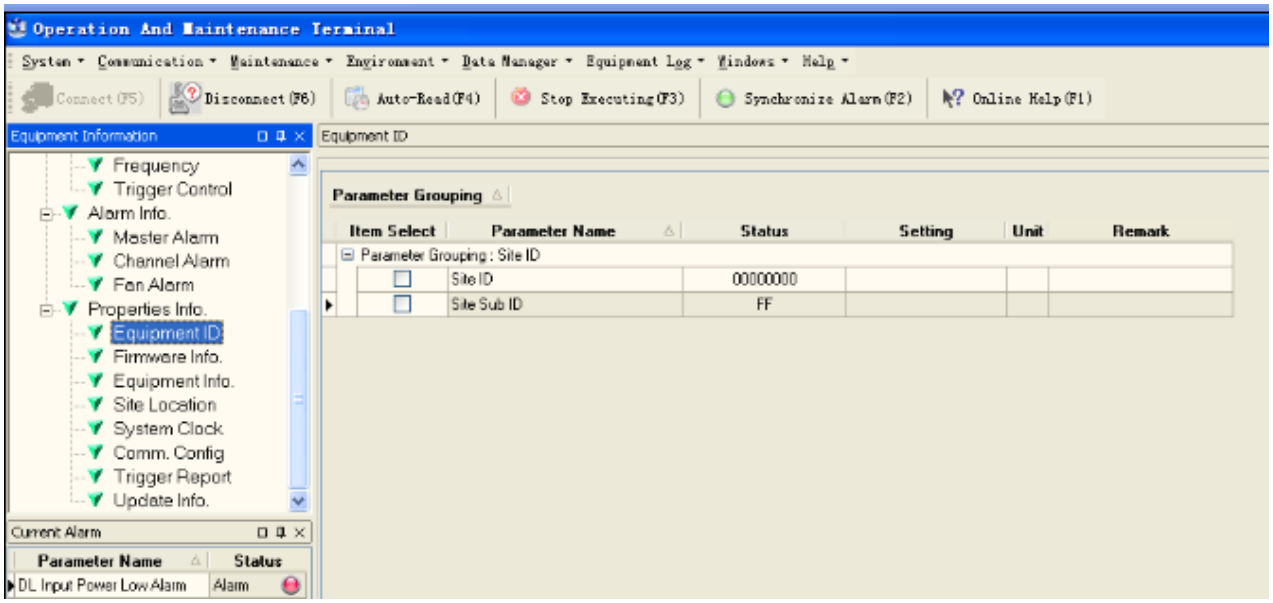


Figure 29: Equipment ID

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

4.7.2 FIRMWARE INFO.

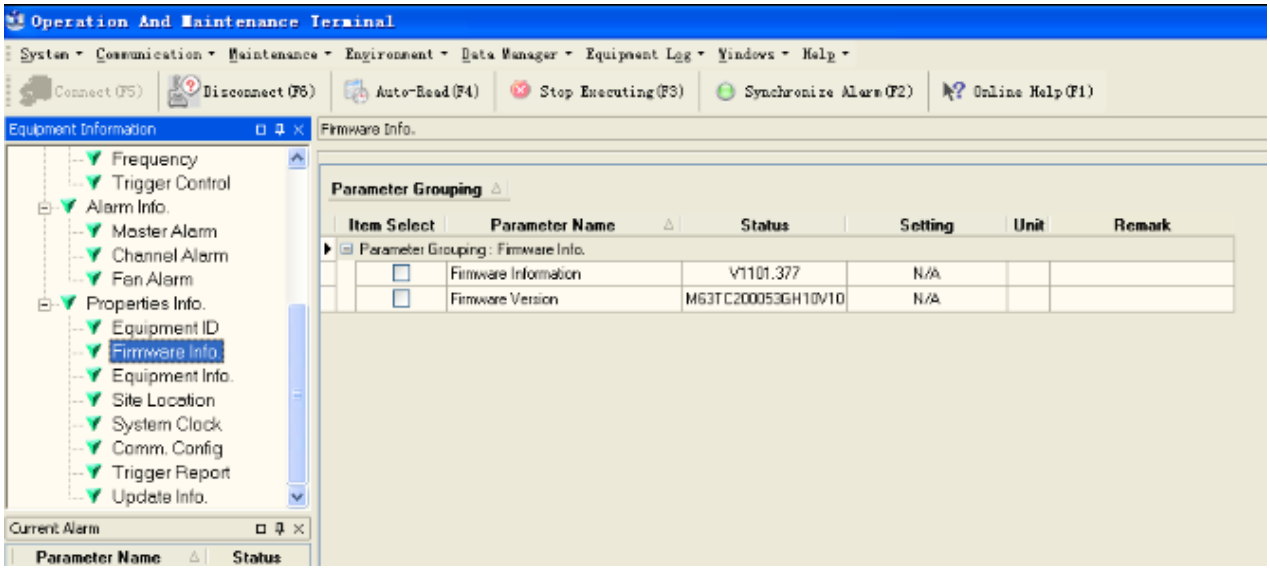


Figure 30: Firmware Info.

4.7.3 EQUIPMENT INFO.

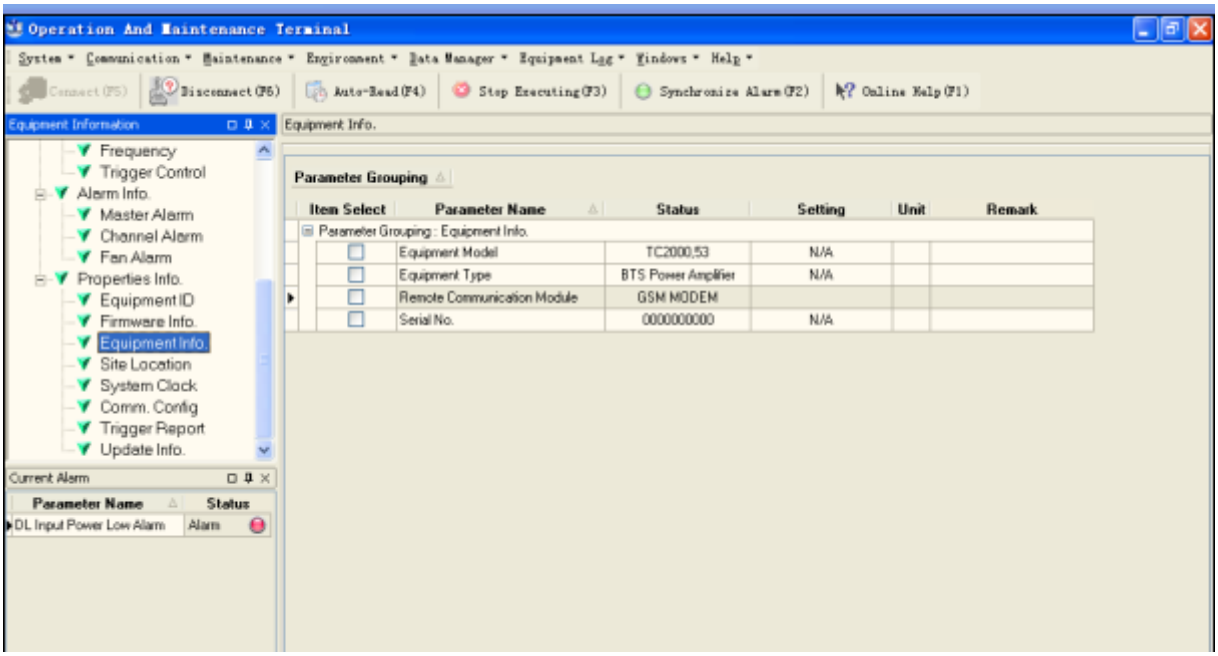


Figure 31: Equipment Info.

4.7.4 SITE LOCATION

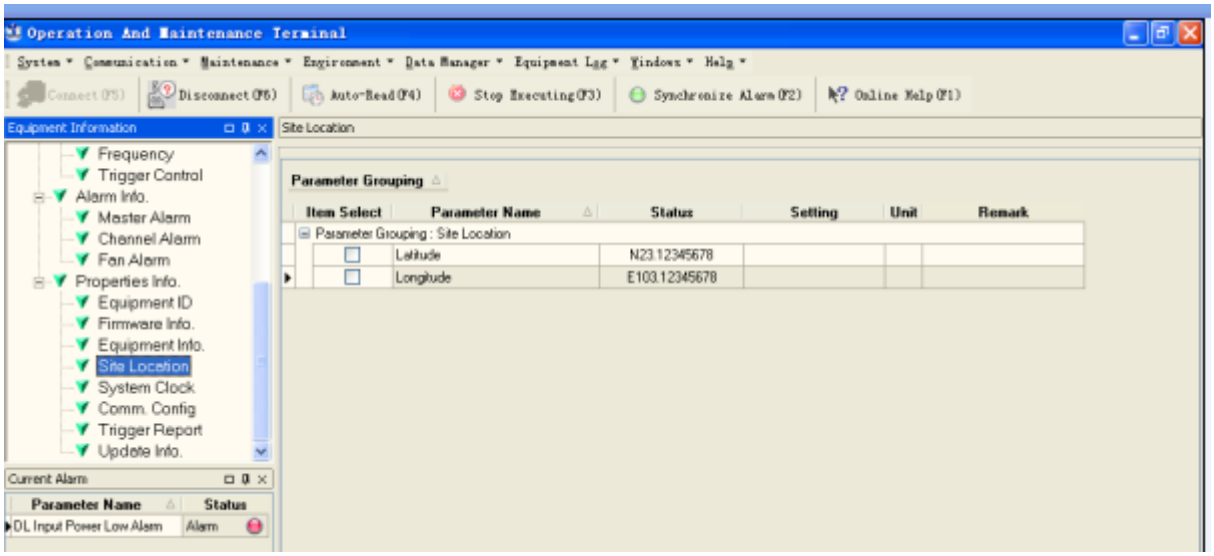


Figure 32: Site Location

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

4.7.5 SYSTEM CLOCK

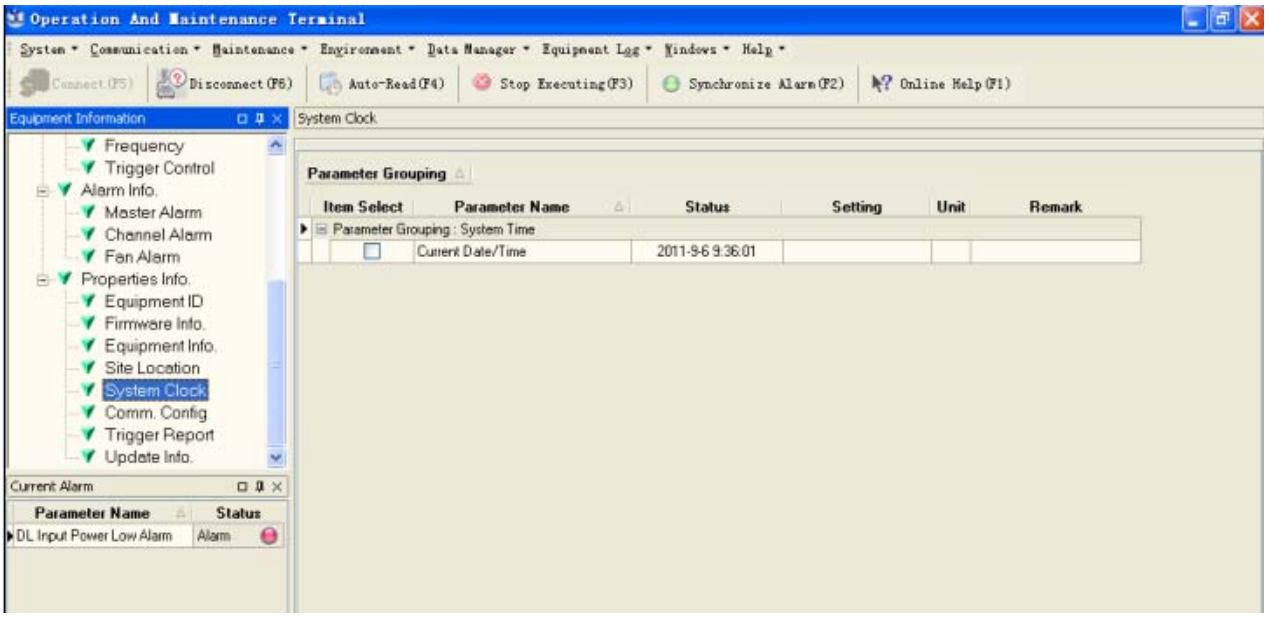


Figure 33: System Clock

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

4.7.6 COMM. CONFIG

If the equipment is to be monitored by OMC software over Wireless GSM / CDMA network, users must finish the [Comm. Config.] in the next step.

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

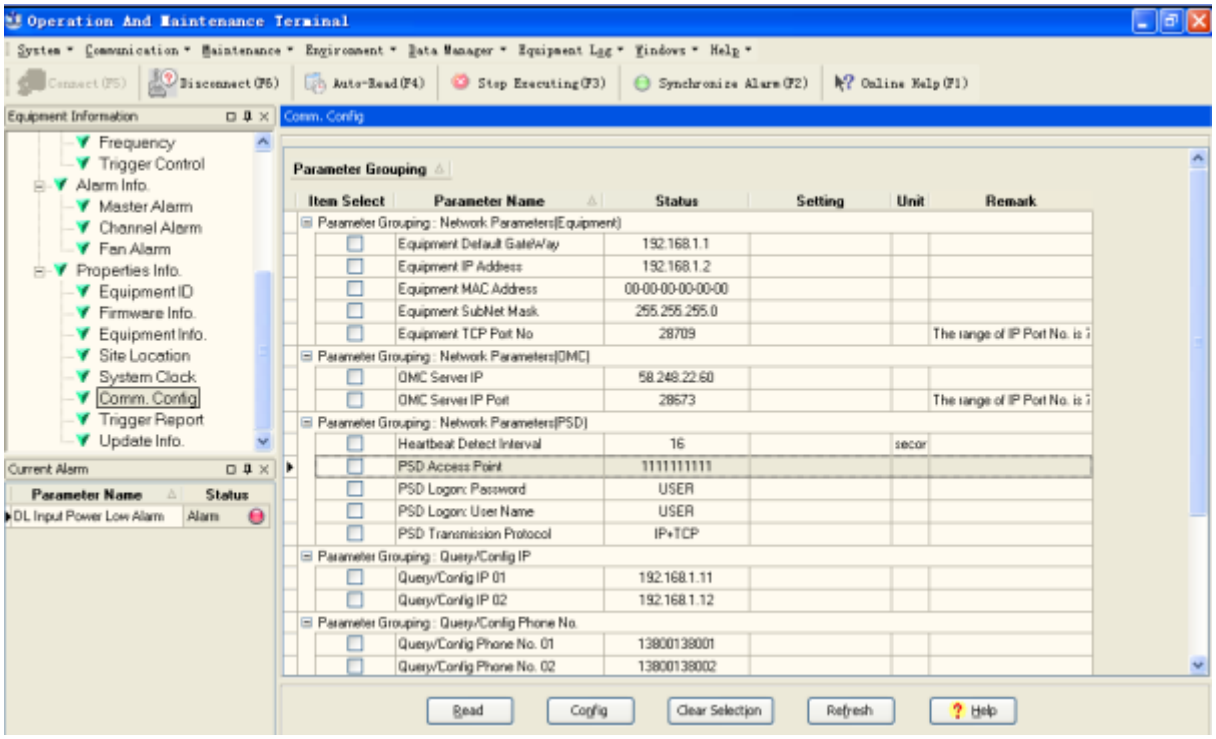


Figure 34: Com. Config.

See the table below for configuration details of each parameter.

Item	Description
Phone No.	This is designed for authentication purpose when remote connection via modem is required. It is the phone number to dial the equipment. Only the phone number pre-defined in this field, will it be allowed to dial the equipment. It is required to manually enter the phone number. Up to 5 phone numbers are allowed. The use of phone number authentication can avoid unauthorized use of the OMT. In addition, it can prevent the equipment receiving piles of spam short messages, thus help the operator greatly reduce the cost.
Report Config	The Report No. is the SIM card number of the modem built into the OMC Server computer. The equipment will send alarm SMS to this number. If remote communication is needed via modem, users have to enable SMS mode and set the report phone No. by entering the SIM card number of the equipment built-in modem.
SMSC No.	It specifies the SMS centre. Users have to set the service No. of SMSC for the first installation, so that the alarms can be sent to OMC.

4.7.7 TRIGGER REPORT

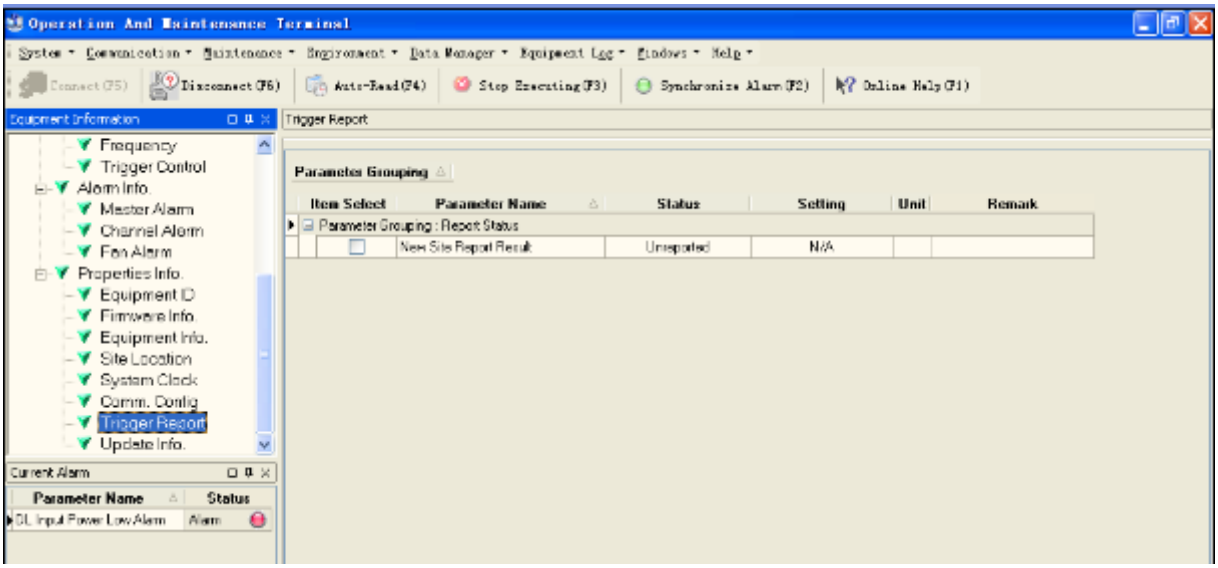


Figure 35: Trigger Report

4.7.8 UPDATE INFO.

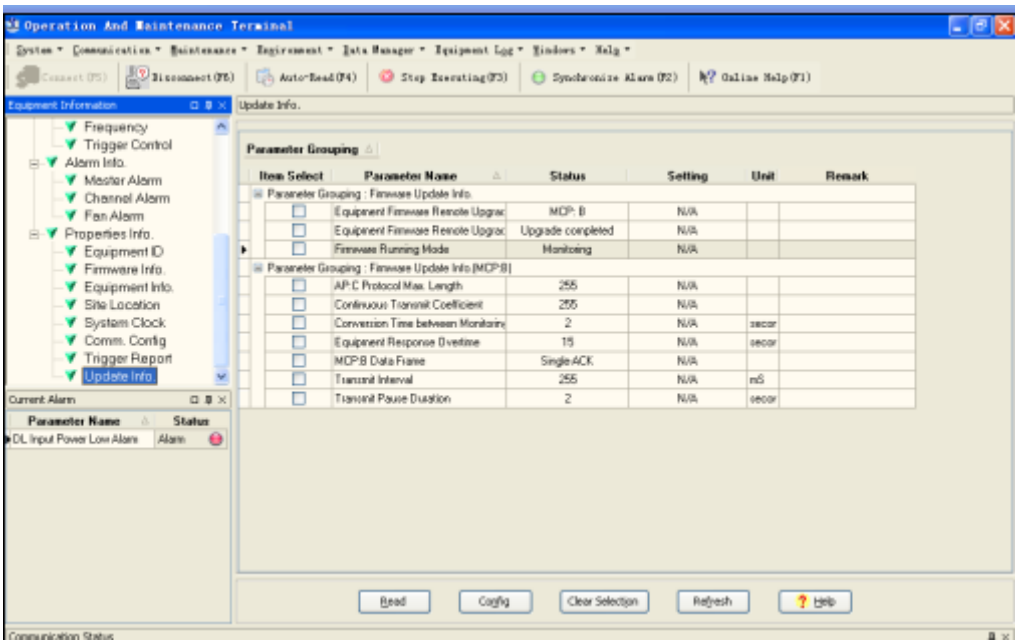


Figure 36: Update Info.

End of section

5 COMMISSIONING

5.1 PRE-COMMISSIONING TASKS

After equipment installation, perform the following steps before equipment powering and commissioning:

- Check the expected voltage, current and power levels do not violate any ratings.
- Visually inspect the power connection within the equipment. Ensure that the power cable is correctly and securely connected, including grounding wire, RF cable and other cables.
- Check grounding connection and verify that the ground resistance is less than 10Ω.

5.2 LED INDICATORS

Diagnostic LEDs of each unit are located on the chassis; each indicates the status of a particular function.

Monitoring Panel LEDs

Identifier	Colour	Indication
MOD	Red	Modem status indicator. Flash while initiating, after that OFF when the initiation completes. ON=initiation failed, OFF= initiation success, can realize remote monitoring.
ALM	Red	System Alarm indicator. ON = Failure Alarm; OFF = normal operation.
RUN	Green	Operation indicator. ON = normal operation; Flashes at a rate of 1 flash/sec = normal operation starts; OFF = no power supply / MCU operating problem.

PA Unit Panel LEDs

Identifier	Colour	Indication
PWR	Green	ON= normal operation
MIN ALM	Yellow	ON= PA failure, alert only. OFF when there is no alarm.
MAJ ALM	Red	ON when PA is over amplified, alarm while PA shuting down. OFF when there is no alarm.

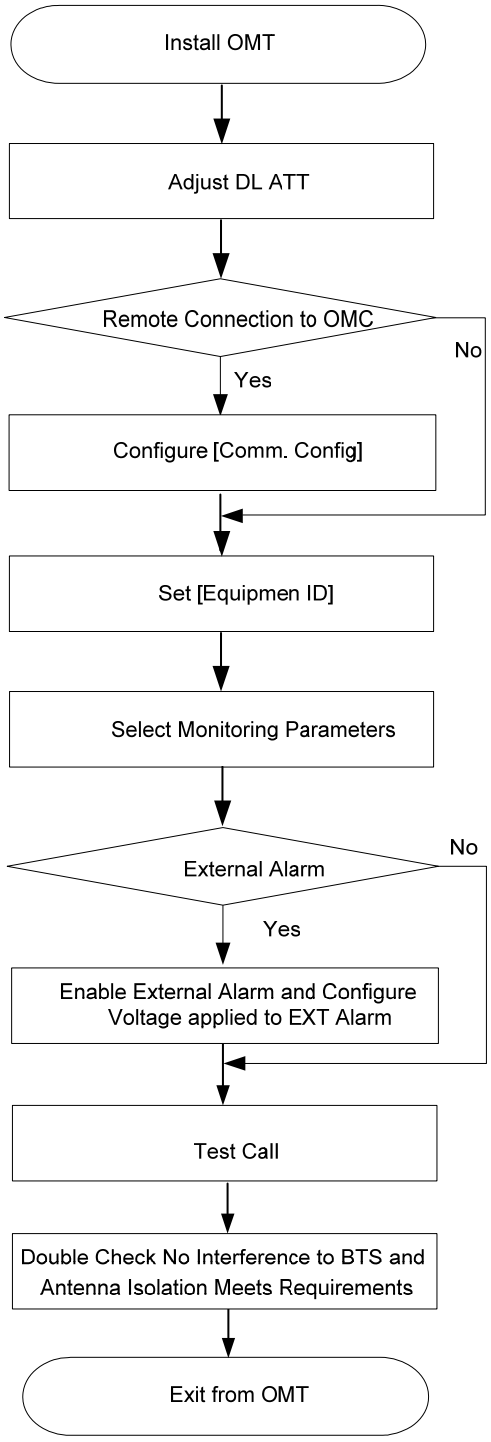
Integrated DPX and PSU Unit Panel LEDs

Identifier	Colour	Indication
PWR	Green	ON= normal operation
ALM	Yellow	ON= duplexer unit failure or power down. OFF when there is no alarm.

All diagnostic LEDs will flash simultaneously when power is initially supplied to the equipment, which indicates system self-check. Then all LEDs are on for about 1 minute; when “Run” LED begins to flash, which indicates successful initialization.

5.3 COMMISSIONING PROCEDURE

System commissioning can commence after the monitoring system has completed self initialization. The commissioning procedure is as follows:



Commissioning Tasks	Observation
1. Install OMT	● Activate the OMT Main window. The system Initialization will completed in about 2 minutes. ● Click “Connect” button to enquire the amplifier’s status. Proceed if there is no alarm; else check the failure and attend to the alarm.
2. Adjust DL ATT	● Observe DL input power from measured value and adjust according accordingly via the ATT1/2 on the front panel. ● Note: To ensure that the measured DL input power is accurate, one should set the DL ATT to “0” before performing the check.
3. Configure [Equipment ID]	● Go to [Properties Info] and set [Equipment ID].
4. Comm. Config	● Enable the power supply by selecting “On” in [RF] -> [Switch]; go to [Properties Info.] -> [Comm. Config.] and set OMC Phones No. , the service No. of SMSC, Report Mode.
5. Select Monitoring Parameters	● Select the equipment controlled and monitored parameters. ● If the external devices are connected to the equipment for management, please enable in the [External Alarm Info.] Interface.
6. Test coverage area field intensity and adjust service antenna.	● Use test-handset to verify field intensity within the coverage area. If needed, realign the service antenna to achieve the desired coverage. ● Note: If during operation, the equipment gain could not be set to maximum or the output power is not high enough due to insufficient donor and service antennas isolation, then the antennas’ position should be changed to increase isolation. If the output power is too high and ALC is activated, then adjust the DL ATT to achieve optimal DL Gain.
7. Verify UL gain and ensure test call produces good voice quality and there is no interfering BTS	● Adjust UL gain on TMA if required and perform test calls. Typically, the UL gain is set around 5dB less than DL gain. Perform test calls in the coverage area while adjusting UL gain on TMA if required. ● Verify again that there is no unacceptable interference to BTS.

6 TROUBLESHOOTING

Following installation and commissioning, troubleshooting tasks to handle alarms may be required. Here below is the alarm list of the equipment and diagnosis.

Alarm	Diagnosis
AC Power Failure Alarm	● Check AC power cable and verify AC mains supply is normal. During power failed alarm, DC power supply has no output.
DC Power Fault Alarm	● Check if DC output power is overload or short-circuited, if not, it would be the fault of PSU.
Li-ion Battery Fault Alarm	● Check if the Li-ion Battery connection is correct or any damage of the battery; ● Replace the fault Li-ion Battery if it couldn't be energized.
DL PA Alarm	● 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 fault modules and return for repair.
DL Output Power Low Alarm	● Reset the output power low threshold; ● Reset the ATT value to increase the Gain; ● Check if Channel No. setting is correct; ● Check the cable connections; ● If alarm can not be cleared, check the equipment.
DL Input Power Overload Alarm	● Eliminate alarm by correct setting of the input power overload threshold; ● Check if the intensity of signal source is large enough; ● If alarm can not be cleared, check the equipment.
Chassis/PA Over- temperature Alarm	● Eliminate alarm by setting of temperature threshold; ● If alarm can not be cleared, apply climatic protection to the equipment.
DL VSWR Alarm	● Check MT antenna system if there is downlink VSWR alarm.

7 APPENDICES

7.1 APPENDIX A: SAFTY 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 colored black on a yellow background. An informative text label may accompany the symbol label.

Hazard labelling 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 which 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 which 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.

7.2 APPENDIX B: SERVICE 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 C.

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: Room 5, 13/F., Vanta Industrial Centre, No 21-33 Tai Lin Pai Road, Kwai Chung, N.T. 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

7.3 APPENDIX C: RMA (RETURN MATERIAL AUTHORIZATION) FORM

Comba

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