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## RD-2020 Tune Up Procedures

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### Revision History

| Revision | Date   | Author | Remarks          |
|----------|--------|--------|------------------|
| R1A      | 190910 | SPGZ   | Checked by SPGZ. |

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## 1 INTRODUCTION

This document is primarily written for those who are new to RD-2020 and wish to tune up the repeater.

The document is applicable to below products from Comba.  
Model number: RD2020-04V102P40U45A92

End of Section

## 2 PREPARATION

This section will be discussing on:

1. What to prepare for those who are going to operate the repeater;
2. LED Indicator description;
3. How to connect to repeater for setting.

### 2.1 PERSONNEL PREPARATION

1. The following checklist will help to make sure relevant personnel get ready before operation.

|  |
|--|
| The personnel preparation list:  |
| <ol style="list-style-type: none"> <li>1. Only trained or qualified personnel is recommended for performing tuning with repeater. Personnel should be with necessary knowledge of electronic, RF, and familiar with local regulation, rules.</li> <li>2. Personnel shall read through the manual/instructions/guide carefully before operation.</li> <li>3. Check if there is warning/alert sign on the equipment to avoid possible danger.</li> <li>4. Wear proper cloth. If necessary, equip with PPE (Personal Protective Equipment).</li> <li>5. Before operation, procedures and data recording form should be prepared.</li> </ol> |

#### 2. Package Inspect

Visual inspect the external product package, and check internal items according to packing list. Prepare ample space and easy accessible to socket-outlet. For tools reference please find in manual.

#### 3. Tools preparation

Please prepare tools and measure instruments ready before hand-on. For tools recommendation please refer to product manual.

### 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.

|                                     |                  |                    |                                |                 |                |
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**Caution, Electrostatic Discharge (ESD):**

Before removing the antistatic bag from repeater, enough caution shall be taken to avoid ESD. The Anti-static Wrist Strap is recommended.

## 2.2 INDICATORS AND POWER UP

Before power up, please check product voltage requirement, and make sure the socket and repeater enclosure is with good grounding protection.



**Warning:**

Always be caution to voltage safety. Before hands-on operation, check if the equipment is powered off and disconnected from power supply or otherwise will cause personnel injury and equipment damage.

### 2.1.1 PSU LED

Turn on the left switch as shown in the figure below.

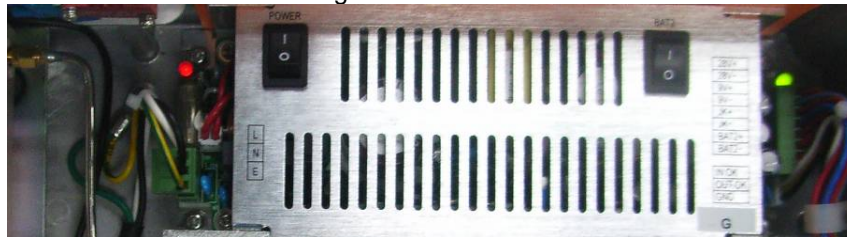


Figure 1: PSU Indicator

The normal PSU LED status will be:

| LED      | Description                 |
|----------|-----------------------------|
| AC input | Steady red on when normal   |
| DC input | Steady green on when normal |

Table 1: PSU LEDs

Other status indicates abnormal functions, stop proceeding to next step until problem solved. The multi-meter is recommended here to measure the voltage of the PSU (AC: depends on local voltage. DC: 24V out).

### 2.1.2 Module LED

The LEDs on module boards(Frequency Selective Module, PA module) will be blinking at about one time per second synchronously. Other status indicates abnormal functions, stop proceeding to next step until problem solved.

|                                     |                  |                    |                                |                 |                |
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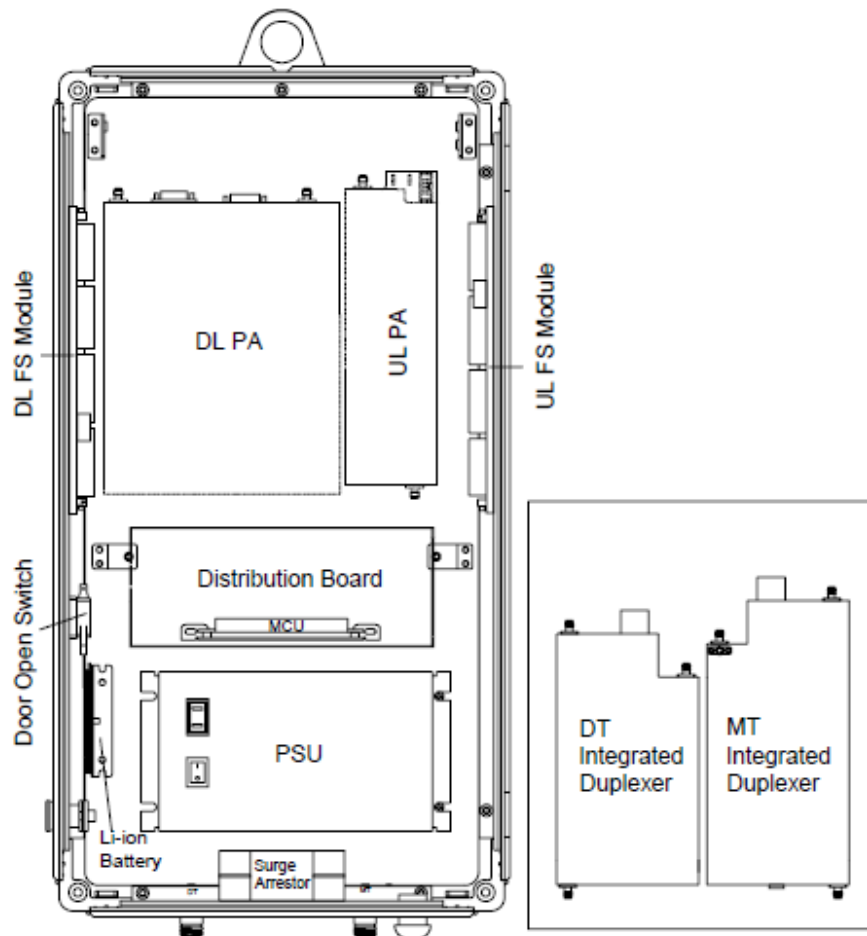


Figure 2: Internal Layout

### 2.1.3 MCU LED

The MCU (Main Control Unit) locates on the Distribution board, and three diagnostic LEDs are located on the MCU, each indicating the status of a particular function:

| Identifier | Colour | Indication   |
|------------|--------|--|
| H1         | Green  | MCU operation. Flashes at a rate of 1 flash/sec. Any other flashing rate indicates MCU is faulty, and has to be replaced.                    |
| H2         | Red    | Alarm LED. When ON, it indicates alarm condition.  |
| H3         | Red    | Wireless modem status. During normal operation, it is OFF. When ON, it indicates faulty wireless modem and no communication will take place. |
| Reset      | N/A    | Reset button. Press the reset button to restart the system.  |

Table 2: MCU LEDs

### MCU Initialization

|                                     |                  |                    |                                |                 |                |
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All three diagnostic LEDs of each MCU will flash simultaneously for three times when power is initially supplied to the equipment. Then H1 will keep flashing at the rate of 1 flash/second. H2 will be ON when any alarm occurs. After successful initialization of the wireless modem, H3 will be ON for about two minutes and then turn off; otherwise, it will remain ON to indicate a problem.

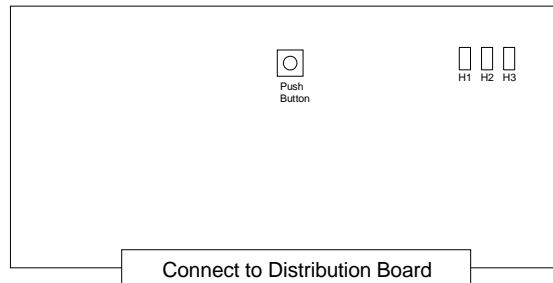


Figure 3: Internal Layout

|                                     |                  |                    |                                |                 |                |
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## 2.3 OMT CONNECTION

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.

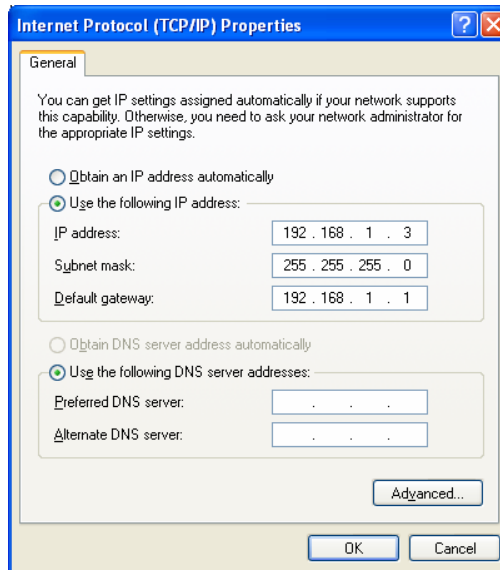


Figure 4: PC Protocol Setting

The default IP address of repeater is 192.168.1.2, and default gateway is 192.168.1.1. To access the repeater 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.

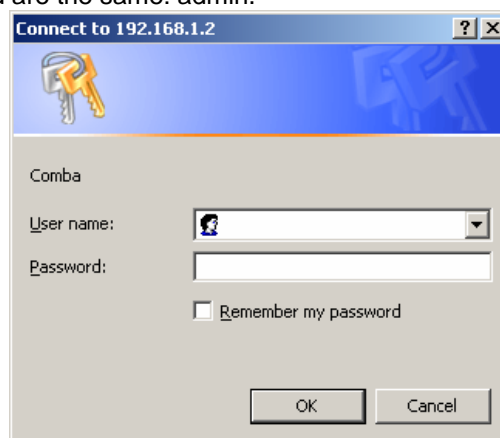


Figure 5: Log in

|                                     |                  |                    |                                |                 |                |
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| 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               |
| Repeater IP Address | 192.168.1.2               |
| Repeater Gateway    | 192.168.1.1               |
| User name           | admin (Capital sensitive) |
| Password            | admin (Capital sensitive) |

Table 3: IP Setting Quick Look-up Table

If the user name and password have been entered properly, then the OMT webpage will be shown as below.

| All Select               | Parameter Name                              | Status | Enable                              |
|--------------------------|---|--------|-------------------------------------|
| <input type="checkbox"/> | 1 AC Power Failure Alarm                    | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 2 DC Power Fault Alarm                      | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 3 Chassis Over-Temperature Alarm            | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 4 UL PA Alarm                               | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 5 DL PA Alarm                               | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 6 DL Input Power Overload Alarm             | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 7 DL Output Power Low Alarm                 | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 8 DL VSWR Alarm                             | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 9 Door Open Alarm                           | Alarm  | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 10 UL PLL Alarm 1                           | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 11 UL PLL Alarm 2                           | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 12 DL PLL Alarm 1                           | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 13 DL PLL Alarm 2                           | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 14 Li-ion Battery Fault Alarm               | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 15 External Alarm 1                         | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 16 External Alarm 2                         | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 17 External Alarm 3                         | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 18 UL LNA Alarm                             | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 19 DL LNA Alarm                             | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 20 Self-Oscillation Alarm                   | Normal | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | 21 Automatic Self-Oscillation Control Alarm | Normal | <input checked="" type="checkbox"/> |

Figure 6: Alarm Information

The alarm information page will be shown as the first page whenever log in. The alarm history will be reserved in repeater until 24 hours after its first power on, and then automatically cleared up. Before its auto clear-up once a day, to manually refresh the alarm status please goes to “User Info & Maintenance” page as below and click “Clear History Alarm”. Below are the definitions for different buttons and functions.

| Items               | Functions   |
|---------------------|---|
| 24 Hours            | The “24 hours” defines a standard reset timing after repeater first power on. This founction is designed for routined self-maintenance and alarms clear-up. |
| Read                | Read alarm history from repeater. Any alarm has been detected, it will be kept in history until next alarm reset per 24 hours.                              |
| Refresh             | Refresh local web page to check which items are selected, but no data read from repeater.   |
| Clear History Alarm | Clear the alarm history manually.   |

|                                     |                  |                    |                                |                 |                |
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Figure 7: User Info& Maintenance

User can access to different sub-titles on the left part of the page.

The “Equipment Information” page contains basic information of the repeater such as firmware version, product model, serial No. etc.

**Note:** The IP network parameters of the repeater can be modified from this page.

| All Select               | Parameter Name               | Status                  | Setting |
|--------------------------|------------------------------|-------------------------|---------|
| <input type="checkbox"/> | 1 Equipment Type             | Band Selective Repeater | N/A     |
| <input type="checkbox"/> | 2 Firmware Version           | MS2RD202040CH10V7001    | N/A     |
| <input type="checkbox"/> | 3 Equipment Model            | RD2020_40               |         |
| <input type="checkbox"/> | 4 Serial No.                 | 10020200                |         |
| <input type="checkbox"/> | 5 Longitude                  |                         |         |
| <input type="checkbox"/> | 6 Latitude                   |                         |         |
| <input type="checkbox"/> | 7 Equipment MAC Address      | S2-S4+4C-19-F7-42       |         |
| <input type="checkbox"/> | 8 Equipment IP Address       | 192.168.1.2             |         |
| <input type="checkbox"/> | 9 Equipment TCP Port No.     | 8025                    |         |
| <input type="checkbox"/> | 10 Equipment Default GateWay | 192.168.1.1             |         |
| <input type="checkbox"/> | 11 Equipment SubNet Mask     | 255.255.255.0           |         |
| <input type="checkbox"/> | 12 Datetime                  | 2006-04-06 07:01:06     |         |

Buttons: Read, Config, Refresh

Figure 8: Equipment Information

The “General Information” page is mainly for setting up the communication between repeater and other remote device such as OMC and mobile phone to receive alarm message.

| All Select               | Parameter Name              | Status   | Setting | Remark |
|--------------------------|-----------------------------|----------|---------|--------|
| <input type="checkbox"/> | 1 Site Sub ID               | 00000000 |         |        |
| <input type="checkbox"/> | 2 Site ID                   | FF       |         |        |
| <input type="checkbox"/> | 3 OMC Server IP             | 0.0.0.0  |         |        |
| <input type="checkbox"/> | 4 OMC Server IP Port        | 7025     |         |        |
| <input type="checkbox"/> | 5 Equipment UDP Port No.    | 7025     |         |        |
| <input type="checkbox"/> | 6 Alarm Report Mode         | Ethernet |         |        |
| <input type="checkbox"/> | 7 Network Protocol          | IP+UDP   |         |        |
| <input type="checkbox"/> | 8 Heartbeat Detect Interval | 120      |         |        |

Buttons: Read, Config, Refresh

Figure 9: General Information

The “Configuration” page is for setting the RF parameters.



|                                     |                  |                    |                                |                 |                |
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User Info & Maintenance

Equipment Information

General Information

Alarm Information

Configuration

Current Status

Close

Configuration

All Select ☐

|                 |                          | Parameter Name                     | Status            | Setting                        | MinValue | MaxValue           | Unit | Remark   |
|-----------------|--------------------------|------------------------------------|-------------------|--------------------------------|----------|--------------------|------|--|
| 1               | <input type="checkbox"/> | Working Band High Edge Channel No. | 560               | <input type="text"/>           | 0        | 899                | MHz  | UL: 1710.000-1754.950MHz<br>DL: 2110.000-2154.950MHz |
| 2               | <input type="checkbox"/> | Working Band Low Edge Channel No.  | 360               | <input type="text"/>           | 0        | 899                | MHz  | UL: 1710.000-1754.950MHz<br>DL: 2110.000-2154.950MHz |
| 3               | <input type="checkbox"/> | RF Switch state                    | ON                | <input type="text" value="v"/> |          |                    |      |  |
| 4               | <input type="checkbox"/> | UL ATT                             | 0                 | <input type="text"/>           | 0        | 30                 | dB   |  |
| 5               | <input type="checkbox"/> | DL ATT                             | 0                 | <input type="text"/>           | 0        | 30                 | dB   |  |
| 6               | <input type="checkbox"/> | DL VSWR Threshold                  | 1.4               | <input type="text"/>           | 1.4      | 2.5                |      |  |
| 7               | <input type="checkbox"/> | Over-Temperature Threshold         | -35               | <input type="text"/>           | -40      | 125                | °C   |  |
| 8               | <input type="checkbox"/> | DL Output Power Low Threshold      | 41                | <input type="text"/>           | 11       | 42                 | dBm  |  |
| 9               | <input type="checkbox"/> | DL Input Power Overload Threshold  | -75               | <input type="text"/>           | -80      | -29                | dBm  |  |
| <div>Read</div> |                          |                                    | <div>Config</div> |                                |          | <div>Refresh</div> |      |  |

Figure 10: Configuration

The “Current Status” shows the status of the running equipment and cannot be modified.

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+ User Info & Maintenance

+ Equipment Information

+ General Information

+ Alarm Information

+ Configuration

+ Current Status

+ Close

+ Current Status

| All Select      |                          | Parameter Name         | Status             | Unit | Remark |
|-----------------|--------------------------|------------------------|--------------------|------|--------|
| 1               | <input type="checkbox"/> | Device Temperature     | 33                 | °C   |        |
| 2               | <input type="checkbox"/> | DL Input Power         | --                 | dBm  |        |
| 3               | <input type="checkbox"/> | DL Output Power        | --                 | dBm  |        |
| 4               | <input type="checkbox"/> | UL Gain                | 90                 | dB   |        |
| 5               | <input type="checkbox"/> | DL Gain                | 90                 | dB   |        |
| 6               | <input type="checkbox"/> | DL VSWR                | --                 |      |        |
| 7               | <input type="checkbox"/> | New Site Report Result | Unreported         |      |        |
| <div>Read</div> |                          |                        | <div>Refresh</div> |      |        |

Figure 11: Current Status

## 2.4 POWER OUTPUT ADJUSTMENT

The repeater output power could be adjusted in certain range by Comba PA adjustment software(for factory tuning only).

1. Click the bottom button “Set Gain”.

|                                     |                  |                    |                                |                 |                 |
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Figure 12: Set Gain

- Click the “manual” button to adjust the parameters manually.

Figure 13: Manually Adjusting

- The AGC part will be activated for adjustment, and adjust this setting to obtain the desired power output.

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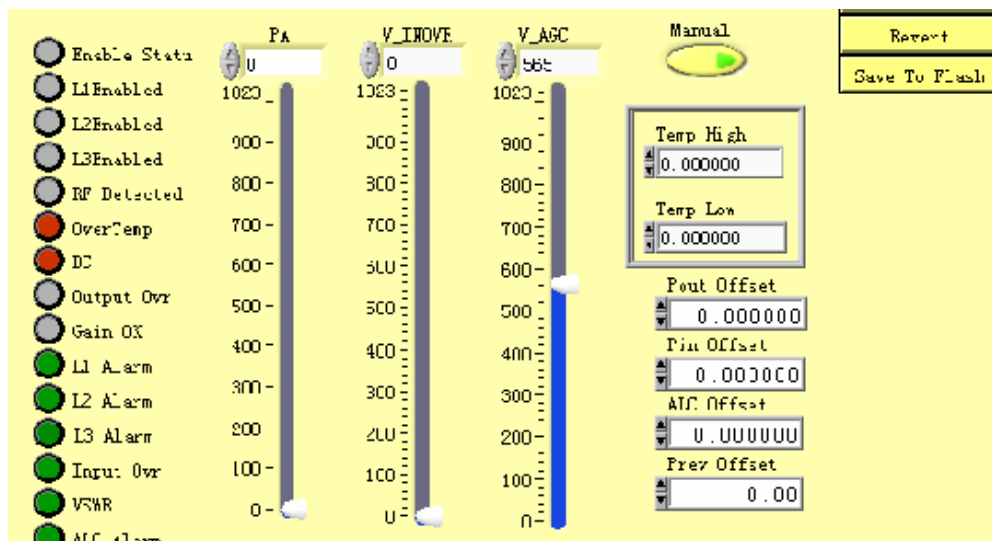


Figure 14: ATT

End of Section

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