RM&C Software

Remote Monitoring & Control for Desktop

Installation and Operation Manual

Rev. 17 – Sep 2011

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Glossary

Abbreviation	Description
Attn	Attenuation
RMC28xx	RMC28 C-Band Up/Down Converter
CSPT	RAV813xxxx C-band Single Package Transceiver (also known as RAV880S)
D/C LO	Down-Converter Local Oscillator
ECSPT	RAV680xxxx C-band 1MHz Step Size Single Package Transceiver
FCSPT	RAV814xxxx Full C-band Single Package Transceiver
Global Address	An address that will be responded by any ODU, disregarding its assigned address. For Ku-SPT, FC-SPT, EC-SPT, BUC, RUC28 and OHT, the global address is *000*.
KUSPT	RAV628xxxx Ku-band Single Package Transceiver
LNB	Low Noise Block Converter
ODU	Out Door Unit Could be RCU, Ku-SPT, C-SPT, FC-SPT, EC-SPT, C-BUC, Ku-BUC, RUC28 and OHT
OHT	RAV980xxxx C-Band One Housing Transceiver
RCU	Redundancy Control Unit
SPT	General name for Single Package Transceiver
SSPA	Solid State Power Amplifier or Booster
SSPA Transmit Switch	The *On* and *Off* show whether the user has switch on or off the SSPA
U/C LO	Up-Converter Local Oscillator
Device ID or Unit ID	Specific ID (or address) assigned to ODU. ODU will only respond to commands that address to its address or Global Address.
Win	Windows® Operating Systems

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CHAPTER 1
GENERAL INFORMATION

1.1 Introduction

The software is developed to monitor the following products:

Model Number	Product Type	Description
RAV628 xxxx	Ku-SPT	Ku-band Single Package Transceiver
RAV670 xxxx	X-SPT	X-band Single Package Transceiver
RAV680 xxxx	EC-SPT	Enhanced C-band Single Package Transceiver 1MHz Step
RAV813 xxxx	C-SPT	C-band Single Package Transceiver
RAV814 xxxx	FC-SPT	Full C-band Single Package Transceiver
RAV980 xxxx	OHT	C-band One Housing Transceiver
RMC28xx	RMC28	C-band Up/Down Converter
RMC285x	RMC28	C-band Up Converter
61xxxxxxxx-M	LNB-M	Ku-band LNB with M&C
RCAxxxxxxx-M	LNB-M	C-band LNB with M&C
RAAxxxxxxx-M/SM/RM	-	Booster with M&C system

Table 1-1: Product List

The software is capable to monitor and control a “Stand Alone Operation” (simple transceiver) or a “Redundancy Operation” (i.e. 1 + 1 hot standby system). It can also be configured for Asymmetric systems (for model numbers ending with “-A”) depending on the model of the transceiver.

1.2 System Requirements & Peripherals

The PC requirements needed for the operation of this software are as follows:

- Windows 9x / Win2000 / Win XP Operating System
- At least 8 MB of hard disk space
- An M&C interface cable for the link between an equipment and a computer

1.3 Backup Copy

Ensure you make a copy of the installation software that comes with the system and keep it in a safe place before installing the software.

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CHAPTER 2
STAND ALONE MODE SOFTWARE INSTALLATION

2.1 Software Installation

Step 1. Ensure that your Windows operating system is working in English.

The software will only launch in an English operating system environment. From your system's "Control Panel", check your language settings.

Select an "English" region (Format). Click [OK] to save the settings. You may need to restart your PC for the change to take effect.

🕮 Note: The instructions above may differ according to your Windows operating system version.

Step 2. Insert USB Flash memory into the USB port.

Step 3. Install the USB-RS485 converter driver into your PC.

Step 4. Click the folder named RMC201-Release-v102.

Step 5. Double-Click the file named, "Setup.exe"

Step 6. Follow the on-screen instructions of the installer to install the software.

2.2 Cable Connection & Pin Configurations

2.1.1 PC RS-232 Port Direct Connection To Device

For product models RAV628 (Ku-SPT), RAV670 (X-SPT), RAV980 (C-OHT), RLB180 (C-BUC) and RLB128 (Ku-BUC) that support RS-232 connection to PC, please use the specific M&C cable coming with the device to connect the device to PC.

For all ODUs except RAV813 (C-SPT), refer to Figure 2-1A and Table 2.1 for RS232 pin-out configuration; for C-SPT, refer to Table 2.2 for RS232 pin-out configuration; for IDU, refer to Table 2.3.

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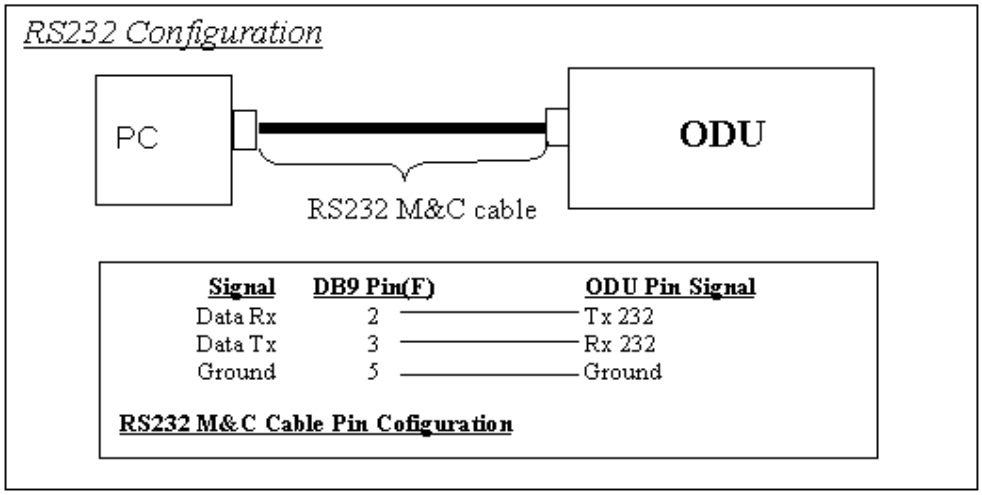

Figure 2-1A: Connection and Pin Configurations for RS232 Application

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Table 2.1: RS-232 M&C cable pin signal assignment for ODU devices except C-SPT

No	Male Circular	Female DB-9	Signal description
1	Pin E	Pin 3	Rx - reception
2	Pin F	Pin 2	Tx - transmission
3	Pin B	Pin 5	Ground

Table 2.2: RS-232 M&C cable pin signal assignment for C-SPT

No	Female Circular	Female DB-9	Signal description
1	Pin E	Pin 3	Rx - reception
2	Pin F	Pin 2	Tx - transmission
3	Pin B	Pin 5	Ground

Table 2.3: RS-232 M&C cable pin signal assignment for IDU devices RUC28 / 38 / 68, stand-alone booster RAA11x0001-RM / RAA12x0001-M

No	Male DB-9	Female DB-9	Signal description
1	Pin 2	Pin 3	Rx - reception
2	Pin 3	Pin 2	Tx - transmission
3	Pin 5	Pin 5	Ground

2.1.2 PC USB Port Indirect Connection To Device Through RS-485 Converter

Product models for boosters RAAxxxxxxx-M do not support direct RS-232 connection to PC. It uses RS-485 for M&C communication. All Raditek products support RS485 communication. When the product is communicating on RS-485, a USB to RS485 adapter is needed to connect product to PC, as shown in Figure 2-1B.

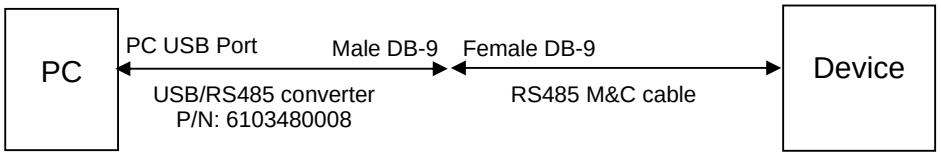

Figure 2-1B: Connection between device and PC through USB/RS-485 converter

2.1.2.1 RS485 M&C Cable

Table 2-4: Part Number for RS485 M&C cable in Figure 2-1B

Product Type	RS-485 cable	Connectors on the end of RS485 cable
RCU/C-SPT	2502040669	8-pin female circular to female DB-9
ODUs	2502040699	8-pin male circular to female DB-9
IDUs	2502040680	Male DB-9 to female DB-9

The following tables list the pin signal assignment for each cable in Table 2-4.

2.1.2.2 RCU/C-SPT (P/N: 2502040669): 8-pin Female Circular to Female DB-9

No	Female Circular	Female DB-9	Signal description
1	Pin E	2	Data+
2	Pin F	1	Data-
3	Pin B	5	Ground

2.1.2.3 ODUs (P/N: 2502040699): 8-pin Male Circular to Female DB-9

No	Male Circular	Female DB-9	Signal description
1	Pin E	2	Data+
2	Pin F	1	Data-
3	Pin B	5	Ground

2.1.2.4 IDUs (P/N: 2502040680): Male DB-9 to Female DB-9

No	Male DB-9	Female DB-9	Signal description
1	3	2	Data+
2	2	1	Data-
3	5	5	Ground

2.3 Software Operation

2.3.1 Software Execution

Upon installation of the software, an icon labelled "*RMC201(Win) 1.0.2"* will be added to "Programs" on the start-up menu. To start using the RM&C software, either click on the icon or the option in the start-up menu.

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2.3.2 Monitor Screen

The M&C programs for all equipment (Ku-SPT, C-SPT, FC-SPT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 and OHT) share almost similar monitor screen depicting the block diagrams of the devices (Figure 2-2 shows Ku-SPT screen. The difference between the programs is that certain parameters are not applicable for some models (e.g. RF In range is only applicable for Ku-SPT systems). This will be explained in details in subsequent sections.

Referring to Figure 2-2, the Transmit Path is formed by the Up-Converter Local Oscillator (U/C LO), Up-Converter Block (U/C) and SSPA Block. The Receive Path is formed by the Down-Converter Local Oscillator (D/C LO), Down-Converter Block (D/C) and LNA/LNB Block.

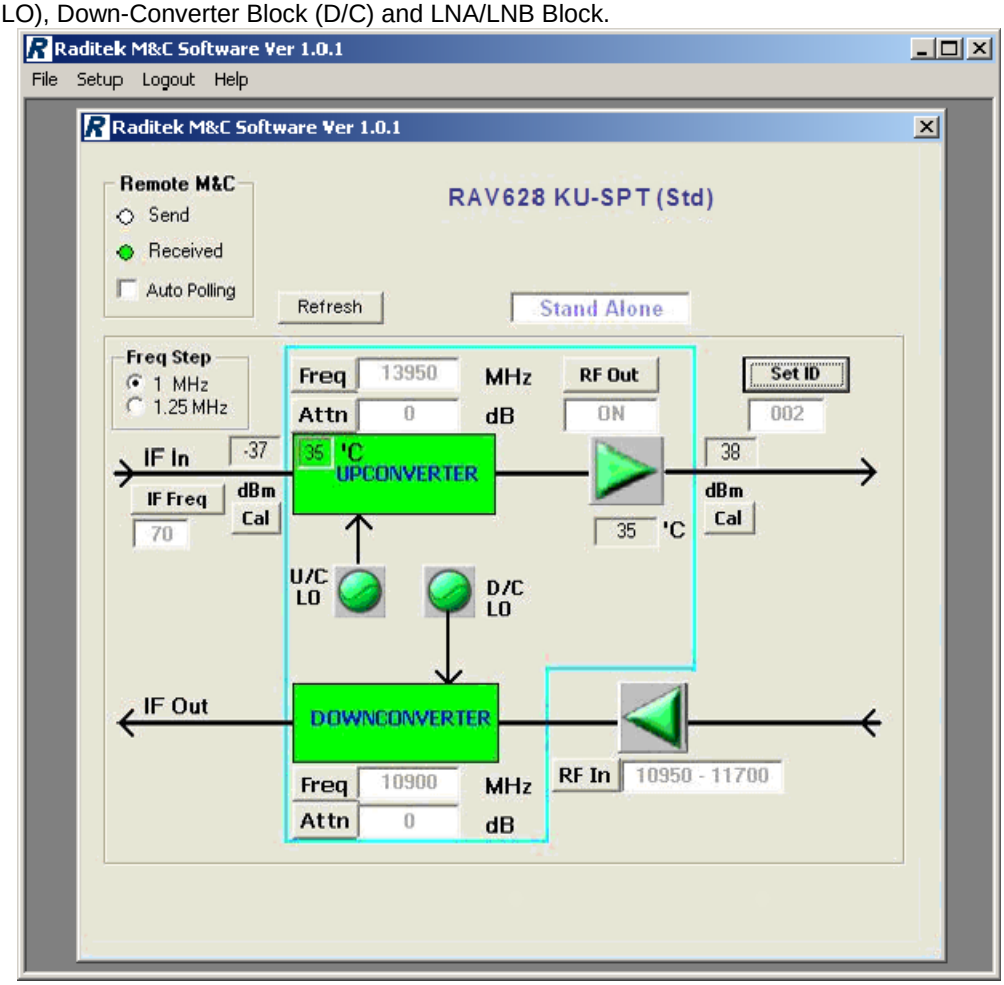

Figure 2-2: Monitor Screen

2.3.2.1 Transmit Path

The Transmit Path consists of the Up-Converter Local Oscillator (U/C LO), Up-Converter Block and SSPA Block. Green colour indicates that the U/C LO and Up-Converter Block are working properly. Red colour indicates that the respective components are in failure. The SSPA Block has an extra yellow colour indicating the SSPA transmission is off. Any failure of the above components (U/C LO, Up-Converter and SSPA) can cause the Transceiver not able to transmit. The Transmit Path colour indication will then turn to red.

Above the Up-Converter Block, the Transmit Frequency (labelled “Freq”) and Transmit Attenuation Level

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(labelled “Attn”) are displayed in the text box besides their respective labels.

Note: For models that do not have attenuation function, “Attn” is not displayed.

SSPA ON / OFF is displayed above the SSPA Block (labelled “RF Out”). User selection for transmit on is indicated by “ON” in the text box and transmit off is indicated by “OFF”. The actual status of the power amplifier (SSPA / booster) is indicated by the colour of the symbol:

- Green = transmit on and good condition
- Yellow = user switched off transmission
- Red = transmission off and alarm

2.3.2.2 Receive Path

The Receive Path consists of the Down-Converter Local Oscillator (D/C LO), Down-Converter Block and LNA/LNB Block. Green colour indicates that the D/C LO Block and Down-Converter Block are working properly. Red colour indicates that the components are in failure. Any failure of the above components can cause the Transceiver not able to receive. The Receive Path will then turn to Red colour indication.

Positioned below the D/C Block, Receive Frequency (labelled “Freq”) and Receive Attenuation Level (labelled “Attn”) are displayed in the text box beside their respective labels.

For Ku-SPT only, the Receive Frequency Band of LNB is displayed below the LNB block (labelled “RF In”). Select the range according to the LNB being used.

2.3.2.3 IF Frequency

The IF Frequency is displayed at the middle left portion of the display screen. Its respective value of 70 MHz or 140 MHz is displayed in the textbox.

Note: “IF Freq" option is not applicable for C-SPT or BUC. The communication is 9600 bps.

2.3.3 Login

To switch to the Control Mode, click “Login” option located at the top of the screen along the control panel. A *Login Box* will appear, as shown in Figure 2-3.

The default password is “PASSWORD” and is case-sensitive. If the password is accepted, the menu item *Login* will be changed to *Logout*, menu item *Setup* will enable menu item *Configuration*. After the first login, it is advisable that you change your password for security reasons.

Enter the password in the Password Field and you will enter the Control Mode. Although both the Monitor Screen and the Control Screen look almost identical, you will notice that the control buttons such as “Freq” and “IF” can now be selected to allow changes to the parameter values.

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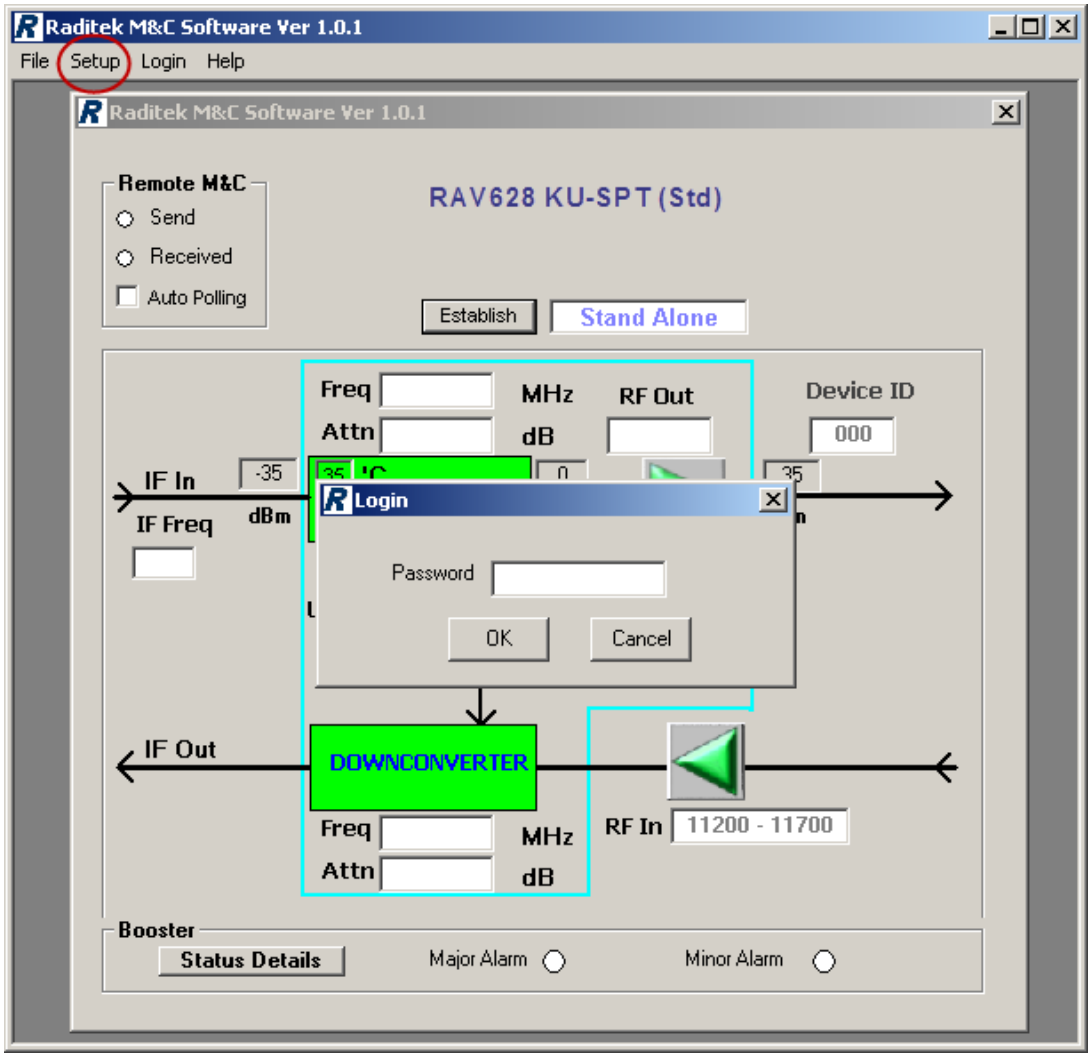

Figure 2-2: Monitor Screen

2.3.4 Change Transceiver

If the changes on the parameters are successfully done, a status box will appear showing "Command confirmed". If the status box does not appear within 5 seconds after the setting of the parameter, repeat the changes. User needs to log in to be allowed to change any parameters of transceiver.

To change parameters, click on the button of the parameter (e.g.: IF Freq, Freq or Attn) and a drop down button will appear next to the text box. Click on the dropdown button to open the dropdown list. Drag through the scroll bar until the desired setting appears. Select the desired setting to execute it.

NOTE:

The moment the parameter button is pressed, a screen refreshing count down timer is initiated. At the end of this timer counting, the whole screen will be refreshed and all drops down button will be cleared away. User necessarily needs to complete the selection within this time frame.

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2.3.5 Changing Password

Click menu item *Setup* on the menu bar, then click *Configuration*. The Device Configuration window shown on Figure 2-5 will appear. The Device Configuration window with three tab options will appear (see Figure 2-5).

Click the *Password* tab. Enter your new password in the "Change Password" and "Confirm" text boxes and click *OK* to confirm the change. The maximum length of the password is 8-character long and any characters can be used. Note that your password is case-sensitive.

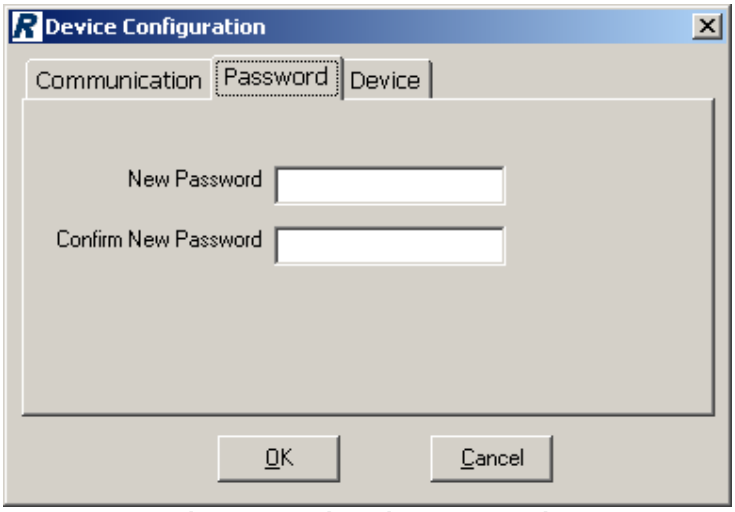

Figure 2-5: Changing Passwords

2.3.6 Communication Setting

CAUTION	**The PC will not be able to communicate with the ODU unless the communication port is set correctly.**

To modify communication settings, click *Setup* > *Configuration.* The *Communication* tab will display the current settings for the baud rate (shown in Figure 2-6). To change the settings, click on the dropdown button and choose from the dropdown list. Click *OK* to confirm the new settings. A message box will appear to confirm your selection. If booster with M&C is used or if more than one equipment is to be controlled by the M&C program (e.g. Redundancy Operation), an RS-485 converter must be used and *Device Mode* must set to RS-485 for the extra conversion delay needed.

Important!

If a RS232/485 converter is being used, choose the device mode RS-485. This will ensure the minimum delay requirement of RS-485.

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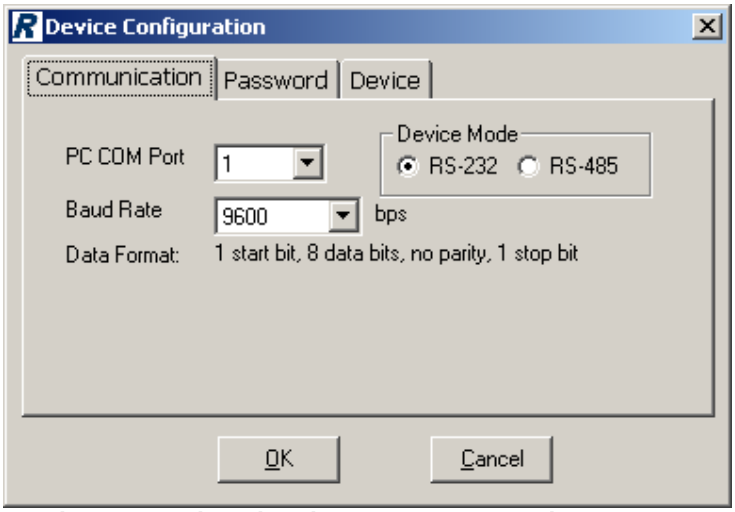

Figure 2-6: Changing the PC COM Port and Data Rates

2.3.7 Device Setting

The *Device* tab is the third option available on the configure screen. This option allows you to choose the model of equipment that you want to monitor. The Driver Model allows you to select the transceiver to be controlled. The equivalent product name (Ku-SPT, C-SPT, FC-SPT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 and OHT) will be displayed next to the model. Figure 2-7 shows how to select the Driver Model under the Stand-alone Operation.

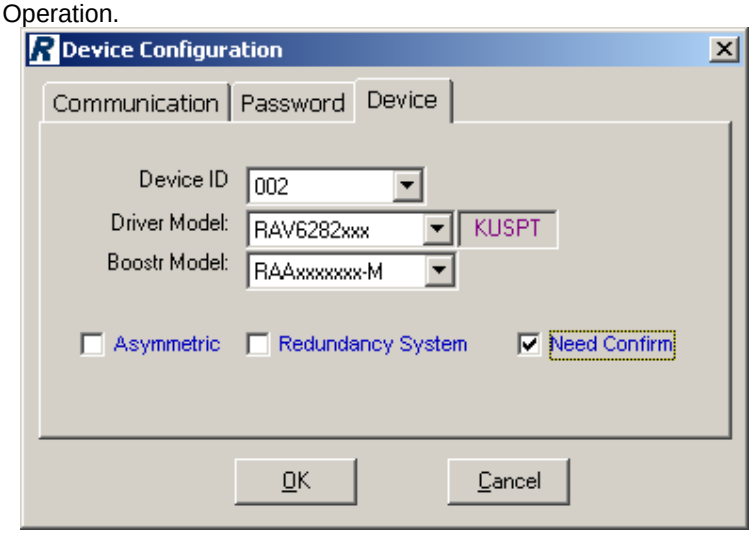

Figure 2-7: Selecting the Driver Model under Stand-alone Operation

Figure 2-8 shows the extra LNB option for BUC with Redundancy enabled. The model of booster you want to control (if applicable) can be selected under *Booster Model*. Booster models with part number ending with "-M" or "-SM" are with M&C feature.

Note: For booster with M&C option to operate properly with transceiver, RS485 connection must be used.

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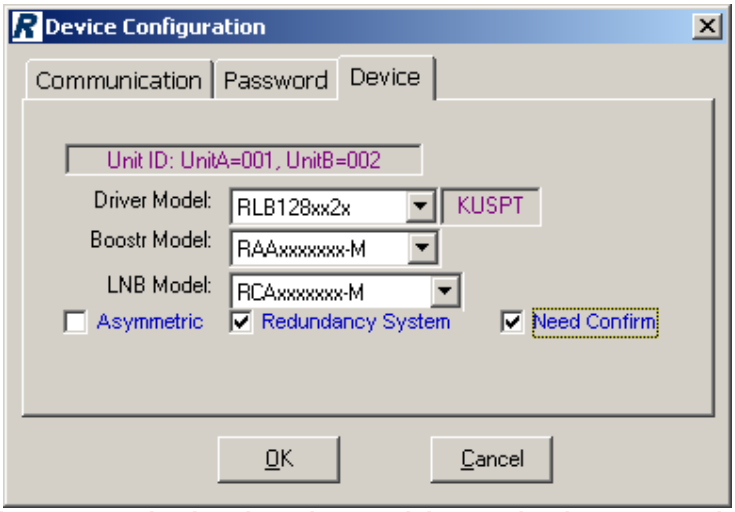

Figure 2-8: Selecting the Driver Model on Redundancy Operation

Driver Model allows you to select the desired model among the various driver models, as shown in Figure 2-9. The Device ID is selected from a dropdown list ranging from 0 to 25. The M&C program uses this Device ID to broadcast its command. Only models with this Device ID will response to the command. If a system has only one transceiver and no booster (with M&C option), this setting can be *000*, since it is the only device on the M&C communication link.

Important!

Address *000* is a global address for Booster (with M&C), Ku-SPT, C-SPT, FC-SPT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 and OHT devices. All units will respond to this address regardless of their assigned address.

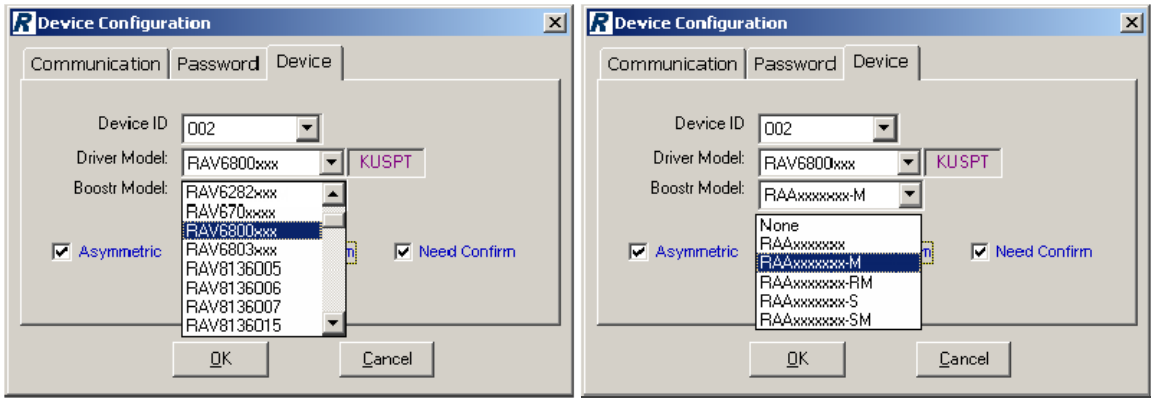

Figure 2-9: Selecting the Models

In case you are using M&C program with the ODU for the first time or you are not sure of the Device ID of the ODU, set the Device ID to *000*. If you have more than one device connected to the M&C link (besides RCU), you will need to use RS485 interface to communicate with all the devices. Each of the devices will need to have a unique address. By default, addresses *9xx* is reserved for controller while *8xx* is reserved for booster (where *xx* = 00 ~ 99).

If one of the models of C-SPT is selected, the Device ID is either *A* or *B*. Indicate your choice and click the *OK* button for confirmation.

For redundancy operation, the Device ID of units A and B are defaulted to *001* and *002* for Ku-SPT, C-SPT,

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FC-SPT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 and OHT, *801* and *802* for booster with M&C option, or A and B for C-SPT. These addresses cannot be changed by you (refer to Figure 2-10).

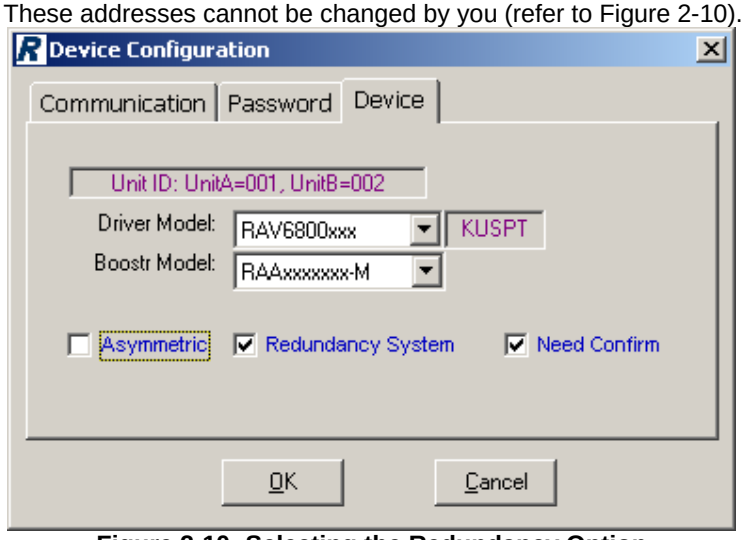

Figure 2-10: Selecting the Redundancy Option

2.3.8 Asymmetric Mode

At the bottom left of the Device Configuration screen, you can find an option *Asymmetric* (refer to Figure 2-11). This option is used for driver model that ends with "-A". Enabling this option will hide the receive path of the transceiver (i.e. Transmit-Only operation).

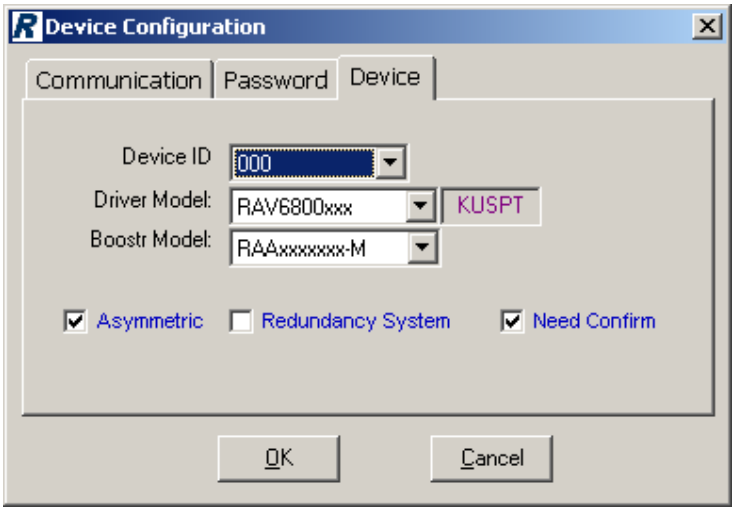

Figure 2-11: Selecting the Device Option

2.3.9 Redundancy Mode

Next to the Device Configuration screen is the *Redundancy* option. Enable this option if you are operating in redundancy mode. More details on this option are described at the later part of the manual (refer to Chapter 3).

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2.3.10 Setting Commands

To set commands, enter into Control Mode by clicking Login and keying in the password. All the control buttons that may be configured will appear.

- Figure 2-13 to Figure 2-21 display the Control Mode main screen for the following product models: Ku-SPT, C-SPT, FC-SPT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 and OHT respectively (with Booster Model set to None or RAAxxxxxxx).

- Figure 2-22 to Figure 2-27 show Asymmetric model screens while

- Figure 2-28 shows sample of Booster with M&C option driven by Ku-SPT

- Figure 2-29 shows Booster with M&C driven by third party up converter (Driver Model set to None).

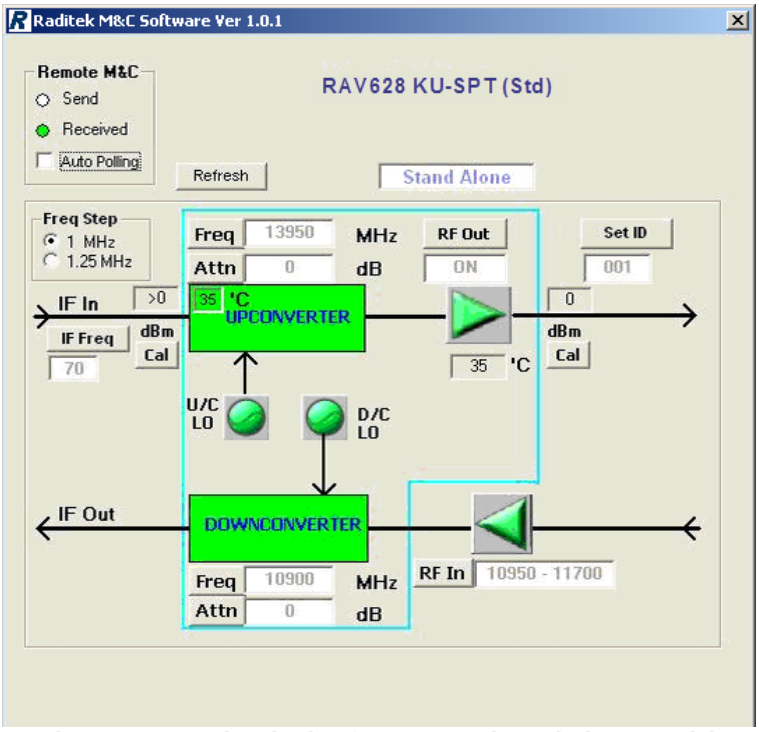

Figure 2-13: Main Display for Ku-SPT (stand-alone mode)

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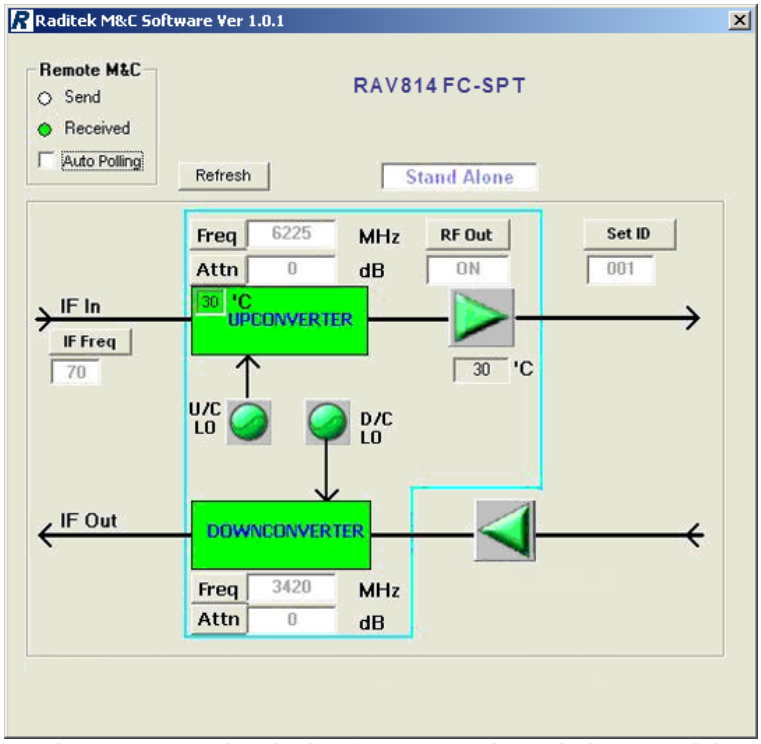

Figure 2-14: Main Display for FC-SPT (Stand-alone mode)

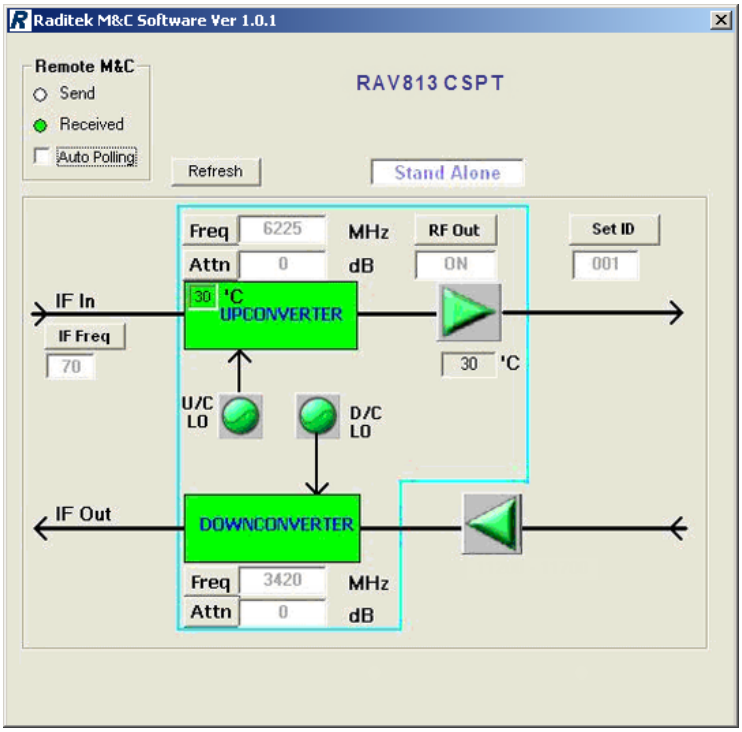

Figure 2-15: Main Display for C-SPT (Stand-alone mode)

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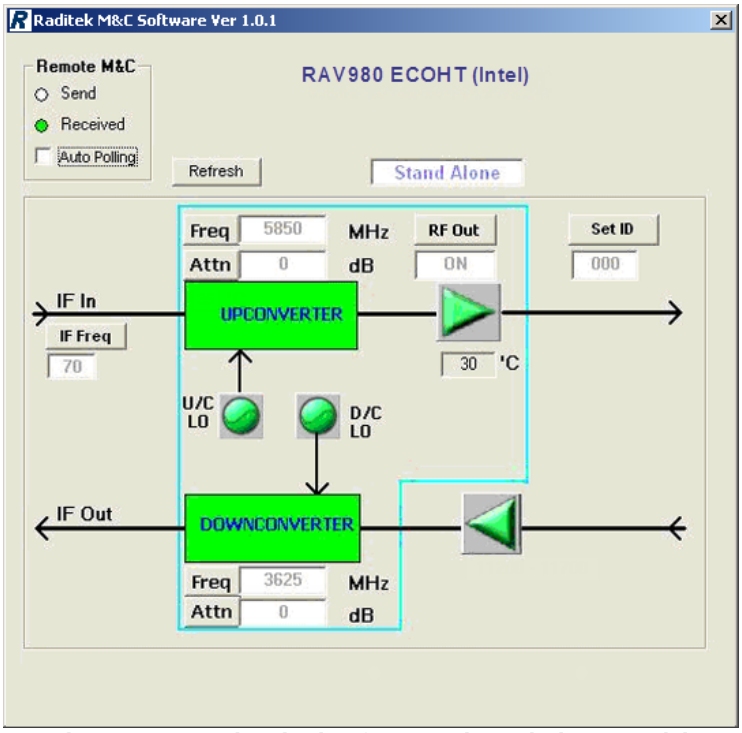

Figure 2-16: Main Display for OHT (stand-alone mode)

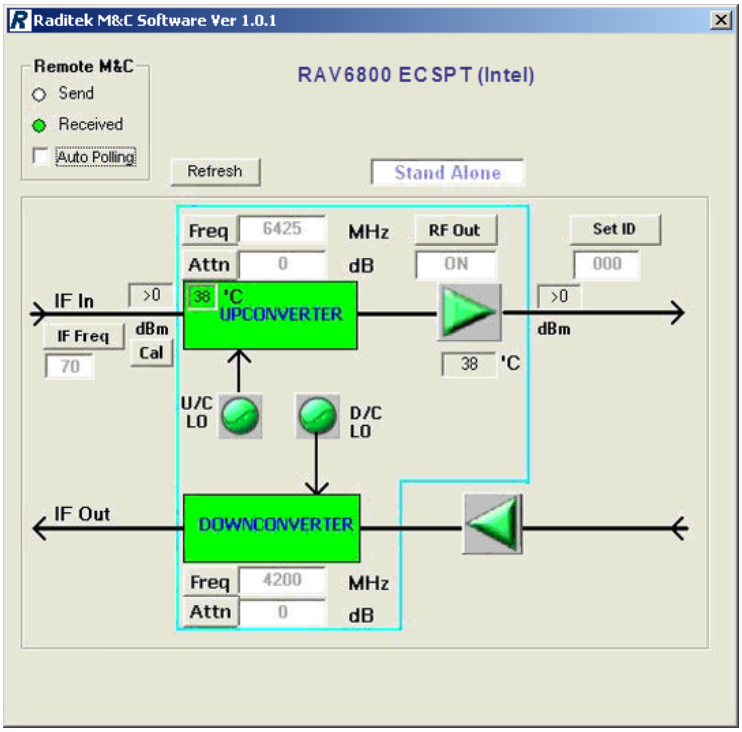

Figure 2-17: Main Display for EC-SPT (stand-alone mode)

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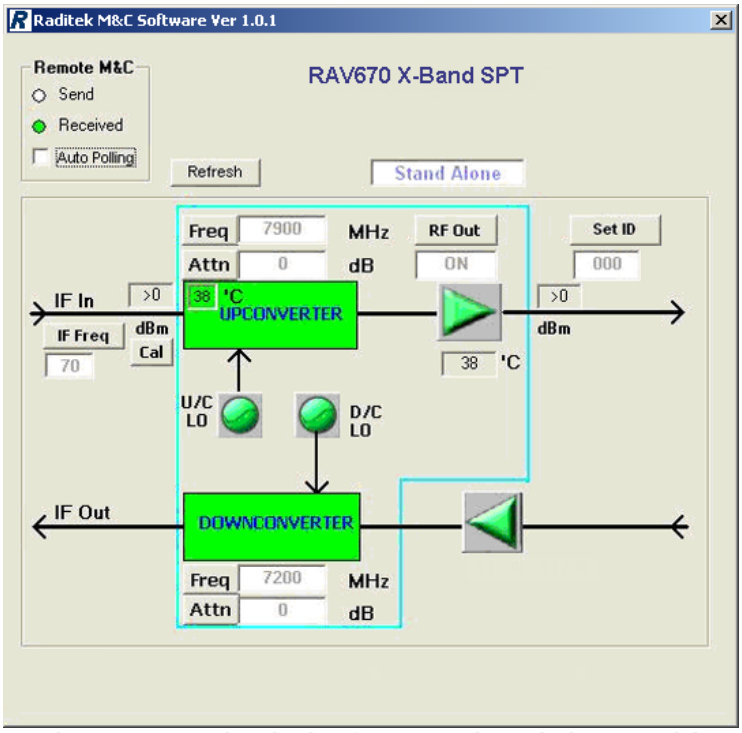

Figure 2-18: Main Display for X-SPT (stand-alone mode)

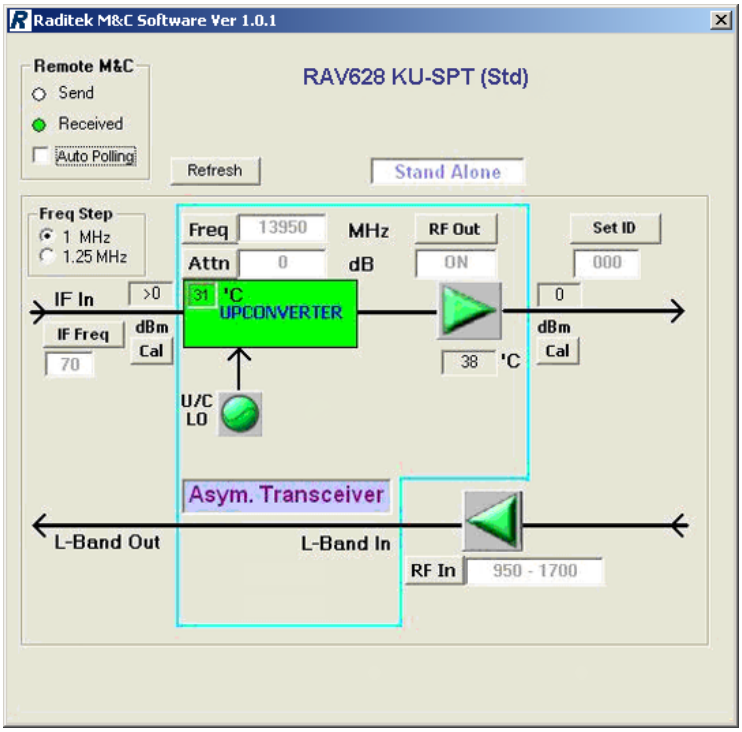

Figure 2-24: Main Display for Asymmetrical Ku-SPT

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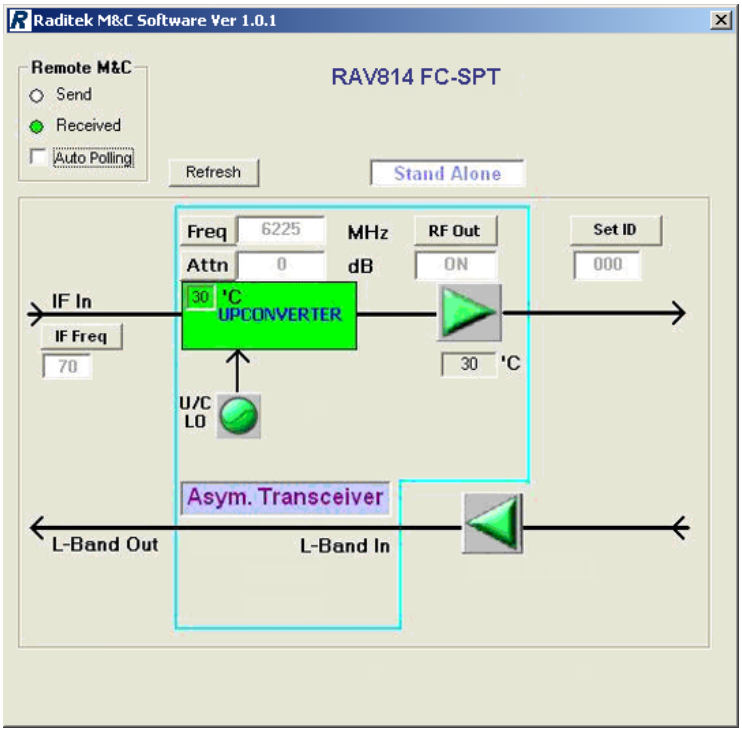

Figure 2-25: Main Display for Asymmetry FC-SPT

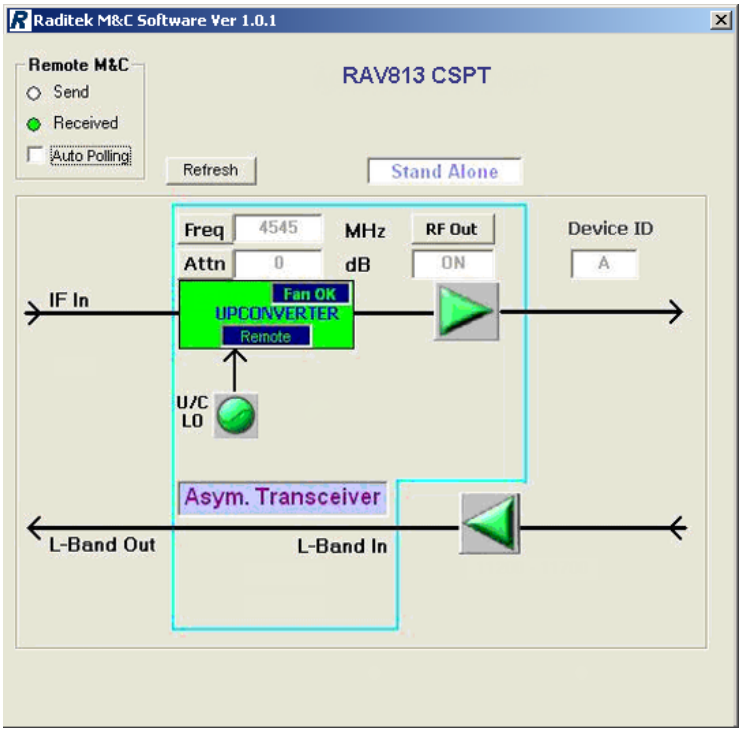

Figure 2-26: Main Display for Asymmetrical C-SPT

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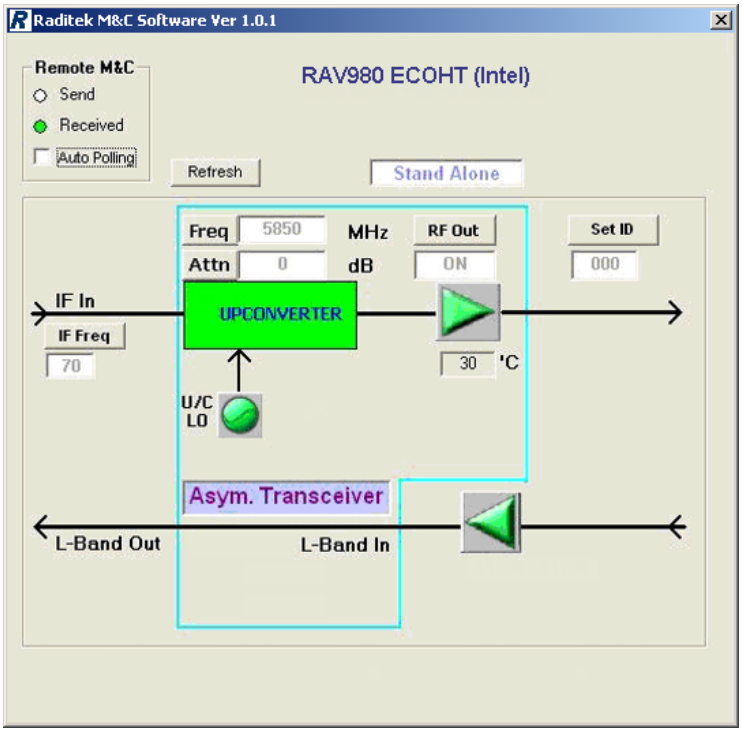

Figure 2-27: Main Display for Asymmetrical OHT

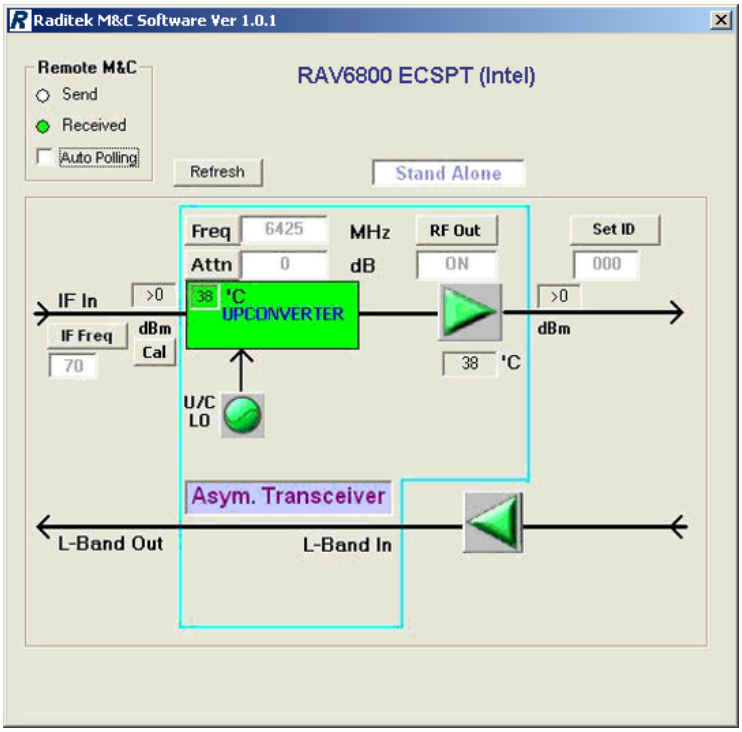

Figure 2-28: Main Display for Asymmetrical EC-SPT

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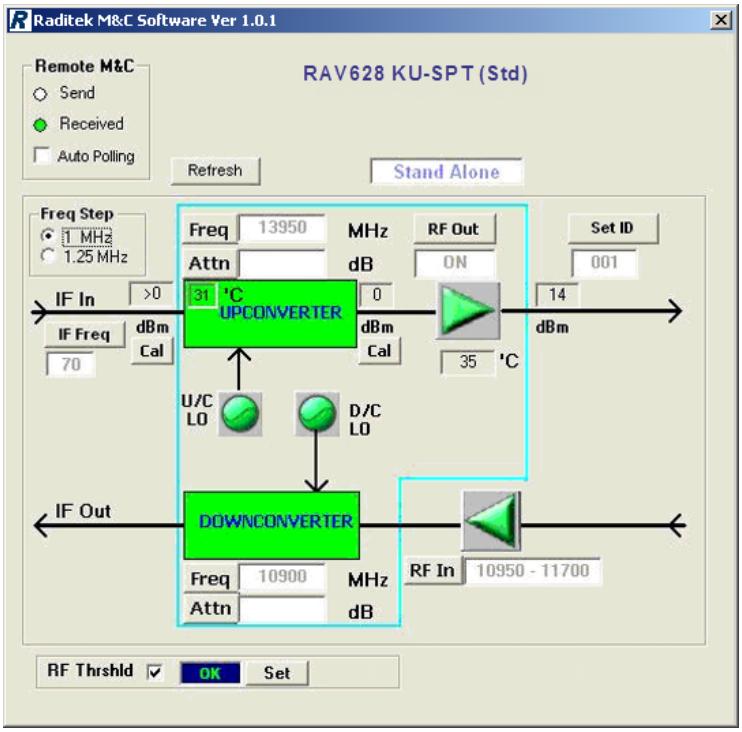

Figure 2-29: Main Display for Booster with M&C driven by Ku-SPT

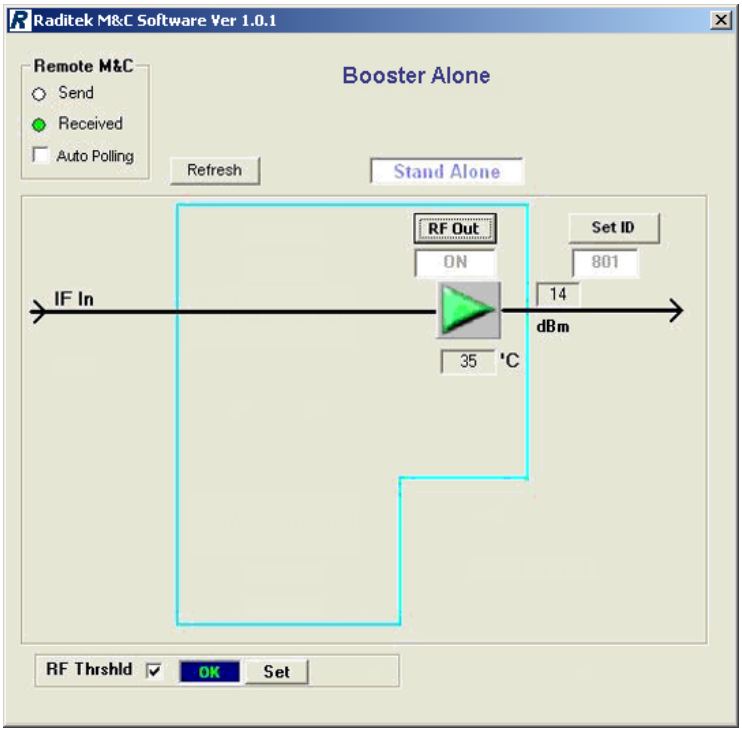

Figure 2-30: Main Display for Booster with M&C driven by Third-party Up-Converter

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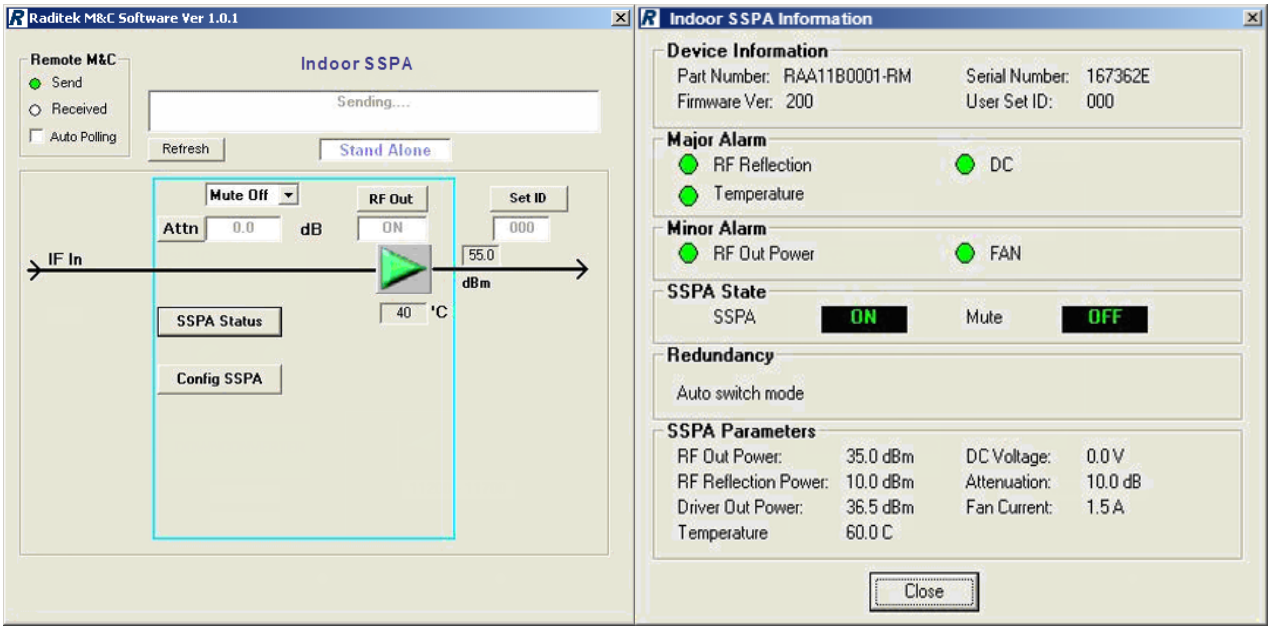

Figure 2-31: Indoor SSPA AAA11B0001-RM Main Display & Status Information

2.3.10.1 Transmit and Receive Frequency

The Transmit Frequency is displayed in the text box besides "Freq" above the U/C Block, and the Receive Frequency is displayed below the D/C Block. To alter the frequency, click on the "Freq" Button. A dropdown text box appears. Set the frequency by clicking on the dropdown button and choose the required frequency from the list.

2.3.10.2 Attenuation Setting

As in Transmit Frequency Setting, click "*Attn*" if you want to change the transmitter attenuation settings. Choose the required attenuation by clicking the dropdown button and select from the list.

2.3.10.3 Device ID Setting

Click *Set ID* to change the Device ID of the transceiver and booster (with M&C option). This is different from the Device ID shown in the *Setup → Configuration Device* screen. This setting is to set the ID of the device while the Device ID screen is to select the destination address to be used during the broadcasting of message.

As a metaphor, *Set ID* is like telling a person his new name, while *Device ID* setting in Device ID screen is like choosing what name to call out every time you send a message. Therefore, once you have set a Device ID to *001* (example), you will need to change the Device ID in *Device ID* screen to *001*, so that when you broadcast the message using the selected device ID, the particular device will respond. Selecting *000* as Device ID is like saying "everyone". All the devices will respond to the message.

Choose the required ID by clicking on the dropdown button and select from the list. The Booster ID by default will be set to "*8xx*" where *xx* is the last two digit of the Transceiver ID just selected.

Note: "Set ID" setting is not applicable to C-SPT.

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2.3.10.4 SSPA On / Off / Delay Control

Click *RF Out* to display the dropdown button. Clicking on the dropdown button reveals 3 options, namely *ON* or *OFF* and *DELAY*. Refer to Section 2.3.11.9 for more details on the Delay option. Note that the SSPA will not be able to be switched on if the U/C LO is unlocked.

2.3.10.5 Receive Frequency Band

For Ku-SPT and RUC28xKK systems, there are two available options for the RF In frequency bands. For Version 3 onwards, you have a wider bandwidth for the first frequency range (10.95 GHz ~11.70 GHz). If you desire to use LNB of frequency range 10.95 GHz ~ 11.70 GHz for transceiver version below 3, you can still select 10.95 GHz ~ 11.45 GHz on the program. However, you are allowed to operate up to 11.45 GHz for this range. Click *RF In* to reveal dropdown box with 4 frequency bands. Select the frequency range that matches the LNB range you use (see Figure 2-33).

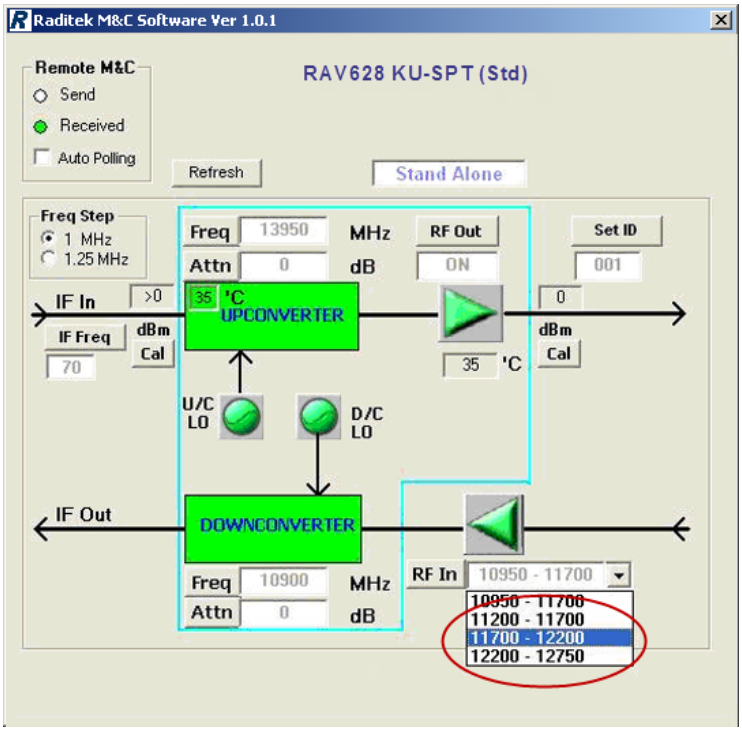

Figure 2-33: Selecting 4 Frequency Bands for IF In (Ku-SPT only)

CAUTION	**It is important that the Rx frequency band selected corresponds to the frequency band of the PLLNB that is being used in the ODU system.**

2.3.10.6 Frequency Bands

Ku-SPT version 3.0 Below	**Ku-SPT version 3.0 above**
10.95 GHz ~ 11.45 GHz	10.95 GHz ~ 11.70 GHz
11.20 GHz ~ 11.70 GHz	11.20 GHz ~ 11.70 GHz
11.70 GHz ~ 12.20 GHz	11.70 GHz ~ 12.20 GHz
12.20 GHz ~ 12.75 GHz	12.20 GHz ~ 12.75 GHz

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2.3.10.7 Frequency Step Size (for Ku-SPT only)

> **CAUTION**
>
> **Step size is depending on the specification of the transceiver. Wrong selection of step size might cause wrong frequency selection.**

Select the frequency step size in steps of 1 MHz or 1.25 MHz at the Freq Step frame by checking the respective option. Click *OK* to confirm (see Figure 2-34). This option is to be backward compatible to the few earlier version of Ku-SPT (1.25 MHz step size). For most of the Ku-SPT, the frequency step is 1 MHz. Refer to the product label on the Ku-SPT to confirm its step size. If there is no indication of 1.25 MHz step size on the product label, set this to 1 MHz step size. If in doubt, check with the actual transmit frequency before connecting to antenna. The frequency step will change accordingly at the dropdown options of the Transmit and Receive frequency boxes.

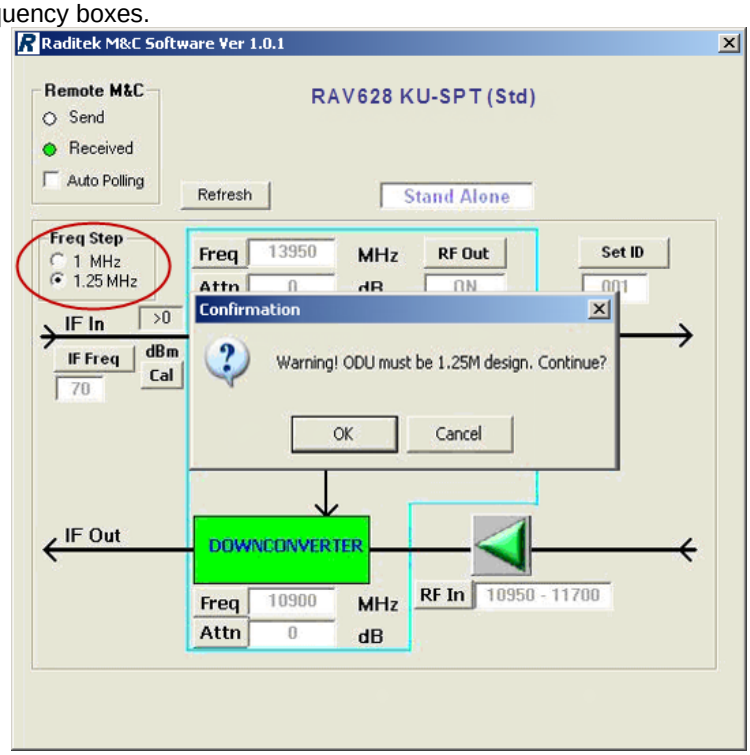

Figure 2-34: Changing Frequency Step Size (for Ku-SPT only)

2.3.10.8 IF Frequency Selection

The SPT is designed to be able to communicate with the indoor satellite modem at either 70 MHz or 140 MHz. The factory default setting is 70 MHz. The IF Frequency box is displayed on the middle left section of the screen. Upon Logging in, the text box labelled “IF Freq” will have a dropdown button. Click on the dropdown button to change the IF frequency to the required setting.

Note: This is not applicable for C-SPT, C-BUC & Ku-BUC.

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2.3.10.9 Delay On for SSPA

To activate the Delay feature for SSPA, click *RF Out* to reveal the three-dropdown options, namely *ON*, *OFF* and *DELAY*. Selecting *Delay* will bring up a dialog box prompting you to enter the delay time desired in minutes (see Figure 2-35).

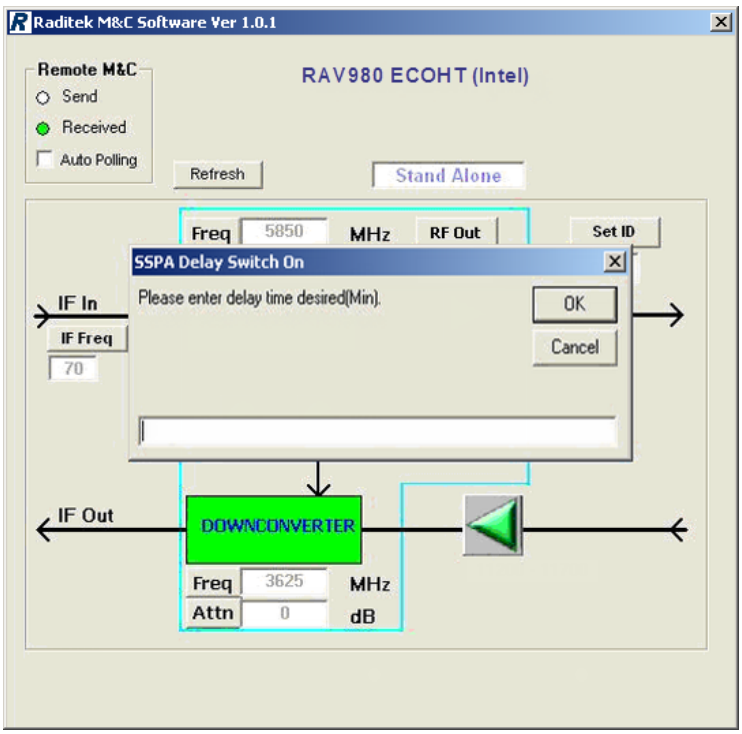

Figure 2-35: Setting the SSPA Delay Timer)

Click *OK* to confirm the delay entered in minutes, and the countdown will commence, displaying the elapsed time remaining every ten seconds (Figure 2-36). At the end of the count down, the M&C will send out the command to switch on SSPA.

PC terminal MUST be connected to the unit while the Delay option is on. Note that the countdown timer is controlled by the M&C program, and NOT the outdoor unit.

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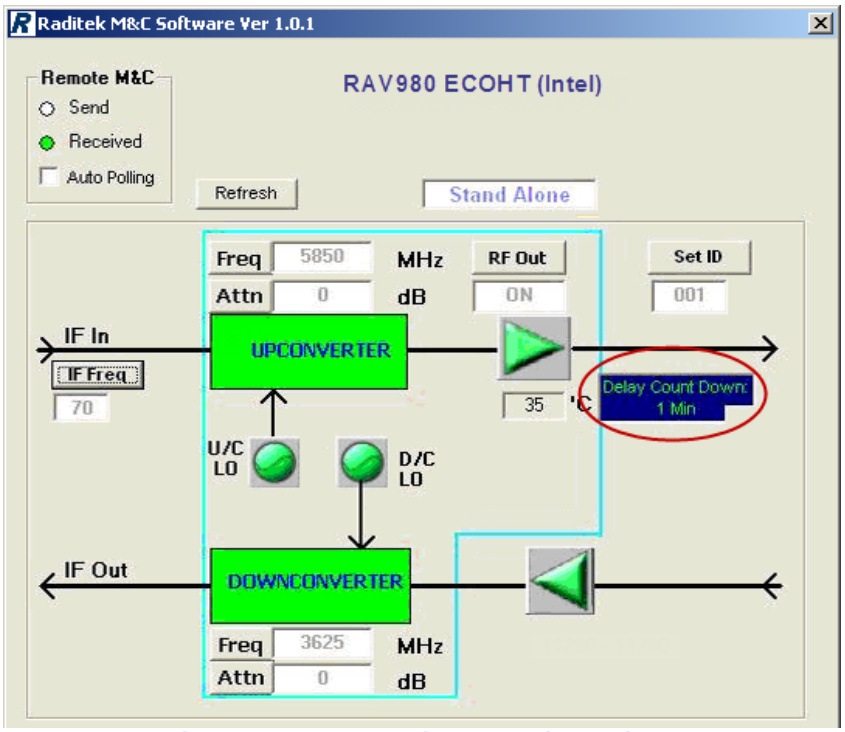

Figure 2-36: SSPA Delay Countdown Timer

2.3.10.10 Stopping the SSPA Delay

To deactivate the SSPA Delay option when countdown has already started, click *RF Out* to reveal dropdown options. Select *OFF* to stop the timer and deactivate the SSPA Delay Option.

2.3.10.11 Customizing Booster's RF Threshold Alarm

This feature is only applicable for boosters with M&C option (model ends with "-M" or "-SM").

CAUTION	**Setting / enabling RF threshold feature might cause transmission to be interrupted. DO NOT execute this feature during operation.**

After installing the system and communication, you would be able to customize the RF threshold alarm setting for the transmit path. There are two methods of configuring the threshold, depending on the model of the booster (Figure 2-37).

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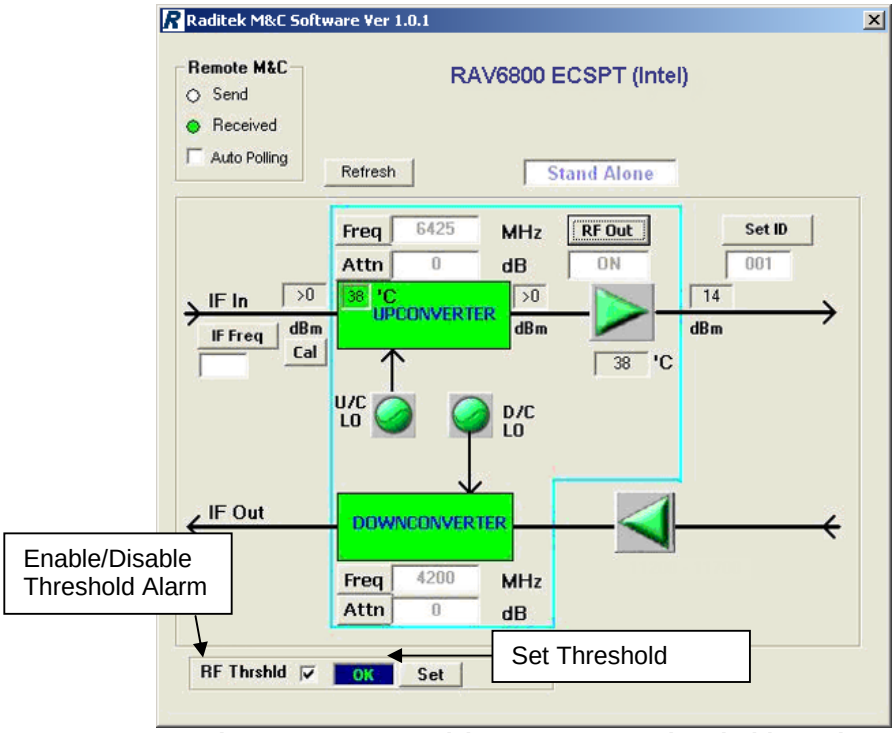

Figure 2-37: Customizing Booster RF Threshold Level

For Booster with "-M" model number

i) Check the RF Threshold option to enable the RF Threshold feature.
ii) Press "Set" to set RF Out Threshold level. Press "No" when ask if want to use factory default.
iii) Adjust modem output power level until the RF Out of booster reaches the minimum acceptable level. Press OK to have the booster remember this level.

For Booster with "-SM" model number

i) Set a check at RF Threshold option to enable the RF Threshold feature.
ii) Press "Set" to set RF Out Threshold level. Press "No" when ask if want to use factory default.
iii) Key in the minimum RF In and RF Out power (dBm) levels acceptable for the booster.
Note: Setting "0" will cause this feature to be disabled. Press Enter to continue.
iv) At confirmation, press "Yes" to confirm.

2.3.10.12 Enable Auto Polling, Send LED and Receive LED

A checkbox at the top right hand corner of the screen allows you to enable / disable *Auto Polling*. If the box is checked, the program will periodically ask for updated values of the various parameters. The green LED will frequently toggle from the Send LED to the Receive LED indicator to demonstrate this on-going process. Green colour at the Send LED indicates a command is being sent out. The Receive LED indicates the last status of the previous receive.

Sometimes due to glitches during M&C data communication (especially in RS485), errors do happen. The Receive LED turns red when the received M&C data contain error. If the colour recovered back to green after the next two polls, it is acceptable. In auto polling of 10 minutes periods, there should not have more than one incident of Receive LED turns red.

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2.3.10.13 Establish and Refresh Buttons

The transceivers are provided with *Auto Scan* and *Auto Scrolling* features.

Auto Scan allows the transceiver to scan between RS232 and RS485 interfaces at the M&C communication. Once it finds a valid instruction from one of the interfaces, it will 'lock' to the interface without checking the other interface until an instruction is given to force an auto scan again or the unit experiences a power reset. This feature allows user to have the flexibility of selecting RS232 or RS485 using the same cable (TxD, RxD and Ground). For communication where more than one device will be connected to the M&C link, RS485 interface is required since it supports multi-drop configuration, while RS232 does not.

Auto Scrolling is a feature where the device will send a series of message to the M&C link to show the status of the device. This scrolling is periodic when using RS232. During the scrolling, the device will not be listening to the M&C communication and any message from PC will be 'jammed' by it. This feature allows field-engineer to know the configuration of the device faster. Once the device detects a valid instruction from the M&C interface, it will stop the auto scrolling and stay in listening mode. It will only return to *Auto Scrolling* mode when it receives an instruction to do so, or the device is power reset.

Since both *Auto Scan* and *Auto Scrolling* will be activated during the power reset of the device, a series of commands have to be sent to the device to "establish" the link, where the device can lock to the correct interface and stop broadcasting messages (*Auto Scrolling*). This is to prevent it from jamming the M&C instructions. The *Establish* button performs this function, establishing the connection between the device and the M&C software. Click *Establish* when the devices have already been physically connected up and wait for a while.

Note: Some random appearances of *"No Response from devices"* or red Receive LED are to be expected since the commands will not be responded by the device until it has managed to receive a valid command. A typical waiting time is between few seconds to one minute.

Wait until the establishing link is done before start to change configuration, press *Refresh* or *Establish* button.

Note: Some random appearances of *"No Response from devices"* or red Receive LED are deemed acceptable as long as it is not too frequent and able to have response after the second trial.

When the **Refresh** button is clicked on, the software will seek updated values of various parameters like frequency, attenuation and alarm status. It performs the same function as *Auto Polling*.

2.3.12 Logout

Once the user has completed the setting changes, the user has to logout to return back to the status display screen.

2.3.13 Quitting the Program

To quit the M&C program, click *File* → *Exit* from the menu bar located at the top left corner of the screen.

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CHAPTER 3
REDUNDANCY MODE SOFTWARE INSTALLATION

3.1 Cable Connection and Pin Configurations

3.1.1 USB to RS485 Converter

Operation in redundancy system or connecting PC to more than one product, such as Booster with M&C option, RAV628 (Ku-SPT), RAV813 (C-SPT) etc., *RS485 connection should be used*.

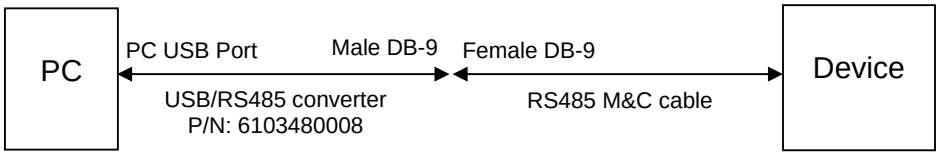

Figure 3-1: Connection between device & PC through USB/RS485 converter

3.1.2 RS485 M&C Cable

Table 3-1: Part Number for RS485 M&C cable in Figure 3-1

Product Type	RS-485 cable	Connectors on the end of RS485 cable
RCU/C-SPT	2502040669	8-pin female circular to female DB-9
ODUs	2502040699	8-pin male circular to female DB-9
IDUs	2502040680	Male DB-9 to female DB-9

The following tables list the pin signal assignment for each cable in Table 3-1.

3.1.2.1 RCU/C-SPT (P/N: 2502040669): 8-pin Female Circular to Female DB-9

No	Female Circular	Female DB-9	Signal description
1	Pin E	2	Data+
2	Pin F	1	Data-
3	Pin B	5	Ground

3.1.2.2 ODUs (P/N: 2502040699): 8-pin Male Circular to Female DB-9

No	Male Circular	Female DB-9	Signal description
1	Pin E	2	Data+
2	Pin F	1	Data-
3	Pin B	5	Ground

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3.1.2.3 IDUs (P/N: 2502040680): Male DB-9 to Female DB-9

No	Male DB-9	Female DB-9	Signal description
1	3	2	Data+
2	2	1	Data-
3	5	5	Ground

3.2 System Set-up

Firstly, connect up the standby outdoor unit (ODU) and Redundancy Control Unit (RCU) at the physical location according to Figure 3-2 and Figure 3-3. Set the ODUs to *Remote* mode on the front panel.

Use RS 485 cable to interface between the RCU unit and the PC terminal.

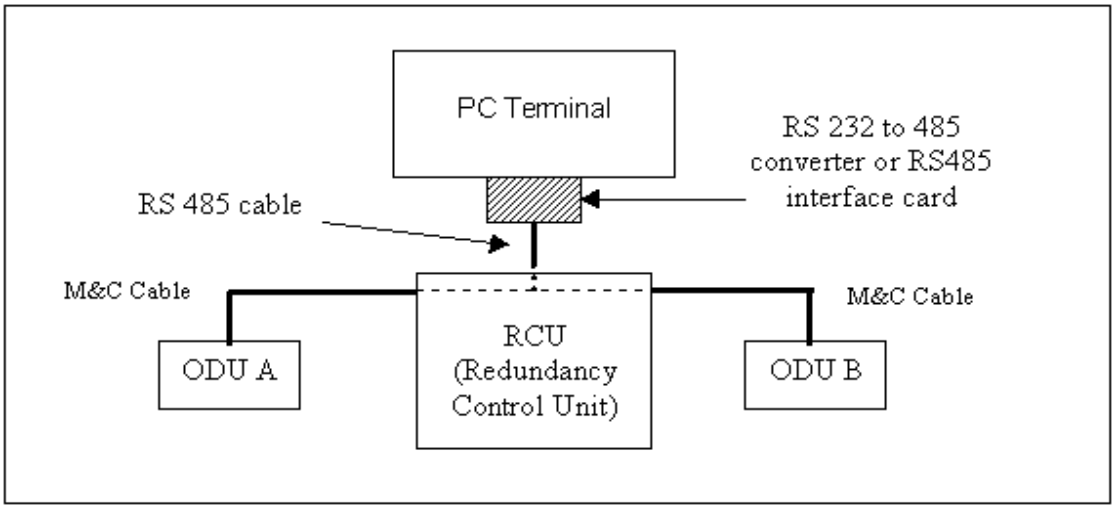

Figure 3-2: A Typical RCU Set-Up Block Diagram

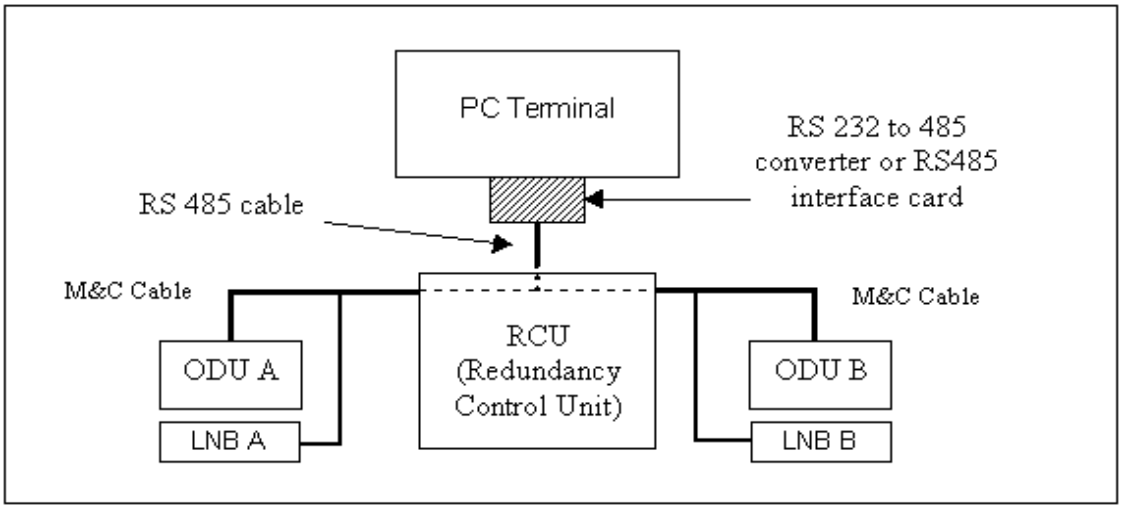

Figure 3-3: RCU Set-Up Block Diagram for LNB with M&C

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3.3 Activating Redundancy Option

To activate the redundancy feature, click the *Device* tab under the menu *Setup* → *Configuration*. Check the box *Redundancy System* and click *OK* (see Figure 3-4 and Figure 3-5). This option is available to all devices (Ku-SPT, C-PT, OHT, EC-SPT, X-SPT, Ku-BUC, C-BUC, AUC28 or FC-SPT) and is similar in operation. The *RCU* (Redundancy Control Unit) screen is shown in **Error! Reference source not found.**Figure 3-6 and 3-7.

Note: The Unit (Device) ID will be automatic selected by the program.

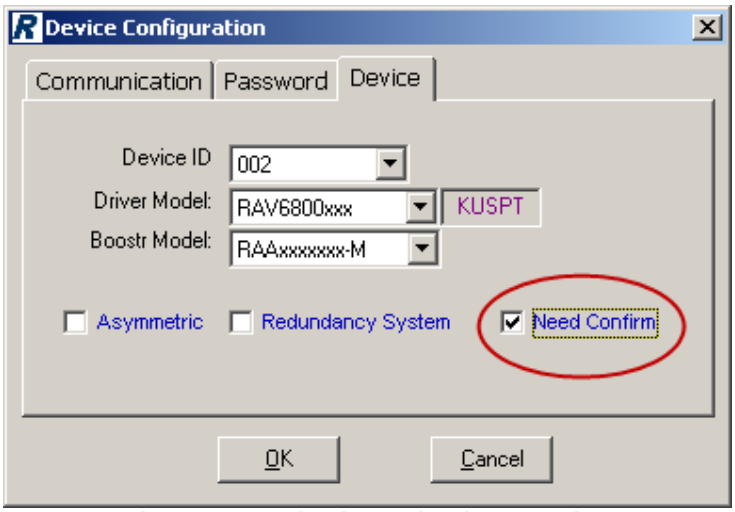

Figure 3-4: Selecting redundancy option

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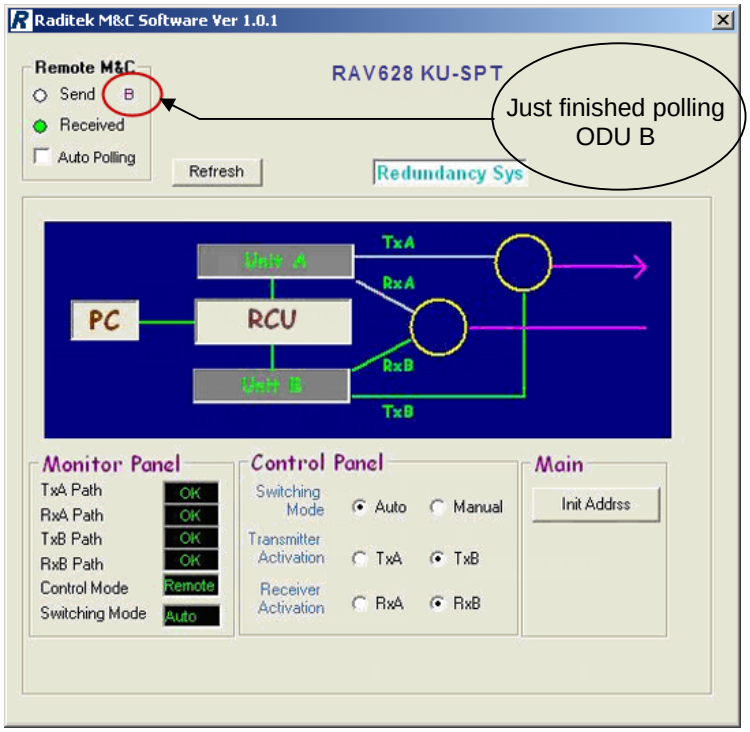

Figure 3-6: A Typical RCU Screen

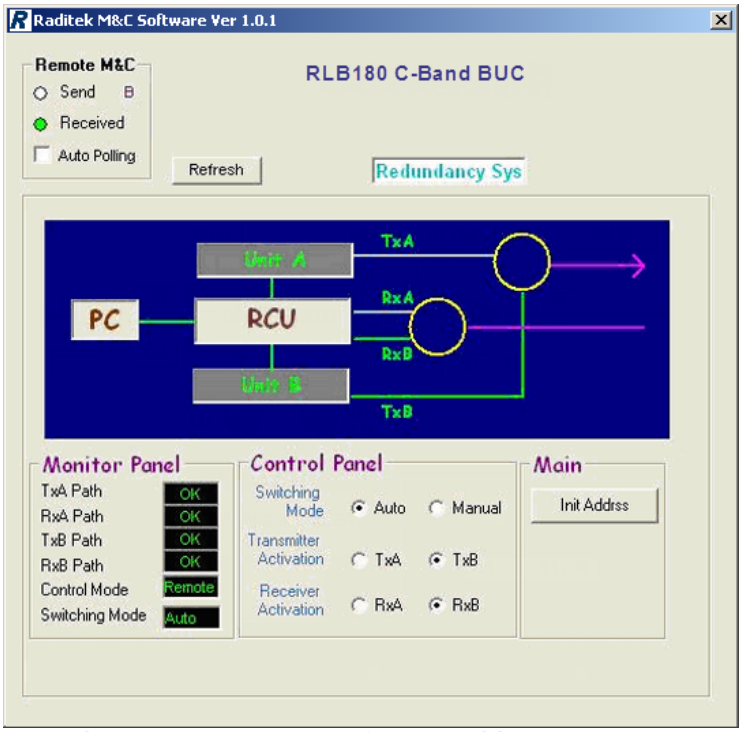

Figure 3-7: RCU Screen for LNB with M&C Feature

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3.4 Configuring the RCU Set-up

Initially, the Send LED & Receive LED will toggle between green and white. The word besides Send LED is indicating if it is polling *RCU ODU A* or *ODU B* (see Figure 3-7). This shows that the program is trying to establish link with the RCU. Once the link is established subsequently, the link will remain Green in colour.

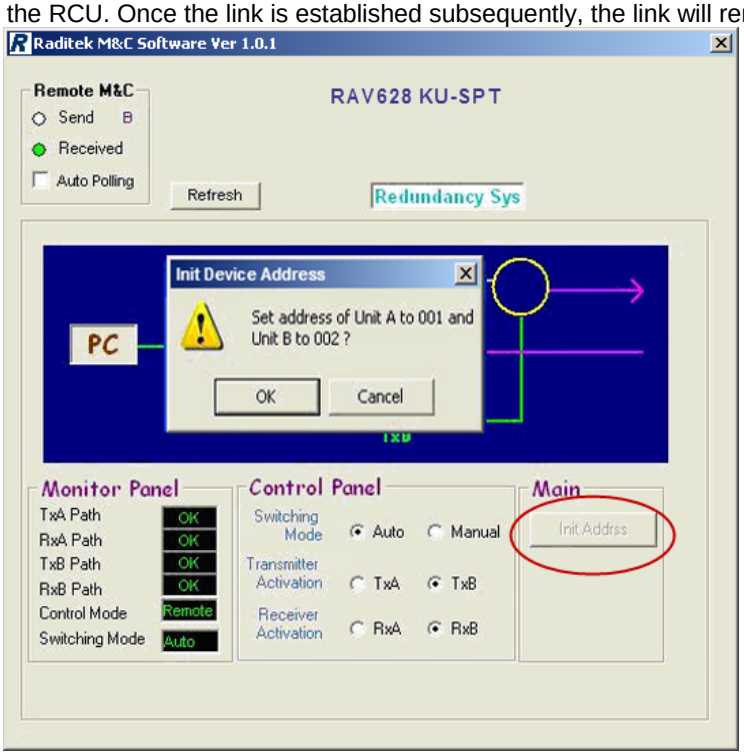

Figure 3-8: Initializing the address

3.5 Initializing Address (N/A for C-SPT)

NOTE: For C-SPT, the address of ODU A is *"A"* and ODU B is *"B"* and these must be set via the front panel of the ODU.

The following is for Ku-SPT, OHT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 & FC-SPT. This function will not be used for C-PT.

NOTE: For Ku-PT, OHT, EC-SPT, X-SPT, Ku-BUC, C-BUC, RUC28 & FC-SPT, the address of ODU A is *001* and ODU B is *002*, while booster with M&C option will be *801* and *802* respectively for redundancy program to function.

The method of the address-initialization done is by broadcasting a change of ID command. Every device connected to the RS485 bus (except for C-SPT and RCU) will change its address accordingly. Therefore, during the initialization, only the device desired to be have its ID changed (booster with M&C option, Ku-SPT, EC-SPT, etc.) should be connected to the RCU.

To initialize the addresses, click *Init Address* (see Figure 3-8). The RCU program will guide user through the process by instructing which device is to be connected to the RCU. At the end of address initialization, a message to connect all the devices back to the RCU will be prompted.

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3.6 Control and Monitor Panel

IMPORTANT!

At the 'Monitor Panel' located on the bottom left of the screen, if the 'Control Mode' status displays *Local*, go to the physical RCU unit (outdoor), open the front panel and set the dip switch to *Remote*. This will allow the PC terminal to have control of the system remotely.

The default switching mode is set to *Auto*. In *Auto* mode, the system will automatically switch over to the standby path once there is an alarm or fault detected. However, the user may wish to switch between the paths manually. To do so, click *Manual* at the *Switch* option under the control panel to activate manual operation.

3.6.1 Auto Switching Mode

In normal operation, Auto Mode should be chosen.

In Auto Mode, when any of the paths (transmit or receive) fails, the RCU will try to switch both paths to the stand-by unit. If one of the paths of the standby unit is faulty, it will try to switch the particular path back to the original path.

Example: If 'TxA' fail, it will switch both transmit and receive paths to 'TxB' and 'RxB'. If 'RxB' is already in failure or fail subsequently while 'TxA' still remains faulty, it will switch only 'RxB' to 'RxA'. The configuration then becomes 'TxB' and 'RxA' active.

3.6.2 Manual Switching Mode

IMPORTANT!

The RCU is only allowed to switch its transmit & receive path using M&C program if both transmit & receive switches are connected to the RCU & AC supply is applied to the RCU.

Change the switching mode to *Manual* by clicking *Manual* at the *Switch* option under the control panel to activate manual operation.

Click *'TxA'* and *'RxA'* at the control panel to set the active path to *A*. Both the 'TxA' and 'RxA' paths will turn green in colour. This indicates that both transmit and receive paths have been set to Path A. 'Tx B' and 'Rx B' lines will be grey in colour, indicating that they are on stand-by mode (see Figure 3-9).

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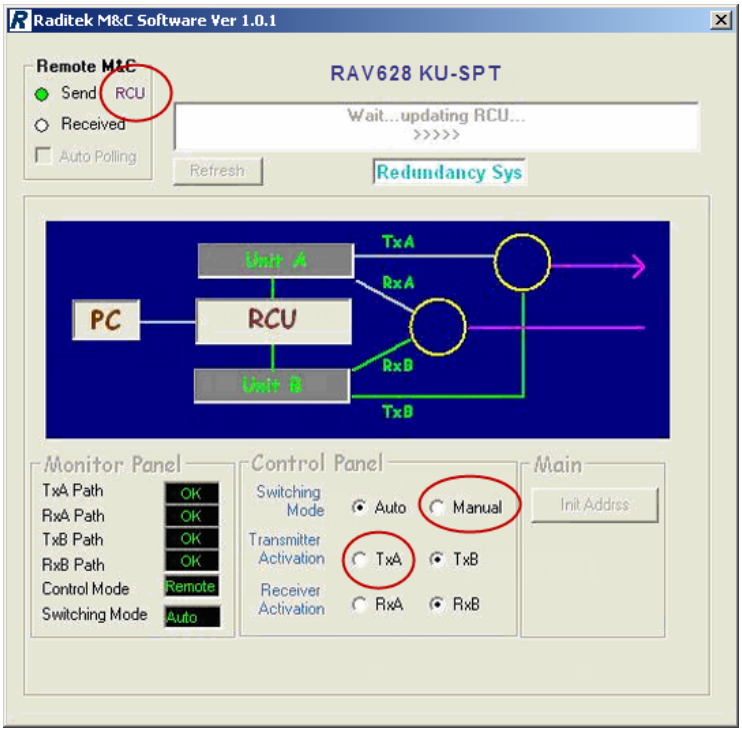

Figure 3-9: RCU mode configured

3.7 Connect, Refresh & Auto Polling

Upon start up of the redundancy option, the M&C program will attempt to establish communication with the RCU and both ODUs. If it is not able to communicate with the RCU, the monitor panel & control panel will remain disabled. Click *Connect* to retry establishing the link.

When the Refresh (see Figure 3-9) button is clicked, the software will seek updated alarm and line status. It has the same function as Auto Polling.

There is a checkbox at the top right hand corner of the screen to enable or disable *Auto Polling* (see Figure 3-9). Tick to enable the program to periodically ask for updated values of the various parameters.

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3.8 Configuring and Individual ODU in Redundancy Mode

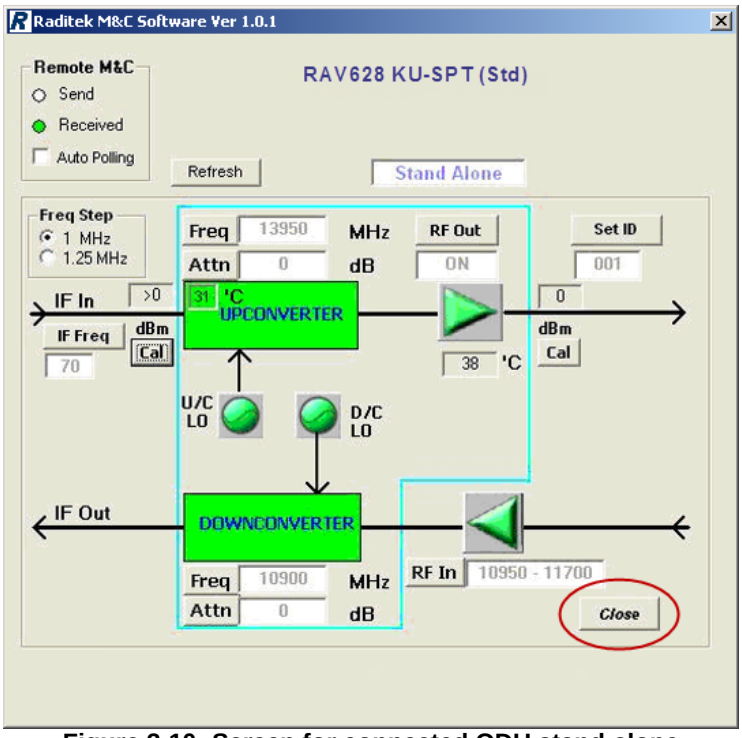

Figure 3-10: Screen for connected ODU stand-alone

At the main RCU screen, click on the block diagram of Unit A or Unit B to go into the stand-alone screen for individual ODU (see Figure 3-10).

At this screen, the user is able to configure any of the parameters as per stand-alone mode. To return to the main RCU screen, click *Close* at the bottom right of the screen.

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APPENDIX A –

QUICK SET-UP GUIDES

This guide is to provide you with the typical steps required to set up a system with referencing to different sections for detail. These steps assumed that you have set up a physical M&C link with the ODU and tested that it functions. Do remember to switch off transmit IF from modem until the whole system set-up is completed.

A.1 Stand Alone without Booster model RAAxxxxxxx (no M&C)

i) Login [Section 2.3.3].

ii) Click menu item *Setup* → *Configuration*, click *Communication* tab:

- Set to correct PC COM port & baud rate (9600) [Section 2.3.6].
- Click *Device* tab, select the correct Driver Model, Booster Model (*None* / *RAAxxxxxxx*) and use ID *000* (since only one unit with M&C being control, one can use global address directly) [Section 2.3.7].
- Make sure the *Redundancy* option is not ticked. Tick to select *Asymmetric* option if the driver model ends with "-A" [Section 2.3.8 and 2.3.9].
- Press *OK* to exit.

iii) Press *Refresh* / *Establishing* if the Send LED and Receive LED have stopped toggling. This is to set up link with the ODU and update the present device setting onto the screen [Section 2.3.11.15].

iv) Set SSPA off by selecting *RF Out* to *Off* [Section 2.3.11.4].

v) Set the device to the desired settings (frequency, attenuation, etc.) [Section 2.3.11: 2.3.11.1 ~ 2.3.11.11].

vi) Press *Refresh* to confirm all configurations are correct.

vii) Select *RF Out* to *On* to transmit.

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A.2 Stand Alone with Booster Model AAAxxxxxxx–M or AAAxxxxxxx–SM

i) Login [Section 2.3.3].

ii) Click menu item *Setup* → *Configuration*, click *Communication* tab:

- Set to correct PC COM port & Baud Rate (9600) [Section 2.3.6].
- Click *Device* tab, select the correct Driver Model and Booster Model (R*AAxxxxxxx-M* or R*AAxxxxxxx-SM*). At *Device ID* column, set to *000* if communicating with the system for the first time or unsure of the addresses of the transceiver and booster. This is to use global address *000* to communicate with all devices at one time before setting their ID [Section 2.3.7].

  Note: With this address set to *000*, there will be communication error, as both the transceiver and booster will try to reply to the broadcast command. Ignore the error and continue with the set up.

- Make sure the *Redundancy* option is not ticked. Tick to select *Asymmetric* option if the driver model ends with "-A" [Section 2.3.8 and 2.3.9].
- Press *OK* to exit.

iii) Tick to disable *Auto Polling* at *Auto Polling* option on the Main screen. This is to allow user time to set up the device address [Section 2.3.11.14].

iv) Press *Refresh* / *Establishing* if both the Send LED and Receive LED have stop toggling. The screen will show *No Response* or the Receiver LED will turn red. This is expected since the link between the devices has not been established with the M&C (auto scrolling of transceiver has not been terminated) and corruption of data due to the global address will cause all the devices to response simultaneously to the status polling. This step is to stop the transceiver from the auto-scrolling mode and lock to the correct interface (RS485) [Section 2.3.11.15].

v) Press *Set ID*, select *001* to set the transceiver to *001* and booster to *801* (the "8" is set by the program by default). Follow the instruction on the screen for the sequence of configuration [Section 2.3.11.3].

vi) Press *Refresh*. It should not have any *"No Response from devices!"* and the Receive LED should not remain red for more than 3 polls in 5 minutes of auto polling (by enabling the *Autopolling*).

Note: Some random appearances of *"No Response from devices"* or red Receive LED are deemed acceptable as long as it is not too frequent and able to have response after the second trial. This is due to the nature of multidrop operation in RS485 bus. Refer to sections 2.3.11.14 and 2.3.11.15.

vii) If the Receive LED remains red or the "*No Response*" message keeps appearing, check the M&C connection, pin configuration (especially for RS485 operation), interface card / RS232-485 converter. Go to menu Setup → Configuration, the *Device* tab, set the *Device ID* back to *000* and repeat step (v).

viii) Set SSPA off by selecting *RF Out* to *Off* [Section 2.3.11.4].

ix) Set the device to the desired settings (frequency, attenuation, etc.) [Sections 2.3.11: 2.3.11.1 ~ 2.3.11.11].

x) Press *Refresh* to confirm that all configurations are correct.

xi) Select *RF Out* to *On* to transmit.

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A.3 Redundancy with and without Booster

i) Login [Section 2.3.3].

ii) Click menu item *Setup* → *Configuration*, click *Communication* tab:

- Set to correct PC COM port (use RS485 option if RS485 converter or interface card is used) & baud rate (9600) [Section 2.3.6].
- Click *Device* tab, select the correct Driver Model and Booster Model (R*AAxxxxxxx-M* or R*AAxxxxxxx-SM*). At the *Device ID* column, set to *000* if communicating with the system for the first time or unsure of the addresses of the transceiver and booster. This is to use global address *000* to communicate with all devices at one time before setting their ID [Section 2.3.7].
- Tick to select the *Redundancy* option. Tick to select *Asymmetric* option if the driver model ends with "-A" [Section 2.3.8 and 2.3.9].
- Press *OK* to exit.

iii) Tick to disable *Auto Polling* at *Auto Polling* option on the Main screen. This is to allow user time to set up the device address [Section 2.3.11.14].

iv) Press *Refresh* / *Establishing* if *Send* & *Receive* LEDs have stop toggling. The screen will show "No Response" or Receiver LED turn red. This is expected since the link between the devices has not been established with the M&C (auto scrolling of transceiver has not been terminated) and corruption of data due to the global address would cause all the devices to response simultaneously to the status polling. This step is to stop the transceiver from the auto-scrolling mode and lock to the correct interface (RS485) [Section 2.3.11.15]. Repeat once just to ensure the auto scrolling of all devices are terminated.

v) Press *Init Address*, and follow the instructions from the screen. Follow the instructions on the screen for the sequence of connecting the transceiver and booster to the computer. This will set Unit A's transceiver to *001* and booster to *801* (the "8" is set by the program by default) while Unit B's transceiver to *002* and booster to *802*. For C-SPT, the address is *A* & *B* for transceivers rather than *001* and *002*. [Section 3.5].

vi) Press *Refresh*. It should not have any *"No Response from devices!"* or Receive LED red for more than 2 polls in 5 minutes of auto polling (by enabling the *Auto Polling*).

Note: Some random appearances of *"No Response from devices"* or red Receive LED are deemed acceptable as long as it is not too frequent and able to have response after the second trial. Refer to Section 2.3.11.15.

vii) Notice the indicator next to the Receive LED. It shows which unit it is polling (A, B or RCU) [3.3]. If the Receive LED remains red or the "No Response" message keep appearing, check the M&C connection, pin configuration (especially for RS485 operation), interface card / RS232-485 converter. Go to *Admin* → *Configure* → *Unit ID*, set the *Unit ID* back to *000* and repeat step (v).

viii) Enter individual unit by clicking on the Unit label [Section 3.8].

ix) Set SSPA off by pressing *RF Out* and select *Off* [Section 2.3.11.4].

x) Set the device to the desired settings (frequency, attenuation, etc.) [Section 2.3.11: 2.3.11.1 ~2.3.11.11].

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xi) Press *Refresh* to confirm all configurations are correct.

xii) Press *RF Out* to *On* to transmit.

xiii) Press *Close* to exit from the ODU menu back to the RCU screen. Repeat the same steps from (viii) to (xii) for the second unit.

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