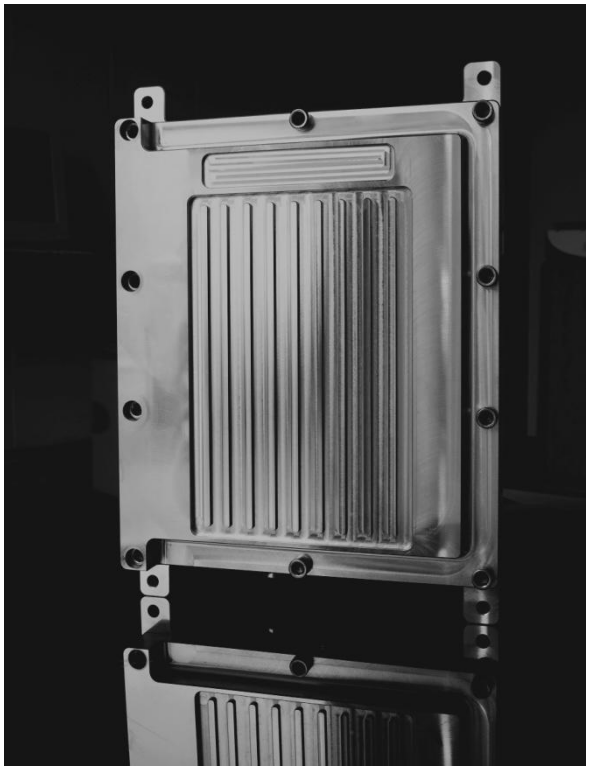
Telcosat Inc

OPERATION & MAINTENANCE MANUAL
CELLULAR CDMA/GSM/WCDMA
REPEATER MODEL RBB 850



**Any modifications to this device will void FCC and IC approvals.**

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Telcosat Inc

OPERATIONS & MAINTENANCE MANUAL
CELLULAR REPEATER MODEL RBB 850

TELCOSAT RBB 850

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**Any modifications to this device will void FCC and IC approvals.**

A Canadian Company
Telcosat Inc.
116, 1919 – 27th Ave NE,
Calgary, Alberta, Canada. T2E 7E4
TEL (403) 291-4031
FAX (403) 291-3059

# SAFETY SUMMARY

High voltage is used in the operation of this equipment. Death on contact may result if personnel fail to observe the following safety precautions:

Only qualified trained personnel can install this equipment. Electrical connection and installation must meet your local Electrical Safety Installation codes.

Prior to any maintenance or inspection of this device disconnect the power supply.

Do not remove covers or access plates on the equipment unless you are a trained technician and authorized to carry adjustment and maintenance for this apparatus.

When installing antennas always be aware of high voltage overhead power lines. Contact with power lines will result in severe injury and or death.

To prevent electrical shock or damage to the equipment, do not operate the repeater until you thoroughly understand the operation and function of all controls, indicators, and connectors.

The RBB850 Repeater weighs approximately 25 lbs/ 12 kilograms. The repeater must be attached to the appropriate supporting device using nuts, bolts and lock washers. Material grade, must be a minimum Grade 5, 5/16th" (6mm) diameter and corrosion resistant.

# FIRST AID

## In case of electrical shock:

THIS PERSON COULD STILL BE IN CONTACT WITH ELECTRICAL POWER. DO NOT TOUCH THIS PERSON BEFORE YOU INSULATE YOUR SELF FROM THE ELECTRICAL SOURCE.

Turn off the electrical power.

If you cannot turn off the electrical power, pull, push, or lift the person to safety using a dry wooden pole, a dry rope, or some other insulating material. Do not use any metallic objects to move this person.

After the injured person is no longer in contact with the electrical source, obtain/perform immediate medical attention.

# TABLE OF CONTENTS

**LIST OF FIGURES**



**LIST OF TABLES**

# CHAPTER 1

## SCOPE

### 1.1 GENERAL

The TELCOSAT RBB 850 Cellular Repeater (consisting of UPLINK and DOWNLINK bidirectional system) contains operational and maintenance information.

- Chapter 1 outlines the manual contents, with description and general application notes
- Chapter 2 contains an operational and product overview.
- Chapter 3 contains of antennas, antenna isolation, installation tools.
- Chapter 4 contains information on the software GUI, connecting to a network, configuring the software and configuring the RBB850 repeater.
- Chapter 5 contains warranty information
- Appendix A contains FCC/IC RF Exposure Requirements and RBB850 repeater specifications.
- Appendix B contains the return goods procedure.

### 1.2 INTRODUCTION

The TELCOSAT RBB 850 is a bidirectional amplifier system consisting of UPLINK and DOWNLINK amplifiers.

When conventional cellular communication systems cannot penetrate a structure, or reach a target area, such as inside buildings, parking structures, tunnels and remote areas, other methods and or equipment are required.

To overcome coverage issues cellular repeaters can be deployed. Repeaters manufactured by Telcosat, Model RBB850 will alleviate many of these coverage issues.

The Telcosat RBB850 repeater has full remote control, monitoring and alarm feature, accessible over the Internet or IP network. The RBB850 has an internal web interface and a user friendly GUI software interface.

The GUI interface (Graphical User Interface) controls all functions of the repeater.

The RBB850 repeater also comes with digital power control and oscillation detection and control.

**1.2.1**

**Materials**

The RBB 850 Repeater is enclosed in a weather proof enclosure. System comes with instruction manual and attached power cord.

**Fig. 1-1**

**Typical TELCOSAT INC remote location Site System**

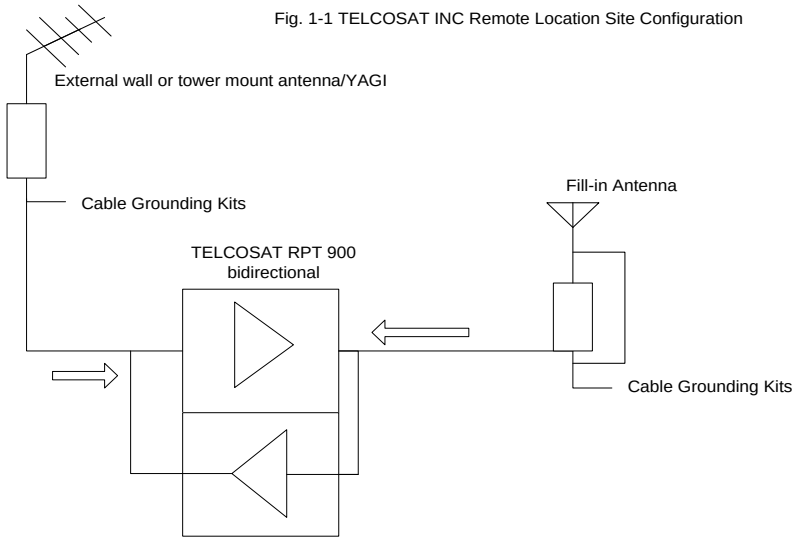



Fig. 1-1

## 1.3 RBB 850 SPECIFICATIONS

Appendix A contains the TELCOSAT RBB 850 Repeater Specifications.

## 1.4 TECHNICAL ASSISTANCE

Technical assistance on the TELCOSAT RBB 850 Repeater is available through:

TELCOSAT Customer Service Center,
Phone: 1-403-291-4031.
Fax: 1-403-291-3059

EMAIL: inquiries@telcosat.com

# CHAPTER 2

## OPERATIONAL OVERVIEW

### 2.1 GENERAL

The TELCOSAT RBB 850 provides service at cellular radio frequencies 824/849MHz & 869/894MHz.

Downlink RF signals from a donor cell site are routed through a pick-up antenna, through a Diplexer then continues to be process by the amplifier chain. The RF signal is amplified and filtered to reject out-of-band IM products and unwanted radio signals. The downlink RF is injected into a fill-in antenna (coverage antenna) for null-area coverage.

The Up-link signals from mobile units are received into the coverage antenna of the repeater. The incoming signal then passes through a Diplexer, then amplified in the Up-link modules and finally the power amplifier. The Up-link process is the same as the Down-Link process.

### 2.2 OSCILLATION DETECTION

The RBB 850 has an oscillation detection function. Upon detection of oscillation the repeater will shut down for a short duration, approximately 25 seconds. After 25 seconds the repeater will restart, reduce the RF gain and determine if the repeater is stable. The repeater will continue this process until the oscillations is eliminated. If oscillation cannot be eliminated the repeater will activate the disable mode and will cease to transmit.

The repeater requires a power cycle to reset the auto oscillation detection process, or alternatively the repeater can be reactivated via the GUI web interface.

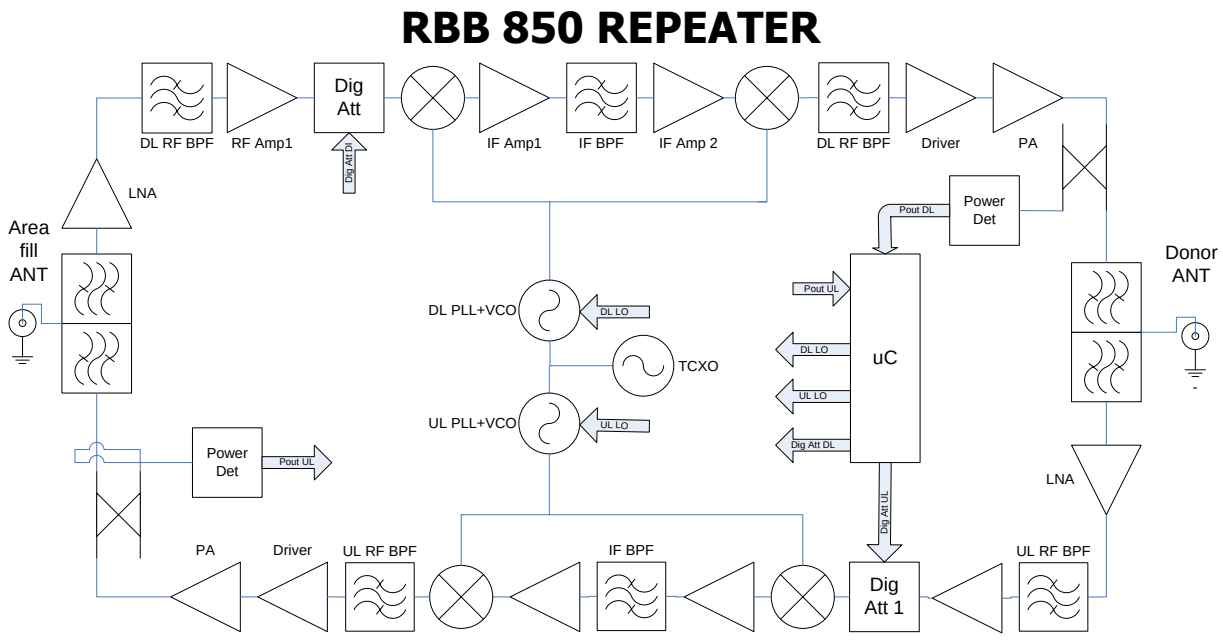



Figure 2-1 illustrated a simplified block diagram of the RBB 850 Cellular Repeater.

### 2.3 AC POWER DISTRIBUTION

**AC** input power via a power cord which feeds a power supply that converts the AC to DC low voltage. The DC power provides all the necessary requirements for the active components.

The repeater is equipped with a red LED power on light.

Power Supply Specifications,

-40c° to +50c° Operating Temperature Range
Short circuit, over power and over voltage protection
Input Power, 100-240 VAC
47/63 Hertz
Output Power, 12VDC/5AMPS
Approvals, UL, CUL, CE

# CHAPTER 3

## INSTALLATION

## READ THESE INSTRUCTIONS PRIOR TO INSTALLATION

## 3.1 WARNING

**Cellular Repeaters should be installed by fully trained technicians. Improper installation and excessive RF power levels can cause interference with the operation of cellular towers.**

**Antennas must be mounted in a secure safe manner and according to safe working practices.**

**To protect your equipment, lightning protection hardware is recommended when installing a cellular repeater unit.**

**Antennas must not be installed near overhead electrical power lines as this can cause serious injury and or death.**

**If you require any additional installation guidelines then please consult your supplier or consult with an RF Systems Engineer.**

### 3.2 TOOLS REQUIRED

Spectrum analyzer with a tracking generator, frequency ranges 1 Gigahertz.
Optional Signal Generator for onsite testing of the repeater, frequency range of 1 Gigahertz minimum.
Antenna analyzer.
Computer with all necessary cables.
Multi-meter.
Hand tools.
Water proofing tape.
Coax cable straps for support.
Cellular Phone.

### 3.3 ANTENNA REQUIREMENTS

**ANTENNAS: please read your manufacturers antenna specifications before installation. Your antenna will require a type "N" connection. The antenna, coax, and fittings must be 50 ohms impedance.**

The cellular repeater requires antennas that operate in the desired frequency range of the cellular repeater. The RBB850 Repeater has a frequency operating range of 824 to 849 Megahertz for the up-link, and 869 to894 Megahertz for the downlink. Your antennas must operate within these frequencies. Failure to select the proper antennas will degrade the performance of your repeater.
**NOTE:**
"UP-LINK" is the radio link from your hand held cellular phone to the cellular tower in the frequency range of 824/ 849 Megahertz
"DOWN-LINK" is the radio link from the cellular tower to your cellular phone in the frequency range of 869 /894 Megahertz.

### 3.4 ANTENNA ISOLATION & COAX CABLES

All repeaters require antenna isolation to prevent oscillation. The usable gain level of your repeater is directly linked to the antenna isolation values. The maximum gain of your repeater must be adjusted to a minimum of 10 dB lower than your antenna isolation values. For example, if your antenna isolation value is 75dB then your maximum usable repeater gain is 65dB.

Due to the variations of system layouts and requirements it is not possible to have one procedure that will suffice every installation. You are strongly advised to acquire the services of an RF system designer to calculate your antenna isolation requirements.

Ensure that your antennas are at the maximum possible distance apart. Do not place antennas in close proximity to each other; otherwise you will activate the oscillation detection process.
Coax cables should be low loss 50 ohm, and suitable for 800 Mhz band frequency.
Antenna connections should be clean and moisture free. Do not spray lubricant into the connectors as this prevents the signal traveling through the coax. Use a cleaning solvent that has no oil and does not leave any residue. High quality oil-less contact cleaner is suitable.

All coax connectors must be water tight and wrapped with water proof tape. Any moisture in the connectors will degrade or eliminate the signals.

**ANTENNA CONNECTIONS ON THE RBB850**


Connect the antenna that is aimed at the Cell Tower to the bottom left side N connector.

Connect the antenna that is aimed towards the Area Fill (target site) to the bottom right side N connector.

Connect your Ethernet cable to the connector socket located on the left side of the power on LED light.

NOTE; If you require a water proof boot cover for the Ethernet connection contact your Repeater supplier.

# CHAPTER 4

**CONNECTING THE RBB850 REPEATER TO A COMPUTER OR NETWORK**

**4.1** The default IP address of the Repeater
IP 192.168.1.100
NETWORK MASK
255.255.255.0

To connect your computer to the repeater you need to configure your network card in your computer to the following IP

IP 192.168.1.99
NETWORK MASK
255.255.255.0

Start your Internet Browser, for example Windows Internet Explorer.
In the browser address bar type in, http://192.168.1.100

## REPEATER LOGIN SCREEN

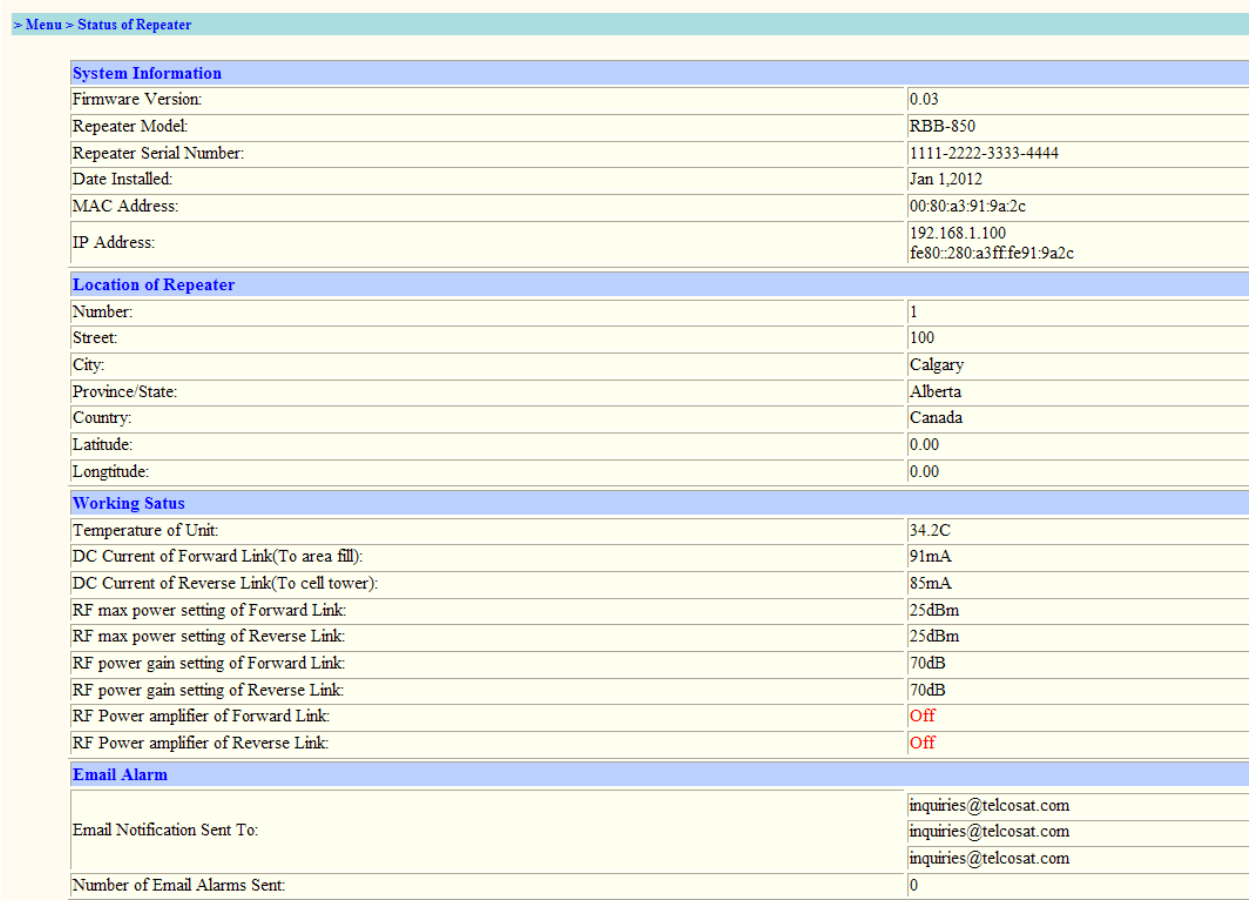
**4.2** The Repeater log in page should appear. See image below.


REPEATER LOGIN PAGE

The default log in password for the Administration is "**telcosat**"
The default log in password for the Monitoring password is "**telcosat**"
You can change the password in the System Setup Screen.
The repeater will allow two levels of password.
The Monitor Password only allows the user to view the details and cannot make any adjustments.
The Administrator Password allows the user to make all adjustments to the repeater and also change password settings.

# REPEATER STATUS PAGE

## 4. 3



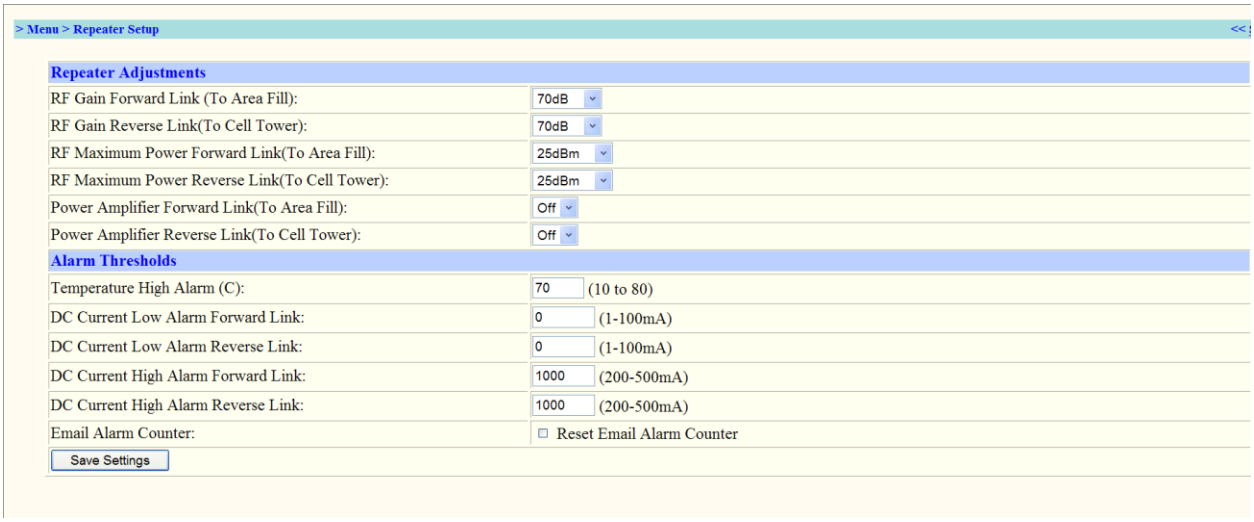
> Menu > Status of Repeater

| System Information | |
|---|---|
| Firmware Version: | 0.03 |
| Repeater Model: | RBB-850 |
| Repeater Serial Number: | 1111-2222-3333-4444 |
| Date Installed: | Jan 1,2012 |
| MAC Address: | 00:80:a3:91:9a:2c |
| IP Address: | 192.168.1.100<br>fe80::280:a3ff:fe91:9a2c |
| **Location of Repeater** | |
| Number: | 1 |
| Street: | 100 |
| City: | Calgary |
| Province/State: | Alberta |
| Country: | Canada |
| Latitude: | 0.00 |
| Longtitude: | 0.00 |
| **Working Satus** | |
| Temperature of Unit: | 34.2C |
| DC Current of Forward Link(To area fill): | 91mA |
| DC Current of Reverse Link(To cell tower): | 85mA |
| RF max power setting of Forward Link: | 25dBm |
| RF max power setting of Reverse Link: | 25dBm |
| RF power gain setting of Forward Link: | 70dB |
| RF power gain setting of Reverse Link: | 70dB |
| RF Power amplifier of Forward Link: | Off |
| RF Power amplifier of Reverse Link: | Off |
| **Email Alarm** | |
| Email Notification Sent To: | inquiries@telcosat.com<br>inquiries@telcosat.com<br>inquiries@telcosat.com |
| Number of Email Alarms Sent: | 0 |

The “Status Page” is a summary of current settings of the repeater. This page is only a status page. No repeater adjustments can be performed from this screen.
When the repeater is remotely accessed using the Monitoring Mode, this page is displayed.

# REPEATER SET UP PAGE

## 4.4




The Repeater Set-up Page is where all adjustments/settings are performed. Enter the required setting in the box and then click the “Save Settings” box. You can verify the setting by reviewing the “Status Page”

## 4.5 ALARM THRESHOLDS

Alarm thresholds will send an email alerting that the number in the threshold boxes have be reached. For example, the Temperature high alarm box is set to 70c°. If the temperature of the repeater reaches 70c° an email alert will be sent from the repeater.

**Setting the Alarm Thresholds**

Power up the repeater, allow the unit to warm up to operating temperature, log in and go to the **Repeater “Status Screen”. Look for the Repeater Status Screen, then look for Working Status Box on the** same page.

**DC current of the Forward Link and the DC current of the Reverse Link.**

## 4.6 High Current Alarm Settings

Using the data from the manual for this example only, REPEATER STATUS PAGE,

Displayed is DC current Forward Link 91mA
Displayed is DC current Reverse Link 85mA.
This is the normal operating current from your repeater and should be used as a guide line for Alarm Threshold.

Add another 5mA to each value, 91+5= 96mA Forward Link
85+5=90mA Reverse Link
The new values can be inserted into the Threshold Alarm settings
DC current High alarm Forward Link set to 96mA
DC current High alarm Reverse Link set to 90mA

In the event that the current reaches this alarm setting, an email will be sent, sudden high current could indicate a possible problem.

## 4.7 Low Current Alarm Settings

Using the same data set from the Status Page.

For low current alarm threshold we need to be less than the normal operating current. For low current settings minus 5mA from the operating current.
Minus 5mA to each value, 91-5= 86mA Forward Link
85-5=80mA Reverse Link

DC current low alarm Forward Link set to 86mA
DC current low alarm Reverse Link set to 80mA
In the event that the current reaches this alarm setting, an email will be sent.

Sudden low current could indicate a possible problem or failure.

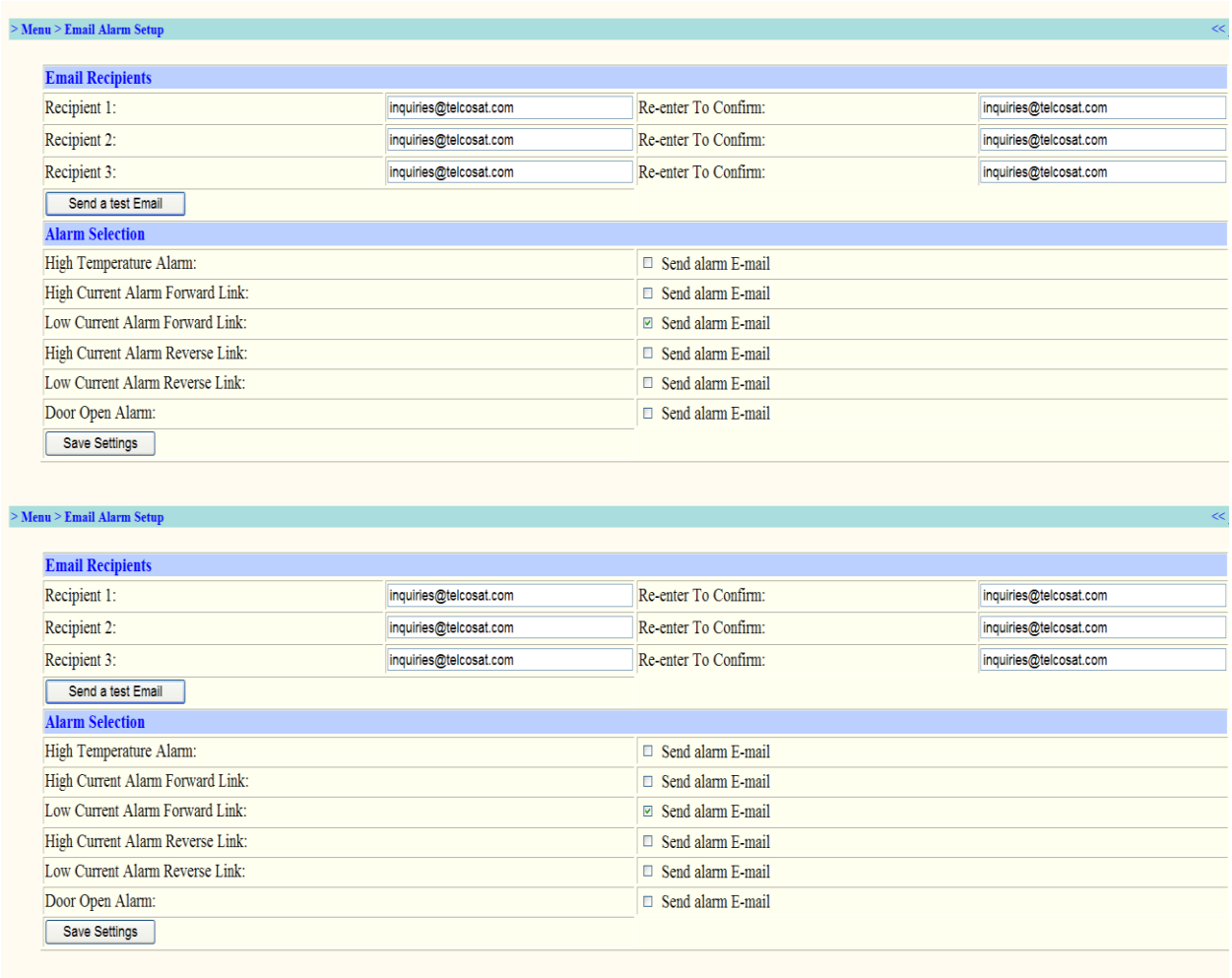
## 4.8 EMAIL ALARM COUNTER.

The email alarm counter records the number of times and email was sent. You can reset the counter to zero by clicking the Reset Alarm Counter Box.

# ALARM SET-UP PAGE

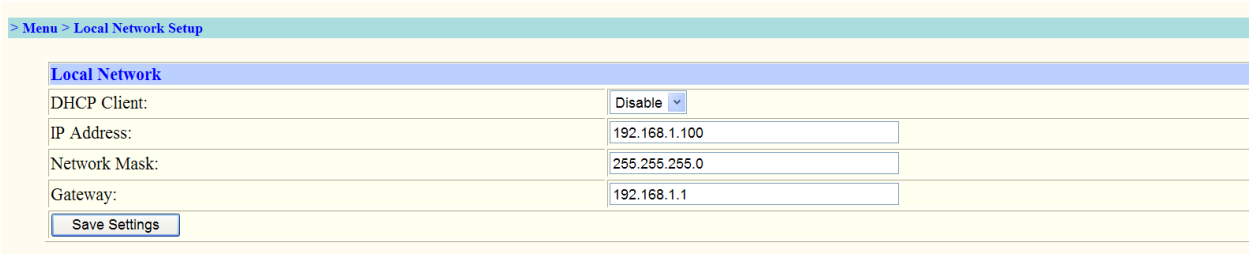
## 4.9

This page allows the user to configure the email settings for the alarm recipient.
This page allows the user to enable or disable the Send Alarm Email.
After entering the information the user must click the Saves Settings box.



# LOCAL NETWORK SETUP

## 4.10

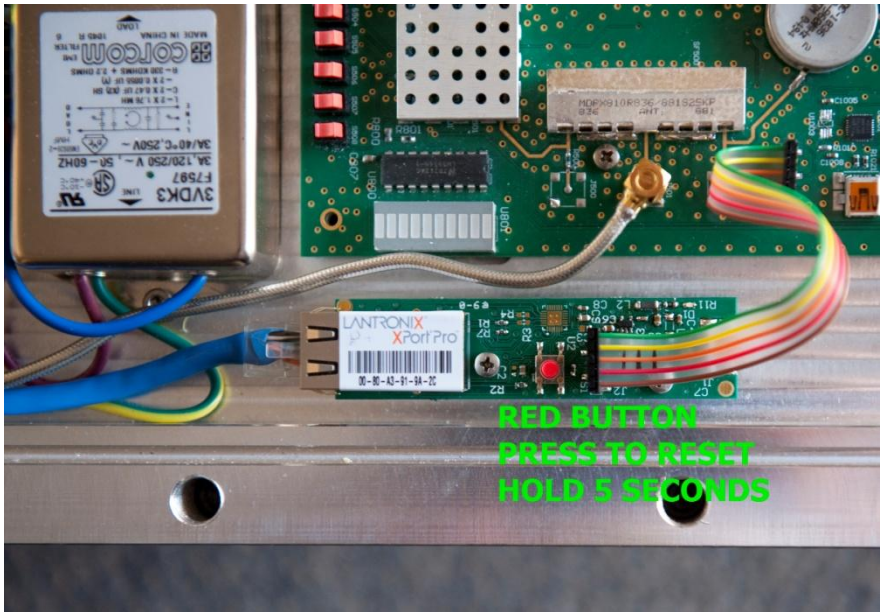



The local network set-up screen allows the user to modify the network setup.
Enter the new information into each box and click the Save Settings box.
Verify the settings in the System Status page.
The user must record the network settings for future reference and access requirements.

## 4.11 RESETTING THE IP/NETWORK MASK DEFAULT

In the even the IP/Network information is not available then a manual reset has to be performed on the repeater.
Remove the 10 Allen Head type bolts, use an 8 mm Hex Key wrench.
There is a small push button, press and hold for 5 seconds.
The default IP will be reset to 192.168.1.100
The default Network Mask will be reset to 255.255.255.0

See attached image to locate the RESET BUTTON.



## 4.12 PASSWORD SETUP AND REPEATER LOCATION SCREEN

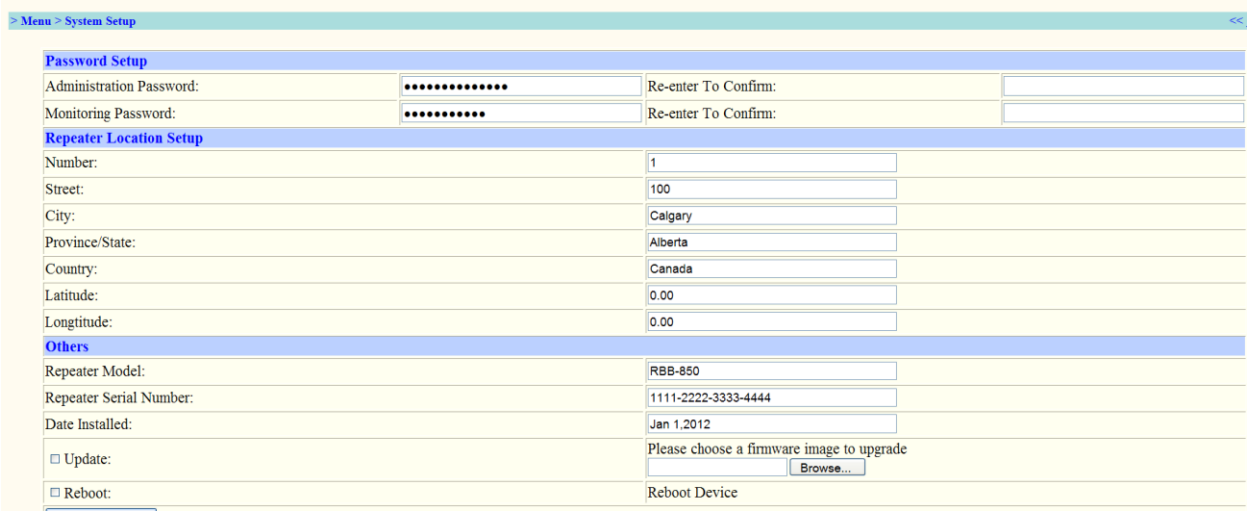
**Administration Password**
Type in your new password in the Administration box. You will be required to retype your password to ensure accuracy. It is recommended that you use minimum of 12 characters, letter number mix for security. Click the Save Settings button.
The Administration screen allows the user to access all settings and make changes.
Your Administration password should be different from your Monitoring Password.

**Monitoring Password**
Type in your new password in the Monitoring box. Retype your password to ensure accuracy. Click the Save Settings button.
The Monitoring screen does not allow the user to make any changes. The user can only view the data.

# System Setup Screen

## 4.13 Repeater Location Setup Screen.

The repeater location box allows the user to insert the address and or location of the repeater. The location Latitude and Longitude are in Degrees Decimal. After entering data Click the Save Settings box.



# ADJUSTING UP-LINK TRANSMIT POWER TO CELLULAR TOWER

## 4.14 Adjusting RF Transmit Levels

After installing your repeater system you will need adjust the RF transmit levels for the Forward Link and the Reverse Link.

Power up the repeater, log into the GUI interface. Go to the Repeater Set up Page. Adjust the gain to zero on the Forward Link Gain and the Reverse Link Gain. Click the save settings button.

Start increasing the gain on the Forward Link 5 dB increments. Click the save settings button. View your cell phone and look for an increase in the bars (signal strength) or use a Spectrum Analyzer with attached antenna.

Continue to increase the Forward Link gain at 5dB increments until to see a suitable increase in signal strength. Note, it is not necessary to have maximum bars, 3 to 4 bars is adequate. For in-building coverage to much signal will cause the building to leak out excessive RF and cause possible interference.

The next step is to adjust the RF power going back to the cell tower. (Reverse Link Gain)
Using your cell phone, initiate a call. If the call does not connect then increase the Reverse Link Gain 2dB, then click the save settings buttons.

Every time you increase the Reverse Link Gain use your cell phone and try to make a call. Repeat the process, increase the Reverse Link Gain 2dB increments, Click the save settings button.

Eventually you will be able to make a cellular call with quick connection time. At this point increase the Reverse Link Gain by an additional 2dB then your system should be configured to work correctly.

## 4.15 Setting the Maximum RF Power Level for the Reverse Link.

It is very important not to have too much reverse link RF power to the cell tower. Excessive RF power towards the cell tower will cause interference and non-functionality to the wireless network.

Adjusting the repeater reverse link correctly will prevent cell tower interference. This process is explained in the **Setting RF Transmit Levels.**

**ADJUSTING REVERSE LINK MAXIMUM POWER LEVEL.**
Additional protection is gained if the reverse link maximum power level is adjusted to prevent the possibility of sudden unwanted high input RF levels. This can happen in various ways, mobile cellular vehicle boosters coming within range of the cellular repeaters, malfunctioning cellular phones, or other stray signals.

The RBB850 has an adjustable Maximum allowable RF Power limit. The maximum allowable RF power limit is 25dBm. The digitally controlled attenuator will not permit RF signal levels greater than 25dBm.

The user can decrease the maximum allowable RF transmit power from 25dBm to 0.0dBm. The microprocessor controlled digital attenuator will maintain the preset allowable RF transmit power limit regardless of unwanted high input signal levels.

Decreasing the level of maximum RF reverse link power helps to reduce possible cellular tower interference for sudden elevated RF power, especially when the RBB850 repeater is installed in areas where the cellular towers are less than 5 kilometres (2 miles) distance.

Under normal operations and when the cell tower is less than 2 miles away the user can reduce the Reverse Link Maximum power to +10dB to +15dB when connected to a 10dB to 14dB Donor antenna.

# CHAPTER 5

## WARRANTY AND REPAIR

### 5.1 WARRANTY

Your Telcosat Repeater is guaranteed against manufacturers defects for 2 years.
Telcosat Inc retains the right to decide if the fault/defect is a manufacturer's defect.
Telcosat Inc will not accept liability for any damage caused through improper use or poor installation practices.

### 5.2 Limited Warranty

**Hardware**. Telcosat Inc or any subsidiary selling the Product (RBB850 Cellular Repeater) warrants that commencing from the date of shipment for a period of 2 years factory warranty against manufactures defect. Warranty includes parts and labour only.
Note, freight is not included in the warranty. Shipper is liable for all freight costs.
Telcosat Inc reserves the right to determine if repair claims are Warranty, or damage caused by some other reason, for example and not limiting to, lightning strikes etc,.

EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, SATISFACTORY QUALITY, NON-INTERFERENCE, ACCURACY OF INFORMATIONAL CONTENT, OR ARISING FROM A COURSE OF DEALING, LAW, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE EXTENT ALLOWED BY APPLICABLE LAW AND ARE EXPRESSLY DISCLAIMED BY TELCOSAT INC, ITS SUPPLIERS AND LICENSORS. TO THE EXTENT AN IMPLIED WARRANTY CANNOT BE EXCLUDED, SUCH WARRANTY IS LIMITED IN DURATION TO THE EXPRESS WARRANTY PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS; THE ABOVE LIMITATION MAY NOT APPLY. THIS WARRANTY GIVES CUSTOMER SPECIFIC LEGAL RIGHTS, AND CUSTOMER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO **JURISDICTION.** This disclaimer and exclusion shall apply even if the express warranty set forth above fails of its essential purpose.

**Restrictions.** This warranty does not apply if the Product or any other equipment upon which the Product is authorized to be used (a) has been altered, except by Telcosat Inc, (b) has not been installed,

operated, repaired, or maintained in accordance with instructions supplied by Telcosat Inc, (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, accidents forces of nature, earthquakes, lightning strikes, vandalism, and civil unrest.

### 5.3 Storage of Equipment

When storing your equipment you must place the unit in a dry location, away from direct sun exposure and take measures to prevent moisture/condensation build up in your repeater enclosure.

Silica Gel bags should be placed inside the enclosure to absorb moisture. The door on the enclosure should be closed and sealed.The silica gel bags should be changed /inspected at regular intervals to ensure proper functionality of the material.

You are strongly advised to seek the advice of a professional company that has expertise in long term preservation techniques of electronic equipment.
Maximum storage temperatures of your Telcosat Repeater is +50c (122F)
Minimum storage temperature of your Telcosat Repeater is -40c (-40F)

Appendix A

**Specifications for Telcosat Repeater Model RBB850**

| | |
|---|---|
| Frequency Range: | Down link 824-849MHz / Up-link 869-894MHz |
| Overall systems Gain | 70dB |
| Band Width | 25 Megahertz |
| RF Composite Power | +25dBm |
| Noise Level | < Less than 5dB |
| RFGain Adjustment | 31.5 dB with 0.5dB increments via software |
| Antenna Connector | N type Female 50 ohms |
| EVM | <less than 3% |
| Ethernet Connector | RJ45 |
| Power Requirements | 110/240 VAC 47/63 Hertz |
| Power Consumptions | 20 Watts |
| Enclosure Rating | IP67 |
| Enclosure Material | Aluminium |
| EMC | EMC Compliant |
| Operating Temperature | -40°c to +50°c |
| Storage Temperature | -40°c to +70°c |
| Weight | 25 lbs (11.4 Kilograms) |
| Dimensions | H x W x D 16.5”ins x 12”ins x 3inches<br>(470mm x 305mm x 76mm) |
| Warranty | Two years |
| FCC and Industry Canada | Certified FCC and Industry Canada |

Appendix A

NOTE RULE: RSS-133 section 5.3

The manufacturers rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5dB, especially where the out-put signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the out-put device

## FCC/IC RF Exposure Requirements

**FCC antenna(s) used for this transmitter must be installed to provide a separation distance of at least 51.61 centimetres (cm) (20.32 inches) from all persons, and must not be co-located or operating in conjunction with any other antenna or transmitter.**

## Any modifications to this device will void FCC and IC approvals

APPENDIX B
RETURNED GOODS PROCEDURE

B1. Technical Information

Contact Telcosat Inc or your supplier to determine whether or not an item should be returned for repair.
Contact Telcosat Inc 403 291 4031
Email, inquiries@telcosat.com

B2. Return Identification

Please provide the following information with each repair.

Date of requested repairs.
Customer name with full address for returning goods
Contact person responsible for returning the product for repairs
Client telephone number
Serial number
Original purchase date
Reason for return.

B3. Shipping Procedure

Ship all returned goods PREPAID to the following address:

Product Repairs,
Telcosat Inc,
Bay 116 1919 – 27th Avenue NE,
Calgary, Alberta,
Canada. T2E 7E4
Telephone 403 291 4031
Fax 403 291 3059
Email:inquiries@telcosat.com

Your commercial invoice must state REPAIR/RETURN. Failure to provide proper Commercial Invoices may result in taxes and duties which will be charged back to the client.

B4. Return Shipments

All returned shipments will be sent PREPAID, to the customer's indicated address.
Any extra packaging material will be charged back to the client.

B5. Repair / Return Status

Under normal circumstances defective items will be replaced repaired within 5 working business days of receipt.
Telcosat Inc will inspect and test your repeater in a lab environment. Upon completion of the inspection a written estimate will be provided to the client. A minimum charge of $500.00 will be charged to the client to cover the cost of inspection and testing plus minor repairs.