Model 3434 BTR-L
L-Band Beacon
Tracking Receiver
Version 4P01
Firmware
Instruction Manual
REV B 5/2021

Model 3434 BTR-L
L-Band Beacon Tracking Receiver

A tracking receiver for antenna step tracking or automatic uplink power control

1. Functional Description

a. Radeus Labs Model 3434BTR-L is a fully agile satellite tracking receiver designed to provide a linear DC reference voltage proportional to the received signal level of a satellite beacon or other SCPC carrier. The 3434BTR-L has a pre-detection bandwidth of 50 kHz and a minimum frequency step size of 10 kHz. Carrier frequency selection can be made of any carrier within the 1370 MHz band of the satellite. The frequency, RF Input reference level, baud rate and serial communication format are controlled through front panel controls. The frequency and RF Input reference level may also be controlled through a remote serial link.

b. With our enhanced Monitor and Control the unit can be connected by Ethernet, RS-232 and RS-485/422. All ports are available on the unit, and the front panel controls will select which of the three ports are currently active. Only the active port will respond to data.

c. With our modulated carrier option, the receiver can handle a CW carrier, or a BPSK carrier. Selection between CW and BPSK is automatic. No user intervention is required.

d. With our new Accu-Trac signal tracking feature, systems with moderate Frequency drift can now be accommodated. The Accu-Trac feature can be set by front panel or Remote Monitor and Control to track a frequency range of ±20 kHz all the way up to ±800 kHz, or disabled, in which case the BTR will revert to standard operation. In addition, if the signal is lost, there is an adjustable delay before a search is initiated. This delay can be set by front panel or Remote Monitor and Control from 0 to 100 seconds.

e. With our switchable AFC / MFC mode, the unit can be set to the AFC mode to track CW or narrow data carriers, or changed to the MFC mode to track very wide data carriers.

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2. Model 3434-L BTR Unit Specifications

Input Frequency ....930 to 2300 MHz
Input Level .... -100 dBm minimum; -40 dBm maximum for full tracking range
Input Impedance ....50 ohm
(Optional 75 ohm with 'F' type adapter)
Frequency Selection...Local or Remote over 1370 MHz on 10 kHz steps
Tracking Threshold.. 4 dB C/N for acquisition, < 1 dB C/N for carrier lock
Alarm..Lock/Alarm display, Form-C relay contacts
Noise Bandwidth .... 50 kHz
Tracking Response...0 to 10.0 VDC for a 20 dB change of input level
AFC ....±25 kHz or MFC only mode
Accu-Trac Frequency Sweep .... Disabled, or ±20 kHz to ±800 kHz in steps
Accu-Trac Delay...Disabled, or 1 to 100 seconds in steps
Carrier Type..CW, or BPSK 800 bps to 8kbps, Wide data in MFC only mode

MECHANICAL
Front Panel Display .... Frequency, Carrier Lock or Alarm, RF Input Reference level, DC Output Voltage,
Accu-Trac mode and status, AFC
Input Connector .... N-Female (50 ohm)
(Optional 75 ohm with 'F' type adapter)
Output Connectors .... two Modular connectors (provided)

MONITOR AND CONTROL
RS-232/422/485..DB-9 Female Connector
Ethernet TCP/IP Network..RJ-45 Connector

DIMENSIONS ....Standard 19" rack mount, 1 RU, 16" deep

POWER .... 90-260 VAC, 47-63 Hz, auto-sensing, 45 watts maximum

3. Front Panel Facilities

3.1 DISPLAY

3.1.1 Receive Frequency

    The frequency to which the 3434 is tuned is displayed in the upper left corner of the display.

3.1.2 Carrier Lock or Alarm Status

    When the 3434 is locked to a carrier, the LOCK LED on the front panel will light green. When the unit is in alarm, the LOCK LED will be extinguished.

3.1.3 VDC Output

    The tracking reference DC level output from the 3434 will be displayed in the lower right corner of the display.

3.1.4 RF Input Reference Level

    The RF Input Reference Level to the 3434 may be adjusted to the receiver's linear range. A number between -100.0dB and -40.0dB, which represents the input level setting to achieve 7.5 Volts DC output, is displayed in the lower left corner of the display. If Accu-Trac is enabled, the Reference Level will only be shown when it is being adjusted, otherwise the Accu-Trac offset will be shown.

3.1.5 AFC Status

    The AFC status, L, H, N, or — is displayed in the upper right corner of the display. (Sec 5.4) If the unit is in MFC mode, MFC will be displayed. If Accu-Trac is enabled, the AFC status is not displayed. Instead, the Accu-Trac status is displayed.

3.1.6 Accu-Trac Status

    When enabled, the Accu-Trac status is displayed in the upper right corner of the display in the place of the normal AFC status.

DELAY	The Accu-Trac system has detected that the signal that was previously found and has been tracked has now been lost. Once the selected DELAY time is expired, then the search mode will continue. If the signal returns before the DELAY time has expired, the Accu-Trac system will return to the TRACK mode without searching.
SRCH	The Accu-Trac system is actively scanning the selected Search width window for a signal.
TRACK	The Accu-Trac system is locked to the signal, and is actively tracking any slow frequency changes that may occur. Frequency changes will be tracked to the edge of the selected Search width window. If the selected Search width window is exceeded, the display will show

Accu-Trac Alarm
Frequency Window

    If this occurs, the selected Search width window should be increased, or the center Frequency should be re-adjusted for better frequency centering of the signal.

3.1.7 Accu-Trac Offset

    When enabled, the Accu-Trac offset is shown in the lower left corner of the display. It shows the current Accu-Trac Frequency Offset delta from the primary Frequency setting.

3.2 KEYPAD FUNCTIONS

3.2.1   **L/R**   Activates LOCAL /REMOTE SET MODE

3.2.2   ➤   Activates MONITOR AND CONTROL options.
          Moves cursor right in FREQUENCY SET MODE.
          Select NETWORK.

3.2.3   **CUR**   Activates FREQUENCY SET MODE.
          Performs EXIT functions.

3.2.4   ✛   Increases RF Input Reference Level to make the unit more sensitive to allow for weaker
          signals.
          Select AFC submenu.
          Select SEARCH from menu.
          Change FREQUENCY up.
          Select AFC mode
          Select BAUD RATE up.
          Select RS-232.
          Select ADDRESS up.
          Select SEARCH up.
          Select DELAY up.

3.2.5   —   Decreases RF Input Reference Level to make the unit less sensitive to allow for stronger
signals.   signals.

          Select Accu-Trac submenu.
          Select DELAY from menu.
          Change FREQUENCY down.
          Select MFC mode
          Select BAUD RATE down.
          Select RS-485.
          Select ADDRESS down.
          Select SEARCH down.
          Select DELAY down.

3.2.6   **RESET** Soft system reboot.

4. <u>Rear Panel Facilities</u>

4.1 <u>Rear Mounted Terminal Plug (provided)</u>

1 - N/C	Normally closed relay contact. Closed with respect to common when unit is LOCKED to beacon.
2 - N/O	Normally open relay contact. Open with respect to common when unit is LOCKED to beacon.
3 – COM	Alarm relay common
4 - N/A	Reserved
5 - PWR-2	Jumper PWR-1 to PWR-2 to provide +24 VDC on the L-band input center conductor
6 - PWR-1	Jumper PWR-1 to PWR-2 to provide +24 VDC on the L-band input center conductor
7 – GND	Signal Ground
8 - SS	Provides a DC reference proportional to the received signal input level. This DC level changes approximately 0.5 volts for a one dB input signal level change over a 0 to 10.0 VDC range. Normal; +7.5 VDC for -65 dBm input.

4.2 <u>Alternate Signal Strength Output (provided)</u>

1 - SS	Provides a DC reference proportional to the received signal input level. This DC level changes approximately 0.5 volts for a one dB input signal level change over a 0 to 10.0 VDC range. Normal; +7.5 VDC for -65 dBm input.
2 – GND	Signal Ground

4.3 RF Input Connector

N-type female connector with +24 VDC on center conductor when PWR-1 and PWR-2 are jumpered together. Connects directly to the PLL BDC or LNB for 930 to 2300 MHz operation.

*NOTE: If the 3434 is supplied with a BDC or LNB, the +24 VDC on the center conductor may have been activated internally at the factory.
Refer to the TEST DATA SHEET for verification.

!! Safety Notice !!
The socket-outlet shall be installed near the
equipment and shall be easily accessible.

4.4 Ethernet Connector

RJ-45 type female connector for Monitor and Control Ethernet connectivity.

5. <u>Programming Procedures</u>

The 3434 **Version 4P01 Firmware** offers accessibility to all operating parameters quickly, and easily. Carrier frequency, RF Input Reference Level, local or remote operation, NETWORK, RS-232, RS-485, RS-485 addressing and baud rates can all be changed with just a few button clicks.

5.1 <u>SELECTING LOCAL OR REMOTE MODE</u>

To change mode of operation press and release **L/R** .

When the 3434 is in LOCAL mode, the display will show:
> Go to Remote
> Mode ? + = Yes

Press and release ✛ . The 3434 will switch to REMOTE operation mode.
Pressing any other key will exit mode.
See Sec.5.5 for M&C options and operations.

*NOTE: When the 3434 is in remote mode only the **L/R** and **RESET** buttons are active.

The same procedure is used to switch from REMOTE to LOCAL.
Press and release **L/R** .

When the 3434 is in REMOTE mode, the display will show:
> Go to Local
> Mode ? + = Yes

Press and release ✛ . The 3434 will switch to LOCAL mode.
Pressing any other key will exit mode.

5.2 <u>SETTING CARRIER FREQUENCY</u>

To set the FREQUENCY on the 3434, place unit in LOCAL mode. Press and release **CUR** to activate FREQUENCY SET mode.

The display will show:
> Freq Set
> F = 1555.50

The cursor will highlight the digit to be changed.
To raise the value press ✛ , To lower the value press — .
To move the cursor right press ➤ , To move the cursor left press **L/R** .
The roll-over feature will automatically change the digits left of the cursor.
When carrier frequency has been selected press **CUR** to exit.

5.3 ADJUSTING RF INPUT REFERENCE LEVEL

To increase RF Input Reference Level sensitivity, press and hold ✛ .
To decrease RF input Reference Level sensitivity, press and hold — .

5.4 AFC STATUS

The **AFC STATUS** shows the location of the beacon signal frequency relative to the center frequency selected on the 3434 within the **AFC** range.

When the center frequency selected on the 3434 is within 15 kHz of the beacon signal frequency, the **AFC STATUS** will read **N** for Normal.

If the center frequency selected on the 3434 is greater than 15 kHz above the beacon signal frequency, the **AFC STATUS** will read **L** for Low.

If the center frequency selected on the 3434 is greater than 15 kHz below the beacon signal frequency, the **AFC STATUS** will read **H** for High.

When the 3434 is in alarm, meaning there is no carrier detected, the **AFC STATUS** will read — for Alarm.

Adjustments can be made accordingly (sec 5.2).

5.4.1 ACCU-TRAC STATUS

When enabled, the Accu-Trac status is displayed in the upper right corner of the display instead of the normal AFC Status. One of the following will be displayed.

DELAY	The Accu-Trac system has detected that the signal that was previously found and has been tracked has now been lost. Once the selected DELAY time is expired, then the search mode will continue. If the signal returns before the DELAY time has expired, the Accu-Trac system will return to the TRACK mode without searching.
SRCH	The Accu-Trac system is actively scanning the selected Search width window for a signal.
TRACK	The Accu-Trac system is locked to the signal, and is actively tracking any slow frequency changes that may occur. Frequency changes will be tracked up to the edge of the selected Search width window. If the selected Search width window is exceeded, the display will show

<div align="center">

ACCU-TRAC ALARM
Frequency Window

</div>

If this occurs, the selected Search width window should be increased, or the center Frequency should be re-adjusted for better frequency centering of the signal.

5.4.2 ACCU-TRAC OPERATION

Radeus Labs Inc's proprietary Accu-Trac algorithm has been developed in order to obtain the bestperformance from systems that have a small to moderate amount of frequency drift.

The search algorithm has been designed to rapidly search for a signal in the noise floor. If the algorithm detects a rise in the noise floor, a more intensive search mode is used to search the nearby frequencies a few steps in each direction. If this does not lock on a signal, the rapid search will continue. If after several complete sweeps have occurred, the intelligent search algorithm will begin to slow down for a more intensive search.

Once the Signal has been detected, the algorithm leaves the Search mode and changes to the Track mode. Now the Frequency will be followed to adjust for minor frequency drift as the system follows it's normal daily cycle of temperature and frequency drifts.

If the frequency drift is too great for the current Search Range setting, or if the center frequency was not entered accurately, it is possible that the system could Track the frequency of the satellite right out of the Search range window. This constitutes an error condition, and will result in an alarm. This is a latching alarm that requires manual intervention to clear. To recover, the Search width can be widened (either locally from the front panel, or remotely via Monitor and Control). Alternatively, the center frequency can be re-calculated and adjusted (again, either locally from the front panel, or remotely via Monitor and Control) and re-entered. Changing the center frequency will initiate a new Search cycle.

If the satellite is expected to be highly frequency stable, the user could enable Accu-Trac to initially acquire the satellite, read the frequency delta from the Monitor and Control port using the 'W' command. Then re-center the BTR's center frequency using the delta information, and disable the Accu-Trac option.

Note that Accu-Trac requires the unit to be in the AFC mode.

5.4.3 MODULATED CARRIER OPTION

With our modulated carrier option, the receiver can handle a CW carrier, or a BPSK carrier of up to 8 kbps. Selection between CW and BPSK is automatic. No user intervention is required.

If a wide data carrier is to be tracked, the MFC mode can be enabled. Note that setting the MFC mode will automatically disable Accu-Trac.

5.5 SELECTING MONITOR and CONTROL PARAMETERS

Monitor and Control parameters are accessed through a series of sub-screens. Selection of baud rate, mode, and RS-485 addressing requires just a few button clicks. With our expanded RS-485 addressing **Version 4B05 Firmware**, numerous multi-unit combinations and large applications are easily supported.

The model 3434 now supports TCP/IP Network operations. Below is the default Network setup that every unit is shipped with :

Unit IP Address	192.168.1.200
Unit IP Port number	8080
Unit IP Subnet mask	255.255.255.0

All ports are available on the unit, and the front panel controls will select which of the three ports are currently active.

To begin **Monitor and Control** programming, place the 3434 in LOCAL mode (sec.5.1). Press and release ➤ to activate SUB-SCREEN #1:

5.5.1 SELECTING MODE (RS-232, RS-485, or Network)

The display will show:

> Press   ✛ RS-232
>
> —   RS-485   ➤ Net

5.5.1a Selecting RS-232
To select RS-232, press and release ✛ .
The 3434 will automatically continue to the BAUD RATE screen.

5.5.1b Selecting RS-485
To select RS-485, press and release — .
This will activate RS-485 ADDRESS screen.

5.5.1 c Selecting Network
To select Network, press and release ➤ .
The 3434 will automatically return to the LOCAL mode screen.

5.5.2 SELECTING RS-485 ADDRESSING

The display will show:

> M&C Addr   =   01
>
> Cur to Exit

RS-485 ADDRESSING OPTIONS are 01 thru FF hexadecimal.

To raise the address number, press and hold ✛ .
To lower the address number, press and hold — .
When the correct address is displayed, press and release **CUR.**
The 3434 will automatically continue to the BAUD RATE screen.

*NOTE: Due to addressing conflicts, addresses **0A** and **0D** are invalid and cannot be used.

5.5.3 SELECTING BAUD RATE

The display will show:

> Baud   1200
>
> Cur to Exit

BAUD RATE choices are 1200, 2400, 4800, 9600, and 19200.

To increase BAUD RATE press and release ✛ .
To decrease BAUD RATE press and release — .

When the correct BAUD RATE is displayed, press and release **CUR**.

The 3434 will automatically return to the LOCAL mode screen.
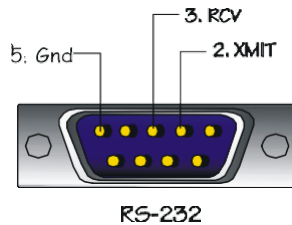
6   Remote Operations

The serial protocol for the 3434 shall remain the same for any of the selected baud rates and must be followed.
Example:
1200,8,N,1
1200 baud, eight data bits, no parity, 1 stop bit.

6.1 RS-232 OPERATION

6.1.1 POLLING THE 3434 IN RS-232

The 3434 can be polled in either LOCAL or REMOTE mode.

To query a status report from the 3434, send the command string:
F\<CR\>
That is, the ASCII letter "F" followed by a carriage return.
The unit will respond with:

FREQ=(*receive frequency*), REF=(*reference level*), SS=(*signal strength voltage*), L (*lock*) or A (*alarm*)

Example:
FREQ=1555.50,REF=-65.0dB,SS=750,L\<CR\>

6.1.2 CHANGING FREQUENCY AND REFERENCE LEVEL in RS-232

To change the FREQUENCY and REFERENCE LEVEL setting on the 3434 in RS-232 send the following command string :

**F space frequency in MHz space frequency in kHz space
Reference level <CR>**

Example:
F 1555 50 -65.0<CR>

The 3434 will respond with:

FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

Valid command options are as follows:

Frequency in MHz = 930 to 2300 MHz in 1 MHz increments
Frequency in kHz = 00 to 99 in 10 kHz increments
Ref = a reference level between -100.0 and -40.0 in 0.5 dB steps.

<u>NOTES:</u>

All ports are available on the unit, and the front panel controls will select which of the three ports are currently active. Only the active port will respond to data.

Do not attempt to use a Linefeed character, as the string will not be accepted. Use a Carriage Return only to terminate the string.

Reference Level dB values must contain the '-' (minus sign) and the '.' (Decimal point) at the indicated locations. If these are misplaced or missing, the string will be rejected.

Reference Level dB values must be in multiples of 0.5 dB. Therefore the Reference Level field must end in a '0' or '5'. Other values will be rejected and will return a REF STEP ERROR.

The entire command string must be transmitted in all cases; to change frequency, Reference Level or both. If an invalid command is sent the 3434 will respond with one of the following:
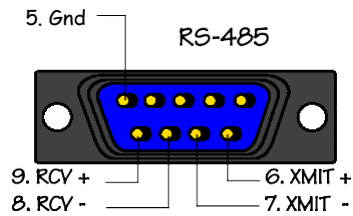
<div align="center">

FREQ ERROR
REF ERROR
BOTH ERROR
REF STEP ERROR
COMM ERROR

</div>

*NOTE: The 3434 must be in REMOTE mode (sec.5.1) to respond to command strings. When the 3434 is in LOCAL mode, and a command string is sent, the unit will respond with a current status reading.

<div align="center">Example:</div>

LOCAL ONLY
FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

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6.2 RS-485 Operation

6.2.1 POLLING THE 3434 IN RS-485

To query a status report from the 3434 in RS-485 mode, send the command string:

Hex address <CR>

That is, the address value you have assigned to the 3434 (sec. 5.5.3) followed by a carriage return in hexadecimal.

The unit will respond with:

ADDR=(*hex address*), FREQ=(*receive frequency*), REF=(*reference level*), SS=(*signal strength voltage*),
L (*lock*) or A (*alarm*)

Example:

ADDR=01,FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

6.2.2 CHANGING THE FREQUENCY AND GAIN IN RS-485

To change the FREQUENCY and REFERENCE LEVEL setting on the 3434 in RS-485 send the following command string :

Hex address space frequency in MHz space
Frequency in kHz space reference level <CR>

Example:
^A 1555 50 -65.0 <CR>

The 3434 will respond with:

ADDR=01,FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

Valid command options are as follows:
Hex address = 01 through FF
Frequency in MHz = 930 to 2300 MHz in 1 MHz increments
Frequency in kHz = 00 to 99 in 10 kHz increments
Ref = a reference level between -100.0 and -40.0 in 0.5 dB steps.

NOTES:

All ports are available on the unit, and the front panel controls will select which of the three ports are currently active. Only the active port will respond to data.

Do not attempt to use a Linefeed character, as the string will not be accepted. Use a Carriage Return only to terminate the string.

Reference Level dB values must contain the '-' (minus sign) and the '.' (Decimal point) at the indicated locations. If these are misplaced or missing, the string will be rejected.

Reference Level dB values must be in multiples of 0.5 dB. Therefore the Reference Level field must end in a '0' or '5'. Other values will be rejected and will return a REF STEP ERROR.

The entire command string must be transmitted in all cases; to change frequency, Reference level or both. If an invalid command is sent the 3434 will respond with one of the following:

FREQ ERROR
REF ERROR
BOTH ERROR
REF STEP ERROR
COMM ERROR

6.3 Network Operation

The 3434 is equipped with TCP/IP interface for raw TCP/IP communications.

Communications can be established using a TCP/IP port to connect to our Graphical User Interface that is supplied with the unit.

Alternatively, you may use Hyperterminal or similar terminal program to communicate with the unit.

6.3.1 POLLING THE 3434 IN NETWORK MODE

The 3434 can be polled in either LOCAL or REMOTE mode.

To query a status report from the 3434, send the TCI/IP command string:
<div align="center">F<CR></div>

That is, the ASCII letter "F" followed by a carriage return.

The unit will respond with the TCP/IP reply string:
> FREQ=(*receive frequency*), REF=(*reference level*), SS=(*signal strength voltage*), L (*lock*) or A (*alarm*)

<div align="center">

Example:
FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

</div>

6.3.2 CHANGING FREQUENCY AND REFERENCE LEVEL IN NETWORK MODE

To change the FREQUENCY and REFERENCE LEVEL setting on the 3434 in the Network mode, send the following TCP/IP command string :

<div align="center">

**F space frequency in MHz space frequency in kHz space
Reference level <CR>**

Example:
F 1555 50 -65.0<CR>

</div>

The 3434 will respond with the TCP/IP reply string:

<div align="center">

FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

</div>

Valid command options are as follows:

> *Frequency in MHz* = 930 to 2300 MHz in 1 MHz increments
> *Frequency in kHz* = 00 to 99 in 10 kHz increments
> *Ref* = a reference level between -100.0 and -40.0 in 0.5 dB steps.

NOTES:

All ports are available on the unit, and the front panel controls will select which of the three ports are currently active. Only the active port will respond to data.

The model 3434 supports TCP/IP Network operations. Below is the default Network setup that each unit is shipped with :

Unit IP Address	192.168.1.200
Unit IP Port number	8080
Unit IP Subnet mask	255.255.255.0

These settings can be changed by the User. Refer to Appendix C on IP and Port Configuration.

Do not attempt to use a Linefeed character, as the string will not be accepted. Use a Carriage Return only to terminate the string.

Reference Level dB values must contain the '-' (minus sign) and the '.' (Decimal point) at the indicated locations. If these are misplaced or missing, the string will be rejected.

Reference Level dB values must be in multiples of 0.5 dB. Therefore the Reference Level field must end in a '0' or '5'. Other values will be rejected and will return a REF STEP ERROR.

The entire command string must be transmitted in all cases; to change frequency, Reference Level or both. If an invalid command is sent the 3434 will respond with one of the following:

FREQ ERROR
REF ERROR
BOTH ERROR
REF STEP ERROR
COMM ERROR

*NOTE: The 3434 must be in REMOTE mode (sec.5.1) to respond to command strings. When the 3434 is in LOCAL mode, and a command string is sent, the unit will respond with a current status reading.

Example:
LOCAL ONLY
FREQ=1555.50,REF=-65.0dB,SS=750,L<CR>

7. System Alignment Procedure

<u>7.1</u>
Install the recommended cable between the PLL BDC or LNB and the 3434.

<u>7.2</u>
Plug the AC cord, which is provided with the unit, into the rear mounted receptacle. Plug the male end of the power cord into a suitable 90-260 VAC, 47-63 Hz power outlet. The BTR's power supply automatically detects AC input voltage.

<u>7.3</u>
Tune the 3434 to the beacon frequency. (Sec. 4.2)

<u>7.4</u>
Adjust the 3434 reference level to -100.0dB. (Sec. 4.3)

<u>7.5</u>
If the antenna system is properly aligned to the appropriate satellite and polarity, the front panel LOCK LED will become illuminated, and the AFC STATUS will read H, L or N (sec.5.4). Observe the REFERENCE LEVEL value at the lower left corner of the display. Adjust the REFERENCE LEVEL (Sec. 5.3) for a DC level as nearly as possible to + 7.50 Volts. This sets the receiver to it's most linear range.

<u>7.6</u>
If the antenna system is properly aligned to the appropriate satellite and polarity and the front panel LED fails to show LOCK, try tuning the 3434 in 10 kHz steps above and below the beacon frequency (sec.5.2). You may find the beacon is slightly off frequency or minor frequency uncertainty within your link.

<u>7.7</u>
The antenna can be optimally aligned while monitoring this voltage for a maximum reading. If necessary readjust the REFERENCE LEVEL to achieve +7.50 VDC. (Sec.5.3)

The following page is a work sheet for your records.

8. System Alignment Work Sheet

Model 3434-L BTR
Serial Number _____   Date _____

Input Signal Level dBm	Output Volts DC
- 60	_____
- 61	_____
- 62	_____
- 63	_____
- 64	_____
- 65	_____
- 66	_____
- 67	_____
- 68	_____
- 69	_____
- 70	_____
- 71	_____
- 72	_____
- 73	_____
- 74	_____
- 75	_____
- 76	_____
- 77	_____
- 78	_____
- 79	_____
- 80	_____

9. Trouble Shooting Guide

1. No power to unit.

1. Insure there is proper AC power to the unit. The unit can operate on 90VAC to 260VAC with the use of the associated power cord.

2. AC power fuse blown.
   *NOTE: The AC power fuse is located in the rear mounted power connector. A spare fuse is located within.

3. LNB power shorted. If PWR-1 is jumpered to PWR-2, LNB power is provided via the center conductor of the input connector at the rear of the unit. If the 3434 is not used to power the LNB, remove the jumper between PWR-1 and PWR-2. If the DC is not disabled, potentially the DC output could be terminated to ground even if power splitters are used.
   *NOTE: If the 3434 is supplied with a BDC or LNB, the +24 VDC on the center conductor may have been activated internally at the factory. Refer to the TEST DATA SHEET for verification.

2. Alarm Condition.

1. Unit is not tuned to proper frequency. Recheck beacon frequency.
There may be frequency drift in the beacon or the downlink. Observe AFC voltage between pin 7 (ground) and pin 4 (AFC) on the output modular connector while tuning the beacon receiver in 10 kHz steps above and below the beacon frequency. The AFC voltage is +6.6 VDC when the input carrier frequency is exactly equal to the frequency that the beacon receiver is tuned to.

2. The Carrier-to -Noise (C/N) of the receive signal is not adequate for the unit to operate.
   *NOTE: The C/N is a function of the down link power of the carrier as well as the G/T (figure-of-merit) of the receive system.

3. The carrier level is too low.
   *NOTE: Absolute signal level is affected by the length of cable as well as the type of cable used. LNB input models require cable with a copper center conductor be used. Copper clad steel cable generally drops too much DC for the PLL LNB to function.

3. Unit locks but low DC output tracking voltage.

1. Signal too low to unit (see above).

2. Low C/N. Unit may be noise driven which minimizes signal level sensitivity.

4. Unit locks but high output tracking voltage with no change when input signal level changes.

1. RF Input Reference level adjust set too high. Unit is in compression. Refer to alignment procedure (sec.7).

5. Unit locks with no signal input.

1. RF Input Reference level adjust set too high. Unit is locking on internal noise. Refer to alignment procedure (sec.7).

2. Note that this is a very sensitive instrument, and will occasionally lock on spurious signals. Generally the Beacon Signal from the satellite will overpower these spurious signals.

6. INTERNAL ERROR!

1. Turn off power to unit, wait 10 seconds, and turn power on again. If unit fails 5 or more times, contact RADLABS.

Note: There are no internal adjustments within the receiver. If it is determined that the unit has failed, Refer to Radeus Labs Inc Repair Return Policy which follows.

Model 3434BTR-L -- L-Band Beacon Tracking Receiver -- Version 4P01 Firmware – MAY 2021-- Page 22

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10   Monitor and Control Protocol for Rev 4P01 Firmware

10.1   This section describes the protocol specific to the Rev 4P01 firmware.

10.2   There are some new commands in the Rev 4P01 that are not backward compatible with earlier firmware versions.

10.3   Rev 4P01 now supports network communications. All network strings are identical to the RS-232 strings.

10.4   Message Format

10.4.1   Baud rates of 1200, 2400, 4800, 9600, and 19200 are available and are selected on the front panel of the unit. Changing the baud rate remotely is not permitted.

10.4.2   The data format is fixed at 8 data bits, No parity, and 1 Stop bit.

10.4.3   All characters must be sent as a complete string with no delay between characters. Delays between characters will cause an internal buffer timeout, and will cause the firmware to discard the message. This is very important on Command strings since they are longer in length.

10.4.4   Each inbound string sent to the unit must be terminated with a Carriage Return only. Do not include a Linefeed character as the strings are not setup to accept this character.

10.4.5   In the RS-485 mode, if an incorrect address is sent, the unit will not respond.

10.4.6   All three ports are available on the unit, and the front panel controls will select which of the three ports are currently active. Only the active port will respond to data.

10.5   Message list.

10.5.1   Request Messages

        "A" – AFC information
        "F" – Frequency, Reference Level, Signal Strength, and Lock information
        "M" – Model and firmware information
        "P" – Accu-Trac parameter information
        "S" – M&C status information
        "W" – Accu-Trac status information

10.5.2   Command Messages

        "C" – AFC/MFC Parameters
        "F" – Frequency and Reference Level
        "P" – Accu-Trac Parameters

10.6   Requesting AFC information

10.6.1   The AFC information can be read over the RS-232 / RS-485 / Network M&C port using the "A" command as follows. Please refer to the unit Instruction Manual for further details on the AFC status:

10.6.2   In RS-232 mode, send the String "A (CR)" (ASCII A, ASCII Carriage Return). Do not transmit the comma.
Reply String is AFC=a (CR) (LF)
            where a = ALARM, H, N, L, or MFC.

10.6.3   In RS-485 mode, send the String "(HEX ADDRESS), A, (CR)" (Hexadecimal Address, ASCII A, ASCII Carriage Return). Do not transmit the commas.
Reply String is (HEX ADDRESS) AFC=a (CR) (LF)
            where a = ALARM, H, N, L, or MFC.

10.6.4   In Network mode, send the String "A (CR)" (ASCII A, ASCII Carriage Return). Do not transmit the comma.
Reply String is AFC=a (CR) (LF)
            where a = ALARM, H, N, L, or MFC.

10.7 Requesting Frequency, Reference Level, Signal Strength, and Lock information

10.7.1   The Frequency, Reference Level, Signal Strength, and Lock status information can be read over the RS-232 / RS-485 / Network M&C port using the "F" command as follows:

10.7.2   Note that in the RS-485 mode, the "F" command is replaced with the Hexadecimal Address.

10.7.3   In RS-232 mode, send the String "F (CR)" (ASCII F, ASCII Carriage Return). Do not transmit the comma.

Reply String is as follows

FREQ= aaaa	where aaaa = frequency in MHz
An ASCII decimal point	
bb	where bb = frequency in kHz * 10
An ASCII comma	
REF=	
An ASCII minus sign	
cc or ccc	where ccc = dB of Reference Level
An ASCII decimal point	
d	where d = dB of Reference Level 0.1 digit
An ASCII comma	
SS=eee	where eee is Analog Signal Strength Output in Volts / 100
An ASCII comma	
f	where f = 'L' for Lock or 'A' for Alarm
(CR)	
(LF)	

10.7.4   In RS-485 mode:

10.7.4.1 Note that in the RS-485 mode, the "F" command is replaced with the Hexadecimal Address.

10.7.4.2 Send the String "(HEX ADDRESS), (CR)" (Hexadecimal Address, ASCII Carriage Return). Do not transmit the commas.

Reply String is as follows

(HEX ADDRESS)	
FREQ= aaaa	where aaaa = frequency in MHz
An ASCII decimal point	
bb	where bb = frequency in kHz * 10
An ASCII comma	
REF=	
An ASCII minus sign	
cc or ccc	where ccc = dB of Reference Level
An ASCII decimal point	
d	where d = dB of Reference Level 0.1 digit
An ASCII comma	
SS=eee	where eee is Analog Signal Strength Output in Volts / 100
An ASCII comma	
f	where f = 'L' for Lock or 'A' for Alarm
(CR)	
(LF)	

10.7.3   In Network mode, send the String "F (CR)" (ASCII F, ASCII Carriage Return). Do not transmit the comma.

Reply String is as follows

FREQ= aaaa	where aaaa = frequency in MHz
An ASCII decimal point	
bb	where bb = frequency in kHz * 10
An ASCII comma	
REF=	
An ASCII minus sign	
cc or ccc	where ccc = dB of Reference Level
An ASCII decimal point	
d	where d = dB of Reference Level 0.1 digit
An ASCII comma	
SS=eee	where eee is Analog Signal Strength Output in Volts / 100
An ASCII comma	
f	where f = 'L' for Lock or 'A' for Alarm
(CR)	
(LF)	

10.8   Requesting Model and Firmware information

10.8.1   The Model and Firmware information can be read over the RS-232 / RS-485 / Network M&C port using the "M" command as follows:

10.8.2   In RS-232 mode, send the String "M (CR)" (ASCII M, ASCII Carriage Return). Do not transmit the comma.
Reply String is MODEL=3434-xx Ver yyyy (CR) (LF)
where xx is the band information,
and yyyy is the firmware version information.

10.8.3   In RS-485 mode, send the String "(HEX ADDRESS), M, (CR)" (Hexadecimal Address, ASCII M, ASCII Carriage Return). Do not transmit the commas.
Reply String is (HEX ADDRESS), MODEL=3434-xx Ver yyyy (CR) (LF)
where xx is the band information,
and yyyy is the firmware version information.

10.8.2   In Network mode, send the String "M (CR)" (ASCII M, ASCII Carriage Return). Do not transmit the comma.
Reply String is MODEL=3434-xx Ver yyyy (CR) (LF)
where xx is the band information,
and yyyy is the firmware version information.

10.9   Requesting M&C status information

10.9.1   The M&C status information can be read over the RS-232 / RS-485 / Network M&C port using the "S" command as follows:

10.9.2   In RS-232 mode, send the String "S (CR)" (ASCII S, ASCII Carriage Return). Do not transmit the comma.
Reply String is as follows
  STATUS= a where a = REMOTE or LOCAL
  An ASCII comma
  RS-bbb where bbb = 232, 485, or NETWORK
  An ASCII comma
  ccccc BAUD where ccccc = 1200, 2400, 4800, 9600 or 19200
  (CR)
  (LF)

10.9.3   In RS-485 mode, send the String "(HEX ADDRESS), S, (CR)" (Hexadecimal Address, ASCII S, ASCII Carriage Return). Do not transmit the commas.
Reply String is as follows
  ADDR=zz where zz = 00 thru FF hexadecimal address.
  An ASCII comma
  STATUS= a where a = REMOTE or LOCAL
  An ASCII comma
  RS-bbb where bbb = 232, 485, or NETWORK
  An ASCII comma
  ccccc BAUD where ccccc = 1200, 2400, 4800, 9600 or 19200
  An ASCII comma
  ADDR=dd HEX where dd =00 thru FF hexadecimal address.
  (CR)
  (LF)

10.9.4   In Network mode, send the String "S (CR)" (ASCII S, ASCII Carriage Return). Do not transmit the comma.
Reply String is as follows
  STATUS= a where a = REMOTE or LOCAL
  An ASCII comma
  bbbbbbb where bbbbbbb = NETWORK
  (CR)
  (LF)

10.11 Requesting Accu-Trac Parameters

10.11.1 The Accu-Trac parameter information can be read over the RS-232 / RS-485 / Network M&C port using the "P" command as follows. Please refer to the unit Instruction Manual for further details on the Accu-Trac parameters:

10.11.2 In RS-232 mode, send the String "P (CR)" (Ascii P, Ascii Carriage Return). Do not transmit the comma.

Reply String is PARM W=aaaa,D=bbb (CR) (LF)
where aaaa = Search Width and bbb = Delay.

10.11.3 In RS-485 mode, send the String "(HEX ADDRESS), P, (CR)" (Hexadecimal Address, Ascii P, Ascii Carriage Return). Do not transmit the commas.

Reply String is (HEX ADDRESS) PARM W=aaaa,D=bbb (CR) (LF)
where aaaa = Search Width and bbb = Delay.

10.11.4 In Network mode, send the String "P (CR)" (Ascii P, Ascii Carriage Return). Do not transmit the comma.

Reply String is PARM W=aaaa,D=bbb (CR) (LF)
where aaaa = Search Width and bbb = Delay.

10.11.5   W (aaaa) parameter is the Search Width value

OFF	Search Disabled
0020	±20 kHz
0050	±50 kHz
0075	±75 kHz
0100	±100 kHz
0150	±150 kHz
0200	±200 kHz
0250	±250 kHz
0300	±300 kHz
0400	±400 kHz
0500	±500 kHz
0600	±600 kHz
0700	±700 kHz
0800	±800 kHz

10.11.6 D (bbb) parameter is the Delay value

OFF	Delay Disabled
001	1 Second
002	2 Seconds
005	5 Seconds
010	10 Seconds
020	20 Seconds
050	50 Seconds
100	100 Seconds

10.12 Requesting Accu-Trac Status

10.12.1 The Accu-Trac status information can be read over the RS-232 / RS-485 / Network M&C port using the "W" command as follows. Please refer to the unit Instruction Manual for further details on the Accu-Trac status:

10.12.2 In RS-232 mode, send the String "W (CR)" (Ascii W, Ascii Carriage Return). Do not transmit the comma.

Reply String is SEARCH = aaaaaaa,b (CR) (LF)

10.12.3 In RS-485 mode, send the String "(HEX ADDRESS), W, (CR)" (Hexadecimal Address, Ascii W, Ascii Carriage Return). Do not transmit the commas.

Reply String is (HEX ADDRESS) SEARCH = aaaaaaa,b (CR) (LF)

10.12.4 In Network mode, send the String "W (CR)" (Ascii W, Ascii Carriage Return). Do not transmit the comma. Reply String is SEARCH = aaaaaaa,b (CR) (LF)

10.12.5 aaaaaaa parameter is the Search frequency offset status

> <space> CENTER
> or +ccc <space> kHz
> or -ccc <space> kHz

Where ccc = kHz of frequency offset and + or – is direction of frequency offset.

10.12.6 b parameter is the Search status

A	Alarm
D	Delay
S	Search
T	Track

10.13 Commanding AFC/MFC Parameters

10.13.1 The AFC/MFC parameter information can be commanded over the RS-232 / RS-485 / Network M&C port using the "C" command as follows. Please refer to the unit Instruction Manual for further details on the Accu-Trac parameters:

10.13.2 In RS-232 mode, send the String "Cx (CR)" (Ascii C, 1 Ascii character for the 'x', Ascii Carriage Return).

Reply String is OK, or LOCAL ONLY(CR) (LF)

10.13.3 In RS-485 mode, send the String "(HEX ADDRESS) Cx (CR)" (Hexadecimal Address, Ascii C, 1 Ascii character for the 'x' parameter, Ascii Carriage Return).

Reply String is (HEX ADDRESS) OK, LOCAL ONLY(CR) (LF)

10.13.4 In Network mode, send the String "Cx (CR)" (Ascii C, 1 Ascii character for the 'x' parameter, Ascii Carriage Return).

Reply String is OK, or LOCAL ONLY(CR) (LF)

10.13.5 C (x) parameter

        'a'   AFC mode
        'm'   MFC mode

The unit should return one of the following:
OK The command has been received and executed.
LOCAL ONLY The unit is in the Local mode, not Remote mode. The command has not been executed.

10.13 Commanding Accu-Trac Parameters

10.13.1 The Accu-Trac parameter information can be commanded over the RS-232 / RS-485 / Network M&C port using the "P" command as follows. Please refer to the unit Instruction Manual for further details on the Accu-Trac parameters:

10.13.2 In RS-232 mode, send the String "Paaaa,bbb (CR)" (Ascii P, 4 Ascii numeric digits of the 'a' parameter, Ascii Comma, 3 Ascii numeric digits of 'b' parameter, Ascii Carriage Return). You MUST transmit the comma between the a and b parameters.

Reply String is OK, FORMAT ERROR, RANGE ERROR, or LOCAL ONLY(CR) (LF)

10.13.3 In RS-485 mode, send the String "(HEX ADDRESS) Paaaa,bbb (CR)" (Hexadecimal Address, Ascii P, 4 Ascii numeric digits of the 'a' parameter, Ascii Comma, 3 Ascii numeric digits of 'b' parameter, Ascii Carriage Return). You MUST transmit the comma between the a and b parameters.

Reply String is (HEX ADDRESS) OK, FORMAT ERROR, RANGE ERROR, or LOCAL ONLY(CR) (LF)

10.13.4 In Network mode, send the String "Paaaa,bbb (CR)" (Ascii P, 4 Ascii numeric digits of the 'a' parameter, Ascii Comma, 3 Ascii numeric digits of 'b' parameter, Ascii Carriage Return). You MUST transmit the comma between the a and b parameters.

Reply String is OK, FORMAT ERROR, RANGE ERROR, or LOCAL ONLY(CR) (LF)

10.13.5 W (aaaa) parameter is the Search Width value

0000	Search Disabled
0020	±20 kHz
0050	±50 kHz
0075	±75 kHz
0100	±100 kHz
0150	±150 kHz
0200	±200 kHz
0250	±250 kHz
0300	±300 kHz
0400	±400 kHz
0500	±500 kHz
0600	±600 kHz
0700	±700 kHz
0800	±800 kHz

10.13.6 D (bbb) parameter is the Delay value

000	Delay Disabled
001	1 Second
002	2 Seconds
005	5 Seconds
010	10 Seconds
020	20 Seconds
050	50 Seconds
100	100 Seconds

The unit should return one of the following:
OK The command has been received and executed.
FORMAT ERROR The string was not formatted properly. The command has not been executed.
RANGE ERROR One or more of the values in the string were out of range. The command has not been executed.
LOCAL ONLY The unit is in the Local mode, not Remote mode. The command has not been executed.

10.10   Commanding Frequency and Reference Level information

10.10.1   The Frequency and Reference Level must be within range of the model you are using. For the 3434-L, the frequency range is 930 to 2300 MHz and the reference level is -100 to -40 in 0.5 dB steps. They can be assigned over the RS-232 / RS-485 / Network M&C port using the "F" command as follows:

10.10.2   Note that in the RS-485 mode, the "F" command is replaced with the Hexadecimal Address.

10.10.2.1   In RS-232 mode, send the String as follows:

         ASCII F
         ASCII Space
         Frequency in MHz in 3 or 4 ASCII numerical digits
         ASCII Space
         Frequency in kHz / 10 in 2 ASCII numerical digits
         ASCII Space
         ASCII Minus sign
         Reference Level in whole dB in 2 or 3 ASCII digits
         ASCII Decimal Point
         Reference Level in tenths of dB in 1 ASCII digits (Must be a 0 or 5)
         ASCII Carriage Return

10.10.2.2   If the command is accepted, the reply string is as follows

FREQ= aaaa	where aaaa = frequency in MHz
An ASCII decimal point	
bb	where bb = frequency in kHz * 10
An ASCII comma	
REF=	
An ASCII minus sign	
cc or ccc	where ccc = dB of Reference Level
An ASCII decimal point	
d	where d = dB of Reference Level 0.1 digit
An ASCII comma	
SS=eee	where eee is Analog Signal Strength Output in Volts / 100
An ASCII comma	
f	where f = 'L' for Lock or 'A' for Alarm
(CR)	
(LF)	

10.10.3   In RS-485 mode:
10.10.3.1   Note that in the RS-485 mode, the "F" command is replaced with the Hexadecimal Address.
10.10.3.2   In RS-485 mode, send the String as follows:

       (HEX ADDRESS)
       ASCII Space
       Frequency in MHz in 3 or 4 ASCII numerical digits
       ASCII Space
       Frequency in kHz / 10 in 2 ASCII numerical digits
       ASCII Space
       ASCII Minus sign
       Reference Level in whole dB in 2 or 3 ASCII digits
       ASCII Decimal Point
       Reference Level in tenths of dB in 1 ASCII digits (Must be a 0 or 5)
       ASCII Carriage Return

10.10.3.3   If the command is accepted, the reply string is as follows

       (HEX ADDRESS)
       FREQ= aaaa   where aaaa = frequency in MHz
       An ASCII decimal point
       bb   where bb = frequency in kHz * 10
       An ASCII comma
       REF=
       An ASCII minus sign
       cc or ccc   where ccc = dB of Reference Level
       An ASCII decimal point
       d   where d = dB of Reference Level 0.1 digit
       An ASCII comma
       SS=eee   where eee is Analog Signal Strength Output
                             in Volts / 100
       An ASCII comma
       f   where f = 'L' for Lock or 'A' for Alarm
       (CR)
       (LF)

10.10.4.1   In Network mode, send the String as follows:
                ASCII F
                ASCII Space
                Frequency in MHz in 3 or 4 ASCII numerical digits
                ASCII Space
                Frequency in kHz / 10 in 2 ASCII numerical digits
                ASCII Space
                ASCII Minus sign
                Reference Level in whole dB in 2 or 3 ASCII digits
                ASCII Decimal Point
                Reference Level in tenths of dB in 1 ASCII digits (Must be a 0 or 5)
                ASCII Carriage Return

10.10.4.2   If the command is accepted, the reply string is as follows

FREQ= aaaa	where aaaa = frequency in MHz
An ASCII decimal point	
bb	where bb = frequency in kHz * 10
An ASCII comma	
REF=	
An ASCII minus sign	
cc or ccc	where ccc = dB of Reference Level
An ASCII decimal point	
d	where d = dB of Reference Level 0.1 digit
An ASCII comma	
SS=eee	where eee is Analog Signal Strength Output in Volts / 100
An ASCII comma	
f	where f = 'L' for Lock or 'A' for Alarm
(CR)	
(LF)	

10.11   Possible errors in sending command strings.

10.11.1   Freq Error
10.11.1.1   This is most likely caused by a Frequency that is out of the range of the model that you are using. For the 3434-L, the frequency range is 930 to 2300 MHz and the reference level is -100 to -40 in 0.5 dB steps.
10.11.1.2   Could be a result of wrong string format.

10.11.2   Ref Error
10.11.2.1   This is most likely caused by a Reference Level that is out of the range of the model that you are using. For the 3434-L, the frequency range is 930 to 2300 MHz and the reference level is -100 to -40 in 0.5 dB steps.
10.11.2.2   Could be a result of wrong string format.

10.11.3   Both Error
10.11.3.1   This is most likely caused by both Frequency and Reference Levels that are out of the range of the model that you are using. For the 3434-L, the frequency range is 930 to 2300 MHz and the reference level is -100 to -40 in 0.5 dB steps.
10.11.3.2   Could be a result of wrong string format.

10.11.4   Ref Step Error
10.11.4.1   In this model all internal steps are 0.5 dB. Therefore, all Reference Level commands must be given in this format. If the tenths digit is anything other than a 0 or 5, this error will occur.

10.11.5   Comm Error
10.11.5.1   Could be a result of wrong string format, wrong baud rate, or wrong data format.

Appendix A
Computer Set Up

Computer Set Up

Figure 4. Select My Network Places

The user's computer and the BTR must be set to the same domain in order to communicate via the CAT5 crossover cable.
Select "My Network Places" and double click the icon to open as shown in Figure 4.
Select "View Network Connections" and double click the icon as shown in figure 5.
Select "Local Area Connection" and double click to open.
In the "General" tab locate and highlight the "Internet Protocol [TCP/IP] properties" option, then press the Properties button to view the Internet properties. See Figure 6 for details.
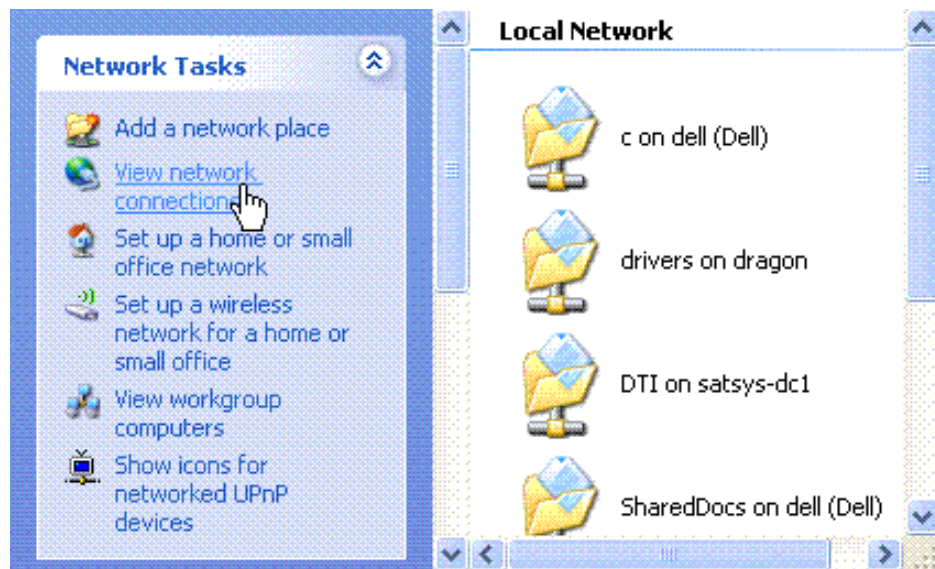
Figure 5. Select Local Area Connection
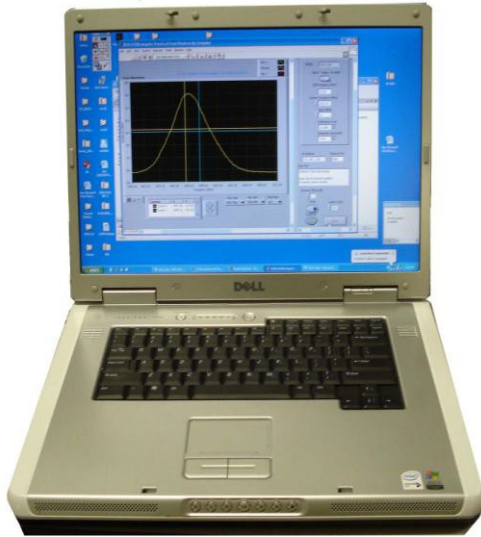
Figure 7. IP configuration
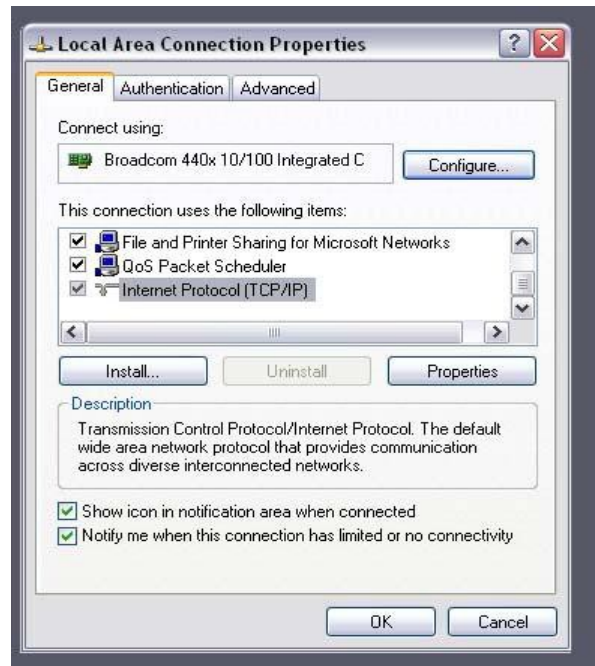
Figure 6. Open Properties
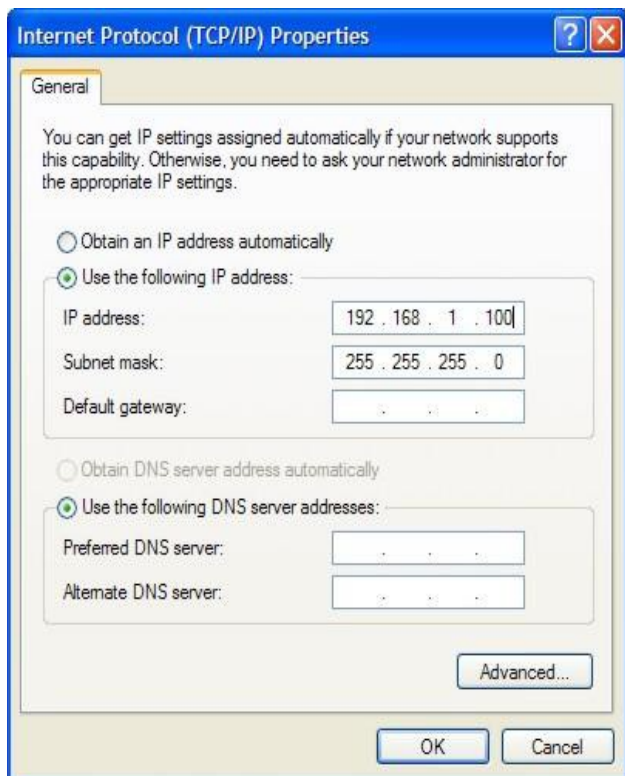
Select the "Use the following IP address" option and set the IP address to 192.168.1.100. Set the Subnet mask to 255.255.255.0.

Press the "OK" button to close the form.

At this time the BTR and the user's computer should be able to link up via the CAT5 crossover cable.

After successful operation of the BTR using the CAT5 crossover cable, the IP address in the BTR may be changed to the user's network requirements.

Appendix B
Router Set Up

ROUTER SET UP

To set a LINKSYS wireless router up for port forwarding you must perform the following steps.

1. Connect your computer to the Router, open an Internet explorer window and enter 192.168.1.1 (or as required by your network). This should bring up a security page asking you for the administration name and password. If these have never been changed enter admin for the name and admin for the password.
2. Click on The menu button called Applications and Gaming as shown in this screen shot. Do not make any changes on this page.
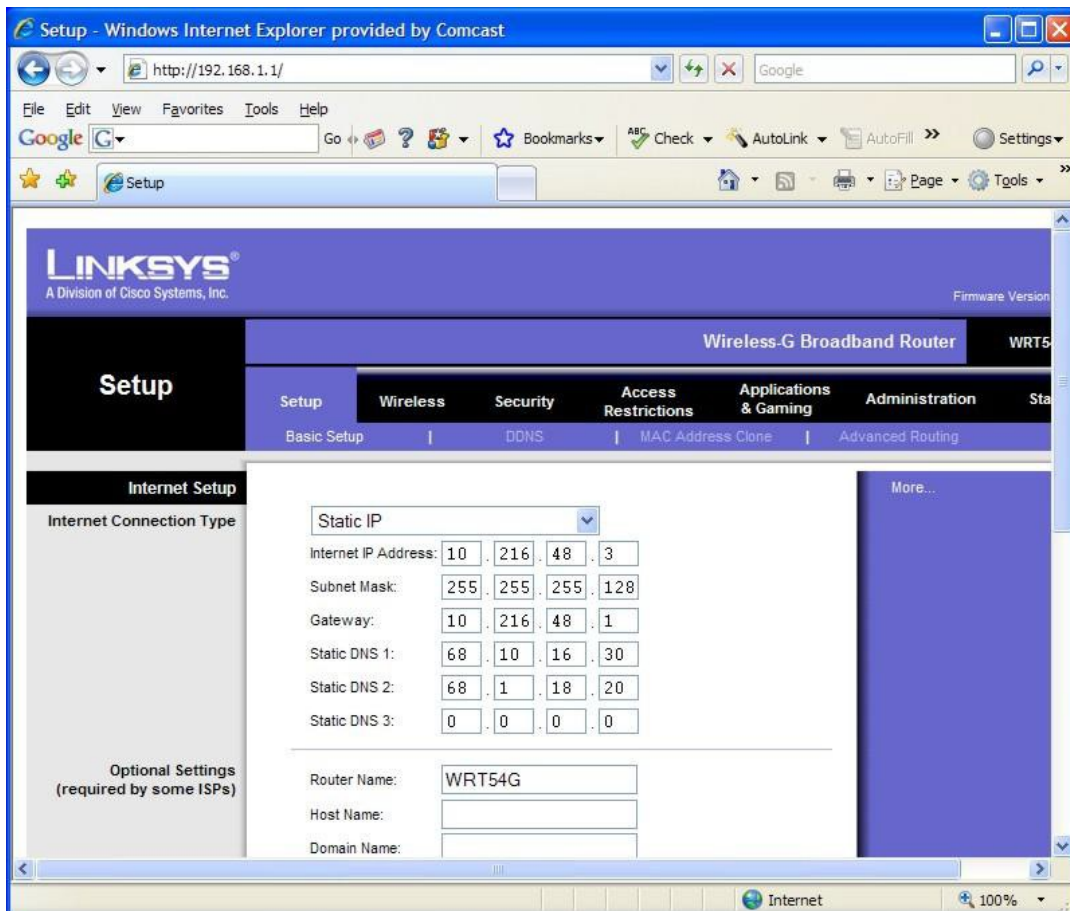
Figure 15.

3. When this page opens you set up port forwarding by finding a blank row and giving the application some name that you choose. Set the start and stop address to 8080 (unless this address is already selected). Protocol is set to both and IP address is set to the IP address we have set into the BTR. This is set to 192.168.1.200. (or as required by your network) Check the Enable box and save these settings.
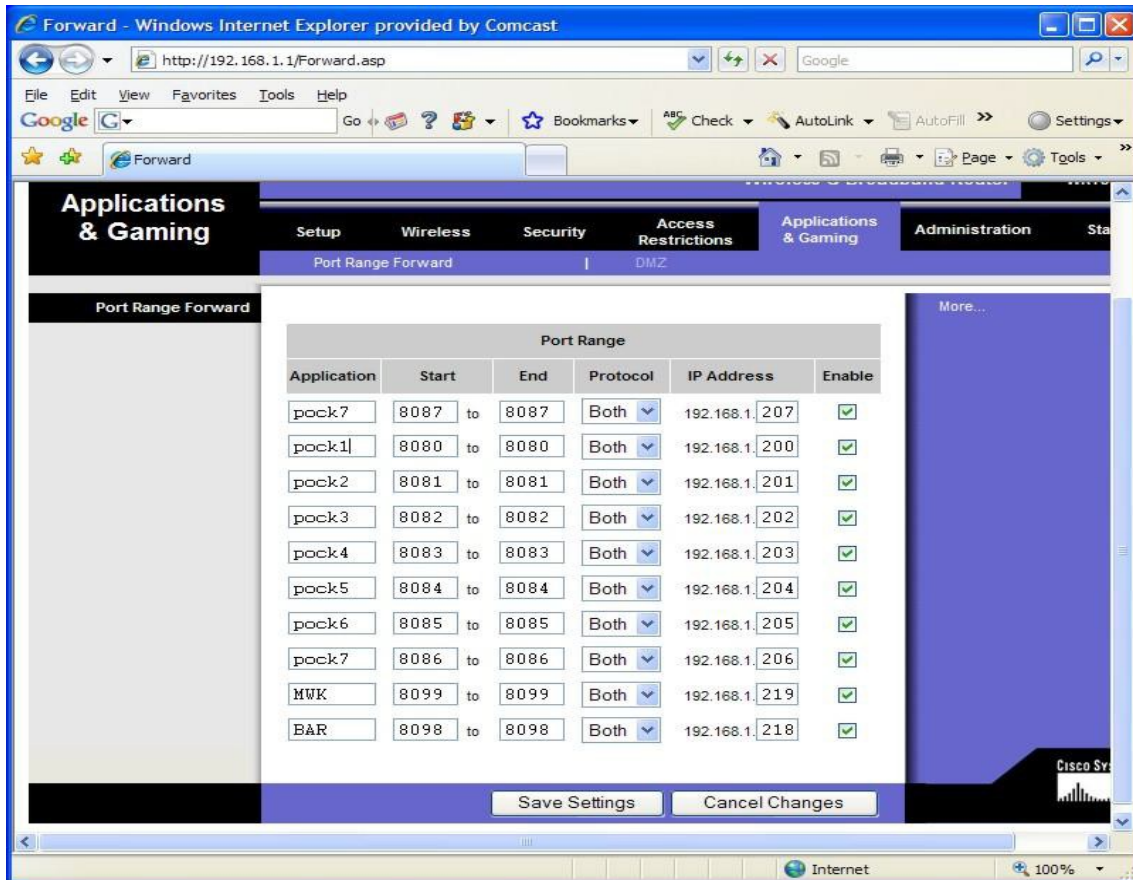
Figure 16.

4. Close this program.

NOTE: Please ask your network administrator to check your router settings and make sure your firewall settings will allow operation of our unit on your network.

Appendix C
IP & Port Configuration

Setting up our unit for remote monitoring

The following procedure will allow the IP and Port number our unit to be set to the user's IP and Port number.

To change IP address and port number on X-port Ethernet device.

1. Open your web browser program to the current address of the unit. The following screen should appear. Note: Units are shipped from the factory with an IP address of 192.168.1.200
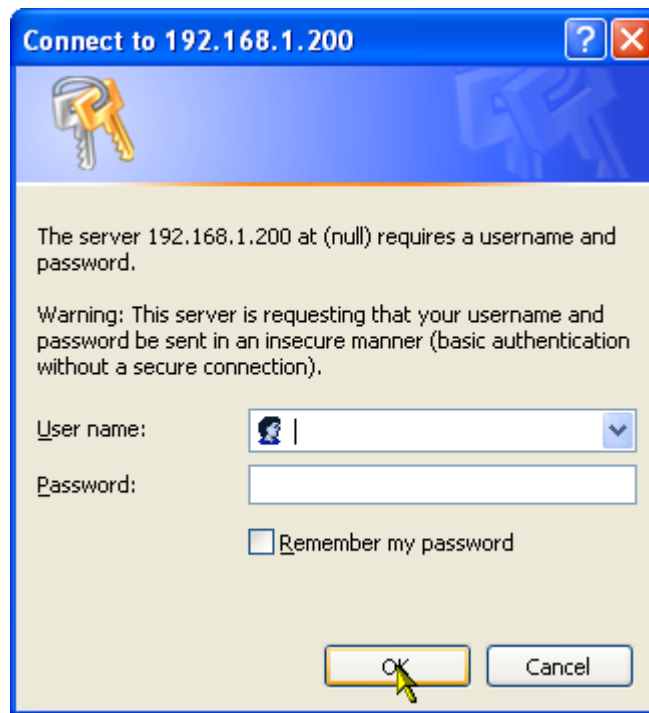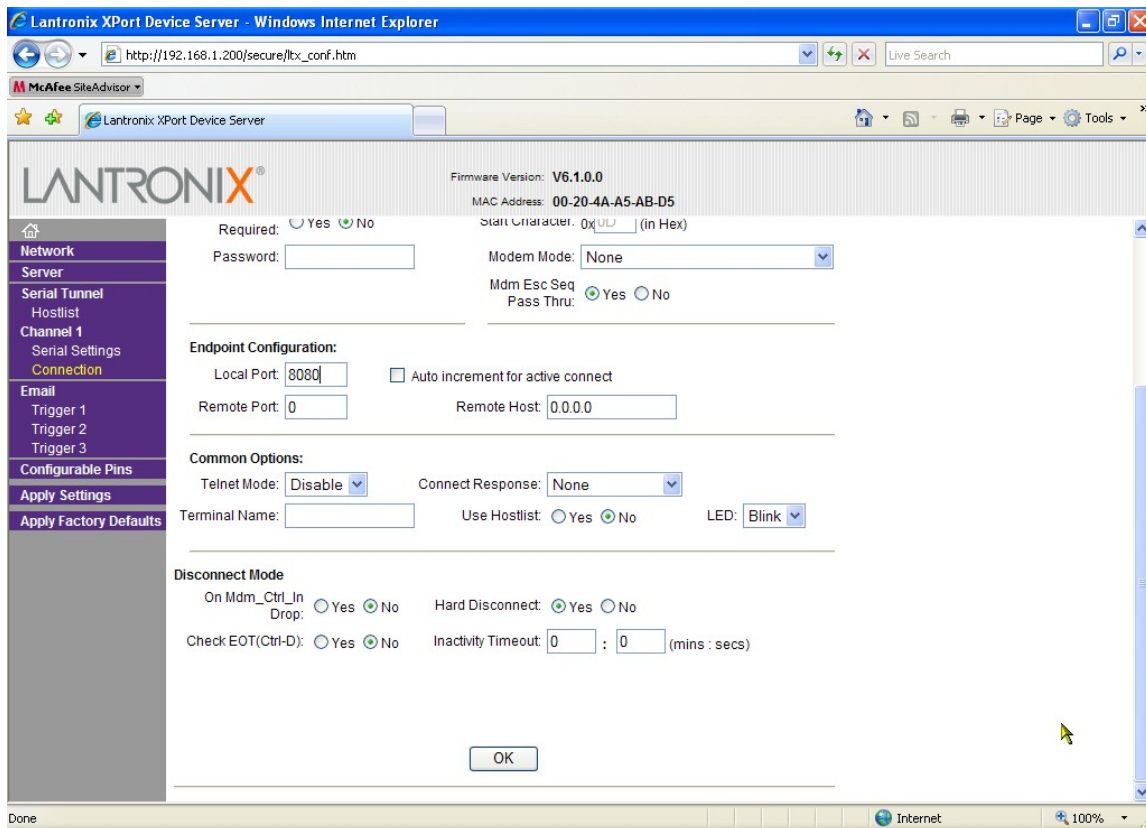

2. Click the OK button.

3. The following screen will appear.

4.   On the left side, click on Network. The screen should change to the Network settings screen.
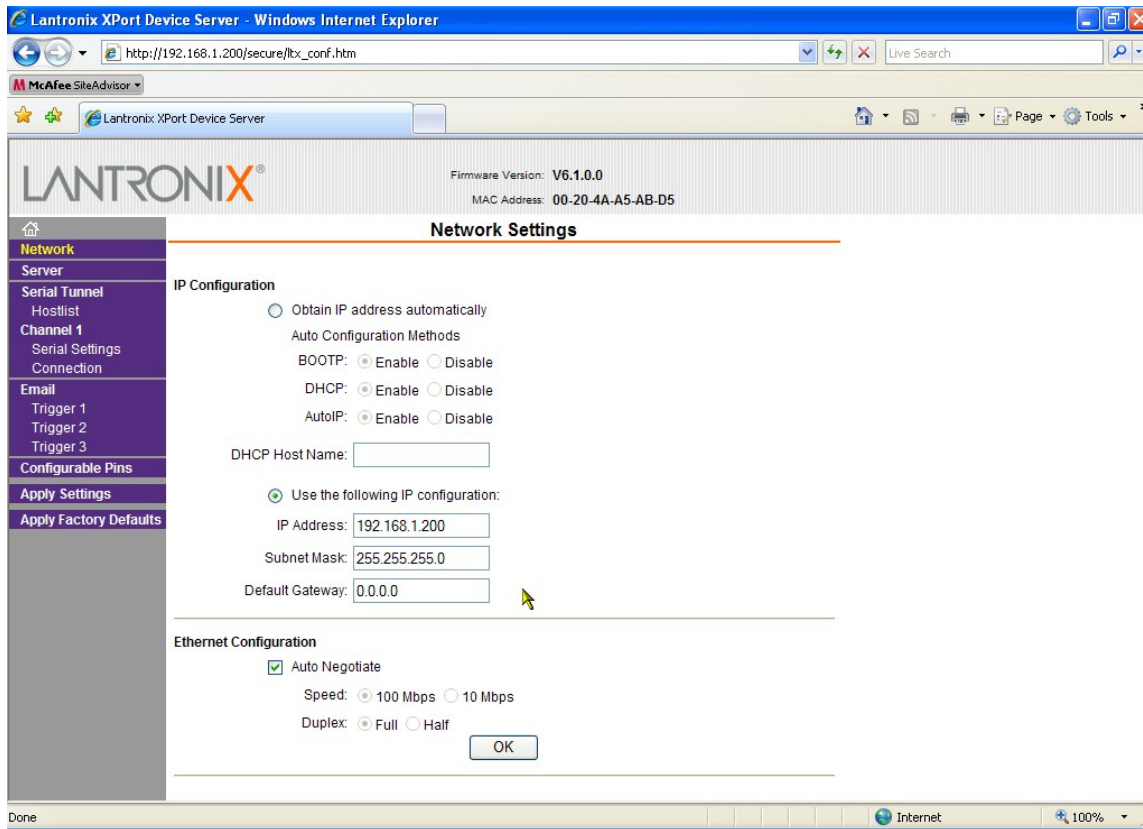
5.   Enter your desired IP address, Subnet mask, and default gateway settings. Be sure to click on the OK button at the bottom of this screen when you are satisfied with your settings.

6.   On the left side, click on Connection. The screen should change to the Connection screen.

7.   You can change your Local Port number on this screen. Be sure to click on the OK button at the bottom of this screen when you are satisfied with your settings.

8.   When you are satisfied with all of your settings, on the left side, click on Apply Settings. The screen should change to the writing defaults screen.
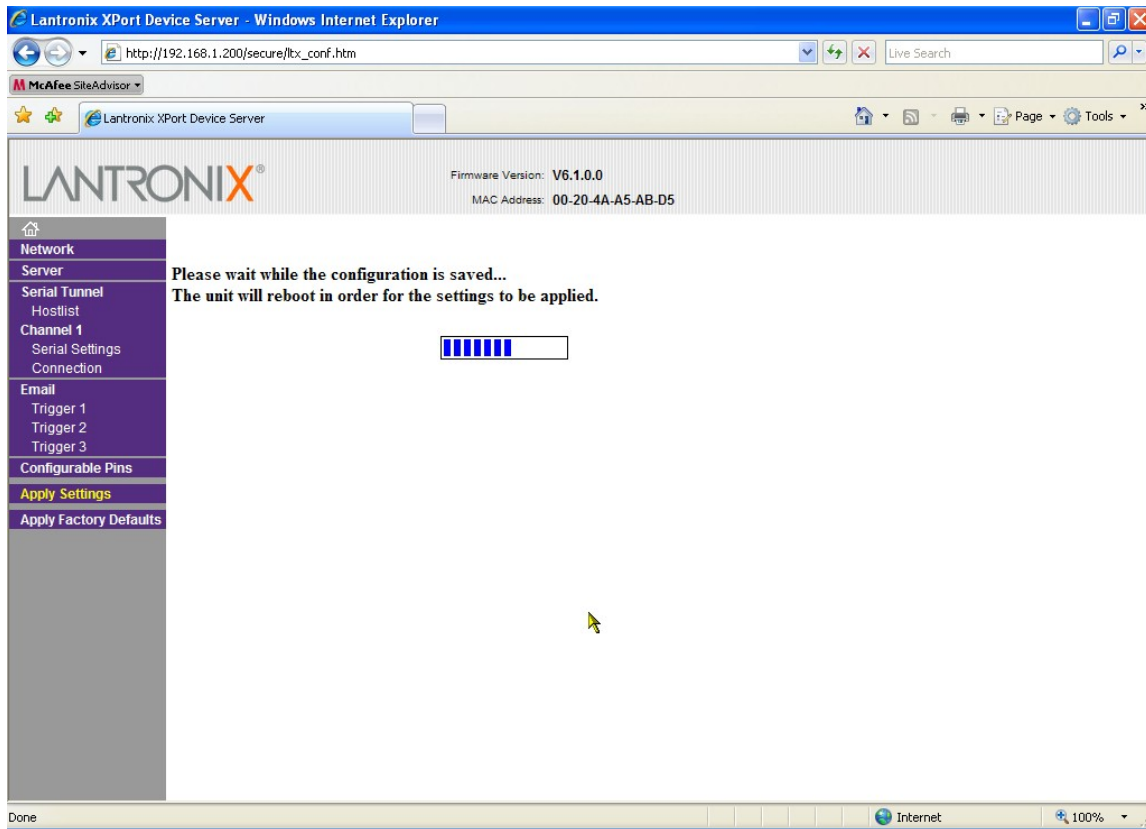
9. Wait for the screen to complete the update process. If you changed your IP address, your connection to the unit will be lost. Enter your new IP address in your browser window to reconnect to the unit. Remember that if you changed the network address you may have to reset the static IP and Port numbers to connect to the new unit IP and Port network numbers.

Note: The numbers to be entered are the responsibility of the user and his network administrator. Radeus Labs Inc does not select or assign these numbers. The numbers shown in this manual are for the default set up loaded into our unit at the time of manufacture. Once these numbers have been changed, it is the responsibility of the user to record the new Ethernet settings. Future requirements to change these numbers will be done using the recorded numbers not the Radeus Labs Incs default numbers.

Sales Terms
And Conditions

1   APPLICATION & ACCEPTANCE – All quotations covering Seller's products are made and all contracts or purchase orders for said products are accepted and all shipments are made on the condition that the terms and conditions set forth herein shall be applicable thereto, and shall supersede any provisions on Buyer's purchase order or other documents accepted by Seller which are at variance with or in addition to these terms and conditions other than additional provisions specifying character of the items ordered, quantity, price, delivery, insurance and shipping instructions. No changes or additions to these terms and conditions shall be binding upon Seller unless in writing and signed by a duly authorized representative of Seller. All contracts and orders are subject to acceptance by Seller at its Poway, CA facility.

2   QUOTATIONS & PRICE – All quotations expire thirty (30) days after the date thereof unless otherwise stated in the body of the quotation. Prices are net and are not subject to trade or other discounts and do not include local, state or federal sales, excise or similar axes, or cost of insurance or special packaging requested by Buyer, which when applicable shall by paid by Buyer.

3   PAYMENT – Unless otherwise specified on Seller's invoice, the amount thereof becomes due and payable within thirty (30) days from the invoice date. If, in the judgment of Seller the financial condition of the Buyer at any time does not justify shipment on the terms of payment originally specified, Seller may require full or partial payment in advance, may require Buyer to furnish an acceptable irrevocable letter of credit issued or confirmed by a prime U.S. Bank, or may ship COD. In the event of the bankruptcy or insolvency of the Buyer whether under the Federal Bankruptcy laws or other insolvency, the Seller shall be entitled to suspend or terminate performance until Buyer is able to give Seller reasonable assurance of payment. The invoiced amount shall not be subject to set-offs for any claims by Buyer against Seller, including any claims for products returned by Buyer for repair or correction of defects.

4   WARRANTY – Seller warrants to the original purchaser that the communications products that it manufactures and sells will be free from defects in materials and workmanship for a period of Three (3) years from date of shipment. If any such product proves defective during this warranty period, Seller at its option either will repair the defective product, or will provide a replacement in exchange for the defective product. Repaired or replacement product will be under this warranty for the remainder of the original warranty period of the replaced or repaired product. This warranty shall not apply to materials or components not of RADLABS's manufacture and shall not apply to any product which has been subject to misuse or damage or which has not been operated in accordance with the recommended safe operating procedure. In order to obtain service under this warranty, Buyer must notify Seller in writing of the defect before the expiration of the warranty period. This notice must include the Seller's Serial Number and date of shipment for the product the Buyer claims is defective. Buyer shall be responsible for packaging and shipping the defective product to Seller's factory located in Poway, CA, U.S.A. with shipping charges prepaid. This warranty shall not apply to any defect, failure or damage caused by improper use, or improper or inadequate maintenance and care. Seller shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Seller representatives to repair or service the product, b) to repair damage resulting from improper use or connection with incompatible equipment, or c) to repair or service a product that has been modified in any way by personnel other than Seller representatives. This warranty is given by seller in lieu of any other warranties, express or implied. Seller disclaims any implied warranties of merchantability or fitness for a particular purpose. Seller responsibility to repair or replace defective products is the sole and exclusive remedy provided to buyer for breach of this warranty. Seller will not be liable for any indirect, special, incidental or consequential damages irrespective of whether seller has advance notice of the possibility of such damages.

5 DELIVERIES – Shipping dates are approximate and are predicated on prompt receipt from Buyer of all necessary information. Seller shall not be liable for delay or non-delivery due to causes beyond Seller's reasonable control, including but not limited to acts of God, acts of Government authority, shortage of materials, shortage of power or other public utility services, fires, strikes, lockouts and inability to obtain acceptable products from Seller's vendors. If production is curtailed as a result of any of the foregoing contingencies, Seller shall allocate available resources equitably among Seller's customers.

6 SHIPMENT – All shipments will be made F.O.B, Seller's factory unless otherwise specified. In the absence of specific instructions, the Seller will select the carrier. Title to the material shall pass to the Buyer upon delivery thereof by the Seller to the carrier or delivery service. Thereupon the Buyer shall be responsible therefore. Products held for Buyer, or stored for Buyer shall be at risk and expense of Buyer. If at the request of Buyer shipments are postponed more than thirty (30) days, invoices shall become due thirty (30) days after notice that products are ready for shipment. Claims against Seller for shortages must be made within ten (10) days after arrival of shipment.

7 SERVICE CHARGE – Any account not adhering to the payment terms on the face thereof will be subject to a service charge of 2% per month on the unpaid balance. Unless otherwise indicated on the hereof payment terms are net 30 days. If Seller commences an action to collect amounts due on this account, Buyer will indemnify and hold harmless from all expenses incurred in connection therewith, including attorney's fees.

8 RETURN OF GOODS – A 15% handling or restocking charge after inspection and in the opinion of the Seller can be made upon all goods returned for credit.   Goods returned for credit must be returned within five (5) days after receipt and must be accompanied by our invoice number and date of purchase.

9 TERMINATION OF DEVELOPMENT CONTRACTS – If this order calls for the development of a product or process, Seller shall have the option to terminate the contract any time if in Seller's opinion completion is not technically possible or economically practicable. Upon such termination, Seller shall refund to Buyer any amount therefore paid by Buyer to Seller on account of the contract and Seller shall return to Buyer any and all tooling, property, drawings or data furnished to Seller by Buyer with respect to the development or production of the product or process. Thereupon, all liability of Seller to Buyer for the performance of the contract shall terminate.

10 PROPRIETARY RIGHTS – Seller shall not be obliged to disclose to Buyer any proprietary information or to deliver to Buyer any artwork or tools including masks, drawings and production aids developed by Seller, whether in furtherance of this order or otherwise, unless a written agreement signed by Buyer and Seller expressly provides for such disclosures or delivery. In the absence of such an agreement, Buyer shall acquire no rights or property in such information, artwork or tools. Seller shall have the right to exclude Buyer or Buyer's representatives from any area of Seller's plant access to which might reveal to Buyer or such representative's information which is proprietary to Seller or to third parties.

11 PATENTS & OTHER INTELLECTUAL PROPERTY – It is expressly agreed that Seller does not, directly or indirectly, provide any indemnity to Buyer with respect to infringement of patent, copyright, trademarks or other forms of intellectual property by goods supplied by Seller hereunder.

12 ASSIGNMENT – The Buyer shall not assign this order or any interest herein or any rights there under without the prior written consent of Seller.

Radeus Labs Inc
STATEMENT OF WARRANTY

Radeus Labs Inc (RADLABS) warrants to the original Buyer that the communications products that it manufactures and sells will be free from defects in materials and workmanship for a period of three (3) years from date of shipment. If any such product proves defective during this warranty period, RADLABS at its option either will repair the defective product, or will provide a replacement in exchange for the defective product. Repaired or replacement product will be under this warranty for the remainder of the original warranty period of the replaced or repaired product. This warranty shall not apply to materials or components not of RADLABS manufacture and shall not apply to any product which has been subject to misuse or damage or which has not been operated in accordance with the recommended safe operating procedure.

In order to obtain service under this warranty, the Buyer must notify RADLABS in writing of the defect before the expiration of the warranty period. This notice must include the RADLABS Serial Number and date of shipment for the product the Buyer claims is defective. Buyer shall be responsible for packaging and shipping the defective product to the RADLABS factory located in Poway, CA, U S.A. with shipping charges prepaid.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. RADLABS shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than RADLABS representatives to repair or service the product, b) to repair damage resulting from improper use or connection with incompatible equipment, or c) to repair or service a product that has been modified in any way by personnel other than RADLABS representatives.

This warranty is given by RADLABS in lieu of any other warranties, express or implied. RADLABS disclaims any implied warranties of merchantability or fitness for a particular purpose. RADLABS responsibility to repair or replace defective products is the sole and exclusive remedy provided to the Buyer for breach of this warranty. RADLABS will not be liable for any indirect, special, incidental or consequential damages irrespective of whether RADLABS has advance notice of the possibility of such damages.

Repair Service Policy

In the event of an equipment failure, contact Radeus Labs Inc (RADLABS) for technical support either by phone or e-mail. If necessary, the defective unit may need to be returned to the factory for correction. Evaluationand repair will normally be completed within 15 working days of receipt. Email support at support@radeuslabs.com

In some cases, RADLABS can supply the customer with a field loan unit during the repair of his equipment. Loan equipment is subject to availability at the time of request. The standard loan charge, twice the current minimum shop rate, plus freight will be charged in the form of a C.O.D. shipment for each loan unit regardless of the warranty status and any subsequent charges for the repair of the equipment to be repaired.

In the interest of minimizing repair processing time, RADLABS requires notification prior to the return of the defective equipment. Upon notification, RADLABS will assign a Returned Material Authorization (RMA) numberthat should appear on the outside of the package containing the defective equipment. Other information accompanying equipment being returned are: Serial Number, shipping and billing address(es), contact name, telephone number and **a comprehensive description of the failure.**

Satellite Systems strives to provide excellent customer service, if you feel your unit has a fault please contact us for a RMA# and we will evaluate your equipment promptly at no charge.

Notification may be made by telephone, email or fax:

RADEUS LABS INC
12720 Danielson Ct.
Poway, CA 92064
Support@radeuslabs.com

Warranty Information

Radeus Labs Inc (RADLABS) warrants new equipment to be free from defects in material or workmanship for a period of 36 months from date of original shipment. This warranty is extended to the original purchaser only and is not transferable to subsequent owners. If at any time the equipment malfunctions as a result of faulty material or workmanship, RADLABS will repair the defect(s) or replace the equipment at its sole option.   Any such repair or replacement of said equipment as well as return freight (2 day standard air) shall be made free of charge to the customer through the warranty period. All repairsshall be made at RADLABS facility with all transportation and any other subsequent charges prior to the receipt of said equipment at RADLABS facility shall be the sole responsibility of the customer.

RADLABS liability shall not extend beyond the reasonable repair or replacement for the repairs previously described. RADLABS does not warrant the equipment to operate in conditions other than those stated within this User Instruction Manual. RADLABS makes no other express warranty of any kind whatsoever. All implied warranties, including warranties of merchantability and fitness for a particular purpose, exceeding the duration of this warranty are hereby disclaimed and excluded from this warranty. RADLABS disclaims liability for any incidental or consequential damages.

*NOTE: Field alignment or repairs other than those provided for within this user instruction manual may void the equipment warranty and should be authorized by a factory representative prior to implementation.

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**Radeus Labs Inc — 12720 Danielson Ct, -- POWAY— CA -- 92064 – 858.391.1210 P – 358.391.1448 USA --
www.radeuslabs.com**

EC Declaration of Conformity

CE

According to ISO/IEC Guide 22 and EN45014:

Manufacturer's Name:	Radeus Labs Inc
Manufacturer's Address:	12720 Danielson Ct.
	Poway, CA 92064 U.S.A.

Declares that the product:

Product Name:	3434BTR Beacon Receiver
Model Number(s):	3434 (Product number may be followed by suffixes.)

Conforms to the following Product Specifications:

Safety: IEC 950:1991 +A1 +A2 +A3 / EN60950: 1992 +A1 +A2 +A3

EMC: CISPR 22: 1993, Class B / EN55022: 1994, Class B
IEC 1000-3-2: 1995 / EN61000-3-2: 1995
IEC 1000-3-3: 1995 / EN61000-3-3: 1995
EN50082-1: 1992
IEC 801-2: 1991 / prEN 55024-2: 1992, 4 kV CD, 8 kV AD
IEC 801-3: 1984 / prEN 55024-3: 1991, 3 V/m
IEC 801-4: 1988 / prEN 55024-4: 1992, 1 kV Power Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE-marking accordingly.

Date: Virginia Beach, Virginia, U.S.A.
June 15, 1997

In order to meet the EMC Directive (EN55022, EN50082-1), properly shielded cable for Serial Data I/O is required. These cables must be double-shielded from end-to-end, ensuring a continuous ground shield.

<HAR>	Type of power cord required for use in the European Community
⚠	CAUTION: Double-pole/Neutral Fusing ACHTUNG: Zweipolige bzw. Neutralleiter-Sicherung