

## APPENDIX BCN - INTEGRATED BEACON RECEIVER

Last Revised: 28 March 2019

This appendix describes the additional functions provided by the RC4600's integrated Beacon receiver option.

### 1 Introduction

#### 1.7 Appendix Organization

This appendix is provided as a supplement to the baseline RC4600 manual. The corresponding paragraphs in the baseline RC4600 manual are referred to when data specific to the Integrated Beacon Receiver option is described.

#### 1.3 RC4600 Features

This option provides the ability to manually and automatically tune an integrated beacon receiver for use during LOCATE and TRACK modes.

#### 1.4 Hardware Overview

For many tracking applications, it is desirable to monitor a satellite's beacon as an indication of received signal strength. Due to the relatively low power and narrow bandwidth of satellite beacons, specialized receiving equipment is required. This option allows the RC4600 ACU to internally house and control any of the three L-band beacon tracking receivers listed above.

All hardware options lock on, while measuring the level of conventional continuous wave beacons. The Novella Satcoms B38 and AVCOMM SBS2-2150E can also lock on, while measuring the signal level of BPSK modulated beacons.

The L-band beacon signal is input to the beacon receiver from the receive RF interface of the RC4600. Via user programming, beacon frequency may be selected to a resolution of 10 kHz. The receiver is capable of automatically locking to a satellite beacon through a search band listed in the table in section 1.6. Therefore accurate centering of the satellite beacon frequency is achieved despite the 10 kHz granularity of frequency selection.

The beacon receiver tracks the beacon signal's frequency drifts and measures its power level. The receiver generates a DC voltage output which represents, in logarithmic scale, the beacon power at the receiver's input. The output voltage to input power log-conformity is better than 0.1 dB over a 40 dB measuring range. The RC4600 monitors this DC voltage during tracking operations in order to keep the antenna peaked on the satellite.

## 1.6 Beacon Receiver Specifications

	Novella Satcoms B38	ASC350L	AVCOMM SBS2
Input Range	940 to 2150 MHz	930 to 2050 MHz	950 to 2150 Mhz
Input Impedance	50 Ohm	50 Ohm	50 Ohm
Input Level	-70dBm to -110dBm	-35 to -85 dBm	0 to -115 dBm
Signal Strength Output Range	±10 VDC	0 to 10 VDC	0 to 10 VDC
Signal Strength Output Slope	2 dB/V	2 dB/V	2 dB/V
Post-detection Time Constant	100 ms	400 ms	100 ms
Threshold for Lock Reacquisition	< 43 dB-Hz	< 45 dB-Hz	<44 dB-Hz
Search Range	±200 kHz	±30 kHz	±92 kHz
Attenuation Control	0 – 40 dB	0 – 50 dB	0 – 40 dB
Demodulation	CW or BPSK	CW only	CW or BPSK

The beacon receiver hardware may be purchased in three configurations:

- 1) Embedded Novella Satcoms B38 Compact Tracking Receiver.
- 2) Integrated Atlantic Satellite Corporation ASC350L Beacon Receiver.
- 3) Integrated AVCOMM SBS2-2150E Satellite Beacon Receiver.

The Receiver Option software is used for all hardware configurations. Functional and performance differences between the three hardware configurations are described in the remainder of the appendix.

## 1.7 Part Number Scheme

RC4600 software configuration is presented in the form RC46-abc-vwxyz where abc-vwxyz represents: (Mount manufacturer/Model) **abc** (Nav Sensor Option) **v** (Tracking Option) **w** (Remote Option) **x** (Receiver Option) **y** (Thor Receiver Option) **z**

This feature is categorized as one of the (Digit 11) Receiver 2 (Internal) options of the RC4600.

OPTION CATEGORY	DESIGNATOR	DESCRIPTION
Spectrum Analyzer/ Beacon Receiver	N	No integrated receiver supported
	A	ASC (Atlantic Satellite Corp.) BTR
	B	Novella Satcom BTR
	C	Avcom Spectrum Analyzer
	F	Avcom Spectrum Analyzer & Novella BTR
	H	DVB-S2
	I	DVB-S2 & Novella BTR
	J	DVB-S2 & Avcom Spectrum Analyzer + BTR
	K	Avcom Spectrum Analyzer + BTR
	L	Avcom BTR
	M	DVB-S2 & Avcom BTR
	P	DVB-S2 & ASC BTR

Software supporting the integrated beacon receiver would therefore be designated in the form RC46-abc-vwxyz.

## 2 SOFTWARE

### 2.7 Operation Overview

#### 2.7.1 Front Panel Software Operation

##### 2.7.1.2 Front Panel Operating Group

###### 2.7.1.2.2 MENU Mode

###### 2.7.1.2.2.3 LOCATE

###### 2.7.1.2.2.3.3 Azimuth Scan

When the beacon receiver option is used as the LOCATE source, the azimuth scan routine will be controlled by the settings found in the Beacon Sig Factors configuration screen (section 2.1.1.3.1.2.7 of the baseline manual).

###### 2.7.1.2.2.4 TRACK

When the beacon receiver option is used as the TRACK source, the step-track and peaking will be controlled by the settings found in the Track Factors configuration screen (section 2.1.1.3.1.9 of the baseline manual).

### 2.7.1.3 Front Panel Programming Group

#### 2.7.1.3.1 Configuration Mode

##### 2.7.1.3.1.1 Normal Access Items

##### 2.7.1.3.1.1.5 Beacon Detection Points

When the ACU is order with the integrate beacon receiver option this configuration group will be available. See this section of the mainline manual for information on configuring preset satellite beacon frequencies.

LOCK:1	TIME:1.5	CONFIG-BCN
THRES: 0	SENSE:1	
SCAN RG: 6	SRCH AZ: 5	SRCH:EL: 5
LOCK TYPE <0>NONE <1>HI <2>LO		

##### 2.7.1.3.1.2 Install Access Items

##### 2.7.1.3.1.2.1 Beacon Sig Factors

When the ACU is order with the integrate beacon receiver option this configuration group will be available. See this section of the mainline manual for information on configuring beacon receiver parameters used during LOCATE mode.

LOCK:1	TIME:1.5	CONFIG-BCN
THRES: 0	SENSE:1	
SCAN RG: 6	SRCH AZ: 5	SRCH:EL: 5
LOCK TYPE <0>NONE <1>HI <2>LO		

#### 2.7.1.3.2 Maintenance Items

##### 2.7.1.3.2.11 BCN

When the ACU is order with the integrate beacon receiver option this maintenance group will be available. See this section of the mainline manual for information on how to use the beacon maintenance screen for diagnostic procedures.

a: 25.906	SS: 791 L	.-AN: 0	BCN
e: 41.474	RF: 578	5-FR:20199.80	
	<>DM:CW	LO:18250.00	
<5,9,..,>>TUNE BCN		9-IF: 1949.80	

## 2.7.2 Graphical User Interface Software Overview

### 2.7.2.1.5 Automatic Operations

#### 2.7.2.1.5.3 Locate

When the beacon receiver option is used as the LOCATE source, the azimuth scan routine will be controlled by the settings found in the Beacon Sig Factors configuration screen (section 2.1.1.3.1.2.7 of the baseline manual).

#### 2.7.2.1.5.4 Track

When the beacon receiver option is used as the TRACK source, the step-track and peaking will be controlled by the settings found in the Track Factors configuration screen (section 2.1.1.3.1.9 of the baseline manual).

### 2.7.2.1.6 Signal Strength and Transmit Status

When the ACU is order with the integrate beacon receiver option BCN will be available as one of the signal strength sources. See this section of the mainline manual for information on viewing beacon signal strength.

## 2.7.2.2 Configuration Page

### 2.7.2.2.1 Satellite Database

When the ACU is order with the integrate beacon receiver option this beacon information will be available in the satellite database. See this section of the mainline manual for information on configuring preset satellite beacon frequencies.

### 2.7.2.2.2 System Settings

#### 2.7.2.2.2.2 GUI Configuration

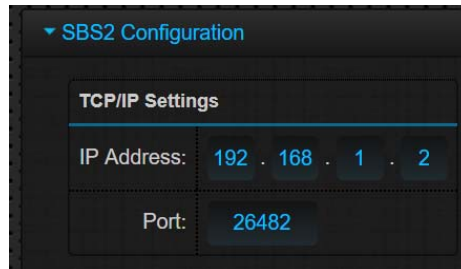
When the integrated beacon receiver for the ACU is the Avcom BTR, the BTR will be controlled via IP from the ACU. When setting the GUI configuration, it is important to make sure that the both the IP address of the controller and the IP address of the beacon are within the Subnet Mask Range of the ACU. The default IP addresses of each device will be as listed below.

- ACU IP Address: 192.168.1.1
- ACU Subnet Mask: 255.255.0.0
- Avcom SBS2 IP Address: 192.168.1.2
- Avcom Beacon Port: 26482

For information on how to change the IP settings of the beacon receiver see section 2.7.2.2.2.3.1.

### 2.7.2.2.2.3 Additional IP Devices

When the integrated beacon receiver for the ACU is the Avcom BTR, the BTR will be controlled via IP from the ACU. When setting the TCP/IP settings in the SBS2 Configuration drop down, it is important to make sure that this is the current IP address and Port are the current values of the BTR. Information on how to change the IP settings of the BTR are found in section 2.7.2.2.2.3.1.



#### 2.7.2.2.2.3.1 Configuring Avcom SBS2 beacon receiver

To change the IP settings of the Avcom SBS2 beacon receiver, the Avcom IP based GUI will be used. When you type in the current IP address of the BTR (192.168.1.2 by default), the user will be presented with the following screen. **NOTE: The only web browser with known compatibility is Mozilla Firefox.**

The screenshot shows the Avcom logo and tagline 'Bringing High Technology Down to Earth'. Below this is a table of device information:

Model Name: SBS2-2150C-S3C0-B	DHCP: Disabled	MAC: 00-E0-22-FE-00-82
Analyzer Name: SBS2-00-82	IP: 192.168.1.2	Hostname: SBS2-00-82
Serial: SBS2D50082	Subnet: 255.255.0.0	
Firmware: 1.5a1	Gateway: 0.0.0.0	Port: 26482

Welcome to the IP Settings Configuration Page! Please use the following page to configure your analyzers IP and port settings.

Connection (TCP) Port Number:

IP Configuration

Obtain IP address automatically through DHCP

DHCP Host Name:

Use the following static IP configuration:

IP Address:

Subnet Mask:

Default Gateway:

Through this screen, the user can adjust the IP settings of the BTR. Once the IP settings have been modified to the desired settings, the user can save the settings by pressing the OK button. **NOTE: The BTR will not work properly with the ACU if the IP configuration is set to DHCP.**

When the IP settings of the BTR have been modified, the user will then need to make the ACU aware of the new settings as described in 2.1.2.2.2 of the mainline manual.

When setting the BTR configuration, it is important to make sure that the both the IP address of the controller and the IP address of the BTR are within the Subnet Mask Range of the BTR.

## 5 SUPPORT

### 5.1 Troubleshooting

If the functionality of the beacon receiver is in question, first go to the maintenance screen (2.7.1.3.2.11) and confirm communication with the receiver. If the receiver cannot be tuned, check the internal cabling between the beacon receiver and the rest of the RC4600.

If a LOCATE to a satellite does not work, manually position onto the satellite and confirm (via the maintenance screen) that a lock can be obtained at that frequency.

The inability to obtain lock may be due to low signal level reaching the beacon receiver. From the maintenance screen, set the attenuation to 0 to make the receiver as sensitive as possible.