
Model 3470 BTR

Beacon Tracking Receiver



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

1. Functional Description

1.1 The Model 3470 BTR is a fully frequency agile satellite receiver designed to provide a DC reference voltage proportional to the received signal level of a satellite beacon or other SCPC carrier. The receiver has a pre-detection bandwidth of 50 KHz. Frequency selection of the desired carrier is accomplished from the front panel or by remote serial link. The minimum step size is 10 kHz. Programming instructions are outlined in the back section of this manual.

2. Model 3470 BTR Unit Specifications

Input Frequency 67.5 to 72.5 MHz
Input Level ≥ -60 dBm, front panel adjustable
Input Impedance 50 ohm
Frequency Selection Local or remote over
 ± 2.5 MHz on 10 KHz steps
Threshold 4 dB C/N for acquisition
 < 1 dB C/N for carrier lock
Alarms Local/Alarm Display
Form-C relay contacts
AFC ± 25 KHz,
Noise Bandwidth 50 KHz
Output Level Internal op amp scalable 0 to 10 VDC, 7.5VDC NOMINAL
Tracking Response 0.5 volts change for 1 dB
change of input level.

MECHANICAL:

Input Connector BNC (Female) 50 Ohm
Output Connector Modular socket & plug
M&C Connector DB-9, Female
M&C Interface RS-232 or RS-485 (factory configured)
DIMENSIONS: Single 19" rack unit, 16" deep

POWER 110/230 VAC 40-60 Hz
auto-sensing

3. Front Panel Facilities

3.1 DISPLAY

3.1.1 Receive Frequency

The frequency to which the 3470 is tuned is displayed in the upper left corner of the LCD display.

3.1.2 Carrier Lock or Alarm Status

When the 3470 is locked to a carrier, the LCD will display LOCK in the upper right corner. When the 3470 is not locked to a carrier, the LCD will display ALARM.

3.1.3 VDC Output

The tracking reference DC level output from the 3470 will be displayed in the bottom left corner of the LCD display.

3.1.4 Input Gain

The RF input to the 3470 may be adjusted to the receiver's linear range. A number between 400 and 999, which represents the input attenuation, is displayed in the bottom right corner of the LCD display.



3.2 KEYPAD

3.2.1 The **L/R** key is used to toggle the Local or Remote mode of operation. To place the unit in **LOCAL** or **REMOTE** mode of operation, hold the **L/R** key and simultaneously press and then release the **RESET** key. After the display changes, release the **L/R** key. The unit will change modes of operation and retain the new mode selected.

3.2.2 The **RIGHT ARROW** key moves the cursor on the LCD display. **NOTE:** Hold the **CUR** key to enable the **RIGHT ARROW** key. Use the **RIGHT ARROW** key to position the cursor under the LCD digit you wish to change. The number above the cursor is the number which will change when the + or - key is pressed. When you release the **CUR** key, the frequency is updated internally. If an invalid frequency is selected, the colon [:] after **FREQ** will blink.

3.2.3 The + key is used alone to increase gain. The + key is also used in conjunction with the **CUR** key to change frequency. The + key increases the RF input gain by reducing an attenuator inside the 3470. A number between G: 400 and G: 999, which represents the input attenuation, is displayed in the bottom right corner of the LCD display.

3.2.4 The - key is used alone to decrease gain. The - key is also used in conjunction with the **CUR** key to change frequency. The - key decreases the RF input gain by reducing an attenuator inside the 3470. A number between G: 400 and G: 999, which represents the input attenuation, is displayed in the bottom right corner of the LCD display.

3.2.5 The **RESET** key is used to toggle the Local or Remote mode of operation. To place the unit in **LOCAL** or **REMOTE** mode of operation, hold the **L/R** key and simultaneously press and then release the **RESET** key. After the display changes, release the **L/R** key. The unit will change modes of operation and retain the new mode selected.

4. Rear Panel Facilities

4.1 Rear Mounted Terminal Plug (provided)

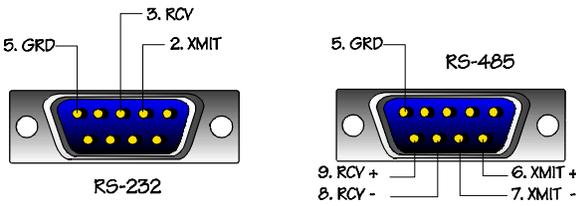
8 - SS	Provides a DC reference proportional to the received signal input level. This DC level changes approximately 0.5 volts for a one dB input signal level change over a 0 to 10.0 VDC range. Normal; +7.5 VDC for -70 dBm input.
7 - GND	Signal Ground
6 - PWR-1	Not Used
5 - PWR-2	Not Used
4 - N/A	Not Used
3 - COM	Alarm relay common
2 - N/O	Normally open relay contact. Open with respect to common when unit is LOCKED to beacon.
1 - N/C	Normally closed relay contact. Closed with respect to common when unit is LOCKED to beacon.

4.2 IF Input

4.2.1 BNC Female connector for input of 67.6MHz to 72.5MHz.

Installation and Alignment

The serial protocol of the 3470 is fixed at 1200N81. 1200 baud, no parity, eight bits, 1 stop bit.



RS-232

RS-485

Changing the RS 485 serial address

- ? The unit must be in remote mode to change the serial address.
- ? Press and hold the **CUR** key.
- ? Press and release the RESET key (continue to hold the CUR key).
- ? Continue to press and hold the **CUR** key; press and release the L/R key. As the L/R key is pressed and released, the address will scroll up in value.
- ? When you have reached the address value you want, release the **CUR** key.
- ? The address range is from the number 1 through the letter F.

Polling the 3470

- ? To query a status report from the 3470, send the command string: (*hex address, space*) That is, the address value you have assigned followed by a space in hexadecimal.
- ? The unit will respond with: *ADD=(hex address), FREQ=(receive frequency), GAIN=(gain), SS=(signal strength voltage), L (lock) or A (alarm)*

Changing the frequency and gain

- ? Send the command string: (*hex address, space, frequency, space, gain, space*) WHERE:
 - ? *hex address* = 1 through F
 - ? *frequency* = 67.50 to 72.50 Mhz
 - ? *gain* = a relative number between 400 and 999.
- ? The entire command string must be transmitted in all cases; to change frequency, gain or both.
- ? If an incomplete command string with the correct address is sent, the unit will respond with the current conditions as if being polled.
- ? If an incorrect command string with the correct address is sent, the unit will not respond
- ? If the correct address is not transmitted the unit will not respond.

Polling the 3470

- ? To query a status report from the 3470, send the command string: (*F, space*) That is, the ascii letter "F" followed by a space
- ? The unit will respond with: *FREQ=(receive frequency), GAIN=(gain), SS=(signal strength voltage), L (lock) or A (alarm)*

Changing the frequency and gain

- ? Send the command string: (*F space frequency in MHz, space, frequency in KHz, space, gain, space*)
- WHERE:
 - ? *frequency in MHz* =67.5 - 72.5 Mhz in 1 MHz increments
 - ? *frequency in KHz* = 00 to 99 in 10 KHz increments
 - ? *gain* = a relative number between 400 and 999.
- ? The entire command string must be transmitted in all cases; to change frequency, gain or both.
- ? If an incomplete command string is sent, the unit will respond with the current conditions as if being polled.
- ? If an incorrect command string is sent, the unit will not respond

5. SYSTEM ALIGNMENT PROCEDURE

5.1 Install a 50 ohm, BNC cable between the downconverter and the MODEL 3470 BTR .

5.2 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, 47-60 HZ power outlet. The MODEL 3470 BTR 's power supply automatically detects AC input voltage.

5.3 Tune the 3470 to the beacon frequency.

5.4 Adjust the 3470 gain to 999. (Refer to paragraph 3.2.3 or 5.2)

5.5 If the antenna system is properly aligned to the appropriate satellite and polarity the LCD display will show LOCK in the upper right corner. Observe the GAIN value at the lower right corner of the LCD display. Adjust the gain (refer to paragraph 3.2.3 or 5.2) for a DC level as nearly as possible to + 7.5 Volts. This sets the input gain for the receiver's most linear range.

5.6 The antenna can be optimally aligned while monitoring this voltage for a maximum reading. If necessary readjust the GAIN to achieve + 7.5 VDC.

Work Sheet

Model 3470 BTR
SERIAL NUMBER _____ Date _____

Input Signal Level dBm	Output VDC	Input Signal Level dBm	Output VDC
-35 dBm	_____	-46 dBm	_____
-36 dBm	_____	-47 dBm	_____
-37 dBm	_____	-48 dBm	_____
-38 dBm	_____	-49 dBm	_____
-39 dBm	_____	-50 dBm	_____
-40 dBm	_____	-51 dBm	_____
-41 dBm	_____	-52 dBm	_____
-42 dBm	_____	-53 dBm	_____
-43 dBm	_____	-54 dBm	_____
-44 dBm	_____	-55 dBm	_____
-45 dBm	_____		

Symptom	Cause
1. No power to unit.	<p>1. AC power fuse blown.</p> <p>Note: the AC power fuse is located in the rear mounted power connector. A spare fuse is also located within.</p> <p>2. Insure there is proper AC power to the unit. The unit can operate on either 220VAC or 120VAC with the use of the associated power cord.</p>
2. Alarm Condition	<p>1. Unit not tuned to proper receive frequency. Recheck tuning table and procedure.</p> <p>2. The Carrier-to-Noise (C/N) of the receive signal is not adequate for unit to operate.</p> <p>Note: the C/N is a function of the downlink power of the carrier as well as the G/T (figure-of-merit) of the receive system.</p> <p>3. The carrier level is too low.</p> <p>Adjust the downconverter output to insure > -60 dBm input to the 3470 BTR.</p>
3. Lock but low DC output tracking voltage.	<p>1. Signal level too low to unit (see above).</p> <p>2. Low C/N. Unit may be noise driven which minimizes signal level sensitivity.</p>
4. Lock but high output tracking voltage with no change when input signal level changes.	<p>1. I.F. input level adjust set too high. Unit is in compression. Refer to alignment procedure.</p> <p><i>NOTE:</i> When in compression [too much input level] the DC signal strength may increase as the input level decreased when the unit is going out of compression. Continue to decrease input level until a linear response is obtained, <i>ie</i>; 7.5 volts.</p>

Note: there are no internal adjustments within the receiver. If it is determined that the unit has failed, refer to the Satellite Systems Corporation Repair Return Policy which follows.

Repair and Warranty Policies

Repair Service Policy

In the event of an equipment failure, the defective unit should be replaced with a spare unit and then returned to the factory for correction. Returned units are normally repaired and returned within 10 working days from receipt of unit.

In many cases, Satellite Systems Corporation, 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, equal to the current minimum shop rate, plus freight will be charged in the form of a C.O.D. shipment for each unit loaned 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, Satellite Systems Corporation requires notification prior to the return of the defective equipment. Upon notification, Satellite Systems Corporation will assign an RMA (Returned Material Authorization) number that should appear on the outside of the package containing the defective equipment. Other information should accompany equipment being returned are Purchase Order Number, shipping and billing address(es), contact name, telephone number and a comprehensive description of the failure.

For equipment returned that Satellite Systems Corporation finds no failure or defect, the current minimum one hour shop rate will be charged.

Notification may be made by telephone or fax to:

SATELLITE SYSTEMS CORPORATION
Communications Products Division
101 Malibu Dr.
Virginia Beach, VA 23452
Phone Number: (757) 463-3553 Fax Number: (757) 463-3891
info@satsyscorp.com

Warranty Information

Satellite Systems Corporation (SSC) warrants new equipment to be free from defects in material or workmanship for a period of 12 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, SSC 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 repairs shall be made at SSC's facility with all transportation and any other subsequent charges prior to the receipt of said equipment at SSC's facility shall be the sole responsibility of the customer.

SSC's liability shall not extend beyond the reasonable repair or replacement for the repairs previously described. SSC does not warrant the equipment to operate in conditions other than those stated within this User Instruction Manual. SSC 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. SSC 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.



EC Declaration of Conformity

According to ISO/IEC Guide 22 and EN45014:

Manufacturer's Name: Satellite Systems Corporation
Manufacturer's Address: 101 Malibu Drive
 Virginia Beach, Virginia 23452 U.S.A.

Declares that the product:

Product Name: 3430BTR Beacon Receiver
Model Number(s): 3430 (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

**Model 3470 BTR
Beacon Tracking Receiver
Instruction Manual**