RC2500

Controller for Resolver Based Satellite Antennas

A:190.73 E: 30.20 P:132.5 H S:668 MANUAL
SAT:SPACENET 4 101.0 W   SPEED:SLOW

Research Concepts, Inc.
RC2500 SATELLITE ANTENNA CONTROLLER

FEATURES

➤ **Automatic Positioning**
precisely positions antenna with the press of a single key

➤ **User Friendly Interface**
operator interaction is the same as the Industry Standard RC2000

➤ **Easy to Read Super-twisted nematic LCD**
simultaneously displays Az, El and Pol Angles, Received Signal Strength, as well as current Satellite Name and Longitude

➤ **Non-volatile Memory**
stores 38 preset position and polarization combinations

➤ **Continuous Antenna Status Monitoring**
motion limits, drive error, maintenance, emergency stop and runaway conditions

➤ **Dual Speed**
fast slewing, fine positioning

➤ **Inclined-Orbit Tracking**
Step Track, Memory & Search modes supported

➤ **Solid-State Control Circuitry**
5KV-rated opto-isolation, operates with many outdoor boxes

➤ **Intelli-Search™**
eliminates problems associated with traditional searches – search mode may be overridden for transmit applications

➤ **Multi-Band Operation**
supports Ku, C and L-band satellites

➤ **Optional RS-422 PC Control Interface**
automated control with many popular packages

➤ **High-Resolution Resolver Interface**
ensures accurate Ku-band positioning

➤ **Software Controlled Offsets**
allows for easy resolver setup

➤ **Designed for Future Expansion**
designed-in ports for potentiometer-based feed control, RF power measurement circuits, TTL-compatible Digital input, form-C relay output

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OPERATIONAL OVERVIEW

The RC2500 is designed to provide an upgrade path for users of older, unsupported antenna controllers. The large investment in an antenna system is preserved by retrofitting an existing installation with the RC2500. In addition to the ease of use afforded by the industry standard menu scheme of the RC2000 series, the capability of the antenna system can be enhanced to include features such as inclined orbit tracking and PC remote control.

A reliable all solid-state control section interfaces to many standard antenna-pad-mounted drive housings. Optically coupled drive outputs and limit inputs provide isolation between the outdoor unit and the rack-mounted RC2500. The RC2500 can support a single summary limit input or individual limits for each axis.

Antenna Position sensing is performed by high precision resolver system. Overall, the RC2500 is well equipped to handle the demanding requirements for both domestic and international inclined-orbit satellite tracking.

TRACKING ALGORITHM

Unique to the RC2000-RC2500 series tracking controllers is Intelli-Search, a novel and very efficient search algorithm that minimizes errors associated with traditional box searches and frees the user from having to update vague search window parameters. This scheme accounts for the specific mount geometry, calculates the nominal trajectory for the satellite, and then searches in an area that coincides with the satellite's expected path. Once an inclined
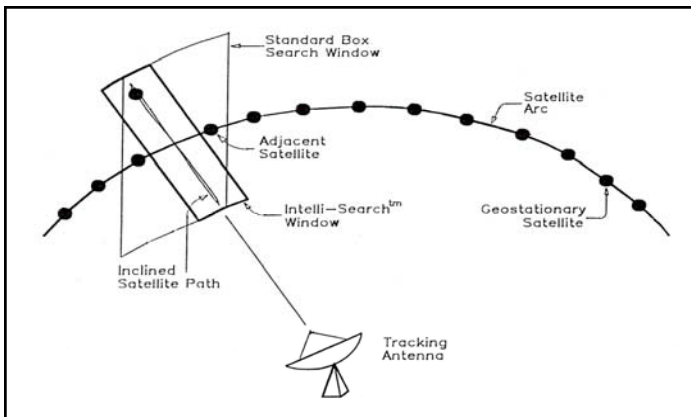
satellite has been stored in the RC2500, finding it again is as easy as locating a fixed satellite. Simply move to Auto mode, select the satellite from the list of those available, specify the proper polarization and let the RC2500 do the rest.

The tracking algorithm used by the RC2500 antenna controllers can be divided into 3 distinct parts - STEP_TRACK, PROGRAM_TRACK and SEARCH. To initiate the track process, the user jogs the antenna to the satellite and verifies the identity of the satellite. The system then enters STEP_TRACK mode.

In **STEP_TRACK** mode the controller periodically peaks the receiver's AGC signal strength by jogging the antenna. The time and position are recorded in a track table maintained in the controller's non-volatile memory. The interval between peakups is

determined by antenna beamwidth (as determined from antenna size and the frequency band), satellite inclination and a user specified maximum allowable error (in dB). STEP_TRACK mode is active until a time is reached that corresponds to a segment of the satellite's motion which has previously been stored in the track table. When this occurs PROGRAM_TRACK mode is activated.

In **PROGRAM_TRACK** mode the controller smoothly moves the antenna to azimuth and elevation positions derived from entries in the track table. The time between movements is determined by the same factors which govern the time between peakup operations in STEP_TRACK mode. In particular the user can specify the maximum allowable error between the antenna's actual position and the position specified by the track table. By increasing the maximum allowable error, antenna movements can be performed less frequently, thus avoiding unnecessary wear on the antenna actuators. In PROGRAM_TRACK mode the accuracy of the track table is monitored by periodically peaking up the receiver AGC signal. If the error exceeds a level set by the user, all entries in the track table are flagged for update. The period between these accuracy checks is specified by the user and typically varies from once a day to once a week.

SEARCH mode is entered from STEP_TRACK mode when the satellite signal has been lost. When the satellite is located through the aforementioned Intelli-Search algorithm, the controller re-enters the STEP_TRACK mode.

SPECIFICATIONS

PHYSICAL

Size:	19.0" x 3.5" x 9.0" (rack)
Weight:	10.0 lbs.
Temperature:	$0^o - 50^o$ C
Input Power:	115/230 VAC, 50/60 Hz., 48 W

TRACK MODE

Antenna Size:	0.4 – 10.0 meters
Maximum Inclination:	+/- 10° standard
Tracking Modes:	Intelli-Search^{TM}, Step Track, Program Track
Inclined Satellites:	5 maximum
2 AGC Inputs:	-15 to +15 VDC input range, 4M Ω input impedance

ANTENNA INTERFACE

Control Output:	Protected, Open-Collector Relay drivers (Imax: 700mA, Vmax 60V)
Alarm Output:	3A @ 30 VDC or 3A @ 125 VAC both NO and NC
Positioning Sensing:	Low Voltage Resolver Interface