

## Antenna Controller Retrofit for Comtech 3.8 Meter Antenna

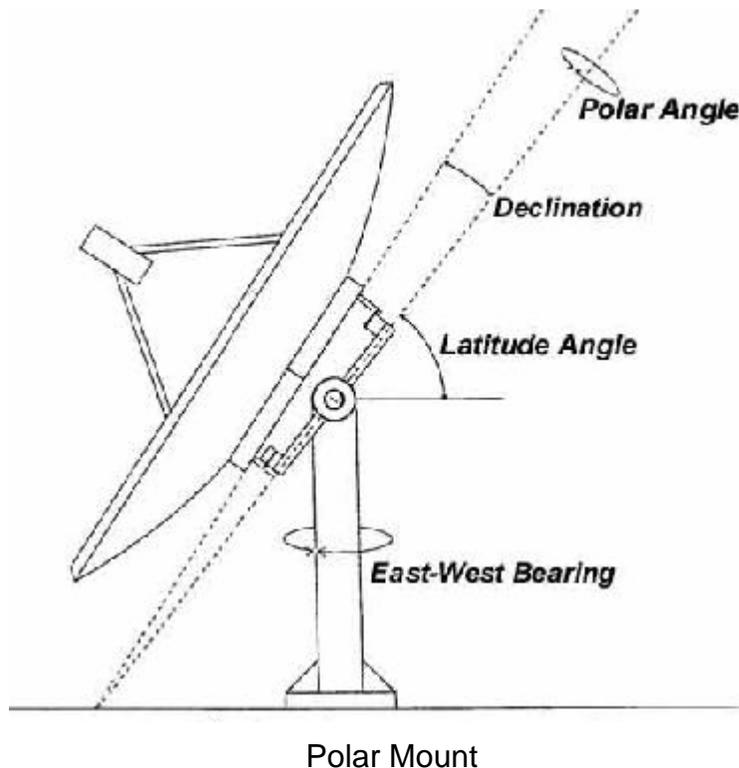
The paper describes how to retrofit a Comtech 3.8 meter antenna configured for use with a CTI EC6 or EC8 controller with the Research Concepts RC1500 or RC2000 antenna controllers. The RC1500 is a single axis antenna controller unit (ACU). The RC2000 is a dual axis antenna controller.

The retrofit requires the following ...

1. The linear actuators that position the antenna must be replaced with 36 volt DC linear actuators with built-in pulse sensors. Some models have one linear actuator. Others have two linear actuators.
2. Antenna's with a single linear actuator can be retrofitted with the RC1500A. Antenna's that employ two linear actuators require the RC2000. The RC2KPOL daughterboard must be installed in the RC1500 or RC2000 to control the rotating feed.
3. The pulse sensor on the rotating feed must be replaced with a potentiometer.
4. New cabling between the antenna and the ACU.

### **Comtech 3.8 Antenna**

Motorized Comtech 3.8 meter antennas employ a polar mount. A diagram of a polar mount is provided below. A unique characteristic of a polar mount is that it can track the geostationary satellite arc with movement about the Polar Angle axis IF the mount East-West Bearing, Latitude, and Declination angles are properly adjusted. The polar mount's Polar Angle is often referred to as 'Hour Angle'.



### **Linear Actuators**

All Comtech 3.8 meter antennas employ a linear actuator with built-in AC motor/brake for Polar Angle (or Hour Angle) adjustment. Some Comtech 3.8 meter antennas are also equipped with an AC powered linear actuator to change the declination angle.

To use the RC1500 or RC2000 with the Comtech 3.8, the AC powered linear actuators must be replaced with 36 volt DC linear actuators with built in pulse type (reed switch or hall effect) position sensors such as those manufactured by Thomson Saginaw. DC linear actuators are available in 24 and 36 inch lengths. Some linear actuators incorporate limit switches with steering diodes that are placed in-line with the motor. Other actuators employ a slip clutch. We usually recommend actuators equipped with limit switches.

The CTI EC6 and EC8 antenna controllers employ quadrature pulse encoders attached directly to the polar angle and declination axis. These pulse sensors are not compatible with the RC1500 or RC2000.

### ***Polarization Control***

Comtech antennas usually employ a four port feed based on a Seavey ESA124D feed. This feed has two Ku band LNB's and two C band LNB's. It can simultaneously receive H and V for C and Ku bands. The Seavey ESA124D feed employs a 24 volt DC Pittman gear motor. For polarization position sense, Comtech employs a quadrature type pulse position sensor. The form factor of the feed pulse position sensor is similar to that of a potentiometer with a ¼" shaft.

Some Comtech antennas were offered with a Ku band, dual polarization feed based on Seavey ESA 1212 or ESR 1212 mode feeds. The pulse position sensor found on these feeds are different from that of the four port feed.

To interface to an RC1500 or RC2000 the pulse sensor on the rotating feed must be replaced with a potentiometer. The pulse sensor on the Seavey ESA124D feed can be replaced with a 5 turn, 5 K ohm potentiometer. We recommend the Contelec P-F3-82379 potentiometer (sold in the US by Novotechnik). The Contelec potentiometer is well sealed. This potentiometer is available from Research Concepts (RCI p/n P-F3-82379). See the contelec2.pdf attachment for a drawing of the Contelec potentiometer.

The Seavey ESA124D feed is equipped with mechanical stops. When replacing the quadrature encoder with a potentiometer, first motor the feed to the center of its range of rotation. Rotate the potentiometer shaft so that it is in the middle of its range of motion (approximately 2 ½ turns from the pot's mechanical limits). Then install the potentiometer in the feed. This will insure that the feed's travel limit is reached before the potentiometer's mechanical limit is reached.

The RC2KPOL must be installed in the RC1500 or RC2000 to interface to a rotating feed powered by 24 VDC motor that employs a potentiometer for position feedback. The RC2KPOL daughterboard can be installed in the field.

### ***Cabling***

RCI p/n CBL-2\_16-3\_22A contains two 16 AWG conductors for motor drive current and a shielded triple (3 x 22 AWG) with a bare drain wire for the sensor. The jacketing material is uV rated black. We refer to this as actuator cable. This cable can interface a single actuator to an RC1500 or RC2000. See the data sheet, CBL-2\_16-3\_22Aspec.pdf.

RCI p/n CBL-3XACTUATR1 consists of 3 separate CBL-2\_16-3\_22A cables in a common jacket that is uV rated. A single run of this cable can interface an RC2000 to a dual axis antenna with a rotating feed. See the data sheet, CBL-3XACTUATR1spec.pdf.

### ***Attachments***

contelec2.pdf, CBL-2\_16-3\_22Aspec.pdf, CBL-3XACTUATR1spec.pdf