

## RC3000 SOFTWARE VERSION 1.55 DESCRIPTION

1 December 2005

### INTRODUCTION

Version 1.55 of the RC3000 software will be released in December 2005. Along with the software update, the RC3000 User's Manual will be updated. The last major update of the manual was performed in January 2005 and reflected the software version 1.46.

The RC3000 software is constantly being updated to provide support for additional mounts, add new features/options and incorporate user suggested modifications. This document describes changes made and options added since version 1.46. It is intended for system integrators and users already familiar with the RC3000. Please review the document to decide if any of the modifications might warrant updates to existing fielded units. Also feel free to distribute the document as you wish.

The version 1.55 User's Manual and appendices describing new options may be downloaded from [www.researchconcepts.com](http://www.researchconcepts.com). References to these manuals are made throughout the following descriptions.

### HIGHLIGHTS OF MAJOR CHANGES

#### 1) Satellite Polarization Offset

The angles calculated for the horizontal (H) and vertical (V) polarization positions assume that the selected satellite maintains its polarization axis aligned with the earth's equatorial plane. For most satellites this is the case, but some satellites do not maintain this orientation. For example, AMC1 (103W) maintains the polarization of its Ku transponders 26 degrees counterclockwise from the equatorial plane.

Version 1.55 software allows any such polarization offset to be described per satellite. During LOCATE, the RC3000 will adjust the calculated H and V positions accordingly.

ref. 3.2.2.3.1 (LOCATE - Satellite Selection), 3.3.1.1.3 (Preset Satellites)

#### 2) LOCATE Screen Modification

In order to make the main LOCATE screen less cluttered, the prompt associated with satellite selection has been removed and placed on an individual screen.

```
POS:      38°56N  94°44W  180.0      LOCATE
SAT:GALAXY 6    74.0W           AZ:-31.1
                                           EL: 40.0
<1>SELECT NEW SAT           READY TO LOCATE
```

The user now presses the 1 key to choose from what source to select another satellite.

```
1-MANUALLY ENTER SAT DATA      LOCATE
2-CHOOSE SAT FROM PRESET LIST
3-SELECT SAT LONGITUDE
<1-3>SELECT SAT DATA SOURCE  <BKSP>EXIT
```

Satellite data sources 1 and 2 are the same as in previous versions of the RC3000. The third source is new as described in the next section.

ref. 3.2.2.3.1 (LOCATE - Satellite Selection)

### 3) Removal of SATLIST, Satellite Longitude Selection

The SATLIST present in earlier versions was a worldwide list of satellite data hard-coded into the RC3000's EPROM. Due to constant satellite deletion, addition and name changes, the SATLIST would become more and more obsolete over time. To avoid this situation, the SATLIST has been removed.

The ability to select another satellite by its orbital slot has been introduced to replace the SATLIST.

```
LOCATE
LON: 94W          BAND: Ku
(ASSUMES NO INCLINATION & POL OFFSET)
<SCR>LON <7>BAND <ENTER>SELECT <0>EXIT
```

When the user chooses to select a satellite longitude, a screen appears showing the satellite orbital slot closest to the mount's current longitude. The user may change the orbital slot by one degree at a time by scrolling up or down. The selected satellite's band may also be changed. The name used by the LOCATE function will reflect the orbital slot selected ("94W" in the above example.)

ref. 3.2.2.3.1 (LOCATE - Satellite Selection)

### 4) Heading Display

The azimuth angle traditionally displayed by the RC3000 reflects the current relative angle of the antenna. This angle is derived from a position sensor on the azimuth axis that is always active. An estimate of the heading the azimuth axis is pointing is not always available and/or guaranteed to be extremely accurate due to availability and accuracy of compass data.

Some customers would like to display azimuth information as a magnetic or true heading. Version 1.55 allows the user to program the controller to show magnetic or true heading when available. **NOTE: the default azimuth display will be antenna-relative as has existed in previous versions.**

In the AZIMUTH CALIBRATION screen, the user may now program the controller to attempt to show heading (vs. antenna-relative) data in the LOCATE and MANUAL modes. These heading angles will still be derived from the mount's azimuth sensor, but will be biased by the current heading estimate obtained by the controller. When the ACU does not have a heading estimate, no angle can be displayed. When the controller knows that the heading estimate may be slightly inaccurate due to compass error, the field will be displayed in small letters ("mag:" or "true" vs. "AZIM").

See the following paragraphs in the updated manual for discussion:

- 1.3.4 Antenna Pointing Solution
- 3.2.1 MANUAL mode
- 3.2.2.3 LOCATE mode
- 3.3.1.2.3 Azimuth Calibration

### 5) MAINTENANCE menu update

In order to accommodate additional maintenance actions, the MAINTENANCE menu has been reformatted.

```
1-VOLTS  2-DRIVE  3-TIME  4-SIG MAINT
5-LIMITS 6-GPS COM 7-FG COM 8-MOVETO
9-FG CAL 0-SHAKE      .-CI RECORD
Z1-GTRv1.55
```

The reformatted screen allows for use of all 15 non-MODE keys for triggering maintenance functions. NOTE: the key allocation for all previous maintenance functions remains the same. The function AZEL has been renamed MOVETO and now allows for triggering automatic movements of the polarization axis.

The configuration item record action, triggered by pressing the STOP/. key is new to version 1.55 and is described next.

ref 3.3.2.8 (MAINTENANCE - MOVETO)

## **6) - Recording of Configuration Items**

Version 1.55 allows the user to initiate a downloading of the configuration items to an external device via the remote control port. This download is a simple ASCII dump of the values to be captured by an external device such as a PC running HyperTerminal. The intent of this feature is to provide a simple method for the user to record all configuration items following calibration of the controller.

ref. 3.3.2.11 (MAINTENANCE - CONFIGURATION ITEM RECORD)

## **7) Miscellaneous Items**

Multiple minor modifications have been developed:

- a) The RC3000 now utilizes the LCD driver more efficiently to redraw screens faster
- b) The System Definition configuration screen now allows the user to record the ACU's serial number for easier recall

## **8) Updated TRACK functions**

The TRACK mode now allows for a "step track only" mode of operation. Also the logging of tracking events and the downloading of the track table are now available.

ref. app-TRK

## **HIGHLIGHTS OF NEW OPTIONS**

### **a) Integrated DVB Receiver Option**

As an aid to performing automatic LOCATEs, the RC3000 may now integrate a DVB receiver. The RC3000 scans and peaks up on one of multiple "signpost" satellites identifiable via information in their DVB data stream. After peaking up on an identifiable satellite, the controller can automatically "fix" its original heading estimate thus overcoming initial compass error. The controller may then reposition with confidence to user's satellite of interest.

Most second generation RC3000s (serial number > 2000) can integrate the DVB receiver internally. First generation RC3000s may be retrofitted with an external DVB receiver and perform the same function.

The functions of the integrated DVB receiver are described in appendix app-DVB.

### **b) No Compass Option**

If the antenna mount has full 360 degree azimuth travel, the integrated DVB receiver may be used without a compass present. During LOCATE, the controller will scan 360 degrees in azimuth looking for a "signpost" satellite. Having found a signpost satellite, the controller may then reposition to the satellite of interest.

The "No Compass" option is also described in app-DVB

### **c) Safety Interlock Option**

The RC3000 may be purchased with an optional function that requires the user to hold down a "safety interlock" button while viewing the antenna as it initially reaches its highest point. This feature is intended to help ensure that the antenna is deployed only when there is adequate and safe clearance overhead. For example, this option may be used as a step to implementing the California OSHA Electronic News Gathering safety requirements.

ref. app DSI (Deployment Safety Interlock)

### **d) Ethernet Interface Option**

An integrated Ethernet interface is now available with the RC3000.

Contact RCI for details of this capability.

### **e) GPS Compass Option**

The RC3000 may be fitted with an array of two specialized GPS antennas for the derivation of mount heading. Use of this option requires that the mount be operated in a position with a clear view of the horizon in all directions. This option is most suitable for large, slow-moving antennas operating in poor magnetic environments, such as above the arctic circle.

ref. app CSI

## **SUMMARY**

Many of the updates in version 1.55 have been made with the goal of providing a more autonomous automatic LOCATE capability. With the appropriate options installed and correct calibration, many mounts could be configured to achieve this goal.