



# Research Concepts, Inc.

## *Satellite Antenna Control Solutions*

### UPDATING RC2000 ANTENNA CONTROLLERS

This paper describes the procedure for upgrading the software (contained in an EPROM memory chip) of the model RC2000 antenna controller. To upgrade to the latest software version, it is necessary to replace the controller's EPROM memory chip. It is sometimes necessary to replace the memory select PLD (Programmable Logic Device). Changing the EPROM will sometimes corrupt the controller's non-volatile memory. Changing the PLD will **ALWAYS** wipe out the data in non-volatile memory for a unit in service.

### CONVERTING A NON-TRACKING CONTROLLER TO A TRACKING CONTROLLER

Note that any non-tracking controller may be converted to a tracking unit and vice versa. The tracking controller requires that a real-time clock chip be present in socket U6 of the controller's digital board. The real-time clock chip is an 18-pin chip and an OKI model M62X42B. To convert a non-tracking controller to a tracking model, simply replace the 28-pin EPROM (U4), the 20-pin PLD (U2), and make sure the real-time clock chip is present in U6. When upgrading an RC2000A to and RC2000B, clip the jumper (JMP1) on the digital board located just behind and to the left of the battery. **NOTE: This jumper may not be installed on older models.**

### INSTALLING THE UPGRADE AND RESTORING NON-VOLATILE MEMORY

This is the procedure for upgrading the software on RC2000 model antenna controllers. The use of this procedure will allow the user to change the controller's memory map and restore the original non-volatile memory contents. If the software is being upgraded on a unit which is in service, skip the following paragraph and proceed to the upgrade procedure.

### UPGRADING A UNIT NOT IN SERVICE

If the software is being upgraded on a unit which is not in service, perform the following steps:

1. Install the new chips.
2. From CONFIG mode, verify the 'Expert Access' flag is set (on) by keying in 41758 at the prompt followed by the ENTER key. This allows the user access to CONFIG mode items.
3. Perform a memory reset (from CONFIG mode) by keying in 41758 at the 'Reset System Data' prompt followed by the ENTER key.

### UPGRADE PROCEDURE FOR A UNIT IN SERVICE

**NOTE: If the position display is enabled, disable that feature before starting this procedure.**

1. In MANUAL mode, jog the antenna to the west and up limit. Record the position count for each axis just before the limit is reached.
2. Go to CONFIG mode and record the value of each CONFIG mode item.
3. Using AUTO mode, position the antenna on each of the geostationary satellites stored in non-volatile memory. Record the azimuth and elevation positions and the longitude value of each



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geostationary satellite. Use the H and V keys to select the polarization. Record the H and V positions for each satellite.

4. Move the antenna to the position just before the east and down limits are reached. This should correspond to a position count value of 30 for both the azimuth and elevation axis.
5. Turn the unit off. Replace the EPROM (U4) chip and PLD (U2, if necessary). If the controller is being upgraded to a tracking system from a non-tracking system, make sure that a real-time clock chip is present in socket U6. When handling the chip make sure you are properly grounded to avoid static damage to the chips.
6. Make sure the chips are oriented properly in the sockets. The notch (or dot) should line up with the notch of the outline silk-screened onto the printed circuit board under each IC socket. Make sure that the legs of the chips do not bend up when they are inserted into the sockets.
7. Verify that the chips are properly oriented in the sockets. Power the unit up. Go to CONFIG mode, bringing up the 'Expert Access' items. Key in 41758 followed by the ENTER key to enable access to CONFIG mode items. From CONFIG mode, bring up the 'Reset System Data' item and perform a memory reset by keying in 41758 followed by the ENTER key.
8. Go to LIMITS mode. WITHOUT MOVING THE SATELLITE, set the east and down limits. AFTER THE EAST AND DOWN LIMITS HAVE BEEN SET, jog the controller to the positions for the west and up limits recorded in step one. Set the west and up limits. After the west and up limits have been set, exit the LIMITS mode by hitting the MODE key.
9. Go to CONFIG mode and key in the data recorded in step two. Each entry must be terminated with the ENTER key. After the data has been entered, scroll through the CONFIG mode items (using the SCROLL UP and SCROLL DOWN keys) and make sure the data has been entered correctly.
10. In this step, the positions of the geostationary satellites are stored in non-volatile memory. Go to the SETUP mode. Position the antenna on each of the satellites, which were recorded in step three. At each satellite position, select the satellite name, enter the satellite longitude, and adjust the polarization to the recorded H and V positions in response to the appropriate SETUP mode prompts.

### **115/230 VOLT INPUT**

First, unplug the unit from the power source. Determine the type of power entry module your unit has: Either (1) A plain black entry or (2) a plain black entry with a grey insert.

If (1), simply remove the cover of the RC2000 and reset the internal switch to the desired voltage setting on the power entry module. All controllers from the factory have an orange label over the power entry module stating the voltage. Change the orange label on the outside of the unit to reflect the new input voltage, and replace the cover. Replace the line cord with the proper type.

If (2), remove the fuse drawer from the power entry module with a small straight-blade screwdriver. With the same tool, remove the small plastic circuit card. Rotate the card so that the desired operating voltage will be displayed through the front of the fuse drawer and reinsert the card so that it firmly seats into the power entry module.