

14 November 2001

TO: FTSAT/RC3000 users

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RE: FTSAT RC3000 Software Replacement Instructions

INTRODUCTION

This memo discusses the software update being made available for the RC3000 antenna controller and provides instructions for installation of the replacement EPROMs.

HISTORY

August 1999. Six RC3000s (SNs -034, -035, -036, -040, -041, -042) sold to LNR for use with the FTSAT mount.

December 2000. SN -042 returned for repair with problem description “not tracking well”. After several days of tests, it appeared that the pulse counting circuitry on the RC3000 would lose several pulses every few hours. The digital board was replaced and the pulse counting problem went away. The unit was returned with no other modifications.

June 2001. SN -035 returned for repair with problem description “not controlling actuators”. The large transformer inside the unit was found to be dislodged along with a couple of the control relays. The transformer was reattached and the relays replaced.

Just prior to this RCI had recognized that a relay within the RC3000 was prone to degradation after long periods of use such as would occur with a controller performing inclined orbit tracking. A modification to the auxiliary relay board was developed that would alleviate this potential wear and tear. SN -035 was updated with this modification. Additional modified relay boards were sent for the other FTSAT controllers. **It is assumed that these boards have all been replaced in the field.**

October 2001. SN -040 returned for repair with problem description “memory tracking system still has problem”. This controller was returned with the auxiliary relay board replaced. The same tests that were performed on SN -042 were performed to determine if the unit had a pulse counting problem. The pulse counting problem could not be duplicated.

The controller was then connected to a RCI test mount and allowed to track an inclined orbit satellite. A software error was discovered that could make the controller not move the antenna correctly during MEMORY track. The nature of the error is such that in some circumstances MEMORY track would work correctly but in other cases it would not work. This error only manifests itself on RC3000s configured to be used with the FTSAT mount since only this mount (with respect to the RC3000) uses a fixed step size and time.

A software fix has been made and tested. **SN -040 will be returned with software version 1.30 installed.**

SOFTWARE UPDATE

Almost two years of software updates have been made since the six RC3000s were originally delivered for use with the FTSAT mount. The majority of changes deal with providing support for other types of antennas and are transparent to FTSAT functionality. Operationally, version 1.30 will be identical to the initial software (other than the MEMORY track fix). The most notable difference will be the organization of the configuration items.

EPROM REPLACEMENT INSTRUCTIONS

The EPROM replacement kit includes the following items:

- these instructions
- replacement EPROM (RC3K-L1-GTN v 1.30)
- chip puller tool
- RC3000 User's Manual (13 March 2000).

The newer User's Manual is included for reference. Unique FTSAT operation is still as described in the separate "Appendix B – Mount Specific Data for LNR 2.4m FTSAT" which was provided with the controllers initially.

To update the software, perform the following sequence of steps:

1 – Prior to opening the RC3000, note the current configuration item values programmed into the controller. To access the configuration item values, Expert Access must be enabled from the SETTINGS screen. The 5 digit code to enable expert access is 42458. After enabling expert access, the configuration screens may be accessed by holding the MODE key down for five seconds.

A table is provided at the end of these instructions for noting the current values of all configuration items. Inspect the various configuration item screens and record the values in the "CURRENT VALUE" column. The table also shows the new mapping of individual configuration items to configuration screens for software version 1.30.

NOTE: it is very important to note existing configuration item values before opening the RC3000. While extremely unlikely, it is possible for the non-volatile memory to be scrambled due to handling of the boards. Also, after replacing the EPROM, the default values will be reset in the controller to ensure operation of the new software version. Following this reset any non-default values will need to be restored.

2 – Open the RC3000. Precautions similar to opening a PC should be followed with respect to electrostatic discharge.

3 – Using the chip puller provided, remove the existing EPROM which will be labeled "RC3K-L1-GTN".

4 – Insert the new EPROM "RC3K-L1-GTN v 1.30". Be sure to insert the new EPROM in the correct direction. A U-shaped notch on the EPROM and on the printed circuit board identify the correct orientation. As a second check of proper orientation, the "*" on the EPROM label and the "U1" designation on the printed circuit board should be at the same end.

WARNING: Powering on the RC3000 with the EPROM installed backwards will destroy the EPROM.

5 – Close the RC3000.

6 – Turn on the RC3000 and go to the EXPERT ACCESS PERMISSION screen (3.3.1.1.1 in new User's Manual). Insert the SUPER-USER code 20261.

7 – Exit the EXPERT ACCESS PERMISSION screen and scroll to the RESET DEFAULTS screen (3.3.1.3.1). Enter the 42458 code to reset system default values. Make sure you have done step 1 first!

8 – Inspect the various configuration item screens and restore any previously noted non-default values. Possibly the only items that would have been at a non-default value are the elevation reference voltage and scale factor that are now contained in the ELEVATION CALIBRATION screen.

V 1.11 SCREEN	CONFIGURATION ITEM	DEFAULT VALUE	CURRENT VALUE	V 1.30 SCREEN
LNR	Step Size	5		LNR
	Step Time	90		LNR
	Start Cnts	750		LNR
	Pack Cnts	100		LNR
System Components	GPS_Present	1		System Definition
	Compass_Present	1		System Definition
Antenna Data	antenna_size_cm	240		System Definition
	ccw_azim_limit	0		Azimuth Calibration
	Cw_azim_limit	360		Azimuth Calibration
	Up_elev_limit	90		Elevation Calibration
	Down_elev_limit	0		Elevation Calibration
	Azim_offset	0.0		Azimuth Calibration
	Elev_offset	0.0		Elevation Calibration
	Elevation_look_configuration	1		Elevation Calibration
Pol Configuration	Polarization_type	Circular		Polarization Calibration
	Default Horizontal Position	-45.0		Polarization Calibration
	Default Vertical Position	45.0		Polarization Calibration
	CW Polarization Limit	90.0		Polarization Calibration
	CCW Polarization Limit	90.0		Polarization Calibration
Azimuth Pot Drive	Zero Voltage	2.50		Azimuth Calibration
	Fast/Slow Threshold	2.5		Azimuth Pot Drive
	Maximum Position Error	0.20		Azimuth Pot Drive
	Coast Threshold	0.1		Azimuth Pot Drive
	Scale_Factor	37.50		Azimuth Calibration
	Maximum Retry Count	3		Azimuth Pot Drive
Azimuth Pulse Drive	Pulse Scale Factor	2406		Azimuth Pulse Drive
	CW Pulse Limit	64000		Azimuth Pulse Drive
	CCW Pulse Limit	100		Azimuth Pulse Drive
	Fast/Slow Threshold	50		Azimuth Pulse Drive
	Maximum Position Error	0		Azimuth Pulse Drive
	Coast Threshold	3		Azimuth Pulse Drive
	Maximum Retry Count	3		Azimuth Pulse Drive
Azimuth Drive Monitoring	Jam Slop	1		Azimuth Drive Monitor
	Runaway Slop	1023		Azimuth Drive Monitor
	Fast Deadband	1000		Azimuth Drive Monitor
	Slow Deadband	500		Azimuth Drive Monitor
Elevation Pot Drive	Zero Voltage	2.50		Elevation Calibration
	Fast/Slow Threshold	3.0		Elevation Pot Drive
	Maximum Position Error	0.2		Elevation Pot Drive
	Scale Factor	50.00		Elevation Calibration
	Coast Threshold	0.4		Elevation Pot Drive
	Maximum Retry Count	3		Elevation Pot Drive
Elevation Pulse Drive	Pulse Scale Factor	1646		Elevation Pulse Drive
	UP Pulse Limit	64000		Elevation Pulse Drive
	Down Pulse Limit	100		Elevation Pulse Drive
	Fast/Slow Threshold	50		Elevation Pulse Drive
	Maximum Position Error	0		Elevation Pulse Drive
	Coast Threshold	3		Elevation Pulse Drive
	Maximum Retry Count	3		Elevation Pulse Drive

V 1.11 SCREEN	CONFIGURATION ITEM	DEFAULT VALUE	CURRENT VALUE	V 1.30 SCREEN
Elevation Drive Monitoring	Jam Slop	1		Elevation Drive Monitor
	Runaway Slop	1023		Elevation Drive Monitor
	Fast Deadband	1000		Elevation Drive Monitor
	Slow Deadband	500		Elevation Drive Monitor
Polarization Drive	Zero Voltage	2.50		Polarization Calibration
	Fast/Slow Threshold	2.0		Polarization Pot Drive
	Maximum Position Error	0.5		Polarization Pot Drive
	Coast Threshold	0.3		Polarization Pot Drive
	Maximum Retry Count	3		Polarization Pot Drive
Pol Drive Monitoring	Jam Slop	1		Pol Drive Monitor
	Runaway Slop	200		Pol Drive Monitor
	Fast Deadband	1000		Pol Drive Monitor
	Slow Deadband	500		Pol Drive Monitor
Track Factors	Search Enable	Disabled(0)		Track Factors
	Max Track Error	3		Track Factors
	Search Width	4		Track Factors
	Peakup Holdoff Time	120		Track Factors
	Track Signal Source	SS2		Track Factors
	Signal Sample Time	2		Track Factors
Sig Factors	Channel 1 Polarity	Positive		Signal Factors
	Channel 1 Threshold	100		Signal Factors
	Channel 2 Polarity	Positive		Signal Factors
	Channel 2 Threshold	100		Signal Factors
Autopeak	Autopeak Enabled	True (1)		AutoPeak
	Signal Source	RF		AutoPeak
	RF Band	Ku (1)		AutoPeak
	Spiral Search AZ Limit	5		AutoPeak
	Spiral Search EL Limit	5		AutoPeak
	Spiral Signal Threshold	200		AutoPeak
	Scan Range Limit	10		AutoPeak
	Scan Signal Threshold	200		AutoPeak

NOTE: As with the original FTSAT software, many of the configuration items (such as polarization items) are not applicable to FTSAT.