APPENDIX B - MOUNT SPECIFIC DATA

For

Superior 4.5 m Fixed Base Antenna

This appendix describes RC3000 operations unique for the Superior 4.5 m. fixed-based mount equipped with resolvers. Differences between this version and the operation described in the “baseline” RC3000 manual are noted on a paragraph by paragraph basis.

REVISION HISTORY

30 January 2008, Software Version 1.59

1.1 Manual Organization

This appendix is provided as a supplement to the baseline RC3000 manual. The corresponding paragraphs in the baseline RC3000 manual are referred to when data specific to the Superior 4.5 m. mount with resolvers are described.

1.2 RC3000 Features

All basic features of the RC3000 are utilized to provide the operations for this mount. Some features have been modified (as described below) to customize operations for this antenna.

Hardware Configuration. A RC3000A version of hardware is utilized for this mount.

Software Configuration. The mount model will be designated as **M2**. Software will be designated as RC3K-**M2**-abcd.

1.3.2 System Interface Requirements

The M2 interface differs from baseline RC3000 interface requirements as follows:

1) No stow limit switch feedback is provided from the azimuth or elevation axes

2) Resolvers present on the azimuth and elevation axes

3) No Inclinometer

1.3.4 Antenna Pointing Solution

The baseline RC3000 is mechanized for operations of a mobile satellite antenna. Whenever the antenna is relocated, the RC3000 determines the antenna's new latitude, longitude and estimated heading.

The M2 mount is considered a "Fixed Base" antenna in that it will typically be installed in one location for extended periods of time. Slight differences in the installation and operation of the RC3000 are made to better accommodate operations of a fixed base antenna. These differences will be highlighted in following paragraphs of this appendix.

With respect to the antenna pointing solution, the latitude and longitude of a fixed base antenna only needs to be entered once. Once entered, this lat/lon will remain (not dynamically updated as with a mobile mount.) Also the heading reference for a fixed base antenna will be considered 180 (True South) when the antenna is in the Northern Hemisphere and 0 (True North) when the antenna is operating in the Southern Hemisphere.

1.3.5 Timekeeping

When the RC3000 is used for a mobile antenna, the internal real time clock is updated every time the antenna's lat/lon is obtained from the GPS. This will typically not be the case for a fixed base antenna so the user should be aware to periodically (perhaps monthly) adjust the clock.

1.3.7 Drive System

Jam and Runaway Sensing. Jammed and runaway sensing is based on resolver counts.

2.0 INSTALLATION

2.2 Electrical Connections

Example schematics for the electrical connections between the RC3000 and the M2 mount are shown in section 4.2.

The following subparagraphs describe any unique items with respect to the M2 system.

2.2.2 Motor Drive. No polarization axis drive.

2.2.3 Drive Sense.

2.2.4 Limit Switches. The limit switch inputs are internally jumpered within the RC3000 since no limit switches on the mount are supplied to the controller.

2.2.5 Signal Strength. AGC channel 1 is to be wired to the Tracking Receiver as shown in this section of the baseline manual.

2.2.6 Navigation Sensors. No GPS receiver or Fluxgate Compass will typically be used with the M2 mount.

2.2.7 Accessories. Outputs from this connector are available as described in the baseline manual.

2.2.8 RF Autopeak. This input is available but it is intended that only the signal strength indication from the tracking receiver via AGC channel 1 will be used.

2.2.9 Hand Held Remote. This option is available.

2.2.11 PC Remote Control. The remote control interface is wired as shown in the baseline manual.

2.2.12 Waveguide Switch. The optional waveguide switch module is not provided.

2.3 Initial Configuration, 2.4 Final Calibration

Setup and calibration of the M2 mount is somewhat unique compared to that described in the baseline manual for a vehicle mounted antenna.

2.3.2 Elevation Calibration

The first elevation calibration step should be performed from the 0 degree look angle position. From Manual Mode, jog the antenna until the reference position is achieved.

Elevation Resolver Reference. Rotate the elevation resolver until a raw resolver angle of approximately 180 degrees is obtained. Lock the resolver and note the raw resolver angle. Calculate the correct resolver offset to obtain the look angle of 45 degrees and enter it as the elevation_resolver_offset (refer to step 3b in baseline manual)

Elevation UP limit. Move the elevation axis up to within a short distance of its physical limit. Note the elevation resolver count (from the MANUAL mode) and enter this as the UP limit in the ELEVATION PULSE DRIVE configuration screen. An elevation resolver count greater than this value will thereafter generate an elevation UP limit.

Elevation DOWN limit. Move the elevation axis down to within a short distance of its physical limit. Note the elevation resolver count (from the MANUAL mode) and enter this as the DOWN limit in the ELEVATION PULSE DRIVE configuration screen. An elevation resolver count less than this value will thereafter generate an elevation DOWN limit.

2.3.3 Azimuth Calibration

The first azimuth calibration step should be performed from the azimuth center of travel position. If possible, this position should be close to true South in the Northern Hemisphere or true North in the Southern Hemisphere. From Manual Mode, jog the antenna until the azimuth is as close to this position as possible.

Azimuth Resolver Reference. Rotate the azimuth resolver until a raw resolver angle of approximately 180 degrees is obtained. Lock the resolver and note the raw resolver angle. Calculate the correct resolver offset to obtain an angle of 0.0 degrees and enter it as the elevation_resolver_offset (refer to step 3b in baseline manual)

Azimuth CW limit. Move the elevation axis clockwise to within a short distance of its physical limit. Note the azimuth resolver count (from the MANUAL mode) and enter this as the CW limit in the AZIMUTH PULSE DRIVE configuration screen. An azimuth resolver count greater than this value will thereafter generate an azimuth CW limit.

Azimuth CCW limit. Move the azimuth axis counterclockwise to within a short distance of its physical limit. Note the azimuth resolver count (from the MANUAL mode) and enter this as the CCW limit in the AZIMUTH PULSE DRIVE configuration screen. An azimuth resolver count less than this value will thereafter generate an azimuth CCW limit.

2.4.2 Azimuth and Elevation Alignment

As described in the baseline manual, perform a LOCATE to several known satellites. If necessary, correct any calibration values in order to achieve satisfactory automatic LOCATEs.

2.4.3 Signal Strength Adjustment

NOTE: The RC3000 will initially be calibrated to work with a signal strength input that varies between 0.0 (off satellite) to 10.0 (strongly on satellite) VDC.

Follow the RC3000 signal strength adjustment procedure described in the RC3000 manual Section 2.4.3. This procedure requires finding a strong satellite signal, measuring the beacon receiver output voltage and then looking at open space and measuring the output signal. Alternatively, a DC voltage of the correct level may be injected into the RC3000 AGC pin on J2. The nominal setup will use AGC channel 1 of the RC3000.

3.0 Detailed Operation

3.1.1 Modes

While the basic functionality of the RC3000 is as described in the baseline manual, several modes are customized and several modes are unique for operation with the M2 mount.

3.2.1 Manual Mode

```
TRUE: 141.1(157.6) SS1:579         MANUAL
ELEV: -67.5( 42.4) SAT:telstar 402
                   SPD:FAST           UTC
<0-9>JOG ANTENNA   <MODE>MENU   14:25:47
```

SS1: 659

The M2 version will initialize showing the SS1 signal value rather than the RF value.

TRUE: 141.1

The M2 version will initialize showing TRUE heading (180.0 + antenna azimuth angle in Northern Hemisphere).

3.2.2.3 LOCATE

LOCATE mode operates in the fashion described in the baseline manual.

NOTE: rather than AZIM (antenna angle) the LOCATE screen will display the TRUE heading target as this is more appropriate for a fixed base antenna.

3.2.2.7 POSITION

From the POSITION screen, only the ability to change lat/lon is provided for the fixed base antenna.

```
L/L: 38.56 N 98.45 W MANUAL      POSITION


<1>LAT/LON                      <MODE>MENU
```

3.2.2.9 TRACK

3.2.2.10 REMOTE

TRACK and REMOTE modes perform as described in the baseline manual.

3.3 Programming Group

All programming group modes described in the baseline manual are provided.

3.3.1.2 Reset Defaults

The following table supplies the default configuration item values for this mount. Space has also been provided to record installation specific changes to the configuration items. Note: recording of installation specific changes to defaults may prove valuable when trying to restore system configuration.

CONFIGURATION ITEM	M2	COMMENTS	INSTALL VALUE
SYSTEM DEFINITION			
GPS_present	0		
Compass_present	0		
Initial_mode	2		
antenna_size_cm	450		
Waveguide_present	0		
ELEVATION CALIBRATION			
Zero Voltage	2.50		
Elev_offset	0.0		
Up_elev_limit	90		
Down_elev_limit	0		
Elevation_Scale_Factor	50.00		
Elevation_look_configuration	1		
Elevation_resolver_reversed	0		
Elevation_resolver_offset	-135.00	Set during calibration	
AZIMUTH CALIBRATION			
Azim_offset	0.0		
ccw_azim_limit	60		
Cw_azim_limit	60		
Azimuth_resolver_reversed	0		
Azimuth_resolver_offset	-180.00	Set during calibration	
POLARIZATION CALIBRATION			
Zero Voltage	2.50		
Polarization_Offset	0.0		
CW Polarization Limit	90.0		
CCW Polarization Limit	90.0		
Pol_Scale_Factor	37.50		
Polarization_type	1	1=Circular=> No Pol Axis	
H/V_Reference	1		
Pol_Automove_Enable	1		
SIGNAL PARAMETERS			
Channel 1 Polarity	1		
Channel 1 Threshold	100		
Channel 1 Delay	0.1		
Channel 1 Lock Type	0		
Channel 2 Polarity	1		
Channel 2 Threshold	100		
Channel 2 Delay	0.1		
Channel 2 Lock Type	0		
AUTOPEAK			
Autopeak Enabled	2	Enabled with peak	
Signal Source	2	2=SS1	
RF Band	4		
Spiral Search AZ Limit	5		
Spiral Search EL Limit	5		
Spiral Signal Threshold	200		
Scan Range Limit	8		
Scan Signal Threshold	200		

CONFIGURATION ITEM	M2	COMMENTS	INSTALL VALUE
AZIMUTH POT DRIVE			
Fast/Slow Threshold	2.5		
Maximum Position Error	0.2		
Coast Threshold	0.1		
Maximum Retry Count	3		
AZIMUTH PULSE DRIVE			
Pulse Scale Factor	10431		
CW Pulse Limit	64000		
CCW Pulse Limit	100		
Fast/Slow Threshold	50		
Maximum Position Error	0		
Coast Threshold	3		
Maximum Retry Count	3		
AZIM DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		
ELEV POT DRIVE			
Fast/Slow Threshold	3.0		
Maximum Position Error	0.2		
Coast Threshold	0.4		
Maximum Retry Count	3		
ELEV PULSE DRIVE			
Pulse Scale Factor	10431		
UP Pulse Limit	64000		
Down Pulse Limit	100		
Fast/Slow Threshold	50		
Maximum Position Error	0		
Coast Threshold	3		
Maximum Retry Count	3		
ELEV DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		
POL POT DRIVE			
Fast/Slow Threshold	2.0		
Maximum Position Error	0.5		
Coast Threshold	0.3		
Maximum Retry Count	3		
POL DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		

CONFIGURATION ITEM	M2	COMMENTS	INSTALL VALUE
TRACK			
Search Enable	0		
Max Track Error	3		
Search Width	4		
Peakup Holdoff Time	120		
Track Signal Source	1	2=SS1	
Signal Sample Time	2		
REMOTE CONTROL			
Remote Enabled	1		
Bus Address	50		
Baud Rate	6		
Jog	20		
STOW / DEPLOY			
AZ STOW	0.0		
EL STOW	0.0		
PL STOW	0.0		
AZ DEPLOY	0.0		
EL DEPLOY	45.0		
PL DEPLOY	0.0		
PL ENABLED	1		

4.2 Schematics