APPENDIX B - MOUNT SPECIFIC DATA

For

General Dynamics C139M

This appendix describes RC3500 operations unique for the General Dynamics C139M fixed-based mount antenna. Differences between this version and the operation described in the “baseline” RC3000 manual are noted on a paragraph by paragraph basis.

REVISION HISTORY

25 March 2011, Software Version 1.60

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 General Dynamics C139M mount are described.

1.2 Mount Model

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 RC3000D version of hardware is utilized for this mount. The "D" version of hardware is used to provide drive signals to a separate Antenna Interface Unit (AIU).

Software Configuration.

The basic RC3000 software operation has been modified to better accommodate fixed-based (vs. mobile) antenna operations. This fixed-based antenna operation leads to the designation **RC3500** to follow on from other RCI models such as the RC2500.

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

1.3.2 System Interface Requirements

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

1) Resolvers present on the azimuth and elevation axes

2) 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 KH 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 RC3500 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. NOTE: Exact timekeeping would be most important when the Ephemeris (Two Line Element) Tracking option is present.

1.3.7 Drive System

Jam and Runaway Sensing. Elevation jammed and runaway sensing is based on resolver counts and azimuth via potentiometer feedback.

2.0 INSTALLATION

2.2 Electrical Connections

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

2.2.4 Limit Switches.

Azimuth and Elevation limit switch status is sent via the AIU. See the RC3500/AIU schematic in section 4.2.

2.2.6 Navigation Sensors. No GPS receiver or Fluxgate Compass will be used with the D2 mount.

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

2.3 Initial Configuration, 2.4 Final Calibration

Setup and calibration of the KH 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 18.8 degree look angle (face vertical) 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 0 degrees and enter it as the elevation_resolver_offset (refer to step 3b in baseline manual)

Elevation UP limit. Carefully move the elevation axiz up to confirm operation of the UP limit switch.

Elevation DOWN limit. Carefully move the elevation axis down to confirm operation of the DOWN limit switch.

Elevation STOW limit. Carefully move the elevation axis down (with azimuth in stow position) to confirm operation of the STOW limit switch.

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/CCW limits. Carefully move the elevation axis clockwise and counterclockwise to confirm the operation of the limit switches.

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.

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 for RC3500 operation with the KH mount.

3.2.1 Manual Mode

Manual mode has been modified to display azimuth and elevation angles to the 0.01 degree resolution vs. the baseline RC3000 resolution of 0.1 degrees.

```
TRUE: 141.12(157.63 SS1:579       MANUAL
ELEV: -67.54( 42.43 SAT:telstar 402
 POL:  32.1          SPD:FAST          UTC
<0-9>JOG ANTENNA   <MODE>MENU   14:25:47
```

TRUE: 141.12

The KH version will default showing TRUE heading (180.0 + antenna azimuth angle in Northern Hemisphere). Baseline RC3000 operation displays "antenna angle" AZIM.

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. TRUE and ELEV targets will also be shown to the 0.01 degree resolution.

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	KH	COMMENTS	INSTALL VALUE
SYSTEM DEFINITION			
GPS_present	0		
Compass_present	0		
Initial_mode	2		
antenna_size_cm	700		
Waveguide_present	0		
ELEVATION CALIBRATION			
Zero Voltage	2.70	N/A	
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	-120.00	Set during calibration	
AZIMUTH CALIBRATION			
Fluxgate_offset	0.0	N/A	
ccw_azim_limit	165		
Cw_azim_limit	165		
Azimuth_resolver_reversed	0		
Azimuth_resolver_offset	-180.00	Set during calibration	
Initial_Display	4	Display TRUE	
POLARIZATION CALIBRATION			
Zero Voltage	2.50		
Polarization_Offset	0.0		
CW Polarization Limit	90.0		
CCW Polarization Limit	90.0		
Pol_Scale_Factor	90.0		
Polarization_type	2		
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	0		
Signal Source	1		
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	KH	COMMENTS	INSTALL VALUE
AZIMUTH POT DRIVE			
Fast/Slow Threshold	2.5		
Maximum Position Error	0.1		
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	2.50		
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	KH	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	2		