APPENDIX B - MOUNT SPECIFIC DATA
For
Vertex DMK with resolvers

Revision: 11 November 2013   Software Version: 1.60

This appendix describes RC3000 operations unique for this mount. Differences between this version and the operation described in the "baseline" RC3000 manual are noted on a paragraph by paragraph basis.

1.2 Mount Models

This appendix describes the RC3000 variation built for a Vertex DMK mount retrofitted with resolvers and azimuth limit switches. This model will be referred to as "ZD".

1.3.1 Controller Description

A resolver to digital conversion board has been added to the baseline RC3000A hardware. A schematic of this board is shown in section 5 of the baseline RC3000 manual.

1.3.2 System Interface Requirements

The ZD mount follows the standard RC3000 interface requirements with a few exceptions:

- no azimuth potentiometer exists, a resolver is used for sensing azimuth position and for performing high resolution movements.

- a resolver is used for high resolution movements in elevation.

- azimuth CW and CCW limits are generated via limit switches

2.3.2 Elevation Calibration

Both the elevation inclinometer and the elevation resolver should be calibrated as described below and in the baseline RC3000 manual.

Elevation Reference Position

From the reflector vertical position, the elevation reference voltage should be close to 1.69 V. The elevation displayed at this voltage should be 22.3 reflecting the RF offset of the antenna.

Elevation Resolver Reference

In order to characterize platform tilt, it is critical that the elevation resolver be calibrated with the platform level. From the reference elevation position, adjust the raw elevation resolver angle (shown on the Analog to Digital Voltage maintenance screen (3.2.2.1)) to as close to 180.00 degrees as possible. Adjust the elevation resolver offset as described in 3.3.1.2.2 below.

2.3.3 Azimuth Calibration.

The only position sensor on the azimuth axis is the resolver.

Sensor Polarity. Azimuth resolver "counts" should increase as the mount rotates clockwise. If it does not, the polarity may be changed by setting the azimuth resolver reverse flag.

Azimuth Reference Position. - Position the mount at the azimuth stow position as exactly as possible. Loosen and adjust the azimuth resolver to be as close to 180 degrees (seen at a/d volts screen 3.3.2.1) as possible. The azimuth resolver offset will be 0.0 – "raw resolver angle".

Azimuth Limits.

The azimuth CCW limit switch should connect to pins 14 and 2 of the J8 backpanel connector.
The azimuth CW limit switch should connect to pins 12 and 25 of the J8 backpanel connector.

NOTE: the following three sections exist in the baseline RC3000 manual but are repeated here since the resolver offset and reverse configuration items are required to be set for correct operation of the ZD mount type.

3.3.1.2.2 Elevation Calibration.

In addition to the normal inclinometer calibration items, two elevation resolver calibration items are included.

```
REF_V:1.69 OFF:   0.0          CONFIG-ELEV
 DOWN:   0    UP: 90.0    SF:50.00
 LOOK:1     RES: 0.0     REV:0
SET REFERENCE VOLTAGE <0.50 – 3.50>
```

RES: ELEV RESOLVER OFFSET<+/-300.00 DEGREES>
The elev_resolver_offset configuration item defines the offset to be applied to the angle read directly from the elevation resolver for the purpose of displaying elevation angle. Example: If when at the elevation reference (reflector vertical) position the raw elevation resolver angle reads 122.0, a elev_resolver_offset of -100.0 will result in a resolver based elevation angle of 22.0.

REV: ELEV RESOLVER<0-NORMAL 1-REVERSED>
The elev_resolver_reversed configuration item defines whether the polarity of the elevation resolver matches that of the RC3000 resolver circuitry. If the raw elevation resolver angle decreases as the mount moves up, the elev_resolver_reversed item must be described as reversed.

3.3.1.2.3 Azimuth Calibration

In addition to the normal azimuth calibration items, two azimuth resolver calibration items are included. No azimuth reference_voltage item is displayed since no azimuth potentiometer is present.

```
            OFF: 0.0           CONFIG-AZIM
   CCW:180    CW:180
   RES: 0.0 REV:0
SET REFERENCE VOLTAGE <2.00 - 3.00>
```

RES: AZIM RESOLVER OFFSET<+/-300.00 DEGREES>
The azim_resolver_offset configuration item defines the offset to be applied to the angle read directly from the azimuth resolver for the purpose of displaying azimuth angle. Example: If when at the azimuth stow position the raw azimuth resolver angle reads 181.3, a azim_resolver_offset of –181.3 will result in a resolver based azimuth angle of 0.0.
REV: ELEV RESOLVER<0-NORMAL 1-REVERSED>
The elev_resolver_reversed configuration item defines whether the polarity of the elevation resolver matches that of the RC3000 resolver circuitry. If the raw elevation resolver angle decreases as the mount moves up, the elev_resolver_reversed item must be described as reversed.

3.3.2.1 Analog to Digital Voltages

In addition to the normal voltages displayed this screen also shows "raw resolver" angles and counts.

```
AZ: 1.114   181.30 33004     AD VOLTAGES
EL: 1.143 1 122.30 22264
POL:2.237 0
SIG: 3.756(1) <1>RF <2>SS1 <3>SS2 <4>GND
```

The azimuth and elevation resolver angles and counts displayed are read directly from the resolvers without being biased by offset terms. The displayed values will reflect if the azimuth or elevation resolver polarity has been reversed.

3.3.1.2 Reset Defaults

The following table supplies the default configuration item values for this mount type.

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	ZD					INSTALL VALUE
SYSTEM DEFINITION						
GPS	1					
COMPASS MOUNT	1					
Serial Number	0					
MODE	2					
antenna_size_cm	240					
Waveguide	0					
ELEVATION CALIBRATION						
Zero Voltage	1.69					
Elev_offset	0.0					
Up_elev_limit	90					
Down_elev_limit	0					
Elevation_Scale_Factor	50.00					
Elevation_look_configuration	1					
Resolver offset	-157.70					
Resolver direction	0					
AZIMUTH CALIBRATION						
Fluxgate_offset	0.0					
ccw_azim_limit	170					
Cw_azim_limit						
Resolver offset	-180.00					
Resolver direction	0					
POLARIZATION CAL						
Zero Voltage	2.50					
Polarization_Offset	0.0					
CW Polarization Limit	90.0					
CCW Polarization Limit	90.0					
Pol_Scale_Factor	39.33					
Polarization_type	2					
H/V_Reference	1					
Default Horizontal Position	-45.0					
Default Vertical Position	45.0					
Pol_Automove_Enable	1					

CONFIGURATION ITEM	ZD					INSTALL VALUE
SIGNAL PARAMETERS						
RF Lock Type	0					
RF Delay	0.1					
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	1					
Spiral Search AZ Limit	3					
Spiral Search EL Limit	3					
Spiral Signal Threshold	200					
Scan Range Limit	8					
Scan Signal Threshold	200					
Tilt Compensation	0					

CONFIGURATION ITEM	ZD					INSTALL VALUE
AZIMUTH POT DRIVE						
Fast/Slow Threshold	2.5					
Maximum Position Error	0.20					
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	1					
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	1					
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	ZD					INSTALL VALUE
TRACK *						
Search Enable	0					
Max Track Error	3					
Search Width	4					
Peakup Holdoff Time	120					
Track Signal Source	2					
Signal Sample Time	2					
REMOTE CONTROL*						
Remote Enabled	1					
Bus Address	50					
Baud Rate	6					
Jog Duration	20					
STOW / DEPLOY						
AZ STOW	0.0					
EL STOW	-67.5.					
PL STOW	0.0					
AZ DEPLOY	0.0					
EL DEPLOY	22.3					
PL DEPLOY	0.0					
PL ENABLED	0					
EL_TIME	0					
SHAKE						
AZ1	-40.0					
EL1	30.0					
PL1	-10.0					
AZ2	50.0					
EL2	40.0					
PL2	10.0					
AZ3	0.0					
EL3	-67.5					
PL3	0.0					
CYCLES	5					
DELAY	1					

* these configuration items only present if tracking and/or remote control options present