Appendix SKY – GILAT SKYEDGE MODEM INTERFACE

Revision: 17 Nov. 2011 Software Version: 1.60

This appendix describes the unique features and procedures associated with interfacing an RC3000 Antenna Control Unit to a Gilat SkyEdge modem.

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 Gilat SkyEdge modem option are described.

This appendix is written from the perspective of how the Gilat SkyEdge modem integrates and works with the RC3000 antenna controller. For further information on the modem itself, the user should refer to Gilat SkyEdge modem documentation.

1.2 RC3000 Features

This option provides the RC3000 controller with the ability to sense signal strength and lock status from a Gilat SkyEdge modem.

Software Configuration. If this option is purchased, the remote option designator will appear as "G".

Example: the software for a RC3000 purchased with GPS/Fluxgate, inclined orbit tracking and SkyEdge interface would be designated RC3K-xx-GT**G**N.

NOTE: since the interface to the SkyEdge modem is mechanized via the RC3000's serial remote control connector, remote control of the RC3000 is not concurrently available.

1.3.2 System Interface Requirements

The interface between the RC3000 and the SkyEdge modem is accomplished via a cable described in section 2.2.11.

NOTE: in order for this interface to work, the SkyEdge modem must be programmed to implement the protocol described by the following document:

Gilat Generic Antenna Interface Version 3 Reference Guide

July 2010 Revision 0.2

Document #: DC-001940(B)

1.10 Theory of Operation

When programmed correctly, a SkyEdge modem may provide signal strength and lock status data to the RC3000 ACU via the "Serial" port on the back of the modem. The RC3000 will use and display this data during LOCATE's in a similar fashion to how it uses analog signal strength data from other receivers. Additionally, the ACU supplies antenna position data from the GPS to the modem for the calculation of transmit time delay.

2.0 INSTALLATION

This section details specific installation procedures applicable only to the Gilat SkyEdge interface option. Proceed with all other installation steps as described in the baseline RC3000 manual and any other applicable appendices.

2.2.11 Remote Control

In order to mechanize the serial interface with the SkyEdge modem, the Remote Control port (J5, DB-9 Female) on the back of the RC3000 is used. As mentioned in section 1, this precludes any remote control of the RC3000.

Serial data is transferred using the RS-232 standard. The RC3000 must internally be jumpered for RS-232 (vs. RS-422) operation. See section 2.2.11 of the baseline RC3000 manual for instructions on how to accomplish this jumpering.

The following table shows the signals between the RC3000's DB-9 and the SkyEdge modem's "SERIAL" RJ-45:

SIGNAL	J5 (DB-9 F)	RJ-45
TX	2	6
RX	3	3
GND	5	SHIELD

Note that the GND signal needs to connect to the shielded jacket of the RJ-45. Most common Ethernet cables do not have a shielded jacket. See the cable drawing in section 5 for an example part number of a shielded Ethernet cable.

Also note that the SkyEdge modem may have multiple RJ-45 connectors. Be sure to use the RJ-45 connector marked "SERIAL".

SKYEDGE INTERFACE CHECKOUT

Utilize the maintenance mode described in 3.3.2.12 below to checkout the interface between the RC3000 and the SkyEdge modem.

Initially check that the status message count (CNT) is increasing. This provides confirmation that data is passing between the ACU and the modem.

Next check that the frequency (KHZ) displayed reflects the frequency that the modem is currently tuned to.

After having confidence in the communication link, manually position the antenna on the satellite of interest. Confirm that the lock status and SNR varies as the antenna sweeps across the satellite.

Following this manual confirmation of the interface, the user should attempt automatic LOCATEs of the satellite.

3.0 DETAILED OPERATION

With the SkyEdge modem option properly installed, the operation of the RC3000 will be almost exactly as described in the baseline user's manual with just a few exceptions noted below.

3.2.2.3 LOCATE

The LOCATE mode should scan azimuth looking for signal strength and lock status via SS2. The SS2 signal strength and lock status will be parsed from the serial data coming from the SkyEdge modem.

NOTE: The Autopeak Signal Source configuration item (3.3.1.2.6 in baseline manual) should to set to "SS2" in order for the LOCATE's scan function to sense signal lock and strength from the modem.

3.3.2 Maintenance Items

A unique maintenance mode for the Gilat SkyEdge interface is selected from the Maintenance Menu by pressing the ENTER key.

```
1-VOLTS   2-DRIVE   3-TIME   4-SIG MAINT
5-LIMITS  6-GPS COM 7-COMPAS 8-MOVETO
          0-SHAKE   +/-DVB
                    <>GILAT  JM_TNGR1.60
```

3.3.2.12 GILAT SKYEDGE MODEM MAINTENANCE

This mode allows the user to observe the data interface between the modem and the ACU. It also allows the user to jog the antenna to observe the modem's signal strength feedback.

```
-123.4         MOD:LOCK   RF:123  SKYEDGE
 123.4  UP     SNR:-1.04 SS2:125
 -89.7 CCW     SPD:SLOW       KHZ:1101067
                TX:MUTE       CNT:  12345
```

CNT: Status Message Count

This field shows the number of status messages successfully received from the modem. When the interface between the ACU and the SkyEdge modem is working correctly, this count should increment at a rate of approximately 8 times a second.

Note that it may take several minutes after the modem has been powered up before the 8 Hz. message rate is achieved.

KHZ: Modem Downlink Frequency

The modem's current downlink frequency is included in the status message to the ACU. This frequency is not required by the ACU for operation but is reflected in this field as an additional confirmation that the modem/ACU interface is working.

MOD: Modem Lock State (LOCK/----)

This field will show "LOCK" if the modem is reporting that it has a signal lock or "----" if there is currently no lock.

SNR: Signal to Noise Ratio

This field shows the current signal to noise ratio reported by the modem (12.34 dB format).

SS2: Scaled Signal Strength

The RC3000 parses the SNR reported by the modem and scales it to a value between 0-999 for use by the LOCATE mode's scanning and peaking routines. This signal strength is displayed as "SS2".

RF: L-Band Power

This field shows the relative value derived from the RC3000's L-Band power detector. The values seen from this detector depend on the receive system's gain and the number of active transponders on a particular satellite. This field is included to aid the operator when manually jogging the antenna.

Manual Antenna Control

Azimuth, elevation and polarization angles and limit status are shown in the two left columns of the display. The antenna may be moved in a similar fashion to the MANUAL mode. The azimuth may be manually jogged via the 4 and 6 keys, elevation via the 2 and 8 keys, and polarization via the 1 and 3 keys. Speed (FAST/SLOW) may be toggled via the 0 key.

4.0 Troubleshooting

NO ACU/MODEM COMMUNICATION

- Check that interface cable is correct and plugged into proper connectors on the back of the ACU and modem.

- Confirm via the Gilat SkyManage application that the GPS interface option has been enabled. After enabling GPS, "submit" the change and reboot the modem.

- Consult with the modem provider to confirm that the modem's software version supports the protocol referenced in 1.3.2 of this appendix.

NO RECEIVE LOCK

- Confirm (via Spectrum Analyzer, etc) that the antenna is being positioned onto the correct satellite.

- Confirm that the antenna's azimuth and elevation sensors are properly calibrated.

- Confirm that the receive polarity is correct and properly calibrated. A typical problem is that the user has selected the transmit polarity (V or H) for the satellite while the ACU needs the receive polarity described.

- Determine if additional amplification or attenuation is needed in the RF receive chain in the case that the signal may be either too weak or saturated.

ACU PEAKS ON SATELLITE BUT MODEM DOES NOT GO "ONLINE"

- This case indicates that the ACU is receiving correct lock status from the modem but the modem may not be receiving correct GPS data from the ACU.

- Go the GPS Serial Port Diagnostics maintenance screen (3.3.2.6 in the baseline RC3000 manual) to confirm that the ACU is communicating with the GPS receiver and that a valid position solution is being formed by the GPS receiver.

5.0 Drawings & Schematics