GRT AVIONICS

Radenna SkyRadar-D2 and DX ADS-B Receivers

Equipment Supplement

Revision A2

9-Jul-2014

SkyRadar Supplement Revision Notes

Revision	Date	Change Description
A	1-Apr-2013	Initial Release
A1	19-Jun-2013	Added information about own-ship suppression settings (Section 3.1) Corrected error in Section 4 regarding ADS-B Traffic annunciation on EFIS screen Corrected page numbers in Table of Contents Removed availability information for Netix USB hub (now unknown)
A2	9-Jul-2014	Added references to SkyRadar DX (all sections) Added note about using 1090 MHz antennas (Section 1.2) Added tablet connectivity information (Section 2.3) Updated EFIS screen ADS-B indications to be consistent with the latest EFIS software- HXr v. 2b, HX v. 6a, SX v. 10 (Sections 3 and 4)

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Section 1: Introduction

1.1 About the Radenna SkyRadar

The Radenna SkyRadar-D2 and its newest version, the DX, are dual-band ADS-B receivers that receive FIS-B weather and TIS-B traffic data and display it on GRT Horizon HX, HXr and Sport SX EFIS screens. They also transmit data through WiFi to tablets and devices that can display ADS-B information, such WingX, iFly and Avare. The SkyRadar receives traffic position signals on both 1090 MHz (from Mode S transponders) and 978 MHz UAT. **NOTE:** GRT Horizon/Sport HS and WS units do not support USB receivers, including SkyRadar. These systems require a receiver with RS-232 serial output. Please see the GRT website for more information.

WARNING: The SkyRadar is a receiver ONLY. Do not expect or rely on any traffic information unless your aircraft is also participating in ADS-B OUT. GRT recommends the use of an ADS-B compliant Mode S extended-squitter transponder, such as the Trig TT22, coupled with an appropriate GPS for full ADS-B participation. Please read the ADS-B page on the GRT website for more information on current ADS-B options and how the system works.

Download the current installation manual from the Radenna website and follow all instructions thoroughly. This supplement is intended to support GRT users with information about connection and use with GRT EFIS systems, and may not be totally up-to-date with all Radenna specifications.

The interface between this receiver and GRT display units allows for:

- FIS-B subscription-free weather information displayed on a GRT display unit while within ADS-B ground coverage;
- TIS-B traffic information displayed on a GRT display unit while within ADS-B ground coverage (see Warning above for more information);
- Direct airplane- to-airplane traffic information displayed on a GRT display unit from nearby aircraft participating in ADS-B OUT on 1090 MHz.

SkyRadar weather screenshot, Sport SX

SkyRadar traffic on HXr map screen

1.2 Data Port and Hardware Requirements

Display Unit Data Port	USB port
Power Connections	11-36V (cigarette lighter adapter or hard-wired). Power/ground required for both the Radenna unit and the USB hub, if required. Recommend wiring both to avionics bus.
Antennas	Dual (short) included. Extensions or external antennas optional.

USB HUB: GRT Sport SX units require a powered Hi-Speed USB hub to communicate with the SkyRadar. The hub is useful because it will allow simultaneous use of the SkyRadar and an installed USB thumb drive for data recording, something otherwise impossible in single-USB Sport units. Hubs are optional for HX and HXr installations.

These USB hubs are currently in use by GRT customers with SkyRadar receivers:

- StarTech 4-port USB Hub, p/n ST4200USBM, available from Amazon.com. 7-24V DC
- Netix P5USB, p/n CNX-P5USB, 7-32V DC

Both of the recommended hubs have connections for external power. They should be wired to the avionics bus, as the power coming out of the USB hub in the display unit is not adequate for powering the hub.

Antennas: The use of externally-mounted antennas is optional. GRT beta testers in Van's RV aircraft have reported good signal with the included Radenna antennas when they are mounted within view of the sky. Signal reception may be improved by mounting antennas on the belly of the aircraft. An external DME antenna may be used for the 978 MHz band, and a regular transponder antenna may be used for the 1090 MHz band. 1090 antennas have been used with success for both bands. External antennas require SMA to BNC connectors and high quality, low-loss cables. Radenna sells extensions for the included short antennas on the unit for installations where the attached short antennas are not within view of open sky.

RV-6 baggage area mounting bracket. Looking down from top (L) and up from bottom showing dual band and GPS antenna exits. Mounting bracket attaches to existing support. (Airplane shown has a tip-up canopy.) It is a "tight fit" but it works.

SkyRadar receiver is mounted under the instrument panel. Antennas are mounted on top of the instrument panel with antenna cable extensions and a custom bracket to hold antennas in position as shown. GPS antenna is on top of the instrument panel. Note lacing cord to hold antennas in place during aerobatics. Antennas extended using commercially-available SMA cable (not reverse-polarity) and SMA-SMA connectors.

RV-8A with SkyRadar receiver mounted under instrument panel. Antennas are mounted as shown (one on each side of windshield/rollbar) with cable extensions. Velcro or tape can be used to hold them in place. GPS antenna is on top of the instrument panel.

Section 2: Installation & Wiring

2.1 Suggested Connections

USB only. Serial output is not supported by Radenna SkyRadar-D2 or DX. See Section 1, Data Port and Hardware Requirements, for more information.

2.2 Mechanical Installation

Placement of the Receiver

The receiver should be installed within view of the sky if using the included antennas. It is designed to be placed on top of the instrument panel, but it can be mounted to a bracket in the baggage compartment or other area behind the firewall that is not covered by metal.

Receiver GPS Antenna

The SkyRadar has its own GPS receiver for locating its own position. The receiver is contained in the GPS antenna. Place the GPS antenna in a location that has a clear view of the sky at all times.

Placement of the USB Hub

The USB hub is usually mounted near the instrument panel and avionics bus for convenient connection to the aircraft's electrical system and GRT display unit. A USB cable is then run from the hub to the SkyRadar unit.

Placement of External Antennas

External antennas should ideally be at least 4 feet from the transponder antenna, but not on multiples of 4 (due to wavelength interference). Place on the bottom of the aircraft for the best angle to receive ADS-B ground signals. Be sure the antennas are adequately grounded.

2.3 Tablet Connectivity

The SkyRadar can display ADS-B on several types of tablet apps via WiFi. The SkyRadar DX also has an internal AHRS that can display backup attitude information on the tablet. Please refer to the Radenna SkyRadar installation manual and website, www.skyradar.net, for more information.

Section 3: Setup & Programming

3.1 Display Unit & SkyRadar Setup

1. After the SkyRadar, antennas, and USB hub are installed and wired, use the following procedure to program the display unit to communicate with it.
2. Power up the system.
3. Enter the Setup Menu on the display unit that the SkyRadar/USB hub is connected to.
4. Under General Setup, scroll to just below the Serial Port setup options. Highlight **USB ADS-B** option and turn knob to select ON.
5. Stay on General Setup screen. Scroll down to Traffic Altitude Filter. Use this to filter out traffic beyond a certain reported altitude from your position, excluding irrelevant traffic from the map.
6. If broadcasting ADS-B Out, enter Flight ID information on General Setup page as listed below.
7. Press SAVE softkey.

Setting	**Value**	**Notes**
Flight ID and Address*	–	Press to activate menu
Flight ID*	Enter actual value	Enter aircraft registration/N-number
Mode S Address*	Enter actual value	Mode S code (base 16-Hex). Find by looking up N-number on FAA website. Note: The 6-digit Mode S code is only listed for aircraft with an airworthiness certificate, and not for reserved N-numbers.
USB ADS-B	On	Tells display unit to expect ADS-B data through USB port.
Traffic Altitude Filter	Set to preference	Excludes traffic alerts outside of the selected altitude.
*Set this up to receive traffic data if you are transmitting ADS-B Out using an extended-squitter transponder.		

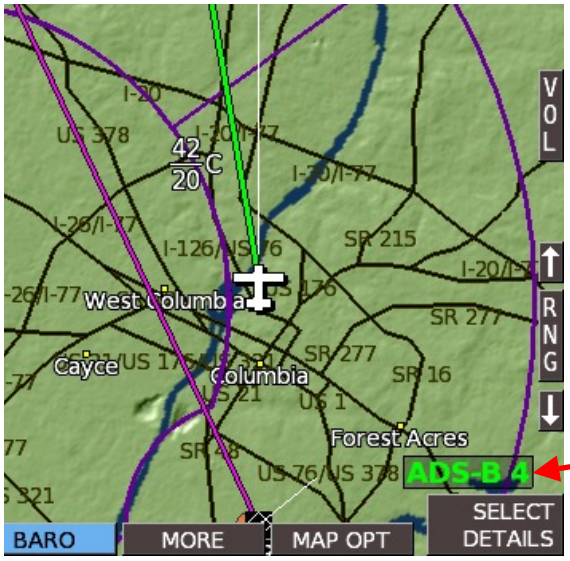
3.2 Post-Installation Checkout

Verify Device Communications

1. Pull the aircraft outside and power up the EFIS system and ADS-B receiver.

2. Go to Set Menu > Display Unit Maintenance. Scroll to ADS-B Status. If the Valid Frames counter is counting, data packets are being received.

3. When the receiver is within range of one or more ADS-B ground towers, a green **ADS-B x** icon will appear on the side of the moving map, with the "x" representing the number of towers received. See image below.



The receiver is communicating with 4 ADS-B ground towers.

Section 4: Using the SkyRadar

1. **WEATHER:** Bring up the MAP screen. Under the SHOW softkey, there is a list of items to choose from. (RADAR, SHADE, TERRAIN, WIND, METARS, etc.) Note that only one of the map features can be selected; Radar information will replace Terrain because the color shading of both features together is confusing. (On HXr, access SHOW softkey by pressing SCREEN, then MAP OPTIONS softkeys.) When selected on the MAP screen, radar will also be displayed in the HXr map inset.

2. **METARS and TAFS**, if available, are shown on the WPT DETAILS page of the airport. Select METARS on the moving map SHOW menu to display color-coded METAR symbols.

3. Go to the Moving Map Setup Menu for traffic alert and AIRMET, METAR, & TAF viewing options:

Setting	Value	Notes
Traffic Alert Window	On or Off	Traffic inset automatically appears when traffic is a threat.
Show AIRMET	Choose to show on all MAP pages, on North-Up page only, or never.	
Color airports using METARS		
METAR Text	Choose to display weather report text in Raw or Translated (English) form	
TAF Text		

4. **TFRs** are currently not shown, but will be available with a future software update.

5. **Traffic** is shown as a black diamond icon with the altitude above or below you in hundreds of feet, an arrow that shows if it is climbing or descending, and a vector line that shows the approximate direction of flight. In addition to the moving map and geo-referenced charts, traffic icons can also be displayed in 3D on the PFD. To turn PFD traffic on or off, go to Set Menu > Primary Flight Display and scroll to Traffic In View. Select ON or OFF.