



ADS-B Discovery Dual Band Receiver Installation and User Manual

Revision A
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1 FOREWORD

Thank you for choosing the ADS-B Discovery Dual Band Receiver!

This manual describes the installation and operation of this receiver, using the software version shown in the Record of Revisions. Some differences may be observed when comparing the information in this manual to other software versions. GRT Avionics is not responsible for unintentional errors or omissions in the manual or their consequences. The builder of the aircraft and the pilot have the final authority on the airworthiness of the aircraft.

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1.1 Important Safety Information

***CAUTION*:** When used with a tablet or phone application, the attitude, air data, and GPS position data transmitted via wi-fi is provided to the receiver by the EFIS. Thus, it is not an independent source of data. It should not be used to cross-check the data from the EFIS that supplies this data to the receiver, since it is the same data.

1.2 Warranty and Return Policy

All GRT products include a 2-year warranty, starting on the day the instrument is put into service (or three years after purchase, whichever comes first), against manufacturer defect.

Contact Tech Support before returning a component to GRT for repair or warranty work. Many issues are installation-related and can be resolved over the phone, saving time and expense. All returns for repair or upgrade must be accompanied by a Service Request Form, downloadable from the GRT website.

1.3 Technical Support

Our tech support staff has real-world experience installing, flying, and troubleshooting GRT equipment in many different types of aircraft. We are here to help you.

Please visit our website for up-to-date contact information for tech support via email.

Check the home page of the GRT website often for new manual updates, video tutorials, and other instructional materials as we release them.

1.4 Record of Revisions

Revision	Date	SW Revision	Description
A	April 2021	1.00	Initial Release

Contents

1	FOREWORD.....	I
1.1	Important Safety Information.....	I
1.2	Warranty and Return Policy.....	I
1.3	Technical Support.....	II
1.4	Record of Revisions.....	II
2	INTRODUCTION.....	1
2.1	Warnings, Cautions, and Notes.....	1
2.2	Electronic Manuals and Internet Links.....	1
2.3	Feedback and Corrections.....	1
2.4	The Discovery ADS-B Receiver.....	1
2.5	General Specifications.....	2
2.6	Compatible Antennae.....	2
3	INSTALLATION.....	3
3.1	Choosing an Antenna Location.....	3
3.2	Mounting the Antenna.....	4
3.3	Choosing a Receiver Location.....	4

3.4	Mounting the Receiver.....	4
3.5	Antenna Wiring.....	5
3.6	Receiver Wiring to a GRT Avionics EFIS.....	5
3.6.1	RS-232 Wiring.....	6
3.6.2	USB Wiring.....	7
3.7	Required GRT EFIS Settings for connecting via RS-232.....	8
3.8	Required GRT EFIS Settings for connecting via USB.....	8
3.9	Other Applicable EFIS Settings.....	8
3.10	Dimensional Drawing.....	9

2 INTRODUCTION

This manual was written to help both builders and pilots learn how to install, use, and maintain this receiver. The receiver may be used in certified aircraft when operated as a portable electronic device per FAA guidance. This guidance allows the receiver to be wired to the aircraft wiring for electrical power.

2.1 Warnings, Cautions, and Notes

Throughout this manual, you will see notes punctuated with the following bold type:

!WARNING!: A special notice that could lead to injury or death if not followed.

CAUTION: A notice that could lead to damage of equipment if not followed.

NOTE: An item of special interest that is not immediately apparent through normal usage.

2.2 Electronic Manuals and Internet Links

Many customers now choose to store electronic copies of the manuals on a tablet computer or phone for easy access to the newest material. It is easy to carry a lot of written materials aboard the aircraft without the added weight and bulk of paper. Because of this, we have added links to videos and other aids to the manual text. Simply touch or click on the link to access interactive materials and tutorials.

2.3 Feedback and Corrections

If you notice any errors or would like a better explanation of something that relates to this product, please contact GRT tech support. We are always striving to make our customers' lives easier.

2.4 The Discovery ADS-B Receiver

This receiver accepts the following:

- ADS-B weather and traffic data from 978 MHz ADS-B ground stations
- Airplane-to-airplane traffic data from other ADS-B OUT equipped airplanes
- Traffic data from airplanes with 1090 MHz mode S transponders with extended squitter

This data is provided to the EFIS via an RS-232 or USB serial data connection and via Wi-Fi to phone/tablet apps.

2.5 General Specifications

Dual-frequency ADS-B UAT (978 MHz), Extended Squitter (1090 MHz) Receiver

- **Physical Dimensions:** 8.0" x 2.5" x 1.3" (203 x 63 x 33 mm)
- **Weight (W/O Wiring):** 0.7 lbs (0.32 kg)
- **Power Input:** 7-35V DC, 8W
- **Temperature Range:** -10° F to 158° F (-25° C to 70° C)
- **Operating Altitude:** No limit
- **Cooling Input:** Not required
- **Interfaces:** -RS-232
-USB
-Wi-Fi

2.6 Compatible Antennas

For maximum sensitivity, an external antenna is recommended. Although an antenna is included with the receiver, any external antenna designed for ADS-B may be used.

3 INSTALLATION

Installation consists of the following steps:

- Mount the Receiver
- Connect Power and Data Wiring
- Install and Wire the Antenna
- Configure the EFIS and Apps to Use the Data

The location of the antenna often dictates the location of the receiver.

3.1 Choosing an Antenna Location

The main considerations for the location of the antenna are:

- 3' away from the transponder, ADS-B OUT (if equipped), and VHF communication antennae.
- 6' away from other transmitting antennae, such as DME.
- Preferably within 6' of the receiver location (this can be extended to 12' or more by supplying your own RG-58 coax cable).
- Mounting the antenna on the bottom side of the airplane reduces the probability of water intrusion.
- A ground plane is required. For an aluminum airplane, the skin of the airplane functions as a ground plane. For a composite (or tube and fabric) airplane, a ground plane should be incorporated. The ground plane can be a sheet of aluminum, at least 5" in width and length. The thickness of the aluminum is not important. Increasing the size of the ground plane, up to 25" on each side, improves the sensitivity of the receiver. Minimal improvement can be expected beyond this size. The antenna should mount through the ground plane, so that its mounting hardware makes electrical connection with the ground plane.
- The antenna must be mounted vertically.
- The antenna must be mounted away from major protrusions, such as engine nacelles, landing gear legs, etc.

Typically, the transponder and its antenna are located near the front of the airplane (to minimize the cable length between the two). In order to achieve the 3' spacing required, it is common to locate the ADS-B receiver antenna aft of the transponder antenna, on

the opposite side of the airplane's center line. However, if this placement isn't feasible, any location more than 3' from another transmitting antenna is acceptable.

3.2 Mounting the Antenna

Using the included hardware, the antenna can be mounted as follows:

- Drill a ½" mounting hole using a stepped drill.
- Install the rubber gasket on the antenna.
- Place the antenna in the mounting hole.
- Secure the antenna with the lock washer and nut.

Further guidance is provided by AC43.12-2A, Chapter 3.

3.3 Choosing a Receiver Location

The main considerations for the location of the ADS-B receiver are as follows:

- The aluminum base plate of the receiver is used to passively cool the receiver. This base plate should not be mounted in a way that thermally insulates it. When mounting to thermally insulating materials, such as on a composite airplane, use ½" standoffs to allow for airflow around the base plate.
- The receiver must be accessible for installation and maintenance purposes. Physical access to the receiver is not required for software updates when it's wired to a GRT EFIS.
- The receiver must be within 12' of the antenna. Receiver sensitivity diminishes due to signal losses in longer coaxial cables.
- The location should not expose the receiver to heat or water.
- Position the receiver so that the D-Sub remains accessible for wiring purposes. Similarly, if a backup GPS is going to be connected to the receiver, maintain space for this connection.

3.4 Mounting the Receiver

The receiver is mounted with four #6 screws put through the holes in its aluminum base plate. For ease of installation and removal, select a location (or fabricate a tray) that allows for the use of #6 nut plates.

3.5 Antenna Wiring

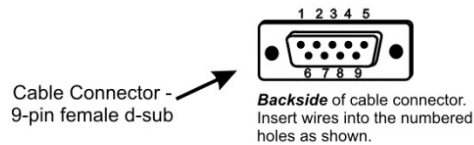
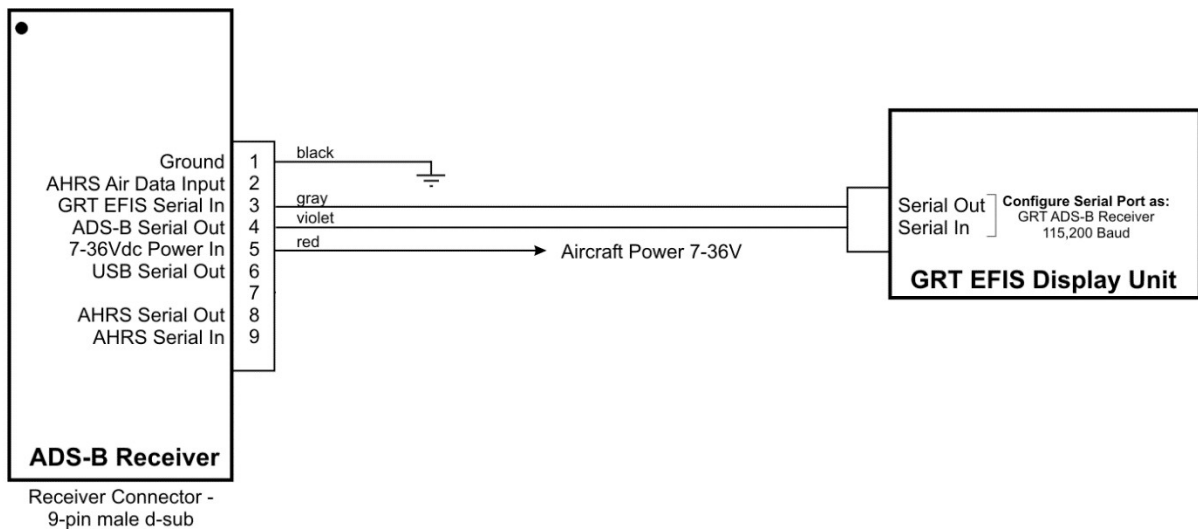
RG-58 or RG-400 coaxial cable (50 Ω characteristic impedance) are acceptable wiring choices. RG-400 is recommended for cable lengths greater than 6' (2m).

3.6 Receiver Wiring to a GRT Avionics EFIS

The receiver may be connected to a GRT EFIS via RS-232 or USB connections. An RS-232 connection is preferred, as the d-sub connector is a proven technology in airplane applications and includes hardware to keep the connector in place. In installations that lack a spare serial input, the USB output can be used.

3.6.1 RS-232 Wiring

The following diagram illustrates the wiring to a GRT EFIS using RS-232. While the “Serial Out” connection from the EFIS display unit to the receiver is optional, it provides the receiver with AHRS and GPS data that it can then output to tablet/phone apps via Wi-Fi. This connection also allows for updates to the receiver’s software.



Power Requirements: 7-36V
 0.7 A @ 12V
 0.35 A @ 24V
 Up to 5A fuse or circuit breaker

Notes:

- The locking aspect of the d-sub connector makes the RS-232 serial port wiring the preferred method of wiring.
- Each serial output can drive 4 GRT EFIS Display Units.
- Providing serial data to the receiver allows it to include GPS and AHRS data in the Wi-Fi output.

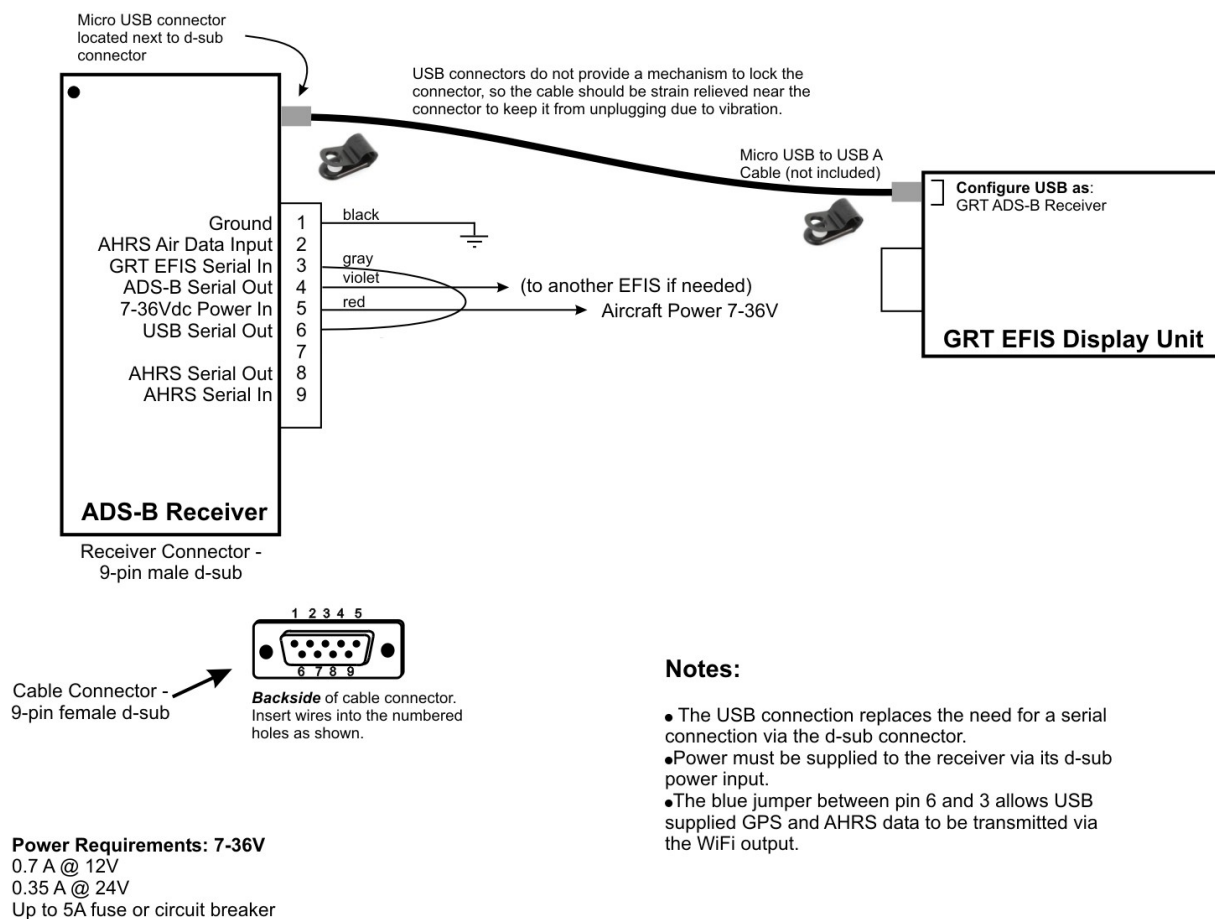
ADS-B Receiver to EFIS Wiring - Serial Ports

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ADS-B to EFIS Wiring Rev A.cdr
 04/8/2021

3.6.2 USB Wiring

The following diagram illustrates the wiring to a GRT EFIS using the USB port. The USB port provides the receiver with AHRS and GPS data that it can then output to tablet/phone apps via Wi-Fi. This connection also allows for updates to the receiver's software.



ADS-B Receiver to EFIS Wiring - USB Connection

ADS-B to EFIS EFIS USB Wiring .cdr
04/8/2021

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3.7 Required GRT EFIS Settings for connecting via RS-232

On the **Set Menu > General Setup** page, configure the serial input and output ports (if wired) to "**GRT Discovery ADS-B In,**" at 115,200 baud.

3.8 Required GRT EFIS Settings for connecting via USB

On the **Set Menu > General Setup** page, configure the USB ADS-B to **ON**.

3.9 Other Applicable EFIS Settings

If a USB GPS is connected to the USB Type A port (on the side next to the mounting holes) and is going to be used as a GPS source for the EFIS, configure it as **GPS1** or **GPS2** on the **Set Menu > General Setup > GPS from ADS-B Receiver** page.

3.10 Dimensional Drawing

