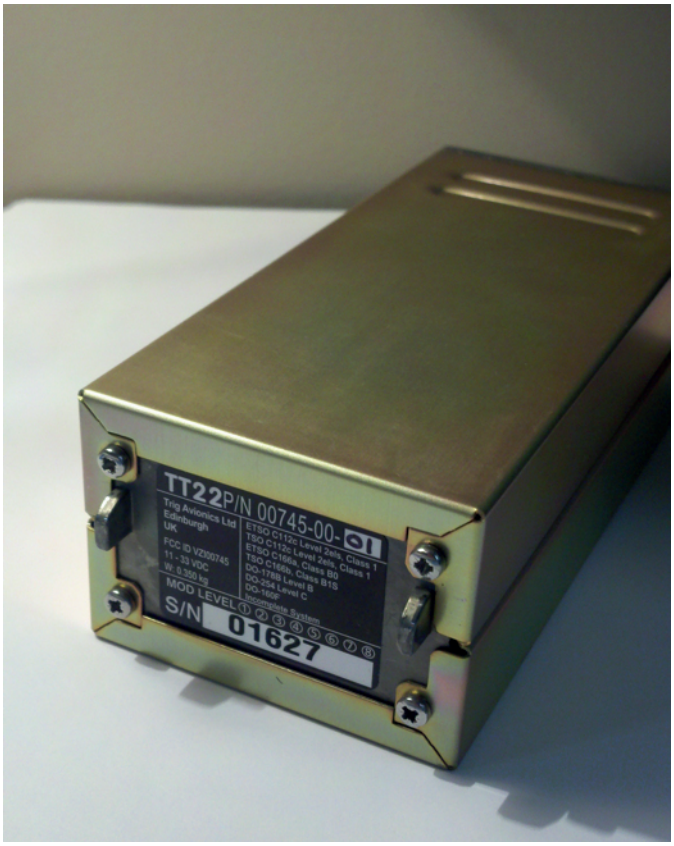
Trig TT21/TT22 Transponder– Remote Mount for HXr

Equipment Supplement



Revision A2

28-May-2014

Trig Supplement Revision Notes

Revision	Date	Change Description
A	1-Dec-2012	Initial Release
A1	7-Mar-2013	Added clarification for Mode S Hex code, p. 10 Updated information about Trig Serial Adapter metal case, p. 3, 6-7
A2	28-May-2014	Corrected “Test Squitters” line in TT22 Setup Menu, Section 3.1. Added “GND” to mode description in Section 4.1. Added pilot interface instructions for SX/HX/Mini, Section 4.2.

Table of Contents

Section 1: Introduction

1.1 About the Trig TT21/TT22

The Trig TT21 and TT22 transponder is uniquely useful to HXr users because it is able interface with the EFIS remotely, eliminating the need for a separate control head on the instrument panel. This supplement is designed to help you connect the transponder to the HXr display unit and program it to allow optimal performance of both units.

Download the current installation manual appropriate for your model of transponder from the Trig website and follow all instructions thoroughly. This supplement does not cover items such as antenna installation and power requirements for the transponder.

The interface between this transponder and the HXr allows for:

- Remote mounting, saving space on the panel and providing a clean, integrated design
- Certified Mode S with 1090-ES/ADS-B Out Support
- Available as Class 1, 250-watt output (TT22) or Class 2, 130-watt output (TT21)

1.2 Data Port and Hardware Requirements

Adapter Module

The Trig transponder requires an adapter module to interface remotely with the HXr. The Single Control adapter is included with the TT22 remote transponder sold through GRT Avionics. It allows one display unit to interface with the transponder. The Dual Control adapter allows two display units to interface with it. (Controlling functions for the transponder do not travel across the Inter-Display Link.) The part numbers are:

TRIG-ADPT-SC GRT Trig Adapter, Single Control
TRIG-ADPT-DC GRT Trig Adapter, Dual Control

Required Data Ports

Required Display Unit Data Port	Suggested Assignment
Serial Port IN	Serial 7 IN
Serial Port OUT	Serial 7 OUT

Suggested serial ports coincide with HXr Interconnect Diagram WD-1010-01, Figure 2-4.

Encoder Information

The Trig transponder has an altitude encoder built into the control head. Because this installation does not use the Trig control head, you will use the altitude encoding function of the HXr system.

Section 2: Installation & Wiring

2.1 Suggested Connections

For more information on Display Unit pins and connectors, see Pinout Diagrams in the Appendix of the HXr Installation Manual. See Figures 2-4 and 2-5 of this supplement for transponder and adapter wiring diagrams.

Display Unit Pin	Display Unit Function	Trig Adapter Pin	Trig Function
B22	Serial 7 Out	Pin 2, Channel 1 Display	Encoder & Command Data
B23	Serial 7 In	Pin 3, Channel 1 Display	Traffic & Status Data
N/A	N/A	Pin 12, Ground 1	Choose & run a minimum of two ground wires from Trig to aircraft ground.
N/A	N/A	Pin 14, Ground 2	
N/A	N/A	Pin 15, Power Input	Unit power, 11-33V DC
N/A	N/A	Pin 18	Suppression

"Own-Ship" Traffic Suppression

Pin 18 on the Trig adapter will prevent the transponder from transmitting while the onboard ADS-B receiver is receiving. This prevents the "shadow" of your own aircraft from popping up in the Traffic Warning screen on the EFIS. Not all ADS-B receivers support Suppression; see the wiring details of your ADS-B receiver for more information.

2.2 Worksheet: My System

You may use this form to make a record of your own serial port & wiring choices.

Display Unit Pin	Display Unit Port	Trig Adapter Pin	Wire Color	Notes
	Serial _____ Out	Pin 2, Channel 1 Display		
	Serial _____ In	Pin 3, Channel 1 Display		
N/A	N/A	Pin _____, Ground 1		
N/A	N/A	Pin _____, Ground 2		
N/A	N/A	Pin 15, Power Input		
N/A	N/A	Pin 18, Suppression		

2.3 Mechanical Installation

Keep the Trig at least 2 feet away from the aircraft magnetometer; otherwise, it may be mounted anywhere that is convenient and complies with instructions in the Trig installation manual.

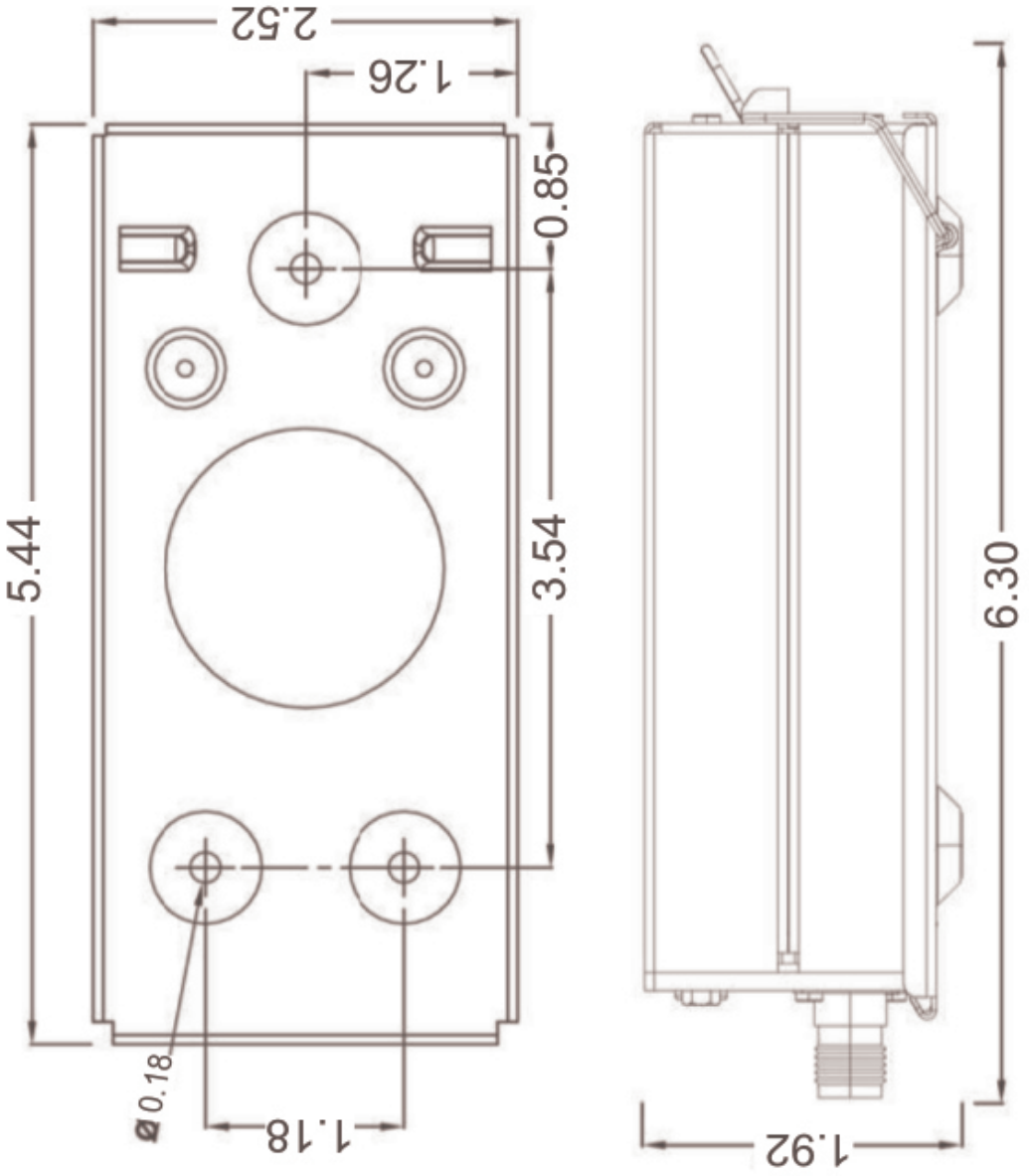
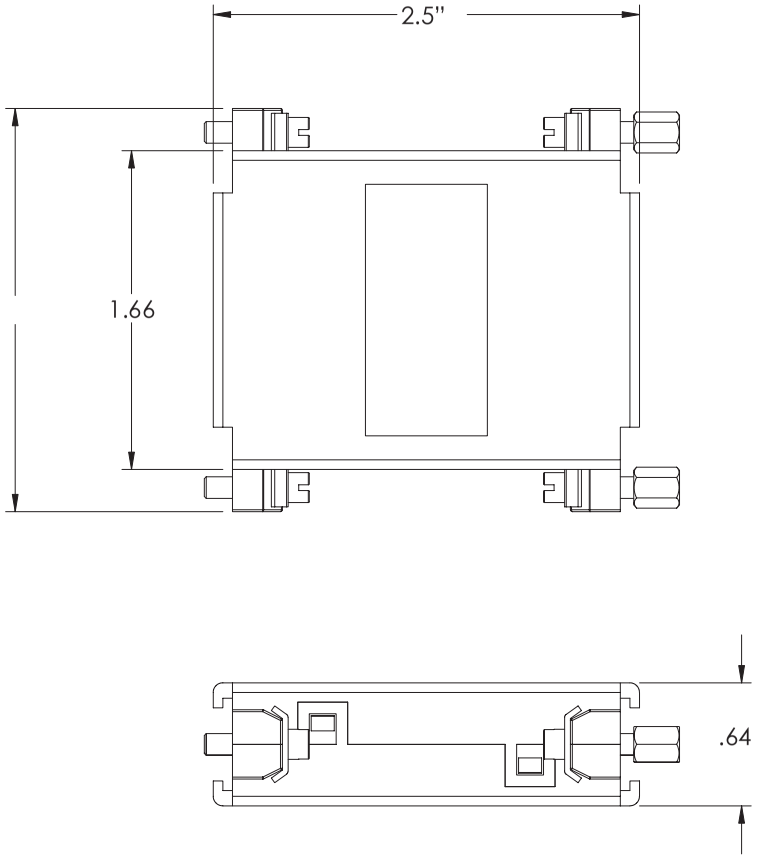


Figure 2-1
M760REM Rev A.cdr

Trig TT21/22 Remote Transponder Mounting Tray & Overall Dimensions

Note: Dimensions shown in inches.



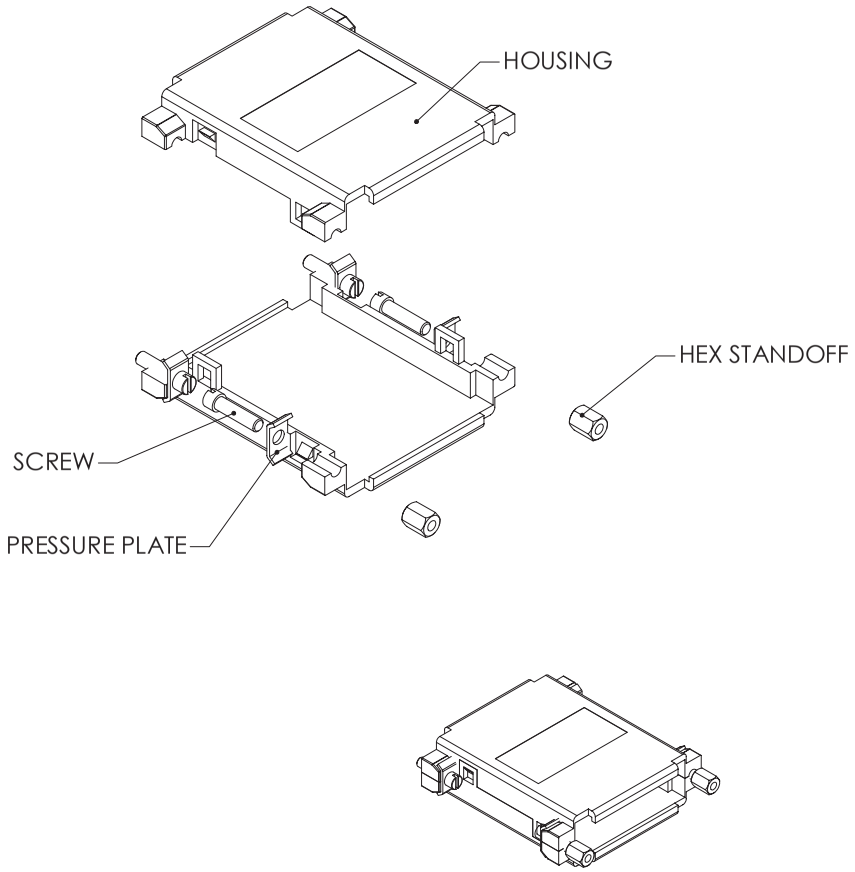


Figure 2-2: Trig Adapter Dimensions

Single- and Dual-Control GRT TRIG Serial Adapter Details

- Standard 25-pin D-sub connectors
- Metal case
- Plugs directly into Transponder D-sub connector.
- 1.8 oz.

Figure 2-4: Sample HXr Wiring Diagram

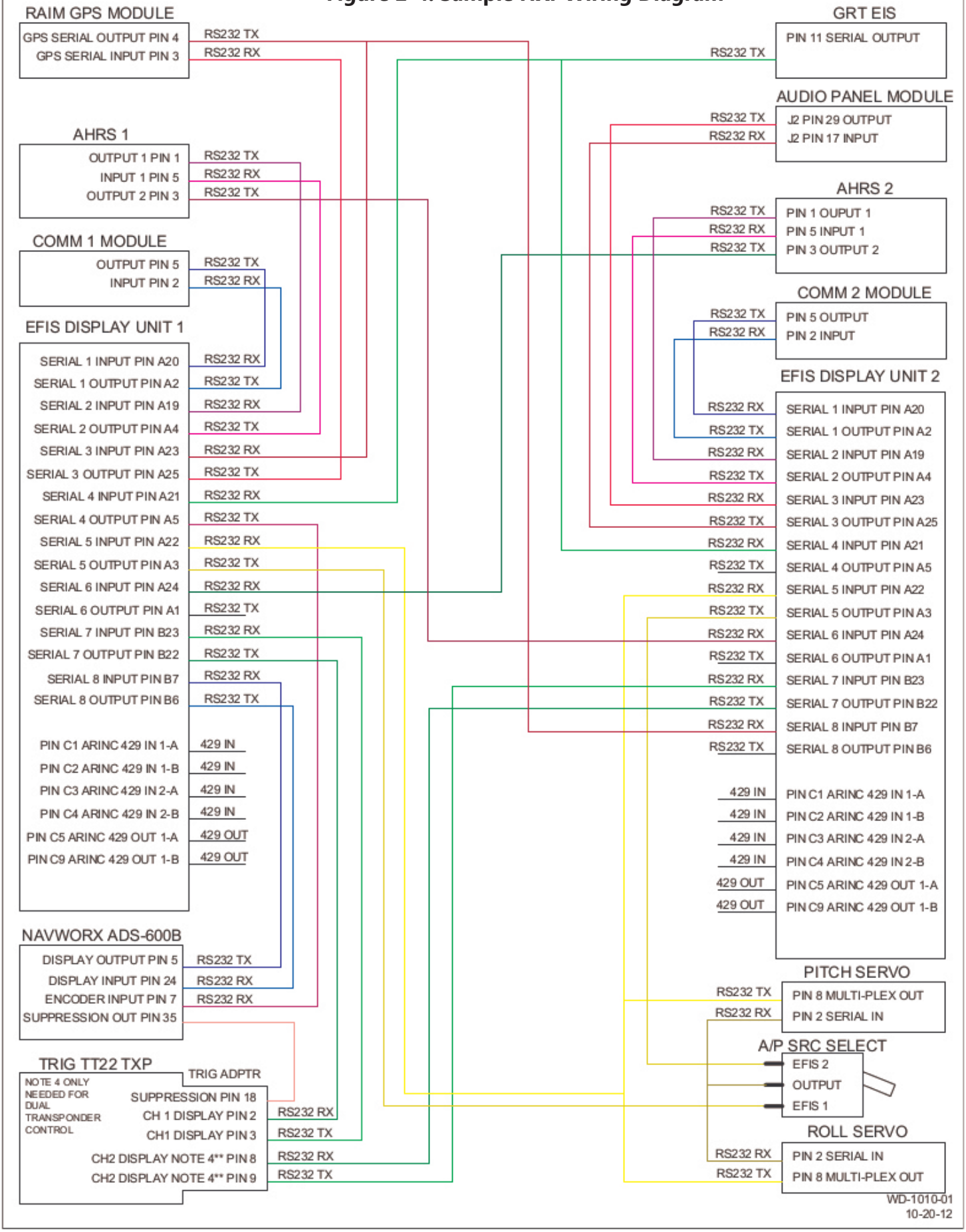
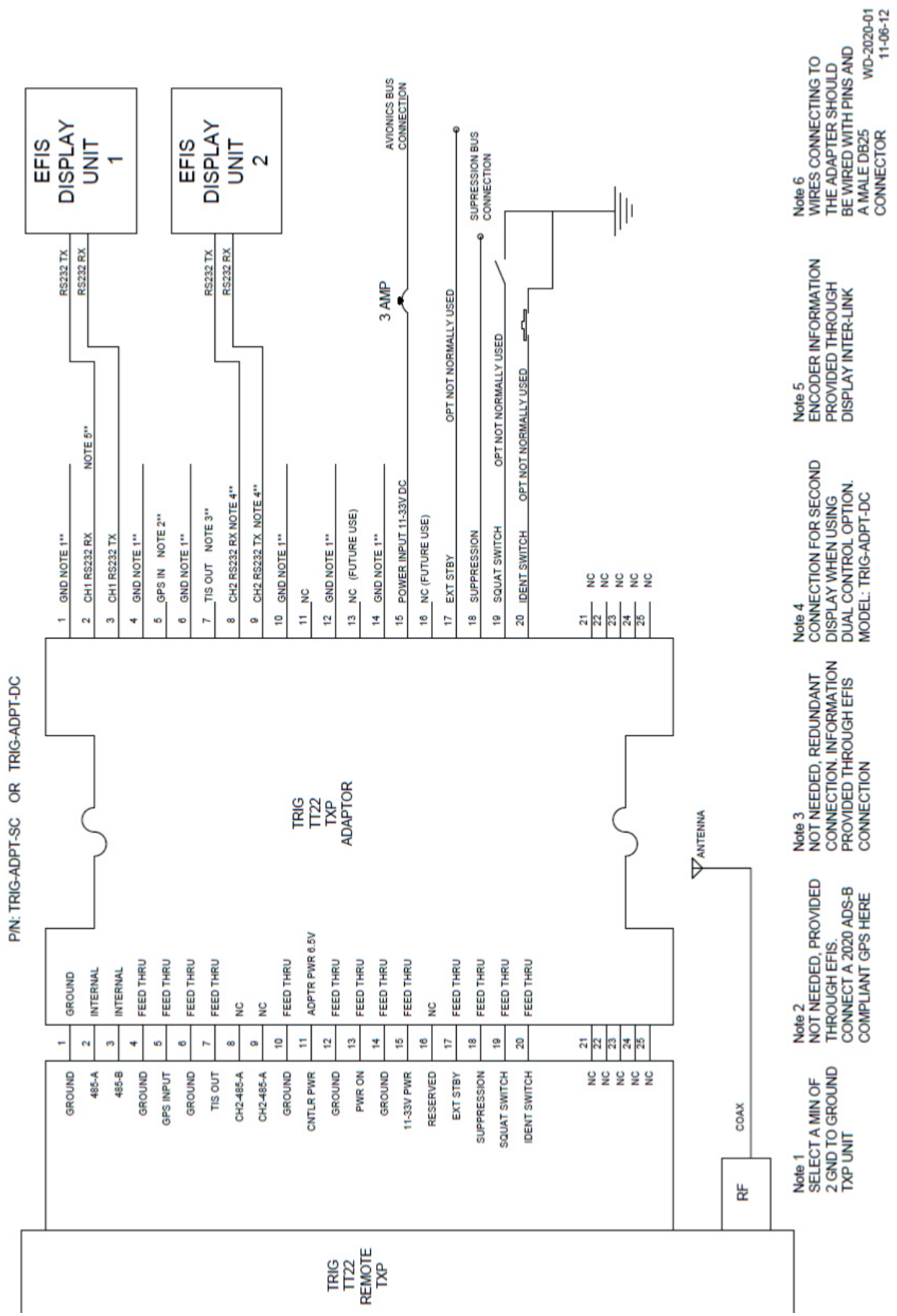


Figure 2-5: GRT Trig Adapter Wiring Diagram



Section 3: Setup & Programming

3.1 Display Unit & Transponder Setup

1. After the display unit and transponder are installed and wired, use the following procedure to program the display unit to communicate with the Trig. Note that in the system, the term "TT22" refers to both the TT22 and TT21 transponder units.

2. From the home screen, press the MORE soft key, then the SET MENU soft key. Turn the lower right knob to place the cursor bar over General Setup, then press the knob to select it and go to the General Setup menu.

3. Highlight Flight ID and Address at the top of the General Setup menu. Enter the Flight ID as your aircraft's registration number. Enter Mode S Address, which (in the U.S.) can be found by looking up your aircraft N number on the FAA website's aircraft registration database. This Mode S Code (base 16/Hex) is a unique 6-digit code assigned to each registration number. Note that the 6-digit code is not generated until the N number is assigned to an aircraft (not simply reserved).

4. Turn the lower right knob to highlight the Settings of the serial port that you wired to the transponder. Enter the Values shown below.

Set Menu Page	Setting	Value
General Setup	Serial Port ____ Rate	9600
General Setup	Serial Port ____ Input	TT22
General Setup	Serial Port ____ Output	TT22

5. When you choose "TT22" as the value for Input or Output of a serial port, the label "TT22" will appear at the top of the General Setup screen. Highlight this and press the knob to activate the TT22 Setup Menu. A long list of Settings and data counters will appear. Enter the Values as shown below to program the transponder.

Setting	Value	Notes
Squat Switch	Choose when squat switch is closed ("low"); operates ground & flight modes automatically	
Aircraft Category	Choose closest value	For ADS-B OUT data
Speed Category	Choose closest value (cruise speed in knots)	For ADS-B OUT data
Aircraft Width	Choose closest value (in meters)	For ADS-B OUT data
Aircraft Length	Choose closest value (in meters)	For ADS-B OUT data
VFR ID	Enter aircraft registration number	For ADS-B OUT data
GPS Input	NMEA0183*	Format of GPS feeding ADS-B OUT signal
GPS/TIS Rate	4800*	Use 57600 for GRT RAIM GPS

Trig Setup Continued

Setting	Value	Notes
GPS Integrity	Low: VFR/Uncertified*	GRT GPS is WAAS-capable, but not TSO'd.
Test Squitters	Auto	
TIS Output	Trig TIS Traffic (typical)	Traffic Information Service (Mode S Traffic) Primary Source
ADS-B Receiver In Aircraft	Choose Yes or No	See www.GRTavionics.com for recommended ADS-B receivers.
*Use this Value with a GRT GPS module. If using a different GPS wired to TT22, enter value for that GPS. (For example, NexNav Mini complies with TSO-C145c and "2020 ADS-B Out" rule.)		

3.2 Post-Installation Checkout

Verify Device Communications

On the top and bottom of the TT22 setup menu, there are several communication counters that make it easy to see if data is crossing between the transponder and EFIS. Check that data is flowing between the display unit, adapter, TT22, and GPS.

At the bottom of the TT22 setup menu, the transponder's Mode and Last Reply Count are visible for in-flight troubleshooting. The Transponder Versions and Adapter Software Version fields display the version of the software in both the transponder and adapter.

Update Adapter Software

Software comes pre-installed in the Trig Adapter. Like the Display Unit and AHRS, periodic updates of this software may be necessary. Load software to the adapter in the same way that you update software on the Display Unit. If new software is available, it will be available for free download from GRTavionics.com, on the Support/Software page. To update software:

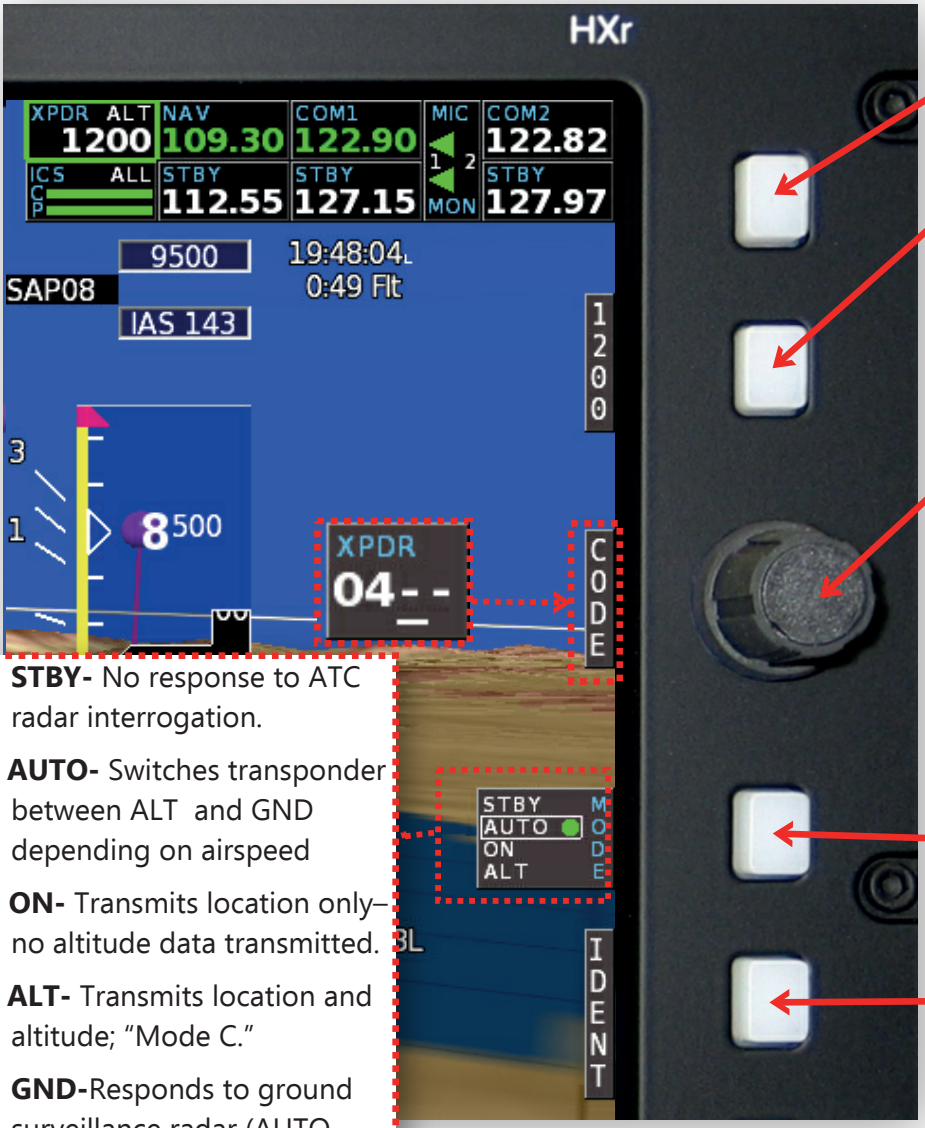
1. Click the link and save the new software file(s) onto the root directory of a USB memory stick. (NOTE: "Root directory" means the file is not inside a file folder on the thumb drive, but visible as soon as you open the thumb drive on your computer. The EFIS does not look inside folders to find files that it needs, but picks them off the main directory file list.) Do not rename the files when you save them.
2. With the display unit powered OFF, plug the memory stick into a USB port in the display unit that the TT22 is wired to.
3. Turn ON the display unit and access the Set Menu page, followed by the TT22 setup menu.
4. Select Load Adapter Software and press the knob. Answer YES, you are sure. The software will load onto the Trig adapter automatically from there. The system will reboot itself after loading the new software.
5. Once the system reboots, you may remove the USB memory stick from the display unit.

Transponder Testing & Certification

Consult the Trig TT21/TT22 installation manual for testing information. The transponder installation must be certified before use in flight.

Section 4: Using the Remote Trig Transponder

4.1 HXr Transponder Interface



SELECT: Press to toggle through remote devices. Highlight XPDR with green box.

1200: Press once to enter and activate VFR squawk of 1200.

To Enter Squawk CODE:

1. Press Upper Knob to activate squawk digit softkeys along bottom of screen and Code Entry Window, shown at left as an inset with red dashed outline.
2. Enter code using bottom softkeys or by pushing/turning Upper Knob.
3. Press Upper Knob again to activate new code.

MODE: Change transponder response mode. Default is AUTO. Note: Active mode is displayed in Avionics Inset XPDR window.

IDENT: Press at request of ATC to identify your target on the scope.

STBY- No response to ATC radar interrogation.

AUTO- Switches transponder between ALT and GND depending on airspeed

ON- Transmits location only– no altitude data transmitted.

ALT- Transmits location and altitude; "Mode C."

GND-Responds to ground surveillance radar (AUTO selection only)

ENTER softkey appears after 4 digits are entered.

Press to enter **squawk code digits**, then press Upper Knob or ENTER softkey to activate new squawk code.

Press to cancel new squawk code and restore HOME softkeys.

Press to **clear** code entry window and start over.

4.2 Sport SX/Horizon HX/Mini Transponder Interface

Transponder Mode/Code Display

The Transponder code display box in the lower left hand corner of the EFIS screen under the airspeed tape shows the active mode and squawk code.

Mode Selection

1. Press any key on the Mini to make the softkeys appear, then press XPDR softkey.
2. Press the softkey under the MODE column until the desired mode is highlighted. Then press EXIT.
3. By highlighting the AUTO mode, the transponder automatically enters ALT mode when the EFIS senses an indicated airspeed of 35 knots. Under 35 knots, it assumes ground operation and reverts to the GND mode. (See Section 4.1 for a description of modes.)

Transponder Code/Mode Display Box

Code Selection

1. Press the XPDR softkey to bring up the Transponder controls.
2. Press the CODE softkey to bring up the squawk code entry keys, shown below.
3. Note the cursor under the first digit of the sqauwk code. Turn the right knob to change the underlined digit. Press the knob to enter the new digit and move the cursor to the next digit.
    - In case of entry error, press the knob repeatedly until the cursor comes back to the digit you want to change.
4. OR– To quickly enter the VFR (1200) squawk code, press the 1200 softkey.
5. When finished, press SAVE.
6. OR– To exit without changing the sqawk code, press CANCEL.