AVIDYNE™

AXP340 MODE S TRANSPONDER INSTALLATION MANUAL

Revision History

The latest installation manuals are available to authorized dealers on the web at www.avidyne.com.

Document Number	600-00308-000	*Control Category*	CC2
Revision	*Description*	*ECO*	*Date*
00	Initial Release	ECO-14-405	01/09/15
01	Update for IFD4XX as a position source	ECO-16-089	04/01/16
02	include IFD4XX, Garmin ADSB+, Removed non approved ADS-B GPS sources	ECO-16-286	10/25/16
03	Clarify ADS-B air ground switching	ECO-17-014	01/26/17
04	Add compliance with FAA Airworthiness Directive 2018-NE-39-AD note, section 2	ECO-20-069	04/29/20
05	Add Atlas/Helios, Update Logo	ECO-20-159	10/20/20

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1. General Information

This manual describes the physical and electrical characteristics and the installation requirements for an AXP340 Mode S Transponder.

The AXP340 Mode S panel mount transponder is an ED-73E and DO-181E Class 1 compliant Mode S level 2es datalink transponder, with support for extended squitter, elementary surveillance and SI codes. The AXP340 is also a DO-260B Class B1S compliant ADS-B out participant. The AXP340 meets the relevant environmental requirements of DO-160G/ED-14G, and is certified to ETSO C112d, ETSO C166b, TSO C112d and TSO C166b.

The AXP340 transmitter power output is nominally 240 watts, and the transponder runs from either 14 volt nominal or 28 volt nominal DC power supply with no configuration changes required.

The AXP340 transponder responds to both legacy Mode A/C interrogations and to Mode S interrogations from both ground radar and airborne collision avoidance systems. In all cases, the interrogations are received by the transponder on 1030MHz, and replies are transmitted on 1090MHz.

In the Mode S environment, S stands for Select, and a Mode S interrogator can selectively address a single transponder. This allows accurate position plotting with lower reply rates, which in turn reduces frequency congestion and interference. As a side benefit, power consumption by the transponder may be reduced, and simple datalink services can be supported, such as ADS-B. It is however crucial to the reliable operation of the system that each aircraft has a distinct Mode S address. The Mode S address is allocated by the registration authority for the aircraft, and must be set when the AXP340 is installed.

1.1 Applicability

This document applies to the following part numbers:

Model Number	**Avidyne Part Number**	**Software Identification** (or later approved revision)
AXP340 Mode S Transponder (Panel Mount, Black Bezel)	200-00247-000	3.13
AXP340 Mode S Transponder (Panel Mount, Gray Bezel)	200-00247-001	

Table 1: Transponder Variants

1.2 Technical Specification

The following section gives mechanical and electrical characteristics for the AXP340:

Specification	Characteristics
Compliance	ETSO C112d, TSO C112d; Class 1 Level 2es ETSO C166b, TSO C166b; Class B1S
FCC Identification	VZI01155
Applicable documents	EUROCAE ED-73E (RTCA DO-181E), EUROCAE ED-14G (RTCA DO-160G) , RTCA DO-260B with Corrigendum 1
Software	ED-12B (RTCA DO-178B) Level B
Hardware	RTCA DO-254 Level C
Power Requirements	10 – 33 Volts DC. Typical 6.3Watts @ 14Volts.
Altitude	55,000 feet
Humidity	95% @ +50C for 6 hours; 85% @ +38C for 16 hours. Tested to Category A in DO-160G
Operating Temperature	-25C to +70C
Transmitter Frequency	1090MHz ± 1MHz
Transmitter Power	240 Watts nominal; 125 Watts minimum at antenna after allowing for 0.5dB connector losses and 1.5dB cable losses.
Transmitter Modulation	6M75 V1D
Receiver Frequency	1030 MHz
Receiver Sensitivity	-74dBm ± 3dB
Operating Limits	Reference Section 8

Table 2: AXP340 Technical Specification

Specification	Characteristics
Height	42mm (1.65”)
Width	160mm (6.30”)
Length	285mm (11.22”)
Weight	1.48 Kg (3.26 lbs)

Table 3: Physical Specifications (in tray)

1.3 TSO Information

TSO information for the AXP340 is contained in Avidyne Document 01201-00.

1.4 Environmental Qualification Forms

The environmental qualification for theAXP340 is listed in Section 8.

Note: If the AXP340 has been exposed to extreme cold temperature prior start, it may take a warm up period to achieve standard performance.

1.5 STC Approved Model List

The aircraft listed on the Approved Model List STC are eligible to install the AXP340. However, the installer must determine if the installation is in compliance with the limitations stated in the STC and this manual. Any deviations from the STC and/or this manual must have a separate installation approval.

Installations in Part 25/27/29 aircraft or Part 23 airplanes not listed on the AML STC may install the AXP340, however, it will require additional installation approval (e.g. Field approval, STC, or TC amendment), reference FAA Advisory Circular 23-22 and 20-165( ) as needed.

1.6 Avidyne Supplied Material

The following Ship Kits are available for ordering from Avidyne Corporation.

Note: Ship Kit content and/or Part numbers may change without notice, verify before ordering.

1.6.1 Product Ship Kits

Component	Ship Kit
AXP340 Mode S, Black Bezel	850-00219-000
AXP340 Mode S, Gray Bezel	850-00219-001

Table 4: Product Ship Kits

1.6.2 Optional Ship Kits

Component	Ship Kit
AXP340 Mounting Tray, Installation Kit	850-00219-002

Table 5: Optional Ship Kit

1.6.3 Unpacking and Inspecting Equipment

Carefully unpack the transponder and make a visual inspection of the unit for evidence of any damage incurred during shipment. If the unit is damaged, notify the shipping company to file a claim for the damage. To justify your claim, save the original shipping container and all packaging materials.

2. Installation Considerations

The following section will describe installation instructions for the AXP340 Unit. The AXP340 should be installed using standard industry practices while following guidance in FAA AC 43.13-( ), AC 20-165 ( ), and this manual.

NOTE: Compliance with FAA Airworthiness Directive 2018-NE-39-AD. Only conventional installations of the AXP340 are acceptable. The installation of the transponder is described as "conventional" if it is in an aft-facing avionics rack such that the transponder faceplate and controls are facing the rear of the airplane. Any other installation is described as "not conventional" and not permitted by this installation

2.1 Minimum System Configuration

The AXP340 is installed typically as shown in Figure 1 below.

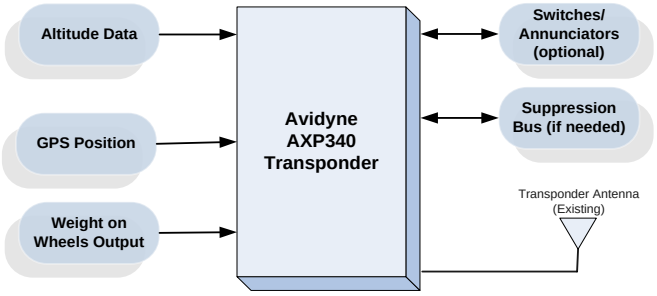


Figure 1: AXP340 Typical System

The minimum items needed for the AXP340 installation is an Altitude Source and transponder antenna.

The ADS-B output is an optional feature on the AXP340. If installing this option, the AXP340 must also be connected to an approved GPS Receiver and Weight-on-wheels output.

3. Transponder Antenna

The AXP340 requires a transponder antenna certified to TSO-C74 or TSO-C112. In most cases, the AXP340 will utilize the aircraft's existing transponder antenna. If a new transponder antenna is needed, a separate installation approval is needed, reference FAA AC 20-151( ).

3.1 Antenna Location

The following considerations should be verified prior to connecting the AXP340 to an existing transponder antenna or installing a new transponder antenna.

1. The antenna should be well removed from any projections, the engine(s) and propeller(s). It should also be well removed from the landing gear doors, access doors or others openings which will break the ground plane for the antenna.
2. If installing the ADS-B option for the AXP340, the antenna ***must*** be mounted on the bottom surface of the aircraft and in a vertical position when the aircraft is in level flight. All other installations, an antenna mounted on the bottom of the aircraft is recommended.
3. Mount antenna as close as practical to the fuselage centerline.
4. Avoid mounting the antenna within 3 feet of the ADF sense antenna or any COMM antenna and 6 feet from the transponder to the DME antenna.
5. Where practical, plan the antenna location to keep the cable lengths as short as possible and avoid sharp bends in the cable to minimise the VSWR.
6. To prevent RF interference, the antenna must be physically mounted a minimum distance of 3 feet from the AXP340 Mode S transponder.

Electrical connection to the antenna should be protected to avoid loss of efficiency as a result of the presence of liquids or moisture. All antenna feeders shall be installed in such a way that a minimum of RF energy is radiated inside the aircraft.

3.2 Antenna Type

The AXP340 should be connected to a TSO-C74 or TSO-C112 antenna. Prior to connecting the AXP340 transponder to the antenna, verify the antenna is capable of transmitting the maximum power from the AXP340, reference Table 2.

3.3 Antenna Cable

The AXP340 is designed to meet Class 1 requirements with an allowance of 2 dB for loss in the connectors and cable used to connect it to the antenna. Excessive loss will degrade both transmitter output power and receiver sensitivity.

Allowing 0.25dB loss for the connector at each end of the antenna cable assembly leaves an allowance of 1.5dB maximum loss for the cable itself.

An acceptable cable:

- Has less than 1.5dB loss for the run length needed
- Has a characteristic impedance of 50 Ohms
- Has double braid screens or has a foil and braid screen

Once the cable run length is known, a cable type with low enough loss per metre that meets the above requirements can be chosen. Longer runs require lower loss cable.

NOTE: Low loss cable typically uses foamed or cellular dielectrics and foil screens. These make such cables especially prone to damage from too-tight bends or from momentary kinking during installation. Once kinked, these cables do not return to full performance when straightened.

The following table is a guide to the maximum usable lengths of some common cable types. Actual cable loss varies between manufacturers, there are many variants, and the table is therefore based on typical data. Use it as a guide only and refer to the manufacturer's data sheet for your specific chosen cable for accurate values.

Max Length in Metres	Max Length in Feet	Insertion Loss dB/metre at 1090MHz	MIL-C-17 Cables	Electronic Cable Specialists Type
2.54	8′ 4″	0.59	M17/128 (RG400)	
3.16	10′ 4″	0.47		3C142B
3.81	12′ 6″	0.39	M17/112 (RG304)	
5.25	17′ 3″	0.29	M17/127 (RG393)	311601
6.42	21′ 1″	0.23		311501
8.22	26′ 11″	0.18		311201
12.59	41′ 3″	0.12		310801

Table 6: Antenna Coaxial Cable Lengths

Contact Carlisle Interconnect Technologies on +1 414 421 5300 or www.carlisleit.com for their data sheets.

When routing the cable, ensure that you:

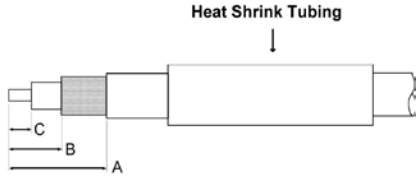
- Route the cable away from sources of heat.
- Route the cable away from potential interference sources such as ignition wiring, 400Hz generators, fluorescent lighting and electric motors.
- Allow a minimum separation of 300mm (12 inches) from an ADF antenna cable
- Keep the cable run as short as possible
- Avoid routing the cable round tight bends.
- Avoid kinking the cable even temporarily during installation.
- Secure the cable so that it cannot interfere with other systems

3.4 Antenna - BNC Connector

This section describes the technique for attaching the antenna cable to the supplied blind-mate BNC connector.

If a low-loss cable is needed that has too large a dielectric diameter to fit the supplied blind-mate BNC connector, a short length (up to 150mm or 6 inches) of smaller cable may be used with suitable mating connectors to adapt to the transponder connector.

- Strip back the coax cable to the dimensions in the table, as shown in the diagram below. Slide 25 mm (1 inch) of heat shrink tubing over the cable.



Dimension	Cut size (mm)	Cut size (inches)
A	12.7	0.5
B	6.4	0.25
C	3.2	0.125

Table 7: Coaxial Cable Dimensions

- Insert the cable into the connector – the inner conductor should align with the center contact, the inner shield should be inside the body of the connector and the outer shield should be outside the body.

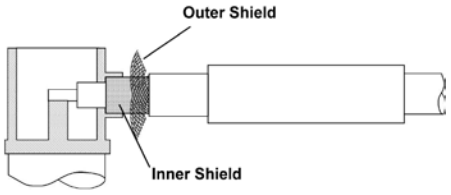


Figure 2: Coaxial Cable Shield Placement

- Solder the center conductor to the center contact, aligning the conductor with the slot in the contact. Avoid excess solder heat on the center BNC conductor pin.
- Solder the inner shield to the inside of the connector body by applying a soldering iron to the body and running solder into the gap. Try to avoid excess solder heat on the connector body.
- Solder the outer shield to the outside of the connector body. Avoid excess solder heat on the connector body.

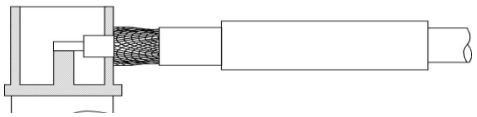


Figure 3: Coaxial Cable Outer Shield

- Slide heat shrink tubing forward (flush to connector) and heat to shrink the tubing.

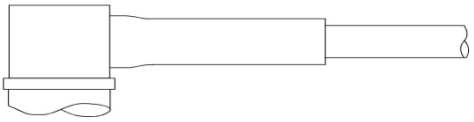


Figure 4: Coaxial Cable Heat Shrink Tube

- Complete the assembly by installing the bushing over the center contact, and fitting the cap. Solder the cap in place in at least two places.

3.5 Tray / BNC Connector Assembly

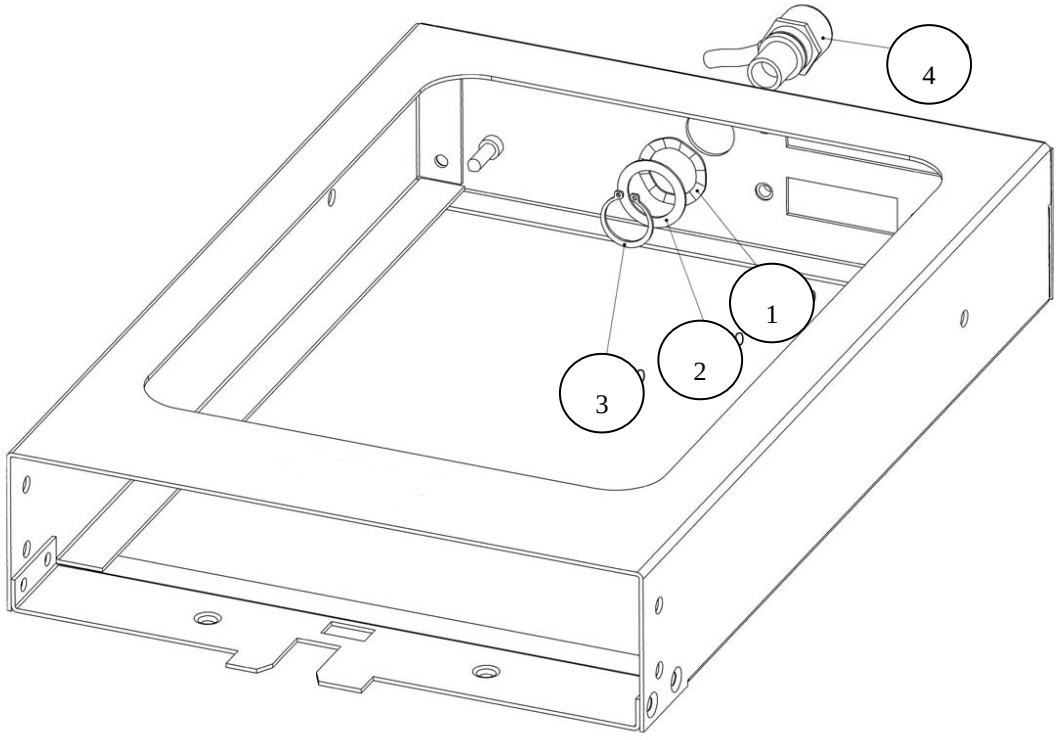


Figure 5: Antenna BNC Connector Installation

When the BNC is prepared (Item 4), feed it through the AXP340 mounting tray and attach the washer combination in the following order:

1. Wave Washer
2. Plain washer
3. Circlip washer

The Circlip washer should be fitted with a set of Circlip pliers.

The two Molex connectors should be passed through the openings in the rear of the tray, and then mounted firmly to the tray from the inside using the four M3 screws supplied.

4. Electrical Installation

The electrical wiring should be installed in accordance with FAA AC 43.13-1B Chapter 11, sections 8 through 13 and in accordance with this manual. The following section will describe requirements for the electrical wiring when installing the AXP340.

4.1 Wire Type

MIL-C-27500 and MIL-W-22759 wire is recommended. Select the appropriate wire type and size for the aircraft type and installation location per FAA AC 43.13-1B.

4.2 Wire and Connector Identification

Wires and connectors should be marked per FAA AC 43.13-1B.

4.3 Wire Routing

All wires and wire bundles must be routed and secured in such a way to eliminate risk of mechanical damage and minimize exposure to heat and fluids.

4.4 Wire Harness Overbraid

Copper overbraid is typically not required on the AXP340 wire harness. However, in the following cases, copper overbraid is required.

4.4.1 Existing Equipment

If interfacing to any existing avionics equipment with copper overbraid over the wire harness, it must be installed on all new wiring to that existing piece of equipment. The copper overbraid must meet the specification in Section 4.4.3.

4.4.2 Severe Lightning Transient Environment

Aircraft Installations where the aircraft actual transients level is higher than the AXP340 equipment transient design level must install copper overbraid on the entire AXP340 wire harness. This does not include the antenna coaxial cable. The copper overbraid must be installed per Section 4.4.3.

The Approved Model List for the STC will indicate if an aircraft is required to install wire harness overbraid on the AXP340 wiring.

4.4.3 Copper Overbraid Installation

The copper overbraid must be a minimum 90% optical coverage per ASTM-B-33. The overbraid must be grounded at both ends. If the aircraft wiring passes through wire disconnects or bulkheads, the overbraid should be continued on each segment.

The wire harness overbraid should also be installed per FAA AC 43.13-1B Chapter 11-189.

4.5 Circuit Protection

Circuit Breakers must be installed in a location easily accessible to the pilot and must be resettable trip free devices. The Circuit Breaker must be clearly identified and visible under all lighting conditions. Circuit breaker size is identified in installation data shown in Section 11.

4.6 Electrical Load Analysis

Prior to installing the AXP340, an electrical load analysis (ELA) must be performed. The aircraft's electrical load should be less than 80% of the total generator output following the AXP340 installation, reference Table 2 for AXP340 power requirements. Also reference FAA AC 43.13-2B Paragraph 208 for more information on performing an aircraft electrical load analysis.

4.7 Molex Crimp Terminals

The Molex connector contacts should be wired with wire of 18-24 AWG. The contacts are compatible with a wide range of crimp tools. Ensure that the contact has been crimped using both the conductor crimp and the insulator crimp.

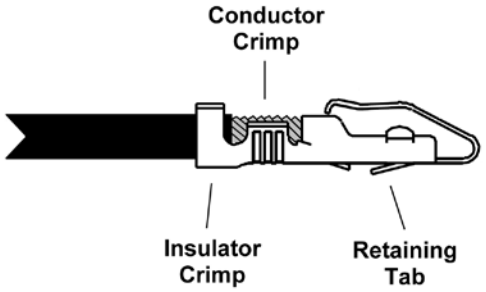


Figure 6: Molex Contact

Once crimped, the contacts should be slotted into the rear of the connector shell. Push the contact in until the retaining tab clicks into place. Tug gently to confirm the contact is locked in place.

The contacts can be easily removed using the Molex removal tool, or equivalent. This is pushed gently into the connector shell from the side opposite from the wire entry, and lifts the retaining tab from the stop, allowing the contact to be eased out by pulling on the wire.

5. Mechanical Installation

5.1 Equipment Location

The AXP340 should be located in a location easily accessible to the pilot.

5.2 Instrument Panel Cutout

The APX340 tray is designed to be installed on the backside of the instrument panel. The instrument panel requires a rectangular hole in the instrument panel for the AXP340 unit to slide through, reference Section 11. If the instrument panel in the aircraft is considered primary structure, additional installation approval will be required for the instrument panel cutout. The installer is responsible to ensure the structural aspects of this installation meet the requirements of AC 43.13-2B, Chapter 11, Paragraph 1104(a).

5.3 Tray Installation

The AXP340 Mode S transponder must be mounted rigidly in the aircraft panel. The following installation procedure should be followed, remembering to allow adequate space for installation of cables and connectors.

The Avidyne Tray must be installed in the aircraft as described below in order to satisfy the structural requirements for the STC. Deviations to these requirements will require separate approval.

1. Rear Tray Support (Instrument Panel)
    a. The existing instrument panel must be fabricated from 2024-T3 aluminum with a minimum thickness of 0.050". The tray brackets must be fabricated from 3/4" x 3/4" x 1/16" 2024-T3 aluminum angle extrusion for mounting the tray, as shown in Section 11.
    b. If new components are fabricated, the fabrication methods must follow the requirements of FAA Advisory Circular 43.13-1B, Chapter 4 for general airframe fabrication criteria, including hole tolerances, edge distances, rivet spacing, and corrosion protection, and Advisory Circular 43.13-2B Chapters 2 and 11 for structural adequacy.
2. Forward Tray Support
    a. The Avidyne Tray must have forward support brackets, reference Section 11. The forward support brace must be 0.032” 5052-H32 aluminum. (Note: equivalent or stronger is acceptable)
    b. If new forward support brackets are fabricated and, the fabrication methods must follow the requirements of Section 11, FAA Advisory Circular 43.13-1B, Chapter 4 for general airframe fabrication criteria, including hole tolerances, edge distances, rivet spacing, and corrosion protection, and Advisory Circular 43.13-2B, Chapters 2 and 11 for structural adequacy.

The AXP340 should be installed using six #6-32 reduced pan head screws and self locking nuts. Section 11 shows installation.

5.4 Cooling Requirements

The AXP340 Mode S transponder meets all applicable ETSO/TSO requirements without forced air-cooling.

Attention should however be given to the incorporation of cooling provisions to limit the maximum operating temperature of each unit when the AXP340 is installed in a typical panel or rack. The reliability of equipment operating in close proximity in a rack can be degraded if adequate cooling is not provided.

5.5 Electrical Bonding

The electrical bonding between the AXP340 tray and aircraft ground should be ≤ 10 milliohm.

5.6 Weight and Balance

After installing the AXP340 transponder, the aircraft's weight and balance must be updated after installation is complete.

5.7 Compass Safe Distance

The AXP340 should be installed 12" or more away from the aircraft's magnetic compass. Perform an aircraft compass swing/calibration after completing the AXP340 installation.

Note: The 12" minimum distance is a TSO-driven value that is designed to ensure the unit will have no impact on the aircraft compass. If an installation is made where this distance is less than 12", then a compass swing/calibration must be accomplished after completing the AXP340 transponder installation.

5.8 Unit Installation/Removal

The AXP340 transponder should be installed using 3/32-inch hex drive tool using the following procedure:

- Insert hex tool into hole on the front bezel AXP340 transponder.
- Check that the locking mechanism is correctly oriented by unscrewing the locking screw if required.
- Slide the AXP340 transponder into the secured mounting tray.
- Lock the AXP340 transponder into the mounting tray using a 3/32" Allen key, taking care not to over tighten the locking screw.

6. System Installation

The AXP340 has two Molex edge connectors, one with 24 contacts, which is the primary interface, and a second connector with 12 contacts which carries signals to support ADS-B. A single coaxial connector attaches to the antenna. In simple installations it is possible to omit wiring for the second connector altogether.

The Molex edge connector used in the AXP340 is similar to the connector used on the KT76A, KT76C and KT78A transponders, and the common signals on the primary connector use the same contact positions and are electrically compatible. The antenna connector is also compatible. Providing that the wiring is appropriately installed, it is intended that you can upgrade a KT76A, KT76C or KT78A installation to the AXP340 without any connector rewiring. Before doing that however, you MUST check that the wiring for the existing transponder is in good condition.

6.1 Primary Interface – Pinout

Pin	Signal	Direction
1	Ground	-
2	Lighting 14V	Input
3	Lighting 28V	Input
4	Suppress I/O *	Bi-directional
5	Squat Switch In *	Input
6	Serial Alt Out *	Output
7	Serial Alt In *	Input
8	Altitude D4	Input
9	Suppress In	Input
10	Standby Switch	Input
11	11-33V DC	-
12	11-33V DC	-
A	Ground	-
B	Altitude B4	Input
C	Altitude B2	Input
D	Altitude C1	Input
E	Altitude B1	Input
F	Ident Switch In	Input
H	Altitude C4	Input
J	Altitude A4	Input
K	Altitude A2	Input
L	Altitude C2	Input
M	Altitude A1	Input
N	Do Not Connect *	-

Table 8: Primary Pinout

*: These signals are different to the KT76A/KT76C/KT78A pinout; on the KT76A, KT76C and KT78A these signals are not usually connected in the aircraft.

The following diagram shows the connector orientation as it would be fitted to the mounting tray.

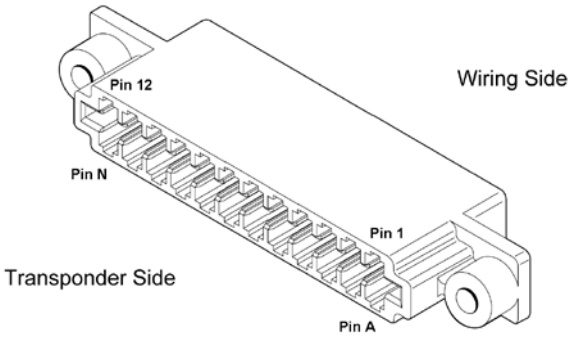


Figure 7: Primary Connector

6.2 Secondary Interface - Pinout

Pin	Signal	Direction
1	Ground	-
2	Reserved	-
3	GPS Position In	Input
4	Reserved	-
5	Audio Mute In	Input
6	Altitude Alert	Output
A	Ground	-
B	Audio +	Output
C	Audio -	Output
D	Reserved	-
E	Reserved	-
F	Reserved	-

Table 9: Secondary Pinout

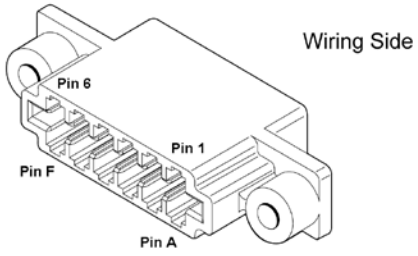


Figure 8: Secondary Connector

6.3 Function Summary

At the rear, the transponder has two Molex style connectors and a single antenna connector for blind mating with the corresponding connectors in the mounting tray.

The interfaces provide the following services:

Type	Description
Parallel Gillham altitude input	Connection to an external altitude encoder using parallel Gillham (gray) code.
Serial altitude input	Connection to an external RS232 altitude encoder or air data computer. Using serial altitude data allows the transponder to report altitude with 25 foot resolution.
Serial altitude output	Connection to a GPS or other device needing serial altitude data – this allows the transponder to act as a repeater instead of requiring a second altitude encoder.
Ident input	External IDENT switch input.
Standby input	External standby input for dual transponder installations.
"On ground" input	Allows automatic flight/ground mode switching for aircraft with a squat switch source.
Lighting bus input	Used to adjust the backlight and switch lighting intensity.
DME Suppression Input	Input to limit interference between DME interrogations and transponder replies – suppresses transponder whilst active.
Suppression bus I/O	ARINC compatible suppression bus signal used in aircraft with more sophisticated suppression needs, both an input to and output from the transponder.
Audio output	Adds an optional aural alert to the altitude monitor function.
Audio mute input	Toggle function to mute the audio output.
Altitude alert output	Output used to signal altitude deviations when optional altitude monitor function is used.
GPS Position Input	Connection to a GPS supplying position input for ADS-B position reporting.

Table 10: Function Summary

6.4 Orientation Diagram

To assist in connector orientation, the following example shows a typical set of connections. This diagram shows the expected connector positions when viewed from the transponder side of the tray, looking into the tray from the front. In the example shown the aircraft uses a 14 volt lighting bus, a parallel Gillham altitude encoder, a DME with simple suppression output, a GPS with serial position output, and a simple lamp for the altitude alerter. This example is representative of a simple fixed gear 14 volt aircraft.

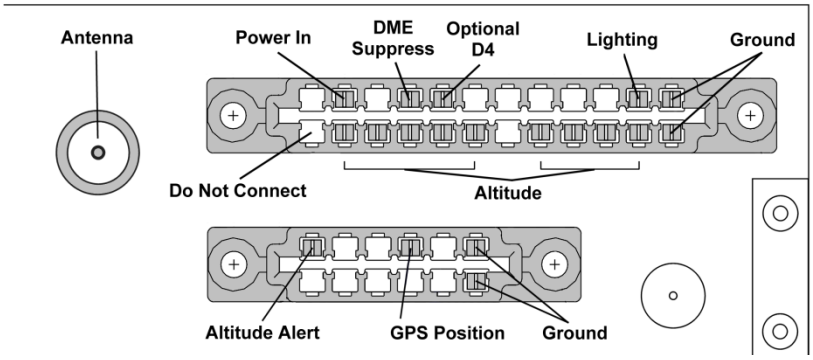


Figure 9: Tray Backplate

6.5 Transponder Interface Details

6.5.1 Power Input

The power supply can be 11-33 Volts DC; no voltage adjustment is required. Contacts 11 and 12 on the 24 way connector are both available as power inputs. This is for compatibility reasons only – internally the two are connected together, and in most installations only one need be connected to the power supply.

Use a 3 Amp circuit breaker for power supply protection to the AXP340.

6.5.2 Lighting Bus Input

Two lighting bus inputs are provided on the 24 way connector to accommodate aircraft with 14 Volt or 28 Volt lighting systems. When the lighting bus operates at 28 Volts, connect the bus input to contact 3, and leave contact 2 unconnected. When the lighting bus operates at 14 Volts, connect the bus input to contact 2. In this case contact 3 can be left unconnected, but for backwards compatibility may also be grounded instead with no effect.

The operation of the lighting bus input is determined by the value of the lighting control setting in section 7.5.16.

6.5.3 Mutual Suppression

Mutual suppression allows two or more transmitters on adjacent frequencies to inhibit the other transmitters when one is active to limit the interference effects. It is commonly used between transponders and DME systems, and between transponders and collision avoidance systems.

The AXP340 provides two styles of mutual suppression interface on the 24 way connector. The Suppress input on contact 9 is typically used in aircraft with simple DME systems and no other suppression requirements. It is an input only, and is active whenever the input is greater than approximately 5 Volts.

The Suppress I/O on contact 4 is an ARINC compatible suppression bus interface, which acts as both an input and an output. The AXP340 will assert this signal when it is transmitting, and can be suppressed by other equipment that asserts the signal. The AXP340 will drive approximately 24 Volts on the output (independently of supply voltage), and will treat the input as active whenever the bus has greater than 10 Volts.

6.5.4 Altitude Inputs and Output

The AXP340 must be connected to an approved altitude encoding source. The AXP340 can use either a parallel Gillham code altitude input, or serial RS232 altitude input. Both of these interfaces are on the 24 way connector. If the altitude encoder you are using offers both, we recommend using the RS232 serial input. Serial formats allow a higher resolution altitude representation that can be used by Mode S interrogations, whereas parallel Gillham (gray) code format can only represent altitude to the nearest 100 feet. You must choose between serial or parallel Gillham formats – you should NOT connect both. **If a parallel Gillham encoder is connected the AXP340 will always use that as the altitude source** even if a serial encoder is also connected.

The parallel Gillham encoder inputs are active when the voltage to ground is pulled below approximately 4 Volts. The AXP340 includes internal isolation diodes which prevent the unit from pulling the encoder lines to ground when the transponder is switched off. The AXP340 can therefore share the altitude inputs with other devices without needing external isolation.

Parallel Gillham output altitude encoders intended for operation below 30,000 feet may not have a signal connection for D4. In an aircraft with a service ceiling below 30,000 feet input D4 will never be active, and can safely be left unconnected.

The serial encoder input uses RS232 input levels. The communication should be 9600 bps, no parity. The AXP340 will correctly recognise either "Icarus/Trimble/Garmin" format altitude data, or "RMS" format altitude data. Refer to the encoder documentation to determine jumper settings as appropriate.

The AXP340 can also accept Shadin family Format G, Format S and Format Z air data protocols which supply both altitude and airspeed information. The airspeed information can be used to provide an automatic air/ground determination for an ADS-B installation.

The AXP340 includes a serial altitude output which repeats the altitude received on the encoded input (either parallel Gillham or serial) for connection to a GPS or other equipment. . If the AXP340 altitude source is RS-232, special care must be taken to ensure that the serial altitude output is NOT providing altitude to the IFD. Due to the priority schemes listed below, this can cause an altitude loop (the AXP340 will continually report field elevation regardless of altitude). The serial output supplies RS232 output levels, and runs at 9600 bps, no parity. The output format is always "Icarus/Trimble/Garmin" format. If the altitude source is a parallel Gillham encoder, the serial output is reported every 0.5 seconds; if the source is a serial encoder, the output simply repeats the input reports, each report delayed by up to 10 milliseconds from the corresponding input report.

The AXP340 transponder can accept altitude from multiple sources, the AXP340 will prioritize the altitude inputs in the following order:

1. Parallel Gillham code input (Gray code input)
2. GPS RS232 Input with Airdata information (e.g. Avidyne R9 IFD)
3. ADC/Serial Input

All the altitude sources above must meet either TSO-C10( ) or TSO-C88( ) per 14 CFR 91.217.

The ADS-B output does not alter any existing regulatory guidance regarding the barometric altitude accuracy or resolution. Aircraft operating in Reduced Vertical Separation Minimum (RVSM) airspace must have the same accuracy and resolution for the ADS-B airdata transmission.

If connecting a RS-232 Airdata Computer, the input protocol is automatically detected. The RS-232 altitude output is fixed as "Icarus" output.

6.5.5 Ident Switch Input

The Ident switch input, on the 24 way connector, allows the IDENT function to be selected using a remote switch. The input is active low, and will be asserted when the voltage to ground is pulled below approximately 4 Volts.

6.5.6 External Standby Input

This input, when held low, places the transponder in Standby mode. It should be used to switch between transponders in an installation with two transponders. The input is active low, and will be asserted when the voltage to ground is pulled below approximately 4 Volts.

6.5.7 Audio Output

The Audio Output is on the 12 way secondary connector. The Audio Output is a balanced (two wire) audio output that can be connected to an unswitched input on the aircraft audio panel. Audio output is up to 10 Volts peak-to-peak across the pair when driving a 600 Ohm load; actual level can be adjusted at installation – see Section 7.5.14.

> *Note: The audio pair is not a true transformer balanced output – both pins are actively driven. If the audio panel input is single-ended, then only one of the output pins should be used, together with a local ground pin – the other audio output should be left floating.*

The Audio Output carries the altitude alert tone used by the altitude monitor function.

6.5.8 Altitude Alerter Output

The AXP340 includes an altitude monitor function that can alert the pilot to altitude deviations in cruise flight. The altitude alerter output, on the 12 way secondary connector, is switched to ground when the altitude deviation is detected and can be optionally connected to a warning light or sounder to warn the pilot. The output is an open collector transistor, and can sink up to 1 Amp DC. The switched voltage should not exceed 60 Volts.

6.6 ADS-B Requirements

The following section will list specific requirements for installing the optional ADS-B out.

6.6.1 Aircraft Equipped with TCAS II

The AXP340 transponder does not support TCAS II ADS-B replies. Aircraft with a TCAS II installed must not install the AXP340 ADS-B option.

6.6.2 Multiple GPS Receivers

The AXP340 should not be interfaced to multiple GPS position sources for the -B output and is outside the scope of this STC.

If switching GPS sources for the ADS-B output is desired, the following requirements must be accomplished per FAA AC 20-165( ):

- The GPS position sources System Design Assurance levels (SDA) and accuracy limits must be identical;
- Annunciation to the flight crew of the GPS being used;
- Description of the switching in an Airplane Flight Manual Supplement.

6.6.3 Mixed Transmitter/Receiver Installations

The AXP340 can be installed with any ADS-B receive equipment (ADS-B In), but cannot be installed with any other ADS-B transmitter(s). For instance, do not install a AXP340 transponder with a UAT ADS-B out in the same the aircraft.

6.6.4 GPS Position Output

An approved GPS position output is required to support ADS-B functionality. The GPS position output is an RS232 input to the transponder. The ADS-B features are optional – no GPS is required for normal Mode S Elementary Surveillance.

The following GPS position sources have been approved by this STC. The AXP340 meets the requirements of FAA AC 20-165( ) for ADS-B out when connected to the following units:

GPS Model		Output Protocol Used	Baud Rate	Hardware P/N	Notes
Avidyne	IFD5XX IFD4XX Atlas Helios	ADS-B (avi)	9600	700-00182-XXX 700-00179-XXX 700-00194-XXX 700-00195-XXX	• S/W 10.1.0.0 or later • The IFD5XX/IFD4XX/Atlas/Helios must be installed and configured as a WAAS GPS installation, reference the IFD5XX/IFD4XX/Atlas/Helios installation manual
	Release 9 IFD	Trig ADS-B	9600	700-00083-XXX	• S/W 9.3.1 or later • The IFD must be a WAAS installation, reference the Release 9 installation manual
Garmin	GXX4X0(A)W	Garmin ADS-B OUT+	9600	011-01057-( ) 011-01058-( ) 011-01059-( ) 011-01060-( ) 011-01061-( )	• Main Software version 5.00 or later.
	GXX5X0(A)W	Garmin ADS-B OUT+	9600	011-01062-( ) 011-01063-( ) 011-01064-( ) 011-01065-( ) 011-01066-( ) 011-01067-( )	• Main Software version 5.00 or later.

Table 11: Approved GPS Position Sources

All other GPS receivers must set the GPS to "uncertified," reference Section 7.5.9, or approve installation using the field approval process, reference Section 10.

The GPS source does not need to be the same position source being used for navigation.

Verify baud rate with the GPS manufacturer's installation documentation.

6.6.5 Squat Switch Input

The Squat switch input allows the transponder to automatically switch between Airborne and Ground modes of operation (ALT, GND). The squat switch will also automatically start and stop the flight timer. The input will be asserted when the voltage to ground is pulled below approximately 4 Volts. The operating mode of the squat switch can be programmed during setup to allow for active low or active high logical behavior. For aircraft with no squat switch source this input should be left open circuit, and the setup mode programmed for "Not Connected", which is not ADS-B out compliant.

ADS-B out compliant installations must have a method of automatically determining the Air-ground status of the aircraft. The AXP340 transponder can use any one of the following sources to supply a signal to pin 5 of the primary connector:

- Aircraft Squat (weight on wheels) Switch
- Airspeed Switch
- Pseudo Weight-on-Wheels output (e.g. GPS derived output such as Avidyne IFD5XX/IFD4XX/Atlas/Helios P1001 Pin 8 or Entegra Release 9 outputs)
- Auto-switch on Airdata GPS (e.g. ADC serial input with altitude and airspeed such as Shadin ADC formats, pin 5 is left open, see sec 6.5.4)
- Collective switch for Part 27/29 aircraft (Note: additional approval required)

The AXP340 will Auto-switch from Ground Mode to Air Mode if a GPS source and Air Data source with altitude and airspeed is connected to the transponder, reference Section 6.5.4.

If installing an airspeed switch, the airspeed switch should transition approximately 10-20 knots below the aircraft's stall speed (V_{so}). For example, if the aircraft's stall speed is 60 knots, the installed airspeed switch should transition from ground to air between 50-40 knots. However, the airspeed switch should not be set lower than 30 knots. False ground-to-air transitions of the transponder may occur if the airspeed switch is set lower than 30 knots. **Note:** Installing an airspeed switch requires a separate installation approval.

Installations on amphibian aircraft should use a source that will support transponder air-ground transitions in all landing configurations, such as pseudo weight on wheels from Avidyne IFD5XX/IFD4XX/Atlas/Helios P1001 pin 8.

7. Post Installation Configuration and Checkout

After completing installation, a complete installation checkout should be performed. Complete the following sections to verify the installation is installed correctly. Prior to configuring the AXP340 unit, the following checks should be performed.

7.1 Wiring Check

Verify wiring is properly installed and secured. Verify the wiring does not interfere with the flight controls. Verify all wiring connected to AXP340 is connected correctly to the unit. **Caution:** Failure to properly connect aircraft wiring to the AXP340 may result in damage to the AXP340 or to the equipment connected to the AXP340.

7.2 Mounting Check

Verify the AXP340 tray is securely installed to the airframe.

7.3 Unit Installation

Install unit in the tray using the captive 3/32" Hex screw. Verify the connectors are fully engaged prior to powering on the unit.

7.4 Electrical Load Analysis

Verify the aircraft's load is within limits, reference Section 4.6.

7.5 AXP340 Configuration

The AXP340 uses a simple setup system to program important system parameters, including the Mode S address. In the original factory configuration, the setup screen is the first thing that runs when you switch on the transponder. If the transponder has already been configured, and you want to access the setup screen again, simply press the FUNC button while switching on the transponder and the setup system will run.

The script will prompt for the following configuration items:

- Aircraft Registration
- Mode S Address
- VFR Squawk Code
- Aircraft Maximum Airspeed
- Aircraft Category
- Squat switch source, if fitted
- GPS position source, if fitted, and ADS-B parameters
- Audio Output Volume
- Pressure Altitude Units
- Lighting Control and LCD Dimming Settings

It will then run some simple installation diagnostics, including an external interface check, a check of the

altitude encoder interface, and a check of the lighting bus input.

All the programming is accomplished using the rotary selector knob, numeric, CLR and FUNC buttons. Pressing the selector knob accepts the current input. Pressing the CLR (back) button allows you to change something you have already entered. Rotating the selector knob moves up and down through the menu options. Pressing the selector knob or FUNC button accepts the selection and moves to the next screen.

7.5.1 Aircraft Registration

Enter the aircraft registration using the numeric keys and selector knob. When the correct character is shown in the flight ID section of the screen, press the selector knob to accept and advance to the next digit.

Note that the aircraft registration is loaded as letters and numbers only. There are no dashes or other punctuation marks, and no spaces can be inserted. When you enter a space it finishes the data entry and moves to the next item.

The aircraft registration is used as the transponder default Flight ID.

For N registered aircraft, the Aircraft Registration may be used to generate the Mode S Address.

Press selector knob to move to the next menu item.

7.5.2 Aircraft Address Programming

The Mode S Address is a 24 bit number issued to the aircraft by the registration authority for the aircraft. These addresses are usually written as a 6 digit hexadecimal number, although you may also encounter one written as an 8 digit octal number. The AXP340 only understands the hexadecimal format, so you must first convert an octal number to hexadecimal.

Enter the 6 digit aircraft address using the numeric buttons or selector knob and confirm selection by pressing the selector knob.

For N registered aircraft, this address may be pre-populated based on the registration number.

Press selector knob to move to the next menu item.

7.5.3 VFR Squawk Code

When the pilot presses the VFR button, a pre-programmed code will replace the current squawk code. The code is set up next; the choice of code will depend on the normal location of the aircraft. In the USA, the VFR squawk code is 1200. In most parts of Europe, the VFR squawk code should be set to 7000.

Enter the 4 digit VFR squawk code using the numeric buttons.

Press selector knob to move to the next menu item.

7.5.4 Airspeed Category

Mode S transponders can transmit their maximum airspeed characteristics to aircraft equipped with TCAS. This information is used to help identify threats and to plan avoiding action by the TCAS equipped aircraft. The airspeeds are grouped in ranges; rotate the selector knob to choose the range that corresponds to the aircraft. Press the selector knob to accept and move to the next menu item.

7.5.5 Aircraft Category

To assist ATC tracking of aircraft, an aircraft category can be transmitted by Mode S transponders. Using the selector knob, choose the aircraft category that most closely matches the aircraft in which the transponder is installed. Press selector knob to accept and move to the next menu item.

Aircraft Type	Description
Light Airplane < 15,000 pounds "Light Fixed Wing"	Any airplane with a maximum takeoff weight less than 15,500 pounds. This includes very light aircraft (light sport aircraft) that do not meet the requirements of 14 CFR 103.1.
Small Airplane ≥ 15,000 to < 75,000 pounds "Medium Fixed Wing"	Any airplane with a maximum takeoff weight greater than or equal to15,500 pounds but less than 75,000 pounds.
Rotorcraft	Any rotorcraft regardless of weight.
Parachutist	Any parachutist equipped with a transponder.
Glider/Sailplane	Any glider or sailplane regardless of weight.
ULM/Hang/Paraglider	A vehicle that meets the requirements of 14 CFR 103.1. Light sport aircraft should not use the ultralight emitter category unless they meet 14 CFR 103.1.
UAV	Any unmanned aerial vehicle or unmanned aircraft system regardless of weight.
Unknown	None of the above categories.

Table 12: Aircraft Type Setup Options

Press selector knob to move to the next menu item.

7.5.6 Squat Switch Source

The Squat switch input allows the transponder to automatically switch between Airborne and Ground modes, and to automatically start and stop the flight timer. The sense of the squat switch input can be selected using the selector knob. If the squat switch input is not connected the "Not Connected" option must be selected.

Input Type	Air-Ground Logic
Aircraft Squat Switch (weight-on-wheels)	Low when ground OR Low when airborne
Pseudo Weight-on-Wheels output (e.g. GPS derived output such as Avidyne IFD5XX/IFD4XX/Atlas/Helios or Entegra Release 9 outputs)	Low when ground
Airspeed Switch (additional approval required for installation of airspeed switch)	Low when ground OR Low when airborne
If using Auto-switch on Airdata GPS (e.g. ADC serial input such as Shadin ADC formats with both altitude and airspeed, see sec 6.5.4)	Auto on Air Data GPS
Helicopter Collective Switch (additional approval required)	Low when ground OR Low when airborne
None (***not ADS-B Compliant***, see AC 20-165B Chapter 3-10)	Not Connected

Table 13: Squat Switch Selection Choices

The Air-Ground Logic in the table above is based on the Input Type. For example, if the aircraft is on the ground and the Input Type is low (less than 10 ohms to aircraft ground), then the AXP340 should be configured for a "Low when ground" input.

Press selector knob to accept and move to the next menu item.

7.5.7 Approved ADS-B GPS Input Selection Settings

If a GPS is connected for ADS-B position reporting, select the appropriate input protocol using the setup mode as per the appropriate installation manual.

GPS Source	Input Configuration	Comments
Garmin GNS 4XX(W)/5XX(W)	Garmin ADS-B	GNS4XX(W)/GNS5XX(W) With main software version 5.00 or later
Avidyne IFD5XX/IFD4XX/Atlas/Helios	Trig ADS-B	Avidyne IFD5XX/IFD4XX/Atlas With software version 10.1.0.0 or later
Entegra R9	Trig ADS-B	Avidyne software version 9.3.1 or later

Table 14: GPS Input Choices

Note: Reference Table 11 for GPS receivers approved under this STC.

Press selector knob to accept and move to the next menu item.

7.5.8 GPS Line Speed

If a GPS input has been configured, you should select the appropriate line speed using the selector knob. Refer to section 7.5 of this installation manual for further instructions on how to enter into the setup mode.

GPS Receiver	Baud Rate ("GPS Line Speed")
Avidyne IFD5XX/IFD4XX/Atlas/Helios ADS-B (avi) Protocol	9600 bps
Avidyne R9 (Trig ADS-B Protocol)	9600 bps
GPS Receivers using the Garmin Protocol	9600 bps

Table 15: GPS Line Speed

Note: Reference Table 11 for GPS receivers approved under the STC.

Press selector knob to accept and move to the next menu item.

7.5.9 System Certification Level

An important metric for ADS-B ground system behavior is the SDA or System Design Assurance level. It is intended to reflect the probability that the GPS position information on the ADS-B output is erroneous. If the system contains different design assurance levels for hardware and software, then the worst case design assurance level should be used. For example, if the hardware design assurance level is level C, and the software assurance level is B, the SDA would indicate that the system has been qualified commensurate with a Major failure condition (level C). Use the lowest letter of the system (i.e. GPS receiver and AXP340 transponder). If the ADS-B system is integrated with a non-compliant GPS, the SDA must be set to "not certified".

The following table lists the SDA for the approved GPS systems when connected to AXP340:

System	System Design Assurance
Avidyne R9	Level C
Avidyne IFD5XX/IFD4XX/Atlas/Helios	Level C
Garmin GXX4X0(A)W/GXX5X0(A)W	Level C

Table 16: System Design Assurance Level

Press selector knob to accept and move to the next menu item. Refer to section 7.5 of this installation manual for further instructions on how to enter into the setup mode.

7.5.10 GPS NAC_V

Another metric that the ADS-B ground system uses to help it track the aircraft is NAC_V. NAC_V is the Navigational Accuracy Category for velocity, and is a design feature of the GPS receiver. It represents the error bound for velocity that the GPS may report in acceleration/deceleration or turning maneuvers. You can find this information from your GPS installation manual.

The following table lists the NAC_V for the approved GPS systems when connected to AXP340:

GPS Receiver	NAC_V Setting
Avidyne R9	10 meters per second
Avidyne IFD5XX/IFD4XX/Atlas/Helios	10 meters per second
Garmin GXX4X0(A)W/GXX5X0(A)W	

Table 17: GPS NACV Setting

NOTE: If using the Garmin ADS-B Plus protocol, the NACv is set dynamically from the GPS data. In this instance, the NACv setting from the setup menu is ignored.

Press selector knob to accept and move to the next menu item.

7.5.11 Aircraft Length and Width

On the ground, ADS-B transmits encoded aircraft size information which is used by ATC to identify taxiing routes and potential conflicts. When configured for ADS-B, the AXP340 will ask for the aircraft length and width (wingspan), in metres, and will calculate the appropriate size code for transmission.

Press selector knob to accept and move to the next menu item.

7.5.12 GPS (Antenna) Reference Offset

The GPS antenna offset is used together with the aircraft length and width to manage taxiway conflicts. A typical GPS installation does not report the geographic position of the center of the aircraft, or even the tip of the nose of the aircraft; instead it usually reports the location of the actual GPS antenna (not the GPS receiver). In normal flight operations this distinction is of no practical importance at all, but if ADS-B is used to manage taxiway conflicts, a significant offset in antenna position could mean that the aircraft is not in the same place as the ADS-B reported position. Although primarily intended for position correction on large transport aircraft, General Aviation aircraft can also have a significant offset. For example, if the aircraft has a long tail boom and the GPS antenna is on the top of the tail, the GPS position could be 15 feet or more from the nose of the aircraft.

Enter the position of the GPS antenna relative to the nose of the aircraft. The position is stored and transmitted to the nearest 2 metres; great accuracy in measurement is not required.

The IFD5XX/IFD4XX/Atlas/Helios, R9, and GXX4X0(A)W/GXX5X0(A)W receivers do not send the antenna offset information via RS-232. The position offset must be entered manually for these GPS receivers via the "Manual set here" option.

After manually entering the values, press selector knob to move to the next menu item.

7.5.13 ADS-B Receiver Options

In the USA there are two ADS-B channels, 1090ES and UAT, and there is an ADS-B based traffic information service called TIS-B. The ADS-B ground stations relay this information between the two channels so that suitably equipped aircraft can receive traffic information. To limit channel congestion these services are only provided to aircraft equipped to receive them.

The transponder reports what receivers are installed in a periodic status message. If the aircraft has ADS-B in receiver, set either 1090ES or UAT to *installed*.

There are two selections to make here: 1090 MHz Receiver Installed – Yes/No, and UAT Receiver Installed – Yes/No.

Press selector knob to move to the next menu item.

7.5.14 Audio Volume

The altitude alert function includes an audio alert. This configuration item lets you adjust the audio volume output from the transponder using the selector knob. While you are turning the volume control, the transponder will periodically output a test signal to verify the settings.

Press the selector knob to accept and move to the next menu item.

7.5.15 Pressure Altitude Units

This configuration setting lets you select the units of the pressure altitude displayed on the AXP340 screen. You may select Flight level (100's of feet), feet or meters.

Press selector knob to move to the next menu item.

7.5.16 Lighting Control

The AXP340 has an integrated ambient light sensor in addition to an external input connection from the aircraft lighting bus (if available). This configuration setting selects the way in which the integrated light sensor and the lighting bus input control the brightness of the LCD and the bezel.

Selected Method	Description of lighting control
Normal mode	The display brightness/backlighting is controlled from the ambient light sensor and the bezel is controlled by the lighting bus.
Bus Only	The lighting bus is used to control the bezel and the display brightness/backlighting.
Sensor Only	The ambient light sensor is used to control the bezel and the display brightness/backlighting.

Table 18: Lighting Control Settings

Press selector knob to move to the next menu item.

7.5.17 LCD Dim Point

Depending on the amount of light spill in the cockpit, and the brightness of other adjacent avionics displays, it may be necessary to adjust the darkest setting of the backlight to best match other equipment and to improve the cockpit appearance.

Note – it is only practical to do this in pitch darkness, since that is the in-flight environment that you are trying to reproduce. If you are working in a hangar with any other lighting it may be better to leave the setting in the mid-range.

Press selector knob to move to the next menu item.

7.5.18 LCD Brightness

The actual maximum brightness of the LCD cannot be increased with this control. What it controls is the rate at which the lighting increases in brightness as detected by the ambient light sensor. This allows the brightness to be matched to other avionics displays during light level changes as far as possible.

Press selector knob to move to the next menu item.

7.5.19 Altitude Check

The Altitude check displays the current state of the altitude inputs. Individual Gillham (gray) code lines are shown to assist in fault tracing.

Press selector knob to move to the next menu item.

7.5.20 Lighting Bus

The lighting bus check displays the voltage on the lighting bus to assist in verifying the correct operation of the lighting bus.

Press selector knob to move to the next menu item.

7.5.21 Temperature

The internal temperature of the transponder may be accessed only in maintenance mode. This is for information only and does not provide any diagnostic value. Display is in degrees Celsius.
Press selector knob to move to the next menu item.

7.6 Transponder Check

Post installation checks should be carried out in accordance with your certification requirements. The following test will require a transponder test set capable of testing a Mode S transponder. These checks should include:

- Mode S interrogations to verify correct address programming.
- Verification of the reported altitude using a static tester. For aircraft using parallel Gillham code encoders, the test should include a range of altitudes up to 6,800 feet, 14,800 feet or 30,800 feet, depending on the service ceiling of the aircraft – these altitudes correspond to code changes which are not otherwise tested at lower altitudes.
- When utilizing the pseudo weight on wheels derived from the IFD5XX/IFD4XX/Atlas/Helios either the squat must be changed to "Low when airborne "on the AXP340, or the controlling IFD should be turned off to allow the transponder to be manually switched to ALT mode.

- Where installed, verification of correct squat switch ground/airborne indications. In an aircraft with a squat switch, setting the Mode switch to ALT when the aircraft is on the ground should leave the transponder in GND mode; when the aircraft becomes airborne, the mode should switch automatically to ALT. To allow the transponder to reply to mode A and C interrogations, go to the transponder squat switch setting page and invert the setting to make the transponder believe it is airborne. Return to the proper setting when done testing.
- Interrogations to verify the receiver sensitivity. A Mode S transponder should have a minimum triggering level (MTL) of between -77 dBm and -71 dBm. Failure to meet this requirement usually indicates antenna or coaxial cable problems.
- Interrogations to verify the transmitted power. A Class 1 installation should have no less than 125 Watts at the antenna (and no more than 500 Watts). Failure to meet this requirement is also generally due to antenna or wiring issues.
- Verify the transponder's Mode A code and IDENT is transmitted
- If installed, verify external annunciators and switches are operating correctly.
- If connected to the aircraft dimmer, verify the AXP340 bezel and display lighting is working correctly.
- Perform transponder test required by 14 CFR 91.413

7.7 ADS-B Check

If the ADS-B option is installed, the following tests are required. In an aircraft with a configured GPS, pressing the FUNC button on the transponder front panel in normal operation will display the ADS position monitor. With the aircraft outside the hangar (for good GPS reception) the aircraft position should be displayed on the transponder. If the position indications are all dashes then either the GPS position is not valid or the GPS interface is not correctly configured. Whenever a valid position is received by the transponder and the transponder is in any mode other than Standby, ADS-B Extended Squitters should be transmitted.

If ADS-B option is installed, verify the minimum set of elements listed 14 CFR 91.227 (d) is being broadcast. This will require a 1090 MHz ADS-B test set. Also verify the following ADS-B values:

ADS-B Parameter	Value
NIC ≥ 7	R_C < 370.4 (0.2 nm)
NAC_P ≥ 8	EPU < 92.6 m (0.05 nm)
NAC_V ≥ 1	< 10m/s
SIL ≥ 3	≤ 1 x 10^{-7} per hour or sample
SDA ≥ 2	≤ 1 x 10^{-5} per hour

Table 19: ADS-B Parameters

If the AXP340 transponder is connected to an approved GPS receiver listed in Table 11, a flight test of the ADS-B systems is not required. If using a GPS receiver not listed in Table 11, the ADS-B out system must be installed via field approval, reference Section 10.

7.8 Interface Check

In AXP340 Setup the Interface Check screen displays the current state of the external IDENT, external STANDBY and external GROUND inputs. Exercise these inputs to confirm the correct behavior.

7.9 Electromagnetic Interference/Compatibility Check

The EMI/EMC check verifies that all of the electronic systems installed on the aircraft are compatible. Operating the AXP340 should not result in Nav flags, constant location lightning strikes, noise on COMM channels, or other phenomena.

Check the following systems:

- **Comm Radios**: Scan through radio channels to ensure there is no interference caused by the AXP340. Check random frequencies from 118MHZ through 136.975MHZ as well as your local ground and tower frequencies to ensure there is no break in squelch due to the installation.
- **GPS**: Ensure that correct position displays and that there is no change in satellite signal strength.
- **Autopilot**: Ensure that autopilot self-test passes OK with the AXP340 operating.
- **Other Instruments**: Verify there is no adverse effect on other instruments with the AXP340 powered on.
- **Other Equipment** Verify no interference with any other approved electronics

Also verify the AXP340 is not affected by the operation of any other aircraft system.

7.10 Magnetic Compass Swing

After installation and EMI checks are complete, perform a magnetic compass "swing" in accordance with the aircraft installation manual for updating the heading correction card in accordance with 14 CFR 23.1327 and 23.1547.

7.11 Placards

Verify all circuit breaker(s), switches, and annunciator lights are labelled appropriately.

7.12 Aircraft Flight Manual Supplement

If installing the ADS-B out option, the AXP340 Airplane Flight Manual Supplement, Avidyne Document 600-00309-XXX must be inserted in the airplane's AFM/POH. All other installations do not need to install the AFMS in the aircraft.

7.13 Instructions for Continued Airworthiness

Complete and install the AXP340 Instructions for Continued Airworthiness in the maintenance records.

7.14 Aircraft Weight and Balance

Update the Weight and Balance report in the aircraft records.

8. Environmental Qualification Form

‡ Also applicable to Avidyne 200-00247-XXX units.

Nomenclature	AXP340 Mode S Transponder		
Part Number:	01155-00-(XX)‡	ETSO:	C112d, C166b
Manufacturer	Trig Avionics Limited		
Address	Heriot Watt Research Park, Riccarton, Currie, Scotland, EH14 4AP		

Conditions	DO-160G Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Categories A4, C4
Low temperature ground survival	4.5.1	-55°C
Low temperature operating	4.5.1	-25°C
High temperature operating	4.5.3	+70°C
High temperature short-time operating	4.5.2	+70°C
High temperature ground survival	4.5.2	+85°C
Loss of Cooling	4.5.4	Cooling air not required (+70°C operating without cooling air)
Altitude	4.6.1	55,000 feet
Decompression	4.6.2	8,000 to 55,000 feet in 15 seconds
Overpressure	4.6.3	-15000 feet
Temperature Variation	5.0	Equipment tested to Category C
Humidity	6.0	Equipment tested to Category A
Operational Shocks	7.2	Equipment tested to Category B
Crash Safety	7.3	Equipment tested to Category B
Vibration	8.0	Aircraft zone 2; type 3, 4, 5 to category S level M Equipment also tested to aircraft zone 2; type 1 (Helicopters) to category U level G
Explosion	9.0	Equipment identified as Category X – no test required
Waterproofness	10.0	Equipment identified as Category X – no test required
Fluids Susceptibility	11.0	Equipment identified as Category X – no test required
Sand and Dust	12.0	Equipment identified as Category X – no test required
Fungus	13.0	Equipment identified as Category X – no test required
Salt Spray	14.0	Equipment identified as Category X – no test required
Magnetic Effect	15.0	Equipment tested to Category Z
Power Input	16.0	Equipment tested to Category BX
Voltage Spike	17.0	Equipment tested to Category B
Audio frequency conducted susceptibility	18.0	Equipment tested to Category B
Induced signal susceptibility	19.0	Equipment tested to Category AC
Radio frequency susceptibility	20.0	Equipment tested to Category TT
Radio frequency emission	21.0	Equipment tested to Category B
Lightning induced transient susceptibility	22.0	Equipment tested to Category B2H2L2

Lightning direct effects	23.0	Equipment identified as Category X – no test required
Icing	24.0	Equipment identified as Category X – no test required
Electrostatic Discharge	25.0	Equipment tested to Category A
Flammability	26.0	Equipment tested to Category C

9. ADS-B Compliance

AXP340 transponders with software version 3.6 and above include support for Extended Squitter ADS-B out which is compliant with DO-260B with corrigendum 1. The AXP340 is a B1S ADS-B transmitter.

9.1 ADS-B Parameters Supported

The following table lists the ADS-B parameters that are transmitted by the AXP340 transponder when connected to an appropriate GPS receiver.

Parameter		BDS Register
SPI		0,5
Emergency Indicator		0,5
Barometric Altitude		0,5
Quality Indicator (NIC)		0,5
Airborne Position	Latitude	0,5
	Longitude	0,5
Quality Indicator (NIC)		0,6
Surface Position	Latitude	0,6
	Longitude	0,6
Surface Ground Speed		0,6
Surface Ground Track		0,6
Aircraft Identification		0,8
Airborne Ground Velocity		0,9
Geometric to Barometric Altitude Difference		0.9
Geometric Vertical Speed		0.9
Squawk Code		6,1
Emergency Status		6,1
Quality Indicator (NACp, NACv and GVA)		6,5
Quality Indicator (SIL and SDA)		6,5
Version Indicator		6,5
Surface Length/Width		6,5
Surface Antenna Offset		6,5

In all cases, uncompensated latency due to the transponder is less than 10 milliseconds. Analysis of the system latency should add this to the latency of the GPS system and the transmission time of the position data from the GPS to the transponder to determine the overall latency.

10. ADS-B Field Approval Support

The following information is given for field approval of the AXP340 transponder. The AXP340 transponder can be installed using field approval per FAA Policy Memorandum dated October 10, 2012, see Section 13. The following tables are provided to assist installers in obtaining field approval. This process is helpful in approving an ADS-B out installation on aircraft not listed in the Approved Model List for the STC or aircraft using a GPS receiver not listed in Table 11. Prior to starting a Field Approval process on an aircraft, the installer should coordinate with the local FAA field office.

Policy Memo Item for Field Approval	Compliance Method	Notes	Complete
The ADS-B Out equipment is authorized under TSO-C166b or TSO-C154c	The Avidyne AXP340 transponder is authorized under TSO-C166b		✓
The GNSS position sensor is approved under TSO-C129 or later, TSO-145a/C146a or later, or TSO-C196 or later;	Connect the AXP340 transponder to GNSS position receiver with one of the following TSOs: TSO-C129, TSO-145/146, or TSO-C196.	The GPS manufacturer must provide the GPS specifications required to configure the AXP340 (i.e. SDA and NAC_V)	
The ADS-B Out equipment (transponder or Universal Access Transceiver (UAT), GNSS position sensor, and interconnect wiring are identical to previously-approved design under type certificate or supplemental type certificate;	Connect the AXP340 transponder to the GNSS receiver as shown in Section 12.		
The installation is performed in accordance with the equipment manufacturer's installation guidance;	The AXP340 transponder and the GNSS receiver must be installed per the manufacturer's installation instructions.		
The installer verifies the installation in accordance with the guidance of AC 20-165, Chapter 3 and 4. The data from the previously-approved installation may be used to address paragraphs 3-1 c, 3-1 d, 3-3 b (2), 4-1b, 4-1c. A	Perform Ground Test and Flight test as described in Table 21 and Table 22.		

Policy Memo Item for Field Approval	Compliance Method	Notes	Complete
return-to-service operational check flight in accordance with AC 20-165 Section 4-3 is recommended for determining if the installation performance is acceptable;			

Table 20: FAA Policy Memorandum

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 3-1 a: Environmental Qualification	The AXP340 has been tested. The environmental categories are listed in Section 8. Verify the installation does not violate the AXP340 environmental test categories.		
Section 3-1 b: System Safety Assessment	The AXP340 transponder hardware and software design assurance level is listed in Table 2. The GPS Receiver design assurance level must be Level C or better for both hardware and software. The GPS position RS-232 output must be directly connected to the AXP340.	The GPS position data must not use any intermediary devices (e.g. data concentrators). If so, a system safety assessment must be conducted.	
Section 3-1 c: Position latency	Using Compliant Architecture - This is accomplished by using the AXP340 transponder and an GPS receiver with one of the following approvals: TSO-C129, TSO-145/146, or TSO-C196		
Section 3-1 d: Integrity Metric Latency	The AXP340 is a TSO-C166b transponder, and is considered compliant architecture.		✓
Section 3-2 a: Equipment eligibility	The AXP340 is a TSO-C166b transponder.		✓
Section 3-2 b (1): UAT system with Mode S	Do not install a UAT ADS-B out system with the AXP340 transponder,		

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
transponder	reference Section 6.6.3.		
Section 3-2 b(2): Mixed transmit/receive classifications	Do not install a UAT ADS-B out system with the AXP340 transponder, reference Section 6.6.3.		
Section 3-2b(3): Stand alone 1090ES transmitters	The AXP340 transponder's ADS-B out is integrated with a 1090 transponder, and is Class B1S.		✓
Section 3-2 b(4): Multiple ADS-B Out System:	Do not install a UAT ADS-B out system with the AXP340 transponder, reference Section 6.6.3.		
Section 3-2 c(1): International Civil Aviation Organization (ICAO) 24-bit address:	The AXP340 automatically sets the 24-bit ICAO address during setup of the aircraft's Mode S Address, reference Section 7.5.2.		✓
Section 3-2 c(2): Aircraft length and width	The aircraft's length and width must be entered, reference Section 7.5.11.		
Section 3-2 c(3): ADS-B IN capability	The AXP340 can be configured for both 1090 ADS-B IN and UAT ADS-B IN, reference Section 7.5.13.		
Section 3-2 c(4): Emitter category	The AXP340 can be configured for the aircraft's emitter category, reference 7.5.5.		
Section 3-3 a: Equipment Eligibility	The GPS must meet TSO authorizations listed above (Section 3-1 C) and the GPS SDA and NAC_V information must be available to setup the AXP340.		
Section 3-3 b(1): Installation Guidance	The GNSS position source must be installed per the GPS installation instructions.		
Section 3-3 b(2): Position source and ADS-B equipment interface	Verify the GPS position information is transmitted per Section 7.7.		
Section 3-3 b(3): Secondary Position Source	The AXP340 must not be connected to two position sources, reference Section 6.6.2.		✓

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 3-3 b(4) Position source selection	The AXP340 must not be connected to two position sources, reference Section 6.6.2.		✓
Section 3-3 b(5) Position source	The AXP340 does not contain an integrated GPS source.		✓
Section 3-3 b(6) GPS/UAT time mark synchronization	The AXP340 is not a UAT system.		✓
Section 3-4 (a) Equipment eligibility	The AXP340 must be connected to an Altitude Source that meets 14 CFR 91.217, reference Section 6.5.4.		
Section 3-4 (b) Installation guidance	The AXP340 will transmit the same barometric altitude for the Mode C and ADS-B reply.		✓
Section 3-4 (c): Configuration of associated parameters	The AXP340 will update the barometric altitude based on the real-time barometric altitude since it is also used for the Mode C reply. The AXP340 transmits the NIC_{BARO} status on the ADS-B reply.		✓
Section 3-5: Heading Source	The AXP340 does not transmit heading information on the ADS-B surface reply.		✓
Section 3-6: TCAS Status source	The AXP340 does not transmit an ADS-B out TCAS II reply.		✓
Section 3-7 b (1): System status	The transponders Mode A code is entered directly on the AXP340 transponder. The AXP340 provides all failure annunciations on the display. The AXP340 Pilot's Guide provides a description of all warnings on the AXP340.		✓
Section 3-7 b (2): Turning off ADS-B	The AXP340 ADS-B output can be turned off by placing the unit in standby or off.		✓

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 3-7 b (3): Anonymity feature	No such feature on TSO-166b equipment		✓
Section 3-7 c (1): Call sign/flight ID	The AXP340 Pilot's Guide has the procedures for entering the flight ID.		✓
Section 3-7 c (2): Emergency status	The ADS-B will be entered using the Mode A code buttons for a single point of entry.		✓
Section 3-7 c (3): IDENT	The IDENT for the ADS-B out and Mode A is a single point of entry on the AXP340 bezel. (Optionally, it is also available using a remote IDENT button)		✓
Section 3-7 c (4): Mode 3/A code	The Mode A code must be entered via the AXP340 bezel. This is a single point of entry for Mode A code.		✓
Section 3-7 c (5): Single point of entry	The AXP340 is a single point of entry for Mode A, IDENT, and emergency status.		✓
Section 3-8 Antenna Interface	The AXP340 is a B1S class transmitter. The antenna must be mounted on the bottom of the aircraft. The AXP340 has a 125 watt minimum transmit power.		
Section 3-8 a: Equipment eligibility	ADS-B antenna must be installed in accordance with the installation data listed in Section 3.		
Section 3-8 b (1): Utilizing an existing antenna	The AXP340 will utilize the aircraft's existing transponder antenna, reference Section 3.		
Section 3-8 b (2): Installation a new shared transponder/ADS-B antenna	Additional approval required if installing a new antenna.		
Section 3-8 b (3): Install a new stand-alone UAT ADS-B antenna	The AXP340 is not a UAT system.		✓

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 3-8 b (4): Antenna diplexers	The AXP340 is not UAT system.		✓
Section 3-8 b (5): Single antenna	The AXP340 is a single antenna system. All AXP340 installation must have a bottom mounted antenna, reference Section 3.		
Section 3-8 c (1): GNSS antenna offset and position offset applied (POA)	The AXP340 can transmit the GPS POA, reference Section 7.5.12.		
Section 3-8 c (2): Single antenna bit	The AXP340 is a single antenna system. The single antenna bit is always set to 1.		✓
Section 3-8 d: Mutual Suppression	The AXP340 has a suppression input/output, reference Section 6.5.3.		
Section 3-9: Vertical Rate Source	The AXP340 transmits Geometric Vertical Rate (GVR) per Section 3-9 a (4).		✓
Section 3-10: Air-ground Consideration	The AXP340 will automatically transition from ground to air with the squat switch input connected, reference Section 7.5.6.		
Section 3-11: Foreign Airspace Requirements	Additional Installation approval is required for Foreign Airspace.		✓
Section 4-1 c: Accuracy and Integrity	Test the AXP340 per Section 7.7.		
Section 4-1 d: EMI/EMC testing	Test the AXP340 per Section 7.9		
Section 4-1 f: Transponder regression testing	Test the AXP340 per Section 7.4		
Section 4-1 g: ICAO 24-bit address	Test the AXP340 per Section 7.7.		
Section 4-1 h: Self test	The AXP340 does not have a pilot initiated self test function. The		✓

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
	AXP340 is automatically tested on each time power is applied to the unit.		
Section 4-1 i: Position source failure	Verify AXP340 displays ADS-B position loss when the GPS is turned off. The AXP340 does not support multiple position sources, reference Section 6.6.2.		
Section 4-1 j: Air-ground status	Verify the air-ground status is functioning correctly on the flight test.		
Section 4-1 k: Transmit Power	Verify the AXP340 transmit power, reference Section 7.4.		
Section 4-1 l: TCAS	The AXP340 does not support TCAS II output.		✓
Section 4-1 m: Transponder all-call inhibit	Test the transponder per 14 CFR 43 Appendix F (h) and (i)		
Section 4-1 n: Mode 3/A code and emergency code	Verify the AXP340 transmit power, reference Section 7.4.		

Table 21: FAA AC 20-165( ) Ground Test

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 4-2 a): Mutual Interference	Verify in all phases of flight that there is no mutual interference between the AXP340 and other aircraft systems.		
Section 4-2 b): Other system performance	Verify any previously installed equipment affected by the ADS-B installation is operating correctly.		
Section 4-2 c): User Interface	Verify the AXP340 is operating correctly per AXP340 Pilot's Guide.		

FAA AC 20-165( ) Installation Guidance	Compliance Method	Notes	Complete
Section 4-3: In-Flight Test with FAA Ground System	Test the ADS-B system per FAA AC 20-165A Section 4-3.		
Section 2-2: Aircraft Flight Manual	Verify Avidyne's Aircraft Flight Manual Supplement (Document Number 600-00309-XXX is adequate. If not, a separate Aircraft Flight Manual Supplement must be developed.		

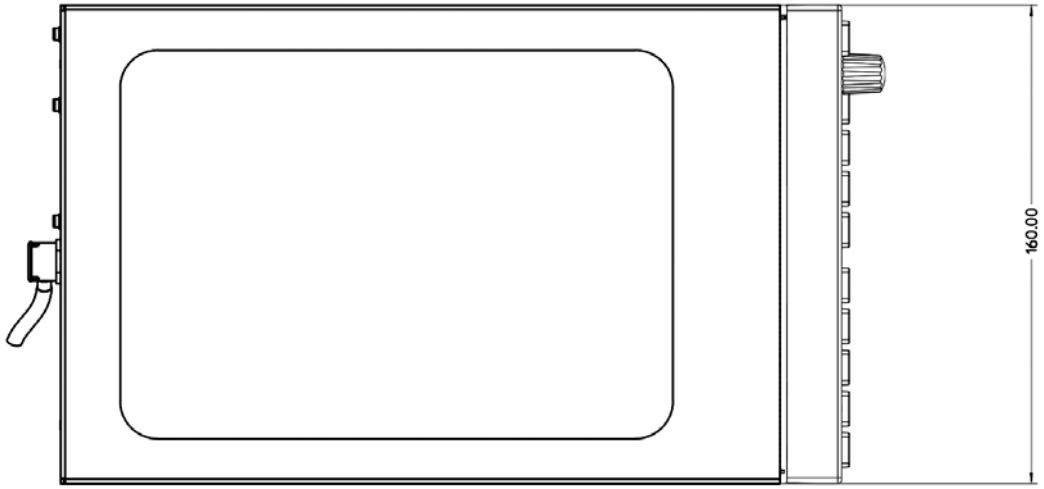
Table 22: FAA AC 20-165( ) Flight Test

10.1 Additional ADS-B Information

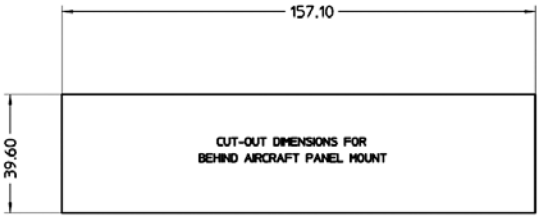
The following information is provide to assist installers in finding compliance with FAA AC 20-165 ( ).

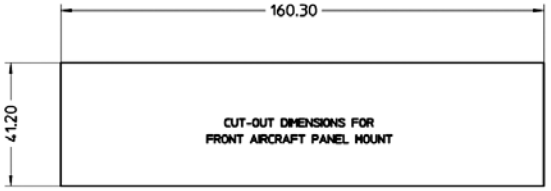
- The AXP340 will transmit an ADS-B message populated with all the parameters required by 14 CFR 91.227.
- The AXP340 will transmit north/south, east/west velocities within the airborne ADS-B message.
- The AXP340 will transmit ground speed and ground track within the surface ADS-B message. The AXP340 will suppress the ground track at velocities less than 7 knots.
- The AXP340 will always limit the NIC value to not greater than 8.
- The NAC_p value is set using HFOM data from the GPS
- The AXP340 will set the GVA value using VFOM data from the GPS.
- If the AXP340 detects an internal failure, the screen will indicate FAULT or WARNING followed by a brief statement of the problem.
- If the AXP340 detects that no position data is being received then the display will indicate WARNING - NO ADSB POSN
- There is no Pilot interface to disable ADS-B reporting
- The AXP340 transmits geometric rate, never barometric.

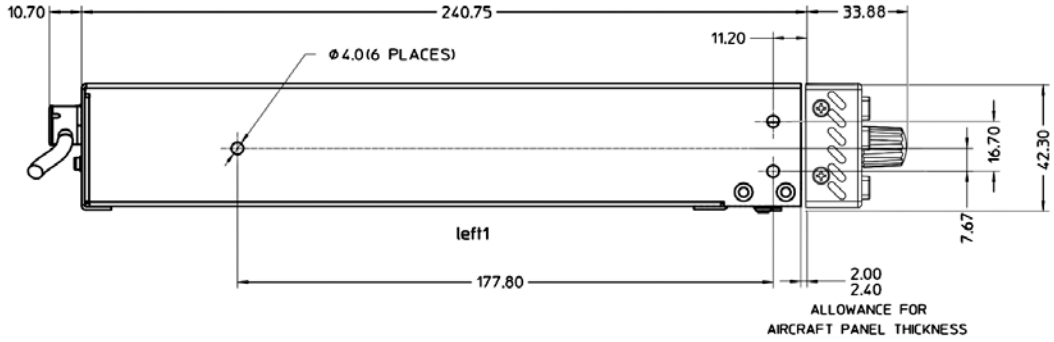
11. Installation Drawings



top1



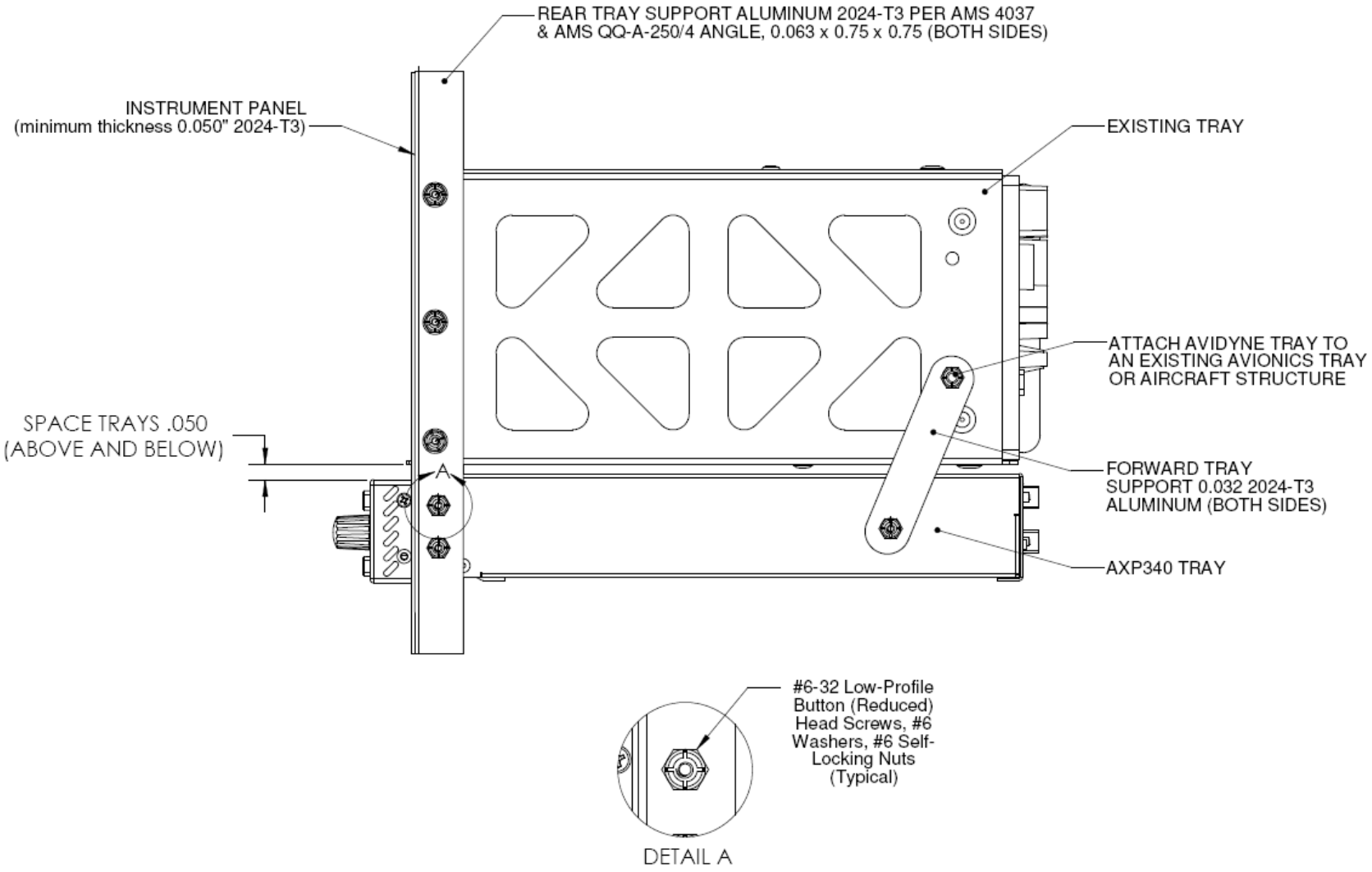




left1

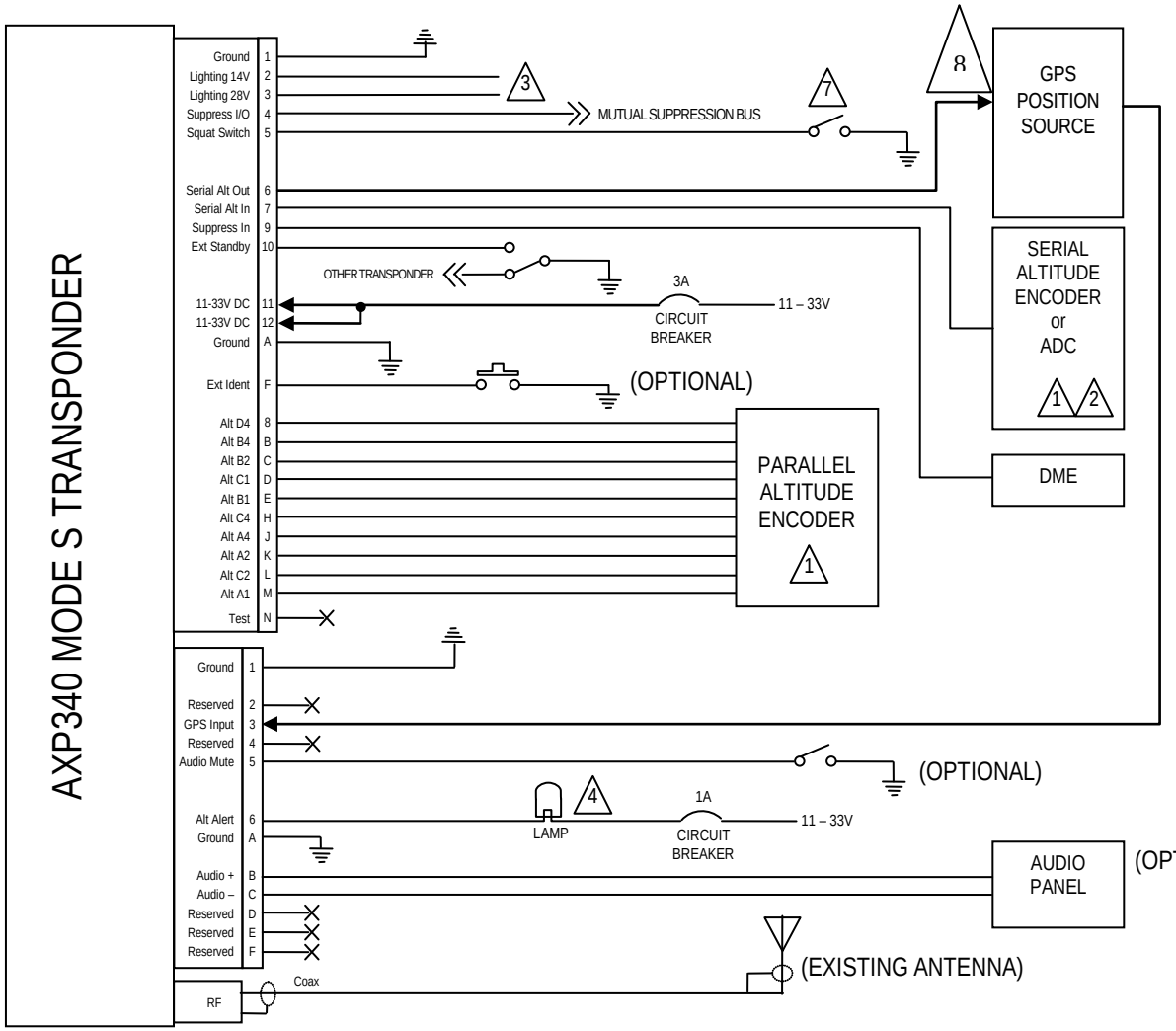
front1

dimensions in millimetres



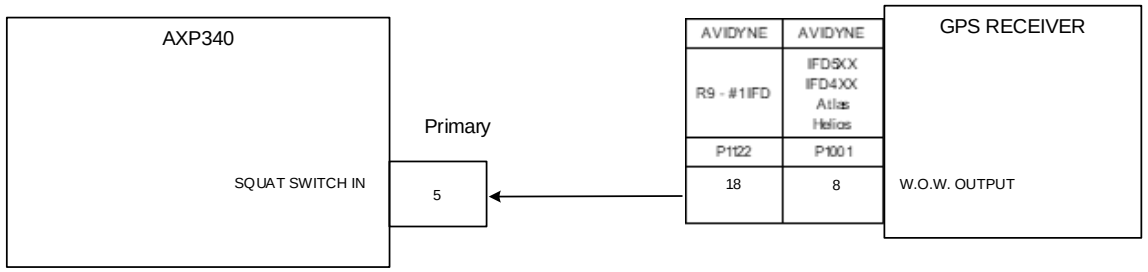
dimensions in inches

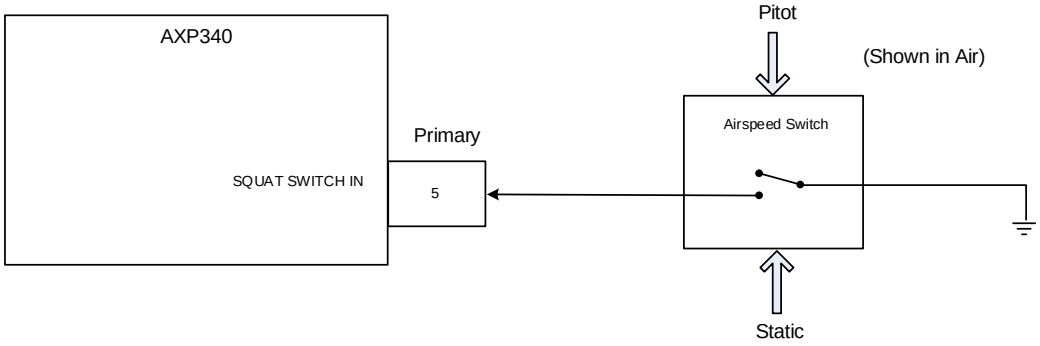
12. Basic Interconnect Diagram



NOTES:

1. ALL WIRES SHOULD BE 18 – 22 AWG
2. ONLY CONNECT ONE ALTITUDE DATA SOURCE, EITHER A SERIAL ENCODER, PARALLEL GILLHAM ENCODER OR ADC.
3. WHEN USING DATA FROM AN ADC, IT SHOULD BE CONNECTED TO THE "SERIAL ALT IN", AS SHOWN.
4. CONNECT ONLY ONE INPUT TO THE LIGHTING BUS, DEPENDING ON LINE VOLTAGE (OPTIONAL)
5. LAMP SHOWN AS EXAMPLE OF POSSIBLE ALERTER INSTALLATION. OTHER OPTIONS ARE POSSIBLE.
6. HARNESS OVERBRAID IS NOT SHOWN, BUT MAY BE REQUIRED.
7. CONNECT TO THE AIRCRAFT'S SQUAT SWITCH OR AS SHOWN ON FOLLOWING PAGE.
8. ONLY CONNECT IF ALTITUDE INPUT SOURCE TO AXP IS GILLHAM ENCODER

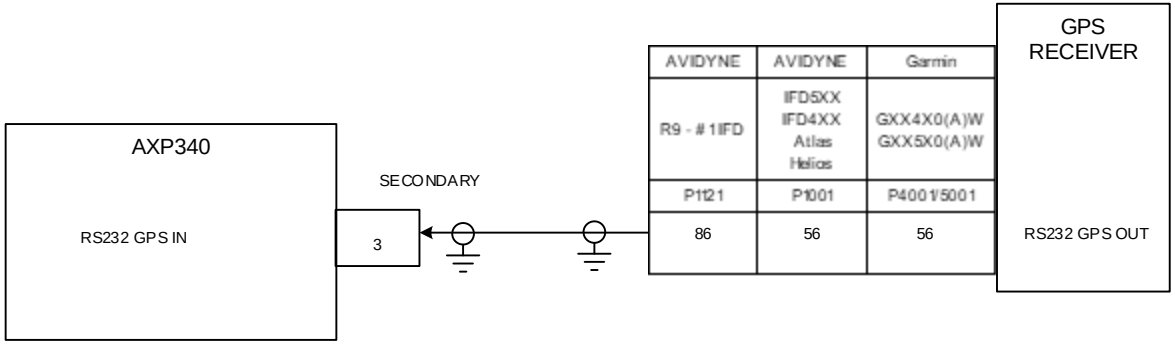




NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.

Squat Switch Inputs



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. THE IFD5XX AND RELEASE 9 IFDs MUST BE WAAS GPS RECEIVERS, REFERENCE TABLE 11.

3. HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.

Approved GPS Receivers Interconnect

13. FAA Policy Memorandum

Federal Aviation Administration

Memorandum

Date: October 10, 2012

To: See Distribution List

From: FOR David W. Hempe, Manager, Aircraft Engineering Division, AIR-100
Steven W. Douglas, Manager, Aircraft Maintenance Division, AFS-300

Prepared by: Alejandro Rodriguez, AIR-130 and Chris Parfitt, AFS-360

Subject: Installation Approval for ADS-B Out Systems

The purpose of this memorandum is to explain the FAA's policy regarding required approvals and non-interference installations of Automatic Dependent Surveillance-Broadcast (ADS-B) systems. This memorandum supersedes the memo dated August 30, 2010 on the same subject.

How can the ADS-B Out system obtain initial approval?

ADS-B Out systems may be installed using the type certificate (TC), amended TC (ATC), or supplemental type certificate (STC) process. We recognize that some installations may not constitute a major change in type design, but authorize the use of a TC amendment or STC as an acceptable method for approval due to the new and novel design and the importance of assuring compliance for the National Airspace System.

For ADS-B Out system projects approved under an Organization Designation Authorization (ODA), it is expected that the FAA Organization Management Teams (OMTs) will be involved if the project involves ADS-B equipment or Global Navigation Satellite System (GNSS) position sensors not previously approved. This level of involvement is based on the lack of maturity in the means of compliance and the coordination with the FAA to obtain test data from the FAA ground network.

Can ADS-B Out systems be approved using data approvals other than an STC, including field approvals?

Yes, ADS-B Out systems can be approved using data approvals other than an STC if all of the following conditions are met:

a) The ADS-B Out equipment is authorized under TSO-C166b or TSO-C154c;
b) The GNSS position sensor is approved under TSO-C129 or later, TSO-C145a/C146a or later, or TSO-C196 or later;

2

c) The ADS-B Out equipment (transponder or Universal Access Transceiver (UAT), GNSS position sensor, and interconnect wiring are identical to previously-approved design under type certificate or supplemental type certificate (see example in figure 1);

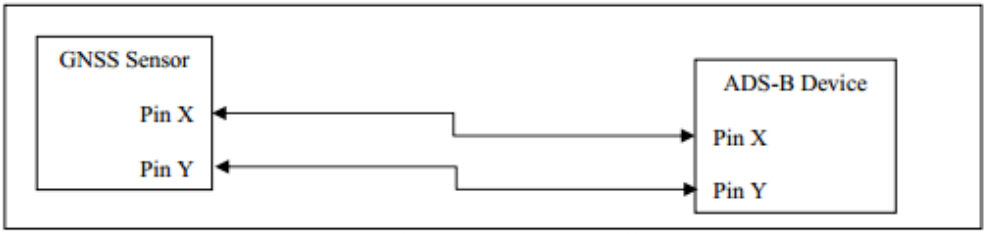


Figure 1: ADS-B/GNSS Sensor Installation Wiring

d) The installation is performed in accordance with the equipment manufacturer's installation guidance;
e) The installer verifies the installation in accordance with the guidance of AC 20-165, Chapter 3 and 4. The data from the previously-approved installation may be used to address paragraphs 3-1 c, 3-1 d, 3-3 b (2), 4-1b, 4-1c. A return-to-service operational check flight in accordance with AC 20-165 Section 4-3 is recommended for determining if the installation performance is acceptable;

All other aspects of the installation qualify for installation under 14 CFR part 43 and follow the guidance in the Major Alteration Data Approval Job Aid (8900.1 Fig 4-68 or other approved guidance).

When field approvals are granted for qualifying ADS-B Out projects, approval of an AFM supplement with the following statement is delegated to the approving ASI:

> "The installed ADS-B Out system has been shown to meet the equipment requirements of 14 CFR § 91.227."

Can ADS-B Out systems be approved for purposes other than ADS-B Out rule compliance?

All transponders or ADS-B transmitters with RTCA DO-260B or DO-282B ADS-B functionality shall be installed in accordance with AC 20-165. Do not allow the installation of a transponder or ADS-B transmitter on a non-interference basis. This policy applies to all ADS-B Out systems utilizing the DO-260B or DO-282B standard, not just TSO-C166b or TSO-C154c equipment.

For 1090 MHz ADS-B, equipment that broadcasts version 0 (RTCA/DO-260) or version 1 (RTCA/DO-260A) can be installed in accordance with EASA Approved Means of Compliance (AMC) 20-24, in lieu of AC 20-165, to support ADS-B usage in other regions of the world. A UAT ADS-B installation that broadcasts version 0 or version 1 can be installed under any of the following methods:

a) Using a ramp tester to verify the appropriate transmission of ADS-B information per guidance outlined in AMC 20-24;
b) Perform a flight test and post flight data analysis as described in AC 20-165A Section 4-3.

Who should I contact for questions about this policy memorandum?

Please contact Mr. Chris Parfitt (AFS-360), 202-385-6398, Chris.Parfitt@faa.gov, or Mr. Alejandro Rodriguez (AIR-130), (202) 385-4943, Alex.J.Rodriguez@faa.gov.

Distribution List:

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Manager, Engine and Propeller Directorate Standards Staff, ANE-110
Manager, Air Transportation Division, AFS-200
Manager, Flight Technologies and Procedures Division, AFS-400
Manager, General Aviation and Commercial Division, AFS-800

14. Factory Service Policies and Procedures

14.1 Technical Support

Avidyne's website contains information that may assist the operator and installer with questions or problems with their Avidyne AXP340. Technical support questions may be submitted, via the following:

- Email: techsupport@avidyne.com
- Fax: 781-402-7599
- Voice: 1-888-723-7592
- Internet: www.Avidyne.com

An Avidyne Technical Support Representative will respond as soon as possible. Avidyne business hours are:

- Monday through Friday: 8:00 AM to 5:00 PM Eastern Time

Please include the part number, revision number and serial number of the unit in all correspondences. For problem reporting, please provide as many details associated with the problem as possible.

For After Hours Technical Support, via the following:

- AOG Support: 877-900-4AOG (4264)

14.2 General Service Procedures

Repair of the AXP340 are performed at authorized Part 145 service centers and the Avidyne factory.

Prior to returning a unit for service, contact Avidyne at 1-888-723-7592 to obtain a Return Merchandise Authorization (RMA) number.

When calling or emailing for product-related help, please have the following information available:

1. Customer Name/Account Information

2. AXP340 Serial Number. Either read it from the label physically attached to side of AXP340 (need to partially remove the AXP340 to see it), or get it from the aircraft maintenance records.

3. AXP340 Software Part Numbers: Displayed during unit power up.

15. STC Permission

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