

# **VFS101 Instructions for Continued Airworthiness**

**VFS101-ICA, Revision J**



FAA STC Number SA02717NY

# Revision History

<b>Date</b>	<b>Version</b>	<b>Description</b>	<b>Sig.</b>
3/25/2009	A	Initial Release	JSM
4/21/2009	B	Revised based on FAA comment	JSM
5/19/2009	C	Revised based on further FAA comment	JSM
5/27/2009	D	Revised based on DER comment	JSM
5/29/2009	E	Removed STC Pending statement from title page	JSM
6/10/2009	F	Revised based on FAA comment	JSM
9/7/2010	G	Updated Address and STC number	JSM
11/10/2010	H	Changed "Pilot's Flight Manual" to "Pilot's Guide"	JSM
11/29/2011	I	Pg 1: Changed Applicability Serial Numbers Pg 7: Removed reference to GMA 340 Pg. 9: Corrected reference to Appendix D. Pg 10: Removed reference to Cessna 182 Pg 13: Added note clarifying GMA 340 as an example Pg. 14: Corrected reference to the VFS101 installation manual Pg. 15: Added OTTO switch	JSM
12/19/2011	J	Pg 1: Removed section 1.3 Pg 2-3: Edited item 2 and added items 3-5 to section 5.3	JSM

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## **1.0 Introduction**

This document describes the routine maintenance procedures needed to maintain the VFS101 speech recognition system. Information regarding the installation of the VFS101 unit (including wiring diagrams, mechanical installation details, part numbers, wire gauges, and installation procedures) can be found in the VFS101 Installation Instructions (VFS101-INSISTR).

Modification of an aircraft by this Supplemental Type Certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's Aircraft Maintenance Manual and the operator's Aircraft Scheduled Maintenance Program.

### ***1.1 Applicability***

These instructions are applicable to VFS101 units with serial numbers between 000001 and 010000.

### ***1.2 Equipment Location***

The VFS101 may be installed within the avionics radio rack using a Tray Mount or a Sled Mount, or directly behind the instrument panel using the Panel Mount. Each of these installations are illustrated in Appendix E.

A VoiceFlight Activation Switch is installed on the Yoke within easy reach of the pilot as illustrated in Appendix E.

## **2.0 Description**

The VFS101 is a speech-recognition system which allows aircraft pilots to enter aircraft navigational data using their voice. Voice entry of navigational data can be performed approximately ten times faster than with conventional knob twisting. It is designed to operate with the Garmin 430/530 series of GPS navigational units, and supports installations with one or two GPS units present.

Section 6.1 of this document provides a simple example of VFS101 usage. Detailed information on VFS101 operations can be found in the VFS101 Pilot's Guide (VFS101-PMAN).

The VFS101 is installed either behind the aircraft instrument panel, or in the aircraft avionics rack. A momentary pushbutton VoiceFlight Activation Switch (VAS) is installed on the left side of the pilot's yoke.

## 3.0 Controls

The VFS101 has a single control, a momentary pushbutton VoiceFlight Activation Switch (VAS) installed on the left side of the pilot's yoke. The VAS must be held down by the pilot when speech commands are provided to the VFS101. The VFS101 will not recognize speech, or transmit updates to the GPS units, unless the VAS is depressed.

## 4.0 Servicing

None required, except as described in sections 5.2 and 5.3.

## 5.0 Maintenance

### ***5.1 Preventive Maintenance***

As a solid-state electronic device no preventative maintenance is required. See section 5.3 for information on updating the navigational database, which is required every 28 days in accordance with the AIRAC charting cycle.

### ***5.2 Inspection and Scheduling***

Condition and airworthiness inspections of the VFS101 installation are performed during each Annual and/or 100-hour inspection. Other than the periodic inspections listed below, and updates to the navigational database every 28 days as specified in Section 5.3, maintenance of the VFS101 is limited to "on condition" with no specific overhaul period.

At each Annual and/or 100-hour inspection:

1. Examine the fasteners used to secure the VFS101, as well as those utilized by a Tray and/or Sled if installed. Insure that all fasteners are present and secure.
2. Wires and cables should be inspected for adequacy of support, protection, and general condition throughout.
3. Ensure that the electrical cables are separated from mechanical control cables. In no instance should wire be able to come closer than 1/2 inch to such controls when light hand pressure is applied to wires or controls.
4. Inspect wires for signs of:
  - (a) chaffing
  - (b) cracking
  - (c) exposure to high temperature.
  - (d) crushing
  - (e) kinking

5. Ensure the DB25 connector is tightly secured to the unit.

### **5.3 Updating the Navigational Database**

It is necessary to update the VFS101 navigational database every 28 days in synchronization with the AIRAC charting cycle. These updates should be done at the same time as a new navigation data-card is installed in the Primary GPS (and secondary GPS if so equipped).

**It is the pilot's responsibility to ensure that the correct navigational data is installed on the VFS101. Failure to use current navigational data may result in incorrect Victor Airway expansion and an inability to enter some waypoints using the VFS101.**

If the VFS101 navigational database and Primary GPS navigation database do not have the same cycle number, the VFS101 will play an audio warning message the first time the VAS is depressed after each power cycle.

Operating the VFS101 with an obsolete navigational database is permissible, however doing so imposes an operational restriction:

**If the navigational database installed on the VFS101 is not current, the pilot must manually verify the correctness of each waypoint and airway entered using the VFS101 by comparison to current navigational charts.**

To update the VFS101 Navigational Database, utilize the following procedure:

1. Download the latest navigational database from the "Navigation Update" section of the VoiceFlight Systems website (<http://www.voiceflight.com>). If the website is unavailable contact VoiceFlight systems customer support. Contact information can be found in section 16.0 of this document. The computer used for this should be running a recent version of Microsoft Windows, Apple OS X or Linux to insure proper support for the USB flash drive used in step 2.
2. Insert the supplied USB flash drive into a USB port on the computer. On most systems the flash drive should be automatically opened (mounted) by the operating system. Transfer the downloaded navigational database file to the Flash Drive. If other VoiceFlight files exist on the USB drive, erase them. Do not place the update file into any sub-directories on the flash drive. Eject the flash drive and remove it from the computer's USB port.
3. At the aircraft, plug a suitable aviation headset into the pilot's headset jacks so that audio responses from the VFS101 can be heard. Alternatively, the aircraft's cockpit speaker may be utilized.

4. With the Aircraft stationary, apply power to the aircraft audio panel and the VFS101. Wait at least thirty seconds for the VFS101 to initialize before inserting the USB flash drive into the VFS101 USB jack.
5. Wait at least one additional minute for the update to be performed. Depress and hold the VAS. An audio message indicating that the navigational update has completed should be heard through the audio system. If the audio message is not heard wait another full minute and try depressing the VAS again. If the message is still not heard, remove the USB drive, remove power from the units and repeat steps 4 & 5.
6. Remove the USB flash drive from the VFS101 USB jack.
7. Install a navigational database data-card with the matching cycle number into the primary GPS (and secondary GPS if so equipped). Apply power to the GPS(s), wait for them to initialize, and acknowledge their self-test screens as required.
8. Depress and hold the VAS. If a simple error tone or double beep is heard, without the explicit warning message "WARNING Navigation data is not current", then the VFS101 has determined that the navigational databases have matching cycle numbers.

## **5.4. Software Update**

VoiceFlight Systems may issue software updates to fix software errors or to add new functionality. These will be announced on the VoiceFlight Systems webpage (<http://www.voiceflight.com>), as well as in an electronic mail message sent to all VoiceFlight authorized dealers, repair stations, and customers that have provided an e-mail address.

To update the VFS101 software, utilize the following procedure:

1. Download the latest software update from the "Software Update" section of the VoiceFlight Systems website (<http://www.voiceflight.com>). If the website is unavailable contact VoiceFlight systems customer support at (518)-720-0060. The computer used for this should be running a recent version of Microsoft Windows, Apple OS X or Linux to insure proper support for the USB flash drive used in step 4.
2. If the software update section of the website contains an updated Pilot's Guide download the PDF and print it, preferably on a two-sided color laser printer. Alternatively, contact VoiceFlight Systems via the email address listed on the software update page for a revised Pilot's Guide.
3. Write down the revised Recognition Processor Software and Interface Processor part numbers and checksums. These will be needed later to verify correct installation of the new software.

4. Insert the supplied USB flash drive into a USB port on the computer. On most systems the flash drive should be automatically opened (mounted) by the operating system. Transfer the downloaded software update file to the Flash Drive. If other VoiceFlight files exist on the USB drive, erase them. Do not place the update file into any sub-directories on the flash drive. Eject the flash drive and remove it from the computer's USB port.
5. At the aircraft, plug a suitable aviation headset into the pilot's headset jacks so that audio responses from the VFS101 can be heard. Alternatively, the aircraft's cockpit speaker may be utilized.
6. With the Aircraft stationary, apply power to the aircraft audio panel and the VFS101. Wait at least thirty seconds for the VFS101 to initialize before inserting the USB flash drive into the VFS101 USB jack.
7. Wait at least one additional minute for the update to be performed. Depress and hold the VAS. An audio message indicating that the software update has completed should be heard through the audio system. If the audio message is not heard wait another full minute and try depressing the VAS again. If the message is still not heard, remove the USB drive, remove power from the units and repeat steps 6 & 7.
8. Remove the USB flash drive from the VFS101 USB jack.
9. Remove power from the VFS101, wait 10 seconds and re-apply power. This may be done using the VFS101 circuit breaker or dedicated power switch.
10. Apply power to the GPS(s), wait for them to initialize, and acknowledge their self-test screens as required. Enter a new title for stored flightplan #19 on the primary GPS containing the letter "C" (for CONFIGURATION) in the first character position. Press ENT to install the new title. Briefly depress and release the VAS to enter configuration display mode.
11. Briefly depress and release the VAS to increment the display. Configuration items will be displayed in sequence as illustrated in the following table.

#	Description	Displayed on Title Line
1	Current Volume Setting	V <Volume setting 0-63>
2	Navigational Database Cycle/Date	DB <Cycle/Date>
3	Navigational Database checksum	DC <Checksum>
4	Recognition Processor Software part number	RP <Part Number>
5	Recognition Processor Software checksum	RC <Checksum>
6	Interface Processor Software part number	IP <Part Number>
7	Interface Processor Software checksum	IC <Checksum>

12. Verify that the Recognition Processor Software and Interface Processor Software part numbers and checksums match those noted in step 3. If not, repeat the procedure. If this again fails contact VoiceFlight Systems technical support.

## 5.5 Volume Adjustment

If the volume level of the VFS101's audio output requires adjustment relative to other audio sources, the following procedures may be used. These procedures are only to be used while the aircraft is not moving.

To INCREASE the VFS101 audio output volume:

1. Plug a suitable aviation headset into the pilot headset jack.
2. With the aircraft audio panel, VFS101 and primary GPS powered up, enter a new title for stored flightplan #19 on the primary GPS containing the letter "U" (for UP) in the first character position and press ENT to install the new title. Briefly depress and release the VAS.
3. The title line will change to: "V <Volume Level 0-63> UP?" where the content in < > is replaced with a number indicating the current volume level.
4. Briefly press and release the VAS again. This will increase the volume by one step. A tone should be heard through the headset at the new volume level. Repeat until the volume is at the desired level.
5. Depress and hold the VAS for at least two seconds. This will return the VFS101 to normal operations, with the new volume output level.

To DECREASE the VFS101 audio output volume:

1. Plug a suitable aviation headset into the pilot headset jack.
2. With the aircraft audio panel, VFS101 and primary GPS powered up, enter a new title for stored flightplan #19 on the primary GPS containing the letter "D" (for DOWN) in the first character position

and press ENT to install the new title. Briefly depress and release the VAS.

3. The title line will change to: "V <Volume Level 0-63> DOWN?" where the content in < > is replaced with a number indicating the current volume level.
4. Briefly press and release the VAS again. This will decrease the volume by one step. A tone should be heard through the headset at the new volume level. Repeat until the volume is at the desired level.
5. Depress and hold the VAS for at least two seconds. This will return the VFS101 to normal operations, with the new volume output level.

## 6.0 Troubleshooting

Problems related to the VFS101 will fall into one of these broad categories:

- The VFS101 fails to function at all. (e.g. No response from the system when the VAS is depressed)
- The VFS101 responds, but fails in one or more aspects of operation. (e.g. Sounds an error tone when the VAS is depressed, or seems to recognize speech, but the waypoint does not appear on the GPS.)
- The unit experiences poor speech recognition (e.g. Sometimes the unit is able to recognize speech, but other times is unable to do so.)

In the event the VFS101 fails to function at all, the following procedure should be performed.

1. Verify that the VFS101 is powered by measuring the voltage across the open VAS switch while the VFS101 is powered on. If less than 3V DC is found, verify the VFS101 is receiving between 14V and 28V. Check the wiring and the VFS101 circuit breaker or fuse and switch.
2. Verify the correct functioning of the VoiceFlight Activation Switch (VAS). Confirm this through continuity testing in the open and closed position.
3. Verify the wiring between the VFS101 and the primary and secondary GPS units matches that found in Appendix B. A table of replacement part numbers can be found in Appendix C.

Pay special attention to the shields as shown in the Wiring Diagram (Appendix B). Additional noise on the audio connections induced by incorrect grounding and shielding will degrade system performance. Verify the routing of wire bundles is not near high-current wires to avoid inducing additional noise in the system. The splice connection to the pilot microphone jack should be as close to the jack as possible. Verify the shields leading to the VFS101 do not contact the shields leading to the audio panel which will create undesirable ground loops. Proper fabrication techniques must be used for all wires. Refer to FAA Advisory Circular 43.13-2A for further information.

4. If these steps fail to reveal the cause of the problem, contact VoiceFlight Systems technical support at (518)-720-0060, via email at support@voiceflight.com or by mail at the address shown in section 16.0 of this document.

In the event the unit fails to function in one or more aspects of operation, follow the following procedure:

1. Conduct the system test found in section 6.1.
2. Verify the wiring between the VFS101 and the primary and secondary GPS units matches that found in the VFS101 installation manual (VFS101-INSISTR).
3. If these steps fail to reveal the cause of the problem, contact VoiceFlight Systems technical support at (518)-720-0060, via email at support@voiceflight.com or by mail at the address shown in section 16.0 of this document.

Poor speech recognition can be caused by a number of factors as described in "Functional Description" of the VFS101 Pilot's Guide. If speech recognition continues to be poor this may be caused by high levels of electrical noise in the aircraft audio system. Verify that all shields in the VFS101 wiring harness are properly connected, and that the headset jacks are properly isolated from the aircraft instrument panel.

## **6.1 System Test**

To confirm the VFS101 is functioning properly perform the following procedure:

1. Move the aircraft to a safe location with a clear view of the sky.
2. Apply power to the aircraft's avionics, including the VFS101.
3. Turn on the primary and if installed the secondary Garmin GNS 530 or GNS 430 GPS.
4. When the GPS unit or units have initialized press the ENT button(s) twice to clear the initialization screens.
5. Turn the display on the primary GPS to the catalog of stored flightplans. Turn to stored flightplan #19 (-- VOICEFLIGHT --). If stored flightplan does not appear in the catalog of stored flightplans, check the other GPS. It may have been wired as the primary. If the (-- VOICEFLIGHT --) flightplan does not appear in either GPS's catalog of stored flightplans, this indicates that crossfill messages from the VFS101 are not reaching the primary GPS. This may indicate a fault with the crossfill connections of the VFS101 wiring harness.
6. Display the contents of flightplan #19 on the primary GPS. For the remainder of the test, watch the title line of this flightplan. Any error generated by the VFS101 should be accompanied by an error message being displayed on title line. This error message may help locate the source of the problem.

7. Plug a standard aviation headset into the pilots station and adjust the microphone so it is close to the lips.
8. Depress and hold the VAS. A “double-beep” should be heard. If it is not, the VFS101 may not be powered, may not be receiving the VAS signal, or the audio output from the VFS101 may not be reaching the headphones. This may be caused by a fault in the audio output signal lines of the VFS101 wiring harness.
9. Say the words “START NEW FLIGHT PLAN”. Speak slowly and clearly. A single beep indicating correct recognition should be heard. If no beep is heard, and after 20 seconds an error tone is heard instead, this indicates that audio from the pilot's microphone is not reaching the VFS101. Release the VAS. If it was not so before, Flightplan #19 on the primary GPS should now be empty.
10. Select a waypoint within 100 nautical miles of the aircraft's current position. If an airport is used remember to include the preceding “K” if appropriate.
11. Depress and hold the VAS. Spell out the waypoint's name using the ICAO spelling alphabet (Alpha, Bravo, Charlie...) followed by the word “ENTER”. Speak slowly and clearly, using only words found in the ICAO spelling alphabet (e.g. “FOXTROT” not “FOX”, “ZERO” not “OHHH”). Release the VAS.
12. Flightplan #19 on the primary GPS should contain a single waypoint; the waypoint entered in step 11 of this procedure. If the flightplan contains a different waypoint, confirm the waypoint entered in step 11 is valid and attempt to enter it again by repeating step 11.

## **7.0 Removal and Replacement**

### ***7.1 Removal***

To remove the VFS101 from the aircraft, first locate the VFS101. Possible installation locations are shown in Appendix E. Next, unmount the VFS101 from it's installed location by removing the four #8 machine screws which hold the unit in place and remove the device. Depending on the installation location it may be necessary to first remove other hardware.

In dual GPS installations, the removal of the VFS101 will render the crossfill connection between the two Garmin GPS units inoperative. This may be remedied by plugging a crossover connector into the VFS101 wiring harness which reconnects the crossfill link. A schematic and required part numbers for this crossover connector can be found in Appendix D.

Placard the VAS switch as inoperative. Placard the VFS101 circuit breaker or dedicated power switch as inoperative and secure it in the OFF position.

For permanent removal of the VFS101 from the aircraft, any supporting structure which was installed as part of the VFS101 installation may be removed. See the VFS101 Installation Drawing (VFS101-INSDWG), for

more information on mechanical installation. For dual GPS installations, install a crossover connector constructed as described in Appendix D. If the installer prefers, they may elect to remove the VFS101 wiring in its entirety and install wiring to return the aircraft to the condition before the VFS101 was installed.

## **7.2 Replacement**

To re-install a temporarily-removed VFS101, disconnect the crossover connector from the VFS101 wiring harness (if installed) and re-connect the VFS101. Attach the VFS101 to the supporting structure using the correct #8 machine screws, as shown in the appropriate section of the VFS101 Installation Installations (VFS101-INSISTR).

## **8.0 Diagrams**

The following diagrams are attached to this document as Appendixes:

<b>Diagram</b>	<b>Appendix</b>
VFS101 System Block Diagram	A
VFS101 Wiring Diagram	B
Crossover Connector	D
Installation Locations and Parts	E

## **9.0 Special Inspection Requirements**

None.

## **10.0 Protective Treatments**

None / Not Applicable.

## **11.0 Structural Data**

The VFS101 weighs .75 lb. The unit is secured to the aircraft secondary structure behind the instrument panel with 4 #8-32 machine screws, as shown in Appendix E.

As a piece of solid-state avionics hardware, the VFS101 does not require mandatory replacement or structural inspection (other than fastener verification).

## **12.0 Special Tools**

None.

## 13.0 Commuter Category Aircraft Data

As the VFS101 is not currently approved for commuter category aircraft, this section is not Applicable. However for convenience, Electrical Load data is included here for reference.

### 13.1 Electrical Loads

The VFS101 draws an average current of less than 1 Ampere of current under all circumstances at voltages between 10 Volts and 32 Volts DC. It is protected by an external 1 Ampere resettable circuit breaker or fuse (and dedicated power switch).

## 14.0 Recommended Overhaul Periods

None. As a solid-state electronic device, no preventative maintenance is required.

## 15.0 Airworthiness Limitations

**The Airworthiness Limitations Section is FAA Approved and specifies maintenance required under 14CFR §§ 43.16 and 91.403 unless an alternative program has been FAA approved.**

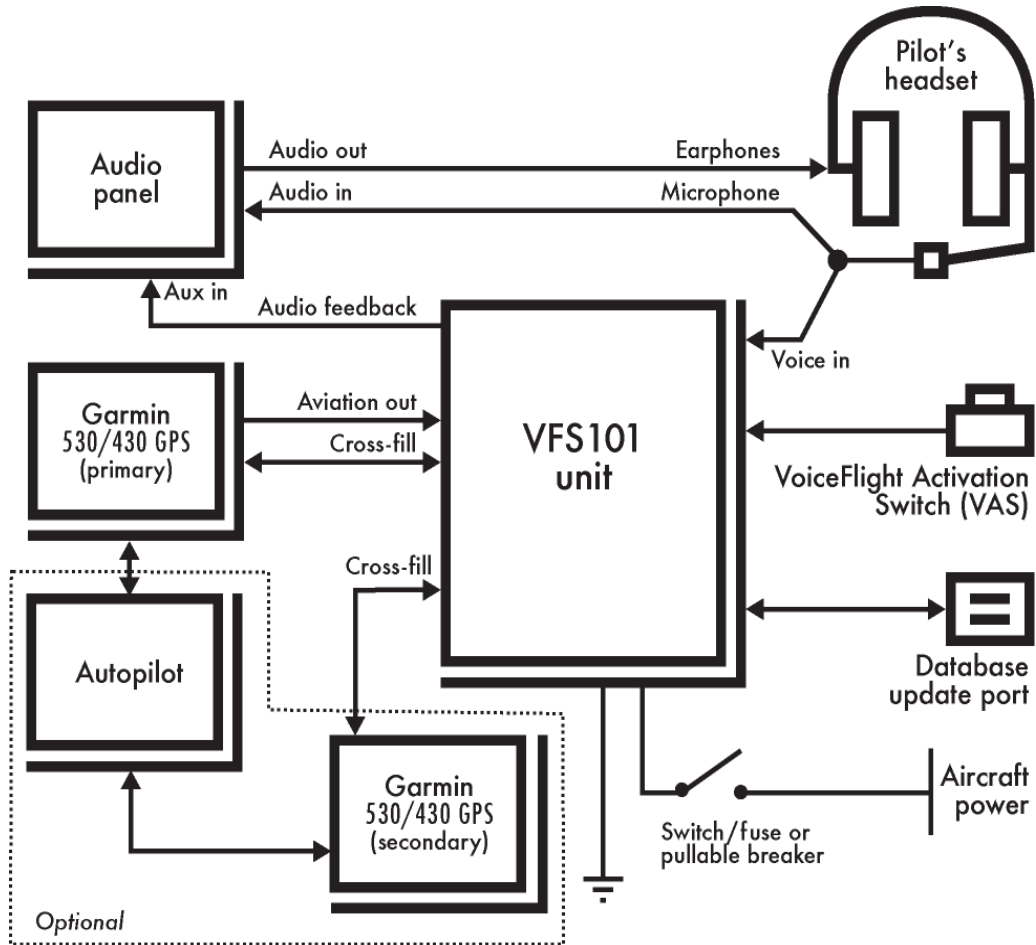
There are no Airworthiness Limitations associated with the installation of the VFS101 system.

## 16.0 Revision

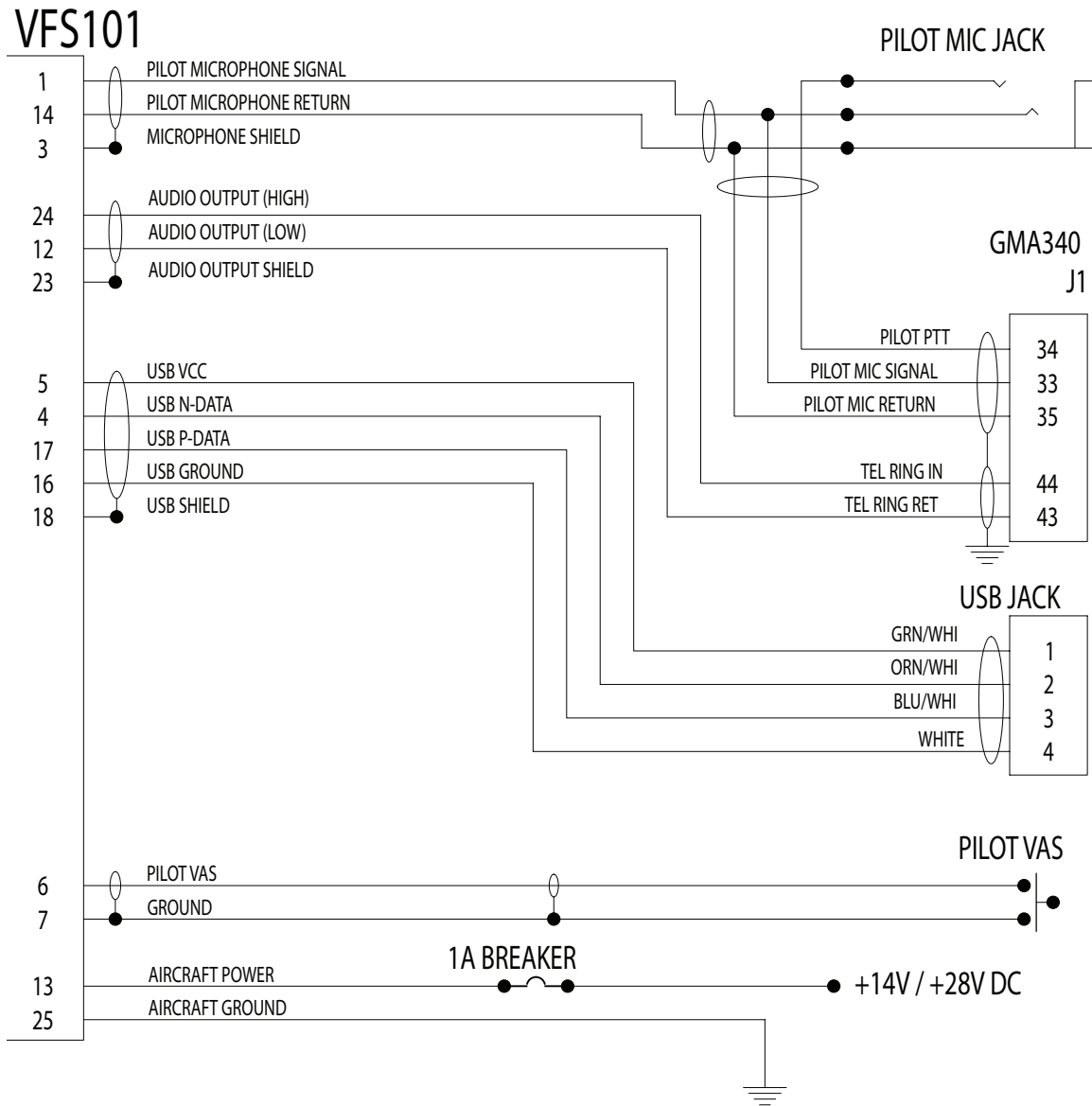
Any changes to this document will be announced on the VoiceFlight Systems website (<http://www.voiceflight.com>) and in an electronic mail message sent to all VoiceFlight authorized dealers, repair stations, and customers that have provided an e-mail address. The revised document will be available for download on the VoiceFlight Systems website. In the event the VoiceFlight website is unavailable, a new copy of these instructions may be requested by phone at (518)-720-0060 or by mail. Send a letter requesting the instructions to the address below. Be sure to include your return address.

VoiceFlight Systems, LLC  
105 Jordan Road  
Troy, NY 12180

## Appendix A: System Block Diagram



## Appendix B: Wiring Diagram

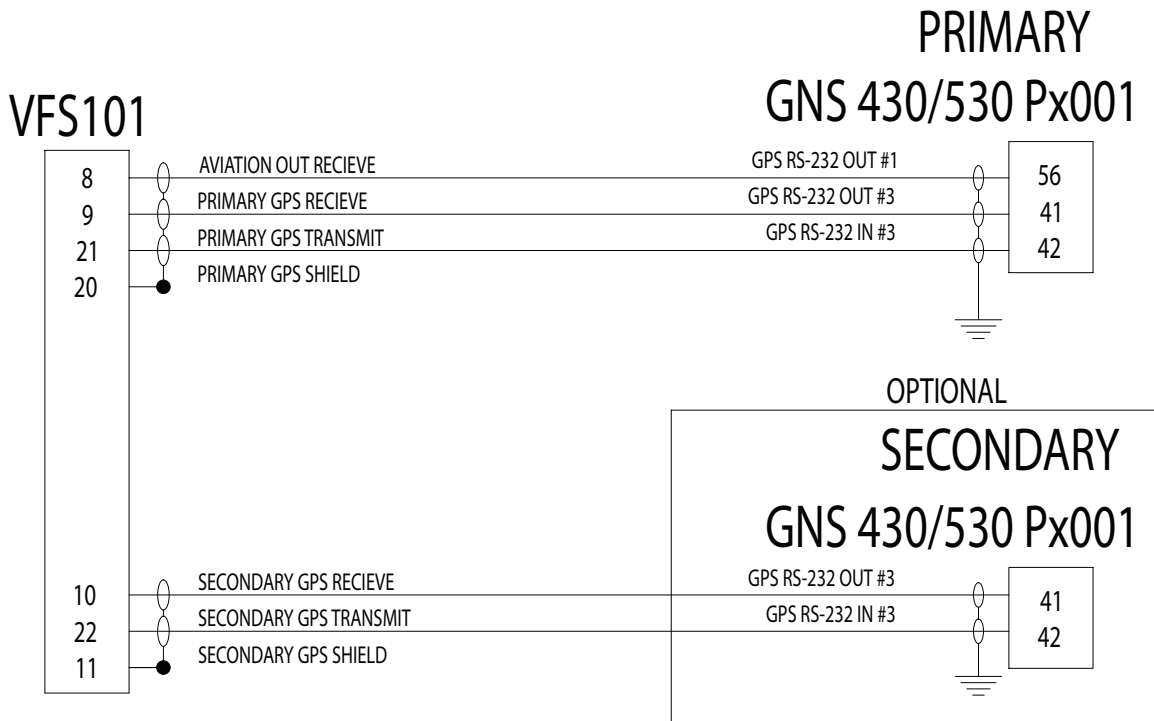


**Note:** VFS101 pin 23 (Audio Output Shield) is internally connected to Aircraft Ground by way of a .1 uF capacitor to prevent ground loops.

**Note:** When connecting the wires to the VFS101 and audio panel at the microphone jack, be sure not to connect the shields to avoid undesirable ground loops.

**Note:** The GMA340 is included here as an example. Any audio panel with an unswitched audio input with an impedance of at least 500 Ohms is acceptable.

**Wire:** See next page for wire type information.



**Note:** Approved software revision numbers for the Garmin GNS 430/GNS 530 Units are:

- **Garmin GNS 430** – “Main Software” revision 5.03
- **Garmin GNS 530** – “Main Software” revision 6.03

**Note:** Alternative RS-232 ports on the GPS units may be used. The ports and pin numbers shown are the recommended port assignments. See section 6.4 of the VFS101 installation manual and the Garmin GNS 430 or GNS 530 installation manual for information on selecting an alternate port.

**Note:** VFS101 pins 11 (Secondary GPS Shield) and 20 (Primary GPS Shield) are internally connected to Aircraft Ground by way of separate .1 uF capacitors to prevent ground loops.

**Wire (Power and Aircraft Ground):** MIL-C-27500 cable or equivalent wire from AC 43.13-1B table 11-11, in 20 AWG.

**Yoke Coil Cable (VAS connection.):** STEC p/n 3953 (5 conductor) or STEC p/n: 3934 (19 conductor) (or equivalent cable meeting the requirements of FAR 23.1359(c))

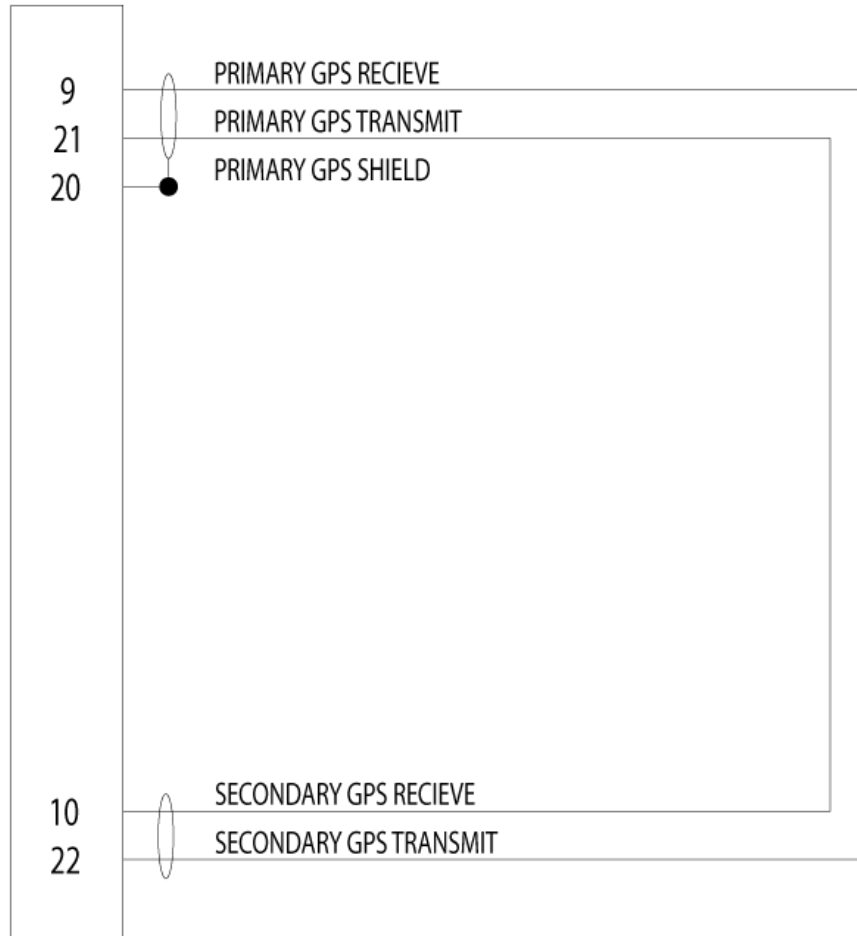
**Wire (All other connections):** MIL-C-27500 cable or equivalent wire from AC 43.13-1B table 11-11, in 24 AWG minimum. Shielded cable must be used as shown.

## Appendix C: Part Numbers

Part Description	Acceptable Part Numbers and/or Part Characteristics
Wire (Power and Aircraft Ground)	MIL-C-27500 cable or equivalent wire from AC 43.13-1B table 11-11, in 20 AWG.
Yoke Coil Cable (VAS connection.)	STEC p/n 3953 (5 conductor) or STEC p/n: 3934 (19 conductor) (or equivalent cable meeting the requirements of FAR 23.1359(c))
Wire (All other connections)	MIL-C-27500 cable or equivalent wire from AC 43.13-1B table 11-11, in 24 AWG minimum. Shielded cable must be used as shown.
DB-25 Connector	AMP p/n: 5205207-1 or equivalent
Crimp socket contacts (20-24 AWG)	AMP p/n: 205090-1 or equivalent
DB-25 Connector Backshell	AMP p/n: 5748676-3 or equivalent
Circuit Breaker (1 Amp)	Klixon p/n: 7274-2-1 or equivalent
VoiceFlight Activation Switch (VAS)	Any of the following switches may be used: Piper, p/n: 688-289 Cessna/Mason, p/n: S1985-1 C & K, p/n: 8633 C & K, p/n: MSPS103CO Grayhill, p/n: 23-1 Alco, p/n: MSPM-101B OTTO, p/n: T4
Pilot's Microphone Jack	Switchcraft p/n: 11 Switchcraft p/n: 111 Or other standard ¼ inch microphone jack
Microphone Jack Insulated shoulder washer	Switchcraft p/n: S1029 or equivalent
Microphone Jack Insulated flat washer	Switchcraft p/n: S1028 or equivalent
Alternative Power Switch (used instead of the Circuit Breaker, with Fuse Holder and Fuse)	Alco p/n: MTA-106E C & K p/n: 7101SH3ZQE
Alternative Fuse Holder (used instead of the Circuit Breaker, with Power Switch and Fuse)	Littelfuse: FNY-1 Littelfuse: FHP-1
Alternative 1A Fuse (used instead of the Circuit Breaker, with Power Switch and Fuse Holder)	Littelfuse: AGC-1
Mounting Hardware	See parts list for appropriate configuration in Appendix E

## Appendix D: Crossover Connector

### DB25M

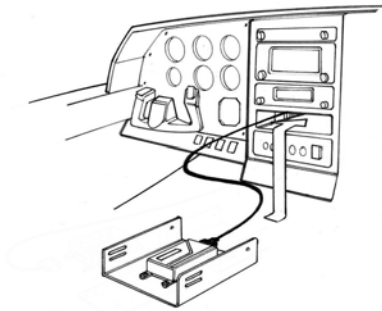


Part Description	Acceptable Part Numbers and/or Part Characteristics
Wire	MIL-C-27500 cable or equivalent wire from AC 43.13-1B table 11-11, in 24 AWG minimum. Shielded cable must be used as shown.
DB-25 Connector	AMP p/n: 5205208-1 or equivalent
Crimp socket contacts (20-24 AWG)	AMP p/n: 205089-1 or equivalent
DB-25 Connector Backshell	AMP p/n: 5748676-3 or equivalent

**Notes:** Keep wire as short as possible. Connect Shield as shown.

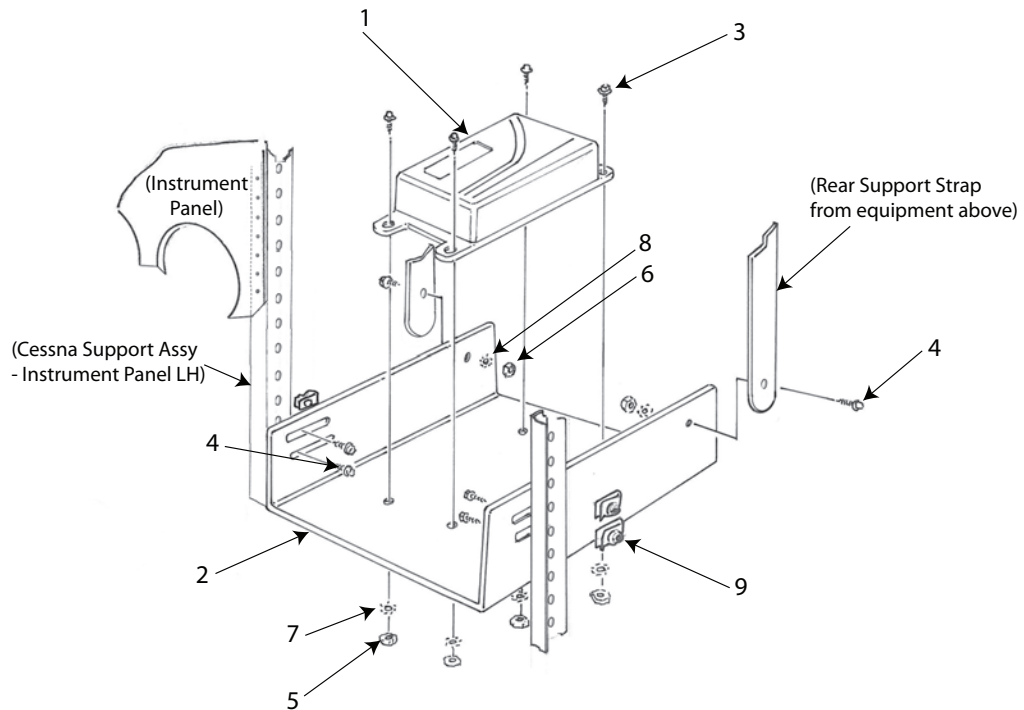
## Appendix E: Installation Locations and Parts

### Tray Mount



#### Part Numbers:

- 1: VFS101 (VFS101 Unit) Qty: 1
- 2: VFS101-M006-A (Mounting Tray) Qty: 1
- 3: MS51957-41 (#8 Mach. Screws, 1/4 inch) Qty: 4
- 4: MS51957-30 (#6 Mach. Screws, 1/2 inch) Qty: 6
- 5: MS35649-284 (#8 Mach. Screw Nuts) Qty: 4
- 6: MS35649-264 (#6 Mach. Screw Nuts) Qty: 2
- 7: MS35333-72 (#8 Star Lock Washers) Qty: 4
- 8: MS35333-71 (#6 Star Lock Washers) Qty: 2
- 9: Monadnock 294667 (#6 Clip-Nuts) Qty: 4



#### Notes:

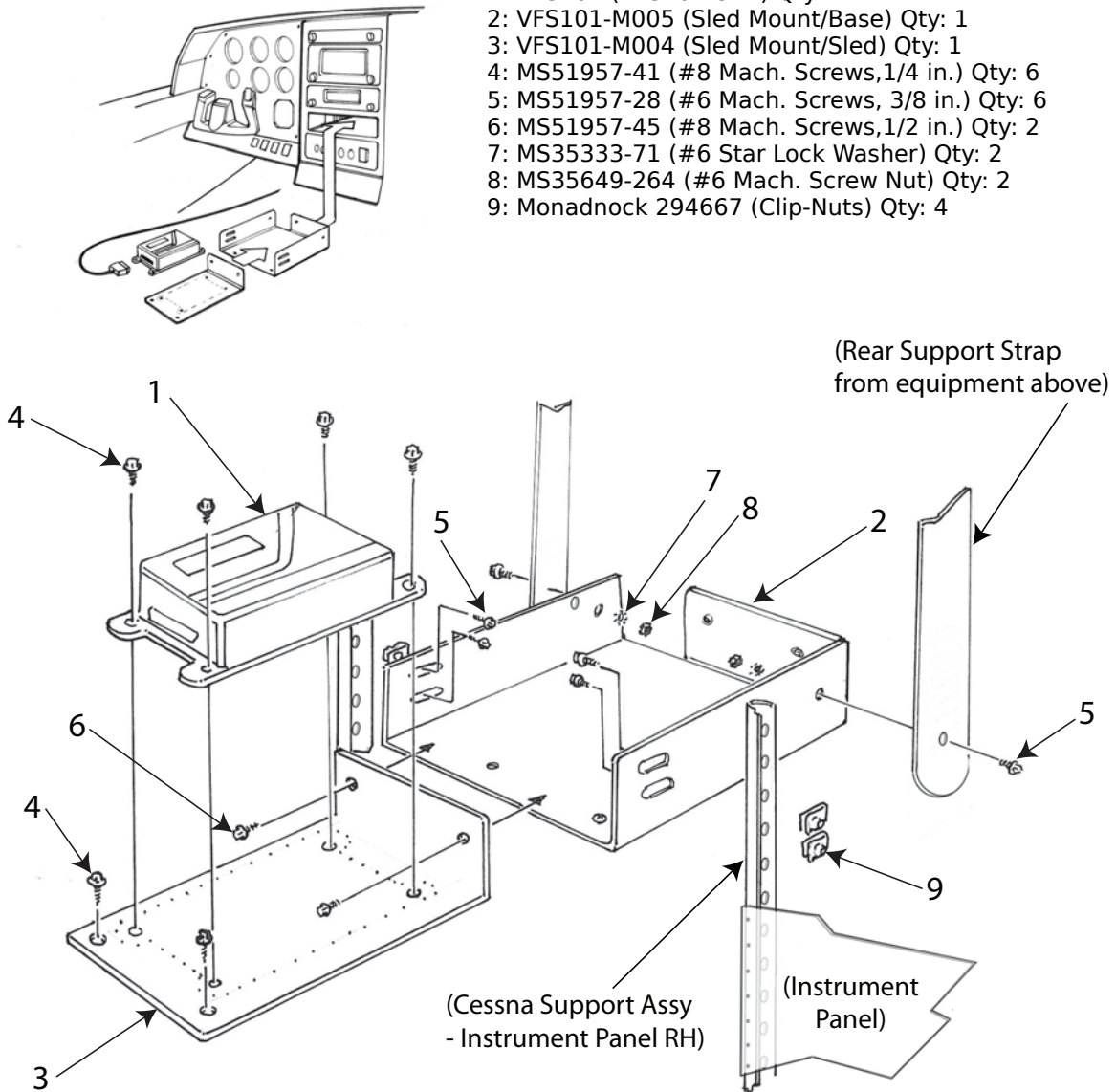
Drill two 0.144 inch holes through supporting strap into Tray (VFS101-M006) to accommodate #6 rear mounting screws.

See Appendix B for Wiring Diagram.

## Sled Mount

### Part Numbers:

- 1: VFS101 (VFS101 Unit) Qty: 1
- 2: VFS101-M005 (Sled Mount/Base) Qty: 1
- 3: VFS101-M004 (Sled Mount/Sled) Qty: 1
- 4: MS51957-41 (#8 Mach. Screws, 1/4 in.) Qty: 6
- 5: MS51957-28 (#6 Mach. Screws, 3/8 in.) Qty: 6
- 6: MS51957-45 (#8 Mach. Screws, 1/2 in.) Qty: 2
- 7: MS35333-71 (#6 Star Lock Washer) Qty: 2
- 8: MS35649-264 (#6 Mach. Screw Nut) Qty: 2
- 9: Monadnock 294667 (Clip-Nuts) Qty: 4

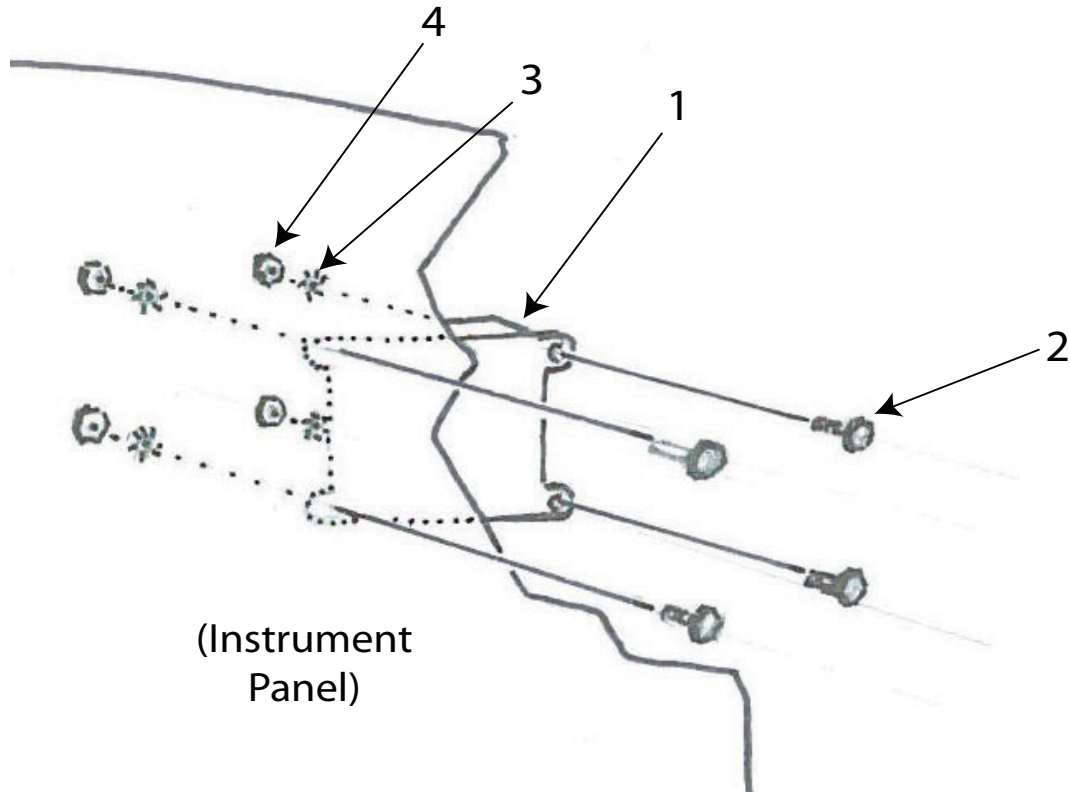


### Notes:

Drill two 0.144 inch holes through the support straps into Tray (VFS101-M005) to accommodate two #6 rear mounting screws.

See Appendix B for Wiring Diagram.

## Panel Mount



### Part Numbers:

- 1: VFS101 (VFS101 Unit) Qty: 1
- 2: MS51957-45 (#8 Machine Screw, 1/2 in). Qty: 4
- 3: MS35333-72(#8 Star Lock Washer) Qty: 4
- 4: MS35649-284 (#8 Mach. Screw Nuts) Qty: 4

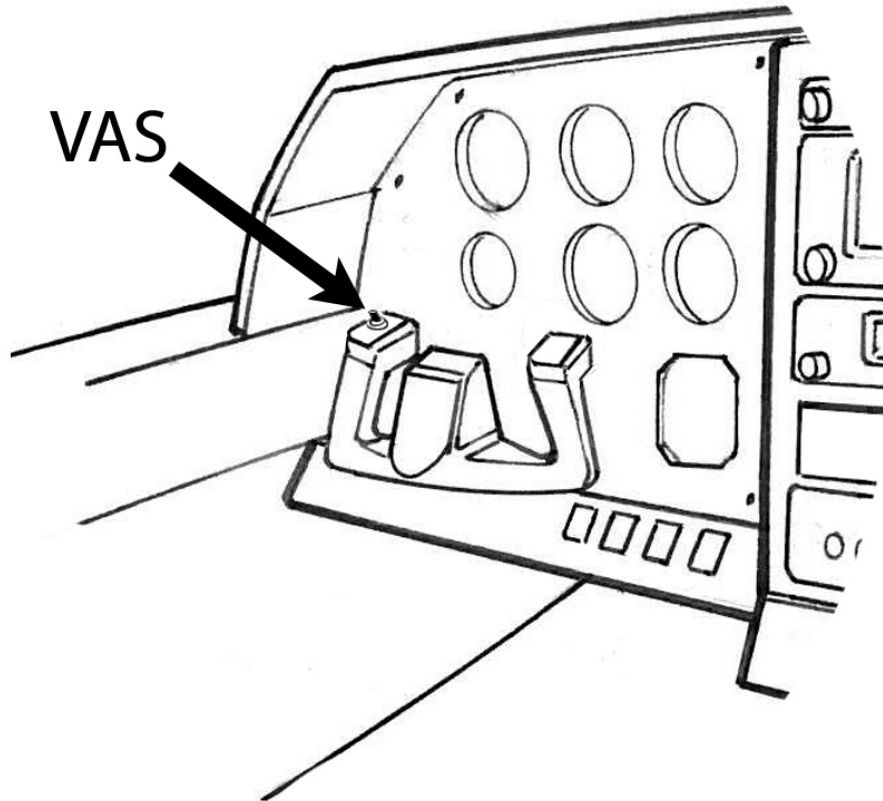
### Notes:

Install on back of unused area of instrument panel.

Minimum panel thickness: 0.024 inches. Panel Material: AL2024-T3.  
(Alternatives: AL6061-T6, AL7075-T6)

See Appendix B for Wiring Diagram.

## ***VAS Installation***



Install VAS so as not to interfere with other yoke switches  
Placard switch "VAS"  
See Appendix B for Wiring Diagram.