



US Department
of Transportation
Federal Aviation
Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020
2/28/2011

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark USA N220TG	Serial No. 3449265	
	Make Piper	Model PA-34-220T	Series
2. Owner	Name (As shown on registration certificate) AUTH DAVID C	Address (As shown on registration certificate) Address 490 S Beach Rd	
		City Hobe Sound	State FL
		Zip 33455-2705	Country USA

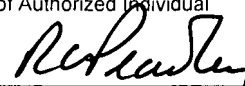
3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☒	AIRFRAME	_____	(As described in Item 1 above)	_____
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type _____ Manufacturer _____		

6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency	
Name Vero Beach Avionics, Inc.		☐ U. S. Certificated Mechanic	☐ Manufacturer
Address 2620 Airport North Drive		☐ Foreign Certificated Mechanic	C. Certificate No.
City Vero Beach State FL		☒ Certificated Repair Station	VQVR013Y
Zip 32960 Country USA		☐ Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐	Signature/Date of Authorized Individual  3/2/2011
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7. Approval for Return to Service

Pursuant to the authority given, persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ Approved ☐ Rejected

BY	FAA Flt. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee ☒	Repair Station	Inspection Authorization	

Certificate or Designation No. VQVR013Y	Signature/Date of Authorized Individual  3/2/2011
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NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N220TG

Nationality and Registration Mark

3/2/2011

Date

Installed Aspen Avionics EFD1000 PRO Primary Flight Display in accordance with the Aspen Avionics EFD1000 Installation Manual, Aspen Document # 900-00003-001 Rev U and FAA AML STC SA10822SC.

The EFD1000 PRO was mounted in the Pilot's Instrument Panel in the location previously occupied by the S-TEC ST-180 HSI System and Bendix/King KI256 Flight Director/Horizon. The Aspen Analog Converter Unit (ACU) was mounted on the forward bulkhead, forward of the instrument panel, using approved materials. The Aspen Remote Sensor Module (RSM) was mounted on the aircraft's fuselage, aft, at FS 209 in accordance with the Aspen Avionics EFD1000 Installation Manual Doc # 900-00003-001 Rev U. The EFD1000 PRO was interfaced to the #1 and #2 GNS430s and the S-TEC 55X Autopilot.

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

All work was performed in accordance with the manufacturer's installation instructions, AC43.13-1B Chapter 7 Sections 1-5, Chapter 11 Sections 1, and 3-17, and Chapter 10; and AC43.13-2B Chapters 2 and 3.

FAA Approved Flight Manual Supplement for the Aspen EFD1000 PRO, Aspen Doc 900-00008-001 Rev H dated October 5, 2010 was installed in the aircraft's Pilot's Operating Handbook. Additionally, the Aspen Avionics EFD1000 PFD Pilot's Guide, Aspen Doc No 091-00005-001 REV C was placed on board the aircraft.

Electrical system load was monitored and found not to exceed manufacturer's specifications.

Aircraft Weight and Balance and Equipment List were amended to reflect this installation.

Instructions for continuing airworthiness are attached and should be made a part of the aircraft's permanent records.

-----End-----

☐ Additional Sheets Are Attached



WEIGHT & BALANCE/EQUIPMENT LIST

REG. NO. N220TG	MODEL PA34-220T	Serial No 3449265	WORK ORDER 6640
Items: (Description / P/N / S/N)	Weight Pounds	Arm Inches	Moments Inch/Pounds
Previous Aircraft Empty Weight:	3564.63	88.61	315875.5
KI256 Steering Horizon S/N 24681	-3.3	64.25	-212.025
6443-PA Horiz. Sit. Ind. S/N 2258F	-2.9	63.4	-183.86
6444 Remote Gyro S/N 2364B	-3.4	35	-119
01171-P Slaving Panel S/N 2254	-0.1	67.3	-6.73
6446 Flux Detector S/N 419	-0.3	89.3	-26.79
Installation Hardware/wiring	-3.65	55.31	-201.8815
MD26-28 Inverter S/N H22558	-1	201	-201
4300-413 Stby Attitude Ind. S/N A11-11010	3.7	64.25	237.725
9015607 Stby Battery S/N A11-11200	0.95	61	57.95
EFD1000 Pro EHSI S/N 9055	2.9	64.25	186.325
Remote Sensor Unit S/N 11800	0.2	209	41.8
Analog Converter Unit S/N 11427	0.8	53.6	42.88
			0
			0
			0
			0
			0
Totals	3558.53		315490.8935
A. Old Empty Weight	3564.63	Pounds	
B. Old Empty CG	88.61	Inches	
C. Old Empty Weight CG Moment	315875.5	Inch/Pounds	
D. Max Gross Weight	4773	Pounds	
E. Old Useful Load	1208.37	Pounds	
A. New Empty Weight	3558.53	Pounds	
B. New Empty CG	88.65765	Inches	
C. New Empty Weight CG Moment	315490.9	Inch/Pounds	
D. Max Gross Weight	4773	Pounds	
E. New Useful Load	1214.47	Pounds	
This new weight & balance information superseads all previous weight and balance data. For aircraft loading, see instructions in Weight & Balance Section of Aircraft Flight Manual.			
FAA Form 337 Completed?	☐ Y ☐ N		
Equipment List Amended?	☐ Y ☐ N		
By: <i>Reckard</i>	Date:	3/2/2011	
Vero Beach Avionics, Inc. FAA CRS VQVR013Y			



Aspen Avionics, Inc.
5001 Indian School NE
Albuquerque, NM 87110 USA

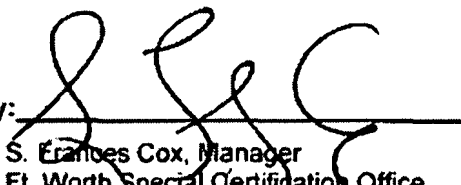
FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
ASPEN AVIONICS EVOLUTION FLIGHT DISPLAY SYSTEM
EFD1000 PRIMARY FLIGHT DISPLAY
Optionally with
EFD1000 AND/OR EFD500 MULTI-FUNCTION DISPLAYS

The information contained in this Supplement must be attached to the FAA Approved Airplane Flight Manual or placed with the Pilot's Operating Handbook or other operating information when the Aspen EFD1000 PFD and optionally the Aspen EFD1000 MFD and/or EFD500 MFD are installed in accordance with AML STC SA10822SC. This document must be carried in the aircraft at all times.

The information in this Supplement supplements or supersedes the information in the FAA Approved Airplane Flight Manual or other operating information only as set forth herein.

For limitations, procedures, and performance data not contained in this Supplement, consult the Airplane Flight Manual or other operating information.

Airplane Make: Piper
Airplane Model: PA-34-220T
Airplane Registration Number: N220TG
Airplane Serial Number: 3449265

FAA APPROVED By: 
S. Frances Cox, Manager
Ft. Worth Special Certification Office
Federal Aviation Administration
Fort Worth, TX 76137-4298

DOCUMENT REVISIONS

Document Revision	Pages Revised	Description of Change	FAA Approval Date	ECO		
()	All	Internal Release.		1775		
A	All	Initial Release for FAA Approval.	9/28/2009	1784		
B	All	Added PFD Pilot information and winds aloft speed limit.	12/10/2009	1847		
C	All	Added AMMD and Charts information to the Databases, Hazard Awareness Limitations and the Warning, Caution and Advisory Sections. Updated the software version section. Updated Acronyms and Abbreviations.	4/12/2010	1950		
D	All	Added Level B/Class III aircraft information. Clarified databases intended function. Added Ownship on instrument Approach Charts information. Improved formatting.	Not submitted	2074		
E	All	Added electronic placard information in Section.2.10. Removed ownship on instrument Approach Charts information.	7/6/2010	2092		
F	All	Added ownship on instrument Approach Charts Limitation information.	7/14/2010	2113		
G	All	Added EA100 A/P AHRS information, limitations and procedures. Added DATABASE INIT and clarified the FREE GYRO MODE annunciation in the Warning, Caution and Advisory summary.	Not submitted	2147		
H	All	Clarified paragraph 2.4, EFD1000 attitude behavior during pitot blockage. Paragraph 2.14, clarified paragraph. Paragraph 3.1, (caution statement) reworded. Paragraph 3.7, added flight director information to EA100 A/P AHRS note. Paragraph 3.10, defined "Data Bar". Paragraph 3.11, added PFD behavior with an inoperative GPS during rollout.		2251		
Prepared By:		WCB	Reviewed By:	TAG	See ECO Record For Release Authorization	

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1 General

1.1 System Overview

This Airplane Flight Manual Supplement (AFMS) applies to aircraft installations of the following possible display combinations:

- EFD1000 Level B PFD Pro (C3) or EFD1000 PFD Pro
- EFD1000 Level B PFD Pro (C3) or EFD1000 PFD Pro, and EFD500 MFD
- EFD1000 Level B PFD Pro (C3) or EFD1000 PFD Pro, and EFD1000 MFD
- EFD1000 Level B PFD Pro (C3) or EFD1000 PFD Pro, and EFD1000 MFD and EFD500 MFD
- EFD1000 PFD Pilot
- EFD1000 PFD Pilot and EFD500 MFD

The Evolution Flight Display System is a multi-display, highly capable Electronic Flight Instrument System (EFIS) with integral Micro Electromechanical Systems (MEMS)-based Air Data Attitude and Heading Reference System (ADAHRS) with either internal backup battery or external Emergency Backup Battery (EBB). The system offers a state-of-the art Primary Flight Display (PFD) with Attitude/Flight Director, and HSI/two-pointer RMI, combined with mapping, satellite weather, traffic and Stormscope® overlays. When combined with the optional EFD1000 MFD and/or EFD500 MFD, the system offers a multi-panel, Multi-Function Display (MFD) solution that displays high resolution moving maps with Jeppesen® enroute and terminal data, satellite weather information, Stormscope data, traffic sensor data, relative terrain depictions, secondary attitude information, and a secondary HSI display. In addition, at the push of a button the EFD1000 MFD can instantly revert to a fully-functional primary flight display generated from ADAHRS data completely independent of that generated by the PFD. When combined with the optional Emergency Backup Battery the EFD1000 PFD and MFD combination provides an unsurpassed level of reliability and safety, and has FAA approval to replace mechanical airspeed and altitude instruments traditionally required with previous generation EFIS systems.

The EFD1000 Pilot PFD is a Primary Flight Display (PFD) with Attitude indicator, heading indicator and moving map. The Pilot PFD does not interface with weather or traffic data, and cannot be installed with an EFD1000MFD.

The Level B EFD1000 PFD (C3) provides a higher level of software integrity, primarily for certification on higher-performance (Class III¹) aircraft. The Level B PFD does not interface with weather or traffic data, and can be installed with an EFD1000 MFD and/or an EFD500.

The EFD1000 Pilot PFD is a Primary Flight Display (PFD) with Attitude indicator, heading indicator and moving map. The Pilot PFD does not interface with weather or traffic data, and cannot be installed with an EFD1000 MFD.

The EFD500 is a fully functional MFD with all the capability of the EFD1000 MFD except reversion, HSI, Remote Sensor Module (RSM), Emergency Backup Battery, Cross Link information(receive only) and the air data, attitude and heading features.

The standard internal battery in the EFD1000 or EFD500 is capable of providing 30 or more minutes of operation at typical cockpit temperatures if aircraft power to the system fails. An optional Emergency Backup Battery (EBB) available for the EFD1000 MFD provides a guaranteed 30 minutes of emergency operation, even under extreme environmental conditions, when maintained as required by the Installation Manual (900-00003-001). Typical EBB endurance at 25°C is two or more hours, depending on the backlight intensity.

When the EFD1000 MFD with Emergency Backup Battery is used to replace backup altimeter and

¹ FAA Advisory Circular 23-1309-1D defines a Class III aircraft as typically Single Reciprocating Engine, Single Turbine Engine, Multiple Reciprocating Engine and Multiple Turbine Engine equal or over 6000 pounds Maximum Certificated Gross Takeoff Weight.

airspeed indicators the battery condition must be verified prior to each flight.

The EA100 Autopilot AHRS (A/P AHRS) optionally provides attitude information to the autopilot. When installed, the EFD1000MFD supplies the EA100 with the data used to generate the attitude solution. If an EFD1000MFD is not installed, the EFD1000 PFD supplies the data. Table 1 Installed Equipment Configuration, identifies the configuration for this aircraft.

Figure 1 provides a block diagram of a complete EFD1000/500 system installation, including optional interfaces. See section 1.2 for a list of equipment installed in your aircraft.

For detailed information on the operation of the EFD1000 PFD please refer to Aspen Avionics document 091-00005-001, EFD1000 PFD Pilot's Guide. For additional information about the EFD1000/500 MFD, please refer to Aspen Avionics document 091-00006-001, EFD1000/500 MFD Pilot's Guide. These documents must be carried in the aircraft whenever an EFD1000 PFD and/or EFD1000/EFD500 MFD are installed in the airplane.

EFD1000 Pilot Features. Refer to the Pilot's Guide for detailed information:

- Airspeed and Altitude Tapes
- Integral Altitude Alerter (visual only; no audible alert)
- Slaved heading indicator with heading Bug
- Base map with flight plan legs and waypoints
- 360° and arc view
- GPS Groundspeed, OAT and TAS
- Display of calculated winds aloft
- Integral Air data computer and Attitude Heading Reference System (ADAHRS)
- Built in backup battery and available emergency GPS
- Brilliant Display
- The Pilot can only be configured for only one GPS navigator

The EFD1000 Pro Features include the features of the EFD Pilot plus:

- Full slaved Electronic HSI with dual bearing pointers in lieu of the slaved heading indicator
- Integrates with most GA autopilot and Flight Director systems
- Dual GPS and dual VHF Nav support
- Built-in GPS Steering, (with compatible GPS navigator)
- Approach minimums alerting
- Optional Traffic and Weather interfaces
- Integration with EA100 Autopilot AHRS Adapter (A/P AHRS Adapter), providing attitude data to compatible autopilot systems. If an EFD1000MFD is installed the EA100 is connected to the EFD1000MFD. See Table 1.

1.2 Installed Equipment Configuration Matrix

The table below records the equipment and optional interfaces installed in your aircraft, and will be completed during installation by the installation facility. The table is marked with the specific equipment that is installed in your aircraft, and shows what external interfaces have been installed, such as traffic and weather, and to which EFD the data is provided.

Please refer to this sheet to determine which portions of this AFMS are applicable to your specific aircraft installation:

NOTE: These tables are to be completed by the Avionics Installer

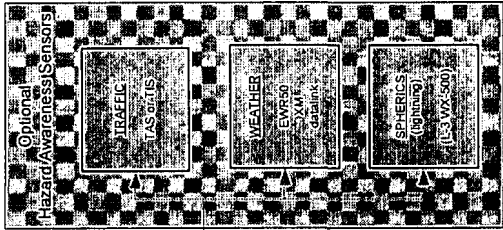
	EFD500 MFD	EFD1000 PFD PRO	EFD1000 PFD PILOT	Level B EFD1000 C3 PFD	EFD1000 MFD
Installed Evolution Flight Displays					
RSM with GPS	N/A				
RSM without GPS, top mount	N/A				
RSM without GPS, bottom mount	N/A				
EBB Emergency Backup Battery	Not Authorized	Not Authorized	Not Authorized	Not Authorized	
Traffic Interface			Not Available	Not Available	
Stormscope [®] Interface			Not Available	Not Available	
XM Weather Interface (Requires optional EWR50)			Not Available	Not Available	
Charts		Not Available	Not Available	Not Available	
EA100 Autopilot AHRS (Must be connected to the MFD when an MFD is installed. Otherwise, the EA100 is connected to the PFD)	Not Available		Not Available	Not Available	

Table 1 Installed Equipment Configuration

Backup Attitude Indicator	YES (Required)	
Backup Attitude Power Source	Emergency Backup Battery	Vacuum
Standby Airspeed Indicator	NO*	YES
Standby Altimeter	NO*	YES

Table 2 Backup Instruments Configuration

*An operational EBB Emergency Backup Battery connected to an EFD1000 MFD is required unless a standby Airspeed indicator and a standby Altimeter are installed. See Section 1.1 and Table 4.



NOTE: The EA100 (not shown) receives pitch and roll inputs from the EFD100MFD or, when an MFD is not installed, from the PFD and provides pitch and roll data to the autopilot. The Level B EFD1000 PFD is not connected to the Optional Hazard Awareness Sensors

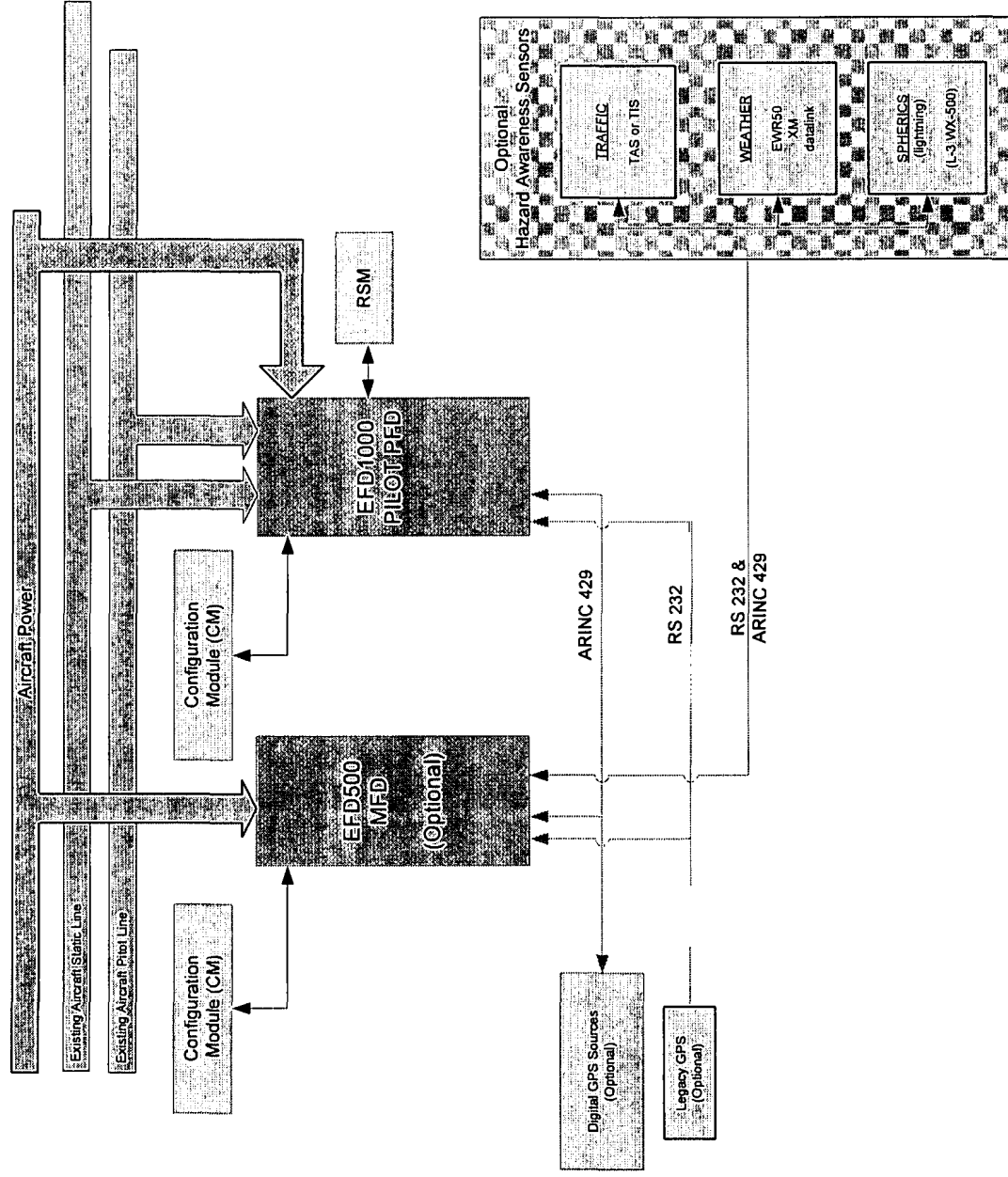


Figure 2 Block Diagram of EFD1000 Pilot PFD System with Optional EFD500

2 Limitations

2.1 Pilot's Guide

Limitation: For EFD1000 PFD installations:

- The Aspen Avionics document 091-00005-001, EFD1000 PFD Pilot's Guide, Revision C or subsequent, and the
- Aspen Avionics document 091-00014-001, Version 2.1 PFD Pilot's Guide Errata, Revision A or subsequent;

must be carried in the aircraft and available to the flight crew.

In addition, for Software version 2.2 and subsequent:

- Aspen Avionics document 091-00017-001, Pilot Guide Addendum, PFD 2.2 Software Upgrade Revision () or subsequent;

must be carried in the aircraft and available to the flight crew.

The next and later versions of the Aspen Avionics document 091-00005-001, EFD1000 PFD Pilot's Guide will incorporate the errata sheet and addendum, eliminating the requirement to carry those documents in the aircraft.

- For Level B EFD1000 C3 PFD installations, only the Aspen Avionics document 091-00019-001, EFD1000 C3 Pro PFD Pilot's Guide Revision () or subsequent must be carried in the aircraft and available to the flight crew.

The latest revision of these documents can be downloaded at the www.aspenavionics.com Customer Port or the Dealer Ramp, or contact Aspen Avionics.

Limitation: For installations that include the optional EFD1000 MFD or EFD500 MFDs;

- Aspen Avionics document 091-00006-001, EFD1000/500 MFD Pilot's Guide Revision A or subsequent, and the
- Aspen Avionics document 091-00014-002, Version 2.1 MFD Pilot's Guide Errata Revision () or subsequent

must be carried in the aircraft and available to the flight crew.

In addition, for software Version 2.2 and subsequent:

- Aspen Avionics document 091-00017-002, Pilot's Guide Addendum, MFD 2.2 Software Upgrade Revision B must be carried in the aircraft and available to the flight crew.

The next and later versions of the Aspen Avionics document 091-00006-001, EFD1000/500 MFD Pilot's Guide will incorporate the errata sheet and addendum, eliminating the requirement to carry those documents in the aircraft.

The latest revision of these documents can be downloaded at the www.aspenavionics.com Customer Port or the Dealer Ramp, or contact Aspen Avionics.

2.2 Software Versions

Limitation: The EFD1000/500 display must use the software versions listed below, or later FAA approved versions.

The EFD1000 and EFD500 use identical software source code. A license key "image" stored in the unit Configuration Module determines the associated operating mode (i.e. PFD, MFD) and enabled features (i.e. weather, traffic) of the connected EFD hardware. The EFD software version is displayed on the Main Menu System Status page. Refer to Table 1 Installed Equipment Configuration, to determine the configuration of this aircraft.

System Component	Software Name	Version 2.X Software Version (or subsequent)	Notes
EFD1000 (PFD or MFD) and EFD500 MFD	MAP	2.1	The EFD1000 PFD or MFD must be at Version 2.2.2 (or subsequent) when using the EA100 A/P AHRS
	IOP	2.0	
EFD1000 Level B Pro (PFD) C3	MAP	B2.1	
	IOP	B2.0	

2.3 Airspeed Limitation

Limitation: The maximum approved operating airspeed for this system is 270 KIAS (311 MPH IAS).

2.4 Pitot Obstruction Monitor

Limitation: For aircraft with two EFD1000 displays, an IFR GPS must be operable for dispatch under IFR.

NOTE:

This limitation applies only to aircraft with both an EFD1000 PFD and an EFD1000 MFD, regardless of the standby instrument configuration

Most light aircraft have a single pitot and static system. The pitot and static inputs are shared among the EFD1000 PFD, EFD1000 MFD, the backup altimeter and the airspeed indicator. Should pitot or static become blocked, then both the EFD1000 PFD and the EFD1000 MFD, along with any standby indicators of airspeed and altitude, could display erroneous attitude, airspeed and altitude information.

When connected to a GPS, the EFD1000 system compares airspeed and groundspeed to identify a

blocked pitot system.

The EFD1000 PFD automatically removes attitude and heading and replaces them with red-X indications shortly (~5 seconds) after the airspeed reduces to less than 30 KIAS (the EFD1000MFD will show ADAHRS FAIL). The EFD1000 attitude will gradually pitch up until the attitude indication is automatically removed. This is a detectable condition that is directly linked to the airspeed loss.

When an EFD1000 is connected to an EA100 A/P AHRS and the autopilot is engaged, a pitot block causes the autopilot to gradually pitch down until the autopilot is manually or automatically disengaged. The red-X indication and "CHECK PITOT HEAT" from the connected EFD1000 PFD (or ADAHRS FAIL from the connected MFD) will cause the autopilot to automatically disengage and the A/P AHRS FAIL lamp to illuminate. The autopilot cannot be reengaged until the attitude on the EFD1000 is restored and the A/P AHRS FAIL lamp is extinguished.

NOTE:

When the autopilot is engaged, the most apparent indication of an attitude malfunction due to a blocked pitot may be the simultaneous decrease in pitch attitude and the airspeed decreasing below expected values.

The autopilot should be manually disengaged during a blocked pitot condition. In a blocked pitot condition, the autopilot will automatically disengage five seconds after the airspeed reduces to less than 30 knots.

When the autopilot is not engaged, the most apparent indication of an attitude malfunction due to a blocked pitot may be the simultaneous change in pitch attitude indication and the airspeed decreasing below expected values.

Once the system detects that the pitot obstruction has been cleared, the "CHECK PITOT HEAT" annunciation is removed and the system automatically performs an ADAHRS in-flight reset.

Should a GPS failure be experienced in flight, the Pitot Obstruction Monitor (POM) continues to operate in a fail safe mode and will continue to detect blockages in the pitot system that might occur. The POM remains active after touchdown. As the airplane slows below 30 KIAS the system will post red-X indications in place of the attitude and heading information and display the "CHECK PITOT HEAT" message. In this circumstance, restoring the GPS system, or cycling power to the affected EFD1000 will restore normal POM operation and attitude indications.

In some aircraft with very low stall speeds it may be possible to activate the Pitot Obstruction Monitor when performing slow flight at indicated airspeeds below 30 KIAS. Under these circumstances if the groundspeed exceeds 50kts the POM will activate. Should this occur, fly by reference to the standby attitude indicator or the visual horizon. To restore normal ADAHRS operation, increase the indicated airspeed to a value greater than 30 KIAS; the affected display will then perform an automatic reset.

This Pitot Obstruction Monitor is not available in installations without a GPS. An IFR approved GPS configuration is required for installations with two EFD1000 displays or when an EA100 system is installed.

2.5 Databases (EFD1000/500 MFD Only)

There are several databases available (see Table 3). Jeppesen provides terrain, NavData®, cultural information and obstacle data. The intended function of each of these databases is to provide a background graphical depiction of the surrounding map features used to improve the flight crew awareness of the aircraft ownship position relative to other items depicted on the moving map. The background graphical depiction of the surrounding map features is not to be used for navigation and must not be used as a basis for maneuvering.

The overlaid flight plan originates from the GPS and can be used for navigation within the limitations of the GPS approval.

The EFD1000 PFD does not use a database.

Limitation: Database currency date must be acknowledged on the EFD1000 MFD and EFD500 MFD prior to each flight. Flight with an expired database is not recommended. Any out of date data displayed on the EMD must either a) be verified to be correct by the flight crew before use or b) not be used.

Limitation: Legend information, as well as climb and descent tables, MLS frequency pairing and general data that are found in the NACO paper Terminal Procedures Volumes are not provided in the Charts Database. The operator is responsible for access to this information as required by regulation.

The Jeppesen NavData[®], Cultural database and Obstacle database are all combined into a single download from Jeppesen. Terrain data is loaded at the factory and does not require periodic updating. The terrain database is available from Jeppesen.

The Terminal Procedures Charts (Charts) database updates are provided by Seattle Avionics.

Data base valid dates for Jeppesen and Charts are displayed at power up and require a pilot action to acknowledge. Database valid date information can also be accessed via the main menu of the MFD.

NOTE:

Flight with an expired database is not recommended.
An expired database does not prevent terrain or other Nav Map features from being displayed on the MFD.

Database Type	Includes	Update Cycle	Database Provider	Limitations
Terrain	High resolution terrain data for Americas, International, or Worldwide geographic regions. Terrain depiction is limited to the region between 65 deg N latitude to 65 deg South latitude	Delivered with unit, updated as desired	Jeppesen mail order	These databases are intended to improve flight crew awareness and are not to be used for navigation.
NavData	Includes NavAids, Controlled Airspace, Restricted, Prohibited and Special Use Airspace, Airports, etc.	28 day update cycle	Jeppesen JSUM [®]	
Cultural	Includes Roads, Rivers, Railroads, Political boundaries, Cities, etc.	28 day update cycle	Jeppesen JSUM [®]	
Obstacles	Includes man made obstacles greater than 250 ft. AGL. This database relies upon data reported by government agencies and may not include all obstacles due to inherent reporting and	28 day update cycle	Jeppesen JSUM [®]	

Database Type	Includes	Update Cycle	Database Provider	Limitations
	processing delays in the data. In addition, obstacle data may not be available for all regions within the data card coverage area.			
Charts	NACO Terminal Procedures Charts	28 day update cycle	Seattle Avionics	

Table 3 Database Listing and Descriptions

2.6 RSM GPS Usage (if installed)

Limitation: The RSM GPS is limited to EMERGENCY USE ONLY.

The EFD1000 RSM can optionally include a non-certified GPS receiver. This GPS can provide positioning data when all other approved sources of GPS data have failed. Position data from the RSM GPS will only become available for use following a loss of position information from all other connected GPS system(s). When the RSM GPS is in use, the current flight plan leg will be shown in white rather than magenta, and a message is presented limiting the RSM GPS to EMERGENCY USE ONLY.

2.7 Operation on Internal Battery or EBB

Limitation: Takeoff with aircraft voltage (as indicated on the EFD) below 12.3V (14V electrical system) or 24.6V (28V electrical system) is NOT AUTHORIZED.

Each EFD1000 or EFD500 is equipped with either an internal battery, or an external Emergency Backup Battery. Battery operation and logic is the same regardless of which battery is connected to your display. The Emergency Backup Battery has a wider operating temperature envelope than the internal battery, and will provide battery capacity for significantly longer than the internal battery.

The EFD system incorporates sophisticated power logic to determine when to transition to battery. On the ground, the system will turn on and turn off with the application or removal of aircraft power. In the air, the system will transition to battery if aircraft power is removed or degraded. Transition thresholds and times will vary as a function of the input voltage to the display, which can be observed via the Menu Power Settings Page. Battery operation should be expected any time the aircraft charging system is unable to maintain a voltage at the EFD of 12.3 V (14V electrical system) or 24.6V (28V electrical system). Under these circumstances, should the aircraft dispatch the EFD will transition to battery shortly after reaching flying speed.

2.8 Emergency Backup Battery (EFD1000 MFD Only)

Limitation: Dispatch when EBB charge status of less than 80% is NOT AUTHORIZED if the EBB is required by the KOEL in section 2.13.
Dispatch with a cabin temperature below -20°C is NOT AUTHORIZED if the EBB is required by the KOEL in section 2.13.

The Emergency Backup Battery is an approved emergency power source for the EFD1000 MFD. When installed, the EBB enables the EFD1000 MFD to be the approved backup instrument to the EFD1000 PFD, and authorizes removal of independently-powered standby airspeed and altitude instruments. When maintained in accordance with the Installation Manual (annual check and scheduled replacement

per 900-00003-001) and the EFD1000 MFD shows a charge status of 80%, the EBB will provide at least 30 minutes operation when cold-soaked to -20°C and the display is operated at the default maximum backlight intensity. Battery operation below this temperature is not assured. The EBB charge status must be verified prior to each flight where the EBB is required by the KOEL in section 2.13. The minimum dispatch limit is 80% when the EBB is required.

At cold temperatures it takes 10 minutes for the EFD1000 system to calculate an accurate EBB charge status. On the ground when the battery is colder than 0°C, a timer will run for 10 minutes before EBB charge status is displayed. In the air, the charge status will be indicated after a 15 second delay. When the battery is cold (<0°C) the % remaining value will initially decrease rapidly for several minutes, but will subsequently increase and stabilize at the correct value. This stabilization process may take as long as 10 minutes. During this period the pilot should consider the charge status determined during the pre-flight checks to be the battery charge state.

NOTE: The limitations in this section apply only to those installations with an EBB installed without standby airspeed and altitude instruments. See section 2.12.7 for the Kinds of Operation Equipment List.

2.9 Geographic Limitation

Limitation: Use of the EFD1000 for IFR operations in the region within 750 nautical miles of the magnetic North or South Pole, based solely upon the attitude and heading data provided by the EFD1000, is NOT AUTHORIZED.

The ADAHRS solution in the EFD1000 uses multiple inputs, including the earth's magnetic field, to determine aircraft heading, pitch and roll. The system must be able to periodically sense the earth's magnetic vector to be able to correctly resolve heading and stabilize the ADAHRS attitude solution.

All magnetic sensors, including the one in the EFD1000, will experience degraded performance in the vicinity of the earth's magnetic poles. When the horizontal component of the earth's magnetic field is no longer strong enough to provide reliable heading data, the EFD1000 will detect this condition and compensate for the reduced magnetic fields. The system can continue to operate for a short time without reference to magnetic North, but must be able to periodically resolve the magnetic vector to continue operations.

If the EFD1000 is unable to resolve the earth's magnetic field for two minutes, the system will switch to and annunciate Free Gyro Mode. In this mode, the ADAHRS continues to provide attitude and heading data based on gyro-only operating logic. This will be accompanied by a "FREE GYRO MODE" message posted on the HSI, and a "CROSS CHECK ATTITUDE" annunciation posted on the attitude indicator. Under these circumstances, increased vigilance and instrument cross check is required.

If the weak magnetic conditions persist, and the EFD1000 is unable to resolve the magnetic vector for six minutes or greater, then the attitude and heading solution will be considered failed and will be removed (i.e. red X indication). The ADAHRS solution will automatically restore once the magnetic vector can again be resolved.

Within a region approximately 750 nautical miles from the magnetic pole, the conditions described above are expected to be persistent. In the Northern Hemisphere, this distance approximately equates to operations in the Arctic Islands found north of continental North America.

2.10 Placards and Decals

When the EBB has been installed and independently-powered airspeed and altitude instruments have been removed, the following placard must be shown on the instrument panel in plain view of the flight crew:

**EMER BAT DISPATCH LIMIT 80%
SEE EFD AFMS**

The following electronic placard is displayed during initialization of the MFD:

CAUTION:
Terrain Information for Awareness Only. Do not Maneuver Based Solely on this Information.

The aircraft ownship position presented on Instrument Procedure Charts and Airport Diagrams may be inaccurate - reference to ownship position for navigation or maneuvering is prohibited.

When an EA100 A/P AHRS is installed an amber annunciator lamp is installed in the Pilot's Primary Field of View. The lamp is labeled with the following:

A/P AHRS FAIL

2.11 Seaplane Operation

Limitation: If the ADAHRS is unable to align due to wave action, departure under IMC or IFR is PROHIBITED.

The EFD1000s may not be able to align when on water as a function of the wave action being experienced by the aircraft. When aligning on water, always perform a visual verification of the attitude reference with a secondary source, such as a mechanical gyro or the horizon. If the alignment is not successful, it is acceptable to depart under VFR/VMC and, while maintaining VFR/VMC, perform an ADAHRS in-flight alignment per Section 3.5.

2.12 Hazard Awareness Limitations (EFD1000 PFD PRO and MFDs ONLY)

2.12.1 Terrain and Obstacle Display Limitation (MFD):

Limitation: Maneuvering based solely on the EFD1000 terrain and obstacle display is NOT AUTHORIZED. Pilot in command has the responsibility to see and avoid terrain and other obstacles.

The EFD1000/500 MFD display of terrain and obstacle information is advisory only. In addition, the system does not provide terrain or obstacle alerts. Not all obstacles within a given region will be charted. The pilot is responsible for terrain and obstacle avoidance by visual means, or by following approved instrument procedures. At system start up the pilot must acknowledge this operational limitation by pressing either knob.

2.12.2 Traffic Display Limitation:

Limitation: Maneuvering based solely on the EFD1000 traffic display is NOT AUTHORIZED. Pilot in command has the responsibility to see and avoid traffic.

The EFD1000/500 MFD and EFD1000 PFD will display traffic information when connected to a TIS or TAS system. Traffic information is presented to assist the pilot in visually identifying nearby aircraft.

2.12.3 XM Datalink Information Limitation:

Limitation: Datalink information (e.g. NEXRAD, METAR, TFR, etc.) shown on the PFD or MFD displays is supplemental to data available from official sources.

The EFD1000/500 MFD and EFD1000 PFD may be connected to an optional EWR50 XM weather receiver. Datalink information displayed on the EFD1000 system is supplemental to the out of the cockpit view and weather information from approved sources.

The XM service and reporting area includes the United States, Southern Canada and Puerto Rico.

The maximum wind speed capable of being shown is 180 knots. Wind speeds greater than 180 knots will be shown as 180 knots.

2.12.4 Electronic Map Display Limitation:

Limitation: The EFD1000/500 moving map display is not a substitute for approved maps or charts required by the operating rules.

The EFD1000 Moving Map Display is not a substitute for approved aeronautical maps or charts from approved sources. Approved maps and charts must be carried in the aircraft, as required by the applicable operating regulations.

2.12.5 Aerodrome Moving Map Display (AMMD) Limitation:

Limitation: The aircraft ownship position presented on the Airport Diagrams may be inaccurate – reference to ownship position for navigation or maneuvering is prohibited.

The intended function of Aerodrome Moving Map Display (AMMD) is to help flight crew orient themselves on the airport surface and improve pilot positional awareness during taxi operations. AMMD function is not sufficient to be used as the basis for maneuvering and shall not be used for navigation.

This EFB AMMD with an aircraft ownship position symbol is designed to assist flight crews in orienting themselves on the airport surface to improve pilot positional awareness during taxi operations. The AMMD function is not to be used as the basis for ground maneuvering. This application is limited to ground operations only.

This function is a Class 3 Electronic Flight Bag Type C application. See FAA AC 91-78 for more information.

The intersection of the wings and fuselage of the aircraft ownship symbol on the AMMD corresponds to the ownship's actual position.

2.12.6 Terminal Procedures Charts ("Charts"), no Ownship Depiction Limitation

Limitation: Except as provided for by regulation, the Terminal Procedures Charts depictions on the EFD are not substitutes for aeronautical charts required to be carried aboard the aircraft. This function does not replace any system or equipment required by the regulations.

The intended function of the Terminal Procedures Charts depiction without the aircraft ownship depicted on the chart is to provide a convenient location to view portions of the Terminal Procedures Charts information.

The Terminal Procedures Charts depiction is not sufficient to be used as the basis for maneuvering and must not be used for navigation.

This function is a Class 3 Electronic Flight Bag Type B application. For most 14 CFR Part 91 operations, the in-flight use of an Electronic Flight Bag/Electronic Chart Display in lieu of paper reference material is the decision of the aircraft operator and the pilot in command. For Part 91 subpart K, Part 91 subpart F and Part 135, Part 121 and Part 125 operations, consult your Operating Specifications. See FAA AC 91-78 for more information.

2.12.7 Terminal Procedures Charts ("Charts") with Ownship Depiction Limitation

Limitation: The aircraft ownship position presented on the Terminal Procedures Charts may be inaccurately portrayed due to errors in the charts – reference to the ownship position for navigation or maneuvering is prohibited.

Limitation: Except as provided for by regulation, the Terminal Procedures Charts depictions on the EFD are not substitutes for aeronautical charts required to be carried aboard the aircraft. This function does not replace any system or equipment required by the regulations.

The intended function of the display of terminal procedures with the ownship position is to provide a graphical depiction of the approach chart used to improve the flight crew awareness of the aircraft ownship position relative to other items depicted on the chart.

The Terminal Procedures Charts depiction is not sufficient to be used as the basis for maneuvering and must not be used for navigation.

2.13 Kinds of Operations Equipment List (KOEL)

The EFD1000/500 system must be installed and maintained in accordance with the STC. The system is approved for day/night IFR and VFR operations in accordance with 14 CFR Parts 91. The system is generally suitable for Part 135 operations, but must be evaluated in accordance with the regulations and the limitations of the Part 135 certificate.

Table 4 below shows the minimum equipment required for dispatch based on the kind of flight operation being conducted. Any other system limitations, such as the minimum battery charge detailed within this AFMS, must also be adhered to when that equipment is required for the kinds of flight operation being conducted.

The minimum equipment required for dispatch, based on the kind of flight operation conducted, must include all of the components shown in at least one of the columns in Table 4. If all of the equipment in a particular column is installed and serviceable, then the type of operation indicated at the top of that column is authorized.

Additionally, VFR day/night operations are authorized with any of the minimum IFR equipment

configurations.

For example, in a single PFD installation, if the PFD is inoperative, but a whiskey compass, altimeter and airspeed indicator are available, then the flight may proceed if conducted under day/night VFR.

NOTE: The numbers in the table refers to the quantity of items required.

Kinds of Operations Equipment Requirements (see 14 CFR Part 91.213(d))	Day VFR	Day/ Night VFR	Day/ Night VFR	IFR	IFR	IFR
EFD1000 PFD	1	1		1	1	1
EFD1000 MFD with EBB		1		1		
EFD1000 MFD with Internal Battery					1	
Magnetic Compass	1	1	1	1	1	1
Standby Attitude Indicator				1	1	1
Standby Airspeed Indicator			1		1	1
Standby Altimeter			1		1	1
IFR Approved GPS				1	1	
Analog Converter Unit	As needed for navigation. Deactivated and placarded if inoperative and not required					

Table 4 - Kinds of Operations Equipment List Pertaining to the EFD 1000 systems.

2.14 EA100 Autopilot AHRS Limitations

The EA100 Autopilot AHRS (A/P AHRS) optionally provides attitude information to the autopilot. When installed, the EFD1000MFD supplies the EA100 with the data used to generate the attitude solution. If an EFD1000MFD is not installed, the EFD1000 PFD supplies the data. Table 1 Installed Equipment Configuration, identifies the configuration for this aircraft.

An amber panel annunciator labeled A/P AHRS FAIL illuminates, the autopilot automatically disconnects and the flight director biases out of view when any of the following conditions exist:

- The EA100 A/P AHRS detects an internal failure
- Power is removed from the EA100 A/P AHRS
- When the EFD1000 connected to the EA100 is turned off
- The EFD1000 PFD connected to the EA100 A/P AHRS displays an ATTITUDE FAIL (red-X) indication (A CROSS CHECK ATTITUDE condition does not cause an A/P AHRS FAIL annunciation)
- The EFD1000 connected to the EA100 A/P AHRS is manually reset (this also resets the A/P AHRS)
- The EFD1000 MFD connected to the EA100 A/P AHRS displays an ADAHRS FAIL indication (A CHECK AHRS annunciation on the EFD1000 MFD does not disconnect the autopilot or cause an A/P AHRS FAIL annunciation)

The autopilot and the flight director cannot be restored until the A/P AHRS annunciator is extinguished. It is possible to activate the autopilot/flight director modes using the Autopilot Mode Controller or CWS, however the only response will be illumination of the corresponding elements on the Mode Annunciator Panel until the A/P AHRS annunciator is extinguished.

3 Emergency and Abnormal Procedures/Conditions

3.1 Pitot/Static System Blockage

If a blocked pitot or static line is suspected or annunciated, proceed as follows:

PITOT HEAT.....	ON
ALTERNATE STATIC SOURCE	SELECT OPEN
AUTOPILOT	MANUALLY DISCONNECT
NOTE: For installations with the EA100 A/P AHRS, the autopilot will automatically disconnect five seconds after the indicated airspeed decreases below 30 knots.	
ATTITUDE	Maintain straight and level flight by reference to standby sources of attitude.
Consider exiting IMC	

CAUTION:

Most light aircraft have only a single pitot and static pneumatic system available for flight instrument use. Should the static line become blocked, the standby and the EFD1000 (PFD and MFD) altimeters and airspeed indicators will be erroneous. If the pitot line is blocked, the airspeed indication will be erroneous on all indicators. The EFD1000 (PFD and MFD) also uses pitot and static pressures as part of the attitude and heading solution. Loss or corruption of this data will affect the accuracy or availability of attitude and heading information. For installations with GPS, if the pitot system is blocked in flight, the EFD1000 PFD will present red "X"s over the attitude and heading indicators, and display an amber "CHECK PITOT HEAT" annunciation. The EFD1000 MFD will display an amber "ADAHRS FAIL" annunciation. For installations with the EA100 A/P AHRS, the ATTITUDE FAIL (red-X) condition resulting from a CHECK PITOT HEAT indication on the EFD1000 will cause the autopilot to automatically disconnect.

3.2 CROSS CHECK ATTITUDE Message

Persistent or frequent CROSS CHECK ATTITUDE annunciations during normal maneuvers are indicative of a degraded ADAHRS solution. CROSS CHECK ATTITUDE on the EFD1000 does not cause an autopilot disconnect.

ATTITUDE	Maintain by reference to other instruments or the visible horizon
Consider exiting IMC	

NOTE:

The CROSS CHECK ATTITUDE message indicates that the statistical confidence in the ADAHRS solution is degraded. Momentary annunciations may be seen during aggressive maneuvers, such as 60 deg turns or aerobatics, which are normal.

3.3 ADAHRS Attitude Disagreement

Should differences be observed between one or more EFD1000 displays and/or the standby instruments, monitor all available attitude, airspeed, and altitude information to diagnose faulty indicator(s).

ATTITUDE	Maintain straight and level flight
If an EFD1000 ADAHRS is suspected as faulty, proceed as follows:	
AUTOPILOT	MANUALLY DISCONNECT
MENU	Select "GENERAL SETTINGS" Page
"ADAHRS: RESET?" LINE SELECT KEY	PRESS
"ADAHRS: RESET?" LINE SELECT KEY	PRESS AGAIN TO CONFIRM RESET
Consider exiting IMC	

CAUTION:

The EFD1000 PFD and MFD may share a common pitot/static system and their otherwise independent attitude solution may be similarly affected by pitot/static faults.

3.4 MFD Reversionary Mode Operation (EFD1000 MFD only)

To select REV mode, proceed as follows:

EFD1000 MFD REV Button	MOMENTARY PRESS
REVERSIONARY PFD Display	Configure as desired
BARO SETTING	Verify

NOTE:

Pressing and holding the REV key for 5 seconds will shut off the unit. The REV button is located on the EFD bezel, marked with "REV" in red text.

NOTE:

When reversion mode is selected, verify that the display is configured as necessary. Items to consider include Baro Setting, Altitude Bug, Airspeed Bug, Minimums, CDI Nav Source, Selected Course and Heading, ARC/360 Mode, Map configuration, Weather, Traffic and Lightning overlays, etc.

In the unlikely event of a failure of the PFD, including the loss of ADC or ADAHRS functions, the EFD1000 MFD can revert to PFD operation. With a single press and release of the red text REV key located on the MFD bezel the MFD will immediately change to the PFD operating mode. To return to the MFD operating mode, press the REV key again. In the MFD Reversionary PFD mode, operation is identical to the PFD except the optional tone generator does not function. In addition, selection of the REV mode does not switch autopilot outputs to the MFD. Rather, autopilot outputs remain connected to the EFD1000 PFD. If the PFD is failed, autopilot operation may be unavailable or limited.

Information that is not related to Primary Flight Information (e.g. navigation configuration data such as navigation source, selected course, selected heading, altitude bug, minimums bug, airspeed bug) is not passed between the displays, and, therefore, must be configured or verified by the pilot, as necessary, prior to entering critical phases of flight. After configuring the MFD REV mode, the unit may be returned to normal MFD operation. This simple step will ensure that the MFD is ready to assume all of the duties performed by the PFD should that equipment experience a failure.

3.5 In-Flight ADAHRS Reset

To reset an EFD1000 ADAHRS proceed as follows:

ATTITUDE	MAINTAIN STRAIGHT AND LEVEL FLIGHT by visual reference, or by standby instruments
AUTOPILOT	MANUALLY DISCONNECT
MENU	Select "GENERAL SETTINGS" Page A
"ADAHRS: RESET?" LINE SELECT KEY	PRESS
"ADAHRS: RESET?" LINE SELECT KEY	PRESS AGAIN TO CONFIRM ADAHRS RESET
	Activate any other control to cancel the reset

NOTE:

When an EFD1000 ADAHRS is manually reset in flight, it performs an abbreviated initialization that usually takes less than 30 seconds.

During the initialization, the attitude and direction information are removed and replaced with red "X"s and the annunciations, "ATTITUDE FAIL" and "DIRECTION INDICATOR FAIL" are presented.

Gentle maneuvering during the initialization is permitted.

The ADAHRS reset is considered complete when the EFD1000 attitude and heading are once again displayed and the attitude display is stable and correct with respect to other sources of attitude information.

When the EFD1000 connected to the EA100 A/P AHRS is reset, A/P AHRS will also reset, the autopilot will disconnect and the A/P AHRS FAIL annunciation on the instrument panel will illuminate. The annunciation will extinguish when the A/P AHRS reset is complete.

The EFD1000 ADAHRS is normally stable, self-correcting, and accurate. The pilot may elect to manually reset it if pitch and roll indications disagree with the standby attitude indicator, or the ADAHRS is suspected to be inaccurate (e.g., following aerobatic maneuvers). The ADAHRS reset function is analogous to "caging" a gyroscopic attitude indicator.

3.6 Alternator or Generator Failure, or ON BAT Annunciation

UNRESTORABLE LOSS OF EXTERNAL POWER IS AN EMERGENCY SITUATION

Electrical System Follow AFM procedures to restore power

If unable to restore aircraft alternator or generator

EFD1000/500 Circuit Breaker / Switch OPEN for each display

LAND AS SOON AS POSSIBLE

CAUTION:

If the aircraft alternator or generator fails and the EFD is operated until its battery is exhausted, the screen may fade to solid white for several seconds before blanking. To avoid this condition at night, manually turn off the EFD once the display shows 0% battery remaining.

NOTE:

The internal battery normally provides 30-60 minutes of operation at 20°C and warmer. At very cold temperatures internal battery operation is not assured.

The Emergency Backup Battery will provide at least 30 minutes of operation with 80% indicated charge when at -20°C. A fully charged EBB at +20°C or warmer will typically provide power for two or more hours of operation.

When operating "ON BAT" the maximum "auto" backlight setting is 40% and the maximum manual backlight setting is 70%. Changing the backlight setting changes battery endurance, reflected by the % remaining indication.

A fully charged battery will indicate a charge level of 99% for some time before beginning to show discharge. Once discharge is indicated the charge level will decrease in a steady manner with a slight acceleration nearing 0%.

The "ON BAT" annunciation and estimated charge remaining, is displayed in the upper half of each EFD whenever the system is operating from battery.



The internal battery (or EBB) provides power for both the EFD and optional RSM GPS.

If aircraft generated power to the EFD is degraded or fails, such as from an aircraft alternator or generator failure, each EFD will begin an automatic load-shed routine, and will disconnect from the power bus two minutes after input power degrades, or immediately if the input power fails.

To complete the load-shed process, the pilot must open each EFD Circuit Breaker / Switch. This may be done as soon as the degraded power is noticed.

These actions prevent the EFD from automatically restarting from connected external power should the flight continue until the EFD battery is fully depleted. If it is desired to reconnect the EFD to the aircraft power bus, close the associated Circuit Breaker / Switch and select EXT Power from the Power Settings Menu.

3.7 Abnormal Shutdown Procedure

In the event of an EFD malfunction requiring in-flight shut down of the equipment, proceed as follows

EFD1000 MFD (with EBB)

EFD Circuit Breaker / Switch OFF / PULL

EBB Disconnect Switch DISC

- OR -

EFD1000/500 display with internal battery

EFD Circuit Breaker / Switch OFF / PULL

REV Button PUSH AND HOLD UNTIL
DISPLAY BLANKS

NOTE:

Heading and navigation inputs to the autopilot are provided by the PFD.
Turning off the PFD may affect selected or available autopilot modes.

NOTE:

For installations with the EA100 A/P AHRS, turning off the EFD1000
connected to the EA100 will cause automatic disconnection of the autopilot
and removes the flight director display on the remaining EFD1000.

NOTE:

Each EFD 1000/500 has a labeled circuit breaker and optional master switch
or a combined circuit breaker / switch. These switches are mounted on or
adjacent to the instrument panel and within the pilot's reach.

3.8 EBB Disconnect (EFD1000 MFD only)

To isolate the EBB in the event of an EBB or EFD1000 MFD malfunction, proceed as follows:

EBB Switch Select DISC

NOTE:

When in the “DISC” position, the EBB isolation relay is powered from the EBB. When the switch is in the disconnect position the Emergency Backup Battery will gradually discharge.
--

The EBB is protected by thermal and short-circuit sensing circuitry to prevent battery overheating or damage. The battery is normally connected to its EFD1000 MFD. If it is desired to remove battery power from the EFD1000 MFD, or to otherwise isolate the EBB, the EBB includes an externally activated isolation relay integral to the EBB aluminum housing. This relay is activated by the EBB Disconnect switch installed in the instrument panel.

The EBB Emergency Disconnect switch is either a guarded or lever-lock switch mounted on or adjacent to the instrument panel and within the pilot’s reach. The switch should be left in the NORM position at all times, including when away from the aircraft. When it is desired to disconnect the EBB from the EFD1000 MFD display, move the switch to the DISC position.

3.9 Power Override

In the event that the pilot wishes to override the automatic power configuration of the equipment, proceed as follows:

MENU	“POWER SETTINGS” Page
<u>To switch FROM aircraft power to Battery:</u>	
“BATTERY” LINE SELECT KEY	PRESS
<u>To switch FROM Battery TO aircraft power:</u>	
“EXT PWR” LINE SELECT KEY	PRESS

3.10 EFD1000/500 Intercommunications Failure

In the event of a "CROSS LINK FAILURE" message, verify that barometric altimeter setting information is correctly transferred between the displays. On the EFD1000 MFD, the barometric altimeter setting can only be set from the MFD REV mode.

BARO SETTING	VERIFY
If EFD1000 Baro Setting must be set	
EFD1000 MFD REV Button	PRESS TO DISPLAY PFD
BARO SETTING	SET

CAUTION:

Relative terrain is based on the barometric altitude from the EFD1000 displays. BARO setting may not be shared between the EFD1000 displays during this Cross Link Failure condition. It is necessary to set BARO individually on both EFD1000 displays to prevent the display of erroneous relative terrain. The Barometric Pressure Setting is shown on the EFD1000/500 MFD Data Bar*.
--

An intercommunications link exists between the EFD1000 PFD, EFD1000 MFD, and EFD500 MFD to share various information, including barometric setting, heading, airspeed and altitude information. The EFD1000 PFD and EFD1000 MFD both receive and transmit data to each other, and each also transmits data to the EFD500 MFD. The EFD500 MFD only receives data, but does so from each installed EFD1000 display.

In the event of an intercommunication failure between the EFD1000 PFD, EFD1000 MFD, or EFD500 MFD, a CROSS LINK FAILURE annunciation will be presented in the affected PFD/MFD's Data Bar. When this occurs, the altimeter's barometric pressure setting may not be communicated between EFDs. It will be necessary to confirm if the baro setting information is being transferred. If it is not, the pilot should manually adjust the BARO setting on the affected display. For the EFD1000 MFD, this is accomplished in the PFD Reversion Mode.

In a three display configuration it is possible for the EFD500 MFD to display this message, but still maintain synchronization. This indicates that only one of the intercommunications buses to the EFD500 has failed.

3.11 Loss of GPS information

CAUTION:

In the event of complete GPS failure, the Nav Map stops moving and orients North Up, the airplane symbol is removed and reverts to a stationary map with an accompanying "GPS POS FAILED" annunciation. In this case, the Nav Map may be manually panned to correlate to the estimated aircraft position determined by other means.
--

* The Data Bar is a segment of the MFD that shows barometric pressure, waypoint information, GPS selection and track direction information.

Position and flight plan data for the PFD and MFD is provided from aircraft GPS equipment. The EFD displays may be configured to receive data from one or two external GPS systems. In addition, when an RSM connected to the EFD includes an emergency GPS, this information may be used if the aircraft GPS system(s) fail.

The Nav Map function in either the PFD or MFD follows an automatic position reversion scheme to determine which GPS is the position source for the map. The primary GPS is always the one selected by the pilot, either by the associated CDI nav source (PFD), or via the menus (MFD). If the selected GPS fails, the EFD automatically switches to another GPS (when installed), and will annunciate "GPS# Reversion", where # represents the GPS source providing position data.

If all external GPS systems fail, and an RSM GPS is connected to that display, the EFD will use position data from the RSM and annunciate RSM GPS REVERSION EMER USE ONLY." In this case, the map data is approved for emergency use only.

Whenever the map has reverted to an alternate position source, all map features and capabilities are retained, including the display of the flight plan from the selected GPS. However, when the GPS position source is different from the source that generated the flight plan, the flight plan is presented without showing an active (magenta) leg. The flight plan and map data from each external GPS is retained independently. If two external GPS were connected prior to, and if each had a different flight plan at the time of failure, both of these flight plans are retained and can be viewed by the pilot.

In the unlikely event that there is a complete loss of all GPS data to an MFD, including loss of the RSM GPS (if installed), the NAV Map is retained, the flight plan is removed, and the map is no longer updated with aircraft position information. An annunciation of "GPS POS FAILED" is presented in the center of the map, the airplane symbol is removed, the map changes to a North-up orientation and the map will no longer move with the aircraft. Manual panning is still possible and all map features that are not GPS position dependent continue to remain available, including relative terrain overlays. GPS groundspeed is compared to airspeed to determine if a pitot blockage has occurred. When the GPS is inoperative, the attitude and heading indications will be replaced by red-X indications when the aircraft slows after landing.

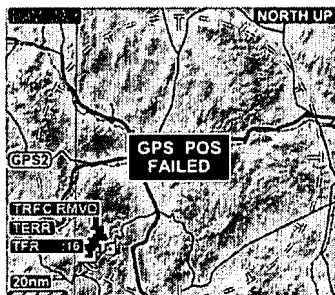


Figure 3 GPS POS FAILED indication

3.12 Loss of MFD Database Card

Each EFD1000 MFD and EFD500 MFD includes a microSDHC (SD card, High Capacity) card slot into which a database card with terrain and Nav Map data may be inserted. The database card must remain in the EFD display as data is dynamically loaded from the microSDHC into the EFD memory during flight as the aircraft position changes.

In the event that the microSDHC database card is removed from the card slot, or communications with the card fails, the MFD will continue to operate using the last data that was loaded into memory. As the aircraft position changes, the software will attempt to access the data card to retrieve additional data for

the new location. When this occurs, if the data card cannot be detected, an annunciation of "DATABASE FAILURE" is displayed at the bottom of the Nav Map. When this occurs the previously loaded data remains available, but new data information (such as roads, rivers, nav aids, and detailed terrain data that has not yet been loaded into memory) will not be available to add to the navigation map.

When the data card is restored, restarting the EFD will reinitialize the database.

3.13 Automatic Autopilot Disconnect (EA100 A/P AHRS Installations)

An amber panel annunciator labeled A/P AHRS FAIL illuminates and the autopilot automatically disconnects when any of the following conditions exist:

- The EA100 A/P AHRS detects an internal failure
- Power is removed from the EA100 A/P AHRS
- When the EFD1000 connected to the EA100 is turned off
- The EFD1000 PFD connected to the EA100 A/P AHRS displays an ATTITUDE FAIL (red-X) indication (A CROSS CHECK ATTITUDE condition does not cause an A/P AHRS FAIL annunciation)
- The EFD1000 connected to the EA100 A/P AHRS is manually reset (this also resets the A/P AHRS)
- The EFD1000 MFD connected to the EA100 A/P AHRS displays an ADAHRS FAIL indication (A CHECK AHRS annunciation on the EFD1000 MFD does not disconnect the autopilot or cause an A/P AHRS FAIL annunciation)

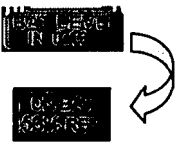
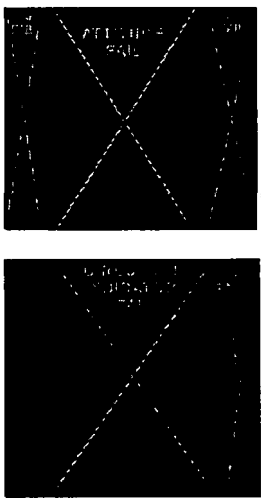
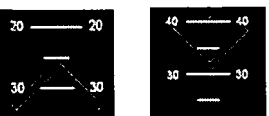
The autopilot cannot be re-engaged until the connected EFD1000 attitude resets and the amber A/P AHRS annunciator lamp is extinguished.

3.14 Warning, Caution, and Advisory Summary

Warning **W**

Caution **C**

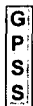
Advisory **A**

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
W	✓	✓	✓	✓	✓		Red annunciations presented whenever the EFD1000 is operating on the internal or EBB. The countdown timer appears first, and is then replaced by the ON BAT and % charge annunciation
W	✓	✓	✓	✓			Red-X annunciation presented whenever the EFD1000 determines that the associated function is invalid or failed. On the EFD1000 MFD SAI and SHSI, only the "ATTITUDE FAIL" and DIRECTION INDICATOR FAIL" annunciations are presented. These indications are also presented when the ADAHRS system is re-initializing after a manual or automatic reset. Fly by reference to standby sources of attitude, altitude and airspeed, such as the EFD1000 MFD, standby instruments, or the visible horizon. In this circumstance GPSS operation is still possible. In addition, the LDI and VDI will continue to remain available and display either GPS approach lateral and vertical deviations, or localizer lateral deviation information, which may be manually flown. For installations with the EA100 A/P AHRS, all conditions that result in a red-X annunciation automatically disconnect the autopilot.
W	✓	✓	✓	✓			Red chevrons displayed on the Attitude Indicator's pitch scale to indicate extreme pitch up and down attitudes and the appropriate fly-to direction to restore level flight.

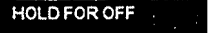
	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
						 A/P AHRS Fail or A/P AHRS FAIL	An amber panel annunciator labeled A/P AHRS FAIL illuminates and the autopilot automatically disconnects when any of the following conditions exist: • The EA100 A/P AHRS detects an internal failure • Power is removed from the EA100 A/P AHRS • When the EFD1000 connected to the EA100 is turned off • The EFD1000 PFD connected to the EA100 A/P AHRS displays an ATTITUDE FAIL (red-X) indication (A CROSS CHECK ATTITUDE condition does not cause an A/P AHRS FAIL annunciation) • The EFD1000 connected to the EA100 A/P AHRS is manually reset (this also resets the A/P AHRS) • The EFD1000 MFD connected to the EA100 A/P AHRS displays an ADAHRS FAIL indication (A CHECK AHRS annunciation on the EFD1000 MFD does not disconnect the autopilot or cause an A/P AHRS FAIL annunciation) Illumination of the annunciator indicates that the autopilot cannot be engaged.
C	✓	✓	✓	✓		CROSS CHECK ATTITUDE	Amber annunciation centered in the upper half of the attitude indicator whenever the EFD1000 ADAHRS internal integrity monitor determines that attitude is potentially degraded. If a steady CROSS CHECK ATTITUDE annunciation is presented, cross check attitude, airspeed and altitude indications against alternate sources.
C				✓		ADAHRS FAIL	Amber annunciation displayed in the Data Bar of the EFD1000 MFD when its internal ADAHRS reports a failure (e.g. during ADAHRS Reset). For installations with the EA100 A/P AHRS, this condition automatically disconnects the autopilot.

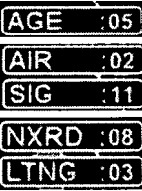
	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
C				✓		CHECK AHRS	Amber annunciation presented on the EFD1000 MFD when its internal ADAHRS reports a "CROSS CHECK ATTITUDE" condition.
C				✓	✓	CROSS LINK FAILURE	Amber annunciation presented in the EFD1000 MFD Data Bar when it loses communication with the PFD, and in the EFD500 MFD Data Bar when it loses communication with either the PFD or the EFD1000 MFD.
				✓	✓	(HDG FAIL)	Amber annunciation presented on the MFD in the Charts, Nav Map and WX applications when heading has failed.
C	✓	✓	✓	✓		CHECK PITOT HEAT	Amber annunciation accompanied by an "ATTITUDE FAIL" annunciation. Presented when the software detects an obstruction in the pitot system that could potentially degrade the attitude solution. This annunciation is removed when the detected condition is resolved, which would be followed by an automatic ADAHRS reset. A GPS system configuration is required for this monitor to be enabled. For installations with the EA100 A/P AHRS, this results in an autopilot disconnect.
C	✓	✓*	✓	✓	✓	GPS1 GPS2 RSM GPS GPS1 REVERSION GPS2 REVERSION RSM GPS REVERSION EVEREST ONLY	Amber annunciations presented when a connected GPS is invalid or not available. GPS# or RSM REVERSION (optional) annunciations indicate the current GPS basemap source. Note: the EFD500 MFD cannot revert to RSM GPS since it is not configured with an RSM. *GPS2 is not applicable to the PFD Pilot. "GPS1", "RSM GPS" and "RSM GPS REVERSION" are the only annunciations of this type that apply to the PFD Pilot.

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
C				✓	✓		Amber annunciation presented in the center of the NAV Map when all GPS sources have failed. When presented, the map changes to a North-up orientation and the map no longer moves with the aircraft. Manual panning is still possible and all map features that are not GPS position dependent continue to remain available, including relative terrain overlays.
C	✓	✓	✓	✓			Amber annunciation presented whenever the selected GPS source indicates that GPS integrity is degraded. See the applicable GPS AFMS for more information.
C	✓		✓				Amber annunciation presented when the aircraft reaches, or is below the set MINIMUMS. Will be accompanied by a one-second stuttered tone when the optional tone generator is installed. Not applicable to the PFD Pilot.
C	✓	✓*	✓				Amber flag presented to indicate the aircraft is reaching (steady) or deviating (flashing) the selected altitude. Will be accompanied by a one-second steady tone when the optional tone generator is installed. *The tone is not available on the PFD Pilot.
C	✓		✓				Amber "DH" annunciation presented when a connected radar altimeter indicates the aircraft has reached the radar altitude set by the pilot. See the radar altimeter's AFMS for more information. Not applicable to the PFD Pilot.

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
C	✓		✓			 	GPSS annunciation that indicates the previously selected GPSS source is invalid (e.g. the flight plan was deleted) or a different GPSS has been selected by pilot. Commands the autopilot to roll the aircraft to wings level until GPSS is re-engaged, or a valid GPSS signal is available. Not applicable to the PFD Pilot.
C				✓	✓		Amber annunciation presented on the dedicated terrain display when any of the information needed to render the map (position, altitude, or heading) is detected as invalid.
C				✓	✓	 	A "TRAFFIC" Advisory annunciation is presented in the Data Bar whenever a connected traffic system generates a Traffic Advisory and a dedicated traffic view is not being displayed. TRFC" legend above the lower center button is presented to inform the pilot of the single pilot action needed show a dedicated traffic display.
C	✓		✓	✓	✓	 	Amber annunciations provided when Traffic data is reported as unavailable by the connected traffic sensor. Not applicable to the PFD Pilot.
C				✓	✓		Amber annunciation that indicates that the traffic data has not been refreshed within 6 seconds. The Primary Flight Display shows only TRFC RMVD.
C				✓	✓		Amber annunciation that indicates a traffic sensor failure.
C				✓	✓		Amber annunciation on the dedicated traffic display to indicate that the link between the EFD and traffic sensor has been lost (e.g., traffic sensor is OFF).
C				✓	✓		Amber annunciation presented when the spherics (lightning) sensor reports that the self-test response has not been received within 10 seconds of the test request.

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
C				✓	✓	FAIL	Amber annunciation presented when the spherics (lightning) sensor reports a failed self-test, an unrecoverable fault, or an undefined fault.
C				✓	✓	ERROR	Amber annunciation presented when the spherics (lightning) sensor reports an undefined but recoverable error
C				✓	✓	ERROR ANT ERROR	Amber annunciation presented when the spherics (lightning) sensor reports a recoverable antenna error
C				✓	✓	ERROR MIC INHIBIT STUCK	Amber annunciation presented when the spherics (lightning) sensor reports a recoverable inhibit line stuck microphone error
C				✓	✓	ERROR ANT JUMP CHG	Amber annunciation presented when the spherics (lightning) sensor reports a recoverable changed antenna jumper error.
C				✓	✓	FAIL HDG INVALID	Amber annunciation presented when the spherics (lightning) sensor reports no heading data. Accompanied by removal of spherics (lightning) sensor data.
C				✓	✓	FAIL NO LINK	Amber annunciation presented when the spherics (lightning) sensor reports that the sensor is enabled but no data is detected
C	✓		✓	✓	✓	NXRD : LTNG : SIG : AIR : AGE : TFR :	Datalink weather product data not received. Not applicable to the PFD Pilot.

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
C	✓	✓	✓	✓			Annunciation presented on the HSI whenever the HSI compass card is no longer receiving magnetic corrections. After 6 minutes of free gyro operation the attitude and heading solutions will be removed.
C	✓	✓	✓	✓	✓		Annunciation presented in the menus when the connected EFD1000 battery is not detected or failed
A	✓	✓			✓		Annunciation presented when the EFD1000 PFD's or EFD500 MFD's "REV" button is pressed.
A			✓	✓			Annunciation presented when the EFD1000 MFD's "REV" button is pressed.
A	✓		✓				Green annunciations provided whenever GPSS is enabled and the GPS source is valid. Either "GPSS1" or "GPSS2" may be annunciated depending on aircraft configuration. Not applicable to the PFD Pilot.
A	✓		✓	✓			GPS annunciations provided by an active GPS source. TERM may also be displayed in the same location as APPR. See the GPS AFMS for additional information on the meaning of these annunciations.
A	✓		✓	✓	✓		Green annunciation that indicates that the traffic sensor is enabled. Not applicable to the PFD Pilot.
A				✓	✓		Green annunciation that indicates that the traffic sensor is in standby.
A				✓	✓		Green annunciation that indicates that the traffic sensor is in the self-test mode.
A				✓	✓		Green annunciation that indicates that the TIS traffic data has not been refreshed within 6 seconds.

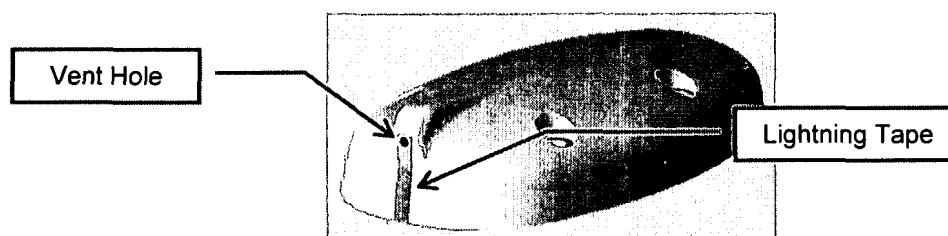
	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
A	✓		✓	✓	✓		Lightning (spherics) Strike display mode selected. The rate indicates the approximate number of lightning strikes detected per minute. Not applicable to the PFD Pilot.
A	✓		✓	✓	✓		Lightning (spherics) Cell clustering display mode selected. The rate indicates the approximate number of lightning strikes detected per minute. Not applicable to the PFD Pilot.
A	✓		✓	✓	✓		Self-test mode annunciation that replaces spherics (lightning) Strike / Cell rate information. Not applicable to the PFD Pilot.
A				✓	✓		Lightning (spherics) Self-test mode selected.
A				✓	✓		Annunciation that replaces aircraft ownship symbol during a spherics (lightning) self-test.
A	✓		✓	✓	✓		A data age annunciation is presented for datalink weather products when the XM receiver is operational. The elapsed time since last data update is expressed in minutes (e.g.:05). Not applicable to the PFD Pilot.
A	✓		✓	✓	✓		A horizontal red line through the spherics (lightning) rate legend that indicates the data is no longer detected. Not applicable to the PFD Pilot.
A	✓		✓	✓	✓		A horizontal red line through the legend of selected data indicates that the data is invalid, unavailable, or for datalink products, that the data product is expired. Not applicable to the PFD Pilot.
A	✓		✓				A horizontal red line through the source legend of selected data indicates that the data is invalid or unavailable. Not applicable to the PFD Pilot.

	Applicability					Annunciation	Description
	EFD 1000 PFD PRO	EFD 1000 PFD PILOT	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD		
A	✓		✓	✓			A horizontal red line through the selected navigation source indicates that the data is invalid or unavailable. HSI and SHSI only. Not applicable to the PFD Pilot.
A				✓	✓	DATABASE FAILURE	Annunciation presented at the bottom center of the Nav Map or the Charts application if the software is unable to access the data base stored to the microSDHC memory card.
A				✓	✓	LOAD 11/11 AIRWAYS	Annunciation presented at the bottom center of the Nav Map when data is being loaded from the micro SD card at start up. The current data type and total number of data types to be loaded is identified (i.e. "11/11"), along with an indication of the type of data that is currently being loaded (i.e. "AIRWAYS").
A				✓	✓	OWNSHIP NOT AVAILABLE	Annunciation presented at the top center of the CHARTS application when the OWN hotkey is selected and the aircraft ownship cannot be displayed because the chart is not geo-referenced.
A				✓	✓	OWNSHIP OFF CHART	Annunciation presented at the top center of the CHARTS application when the displayed chart is geo-referenced, the OWN hotkey is selected and the aircraft position is not on the chart.
				✓	✓	DATABASE INIT	Annunciation presented at the bottom center of the Nav Map and the terrain application if the database is not present during system initialization

4 Normal Procedures

4.1 Exterior Inspection

RSM(s).....	Check condition and security
RSM Vent Hole.....	Check clear of obstructions
RSM Lightning Tape.....	Check condition and security



4.2 Before Taxi Checks

Alternate Static Source.....	CHECK
EBB Switch (if installed).....	Verify set to NORM
EFD MASTER SWITCHES (If installed).....	ON
Avionics and Instruments	SET as desired
PFD.....	Configure for departure
EFD1000 MFD (if installed)	Select REV and configure as necessary
A/P AHRS FAIL lamp.....	CHECK

CAUTION:

The EFD1000 MFD Reversionary PFD display references, bugs, navigation sources, etc. must be configured or verified as necessary for takeoff and departure. This will reduce pilot workload should the MFD reversion mode be required.

NOTE:

ADAHRS alignment begins at power up. Avoid movement during ADAHRS alignment as this will delay and degrade the ADAHRS initialization. Attitude and heading data is presented once alignment is complete.

NOTE:

When in the "DISC" position, the EBB isolation relay is powered from the EBB. When the switch is in the disconnect position the Emergency Backup Battery will gradually discharge.

NOTE:

MFD database features load incrementally after power up. Loading progress is indicated at the bottom of the Nav Map.

4.3 Before Take-Off Checks

MENU	"POWER SETTINGS" Page
EXT PWR: (Aircraft Input Voltage)	Check > 12.3V/24.6V
BAT:	Verify battery status is not shown as "FAIL" (normally this shows "CHARGING" or "READY")
 In addition, if an EFD1000 MFD with EBB is installed, perform the following steps from the Power Settings Page:	
EFD1000 MFD	Select "BATTERY"
EFD1000 MFD	Verify Battery charge is above 80%
EFD1000 MFD	Select EXT PWR
MENU	Press the MENU button to return to normal operation

CAUTION:

If an EFD is required by the Kinds Of Operations Equipment List, takeoff with indicated aircraft voltage (as displayed in the EFD Power Settings Menu) below 12.3V (14 Volt aircraft) or 24.6V (28Volt aircraft) is NOT AUTHORIZED

If the indicated aircraft voltage is below 12.3V (14V Electrical System) or 24.6V (28V Electrical System) the EFD will automatically switch to battery shortly after takeoff.

Indicated aircraft voltages below these thresholds are indicative of an aircraft electrical system charging problem that must be resolved before flight.

CAUTION:

If the EBB is required by the Kinds Of Operations Equipment List (See section 2.12.7), the minimum EBB charge permitted for dispatch is 80%

CAUTION:

If the EBB temperature is below -20°C the battery may not power the EFD1000 until warmed. When an EBB is required by the kinds of operations limitations (See section 2.12.7), the cabin temperature must be above -20°C before departure

NOTE:

If the EBB temperature is below 0°C, it will take 10 minutes or longer to determine the "BATTERY" charge. Indicated battery charge may rise from the initial indication as the battery warms.

The internal or EBB battery will not charge until the battery temperature is above 0°C. The battery will have to be allowed to warm to accept a charge.

4.4 Before Approach Checks

EBB Switch (if installed).....	Verify set to NORM
Avionics and Instruments	SET as desired
PFD.....	Configure for arrival
EFD1000 MFD (if installed)	Select REV and configure as necessary

CAUTION:

The EFD1000 MFD Reversionary PFD display references, bugs, navigation sources, etc. must be configured or verified as necessary for landing and missed or final approach. This will reduce pilot workload should the MFD reversion mode be required.

4.5 Shutdown Checks

EFD1000/EFD500 Circuit Breaker / Switches.....	OFF
EBB Switch (if installed).....	Verify set to NORM

NOTE:

The EBB disconnect switch should be left in the NORM position, except during an abnormal condition. When in the "DISC" position the EBB energizes a relay that is powered from the EBB. When the switch is in the DISC position the EBB will gradually discharge.

NOTE:

Each EFD display includes either an internal battery or external EBB. On the ground the EFD will initiate a shut down sequence when aircraft power is removed. If this sequence is interrupted, the EFD will continue to operate from battery until the battery is depleted.

To avoid inadvertently discharging the EFD battery, confirm that each EFD is completely powered down before leaving the aircraft.

5 Performance

No change to basic Airplane Flight Manual or other performance information or placards.

6 Weight & Center of Gravity

See current weight and balance records.

7 EFD1000/500 System Operation

Refer to Aspen Avionics document 091-00005-001, EFD1000 PFD Pilot's Guide and Aspen Avionics document 091-00006-001, EFD1000/500 MFD Pilot's Guide, for detailed operating instructions of the EFD1000 PFD, EFD1000 MFD, and EFD500 MFD systems.

NOTE:

Although intuitive to operate, a reasonable degree of familiarity is required to effectively use the EFD1000/500 system.

Study this AFMS, the Pilot's Guides, and seek instruction from a competent instructor to gain and maintain familiarity and competence with this system.

Gain experience with the system under VMC before flying in IMC.

Practice often.

Go Fly!

ASPEN  AVIONICS™
A NEW WAY TO LOOK AT AVIONICS™

8 List of Acronyms and Abbreviations

A/P	Autopilot
ACU	Analog Converter Unit
ADAHRS	Air Data Attitude Heading Reference System
AHRS	Attitude Heading Reference System
AFMS	Airplane Flight Manual Supplement
AMMD	Aerodrome Moving Map Display
BARO	Barometric Pressure Setting
BAT	Battery
CM	Configuration Module
CWS	(autopilot) Control Wheel Steering
DH	Decision Height
EA	Evolution Adapter
EBB	Emergency Backup Battery
EFB	Electronic Flight Bag
EFD	Evolution Flight Display
EFIS	Electronic Flight Instrument System
EOC	Executable Object Code
EWR	Evolution Weather Receiver
GPS	Global Positioning System
GPSS	GPS Steering
HDG	Heading
HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IOP	Input-Output Processor
KOEL	Kinds of Operations Equipment List
MAP	Main Application Processor
MEMS	Micro Electromechanical Systems
MFD	Multi-Function Display
NACO	National Aeronautical Charting Office
OAT	Outside Air Temperature
PFD	Primary Flight Display
POM	Pitot Obstruction Monitor
REV	Reversion
RMVD	Removed
RSM	Remote Sensor Module
SAI	Secondary Attitude Indicator
SDHC	Secure Digital, High-Capacity
SHSI	Secondary Horizontal Situation Indicator
TAS	True Airspeed
TAS	Traffic Advisory System
TIS	Traffic Information System
TRFC	Traffic
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	VHF Omni-directional Radio Range
VLOC	VOR / Localizer

United States Of America
Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SA10822SC

This Certificate issued to Aspen Avionics, Inc.
5001 Indian School Rd. NE
Albuquerque, NM 87110

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified herein meets the airworthiness requirements of Part. * of the * Regulations.*

Original Product Type Certificate Number : (see attached FAA Approved Model
Make : List for list of Approved models
Model : and applicable airworthiness regulations)

Description of Type Design Change: Installation of EFD1000/EFD500 Evolution Flight Display(s) System in accordance with Aspen Avionics Installation Manual document #900-00003-001, Revision U, or later approved FAA revision. Airplane Flight Manual Supplement document #900-00008-001, Revision H, dated 10/5/2010, or later FAA approved revision is required.

Limitations and Conditions: The installer must determine whether this design change is compatible with previously approved modifications. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

Certification Basis: In accordance with 14 CFR Amendment 23-59, High Intensity Radiated Fields (HIRF), Docket No. CE278, Special Condition 23-218-SC and Equivalent Level of Safety Memo# ACE-09-15.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application : June 22, 2007

Date reissued :

Date of issuance : March 28, 2008

Date amended : September 22, 2009 Rev.2 ; October 05, 2010 Rev. 3



By direction of the Administrator

(Signature)
S. Frances Cox
Manager, Special Certification Office
Southwest Region

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.
FAA Form 8130-2 (10-68) Page 1 of 2 This certificate may be transferred in accordance with FAR 21.47.

1 STC SA10822SC

1.1 Overview

STC SA10822SC authorizes installation of the various EFD1000 / EFD500 Electronic Flight Instrument System equipment into the make and model aircraft listed on the Approved Model List attached to the STC.

The AML should be consulted for applicability prior to installation.

The installer must record the airplane make, model, registration number, and serial number where indicated on the EFD1000 AFMS and Instructions for Continued Airworthiness documents, and include these documents in the Aircraft Flight Manual and permanent maintenance records respectively.

STC SA10822SC includes the FAA approved Installation Manuals (including Instructions for Continued Airworthiness), the FAA approved Airplane Flight Manual Supplement (AFMS) and the FAA Approved Model List (AML). It is important to note that the EFD1000 / EFD500 Installation Manual 900-00003-001 and EWR50 Installation Manual 900-00007-001 contain FAA-Approved Data and can be used by those seeking installation approval for aircraft not included in the EFD1000 AML, where permitted by National Aviation Authority policy and guidance.

NOTE: The asterisk (*) in the TCDS column indicates that that some models of the TCDS are not included in the AML.

1.2 Permission Statement

In accordance with FAA Order 8110.4c, or later release, Aspen Avionics Inc. hereby grants permission to all National Aviation Authority (NAA) installers who are Authorized Aspen Avionics Inc. Dealers in good standing to use STC SA10822SC data to modify aircraft with either factory new, factory rebuilt, or factory altered EFD1000 / EFD500 Electronic Flight Instrument Systems equipment.

Permission is not granted for installation of used equipment.

Any and all other parties require separate written authorization to use STC SA10822SC and associated data, which is the proprietary data of Aspen Avionics Inc.

APPENDIX D

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Aspen Document # 900-00012-001 Revision G

AIRCRAFT MAKE: Piper
AIRCRAFT MODEL: PA-34-220T
AIRCRAFT SERIAL NUMBER: 3449265

Modification of an aircraft under the EFD1000 AML Supplemental Type Certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's ICA, Aircraft Maintenance Manual and operator's Aircraft Scheduled Maintenance Program.

This ICA consists of 18 pages not including the wiring and placement diagrams

ICA – RECORD OF REVISION

Revision	Date	Description of Change
ICA Revision IR	8/25/09	INITIAL RELEASE – for TSO Approval
ICA Revision A	9/21/09	Made the ICA document stand-alone
ICA Revision B	9/25/09	Added bonding checks. Added pagination.
ICA Revision C	9/28/09	Added Procedures for System Testing During Ground Running FAA Accepted
ICA Revision D	1/15/10	Increased battery replacement interval to three years or 800 hours, section D9 FAA Accepted
ICA Revision E	7/19/10	Added EA100 Adapter information, clarified several headings and expanded the Wiring and Component Location Data information requirements.
ICA Revision F	8/28/10	Removed "Inspection," from first row of the table in Section D4. Added -004 EFD to section D.9.
ICA Revision G	9/14/10	Updated the Installation Manual references to the latest revision.

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D.1 Introductory Information

This ICA provides instructions necessary for authorized personnel to inspect and maintain the EFD500 and EFD1000 system installed by the EFD1000 AML-STC. The following data may be required for this maintenance:

Replacement Parts:	See Section 1 of the EFD1000 and EFD500 SW v2.X Installation Manual, document 900-00003-001 Rev T or later.
Software Version Compatibility	Class III aircraft (typ. >6000 lbs. MGTOW, see AC 23.1309-1X) require a PFD containing RTCA DO-178B Level B software. Verify the software level on the PFD Data tag before installation. See Section 5.2, "Software Version" of the EFD1000 and EFD500 SW v2.X Installation Manual, document 900-00003-001 Rev T or later.
Operating Instructions:	See the EFD1000 AFMS, document 900-00008-001
Wire Routing Locations:	See attachment to this document Figure D1 & D2 (part of the permanent aircraft records).
Wiring Diagrams:	See attachment to this document (part of the permanent aircraft records).
Special Tools	For bonding checks, use a milliohm meter such as an Extech 380460 Portable Precision Milliohm Meter or equivalent. It may be required to align the EA100 Adapter to the autopilot computer using a KTS-150 Test Set, a KTS-158 Test Set, a KTS-154 Test Set or equivalent and following the autopilot manufacturer's procedure for aligning the gyro (KI-256) to the autopilot computer (these Test Sets are normally available at autopilot-qualified Bendix-King dealers). The EA100 Alignment Tool (acquired through the dealer ramp Section of the Aspen.com web site, see Tech Note 2010-10) will be used to manipulate the gyro pitch and roll signals and the autopilot Test Set will be used to measure the autopilot demodulated gyro voltages. In the case of the KFC225 the Remote Terminal Interface (normally available at autopilot-qualified Bendix-King dealers) will be required in place of the test sets. See Appendix F of the EFD1000 and EFD500 SW v2.X Installation Manual, document 900-00003-001 Rev T or later for detailed information.

D.2 System Description and Information about the Interface of the EFD1000/500 System with the Aircraft

The EFD1000 PFD system is comprised of the Primary Flight Display (PFD), Remote Sensor Module (RSM), Configuration Module (CM) and optional Analog Converter Unit (ACU). Optionally one or two MFD displays of either the EFD500 or EFD1000 or the EA100 Adapter (autopilot attitude adapter) may be installed.

The EFD1000 PFD system provides display of attitude, airspeed, altitude, direction of flight, vertical speed, turn rate, and turn quality. The system may optionally provide display of navigation information through interfaces to GPS Receivers and/or VHF Navigation Receivers.

When interfaced with a compatible autopilot, the EFD1000 system provides heading and course datum information to the autopilot, which enables the autopilot to follow the Course and Heading values set by the pilot on the EFD1000.

If optional MFD displays are installed they can present terrain, traffic, XM weather, and WX-500 Stormscope data to the flight crew. The EFD1000 MFD can be used as backup instruments to the PFD supporting reversionary capabilities. The EFD500 presents MFD data, but cannot be used for backup or reversion.

The optional EA100 is supplies pitch and roll stabilization signals the autopilot. The article has no direct pilot controls.

D.2a Description of How the EFD1000 System Operates and is Controlled, Including Special Procedures and Limitations

See the Aircraft Flight Manual Supplement, document 900-00008-001 regarding which appliances are installed, how the EFD1000 system operates, and is controlled, and special procedures and limitations.

This document identifies if the EA100 is installed in the figures and wiring information included at the end of this document.

An EBB58 Emergency Backup Battery may be required in some EFD1000 MFD installation configurations if it is being used as any required secondary instruments.

See the attachment to this document Figure D1 & D2 (part of permanent aircraft records) for detailed interface information.

D.3 System Operation and Procedures for System Testing During Ground Running

Refer to the EFD1000 AFMS, document 900-00008-001 for instructions on system operation. For System Testing refer to Section 10.6 and Appendix F of the EFD1000 and EFD500 SW v2.X Installation Manual, 900-00003-001 Rev T or later.

D.4 Servicing and Scheduling Information

The PFD, MFD, RSM, ACU, CM, EA100, and EBB58 have no field serviceable components. Return defective units to Aspen Avionics or an authorized dealer.

Recommended times for cleaning, inspecting, testing lubricating and adjusting each component of the EFD1000 System. See the Periodic Maintenance and Calibration Section.	
EA100	Verify the operation of the internal autopilot disconnect relay annually.
Internal backup battery	Inspection every twelve months
EBB58 Emergency Backup Battery	Inspection every twelve months
All other components	None

D.5 Overhaul Period

None required.

D.6 Special Tools

For bonding checks, use a milliohm meter such as an Extech 380460 Portable Precision Milliohm Meter or equivalent.

It may be required to align the EA100 Adapter to the autopilot computer using a KTS-150 Test Set, a KTS-158 Test Set, a KTS-154 Test Set or equivalent and following the autopilot manufacturer's procedure for aligning the gyro (KI-256) to the autopilot computer. The EA100 Alignment Tool will be used to manipulate the gyro pitch and roll signals and the autopilot Test Set will be used to measure the autopilot demodulated gyro voltages. In the case of the KFC225 the Remote Terminal Interface will be required in place of the test sets.

D.7 Airworthiness Limitations

There are no Airworthiness limitations associated with the installation of this appliance. The Airworthiness Limitations Section is FAA approved and specifies maintenance required under 14 CFR § 43.16 and § 91.403 unless an alternate program has been FAA approved.

D.8 Distribution of Revisions

Notification of changes to this ICA will be sent to all owners on record. The changed document will then be available at www.aspenavionics.com. Paper copies are available on request, contact Aspen Avionics at www.aspenavionics.com.

D.9 Periodic Maintenance and Calibration

All maintenance is considered "ON CONDITION" unless otherwise noted in this ICA.

EBB58 Emergency Backup Battery (use with MFD P/N 910-00001-002)

The EBB58 Emergency Backup Battery when installed must be visually inspected and tested as described below once every 12 months to ensure it meets the minimum 30 minute requirement for powering the EFD1000 MFD under all foreseeable conditions. The EBB58 must be replaced every 3 years or 800 hours (whichever occurs first), or if it fails the following visual or operational tests.

Remove the EBB from the tray and visually inspect for the following:

- Leakage from the battery especially around the metal seams
- Evidence of water contamination
- Evidence of corrosion

If any of the above issues are noted return the EBB58 to Aspen Avionics for repair.

Re-install the battery and check the battery capacity as follows: (this test must be run at room temperature approximately 25° C)

Turn on the EFD1000 MFD

- Press MENU Key
- Select POWER SETTINGS, Main Menu page 10 of 11
- Press the BATTERY line select key

BAT LEVEL IN --.-- will be displayed for a short period of time as battery capacity is being measured. This could take up to 10 minutes if the ambient temperature is below 0° C.



Once the capacity is measured ON BAT XX% REM will be displayed.



The "ON BAT" indication must read a minimum of 80% to continue. If the battery capacity is below 80% then the battery should be charged by returning the MFD to external power. The EBB will charge as long as the MFD is turned on and external power is supplied.

With the battery displaying greater than 80% charge set a timer for one (1) hour. After the one hour time has elapsed the MFD must still be operating on battery. If the EBB will not supply the minimum 1 hour operating time or fails to charge above 80% return the battery to Aspen Avionics for repair.

Instructions for battery replacement are contained in Section D.12.

Following the battery endurance test and while operating on battery power, switch the "EBB EMER DISC" switch to "DISC"; verify the display powers OFF. Return the "EBB EMER DISC" switch to "NORM"; verify the display powers ON and is on battery power.

Switch the MFD back to external power and recharge the EBB to 80% or greater prior to release to service.

EFD Internal Battery (EFD P/N 910-00001-001, -003, and -004)

The internal back-up battery in the EFD must be tested once every 12 months to ensure it operates properly. Each EFD with an internal battery must have the battery replaced every 3 years or 800 hours, or if it fails the following operational test.

This test must be run at room temperature approximately 25° C.

- Turn on the EFD1000 or EFD500
- Press MENU Key
- Select POWER SETTINGS page from the Main Menu
- Press the BATTERY line select key

BAT LEVEL IN --.-- will be displayed for a short period of time as battery capacity is being measured. This could take up to 10 minutes if the ambient temperature is below 0° C.



Once the capacity is measured ON BAT XX% REM will be displayed.



The "ON BAT" indication must read a minimum of 80% to continue. If the battery capacity is below 80% then the battery should be charged by returning the EFD to external power. The battery will charge as long as the MFD is turned on and external power is supplied.

With the battery displaying greater than 80% charge set a timer for 30 minutes. After the 30 minute time has elapsed the EFD must still be operating on battery. If the internal battery will not supply the minimum 30 minutes operating time or fails to charge above 80%, replace the battery and return the failed battery to Aspen Avionics.

Instructions for battery replacement are contained in Section D.12.

Switch the EFD back to external power and recharge the internal battery to 80% or greater prior to release to service.

Instructions for battery replacement are contained in Section D.12. Contact customer service at Aspen Avionics or an authorized Aspen Avionics Dealer for a replacement battery.

EA100 Autopilot Disconnect (if the EA100 is Installed)

The ability of an EA100 to disconnect the autopilot must be tested annually. The test is accomplished in the following manner:

Turn on the PFD and all MFD systems. Verify the "A/P AHRS FAIL" light extinguishes. Engage the autopilot and then pull the "A/P AHRS" circuit breaker. If the autopilot disengages immediately and the A/P AHRS light simultaneously illuminates, then the test was successful. Restore the circuit breaker. If the autopilot fails to disengage then arrange for repair of the EA100 or associated wiring.

EFD Display Backlight

The EFD display backlight has a median expected life of 50,000 operating hours. Replacement of the lamp is on-condition as it may last longer or shorter than 50,000 hours. It is up to the operator to determine whether the backlighting has become too dim for its intended use.

ACU, RSM, CM

The ACU, RSM and the Configuration Module require no periodic maintenance or calibration.

D.10 Unit and Wiring Inspection

All units, brackets, installation hardware and wiring of the EFD1000 system should be checked as defined below during annual inspection. Items found to be defective should be repaired or replaced prior to returning the aircraft to service.

EFD Inspection

The EFD(s) should be inspected for damage and their operation should be verified using documents from Section D1 of these ICA's. The EFD wiring should be checked for damage, chafing, or excessive wear. The EFD braided bonding strap should be checked for proper termination at the EFD and aircraft grounding point to maintain HIRF and Lightning compliance.

Verify ≤ 3 milliohms from PFD ground stud to airframe ground. The installation of the EFD should be inspected for corrosion on the EFD and the structure it is mounted on. The fasteners should be inspected for tightness and general condition.

ACU Inspection – if installed

The ACU should be inspected for damage and its operation should be verified using documents from Section D1 of these ICA's. ACU wiring should be checked for damage, chafing, or excessive wear. Verify ACU chassis bonding to airframe ground is ≤ 3 milliohms to maintain HIRF and Lightning compliance. The installation of the ACU should be inspected for corrosion on the ACU and the structure it is mounted on. The fasteners should be inspected for tightness and general condition.

RSM Inspection

The RSM(s) should be visually inspected for damage and wear on the lightning strip. RSM wiring should be checked for damage, chafing, or excessive wear. Verify RSM doubler plate bonding from the ground stud to airframe ground is ≤ 3 milliohms to maintain HIRF and Lightning compliance. The RSM installation and doubler should be inspected for corrosion on the RSM, the RSM shim (optional), the fuselage skin, and the doubler. The installation should be inspected for cracks in the fuselage, and loose or damaged fasteners.

Configuration Module Inspection

The Configuration Module(s) should be checked for damage. The Configuration Module wiring should be checked for damage, chafing, or excessive wear.

EA100 Inspection – if installed

The EA100 should be inspected for damage and its operation should be verified using documents from Section D1 of these ICA's. The EA100 wiring should be checked for damage, chafing, or excessive wear. Verify EA100 chassis bonding to airframe ground is ≤ 3 milliohms to maintain HIRF and Lightning compliance. The installation should be inspected for corrosion on the EA100 and the structure it is mounted on. The fasteners should be inspected for tightness and general condition.

EBB58 Inspection –if installed

The EBB58 Emergency Backup Battery should be inspected for damage to the battery and mounting tray. Battery operation should be verified using Section D.9 of this ICA. Verify ≤ 3 milliohms from mounting tray to airframe ground. The wiring should be checked for damage, chafing, or excessive wear.

D.11 Troubleshooting

See Appendix A of the EFD1000 and EFD500 SW v2.X Installation Manual, 900-00003-001 Rev T or later for troubleshooting procedures.

D.12 Removal and Replacement

This section provides instructions for removal and replacement of LRUs that have been previously installed in the aircraft. No special tools are required for the removal and replacement of any system LRUs. If an LRU is found to be defective it should be removed and returned to Aspen Avionics for repair or replacement.

EFD Removal

Verify power is off. Carefully insert a flat blade screw driver into the locking mechanism on the top center of the EFD. While gently prying pull back the top of the EFD and extract from bracket. Remove nut securing braided ground strap to EFD. Remove pitot and static quick connectors (EFD1000 only) by pulling back outer spring loaded locking sleeve while unplugging connectors. To remove 44 pin D-sub connector unscrew both jackscrews fully and pull connector straight back.

EFD Replacement

Verify power is off. Install 44 pin D-sub connector and tighten jackscrews until connector is fully seated. Install pitot and static lines (EFD1000 only) to back of EFD by firmly pressing the fitting until fully seated (pitot and static quick connectors are keyed and cannot be crossed). Gently pull on connector to ensure proper connection. Connect braided bonding strap to EFD with nut. Insert bottom of EFD into bracket and pivot top forward until it locks into place on bracket.

Using Section 10.6 of the EFD1000 and EFD500 SW v2.X Installation Manual, 900-00003-001 Rev T or later, verify all system interfaces are functional. Verify proper bonding per Section 10.1.2. Perform a System Leak Test (Section 10.6.3, EFD1000 systems only) and Sonalert Test (Section 10.6.11, PFD only).

EFD Battery Replacement

EFD battery replacement must only be performed by a properly certified individual or facility. Remove EFD from panel as above. Remove two screws on each end of the football shaped cover plate on rear of the EFD. Unplug electrical connector and slide battery out of EFD. Install new battery in EFD then connect battery plug. Replace cover plate and tighten the cover screws. Tighten to 12 in-lbs. Reinstall and test EFD as above.

ACU Removal

Verify power is off. Remove ACU by unscrewing the jackscrews of all three D-sub connectors. Gently remove the connectors by pulling straight out. Remove the six (6) 6-32 mounting screws securing the ACU to the aircraft and remove unit from aircraft.

ACU Replacement

Verify power is off. Install ACU in mounting location and install six (6) 6-32 mounting screws through holes in ACU mounting tabs. Tighten to 12 in-lbs. Install all three (3) D-sub connectors securing each with the two jackscrews per connector.

Verify proper bonding per Section 10.1.2, then perform post installation tests in Sections 10.6.6, 10.6.7, 10.6.9, 10.6.10 of the EFD1000 and EFD500 SW v2.X Installation Manual 900-00003-001 Rev T or later.

CAUTION: *Do not use a magnetic tipped screw driver when removing and replacing the RSM.*

RSM Removal

Verify power is off. It will be necessary to gain access to the underside of the RSM mounting location in order to unplug the RSM connector. Unscrew RSM electrical connector from inside and undo shield ground wire from ground stud. Remove sealant from around base of RSM and on mounting screws. Remove four (4) 8-32 non-ferrous mounting screws from RSM and remove RSM from aircraft taking care to guide 24 inch "pigtail" connector out through ½ inch hole in aircraft skin.

RSM Replacement

Verify power is off. Replace the O-ring on the RSM. Contact Aspen Avionics for replacement O-ring (256-00001-001). Verify RSM shim is installed between aircraft skin and RSM if required. Feed circular connector down through ½ inch hole in aircraft skin and mount RSM (vent hole faces aft) with four (4) 8-32 non-ferrous screws. Tighten to 12-15 in-lbs. It is critical that the screws be non-ferrous to prevent the introduction of compass errors. Connect the circular electrical connector and cable tie harness to prevent chaffing and interference. Connect shield ground wire to ground stud. For RSM locations that are external or in a wet environment seal around base and on top of four mounting screws of the RSM using one of the following non-corrosive sealants:

Non-pressure vessel mounting	Dow Corning 738, MIL-A-46146 or equiv.
Pressure vessel mounting	Pro-Seal PS 870B-1 /2, MIL-PRF-81733D, or equiv.

Verify proper bonding per Section 10.1.2, and perform RSM Calibration per Section 10.5 of the EFD1000 and EFD500 SW v2.X Installation Manual, 900-00003-001 Rev T or later. Also check OAT operation per Section 10.6.4 and check RSM GPS operation per Section 10.6.6.

CM Removal

Verify power is off. Cut the two (2) cable ties affixing the CM to the PFD wiring harness. Unplug the Molex connector by pressing down on the locking tab and gently pulling the connector from the module.

CM Replacement

Verify power is off. Plug the Molex connector into the module until it clicks. Cable tie the module to the PFD wiring harness.

Perform the Installation Menu Unit Configuration per section 10.4.5 of the EFD1000 Installation Manual, 900-00003-001 Rev T or later.

Perform RSM Calibration per Section 10.5 of the EFD1000 and EFD500 SW v2.X Installation Manual, 900-00003- 001 Rev T or later.

EA100 Removal

Verify power is off. Remove the EA100 by unscrewing the jackscrews of both D-sub connectors. Gently remove the connectors by pulling straight out. Remove the six (6) 6-32 mounting screws securing the EA100 to the aircraft and remove unit from aircraft.

EA100 Replacement

Verify power is off. Install EA100 in mounting location and install six (6) 6-32 mounting screws through holes in EA100 mounting tabs. Tighten to 12 in-lbs. Install all both D-sub connectors securing each with the two jackscrews per connector.

Verify EA100 bonding per the Mechanical Installation section and perform post installation tests in the EFD1000 and EFD500 SW v2.X Installation Manual 900-00003-001 Rev T or later, Appendix F.

If the EA100 being installed is a replacement then configure it using the EA100 Alignment Tool and set the values to those recorded on the configuration table in the permanent aircraft records.

EBB58 Removal

Verify power is off. Unscrew two jackscrews that secure the D-sub connector to the battery and then unplug the connector. Spread battery tray hold down clips outward to release battery and slide battery out of tray.

EBB58 Replacement

Verify power is off. Slide battery into tray until hold down clips lock into place. Install D-sub connector and secure with both jackscrews.

NOTE: If the spring clip(s) are sprung so the pins do not fully seat, the mounting bracket must be replaced.

Turn on the EFD1000 MFD and switch unit to battery. Verify charge of 80% or greater. If battery is below 80% then charge battery to above 80% by switching MFD back to external power. EBB58 battery will recharge as long as MFD is powered up on external power.

EBB58 Tray Removal

Verify power is off. Remove the battery. Remove the four screws securing the tray to the airframe.

EBB58 Tray Replacement

Replace the four screws securing the tray to the airframe. Tighten to 12 in-lbs. Verify proper bonding per Section 10.1.2 of the EFD1000 Installation Manual, 900-00003-001 Rev T or later.

D.13 Wiring and Component Location Data

INSTRUCTIONS:

NOTE: The wire routing information placed here by the installer must be detailed enough to enable maintenance personnel to troubleshoot, repair, and service the electrical system. These diagrams must also include a method of determining connector type (if other than the connectors supplied by Aspen Avionics in the Installation Kits), wire type, and wire size. The system wiring diagrams are descriptive data of the systems used on the aircraft, and are part of the ICA.

1. Draw in the locations of the EFD1000 system, including the PFD, MFD(s), RSM, optional ACU, EBB58 and EA100, and autopilot locations (Figures D1 and D2).
2. Draw in the circuit breaker and switch locations on instrument panel (Figure D3).
3. Draw in the PFD and MFD to RSM cable routing, including wire type and wire size.
4. Draw in the ACU to PFD and ACU to autopilot cable routing, including wire type and wire size.
5. Draw in the optional EA100 to EFD and EA100 to autopilot cable routing, including wire type and wire size.
6. Show the location of access panels for inspection and servicing the EFD1000 system.

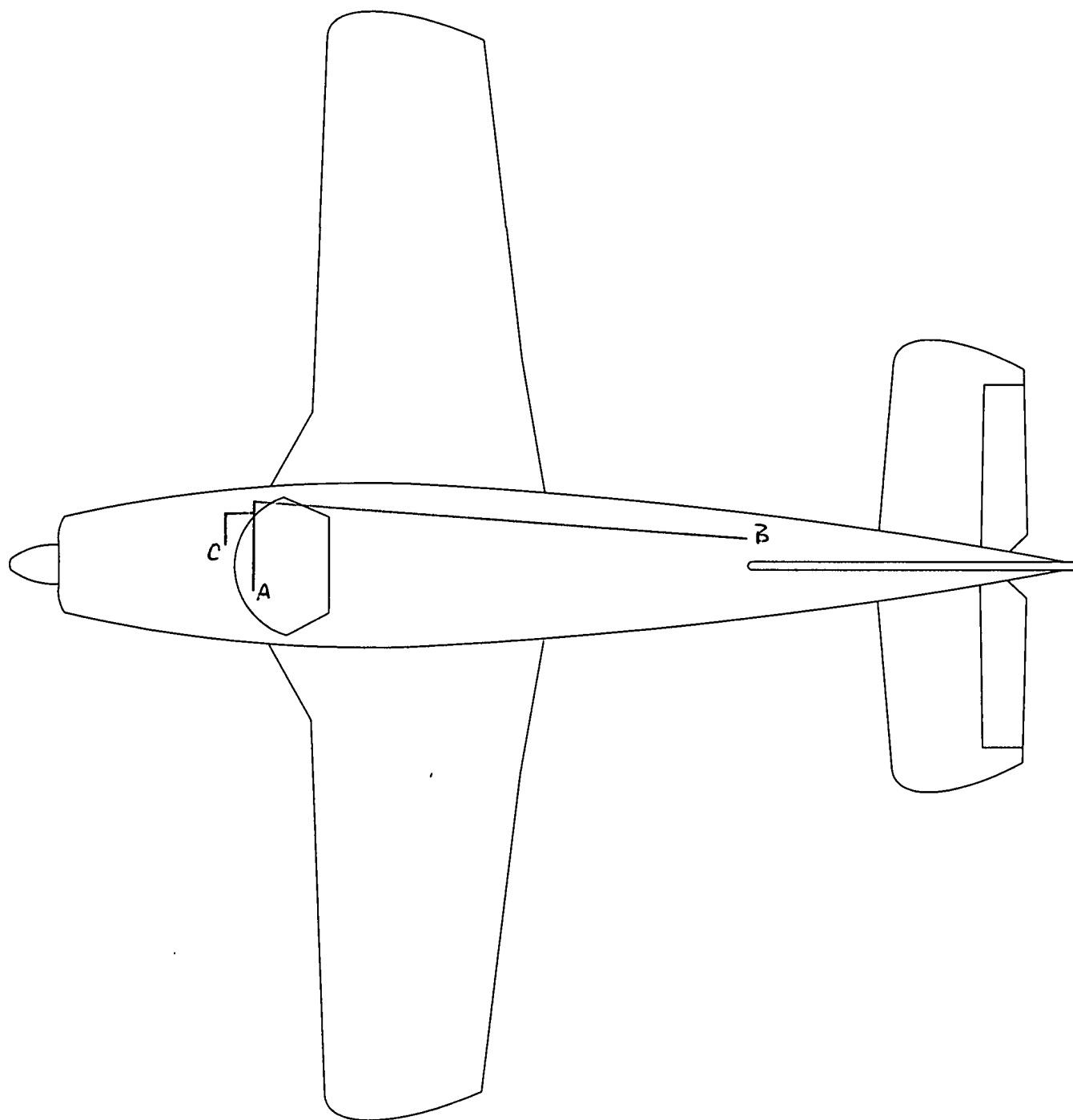


Figure D1 – EFD1000 Components and cable routing (top view)

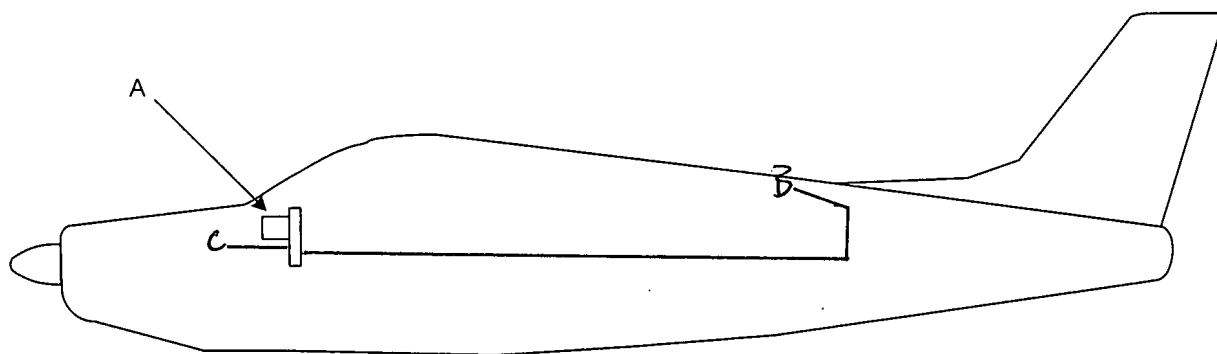


Figure D2 – EFD1000 Components and cable routing (side view)

LRU Definitions

- | | |
|---------------------------------------|---|
| A) PFD (CM is wired within 6" of PFD) | F) RSM (MFD) – optional |
| B) RSM (PFD) | G) EBB58 – optional equipment |
| C) ACU#1 – optional equipment | H) Autopilot computer location – optional equipment |
| D) ACU#2 – optional equipment | J) EWR50 location – optional equipment |
| E) MFD#1 and MFD#2 – optional | K) EA100 location – optional equipment |

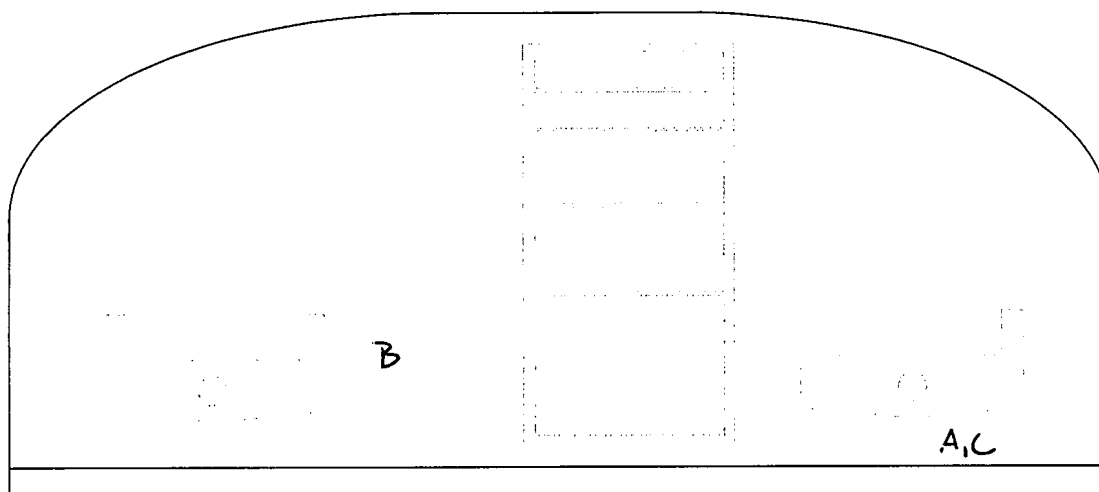


Figure D3 – Circuit Breaker and Switch Locations

Circuit Breaker and Switch Definitions

- | | |
|--------------------------------------|--|
| a) PFD/MFD circuit breakers | d) EBB58 Emergency Disconnect Switch – when required |
| b) PFD/MFD switch(s) | e) A/P AHRS circuit breaker – w/ opt. EA100 |
| c) ACU circuit breaker(s) – optional | f) A/P AHRS FAIL light – w/ opt. EA100 |

INSERT WIRING DIAGRAMS AFTER THIS PAGE

(The drawings must include detailed information on the interface of the EFD1000 system suitable for system troubleshooting)

INSERT THE FOLLOWING AFTER THIS PAGE

COMPLETED – CONFIGURATION CHART – Section 10.4.6 & 10.4.7

COMPLETED – PRE-MODIFICATION CHECKLIST – TABLE 5.1 & 5.2

COMPLETED – OPERATOR CONFIGURATION CHECKLIST FROM APPENDIX C

COMPLETED – EFD1000/500 INSTALLATION FINAL CHECKSHEET FROM APPENDIX B

COMPLETED – EA100 FLIGHT TEST and CONFIGURATION TABLE FROM APPENDIX F

10.4.6 EFD1000 Installation Menu Configuration

Use this form for both the EFD1000 PFD and EFD1000 MFD

INSTALLATION MENU Configuration - EFD1000

Installation Date:	3/3/2011	
Aircraft Model:	PIPER	EFD1000 S/N: 9055
Aircraft Type:	PA-34-220T	RSM S/N: 11800
Aircraft S/N:	3449265	ACU S/N: 11427
		CM S/N: 11257

WARNING: Only an appropriately rated mechanic or repairman (14 CFR 43.3) may set the values on the IAS Config A and B menu pages. The values must match the certified speeds in the Aircraft Flight Manual (AFM), Pilot Operating Handbook (POH), or other legal form of documentation (e.g., Placard).

INSTALLATION MENU PAGE - IAS CONFIG A

Set Speed Bands per Aircraft Flight Manual.

INSTALLATION MENU PAGE - IAS CONFIG A		SW v2.0 and above
Feature	Options	Actual Setting
Vne	0 to 450	204
Vno	0 to 450	164
Vfe	0 to 450	113
Vs	0 to 450	67
Vso	0 to 450	61
Notes:		

INSTALLATION MENU PAGE - IAS CONFIG B

Set Speed Markers per Aircraft Flight Manual.

INSTALLATION MENU PAGE - IAS CONFIG B		SW v2.0 and above
Feature	Options	Actual Setting
Vyse	0 to 450	88
Vmc	0 to 450	66
Triangle	0 to 450	140
Not Used		
Not Used		
Notes:		

INSTALLATION MENU PAGE - IAS CONFIG C (SW v2.2 and above)

These selections are rotorcraft only and are grayed out. This page is not shown in SW v2.0 and v2.1.

INSTALLATION MENU PAGE - IAS CONFIG C		SW v2.2 and above
Feature	Options	Actual Setting
Vne (power on)	0 to 450	
Vne (power off)	0 to 450	
MIN CAUTION SPD	0 to 450	
MIN SAFE SPD	0 to 450	
MAX AUTOROT SPD	0 to 450	
Notes:		

INSTALLATION MENU Configuration – EFD1000 (continued)

INSTALLATION MENU PAGE – IAS CONFIG D

IAS UNITS – Set per Aircraft Flight Manual.

TAPES – Configure based on Flowchart in Figure 10.3.

VSPD EDIT – Set based on “Operator Configuration Checklist” of Appendix C or to owner/operator preference.

INSTALLATION MENU PAGE – IAS CONFIG D		SW v2.0 and above
Feature	Options	Actual Setting
IAS UNITS	kts, mph	KTS
TAPES	UNLOCKED, LOCK OFF, LOCK ON	unlocked
VSPD EDIT	UNLOCKED, LOCKED	unlocked
Not Used		
Not Used		
Notes:		

INSTALLATION MENU PAGE – IAS CONFIG E (SW v2.2 and above)

IAS DISPLAY – DISABLE will remove the airspeed bug from the tape, the upper left window, and the left knob.

ALT DISPLAY – DISABLE will remove the altitude bug from the tape, the upper right window, and the right knob.

BARO DISPLAY – When disabled will remove the BARO setting from the right knob and the BARO display from the center Databar. The Disable setting will also remove the baro-corrected altitude label from the A429 and RS232 busses.

CAUTION – Setting BARO DISPLAY to DISABLE may only be used when the TAPES are Locked Off and it is a stand-alone PFD. PFD/MFD Installations must be set to ENABLE.

INSTALLATION MENU PAGE – IAS CONFIG E		SW v2.2 and above
Feature	Options	Actual Setting
IAS DISPLAY	DISABLE, ENABLE	ENABLE
ALT DISPLAY	DISABLE, ENABLE	ENABLE
BARO DISPLAY	DISABLE, ENABLE (read Caution above)	ENABLE
Not Used		
Not Used		
Notes:		

INSTALLATION MENU PAGE – NAV SET UP

The following menu will be used to configure the EFD1000 system for the installed GPS, NAV and autopilot interfaces. The installation wiring diagrams in Section 9 have a Configuration Matrix table that will be used to set ID#1 and ID#2. The GPS A429 Rx Port speed will be set to HIGH or LOW. Set NAV#2 Position Source to GPS1 if it is desired to have GPS1 map data displayed when VLOC#2 is selected. Set to GPS2 if GPS2 map data is to be displayed when VLOC#2 is selected.

INSTALLATION MENU Configuration – EFD1000 (continued)

INSTALLATION MENU PAGE – NAV SET UP		SW v2.0 and above
Feature	Options	Actual Setting
GPS/NAV #1	NONE, A, B, C, D, E, F, G, H, I, J, K, L, M, P, Q, R	B
GPS/NAV #2	NONE, A, B, C, D, E, F, G, H, I, J, K, L, M	A
GPS/NAV#1 Speed	HIGH, LOW	LOW
GPS/NAV#2 Speed	HIGH, LOW	LOW
NAV#2 POSITION SOURCE:	GPS1, GPS2 ¹	GPS 2
Notes: (1) Set to GPS2 for dual integrated GPS units (i.e. dual GNS-430/530's)		

INSTALLATION MENU PAGE – RS232 PORT CONFIG A

The following menu is used to configure the RS-232 RX IN sensor ports. Options include GPS TYPE X, WX500, XM Weather, RSM, EFD1000 PFD, EFD1000 MFD, and EFD500 MFD inter-system communication. Note – some ports do not include all interface options. (See wiring diagrams in sections 9 to determine how each port was wired and configure port accordingly)

INSTALLATION MENU PAGE – RS232 PORT CONFIG A		SW v2.0 and above
Feature	Options	Actual Setting
232 IN PORT 0	NONE, RSM	RSM
232 IN PORT 1	NONE, GPS TYPE 1, GPS TYPE 2, GPS TYPE 3, XM	NONE
232 IN PORT 2	NONE, GPS TYPE 1, GPS TYPE 2, GPS TYPE 3	NONE
232 IN PORT 3	NONE, WX500	NONE
232 IN PORT 4	NONE, EFD1000 MFD, EFD1000 PFD, EFD500 MFD	NONE
Notes: GPS TYPE 1 = KLN94/90B "standard", GPS TYPE 2 = KLN94 Enhanced, GPS TYPE 3 = CX50/55/60/65		

INSTALLATION MENU PAGE – RS232 PORT CONFIG B

The following menu is used to configure the RS-232 RX IN 5 sensor port and the four RS-232 TX OUT ports. Options include XM Weather, WX500, ADC (two types) and PFD or MFD inter-system communications. Note – some ports do not include all interface options. (See wiring diagrams in sections 9 to determine how each port was wired and configure port accordingly)

INSTALLATION MENU PAGE – RS232 PORT CONFIG B		SW v2.0 and above
Feature	Options	Actual Setting
232 IN PORT 5	NONE, EFD1000 MFD, EFD1000 PFD, EFD500 MFD	NONE
232 OUT PORT 0	NONE, RSM	RSM
232 OUT PORT 1	NONE, XM, ADC TYPE 1, ADC TYPE 2	NONE
232 OUT PORT 2	NONE, EFD, ADC TYPE 1, ADC TYPE 2	NONE
232 OUT PORT 3	NONE, WX500, ADC TYPE 1, ADC TYPE 2	NONE
Notes: ADC TYPE 1 = "Z" (Shadin) format, ADC TYPE 2 = "C" (Bendix King C) format		
Note: EFD is any PFD or MFD		

INSTALLATION MENU Configuration – EFD1000 (continued)

INSTALLATION MENU PAGE – ACU CONFIG

The following menu configures the emulation modes for the Flight Director and HDG and CRS Datum interfaces. The installation wiring diagrams in Section 9 have a Configuration Matrix table that will be used to set ACU HSI TYPE and ACU FD TYPE. (See Section 10.4.7.1 for example). Flight Director display pitch and roll offset adjustments are also made.

INSTALLATION MENU PAGE – ACU CONFIG		SW v2.0 and above
Feature	Options	Actual Setting
ACU HSI TYPE	0,1 (0=KI525A, 1=NSD360)	0
ACU FD TYPE	0,1,3,4 (0=NONE,1=KI256, 3=G550, 4=52C77)	0
ACU DATUM	NORMAL, REVERSED	NORMAL
FD PITCH OFFSET ADJ	-10.0 to +10.0 (degrees)	-1.5
FD ROLL OFFSET ADJ	-10.0 to +10.0 (degrees)	0.0
Notes:		

INSTALLATION MENU PAGE – MISC CONFIG A

RSM Orientation – TOP (A-05-111-00, -001, and -002 RSM), BOTTOM (-003 RSM)

RSM GPS Enable – ENABLE if A-05-111-00 or -001 RSM and RSM has view of satellites. Set to DISABLE if -002 or -003 RSM or RSM is internal with no view of satellites.

RSM GPS USE – EMER ONLY is the only permitted setting under the STC.

OAT Enable – If RSM is internally mounted or in an area which affects OAT accuracy then set to DISABLE.

Caution – Use of the MODE 2 selection affects the certification of the EFD1000 system and is prohibited.

INSTALLATION MENU PAGE – MISC CONFIG A		SW v2.0 and above
Feature	Options	Actual Setting
RSM Orientation	TOP, BOTTOM (Inverted orientation)	TOP
RSM GPS Enable	DISABLE, ENABLE	ENABLE
RSM GPS USE	EMER ONLY / MODE 2 ¹ (SW v2.2 and above) ¹ (read Caution above)	EMER ONLY
OAT Enable	DISABLE, ENABLE	ENABLE
Not Used		
Notes: The standard EFD1000 MFD RSM does not include a GPS. The RSM GPS enable function for the MFD should be set to disable.		

INSTALLATION MENU PAGE – MISC CONFIG B

The following menu will be used to set the aircraft electrical system voltage. EFD Battery Config will be set to INTERNAL for all -001 EFDs and REMOTE for all -002 EFDs. The Panel Tilt Pitch Adj is aligned for tilted instrument panels and the Panel Roll Adj is adjusted to compensate for slightly misaligned EFD mounting in the instrument panel. See Section 10.4.7.1 for instructions on setting the Panel Tilt Pitch Adj, Panel Roll Adj, and Attitude Ref Symbol adjustments.

INSTALLATION MENU Configuration - EFD1000 (continued)

INSTALLATION MENU PAGE - MISC CONFIG B		SW 2.0 and above
Feature	Options	Actual Setting
ELEC SYSTEM	14 VOLT, 28 VOLT	28
EFD BATTERY CONFC:	INTERNAL, REMOTE*	INTERNAL
ATTITUDE REF SYMBOL ADJ:	-5.0 to +5.0 degrees	0
PANEL TILT PITCH ADJ	-10.0 to +20.0 degrees	0
PANEL ROLL ADJ	-2.0 to +2.0 degrees	-1.0
Notes: * REMOTE is for EFD1000 MFD (-002) with EBB58 only		

INSTALLATION MENU PAGE - MISC CONFIG C

COMPOSITE PHASE (VOR1,2) - If the analog NAV receiver has a 180° phase shifted output (i.e., RT-385) then select 180 for VOR1 or 2 or both.

GPSS GAIN - 1.0 is default, Rate Based autopilots may need a setting of up to 2.0.

429 IN PORT 5 - Set to TRAFFIC if a traffic receiver is wired, otherwise set to NONE.

CRS SDI - For a dual A429 GPS interface set to NAV 1/2 and set GPS1 for SDI=LNAV1 and GPS2 for SDI=LNAV2. All other GPS configurations set to COMMON. See Figure 9.27.

OBS DISPLAY - Set to ENABLE (this is a user preference item and can be set to disable).

INSTALLATION MENU PAGE - MISC CONFIG C		SW 2.0 and above
Feature	Options	Actual Setting
COMPOSITE PHASE (VOR1,2)	(0,0) (180,0) (0,180) (180,180)	0,0
GPSS GAIN:	0.5 to 2.0 (0.1 increments)	1
429 IN PORT 5	NONE, TRAFFIC	NONE
CRS SDI	COMMON, NAV 1/2 (SW v2.2 and above)	NAV 1/2
OBS DISPLAY	DISABLE, ENABLE (SW v2.2 and above)	ENABLE
Notes:		

INSTALLATION MENU PAGE - RSM CALIBRATION

The following menu will be used in the next section to calibrate and validate the magnetometer in the RSM. Heading errors of up to +/- 6.0° can be calibrated at 30° increments beginning with North. (Follow RSM Cal procedure in Section 10.5)

INSTALLATION MENU PAGE - RSM CALIBRATION		SW v2.0 and above
Feature	Options	
START CALIBRATION	Press to Initiate	
ACCEPT CALIBRATION?	Press to ACCEPT Cal	
REJECT CALIBRATION?	Press to REJECT Cal	
HDG SEL	030° to 360° (in 30° increments)	
HDG ADJ	-6.0 to +6.0 (degrees)	
Notes:		

INSTALLATION MENU Configuration - EFD1000 (continued)

This table is used to record the HDG ADJ values used to bring the compass heading values in to specification.

RSM CALIBRATION (PFD Software 1.1 and later)	PAGE 1/2	Options	Actual Setting
HDG SEL: 030	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 060	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 090	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 120	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 150	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 180	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 210	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 240	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 270	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 300	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 330	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	
HDG SEL: 360	KEY 4		
HDG ADJ:	KEY 5	Editable: -6 to +6	

INSTALLATION MENU PAGE - ACCEL BIAS CAL

This page is for Factory Calibration only and has no installation purpose.

INSTALLATION MENU PAGE - ACCEL BIAS CAL		SW v2.0 and above
Feature	Options	
BIASES (x,y,z)	Factory Use Only	
START CALIBRATION	Factory Use Only	
ACCEPT CALIBRATION?	Factory Use Only	
REJECT CALIBRATION?	Factory Use Only	
Notes:		

INSTALLATION MENU Configuration - EFD1000 (continued)

INSTALLATION MENU PAGE - WX-500

The following menu is used for WX-500 configuration, system status, and system test. HEAD TYPE is configuration status. It will display NONE if there is no WX-500 connection, DISPLAY when a RS232 RX Port is set to WX500, and CONTROL when a RS232 TX Port is set to WX500.

INSTALLATION MENU PAGE - WX-500		SW v2.0 and above
Feature	Options	Actual Setting
HEAD TYPE	NONE, DISPLAY, CONTROL	NONE
SYSTEM DATA	PAGE1, PAGE2, PAGE3, PAGE4	
STRIKE TEST	Press to Initiate	
NOISE MONITOR	Press to Initiate	
ANTENNA MOUNT	TOP, BOTTOM	
Notes: The HEAD Type menu entry is status only. It is necessary to exit and re-enter the menu to view the updated information.		

INSTALLATION MENU PAGE - NETWORK PAGE

This menu is for diagnostic purposes only. For EA100 installations verify the IP ADDR is set to 192.168.28.12. Use the line select key next to IP ADDR and the right knob to set the value. Subsequent pushes of the line select key will advance the cursor to the right so that each set of digits between the decimal points may be entered.

INSTALLATION MENU PAGE - NETWORK PAGE		SW v2.0 and above
Feature	Options	
IP ADDR	0-255	
SUBNET MASK	0-255	
GATEWAY	0-255	
PORT	0-9999	
Not Used		
Notes: Repeated presses of top 3 line select keys will select one of 4 selectable fields		

INSTALLATION MENU PAGE - DIAGNOSTICS

This menu is for diagnostic purposes only. Note - Operational Time and Flight Time are stored in the configuration module of the aircraft and these times are cumulative for the installation not the EFD unit itself.

INSTALLATION MENU PAGE - DIAGNOSTICS		SW v2.0
Feature	Options	
Not Used		
Not Used		
Not Used		
Not Used		
Not Used		
Notes:		

Certain aircraft can be modified to permit a maximum takeoff weight of more than 12,500 lb. Any aircraft modified in this manner are not eligible for this STC unless specifically noted in this section.

5.1 Pre-Modification Checklist

Complete Table 5.1 and Table 5.2 (if installing MFD) to insure that the aircraft to be modified is a suitable candidate for installation of the EFD1000 PFD/MFD system(s) using this AML-STC. It is required to have a PASS or NA for all rows in order to use this AML-STC as the certification basis for the EFD1000 installation. NA means Not Applicable because no interface is made to that device. Only items designated with "- NA if no ____" may use NA in the PASS column.

PRIMARY FLIGHT DISPLAY - PFD		
ITEM	CRITERIA	PASS
1	Is the aircraft to be modified on the Approved Model List (AML)?	✓
2	Does aircraft have sufficient electrical capacity to supply all required equipment given the current draw in Table 7.1?	✓
3	Is there an acceptable location to mount or relocate the required standby instruments in the pilot's field of view? (see Figures 5.3 and 5.4) See the beginning of this section to determine the required standby instruments.	✓
4	Do the standby instruments meet the requirements of Figure 5.1 and 5.2?	✓
5	Is there acceptable clearance between the control column (yoke or stick) and the PFD when the flight controls are in the full nose down position.	✓
6	If removing an EFIS system - does the EFD1000 replace all required instrumentation previously displayed on the removed EFIS? - NA if no EFIS	NA
7	Is a backup navigation indicator required (see section 5.2.4) - NA if no Backup NAV indicator is required. If a backup indicator is required, is there an acceptable location to mount or relocate a required backup NAV Indicator in the pilot's field of view? (see Figure 5.4)	✓
8	Is there an acceptable location to mount the RSM? (see Section 6.9)	✓
9	Is there a location to mount the necessary circuit breakers that will be accessible to the pilot while seated?	✓
10	Are there suitable locations to mount the necessary switches that are accessible to the pilot while seated? - NA if not installed.	✓
11	Does the aircraft have a compatible GPS receiver or will one be installed? (see Electrical Interface Section 8 to determine compatibility) - NA if no GPS interface.	✓
12	Does the aircraft have a compatible Navigation receiver or will one be installed? (see Electrical Interface Section 8 to determine compatibility) - NA if no NAV interface.	✓
13	If the aircraft is equipped with an autopilot - is the Autopilot compatible? (see Electrical Interface Section 8 to determine heading and nav compatibility, and Appendix F to determine attitude input (KI-256 replacement compatibility) - NA if no autopilot interface.	✓
14	If the aircraft is limited to VFR, is there a placard or equivalent acceptable means, stating "Operation of This Aircraft is Limited to VFR Only", or similar phraseology acceptable to the FAA, as required by § 23.1525, § 23.1559 and § 91.9. Since the kinds of operations are limited to VFR, this placard or equivalent acceptable	NA

PRIMARY FLIGHT DISPLAY – PFD		
ITEM	CRITERIA	PASS
	means should already be in place, but should be verified.	N/A
15	If the aircraft is Class III, is the PFD software level B?	N/A

Table 5.1 – PFD Pre-Modification Checklist

MULTI FUNCTION DISPLAY – MFD		
ITEM	CRITERIA	PASS
1.	If an EFD1000 MFD is installed and the standby airspeed and/or altimeter are to be removed, is there an acceptable location to mount the required EBB58 Emergency Backup Battery? <i>NA if no backup instruments removed.</i>	N/A
2.	If an EFD1000 MFD is installed, does the aircraft have an IFR GPS installed? <i>NA if EFD1000 MFD not installed.</i>	
3.	If an EFD1000 MFD is installed, does the aircraft have an alternate static source?	
4.	Does the aircraft have a standby attitude indicator in the pilot's primary maximum field of view (See Figure 5.3)?	
5.	Does the aircraft have a V_{mo} or barber pole type airspeed indicator (Maximum Allowable Airspeed Indicator) installed? If yes, then it cannot be removed from the instrument panel and must be installed adjacent to, and directly to the left of the attitude indicator on the EFD1000 PFD. <i>NA if no V_{mo} IAS indicator.</i>	
6.	If the standby airspeed indicator and altimeter are to be removed, is there an acceptable location to mount the required placard reading "EMER BAT DISPATCH LIMIT 80% – SEE EFD AFMS"? <i>NA if EBB not required to be installed.</i>	
7.	Is there an acceptable location to mount and label the EBB emergency disconnect switch? <i>NA if EBB not required to be installed.</i>	
8.	Does aircraft have sufficient electrical capacity to supply all required equipment given the current draw in Table 7.1?	
9.	Is there an acceptable location to mount or relocate the required standby airspeed and altitude instruments, collocated with the standby attitude indicator, all within the pilot's primary maximum field of view? (see Figure 5.3 and 5.4)	
10.	Do the standby instruments meet the requirements of Figure 5.1 and 5.2?	
11.	Is there acceptable clearance between the control column (yoke or stick) and the MFD(s) when the flight controls are in the full nose down position?	
12.	Is there an acceptable location to mount the EFD1000 MFD RSM? (see Section 6) – <i>NA if EFD500 only installation</i>	
13.	Is there a location to mount the MFD circuit breaker(s) that will be accessible to the pilot while seated?	
14.	Is there a location to mount the MFD switch(s) that is accessible to the pilot while seated?	

Table 5.2 – MFD Pre-Modification Checklist

EFD1000 Configuration Checklist

Please take a moment to fill out the following information for your Evolution Flight Display installer. The first set of airspeeds, V-Speed Bands and Markers, will be permanently set during the installation of the EFD1000 Pro PFD installation and are not adjustable. Refer to your Aircraft Flight Manual (AFM), Pilot Operating Handbook (POH), Supplemental Type Certificates (STCs) or other legal form of documentation (e.g., Placard) for the correct values.

The second set of airspeeds, V-Speed Textual Markers, is adjustable if you request that they remain unlocked. For Textual Markers that you do not want to display, enter 0 (zero).

ATTENTION:
This document must
be completed and
provided to your
avionics installer!

Aircraft Type: PA34-220T
Aircraft Tail #: N220TG
Owner/Operator (please print): DAVID & NANCY AUTH
Aircraft S/N: 3449265

V-Speed Bands and Markers

Vne	<u>204</u>	
Vno	<u>164</u>	
Vfe	<u>113</u>	
Vs	<u>67</u>	
Vso	<u>61</u>	
Vyse	<u>88</u>	Multi engine only
Vmc	<u>66</u>	Multi engine only
△	<u>140</u>	Initial flap extension speed

V-Speed Textual Markers

Va	<u>139 MAX WT</u> <u>113 MIN WT</u>	* How ARE THESE HANDLED?
Vbg	<u>0</u>	
Vref	<u>80</u>	
Vr	<u>81</u>	
Vx	<u>83</u>	
Vy	<u>88</u>	
Vlo	<u>107</u>	Retractable gear only
Vle	<u>128</u>	Retractable gear only



WARNING

Failure to set V-Speeds as certified will render the aircraft unairworthy.

I would like the Airspeed Textual Markers entered above (check one): ☐ LOCKED ☒ UNLOCKED

Please sign:

Owner/Operator: Nancy L. Auth Date: 1/19/11

EFD1000/500 Installation Final Check Sheet
(page 1 of 5)

Aircraft Type: PA-34-220T

Date: 3/3/2011

Aircraft Serial Number: 3449265

Tail Number: N220TG

The following five pages must be printed and used during checkout. The Section number refers to the section in the manual where the test is performed. This form must be included in document package to be included in aircraft maintenance records.

Complete by performing test of Section 10.5.4(EFD1000)

Calibrated Heading Source	TOLERANCE	Actual PFD Heading	Calibrated Heading Source	TOLERANCE	Actual PFD Heading	Actual MFD Heading
30	+/- 4	32	210	+/- 4	212	
60	+/- 4	62	240	+/- 4	242	
90	+/- 4	93	270	+/- 4	270	
120	+/- 4	123	300	+/- 4	302	
150	+/- 4	153	330	+/- 4	334	
180	+/- 4	181	360	+/- 4	003	

Complete by performing test of Section 10.6.1(EFD1000)

IAS Setting	Band Color	Band Range	Description	Pass
$V_{ne} = 204$	Red	$> V_{ne}$	Red arc displayed at all speeds above V_{ne}	✓
$V_{no} = 164$	Yellow	$V_{no} - V_{ne}$	Yellow arc extending from V_{no} to V_{ne}	✓
$V_s = 67$	Green	$V_s - V_{no}$	Green arc extending from V_s to V_{no}	✓
$V_{fe} = 113$	White	$V_{so} - V_{fe}$	Top of White arc	✓
$V_{so} = 61$	White		Bottom of White Arc	✓
$V_{yse} = 88$	Blue Marker	$= V_{yse}$	Blue Marker at V_{yse}	✓
$V_{mc} = 66$	Red Marker	$= V_{mc}$	Red Marker at V_{mc}	✓
$\triangle = 140$	Triangle (White)	$= \triangle$	White triangle at initial flap extension airspeed	✓

NOTE: Single engine aircraft and aircraft with no flaps will not use all parameters above

EFD1000/500 Installation Final Check Sheet
(page 2 of 5)

SECTION	POST INSTALLATION TESTS	PASS	FAIL
10.5.4*	Heading Accuracy Check (from Page 1 of 4)	✓	
10.5.5*	Heading Interference Test	✓	
10.6.1*	Indicated Airspeed Test	✓	
10.6.2*	Altitude Display Test	✓	
10.6.3*	System Leak Test	✓	
10.6.4*	OAT- Outside Air Temperature Test (if ENABLED)	✓	
10.6.5*	AHRS (attitude solution) Test	✓	
10.6.6	GPS Sensor Test - GPS1 (if installed)	✓	
10.6.6	GPS Sensor Test - GPS2 (if installed)	✓	
10.6.6*	RSM GPS Sensor Test (if ENABLED)	✓	
10.6.7	NAV Receiver Sensor Test - NAV1 (if installed)	✓	
10.6.7	NAV Receiver Sensor Test - NAV2 (if installed)	✓	
10.6.8*	Back-up NAV Indicator Test (if installed)	✓	
10.6.9*	Autopilot Sensor Test (if installed)	✓	
10.6.10*	Flight Director Test (if installed)	✓	
10.6.11*	Sonalert Test (if installed)	N/A	
10.6.12*	Decision Height Test (if installed)	N/A	
10.6.13	Traffic Display Test (if installed)	N/A	
10.6.14	XM Weather Display and Control Test (if installed)	N/A	
10.6.15	WX-500 Display and Control Test (if installed)	N/A	
10.6.16*	Ancillary Equipment Heading and Air Data (if connected)	N/A	
10.6.17*	List equipment interfaced:	N/A	
10.6.18	EFD Inter-System Communication Check (if multi-display)	N/A	
10.6.19	Battery Capacity Check - EBB and Internal batteries > 80% Charge	✓	
10.6.20*	TAPES Configuration Check	✓	
10.6.21	EMI Test	✓	
10.6.22	Flight Control Interference Check	✓	

*Does not apply to an EFD500

EFD1000/500 Installation Final Check Sheet
(page 3 of 5)

SECTION	COMPLIANCE CHECK	PASS	FAIL
6.4	Weight and Balance performed	✓	
7.1	Electrical Load Analysis performed for each EFD	✓	
5.2.1	For aircraft not limited to VFR, a Standby Attitude indicator must be installed in accordance with section 5.2.1	✓	
5.2.2	Standby Airspeed, Altimeter must be installed in accordance with section 5.2.2	✓	
5.2	Is the EBB58 Emergency Backup Battery installed for installations that removed standby Airspeed Indicator and/or Altimeter and replaced them with the MFD1000.	N/A	
5.1	If the EBB58 is installed, is the required placard installed?	N/A	
5.1	If the EBB58 is installed, is the required Emergency Disconnect switch installed and properly labeled?	N/A	
6.5.3	Verify the EBB58 wiring harness and the EFD1000 MFD's RSM wiring is isolated/separated from the EFD1000 PFD's RSM wiring to provide independence.	N/A	
5.2.8	For aircraft limited to VFR, a placard or equivalent acceptable means, stating "Operation of This Aircraft is Limited to VFR Only", or similar phraseology acceptable to the FAA. Note: This placard should be pre-existing under TC or STC. (This verifies that the placard is still present)	N/A	
5.2.9	Cessna 190/195 Aircraft s/n 16083 and below only, verify the TAPES are configured to LOCKED OFF, and the original airspeed indicator and altimeter are in the standard "T" arrangement.	N/A	
5.2.4	Backup Nav Indicator (if required) connected to a nav source installed in pilot's field of view. The indicator must function if the PFD and/or ACU circuit breaker is pulled	✓	
7.2	Circuit breaker installed for each EFD and each ACU.	✓	
6.9.1	RSM location(s) are <2 degrees of needle deflection on hand held compass within 18"x18" survey area	✓	

EFD1000/500 Installation Final Check Sheet
(page 4 of 5)

SECTION	COMPLIANCE CHECK	PASS	FAIL
10.1.2	Each EFD braided ground strap is installed between unit and panel, RSM ground wire attached to ground stud, RSM doubler/mounting plate bonded to airframe ground and ACU(s) chassis bonded to airframe ground. All measure no greater than .003 ohms to ground.	✓	
7.2	Wires, cables, and connectors clearly marked or stamped	✓	
7.2, 5.2.7	When installed, EFD1000/500 master switch(s) and/or circuit breakers and "EBB58 EMER DISC" switch must be easily accessible to flight crew and clearly marked. One switch exists for each display.	✓	
1.1.1	If the aircraft is Class III, does the PFD contain Level B software?	N/A	
11	Post Installation Flight Test	✓	
11.4	Document successful completion of flight test in aircraft log book per FAR 91.407b	✓	
5.2	In aircraft with independent pitot/static systems each EFD1000 must be connected to different systems.	N/A	
5	If an EFD1000 MFD is installed then each EFD1000 display is connected to an IFR GPS	N/A	
6.8.5	EFD1000 PFD and EFD1000 MFD (if installed) do not share the same ground strap location.	N/A	
6.6	Dual RSMs harness shielding (if installed) does not share the same ground path (bonding strap location).	N/A	
6.8.6	If an EFD1000 MFD is installed there is an alternate static source available to the pilot.	N/A	
5.2	In multi-EFD installations, all EFD must be at software version 2.0 or above.	N/A	
5.2	V _{mo} airspeed indicators, verify TAPES are locked off.	✓	
5.2.6	The EBB58 may only be installed in a multiple display configuration and may only be connected to an EFD1000 MFD no other connections are permitted.	N/A	
6.3	Log book entry stating aircraft has been modified in accordance with EFD1000 AML-STC.	✓	
1.10	Update warranty records on Aspen Avionics website at www.aspenavionics.com/dealerramp	✓	

EFD1000/500 Installation Final Check Sheet
(page 5 of 5)

Misc	Complete the Installed Equipment Configuration Matrix in Section 1.2 of the EFD1000 AFMS (900-00008-001) and insert the completed AFMS in the Airplane Flight Manual. (See sample Appendix C)	✓	
Misc	Complete wire routing diagram Figure D1 & D2 in Appendix D. Complete circuit breaker and switch location diagram Figure D3 in Appendix D.	✓	
Misc	Copy of ICA Appendix D with copy of wiring diagrams (Section 9 or installer drafted), copy of Configuration Pages Section 10.4.6 and 10.4.7 for each installed EFD, and copy of Pre-Modification Checklist Table 5.1 and 5.2 inserted. This data package is to be given to owner/operator for inclusion in aircraft permanent records.	✓	
EA100 Adapter Installations Only			
Appendix F	IFR GPS installed and connected to EFD1000		
Appendix F	"A/P AHRS FAIL" annunciator installed in the pilot primary field of view.		
Appendix F	"A/P AHRS FAIL" annunciator powered from the autopilot main breaker so that the light is illuminated whenever the autopilot is powered but the EA100 is not.		
Appendix F	Insert AFMS 900-00008-001 Rev H or later with section 1.2 completed in the Airplane Flight Manual, which must be furnished.		
Appendix F	Post EA100 Test Flight resulted in similar or better performance than the Pre EA100 Test Flight.		

Inspected by (print & sign)

AC Stanley
Installer/ Inspector

3/3/2011
Date



U.S. Department of
Transportation
Federal Aviation
Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020

For FAA Use Only

Office Identification *pmp*

Nm01 SEA FSDO

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft	Make Piper	Model PA34-200T
	Serial No. 3449265	Nationality and Registration Mark N220TG
2. Owner	Name (As shown on registration certificate) David Auth	Address (As shown on registration certificate) 537 5 th Ave West Kirkland, Washington 98033 USA

3. For FAA Use Only

RECEIVED

JUN 26 2006

SEATTLE FSDO

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	(As described in item 1 above)				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address Galvin Flying Service, Inc. 6987 Perimeter Road Boeing Field Seattle, WA 98108	B. Kind of Agency ☐ U.S. Certificated Mechanic ☐ Foreign Certificated Mechanic ☒ Certificated Repair Station ☐ Manufacturer	C. Certificate No. Limited Airframe HUNR846E
---	--	--

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date 6/16/2006	Signature of Authorized Individual <i>Rudy V. Morin</i> RUDY V. MORIN
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7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY	FAA Fit Standards Inspector	Manufacturer	Inspection Authorization	Other (Specify)
	FAA Designee	X Repair Station	Person Approved by Transport Canada Airworthiness Group	
Date of Approval or Rejection 06/16/2006		Certificate or Designation No. HUNR846E	Signature of Authorized Individual <i>Rudy V. Morin</i> RUDY V. MORIN	

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

Aircraft Nationality: USA, Registration N220TG, work completed on June 16, 2006

Work Performed: STC # SA01224AT

Installed wheel hubs with valve stem access door in accordance with LoPresti Speed Merchants Master Drawing List, Report No.36, Revision B, dated April 02, 1997, or later approved revision.

All work was performed on Galvin Flying Service work order 16458

END

☒ Additional Sheets Are Attached

United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA01224AT

This certificate issued to LoPresti Speed Merchants
2620 North Airport Drive
Vero Beach, FL 32960

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air Regulations.

Original Product - Type Certificate Number : 2A13

Make : Piper*

Model : PA-28* Series*

Description of Type Design Change:

Installation of wheel hub caps with valve stem access door in accordance with LoPresti Speed Merchants Master Drawing List, Report No. 36, Revision 'B', dated April 02, 1997, or later FAA approved revision.

Limitations and Conditions:

This approval should not be extended to other aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will produce no adverse effect upon the airworthiness of that aircraft. This determination should include consideration of significant changes in weight distribution such as an increase in the
(See continuation sheet 3 of 4)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application : September 13, 1996

Date of issuance : December 10, 1996

Date reissued :

Date amended : October 21, 1997; April 17, 1998



By direction of the Administrator

Paul C. Sconyers
(Signature)

Paul C. Sconyers
Associate Manager
Atlanta Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

United States of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number SA01224AT

Date of Issuance: December 10, 1996

Date Amended: April 17, 1998

Limitations and Conditions (Continued):

fuselage. "If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission." *Additional Type Certificate Numbers, Makes, and Models are shown on the (Continuation Sheet, Page 2), as follows:

Make	Model	TCDS No.	Cert. Basis
Augusta	F-260 Series	A10EU	CAR 3/FAR 23
Beech	19 Series	A1CE	CAR 3
Beech	23 Series	A1CE	CAR 3
Beech	24 Series	A1CE	CAR 3
Beech	Bonanza 33 Series	3A15	CAR 3
Beech	Bonanza 35 Series	A-777	CAR 3
Beech	Bonanza 36 Series	3A15	CAR 3
Cessna	150 Series	3A19	CAR 3
Cessna	152 Series	3A19	CAR 3
Cessna	172 Series	3A12	CAR 3
Cessna	177 Series	A13CE	CAR 3
Cessna	180 Series	5A6	CAR 3
Cessna	182 Series	3A13	CAR 3
Cessna	185 Series	3A24	CAR 3
Cessna	206 Series	A4CE	CAR 3
Cessna	210 Series	3A21	CAR 3
Commander Aircraft	112 Series	A12SO	FAR 23
Commander Aircraft	114 Series	A12SO	FAR 23
Lake	LA 4 Series	1A13	CAR 3
Lake	250 Series	1A13	CAR 3
Maule	M-4 Series	3A23	CAR 3
Maule	M-5 Series	3A23	CAR 3/FAR 23
Maule	M-6 Series	3A23	CAR 3
Maule	M-7 Series	3A23	CAR 3/FAR 23
Maule	M-8 Series	3A23	CAR 3/FAR 23
Mooney	M-20 Series	2A3	CAR 3
Piper	PA-16/16S	1A1	CAR 3
Piper	PA-17	A-805	CAR 3
Piper	PA-18 Series	1A2	CAR 3
Piper	PA-20 Series	1A4	CAR 3
Piper	PA-22 Series	1A6	CAR 3
Piper	PA-24 Series	1A15	CAR 3
Piper	PA-28 Series	2A13	CAR 3
Piper	PA-30 Series	A1EA	CAR 3
Piper	PA-32 Series	A3SO	CAR 3
Piper	PA-34 Series	A7SO	FAR 23
Piper	PA-39 Series	A1EA	CAR 3
Piper	PA-44 Series	A19SO	FAR 23

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

Manufacturing Drawing

Dwg. No.	Rev	Nomenclature	Models	EO's
			Bonanza 33 Series Bonanza 35 Series Bonanza 36 Series Beech 23 Series Beech 24 Series Beech 19 Series C-150 Series C-152 Series C-172 Series C-177 Series C-180 Series C-182 Series C-185 Series C-206 Series C-210 Series Commander 112 Series Commander 114 Series Swift GC-1A Series Swift GC-1B Series F-260 Series Lake LA 4 Series Lake 250 Series Maule M-4 Series Maule M-5 Series Maule M-6 Series Maule M-7 Series Maule M-8 Series M20 Series PA16 Series PA17 Series PA18 Series PA20 Series PA22 Series PA24 Series PA28 Series PA30 Series PA32 Series PA34 Series PA39 Series PA44 Series PA46 Series TB9 Series TB10 Series TB20 Series TB21 Series TB200 Series	
LSM-200-700	B	Hub Cap		

Revision Control

Dwg. No.	Rev	Date	Nomenclature	Models	EO's
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MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)				Form Approved OMB No. 2120-0020	
US Department of Transportation Federal Aviation Administration				For FAA Use Only	
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This form is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).				Office Identification 20826 SD-FSDO-15	

1. Aircraft	Make	Piper	Model	PA-34-220T	
	Serial No.	3449265	Nationality and Registration Mark	N220TG	
2. Owner	Name (As shown on registration certificate)		Address (As shown on registration certificate)		
	Auth David C		490 S Beach Rd Hobe Sound, FL 33455-2705		

3. For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address Vero Beach Avionics, Inc. Vero Beach Municipal Airport 3160 Airport West Drive Vero Beach, FL 32960	B. Kind of Agency <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td style="width: 95%;">U.S. Certificated Mechanic</td> </tr> <tr> <td></td> <td>Foreign Certificated Mechanic</td> </tr> <tr> <td style="text-align: center;">X</td> <td>Certificated Repair Station</td> </tr> <tr> <td></td> <td>Manufacturer</td> </tr> </table>		U.S. Certificated Mechanic		Foreign Certificated Mechanic	X	Certificated Repair Station		Manufacturer	C. Certificate No. VQVR013Y
	U.S. Certificated Mechanic									
	Foreign Certificated Mechanic									
X	Certificated Repair Station									
	Manufacturer									

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date May 04, 2005	Signature of Authorized Individual AC Stanley
-----------------------------	--

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is

☒ **APPROVED**
☐ **REJECTED**

BY	FAA Fit. Standards Inspector		Manufacturer	Inspection Authorization	Other (Specify)
	FAA Designee	X	Repair Station	Person Approved by Transport Canadian Airworthiness Group	

Date of Approval or Rejection 05-04-2005	Certificate or Designation No. VQVR013Y	Signature of Authorized Individual AC Stanley
--	---	--

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N220TG PIPER PA-34-220T S/N 3449265

Installed Heads Up Technologies XMD076 XM WX Receiver and XMRANT XM Antenna. Installation approved under AML STC # SA00161BO.

The XMR076 Receiver was mounted on the aft Avionics shelf using approved materials. The XMRANT antenna was mounted on the aircraft roof aft following the guidelines as published in AC43.13-2A Chapter 3. The XMR076 was interfaced to the existing Avidyne EX5000 MFD in accordance with the Avidyne FlightMax MFD Installation Manual Pt # 600-00073 Rev 16 and is protected by a 1A Circuit Breaker from the Avionics Buss. Updated EX5000 Main Software to Pt # 530-00162-000 Rev 03 in accordance with Avidyne Service Bulletin # 601-00004-030. Performed Service Bulletin # 601-00004-036 Rev 01, MFD Single-Use Broadcast Activation Utility.

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

All work was performed in accordance with the manufacturer's installation instructions, AC43.13-1B Chapter 7 Sections 1-8, Chapter 11 Sections 3, 6-16 and 17, and Chapter 10; and AC43.13-2A Chapters 2 and 3.

Electrical system load was monitored and found not to exceed manufacturer's specifications.

Aircraft Weight and Balance and equipment List were amended to reflect this installation.

Instructions for continuing airworthiness: None. Maintenance is "on-condition". Should a malfunction occur contact the nearest Certified Repair Facility for assistance.

----- E N D -----

☐ Additional Sheets Are Attached

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)				Form Approved OMB No. 2120-0020	
				For FAA Use Only	
				Office Identification A50-F500-15	
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This form is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).					
1. Aircraft	Make Piper			Model PA-34-220T	
	Serial No. 3449265			Nationality and Registration Mark N220TG	
2. Owner	Name (As shown on registration certificate) New Piper Aircraft, Inc.			Address (As shown on registration certificate) 2926 Piper Drive Vero Beach, Fl. 32960	
3. For FAA Use Only					
The data identified herein complied with applicable airworthiness requirements and is approved only for the above described aircraft subject to conformity inspection by a person authorized in FAR 43.7. Date NOV 20 2002 FAA Inspector <u><i>Tommy Alleva</i></u> Tommy Alleva Principal Aviation Inspector					
4. Unit Identification					5. Type
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				
6. Conformity Statement					
A. Agency's Name and Address			B. Kind of Agency		C. Certificate No.
Sun Aviation, Inc. 3106 Cherokee Dr. Vero Beach, Fl. 32960			U.S. Certificated Mechanic		ECWR470D
			Foreign Certificated Mechanic		
			☒ Certificated Repair Station		
			Manufacturer		
D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.					
Date 29 NOV 2002			Signature of Authorized Individual <i>Robert Peasley</i>		
7. Approval for Return to Service					
Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED					
BY	FAA Fit. Standards Inspector	Manufacturer	Inspection Authorization		Other (Specify)
	FAA Designee	☒ Repair Station	Person Approved by Transport Canadian Airworthiness Group		
Date of Approval or Rejection 29 NOV 2002		Certificate or Designation No. ECWR470D		Signature of Authorized Individual <i>Robert Peasley</i>	

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N220TG PIPER PA-34-220T S/N 3449265

Installed Goodrich SKYWATCH Model SKY 497 and WX-500 Weather Mapping Sensor.

The SKYWATCH is protected by a 5A Circuit Breaker and the WX-500 by a 3A Circuit Breaker, both from the Avionics Buss.

The SKYWATCH antenna was mounted on the aircraft roof above the aft-facing passenger seats. The Mkr Bcn antenna was relocated fwd approx 18" and the WX-500 antenna mounted in the location vacated by the Mkr Bcn antenna. Doublers were fabricated, sealed and attached to the aircraft following the practices as outlined in AC43.13-2A Chapter 3. Airframe manufacturer's Maintenance/Structural manual was consulted to determine airframe limitations for antenna installations. Installed Honeywell International FAA PMA'd Shelf Kit, Pt # 050-03472-0003, between FS201.3 and 223.3, LH side. The SKYWATCH and WX-500 processors were then mounted on the shelf using manufacturer's supplied mounting trays and hardware. A Mid-Continent MD26-28 Peanut Inverter was also mounted on the shelf and used to excite the #2 Bootstrap Circuit of the existing ST-180 Slaved HSI system to provide Heading information to the SKYWATCH and WX-500. Altitude information for the SKYWATCH was obtained from the aircraft's encoded altitude wiring and Transponder/DME suppression from the aircraft's Transponder/DME suppression wiring. Aural warning from the SKYWATCH was wired to the existing GMA-340 Audio Control unswitched/unmuted audio input. The SKYWATCH and WX-500 are displayed on both GNS-430's and the Avidyne FlightMax EX5000 MFD. The GNS-530 is the controlling unit for WX-500 turn-on and function select. The SKYWATCH was installed referencing the data approved by FAA STC # SA00733CH and in accordance with the Goodrich Avionics SKY 497 Installation Manual Pt No 009-10800-001, Rev C, dated 23 February 2001 and the WX-500 in accordance with the Goodrich Avionics WX-500 Installation Manual Pt No 009-11500-001, Rev D, dated 09 November 2001.

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

All work was performed in accordance with the manufacturer's installation instructions, AC43.13-1B Chapter 7 Sections 1-8, Chapter 11 Sections 3, 6-16 and 17, and Chapter 10; and AC43.13-2A Chapters 2 and 3.

FAA Approved Flight Manual Supplement for the Goodrich Avionics SKYWATCH Model SKY 497 dated NOV 20 2002 was installed in the Aircraft's FAA Approved Aircraft Flight Manual. In addition, Pilot's Operating Handbooks for the SKYWATCH and WX-500 were placed on board.

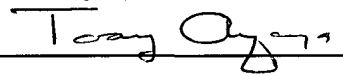
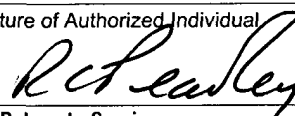
Electrical system load was monitored and found not to exceed manufacturer's specifications.

Transponder/encoder correlation was checked as required.

Aircraft Weight and Balance and Equipment List were amended to reflect this installation.

Instructions for continuing airworthiness: None. The Manufacturer's require no scheduled maintenance to ensure continued airworthiness. Should a malfunction occur, contact the nearest Certified Repair Facility for assistance.

----- E N D -----

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)				Form Approved OMB No. 2120-0020	
US Department of Transportation Federal Aviation Administration				For FAA Use Only	
				Office Identification A60-FSDO-15	
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This form is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).					
1. Aircraft	Make Piper			Model PA-34-220T	
	Serial No. 3449265			Nationality and Registration Mark N220TG	
2. Owner	Name (As shown on registration certificate) New Piper Aircraft, Inc.			Address (As shown on registration certificate) 2926 Piper Drive Vero Beach, Fl. 32960	
3. For FAA Use Only					
The data identified herein complied with applicable airworthiness requirements and is approved only for the above described aircraft subject to conformity inspection by a person authorized in FAR 43.7. Date NOV 20 2002 FAA Inspector 					
4. Unit Identification					5. Type
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	XXXXXXXXXXXX (As described in item 1 above) XXXXXXXXXXXX				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				
6. Conformity Statement					
A. Agency's Name and Address			B. Kind of Agency		C. Certificate No.
Sun Aviation, Inc. 3106 Cherokee Dr. Vero Beach, Fl. 32960					ECWR470D
			U.S. Certificated Mechanic		
			Foreign Certificated Mechanic		
			☒ Certificated Repair Station		
			Manufacturer		
D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.					
Date			Signature of Authorized Individual		
29 NOV 2002					
7. Approval for Return to Service					
Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED					
BY	FAA Fit. Standards Inspector	Manufacturer	Inspection Authorization		Other (Specify)
	FAA Designee	☒ Repair Station	Person Approved by Transport Canadian Airworthiness Group		
Date of Approval or Rejection		Certificate or Designation No.		Signature of Authorized Individual	
29 NOV 2002					

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N220TG PIPER PA-34-220T S/N 3449265

Removed #1 Garmin GNS-530 and installed Garmin GNS-430 in it's place. Installed Insight Avionics Gemini 1200 Graphic Engine Monitor and Left and Right JPI FS450 Fuel Flow Indicators.

The Gemini 1200 is protected by a 2A Circuit Breaker and the FS450's by 1A Circuit Breakers, all from the Avionics Buss. The GNS-430 utilizes the existing Circuit Breakers that were used for the GNS-430.

Removed the GNS-530 mounting tray and back plate and installed the GNS-430 back plate and mounting tray. All existing wiring and antennas were retained with no changes.

Aircraft Owner was given Electronic Flight Solutions Complete Learning Software for the Garmin GNS530/GNS430 one month prior to A/c delivery.

Placard "GPS LIMITED TO VFR USE ONLY" was placed in clear view of the pilot.

Installed the Gemini 1200 display unit in the Co-Pilot's Instrument panel. Installation was performed in accordance with FAA Approved STC # SA157NE, issued June 4, 1993, as amended through October 11, 1989. All components were installed, wired and secured in accordance with instructions provided within Insight Instrument Corporation Installation Manuals, Dwg 8258, Version 2.2 and Document No 930320, Revision 1.02 or later as appropriate. FAA Approved Flight Manual Supplement For Single and Twin Engine Powered Small Airplanes as Listed on Master Eligibility List of STC SA157Ne dated May 6, 1985 was installed in the Aircraft's Flight Manual.

The FS450 Indicators were mounted in the Co-Pilot's Instrument Panel. The FS450's were installed in accordance with FAA Approved STC # SA00432SE. FAA Approved Flight Manual Supplement for the FS450 Fuel Flow Indicator dated December 18, 2000 was installed in the Aircraft's Flight Manual.

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

All work was performed in accordance with the manufacturer's installation instructions, AC43.13-1B Chapter 7 Sections 1-8, Chapter 11 Sections 3, 6-16 and 17, and Chapter 10; AC43.13-2A Chapters 2 and 3; and AC20-138, appendix 1, paragraph 1.

Electrical system load was monitored and found not to exceed manufacturer's specifications.

Aircraft Weight and Balance and Equipment List were amended to reflect this installation.

Instructions for continuing airworthiness: None. Manufacturer's equipment requires no scheduled maintenance to ensure continued maintenance. Should a malfunction occur, contact the nearest Certified Repair Facility for assistance.

----- E N D -----

☒ Additional Sheets Are Attached

Sun Aviation, Inc.

Avionics Repair Facility
Vero Beach, FL 32960
(772)567-0603

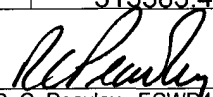
Updated Weight & Balance/Equipment List

Reg. Number: N220TG
Make/Model: Piper PA-34-220T
Year: 2002
Serial Number: 3449265

Date: 12-03-2002
Hobbs: 6.7
Max Weight: 4773
Work Order: 15939

New A/C Empty Weight: 3563.03
New A/C Empty C.G.: 88.57
New A/C Useful Load: 1209.97

Description	Serial Number	Weight	Arm	Moment	Installed	Removed
Previous Aircraft Empty	3449265	3534.50	88.06	311243.8	n/a	n/a
Removed						
GNS-530	78406006	8.47	64.07	542.6		X
Mkr Bcn Antenna		0.45	247.43	111.3		X
Installed						
GNS-430	97112058	6.48	64.07	415.1	X	
EX-5000	1493	6.40	66.30	424.3	X	
Gemini 1200	2367	1.00	64.50	64.5	X	
Probes & Harnesses		4.00	44.00	176.0	X	
2ea. FS-450	4565,4585	0.50	66.30	33.2	X	
SKYWATCH Antenna	80943	2.30	115.00	264.5	X	
Shelf Kit		2.00	208.00	416.0	X	
SKYWATCH Processor	80747	9.82	215.00	2111.3	X	
WX-500 Processor	82436	2.50	215.00	537.5	X	
MD26-28	H22558	1.00	201.00	201.0	X	
WX-500 Antenna	82480	1.00	247.00	247.0	X	
Mkr Bcn Antenna		0.45	229.00	103.1	X	
New Aircraft Values		3563.03	88.57	315583.4		


R. C. Peavley, ECWD470D

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)						Form Approved OMB No. 2120-0020	
US Department of Transportation Federal Aviation Administration						For FAA Use Only	
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This form is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).						Office Identification ASO-FSDO-15	
1. Aircraft		Make Piper Serial No. 3449265			Model PA-34-220T Nationality and Registration Mark N220TG		
2. Owner		Name (As shown on registration certificate) New Piper Aircraft, Inc.			Address (As shown on registration certificate) 2926 Piper Drive Vero Beach, FL 32960		
3. For FAA Use Only							
The data identified herein complied with applicable airworthiness requirements and is approved only for the above described aircraft subject to conformity inspection by a person authorized in FAR 43.7.							
Date DEC 11 2002 FAA Inspector Tony Ayers TONY AYERS PRINCIPAL AVIATION INSPECTOR							
4. Unit Identification						5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration		
AIRFRAME	~~~~~ (As described in item 1 above) ~~~~~				X		
POWERPLANT							
PROPELLER							
APPLIANCE	Type						
	Manufacturer						
6. Conformity Statement							
A. Agency's Name and Address				B. Kind of Agency		C. Certificate No.	
Sun Aviation, Inc. 3106 Cherokee Dr. Vero Beach, FL 32960						ECWR470D	
				U.S. Certificated Mechanic			
				Foreign Certificated Mechanic			
				X			
				Manufacturer			
D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.							
Date				Signature of Authorized Individual			
13 December 2002				RC Peasley			
7. Approval for Return to Service							
Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED							
BY	FAA Fit. Standards Inspector		Manufacturer	Inspection Authorization		Other (Specify)	
	FAA Designee	X	Repair Station	Person Approved by Transport Canadian Airworthiness Group			
Date of Approval or Rejection			Certificate or Designation No.		Signature of Authorized Individual		
13 December 2002			ECWR470D		RC Peasley		

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N220TG PIPER PA-34-220T S/N 3449265

A satisfactory flight check was conducted on the Garmin International GNS-430 GPS Navigation System previously installed by FAA Form 337 dated 11-29-2002. The GPS System was found to meet the system accuracy requirements of AC 20-138, paragraph 8c(2)(iv).

FAA Approved Flight Manual Supplement dated DEC 11 2002 was installed into the Aircraft's Approved Flight Manual.

Removed Placard "GPS LIMITED TO VFR USE ONLY".

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

Attachment: Operational Flight Check Data - Work Sheet.

----- E N D -----

☒ Additional Sheets Are Attached

SUN AVIATION, INC.
FAA CRS ECWR470D
GPS & LORAN C
OPERATIONAL FLIGHT CHECK DATA - WORK SHEET

LEGEND: / = PASS, X = FAIL, N/A = NOT APPLICABLE

- A. / Evaluate all operating modes of the equipment.
 B. / Examine interface with other equipment.
 C. / Review failure modes and associated annunciations.
 D. / Evaluate steering response with autopilot coupled.
 E. / Evaluate instrument interface with HSI, CDI, etc.
 F. / Asses all switching and transfer functions including high-power electrical loads and electrical bus switching.
 G. / Evaluate EMI & RFI on VHF frequencies 121.125, 121.150, 121.175, 121.200, 121.225, 121.250, 131.200, 131.225, 131.250, 131.275, 131.300, 131.325, 131.350 (modulated and unmodulated for 20 second transmissions).
 H. / Evaluate accessibility of equipment controls.
 I. / Evaluation of visibility of displays and annunciators. No distracting cockpit glare or reflections.
 J. / Analysis of crew workload.
 K. / Accuracy should be verified by conducting at least 5 (five) low-level overflights of known landmarks.

HDG	WPT	LAT/LON	MEASURED LAT/LON
110/290	A	N27 39.33/W80 25.30	N 27 39.34 W 80 25.33
090	PHK	N26 47.10/W80 41.60	N 26 46.98 W 80 41.47
180	PHK	N26 47.10/W80 41.60	N 26 46.95 W 80 41.42
270	PHK	N26 47.10/W80 41.60	N 26 46.96 W 80 41.52
360	PHK	N26 47.10/W80 41.60	N 26 46.90 W 80 41.48

Accuracy (FTE nmi) GPS/Multi-Sen Loran C

Note: 1 min. of Lat = 1 nmi

Enroute, on airways:	2.0	3.0	1 min of lon = 1 nmi X Cos
Terminal:	1.0	2.0	of Angle of Lat. e.g. 1 min of
Approach:	0.25	0.6	Lon @28 deg Lat = 1X.8828
			= .8828 nmi.

- L. / Verify continuity of navigation data during normal aircraft maneuvers including 30 degree bank turns for one minute.
 M. N/A Loran receiver should demonstrate the ability to properly acquire at least 5 in-flight and 5 ground acquisitions.
 N. / For equipment approved for approach, conduct at least 3 (three) published instrument approaches (retrieved from the data base) to verify operation.

Equipment Mfg. GARMIN Model GNS-430
 Aircraft N 220TG, Make Piper, Model PA-34-220T, has completed an operational flight check in accordance with the applicable requirements:

GPS: AC 20-138, para 8c(2)(iv).

GPS Multi-Sensor: AC 20-130A, paragraph 9c(2)(iv).

Loran C: AC 20-121A, para 10a(3)(i) and para 10b(6).

Signature Robert S. [Signature] Cert. No. for ECWR470D Date 12/2/2002

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)				Form Approved OMB No. 2120-0020 For FAA Use Only Office Identification ASO-FSDO-15	
US Department of Transportation Federal Aviation Administration					
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This form is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).					
1. Aircraft	Make Piper		Model PA-34-220T		
	Serial No. 3449265		Nationality and Registration Mark N220TG		
2. Owner	Name (As shown on registration certificate) New Piper Aircraft, Inc.		Address (As shown on registration certificate) 2926 Piper Drive Vero Beach, Fl. 32960		
3. For FAA Use Only					
The data identified herein complied with applicable airworthiness requirements and is approved only for the above described aircraft subject to conformity inspection by a person authorized in FAR 43.7.					
Date <u>DEC 11 2002</u> FAA Inspector <u>Tony Ayala</u> TONY AYALA FEDERAL AVIATION INSPECTOR					
4. Unit Identification					5. Type
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				
6. Conformity Statement					
A. Agency's Name and Address		B. Kind of Agency		C. Certificate No.	
Sun Aviation, Inc. 3106 Cherokee Dr. Vero Beach, Fl. 32960		U.S. Certificated Mechanic		ECWR470D	
		Foreign Certificated Mechanic			
		X Certificated Repair Station			
		Manufacturer			
D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.					
Date		Signature of Authorized Individual			
<u>13 December 2002</u>		<u>R. C. Peasley</u>			
7. Approval for Return to Service					
Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED					
BY	FAA Flt. Standards Inspector	Manufacturer	Inspection Authorization		Other (Specify)
	FAA Designee	X Repair Station	Person Approved by Transport Canadian Airworthiness Group		
Date of Approval or Rejection		Certificate or Designation No.		Signature of Authorized Individual	
<u>13 December 2002</u>		ECWR470D		<u>R. C. Peasley</u>	

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N220TG PIPER PA-34-220T S/N 3449265

Installed Avidyne FlightMax EX5000 Multi Function Display.

The EX5000 is protected by a 5A Circuit Breaker from the Avionics Buss.

The EX5000 was mounted in the Co-Pilot's Instrument Panel. The EX5000 was mounted using the Avidyne MFD Adapter Plate, P/N 120-00125-000 and approved hardware. Interface was made to the following equipment: Goodrich SKYWATCH and WX-500, and #1 and #2 Garmin GNS-430's. In addition, an RA Miller AV-14 Communications Antenna was mounted on the top of the Aircraft's fuselage, aft, and a cable run to the EX5000 to provision the unit for the addition of FIS Weather. Aircraft manufacturer's Maintenance/Structural Manual was consulted to determine airframe limitations for antenna installation. Installation was performed in accordance with the Avidyne FlightMax Installation Manual for the Model EX5000 MFD, P/N 600-00073 and following the guidelines as published in FAA STC # SA00143BO.

Installation is in compliance with FAR 23.1301, 23.1309 and 23.1431.

All work was performed in accordance with the manufacturer's installation instructions and AC43.13-1B Chapter 7 Sections 1-8, Chapter 11 Sections 3, 6-16 and 17, and Chapter 10; and AC43.13-2A Chapters 2 and 3.

Electrical system load was monitored and found not to exceed manufacturer's specifications.

Aircraft Weight and Balance and Equipment List were amended to reflect this installation.

Instructions for continuing airworthiness: Attached

----- E N D -----

☒ Additional Sheets Are Attached

Avidyne EX 5000 MFD
Instructions For Continued
Airworthiness

FAA APPROVED

DATE

ORLANDO FSDO-10

DEC 11 2002

FAA APPROVED:

Tony Ogden
FAA APPROVED SIGNATURE

1. Maintenance Instructions

Other than the periodic servicing task discussed below, maintenance of the Avidyne 700-00004-XXX-() MFD is based on condition only; no other periodic maintenance is required.

1.1 Recommended periodic scheduled servicing tasks

The Avidyne 700-00004-XXX-() MFD contains a 3-volt lithium battery that maintains CMOS memory on an internal processor board and should be replaced after 10 years of service, or when CMOS memory fails to retain configuration data, whichever occurs first. The Avidyne MFD must be returned to an authorized FAA repair station to perform this maintenance function. Failure of the CMOS memory is indicated by the message "WARNING: CMOS battery failure. Check database expiration date. Press any bezel key to continue" on a blue background prior to system boot up. After system boot up, the MFD will function normally, but will not have retained the system date and time. If the system is interfaced to the GNS 430 through ARINC 429, it will acquire current date and time from the GNS 430 when valid satellite data is received.

2. Troubleshooting Information

The Avidyne MFD incorporates a message bar located at the bottom of the display. Messages are generated by the system and displayed on the message bar and are helpful in troubleshooting system problems. The following tables present the messages that are generated by each application.

Table 2 - GPS Messages

Message	Meaning
Nav Source: Not Responding	No RS 232 or ARINC 429 GPS data is being received. Check wiring and Comm port setting.
Nav Source: Position Data Not Valid	Data is being received from the external GPS. However, insufficient information is available to determine position. Aircraft could be in the hanger or the GPS may not have determined its "fix" or location.
Nav Source: Position Data Valid	The MFD is receiving valid position data from the GPS.
Nav Source: Data Format Error	Data is being received, however the MFD does not recognize the data as the format selected. May indicate a baud rate or receiver type error.
Nav Source: No Port selected	The COMM port setting in the GPS setup dialog is set to NONE. To correct this, choose the port to which the GPS is connected, typically COM2.
Nav Source: Reconnecting	This message is displayed when data between the MFD and the GPS is being synchronized.
Nav Source: Can't Open Port	Another device is configured for the same port. Check the Setup page for all devices. Typically the GPS is configured for RS 232 Port 2 or ARINC 429 port 1. A second GPS can only be configured for ARINC port 2.

Heading Data is NOT VALID	Heading data is no longer available from the GPS. Will only appear if the GPS is being used as the heading source.
Heading Data is VALID	Heading data has been restored.

Table 3- Lightning Messages

Message	Meaning
Lightning Sensor is Operating Normally	Verification that strike data to the MFD is valid.
Lightning Sensor in Demo Mode	Demo mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor is in Noise-Monitor Mode	Noise-Monitor mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor in Test Mode	Test mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor ERROR	The sensor system has reported an error that may mean current data is incomplete or erroneous. The error may clear.
Lightning Sensor has FAILED	The sensor system has reported an error that may mean current data is incomplete or erroneous. The error will not clear until power is removed from and reapplied to the sensor system.
Lightning Sensor is OFF	Communication of strike data from the Lightning sensor to the MFD has been lost.
Lightning Ahead	The Lightning Ahead option has been checked on the Lightning Setup page. Displayed when a Lightning Ahead condition exists.
Lightning Heading Source Failed	Heading data is no longer available from the WX-500. Strike data may still be valid. Will only appear if the WX-500 is being used as the heading source.
Lightning Heading Source OK	Heading data has been restored.
Stuck mic-PLEASE CHECK	Check the comm transmitters for indication of a stuck mike.
Verify Antenna Location (run Setup)	There may be an inconsistency between the antenna location jumper setting and the software configuration. This message should only appear during installation.

Table 4 - Traffic Messages

Message	Meaning
Traffic Sensor is OFF (TAS)	Traffic data is not being received.
Traffic Sensor is in Stand-By (TAS)	The Skywatch sensor has been placed in Standby mode.
Traffic Sensor is in Self-Test (TAS)	The Skywatch sensor has been placed in Self-Test mode.

Traffic Sensor is Operating Normally (TAS)	Verification that Traffic data is valid.
TCAD Altitude Unavailable (TCAD)	Occurs when altitude data has been lost from the TCAD sensor.

3. Removal and Replacement Information

3.1 Removal

Remove the Avidyne MFD from the instrument panel by turning four corner-mounted ¼-turn fasteners counter-clockwise and pulling the unit away from instrument panel. Remove the avionics console hump with the four fasteners if necessary. Remove the connector located on the back of MFD by turning two jackscrews counter-clockwise.

3.2 Installation

To install the MFD, secure the connector onto the MFD and tighten the two jackscrews. Assure that the service loop of the MFD cable is routed away from any moving parts behind the instrument panel. Secure the MFD to the instrument panel by turning four corner-mounted ¼-turn fasteners clockwise.

Upon reinstallation, a functional check should be performed in accordance with the System Setup and Checkout procedures detailed in Section 7.3

3.3 System Setup and Checkout

Any time the Avidyne MFD is removed and sent to the factory for service, or is replaced with another unit, these system setup procedures should be performed to assure that the unit is properly configured for the installation. This section should also be referenced if it is suspected that the unit may be misconfigured.

Turn on the MFD by applying power to the aircraft battery and avionics bus master switches. The green bezel key backlighting should illuminate to full intensity when the Instrument Lights dimmer control is turned fully counterclockwise. As the dimmer control is turned clockwise, the bezel key lighting should dim fully, and then increase in intensity.

3.3.1 Maintenance Mode Access

Upon initial system power-up, the MFD will execute a start-up sequence. During this time, the screen will initially display the FlightMax logo, followed by a blank screen until a blue screen with the text "Initializing-Please Wait..." is displayed. The startup sequence is finished when the text "Press any bezel key to Continue..." is displayed. The initialization screen displays the loaded software version, along with NavData and Obstacle database expiration dates.

Apply power to all sensors that interface with the MFD such as GPS navigator, lightning sensor, and traffic sensor. The MFD configuration is accomplished in the setup pages that are accessed through the Maintenance Mode, which is accessed as follows:

1. Upon completion of system initialization, rotate the page knob to the *Setup* page.

2. Simultaneously press and hold the top and middle left-hand bezel keys for at least 5 seconds until the maintenance page appears, which is shown in Figure 7.

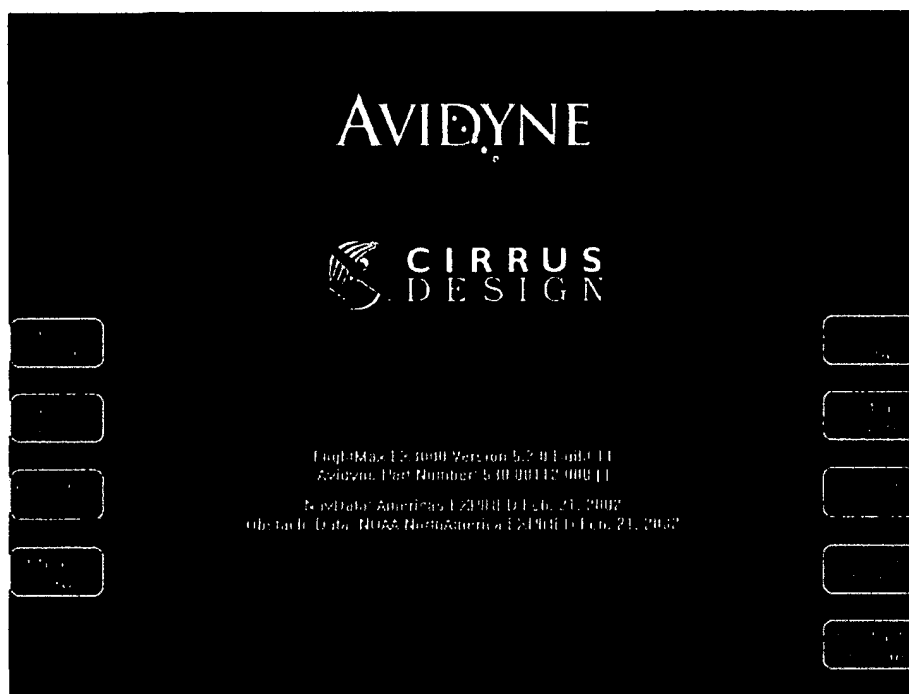


Figure 1 - Maintenance Mode Page

3.3.2 GPS Interface, Setup and Checkout

The GPS is interfaced to the MFD by either of two methods selected at the time of initial installation: ARINC 429 or RS 232. The ARINC 429 interconnect requires that a shielded pair connect the MFD to the GPS navigator. The RS 232 interconnect requires that a single shielded wire connect the MFD to the GPS navigator. Refer to the MFD wiring diagram, drawing no. 900-00014-000 for details (see Appendix). If it is not known which interface is utilized in a particular installation, select ARINC 429. If this selection is not correct, the message *Nav Source: Not Responding* will be displayed on the Map page after system start-up, in which case the RS 232 selection should be configured on the MFD.

Note: ARINC 429 is the recommended configuration.

From the Maintenance Page, press the *GPS Setup* bezel key to select the GPS Setup page.

3.3.2.1 ARINC 429 Setup

When the ARINC 429 interconnect is used, GPS 1 and GPS 2 are normally connected to the MFD. To select ARINC 429, highlight each configuration line and select the appropriate MFD settings as shown below:

Configuration Item	MFD Setting	Comment
Receiver	GAMA 429 Format	
Port	ARINC 1	Select ARINC 2 for GPS 2
Speed	Low	

Press the *Save* bezel key. The MFD must be restarted for the settings to take effect.

Assure the Garmin GNS 400 series navigator is configured appropriately. To display the ARINC 429 Configuration Page, apply power to the GPS while pressing and holding the ENT key. Release the ENT key when the display activates. After the data base pages, the first page displayed is the MAIN ARINC 429 CONFIG page. While in the configuration mode, pages can be selected by ensuring the cursor is off and rotating the small right knob.

To change data on the displayed configuration page, press the small right knob (CRSR) to turn on the cursor. Turn the large right knob to change between data fields. Turn the large or small right knob to change a field that the cursor is on. Once the desired selection is made, press the ENT key to accept the entry.

The Garmin GNS 400 series navigator should be configured as follows:

Configuration Item	Speed	Data
IN 1	As Required	As Required
IN 2	As Required	As Required
OUT	Low	GAMA 429 Graphics w/Int

3.3.2.2 RS 232 Setup

When the RS 232 interconnect is used, only GPS 1 is connected to the MFD. To select RS 232, highlight each configuration line and select the appropriate MFD settings as shown below:

Configuration Item	MFD Setting
Receiver	King/Aviation Format
Port	COM 2
Baud	9600

Press the *Save* bezel key. The MFD must be restarted for the settings to take effect.

Assure that the Garmin GNS 400 series navigator is configured appropriately. Enter the configuration mode as described in section 7.3.2.1 and display the MAIN RS232 CONFIG Page. Verify that the Channel 1 RS 232 output is set to *Aviation*.

3.3.2.3 GPS Checkout

After verifying the MFD GPS settings, the aircraft should be located where the GPS receiver can receive valid GPS satellite signals and generate a valid position. After the MFD has been restarted, the message *Nav Source: Position Data Valid* and the current aircraft position

should be depicted on the MFD Map display. Refer to Section 6 *Troubleshooting Information* for resolution of any error messages.

3.3.3 Lightning Sensor Interface and Setup

The WX-500 Stormscope lightning sensor interface is optional. Interconnect details are provided on the MFD wiring diagram, drawing no. 900-00014-000. The MFD communicates to and from the WX-500 using RS 232 communications. To configure Lightning, access Maintenance Mode as described in Section 7.3.1 and select *Lightning Setup*. Highlight each configuration item and select the appropriate MFD settings as shown below:

Configuration Item	MFD Setting	Comment
Sensor	WX-500	
Operating Mode	Weather	
Port	COM1	
Stab Type	Synchro	Enter GPS if no other stabilization is provided.
Enable Stabilization?	Check	Leave unchecked if no stabilization is provided.
Enable Lightning Ahead Warning?	Check	Leave unchecked if not desired.
Antenna on Top?	Check	Leave unchecked if WX-500 antenna is mounted on bottom.

Press the *Save* bezel key. The MFD must be restarted for the settings to take effect.

3.3.3.1 Lightning Sensor Checkout

After the MFD has been restarted, the message *Lightning Sensor is Operating Normally* should be displayed in the message bar. If not, refer to Section 6, *Troubleshooting Information*, for resolution of any error messages.

Select the Map display and select *Heading/Track Up*. Select the *Strike* Lightning Mode. From the MFD *Setup* page, push the *Lightning Test* bezel key. Verify that a test strike is depicted on the Map display at approximately 18 NM at 45 degrees relative bearing to the aircraft nose.

Refer to Section 6 *Troubleshooting Information* for resolution of any error messages.

3.3.4 Traffic Sensor Interface, Setup and Checkout

The SkyWatch traffic sensor interface is optional. Interconnect details are provided on the MFD wiring diagram, drawing no. 900-00014-000. The MFD uses an ARINC 429 data connection to receive data from the SkyWatch TRC 497. The MFD provides mode control of the SkyWatch through discrete signals to the SoftKey 1 and Softkey 4 inputs on the TRC 497.

3.3.4.1 Traffic Setup

To configure SkyWatch, access Maintenance Mode as described in Section 7.3.1 and select *Traffic Setup*. Highlight each configuration item and select the appropriate MFD settings as shown below:

Configuration Item	MFD Setting	Comment
Sensor	TAS	
Port	ARINC3	
External Controller?	Unchecked	
Heading Available?	Unchecked	Check if heading data is supplied to the SkyWatch and is available to the MFD.

Press the *Save* bezel key. The MFD must be restarted for the settings to take effect.

3.3.4.2 Traffic Sensor Checkout

After the MFD has been restarted, the message *Traffic Sensor is Operating Normally* should be displayed in the message bar. If not, refer to Section 6, *Troubleshooting Information*, for resolution of any error messages.

Select the Map display and select *Heading/Track Up*. Select the *Normal* Traffic mode. From the MFD *Setup* page, push the *Traffic Test* bezel key. Verify that the traffic self-test pattern is depicted on the Map display as follows:

Symbol Type	Relative Bearing	Approx Range	Relative Altitude
Other	30°	3.5 nm	1000 Feet Below
Other	330°	3.6 nm	1000 Feet Above
TA	270°	2 nm	200 Feet Below

The message *Traffic Sensor is in Self-Test* should appear in the message bar.

Refer to Section 6 *Troubleshooting Information* for resolution of any error messages.

3.3.5 Map Setup

The Avidyne MFD has the capability to overlay Traffic and Lightning information onto the Map display. To utilize this feature, Map requires Heading or Track information.

The MFD can receive HEADING data from one of following sources:

Garmin 400 series GPS (via ARINC 429).

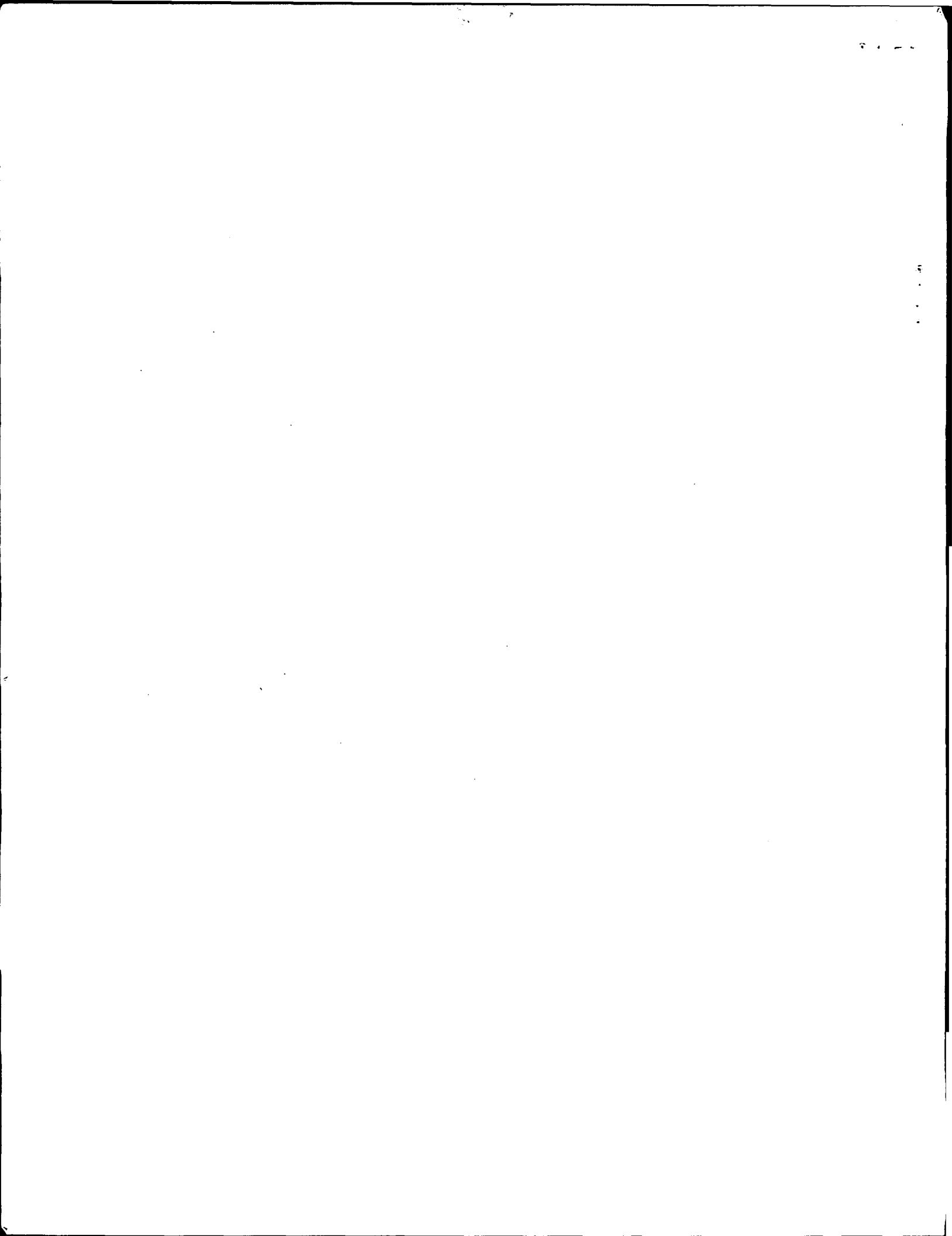
BF Goodrich StormScope (via RS 232). This is the most common method.

BF Goodrich Skywatch (via ARINC 429) with software level 1.6 or higher.

TRACK is the actual direction the aircraft is moving relative to the earth's surface, and is obtained from the GPS.

To configure the Map heading source, access Maintenance Mode as described in Section 7.3.1 and select *Map Setup*. Use the right hand knob to cycle through the selections: None (Use GPS Track), FMS/GPS, Stormscope, and SkyWatch. When the appropriate setting is selected, press the *Save* bezel key. The MFD must be restarted for the setting to take effect.

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U.S. Department
of Transportation
Federal Aviation
Administration

APPLICATION FOR AIRWORTHINESS CERTIFICATE

INSTRUCTIONS - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II and VI as applicable.

I. AIRCRAFT DESCRIPTION	1. REGISTRATION MARK N220TG		2. AIRCRAFT BUILDER'S NAME (Make) PIPER		3. AIRCRAFT MODEL DESIGNATION PA-34-220T		4. YR. MFR. 2002		FAA CODING 7103420	
	5. AIRCRAFT SERIAL NO. 3449265		6. ENGINE BUILDER'S NAME (Make) CONTINENTAL		7. ENGINE MODEL DESIGNATION TSIO-360-RB1B / LTSIO-360-RB1B				17019	
	8. NUMBER OF ENGINES 2		9. PROPELLER BUILDER'S NAME (Make) McCAULEY		10. PROPELLER MODEL DESIGNATION 3AF32C522 / 3AF32C523		11. AIRCRAFT IS (Check if applicable) ☐ IMPORT			

APPLICATION IF HEREBY MADE FOR: (Check applicable items)																						
A	1	☒	STANDARD AIRWORTHINESS CERTIFICATE (Indicate category)		☒	NORMAL	☐	UTILITY	☐	ACROBATIC	☐	TRANSPORT	☐	GLIDER	☐	BALLOON						
B			SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)																			
II. CERTIFICATION REQUESTED	2		LIMITED																			
	5		PROVISIONAL (Indicate class)										1	CLASS I				2	CLASS II			
	3		RESTRICTED (Indicate operation(s) to be conducted)	1	AGRICULTURE AND PEST CONTROL				2	AERIAL SURVEYING				3	AERIAL ADVERTISING							
				4	FOREST (Wildlife conservation)				5	PATROLLING				6	WEATHER CONTROL							
				7	CARRIAGE OF CARGO				0	OTHER (Specify)												
	4		EXPERIMENTAL (Indicate operation(s) to be conducted)	1	RESEARCH AND DEVELOPMENT				2	AMATEUR BUILT				3	EXHIBITION							
				4	RACING				5	CREW TRAINING					MKT SURVEY							
	0	TO SHOW COMPLIANCE WITH FAR																				
	8		SPECIAL FLIGHT PERMIT (Indicate operation to be conducted, then complete Section VI or VII as applicable on reverse side)	1	FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE OR STORAGE																	
				2	EVACUATE FROM AREA OF IMPENDING DANGER																	
3				OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT																		
4				DELIVERING OR EXPORT				5	PRODUCTION FLIGHT TESTING													
6	CUSTOMER DEMONSTRATION FLIGHTS																					
C	6		MULTIPLE AIRWORTHINESS CERTIFICATE (Check ABOVE "Restricted Operation" and "Standard" or "Limited" as applicable.)																			

III. OWNER'S CERTIFICATION	A. REGISTERED OWNER (As shown on certificate of aircraft registration)										IF DEALER, CHECK HERE ☒																			
	NAME THE NEW PIPER AIRCRAFT, INC.										ADDRESS 2926 PIPER DRIVE, VERO BEACH, FL 32960																			
	B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)																													
	☒	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.) A7SO REV 14										☒	AIRWORTHINESS DIRECTIVES (Check if all applicable AD's complied with and give latest AD no.) 2002-21																	
		AIRCRAFT LISTING (Give page number(s)) N/A										☒	SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated) SA09385AC-D																	
C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS																														
☒	CHECK IF RECORDS IN COMPLIANCE WITH FAA FAR 91.417										TOTAL AIRFRAME HOURS 6.6										3 EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed) N/A									
D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Section 501 of the Federal Aviation Act of 1958, and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.																														
DATE OF APPLICATION NOV 10 2002										NAME AND TITLE (Print or type) GUY B. TURNER										AGENT Guy B. Turner										

IV. INSPECTION AGENCY VERIFICATION	A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY (Complete this section only if FAR 21.183(d) applies).																																
	2	FAR PART 121 or 127 CERTIFICATE HOLDER (Give Certificate No.)										3	CERTIFICATED MECHANIC (Give Certificate No.)										6	CERTIFICATED REPAIR STATION (Give Certificate No.)									
	2	AIRCRAFT MANUFACTURER (Give name or firm)																															
DATE										TITLE										SIGNATURE													

V. FAA REPRESENTATIVE VERIFICATION	(Check ALL applicable blocks in items A and B)										☒ THE CERTIFICATE REQUESTED																																							
	A. I find that the aircraft described in Section I or VII meets requirements for										4	AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE																																						
	B. Inspection for a special flight permit under Section VII was conducted by										FAA INSPECTOR										FAR DESIGNEE																													
											CERTIFICATE HOLDER UNDER										FAR 65										FAR 121, 127 OR 135										FAR 145									
	DATE NOV 10 2002										DISTRICT OFFICE CE44										DESIGNEE'S SIGNATURE AND NO. John S. Hambleton										FAA INSPECTOR'S SIGNATURE JOHN S. HAMBLETON										ODARF-511281-CE									

VI. PRODUCTION FLIGHT TESTING	A. MANUFACTURER							
	NAME		ADDRESS					
	B. PRODUCTION BASIS (Check applicable item)							
	☐	PRODUCTION CERTIFICATE (Give production certificate number)						
	☐	TYPE CERTIFICATE ONLY						
	☐ APPROVED PRODUCTION INSPECTION SYSTEM							
C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS —————→								
DATE OF APPLICATION		NAME AND TITLE (Print or type)		SIGNATURE				
VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST	A. DESCRIPTION OF AIRCRAFT							
	REGISTERED OWNER		ADDRESS					
	BUILDER (Make)		MODEL					
	SERIAL NUMBER		REGISTRATION MARK					
	B. DESCRIPTION OF FLIGHT CUSTOMER DEMONSTRATION FLIGHTS ☐ (Check if applicable)							
	FROM		TO					
	VIA		DEPARTURE DATE	DURATION				
	C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT							
	☐	PILOT	☐	CO-PILOT	☐	NAVIGATOR	☐	OTHER (Specify)
	D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS							
	E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION (Use attachment if necessary)							
F. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Section 501 of the Federal Aviation Act of 1958, and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is airworthy for the flight described.								
DATE		NAME AND TITLE (Print or type)			SIGNATURE			
VIII. AIRWORTHINESS DOCUMENTATION (FAA use only)	☒	A. Operating Limitations and Markings in Compliance with FAR 91.9 XXX as Applicable			G. Statement of Conformity, FAA Form 8130-9 (Attach when required)			
	☐	B. Current Operating Limitations Attached			H. Foreign Airworthiness Certification for Import Aircraft (Attach when required)			
	☐	C. Data, Drawings, Photographs, etc. (Attach when required)			I. Previous Airworthiness Certificate Issued in Accordance with			
	☒	D. Current Weight and Balance Information Available in Aircraft			FAR _____ CAR _____ (Original Attached)			
	☐	E. Major Repair and Alteration, FAA Form 337 (Attach when required)			J. Current Airworthiness Certificate Issued in Accordance with			
	☒	F. This inspection Recorded in Aircraft Records			FAR 21.183 (a) per 21.273 (Copy attached)			
	☐							

UNITED STATES OF AMERICA

DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION

STANDARD AIRWORTHINESS CERTIFICATE

1. NATIONALITY AND
REGISTRATION MARKS

N220TG

2. MANUFACTURER AND MODEL

PIPER

PA-34-220T

3. AIRCRAFT SERIAL
NUMBER

3449265

4. CATEGORY

NORMAL

5. AUTHORITY AND BASIS FOR ISSUANCE

This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.

Exceptions:

NONE

6. TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE

NOV 10 2002

FAA REPRESENTATIVE

JOHN STAMBLETON

DESIGNATION NUMBER

ODARF-511281-CE

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

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