ASPEN AVIONICS

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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
or
Aspen Evolution Backup Display

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: _____

Airplane Model: _____

Airplane Registration Number: _____

Airplane Serial Number: _____

FAA APPROVED By: _____ 9/26/16

Manager, Aircraft Certification Office
Fort Worth, Texas

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DOCUMENT REVISIONS FAA APPROVED PAGES

Document Revision	FAA Approved Pages Revised	Description of Change	FAA Approval Date	ECO
Earlier revisions are on file				
W	All	Complete Rewrite, added ADS-B integration	2/20/2015	4258
Y	All	Updated based on FAA comments. Added AOA Functionality.	None	4502
Z	All	Addressed FAA Comments.	17JUL2015	4525
AA	All	Removed references to Pilot Guides from the Limitations Section and added references to the Pilot Guides in the Systems Description section. Updated Copyright to 2016. Added the EBD Model. Added GDL 88 integration information.	None	4712
AB	All	Added caution into Sections 7.9 & 7.11.	31 March 2016	4732
AC	All	Added S-TEC 55X integration to the Installed Equipment List Table and clarified some entries to correspond with the Installation Manual. Added S-TEC 55X integration and new FIS-B annunciations to the Warnings, Cautions and Advisories table and clarified some entries to correspond with the Installation Manual. Updated Pilot Guide revisions, added reference to the VFR PFD Pilot's Guide.	9/26/16	4821

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1 General

1.1 System Overview

The Evolution Flight Display System consists of one or more integrated Electronic Flight Display (EFD1000 or EFD500) systems. The EFD1000 system can be configured as a primary flight display (PFD) or as a multi-function display (MFD) and the EFD500 system can only be configured as a MFD.

When the EFD1000 is configured as a PFD, the EFD1000 provides display of attitude, airspeed, altitude, vertical speed, turn rate, slip/skid and direction of flight. Depending on the optional equipment connected to the EFD1000 and the PFD version, the system can also provide display of lateral and vertical navigation deviations, flight director commands, synthetic vision, weather information, traffic information, and several other features. The following PFD versions are supported on the EFD1000: PFD PRO, PFD PRO C3, PFD VFR, PFD PILOT, PFD EBD Advanced and PFD EBD Basic.

When the EFD1000 is configured as an MFD, the EFD1000 provides navigation and weather information, terrain and obstacle data, and traffic information that can be displayed on a moving map. The EFD1000 MFD also provides PFD reversion capability, synthetic vision, terminal procedure charts, a secondary display of attitude, airspeed, and altitude, and several other features depending on the optional equipment that is connected to the EFD1000.

The EFD500 MFD provides all of the features of the EFD1000 MFD except for PFD reversion capability and a secondary display of attitude, airspeed and altitude.

1.2 Installed Equipment List

Table 1 shows the list of Aspen Equipment installed in this aircraft. Use the table to determine the parts of the AFMS that are applicable to this aircraft.

Table 1 - Installed Equipment List

Installed Equipment	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD1000 PFD PRO C3	EFD1000 PFD PILOT -or- EFD1000 PFD EBD Basic	EFD1000 PFD VFR	EFD1000 MFD	EFD500 MFD	Remarks
N/A = Not Available							
Evolution Flight Display System with Internal Battery Software Version (MAP \ IOP)							
Evolution Flight Display System with Emergency Backup Battery (EBB) Software Version (MAP \ IOP)		N/A		N/A		N/A	
RSM with GPS						N/A	
RSM without GPS						N/A	
Angle of Attack (AOA) System		N/A					

Installed Equipment	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD1000 PFD PRO C3	EFD1000 PFD PILOT -or- EFD1000 PFD EBD Basic	EFD1000 PFD VFR	EFD1000 MFD	EFD500 MFD	Remarks
ADS-B OUT integrated with the Aspen PFD		N/A	N/A		N/A	N/A	ADS-B OUT Make and Model:
ADS-B IN Traffic Interface without TCAS 1 or TAS incorporated		N/A	N/A				ADS-B IN Traffic Interface Make and Model:
Conflict Situational Awareness- traffic alerting (CSA)		N/A	N/A				GDL88 integration only
ADS-B IN Traffic Interface with TCAS I incorporated		N/A	N/A				ADS-B IN Traffic Interface Make and Model:
ADS-B IN Traffic Interface with TAS incorporated		N/A	N/A				ADS-B IN Traffic Interface Make and Model:
TCAS I Traffic Interface			N/A				
TAS Traffic Interface			N/A				
TIS-A Traffic Interface			N/A				
XM Datalink Weather Interface (EWR50)		N/A	N/A				
ADS-B IN (FIS-B) Weather Interface		N/A	N/A				ADS-B IN (FIS-B) Weather Interface Make and Model:
L3 Stormscope® Interface (STRK)		N/A	N/A				
Terminal Procedure Charts	N/A	N/A	N/A	N/A			Requires a database.
MFD NAV Map	N/A	N/A	N/A	N/A	√	√	Requires a database.
EA100 Autopilot AHRS Software Version			N/A			N/A	
Evolution Synthetic Vision and the Aspen Terrain Warning System (TWS)		N/A	N/A	N/A			Requires a database.
10-Hour Evolution Synthetic Vision Demo and the Aspen Terrain Warning System (TWS)		N/A	N/A	N/A	N/A	N/A	Only enabled for a trial period. Acknowledgment page shows the status of the trial period. Requires a database.
Audible alerts for the Aspen Terrain Warning System (TWS)			N/A	N/A	N/A	N/A	Audible alerts are only available if TAWS is not installed.
Aspen Connected Gateway (CG100) Software Version	N/A	N/A	N/A	N/A			Not authorized for EASA-registered aircraft.

Installed Equipment	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD1000 PFD PRO C3	EFD1000 PFD PILOT -or- EFD1000 PFD EBD Basic	EFD1000 PFD VFR	EFD1000 MFD	EFD500 MFD	Remarks
Radar Altitude Numeric Display Input			N/A	N/A		N/A	
Radar Altitude Decision Height Input			N/A	N/A		N/A	
ADF1 Interface			N/A	N/A		N/A	
ADF2 Interface			N/A	N/A		N/A	
VHF1 (VLOC1) Navigation Radio Interface			N/A			N/A	
VHF2 (VLOC2) Navigation Radio Interface			N/A			N/A	
GPS1 Interface							GPS Make and Model:
GPS2 Interface			N/A				GPS Make and Model:
Avionik Straubing APS4A Altitude Pre-selector Function			N/A		N/A	N/A	Not available on the EFD1000 PFD EBD Advanced
A/P Source Select			N/A	N/A		N/A	Not available on the EFD1000 PFD EBD Advanced
Autopilot Mode Annunciations Altitude Preselect and Vertical Speed Control for the S-TEC 55X autopilot with Flight Director		N/A	N/A	N/A		N/A	Available on the EFD1000 MFD in reversion with A/P Source Select installed. Not available on the EFD1000 PFD EBD Advanced
Autopilot Mode Annunciations Altitude Preselect and Vertical Speed Control for the S-TEC 55X autopilot with no Flight Director		N/A	N/A	N/A		N/A	Available on the EFD1000 MFD in reversion with A/P Source Select installed. Not available on the EFD1000 PFD EBD Advanced

Table 2 is used to identify the backup equipment applicable to this aircraft's installation. This table is completed during installation by the installation facility.

Table 2 - Backup Instruments Configuration for the PFD PRO, PFD PRO C3, PFD PILOT or PFD VFR

Model of backup Attitude Indicator in this aircraft:	
Type of Standby Airspeed Indicator in this aircraft: (EFD1000 MFD with EBB or Mechanical Airspeed indicator) *	
Type of Standby Altimeter in this aircraft: (EFD1000 MFD with EBB or Mechanical Altimeter) *	

*An EFD1000 MFD connected to an EBB is required unless a standby mechanical Airspeed indicator and standby Altimeter are installed.

1.3 List of Acronyms and Abbreviations

A	Alert
A/P	Autopilot
ACU	Analog Converter Unit
ADAHRS	Air Data Attitude Heading Reference System
ADF	Automatic Direction Finder
ADS-B	Automatic Dependent Surveillance- Broadcast
AHRS	Attitude Heading Reference System
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
AIR	AIRMET
AIRMET	Airmen's Meteorological Information
AML	Approved Model List
AMMD	Aerodrome Moving Map Display
ANT	Antenna
AOA	Angle of Attack
APPR	Approach
ASPEN GTWY	See GTWY
BARO	Barometric Pressure Setting
BAT	Battery
C	Caution
C3	Class III
CG100	Connected Gateway remote LRU
CHG	Change
CM	Configuration Module
CNUS	Continental United States
Config.	Configuration
CSA	Conflict Situational Awareness -traffic alerting
CTL	Control
CWS	(autopilot) Control Wheel Steering
DH	Decision Height
DISC	Disconnect
EA	Evolution Adapter
EASA	European Aviation Safety Agency
EBB	Emergency Backup Battery
EBD	Evolution Backup Display
ECO	Engineering Change Order
EFB	Electronic Flight Bag
EFD	Evolution Flight Display
EFIS	Electronic Flight Instrument System
EMER	Emergency
EOC	Executable Object Code
ESV	Evolution Synthetic Vision
EWR	Evolution Weather Receiver
EXT PWR	External Power
FAA	Federal Aviation Administration
FIS-B	Flight Information Service- Broadcast
FPL	Flight Plan
FPM	Flight Path Marker
Ft.	Fort
FOV	Field of View
GEO-REFERENCED	Chart scaling that permits ownship depiction
GTWY	Aspen Connected Gateway, including the CG100
GPS	Global Positioning System
GPSS	GPS Steering

HDG	Heading
HORZ	Horizontal
HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
ID	Identification
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
Inc.	Incorporated
INIT	Initialization
INTEG	Integrity
IOP	Input-Output Processor
JSUM	Jeppesen Services Update Manager
KIAS	Knots Indicated Airspeed
KOEL	Kinds of Operations Equipment List
L3	L3 Communications
LRU	Line replaceable Unit
LTNG	Lightning
LOC	Localizer
MAP	Main Application Processor
MEMS	Micro Electromechanical Systems
MFD	Multi-Function Display
MIC	Microphone
MIN	Minimums
MSG	Message
N/A	Not Applicable
NACO	National Aeronautical Charting Office
NAV	Navigation
NAVAIDS	Navigational Aids
NE	Northeast
NEXRAD	Next Generation Radar
NM	New Mexico
NORM	Normal
NOTAM	Notices To Airmen
NXRD	NEXRAD
OAT	Outside Air Temperature
PFD	Primary Flight Display
POM	Pitot Obstruction Monitor
POS	Position
PRESEL	Altitude Preselect
RA	Radar Altitude
REV	Reversion
RGNL	Regional
RMVD	Removed
RSM	Remote Sensor Module
SAI	Secondary Attitude Indicator
SDHC	Secure Digital, High-Capacity
SHSI	Secondary Horizontal Situation Indicator
SID	Standard Instrument Departure
SIG	SIGMET
SIGMET	Significant Meteorological Information
STAR	Standard Terminal Arrival Route
STC	Supplemental Type Certificate
STRK	Strikes (Stormscope)
SV	Synthetic Vision
TAS	True Airspeed
TAS	Traffic Advisory System
TCAS	Traffic and Collision Avoidance System

TERR	Terrain
TFR	Temporary Flight Restriction
TIS	Traffic Information System
TWS	Terrain Warning System
TFC	Traffic
TFCA	Traffic altitude filter “Above”
TFCB	Traffic altitude filter “Below”
TFCN	Traffic altitude filter “Normal”
TFCU	Traffic altitude filter “Unrestricted”
TRFC	Traffic
UAT	Universal Access Transceiver
UNAV	Unavailable
V	Volts
VECT	Vector
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	VHF Omni-directional Radio Range
VLOC	VOR / Localizer
W	Warning
WPT	Waypoint
XFILL	Cross fill
XM	XM Satellite-based weather information

2 Limitations

The following limitations pertain to the installed equipment in the aircraft. See Table 1 for the list of installed equipment in this aircraft.

2.1 Kinds of Operation for the PFD PRO, PFD PRO C3, PFD PILOT or PFD VFR

This is a list of installed Aspen equipment that affects flight operations. This list does not preclude any approved Minimum Equipment List or other equipment required by regulation.

See the aircraft placard located on the flight deck to determine if this aircraft is authorized for Day, Night, VFR or IFR.

At minimum, one vertical column of equipment must be operational for flight. See Table 1 for the equipment installed in this aircraft:

Example: There is a placard in clear view of the pilot that specifies the kind of operations to which the operation of the airplane is limited or from which it is prohibited. If the placard shows authorization for IFR and the aircraft has an operational EFD1000 PFD and EFD1000 MFD, Magnetic Compass, Standby Altimeter, Standby Airspeed Indicator and IFR GPS (Configuration 2), and the aircraft has all the other equipment and certifications required by regulation, the aircraft is qualified for IFR flight.

Table 3 - Minimum Equipment Required for a Flight Operation

	Day VFR	Day/ Night VFR	Day/ Night VFR	IFR Config. 1	IFR Config. 2	IFR Config. 3
EFD1000 PFD (includes PRO, VFR or PILOT)	✓	✓		✓	✓	✓
EFD1000 MFD with EBB		✓		✓		
EFD1000 MFD with Internal Battery					✓	
Magnetic Compass	✓	✓	✓	✓	✓	✓
Standby Attitude Indicator				✓	✓	✓
Standby Airspeed Indicator			✓		✓	✓
Standby Altimeter			✓		✓	✓
IFR Approved GPS				✓	✓	

2.2 EFD1000 PFD System Limitations

1. The moving map display is not a substitute for approved maps or charts required by the operating rules.
2. For the Evolution **Synthetic Vision** option, the following limitations apply:
    a. Maneuvering based solely on the EFD1000 terrain and obstacle depiction is not authorized.
    b. Obstacles on the Synthetic Vision display can be concealed by overlaid indicators such as AOA.
    c. Navigation or maneuvering based solely on the EFD1000 Synthetic Vision background display and associated Terrain Warning System (TWS) is not authorized.
    d. Barometric pressure must be set accurately for proper operation.

e. Cold temperatures affect the accuracy of the SV system.

3. For the **Traffic and Weather** options, the following limitations apply:
   a. Maneuvering based solely on the traffic display is not authorized.
   b. XM Weather information shown on the EFD1000 PFD is supplemental to data available from official sources.
   c. NEXRAD data is limited to the contiguous United Status.
   d. FIS-B information is to be used for pilot planning decisions and pilot near-term decisions focused on avoiding areas of inclement weather that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather.
   e. FIS-B information, including, weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.
4. For **IFR operations** (if this aircraft is authorized for IFR operations) the following limitations apply. See the aircraft placard located on the flight deck to determine if this aircraft is authorized for Day/Night/VFR or IFR.
   a. 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.
   b. For seaplane operation, if the ADAHRS is unable to align due to wave action, departure under IMC or IFR is PROHIBITED.
   c. Takeoff with aircraft voltage (as indicated on the EFD) below 12.3V (14V electrical system) or 24.6V (28V electrical system) is NOT AUTHORIZED.
5. The RSM GPS is limited to EMERGENCY USE ONLY.
6. Barometric pressure must be set accurately for proper terrain depiction.
7. Cold temperatures affect the accuracy of the terrain depiction.
8. For the **EFD1000 PFD VFR**, flying coupled approaches with vertical guidance based solely on the EFD1000 PFD VFR is not authorized. The EFD1000 PFD VFR does not display vertical deviations for the pilot to monitor glide path performance.
9. For the **AOA SYSTEM**, the following limitations apply:
   a. The AOA system is non-required and is to be used only as supplemental information to show the stall margin and trend toward stall. The AOA system is not a substitute for the certified aircraft stall warning system.
   b. Airspeed failure or erroneous airspeed will result in erroneous AOA indications.
   c. No operational credit may be taken for such items as reduced approach speed and shorter landing distances.
   d. The AOA indications are not to be used for takeoff reference.
   e. The AOA indications are not valid when the wings or empennage are frost or ice-contaminated.
   f. The AOA indications are not valid when spoilers or speed brakes are deployed.
10. When the **EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic** is required for operation, the following limitations apply:
    a. When the EBB charge status is less than 80% or has failed, takeoff is NOT AUTHORIZED.

b. When the cabin temperature is below -20°C, takeoff is NOT AUTHORIZED.

c. When the “ON BAT” annunciation is shown on any EFD display, takeoff is NOT AUTHORIZED.

d. Barometric pressure must be set on the EBD.

2.3 EFD1000 and EFD500 MFD System Limitations

1. Maneuvering based solely on the EFD1000 terrain and obstacle depiction is not authorized.
2. For the Evolution **Synthetic Vision** option, the following limitations apply:
   a. Obstacles on the Synthetic Vision display can be concealed by overlaid indicators such as AOA.
   b. Navigation or maneuvering based solely on the EFD1000 or MFD500 Synthetic Vision background display and associated Terrain Warning System (TWS) is not authorized.
   c. Barometric pressure must be set accurately for proper operation.
   d. Cold temperatures affect the accuracy of the SV system.
3. The moving map displays are not a substitute for approved maps or charts required by the operating rules.
4. The RSM GPS is limited to EMERGENCY USE ONLY.
5. Barometric pressure must be set accurately for proper terrain depiction.
6. Cold temperatures affect the accuracy of the terrain depiction.
7. When the EFD1000 MFD is used as the **backup altimeter and/or airspeed indicator** (see Table 2), the following limitations apply:
   a. When the EBB charge status is less than 80% or has failed, takeoff is NOT AUTHORIZED.
   b. When the cabin temperature is below -20°C, takeoff is NOT AUTHORIZED.
   c. When the “ON BAT” annunciation is shown on any EFD display, takeoff is NOT AUTHORIZED.
8. For **Traffic and Weather** options, the following limitations apply:
   a. Maneuvering based solely on the traffic display is not authorized.
   b. XM Weather information is supplemental to data available from official sources.
   c. NEXRAD data is limited to the contiguous United States.
   d. FIS-B information is to be used for pilot planning decisions and pilot near-term decisions focused on avoiding areas of inclement weather that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather.
   e. FIS-B information, including, weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.
9. For the **Terminal Procedure Charts** option, the following limitations apply:
   a. The aircraft ownship position presented on the Airport Diagrams and Terminal Procedures charts may be inaccurate – reference to ownship position for navigation or maneuvering is prohibited.
   b. 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.

10. For the **Aspen CG100 Connected Gateway (CG100)** option, the following limitations apply:
    a. The Flight Plan Review Map is not to be used for navigation.
    b. The pilot must verify that the flight plan as shown on the MFD is correct and authorized before sending the flight plan to the navigator(s).
    c. The Aspen GTWY and the associated applications on the wireless portable device are only to be used as intended by Aspen Avionics. Any manipulation of the system or unauthorized access is prohibited.
11. For the **AOA SYSTEM**, the following limitations apply:
    a. The AOA system is non-required and is to be used only as supplemental information to show the stall margin and trend toward stall. The AOA system is not a substitute for the certified aircraft stall warning system.
    b. Airspeed failure or erroneous airspeed will result in erroneous AOA indications.
    c. No operational credit may be taken for such items as reduced approach speed and shorter landing distances.
    d. The AOA indications are not to be used for takeoff reference.
    e. The AOA indications are not valid when the wings or empennage are frost or ice-contaminated.
    f. The AOA indications are not valid when spoilers or speed brakes are deployed.

2.4 Placards

1. When the EBB is installed, the following placard must be installed in full view of the pilot:

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

2. When the EA100 is installed, the following placard must be installed in full view of the pilot:

A/P AHRS FAIL

3. When the EFD1000 VFR PFD is installed, the following placard must be installed in full view of the pilot:

No Vertical Deviation on PFD

4. During initialization of the EFD1000 MFD and EFD500 MFD, the following electronic placard is displayed if Synthetic Vision and instrument procedure charts are configured:

> **CAUTION:**
> Synthetic Vision information and terrain information are 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.

5. During initialization of the EFD1000 PFD, the following electronic placard is displayed if Synthetic Vision is configured:

> **CAUTION:**
> Synthetic Vision information and terrain information are for awareness Only. Do not maneuver based solely on this Information.

6. When the Aspen Synthetic Vision Demo is configured and the trial period is not expired, the following electronic placard is displayed:

> **CAUTION:**
> Aspen Synthetic Vision Demo
> Time Remaining: ## Hours ## Minutes
>
> Synthetic Vision information and Terrain information are for awareness Only. Do not maneuver based solely on this Information.

7. When the Aspen Synthetic Vision Demo is configured and the trial period has expired, the following electronic placard is displayed:

> **CAUTION:**
> Aspen Synthetic Vision Demo has Expired
> To Re-Enable SV, See your Authorized Dealer

8. During initialization of the EFD1000 PFD and EFD1000/500 MFD, the following electronic placard is displayed if the AOA System is configured:

> **CAUTION:**
> The AOA Indicator is not for use as a primary instrument for flight.

3 Emergency/Abnormal Procedures

3.1 Emergency Procedures

No Change to the aircraft procedures.

3.2 Abnormal Procedures

3.2.1 Pitot Tube Icing resulting in Attitude Indicator Failure and Erroneous Airspeed indication

1. PITOT HEAT ..... ON
2. AUTOPILOT ..... DISCONNECT
3. ATTITUDE ..... Maintain attitude by reference to standby sources of Attitude
4. Consider Exiting IMC

3.2.2 "ON BAT" Annunciation

The "ON BAT annunciation is an indication that the alternator or generator has failed.

1. Aircraft Electrical Power ..... Follow AFM Procedures to Restore Power. If unable to restore the alternator or generator, proceed as follows:
2. EFD1000/500 Circuit Breaker / Switch ..... Pull / Open (turn off) for each Display
3. Press MENU then turn the Left knob ..... Reduce the Display brightness to the lowest practical brightness to conserve battery energy.
4. Exit IMC as soon as practical.

NOTE:
The duration of the internal battery system (at 99% remaining) is less than 30 minutes. The duration of the Emergency Backup Battery (at 99% remaining) is more than 30 minutes.

CAUTION:
When 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.

3.2.3 EFD1000 MFD reversion to a PFD

1. Autopilot ..... DISCONNECT
2. EFD1000 MFD REV Button ..... MOMENTARY PRESS to show the Reversionary PFD Display
3. REVERSIONARY PFD Display ..... Select XFILL as desired
4. BARO SETTING ..... Verify
5. A/P Source Select (if installed) ..... MFD
6. Autopilot ..... CONNECT AS DESIRED

NOTE:
The altitude level-off alert tone, altitude deviation alert tone and synthetic vision caution and warning tones are not available on a reversionary PFD

3.2.4 Attitude and Heading (AHRS) Reset

1. AUTOPILOT ..... MANUALLY DISCONNECT
2. MENU ..... Select the first page, titled “GENERAL SETTINGS”
3. “AHRS: RESET?” LINE SELECT KEY ..... PRESS
4. “AHRS: RESET?” LINE SELECT KEY ..... PRESS AGAIN TO CONFIRM RESET

3.2.5 Turn Off the EFD in Flight

EFD1000 MFD (with EBB), EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic

1. EFD (Aspen) Circuit Breaker / Switch ..... PULL / OFF
2. EBB Disconnect Switch ..... DISC

EFD1000/500 PFD or MFD with Internal Battery

1. EFD Circuit Breaker / Switch ..... PULL / OFF
2. REV Button ..... Push and hold until the display turns off

3.2.6 Continuous EFD1000 or EFD500 System Reset (does not apply to C3 PFD)

In the event of a condition that causes the system to continually reset, proceed as follows:

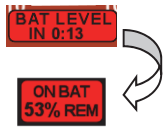
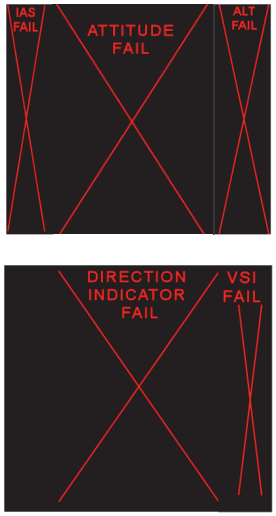
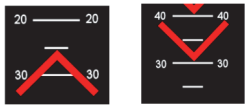
1. REMOVE THE DATABASE CARD ..... PERMIT THE SYSTEM TO REINITIALIZE.
   If the condition persists, then:
2. TURN OFF THE Aspen GTWY SWITCH. PERMIT THE SYSTEM TO REINITIALIZE.
   If the condition persists, then:
3. PULL THE ADS-B
   CIRCUIT BREAKER ..... PERMIT THE SYSTEM TO REINITIALIZE
   If the condition persists, then:
4. PULL THE XM WEATHER
   CIRCUIT BREAKER ..... PERMIT THE SYSTEM TO REINITIALIZE.
   If the condition persists, then:
5. PULL THE STORMSCOPE
   CIRCUIT BREAKER ..... PERMIT THE SYSTEM TO REINITIALIZE.

3.3 Warnings, Cautions and Advisories

The following table shows the Warning, Caution and Advisory indication on the EFD1000 and EFD500 and identifies the appropriate pilot action. Several Warning, Caution and Advisory messages are dependent on the options and equipment installed in the airplane. Refer to Table 1 to determine the options and equipment installed in this airplane.

Table 4 - Warning, Caution and Advisory Annunciations

Warning	W	Caution	C	Advisory	A

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
W	✓	✓	✓	✓	✓	✓	✓		Presented whenever the EFD1000 is operating on the internal battery or EBB. The countdown timer appears first, and is then replaced by the ON BAT and % charge annunciation	Reduce the screen brightness to maximize battery duration. See Section 3.2.2 “ON BAT” Annunciation.
W	✓	✓	✓	✓	✓	✓			Attitude and Heading indications have failed.	Use standby instruments for attitude reference. Perform AHRS Reset if practical.
W	✓	✓	✓	✓	✓	✓			Red chevrons displayed on the Attitude Indicator’s pitch scale to indicate extreme pitch up and down attitudes.	Pitch the aircraft in the direction of the chevrons to restore level flight.

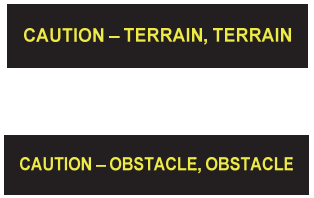
	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
W		✓			✓	✓	✓		Synthetic Vision Flight Path marker. Terrain or obstacle conflict within 30 seconds.	Avoid the terrain or obstacle.
W	✓	✓			✓				Radar Altitude Failed	Use alternate means for altitude determination.
W		✓			✓	✓	✓	 Or 	Synthetic Vision system terrain or obstacle conflict within 30 seconds.	Avoid the terrain or obstacle.
W	✓	✓	✓		✓	✓	✓	MAP SW 2.6 and earlier:  MAP SW 2.7.2 and later:  MAP SW 2.7.2:  MAP SW 2.8 and later: 	XM Weather or Traffic Failure	Use an alternate weather information source Increase vigilance for traffic.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
W		✓	✓		✓	✓	✓		FIS-B Regional NEXRAD data is not valid	Use an alternate weather information source.
W						✓	✓		FIS-B CONUS NEXRAD data is not valid	Use an alternate weather information source.
W						✓	✓		FIS-B METAR data is not valid	Use an alternate weather information source.
W						✓	✓		FIS-B AIRMET/SIGMET data is not valid.	Use an alternate weather information source.
W						✓	✓		FIS-B wind and temperature data is not valid	Use an alternate weather information source.
W						✓	✓		FIS-B TFR data not received.	Use an alternate weather information source.
W		✓	✓		✓	✓	✓	MAP SW 2.6 and earlier  MAP SW 2.7 and later 	Stormscope (STRK) has failed.	No action. Avoid thunderstorms.
W	✓	✓	✓		✓				The navigation source is not available.	Use an alternate navigation source

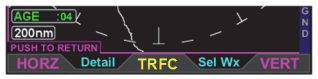
	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
W	✓	✓	✓		✓	✓			The navigation source is not available.	Use an alternate navigation source.
W						✓	✓		The Angle Of Attack System has failed.	No Action- The AOA is unusable.
W		✓	✓	✓	✓				The Angle Of Attack System has failed	No Action – The AOA is unusable. The AOA indication can be removed using the menu.
C								**Panel Mounted Indicator Lamp**  **A/P AHRS Fail** or **A/P AHRS FAIL**	The attitude system provided to the autopilot has failed.	Fly manually. The autopilot will disconnect and cannot be re-engaged.
C	✓	✓	✓	✓	✓	✓			Attitude indication could be degraded.	Cross check attitude, airspeed and altitude indications against alternate sources.
C						✓			MFD Attitude failure.	No immediate action. MFD reversion is not available.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C						✓		CHECK AHRS	MFD attitude could be degraded.	No immediate action. MFD reversion attitude indicator could be degraded.
C						✓	✓	CROSS LINK FAILURE	No communication between PFD and MFD(s).	Barometric pressure must be set on PFD and MFD.
C						✓	✓	(HDG FAIL)	Failed heading on the MFD	No immediate action. MFD Heading up map orientation is not available, reverts to track-up. Fails Strikes (Stormscope) system.
C	✓	✓	✓	✓	✓	✓		CHECK PITOT HEAT	Possible Pitot Obstruction. Accompanied by Red X attitude and heading.	Use an alternate attitude and heading source. Turn on Pitot Heat to clear the condition if icing is the cause.

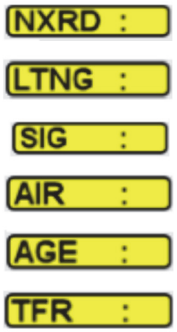
	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C		✓			✓				(Flashing) Invalid Lateral Navigation Signal on the S-TEC 55X. Corresponds to NAV, APR, GPSS or REV and diagonal FAIL indication on the 55X Programmer/Computer.	According to the S-TEC 55X AFMS.
C		✓			✓				(Flashing) Invalid Vertical Navigation Signal on the S-TEC 55X. Corresponds to ALT and GS, and diagonal FAIL indication on the 55X Programmer/Computer.	According to the S-TEC 55X AFMS.
C		✓			✓				S-TEC 55X Trimming Alert. Corresponds to TRIM on the S-TEC 55X Programmer/Computer.	Monitor for runaway trim.
C		✓			✓				No communication from the autopilot. Vertical speed control and altitude preselect are not available on the EFD1000 PFD.	Control the autopilot from the S-TEC 55X Programmer/Computer.

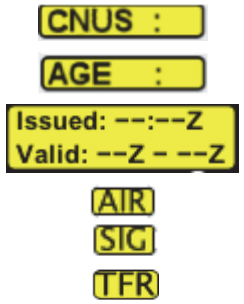
	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C		✓	✓		✓				S-TEC 55X Failure Annunciation.	Disconnect the autopilot and manually fly the airplane.
C	✓	✓	✓	✓	✓	✓	✓		GPS Invalid indications	Select an operational GPS or alternate navigation.
C		✓			✓	✓	✓		Synthetic Vision Flight Path marker. Terrain or obstacle conflict within 45 seconds.	Avoid the terrain or obstacle.
C		✓			✓	✓	✓		Synthetic Vision system terrain or obstacle conflict within 45 seconds.	Avoid the terrain or obstacle.
C						✓	✓		NAV and Terrain Map indication when of all Navigation GPS devices have failed.	No immediate action. NAV and terrain maps no longer move with the aircraft.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C	✓	✓	✓	✓	✓	✓			GPS Integrity indication	The GPS in use is degraded. See the applicable GPS AFMS for more information.
C	✓	✓			✓				The aircraft has reached or is below the set MINIMUMS. Accompanied by a one-second stuttered tone when the optional tone generator is installed.	Pilot action is based on the reason the minimums setting was enabled.
C	✓	✓	✓	✓	✓				The aircraft has reached (steady) or deviated from (flashing) the selected altitude. Accompanied by a one-second steady tone when the optional tone generator is installed.	Pilot action is based on the reason the altitude alerting setting was enabled.
C	✓	✓			✓				The optional radar altimeter Decision height input indicates the aircraft is at or below the radar altitude set by the pilot.	Pilot action is based on the reason the DH was set on the radar altimeter.
C	✓	✓	✓		✓				Indicates the GPSS source is invalid (e.g. the flight plan was deleted) or a different GPS was selected by the pilot. The autopilot will fly wings-level until valid GPSS signal is available and GPSS is re-engaged.	No immediate action. Select a new flight plan to permit GPSS re-engagement.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C						✓	✓	TERRAIN FAIL	The dedicated terrain display is unusable.	No immediate action.
C		✓			✓	✓	✓	TRAFFIC 	Traffic Alert. TFC is shown instead of TRFC for MAP SW 2.8 and later.	See and avoid the traffic. Press TRFC (lower center button) to display a plan view of the traffic.
C	✓	✓	✓		✓	✓	✓	MAP SW 2.7.2 and earlier: TRFC UNAV MAP SW 2.8 and later: TFC UNAV	TIS-A option: Traffic data is unavailable.	No immediate action. See and avoid traffic.
C	✓	✓	✓		✓	✓	✓	MAP SW 2.7.2 and earlier: MAP SW 2.8 and later: TFC RMVD	TIS-A option: Traffic was removed. The PFD does not display the AGE.	No immediate action. See and avoid traffic.
C						✓	✓	MAP SW 2.7.2 and earlier: TRFC FAIL MAP SW 2.8 and later: TFC FAIL	TIS-A option: Traffic sensor failure.	No immediate action. See and avoid traffic.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C		✓	✓					UAT LINK	ADS-B OUT: The UAT link between the ADS-B system and the PFD has failed. This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System.	No immediate action.
C		✓	✓					UAT POS	ADS-B OUT: The UAT position source has failed. This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System.	No immediate action.
C		✓	✓					UAT FAIL	ADS-B OUT: The UAT transmitter has failed. This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System.	No immediate action.
C						✓	✓	TFC DEGRADED	No ADS-B Traffic data uplinked from the ground or GDL 88 is in Standby.	No immediate action. See and avoid traffic.
C		✓	✓		✓	✓	✓	TFC	No ADS-B Traffic data uplinked from the ground or GDL 88 is in Standby.	No immediate action. See and avoid traffic.
C		✓	✓		✓	✓	✓	CSA FAIL	Conflict Situational Awareness -traffic alerting is inoperative. GDL 88 integration only.	Traffic alerting is not provided. See and avoid traffic.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C						✓	✓		Stormscope Option: Sensor has failed.	No immediate action. Use an alternate means to detect thunderstorms.
C						✓	✓		Stormscope Option: Sensor has failed.	No immediate action. Use an alternate means to detect thunderstorms.
C		✓	✓		✓	✓	✓		XM Datalink weather product data not received.	No immediate action. Use alternate means to acquire weather and TFR information.
C		✓	✓		✓	✓	✓		FIS-B Datalink weather product data not received.	No immediate action. Use alternate means to acquire weather and TFR information.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C						✓	✓		FIS-B Datalink weather product data not received.	No immediate action. Use alternate means to acquire weather and TFR information.
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.	No immediate action. Expect attitude loss after six minutes.
C	✓	✓	✓	✓	✓	✓	✓		Annunciation presented in the menus when the connected EFD battery is not detected or failed	No immediate action. The EFD display will not be available in the event of an aircraft power loss. If the MFD is used for backup altimeter and/or airspeed indicator, takeoff is not authorized. See Section 2.3.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
C		✓	✓	✓	✓	✓	✓		When the Upper Pointer points in the yellow/black band, stall is imminent in the Flaps Up configuration.	Reduce the Angle of Attack.
C		✓	✓	✓	✓	✓	✓		When the Lower Pointer points in the yellow/black band, stall is imminent in the Flaps Down configuration.	Reduce the Angle of Attack.
C		✓	✓	✓	✓	✓	✓		When the Upper Pointer points in the yellow band, the airplane is nearing stall in the Flaps Up configuration. When the Lower Pointer points in the yellow band, the airplane is nearing stall in the Flaps Down configuration.	Reduce the Angle of Attack.
A		✓	✓	✓	✓	✓	✓		When the Upper Pointer points in the green band, the stall margin for the Flaps Up configuration is well above stall.	No action.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A		✓	✓	✓	✓	✓	✓		When the Lower Pointer points in the green band, the stall margin for the Flaps Down configuration is well above stall.	No action.
A	✓	✓	✓		✓				GPSS is operational	No action. GPSS can be used if desired.
A	✓	✓	✓		✓	✓			GPS annunciations that are provided by the GPS source. TERM can also be displayed in the same location as APPR.	No action. See the GPS AFMS for additional information on the meaning of these annunciations.
A		✓	✓						When this message is displayed, the PFD is the UAT controller.	Press MENU to access the page to change the Code or to IDENT.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A	✓	✓	✓		✓	✓	✓	MAP SW 2.7.2 and earlier: TRFC MAP SW 2.8 and later: TFC TFC ID	Green annunciation that indicates that the traffic sensor is enabled. ID after TFC indicates that traffic identification is displayed if available. This annunciation does not indicate the status of the ADS-B traffic data uplinked from the ground.	No action. See and avoid traffic.
A						✓	✓	MAP SW 2.7.2 and earlier: TRFC STBY MAP SW 2.8 and later: TFC STBY	Green annunciation that indicates that the traffic sensor is in standby.	No action. See and avoid traffic.
A	✓	✓	✓		✓	✓	✓	MAP SW 2.7.2 and earlier: TRFC COAST MAP SW 2.8 and later: TFC COAST	Green annunciation that indicates that the TIS A traffic data has not been refreshed within 6 seconds.	No action. See and avoid traffic.
A		✓	✓		✓	✓	✓	XRATE 9	Stormscope (strike) option: The rate indicates the approximate number of lightning strikes detected per minute.	No action. Avoid thunderstorms.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A		✓	✓		✓	✓	✓		Stormscope (strike) option: Cell clustering display mode selected. The rate indicates the approximate number of lightning strikes detected per minute.	No action. Avoid thunderstorms.
A		✓	✓		✓	✓	✓		A data age annunciation for XM Datalink products	No action. Useful reference for weather data evaluation. NOTE: The data may be several minutes older than the time shown. It is not real-time data.
A		✓	✓		✓	✓	✓		A data age annunciation for ADS-B weather products.	No action. Useful reference for weather data evaluation. NOTE: The data may be several minutes older than the time shown. It is not real-time data.
A						✓	✓		A data age annunciation for ADS-B weather products.	No action. Useful reference for weather data evaluation. NOTE: The data may be several minutes older than the time shown. It is not real-time data.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A		✓			✓				S-TEC 55X annunciations.	No action.
A		✓			✓				S-TEC 55X annunciations.	No action.

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A		✓			✓				S-TEC 55X annunciations.	No action.
A						✓	✓		Database Failure	No action. Functions that require a database are not available. See Table 1.
A						✓	✓		The Database for the NAV Map is loading	No action. Not all the available data on the NAV Map is displayed yet.
A						✓	✓		Charts Option: The ownship cannot be displayed.	No action.
A						✓	✓		Charts Option: The ownship is off the chart.	No action.
A		✓			✓	✓	✓		Synthetic Vision Option: Failed	No action
A		✓			✓	✓	✓		Synthetic Vision Option: Failed	No action
A		✓			✓	✓	✓		Synthetic Vision Option: Failed	No action
A		✓			✓	✓	✓		Synthetic Vision Option: Not yet operational	No action

	Applies to:							Annunciation	Description	Pilot Action
	EFD1000 PFD PRO C3	EFD1000 PFD PRO -or- EFD1000 PFD EBD Advanced	EFD 1000 VFR	EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic	EFD 1000 MFD REV	EFD 1000 MFD	EFD 500 MFD			
A		✓			✓	✓	✓	SV DATABASE UNAVAILABLE	Synthetic Vision Option: Failed	No action
A		✓			✓	✓	✓	SV LOADING...	Synthetic Vision Option: Not yet operational	No action
A		✓			✓	✓	✓	MAP LOADING...	Synthetic Vision Option: Not yet operational	No action
A		✓			✓	✓	✓		A white flight path marker indicates that approach TWS alerts are available (Terrain Alerts will be generated by terrain 100 feet higher than the runway elevation and all mapped obstacles).	No action
A		✓	✓		✓			OBSTACLE BEHIND AOA	Synthetic Vision Option: An obstacle that is behind the AOA indicator for more than five seconds will elicit this message.	No action
A		✓	✓	✓	✓			AOA AUTO	The AOA indicator is available for display but removed to reduce clutter. This message will be shown until the AOA indicator presents useful information.	No action

4 Normal Procedures

4.1 Exterior Inspection

1. RSM ..... Check for condition and security
2. RSM Vent Hole ..... Check Clear of obstructions
3. RSM Lightning Tape ..... Check for condition and security

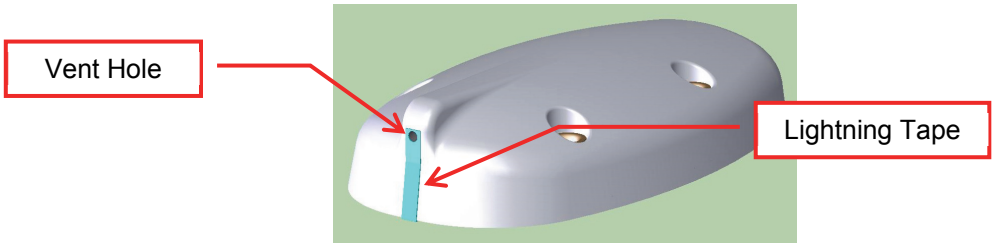


Figure 1 - Remote Sensor Module (RSM)

4.2 Before Take-Off Checks

4.2.1 EFD1000 PFD PRO, EFD1000 PFD PRO C3, EFD1000 PFD PILOT, EFD1000 PFD VFR

1. PFD ..... Configure for departure

4.2.2 EFD1000 MFD (without EBB) or EFD500 MFD

1. MFD ..... Configure for departure

4.2.3 EFD1000 MFD with EBB

If an EFD1000 MFD with EBB is installed in lieu of a backup altimeter and/or airspeed indicator (see Table 2), perform the following:

1. EBB Switch ..... NORM
2. MENU ..... Select POWER SETTINGS page
3. EXT PWR: (Aircraft Input Voltage) ..... Check > 12.3V/24.6V
4. BAT ..... Verify battery status is not shown as “FAIL”
5. EFD1000 MFD ..... Select “BATTERY”
6. EFD1000 MFD ..... Verify battery charge is above 80%
7. EFD1000 MFD ..... Select EXT PWR
8. MENU ..... Press the MENU button to return to normal operation.
9. EFD1000 MFD ..... Select REV then press XFILL. The MFD must be operated in the PFD reversion mode for takeoff.

Except as instructed in Section 3.2.2, the EBB switch should be left in the NORM position at all times, including when away from the aircraft.

4.2.4 EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic

1. EBB Switch ..... NORM
2. MENU..... Select POWER SETTINGS page
3. EXT PWR: (Aircraft Input Voltage) ..... Check > 12.3V/24.6V
4. BAT ..... Verify battery status is not shown as “FAIL”
5. EFD1000 PFD EBD ..... Select “BATTERY”
6. EFD1000 PFD EBD ..... Verify battery charge is above 80%
7. EFD1000 PFD EBD ..... Select EXT PWR
8. MENU ..... Press the MENU button to return to normal operation
9. BARO..... Set

Except as instructed in Section 3.2.2, the EBB switch should be left in the NORM position at all times, including when away from the aircraft.

4.3 Avionik Straubing APS4A Altitude Preselector

1. Altitude Alerter ..... Set as desired
2. PRESEL..... Press for ARMED

To deselect:

3. PRESEL..... Press to Disarm

4.4 S-TEC 55X Altitude Preselect and Vertical Speed Control

Except as described here, refer to the S-TEC 55X AFMS and Pilot’s Guide for S-TEC 55X information.

Preflight:

When the EFD1000 PFD displays “**RDY**”, perform the following steps:

1. Select the STEC55X A/P menu page on the EFD1000 PFD and change the VERT SPD CNTL: option from PFD to STEC55X.
2. Conduct the S-TEC 55X Autopilot Tests per the FAA-approved Airplane Flight Manual Supplement for the autopilot system installation.
3. Select the STEC55X A/P menu page on the EFD1000 PFD and change the VERT SPD CNTL option from STEC55X to PFD.

Operation:

To select a vertical speed, and to preselect and capture a selected altitude:

1. Vertical Speed Bug..... Set as desired on the PFD.
2. Altitude Bug ..... Set as desired on the PFD.
3. S-TEC 55X Programmer/Computer..... Engage the VS mode. For preselected altitude, engage ALT and VS simultaneously.

4.5 ADS-B OUT Control

When the EFD1000 PFD displays "**UAT CTL: MENU**", perform the following steps to set the squawk or IDENT:

To set the squawk:

1. Transponder ..... Set the squawk
2. Press MENU ..... Set the squawk. Press MENU to return

To IDENT:

1. Press MENU ..... Press IDENT. Press MENU to return

4.6 Before Approach Checks

1. PFD ..... Configure for arrival

If an EFD1000 MFD with EBB is installed in lieu of a backup altimeter and/or airspeed indicator (see Table 2), perform the following:

1. EFD1000 MFD ..... Select REV then press XFILL. The MFD must be operated in the PFD reversion mode for landing.

4.7 Shutdown Checks

After conducting normal Shutdown checklist items, ensure the following:

1. EFD1000/500 Switches ..... OFF

4.8 Turning the AOA System On, Off or Auto on the PFD

To turn the AOA system On, Off or Auto on the PFD, proceed as follows:

1. Press MENU to enter the menu pages.
2. Rotate the right knob to select the GENERAL SETTINGS C menu page.
3. Press the AOA DSPL button until the label turns magenta.
4. Rotate the right knob to select ON, OFF or AUTO.
5. Push the AOA DSPL button to retain the selection.
6. Press MENU to exit the menu pages.

5 Performance

There is no change to the airplane performance.

6 Weight and Balance

See the current weight and balance documents for this aircraft.

7 Systems Description

The following paragraphs describe the evaluation flight display and the optional interfaces shown in Table 1.

7.1 Evolution Flight Display

The Evolution Flight Display System consists of one or more integrated Electronic Flight Display (EFD1000 or EFD500) systems. The EFD1000 system can be configured as a Primary Flight Display (PFD) or as a multi-function display (MFD). The EFD500 system can be configured as an MFD only. The EBD Basic or the EBD Advanced are Primary Flight Displays used as backup to a non-Aspen Primary Flight Display.

The following Pilot Guides should be carried in the aircraft and available to the pilot as appropriate for the equipment installed in the airplane:

a. For the EFD1000 PFD PILOT, PFD PRO, EBD Basic and EBD Advanced: Aspen Avionics document 091-00005-001, EFD1000 PFD Pilot's Guide, Revision F or subsequent revision.

b. For the EFD1000 PFD VFR: Aspen Avionics document 091-00028-001, EFD1000 VFR PFD Pilot's Guide, Revision ( ) or subsequent revision.

c. For the EFD1000 PFD PRO C3: Aspen Avionics document 091-00019-001, EFD1000 C3 Pro PFD Pilot's Guide Revision B or subsequent revision.

d. For the EFD1000 MFD or EFD500 MFD: Aspen Avionics document 091-00006-001, EFD1000/500 MFD Pilot's Guide Revision B or subsequent revision.

Go to www/aspenavionics.com/support for current Pilot Guides and Pilot Guides Errata and Addenda.

7.1.1 Internal Battery

The EFD1000 and EFD500 contain internal batteries which provide for continued operation for approximately 30 minutes (at a full charge and a shirt-sleeve environment) in the event of a complete loss of electrical power to the systems.

7.1.2 Emergency Backup Battery (EBB)

The EBB is an external rechargeable battery for the EFD1000 MFD, the EFD1000 EBD Advanced and the EFD1000 EBD Basic. This is a larger battery that will provide at least 30 minutes operation (at 80% charge) in the event of complete loss of electrical power.

7.1.3 Intercommunication

The EFD1000 PFD and the EFD1000/500 MFD intercommunicate barometric pressure and other data among these systems. The EFD1000 EBD does not intercommunicate barometric pressure with the non-Aspen Primary Flight display. It is necessary to adjust the barometric pressure directly on the Aspen EFD1000 EBD.

7.2 Databases

The following table provides information regarding the databases in the EFD.

Table 5 - Databases

Database Type	Includes	Update Cycle	Used In	Database Provider	Comment
Terrain	High resolution terrain data for Americas, International, or Worldwide geographic regions. Terrain depiction is limited to the region between 65° North latitude to 65° South latitude	Delivered with the EFD, updated intermittently as announced by Jeppesen	Synthetic Vision, Nav Maps and Terrain Maps	Jeppesen mail order	These databases are not to be used for navigation.
NavData	Includes Navaids, Controlled Airspace, Restricted, Prohibited and Special Use Airspace, Airports, etc.	28 day update cycle	Synthetic Vision and Nav Maps	Jeppesen JSUM©	
Cultural	Includes Roads, Rivers, Railroads, Political boundaries, Cities, etc.	28 day update cycle	Synthetic Vision and Nav Maps	Jeppesen JSUM©	
Obstacles	Includes man made obstacles greater than 200 ft. AGL. This database relies upon data reported by government agencies and may not include all obstacles due to inherent reporting and processing delays in the data. In addition, obstacle data may not be available for all regions within the data card coverage area.	28 day update cycle	Synthetic Vision and Nav Maps and Terrain maps	Jeppesen JSUM©	
Charts	AeroNav Terminal Procedures Charts	28 day update cycle	Terminal Procedures and Airport Diagrams	Seattle Avionics	

7.3 Remote Sensor Module (RSM)

The RSM provides heading information to the EFD1000 and is powered by the EFD1000. Some models have an internal GPS for emergency use that will automatically operate when the external GPS systems fail.

7.4 Traffic Display

There are several Traffic Interfaces that are available. Table 1 Installed Equipment List identifies the equipment in this aircraft.

The traffic data can be displayed on the moving map or as a dedicated view on the MFD when connected to the approved TCAS I, TAS, TIS or ADS-B external sensor. The dedicated view is titled TFC.

Traffic data provides a graphical depiction of aircraft relative to the aircraft heading. When the traffic data is not displayed on the PFD's moving map, the traffic automatically displays during a Traffic Advisory. When the dedicated traffic view is not displayed on the MFD and a Traffic Advisory occurs, a traffic popup is displayed to allow quick selection to view the Traffic Advisory.

The horizontal position reference point for each traffic image on the display is the center of the traffic image. The horizontal position reference point for the ownship on the display is the

intersection of the geometric centerline of the wing and the geometric centerline of the ownship symbol fuselage.

7.5 ADS-B

7.5.1 ADS-B OUT

The Aspen or FreeFlight ADS-B OUT system automatically transmits surveillance data to Air Traffic Control and other entities. The ADS-B OUT interfaces with an onboard altimeter and GPS to transmit the squawk, registration, altitude and position. When “UAT CTL: MENU” is displayed on the on the PFD, then control of the squawk and IDENT is temporarily transferred to the PFD MENU.

If the ADS-B OUT system is turned off then ATC will not receive the surveillance data.

If the transponder is turned off, the UAT control will be transferred to the Aspen Display.

7.5.2 ADS-B IN

The Aspen PFD and MFD systems can display weather and traffic information when integrated with a compatible ADS-B system.

7.6 Weather Interface

The Datalink weather data can be displayed on the moving map or as a dedicated view on the MFD when connected to the EWR50 or FIS-B external sensor. The dedicated view is titled WX.

NEXRAD consists of composite images from many radar sites that are collected and compiled. The oldest portions of the contributing NEXRAD sites could be 0 to 20 minutes older than the age depicted.

7.7 Stormscope

The Strikes data shows the electrical discharges (associated with thunderstorms) that are detected by the L3 Stormscope®.

7.8 Terminal Procedure Charts

The MFD supports a dedicated charts view. The dedicated view is titled CHARTS.

The dedicated charts view displays pre-composed terminal procedures from the Seattle Avionics Instrument Procedures Charts Database. The dedicated charts view allows the pilot to overlay the ownship on geo-reference instrument approach procedures and airport diagrams. The ownship is only available for display on the airport diagram when the aircraft is on the ground.

The ownship position is centered at the intersection of the wings and fuselage.

The Terminal Procedures Charts require a database.

Only Geo-referenced charts are eligible for ownship depiction.

7.9 NAV and Terrain Maps

The PFD and MFD both support a moving map.

The PFD moving map is integrated into the navigation display on the bottom-half of the PFD.

The MFD moving map is a dedicated view that displays NAVAIDs, Controlled Airspace, Restricted, Prohibited and Special Use Airspace, Airports, etc.

The terrain and obstacle data can be displayed on the moving map or as a dedicated view on the MFD. The dedicated view is titled TERR. The terrain and obstacle data is advisory only.

CAUTION:
Accurate barometric pressure is essential for accurate terrain and obstacle data.

The terrain and obstacle data is colorized information based on the aircraft's proximity to terrain and obstacles. The aircraft's proximity to terrain and obstacles is determined by computing the altitude difference between the terrain and obstacles in the database and the aircraft's baro-corrected altitude.

The MFD Nav and Terrain maps require a database. The PFD moving map does not require a database.

7.10 EA100 Autopilot AHRS

The EA100 provides pitch and roll signals information to the autopilot.

7.11 Synthetic Vision and Terrain Warning System

The PFD and MFD can both support the display of Synthetic Vision. The display of the Synthetic Vision depiction is advisory only.

The Synthetic Vision depiction is a computer-derived perspective view of the nearby terrain obstacles and airports. The Synthetic Vision depiction supports a flight path marker to display the vertical and lateral path of the aircraft based on two parameters, barometric vertical speed and GPS track. The Synthetic Vision depiction also supports a Terrain Warning System (TWS) that uses the flight path marker to present an estimated time-to-collision function for terrain and obstacles. Unless inhibited by the pilot, TWS operates even when Synthetic Vision is turned off.

The MFD Nav and Terrain maps require a database.

CAUTION:
Accurate barometric pressure is essential for accurate Synthetic Vision and Terrain Warning.

7.12 Connected Gateway

The Connected Gateway provides a means to communicate flight plan information from a portable device to the navigation system.

7.13 Radar Altitude

When installed and configured. Radar Altitude information can be presented on the PFD. When the height exceeds the Radar Altitude maximum height, the indication is suppressed. When the Radar Altitude is at or below the maximum height, the Radar Altitude is shown as a number marked RA on the PFD.

Separately, the Decision Height can be shown as an amber balloon on the PFD.

7.14 ADF Interface

When installed and configured, ADF #1, #2 or both can be shown on the needles controlled by the left and right lower buttons.

7.15 VHF Interface

When installed and configured, VLOC 1 or VLOC 2 can be selected by the lower center button.

7.16 GPS Interface

When installed and configured, GPS1 or GPS2 can be selected using the lower center button.

7.17 Avionik Straubing APS4A Altitude Preselector

The Altitude Preselector is a remote altitude hold function. When armed, the altitude hold will be engaged at the selected altitude.

7.18 S-TEC 55X Vertical Speed Control/Altitude Preselect

When installed and configured, the PFD provides vertical speed command and altitude preselect for the S-TEC 55X autopilot.

7.19 Autopilot Source Select

The autopilot normally is connected to the PFD. If the MFD is reverted to a PFD, then the MFD can be selected as the autopilot source.

7.20 AOA System

The Aspen AOA System is a derived AOA system, meaning it uses the air data and inertial functions in the EFD1000 to calculate the approximate AOA. It does not indicate stall warning.

The AOA system is designed to show trend toward stall and stall margin. Stall margin is the actual AOA compared to the stall AOA.

WARNING:
The AOA indications are not valid for takeoff.

There are two pointers that move together. The Upper Pointer indicates stall margin in the flaps up configuration. The Lower Pointer indicates stall margin in the full flaps down configuration.

NOTE:
There is no indication of derived AOA for intermediate flap settings.

When the airplane moves toward stall, the pointers will move from the green band into the yellow band, and eventually to the black/yellow band. Whenever the pointers are rapidly moving toward the yellow/black band, the airplane is rapidly approaching stall.

Conversely, as the airplane accelerates toward cruise speed, both pointers will move toward the blue band and will eventually park at the end of the blue band.

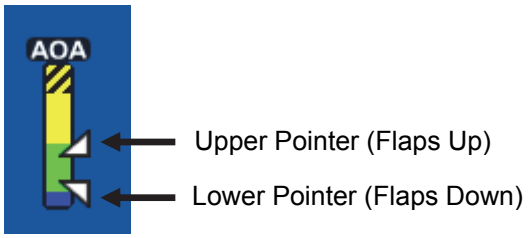


Figure 2 - AOA Indicator

7.20.1 AOA Display Modes

The PFD supports three AOA display modes, Auto, On and Off. The MFD supports one mode, On.

Table 6 - AOA Display Modes

Mode	Description
AUTO	From cruise, the AOA indicator fades in when the Upper Pointer trends past the green/blue transition. This minimizes the indication on the PFD until the AOA presents useful information.
ON	The AOA indicator is always displayed.
OFF	The PFD does not display the AOA indicator.

See Section 4.7 for information on how to select the modes of operation.

7.20.2 AOA Operation by Phase of Flight

The following tables describe the typical AOA indications in various phases of flight in the On and Auto modes.

Table 7 - AOA "ON "Mode

Phase of Flight	Description of the AOA indicator
Taxi	The AOA indicator is displayed with no pointers.
Takeoff	The AOA pointers fade in at about 35 KIAS. AOA indications are not valid for takeoff.
Climb	In the clean configuration, the AOA pointers will be in the green band.
Cruise	In normal cruise, the AOA pointers are parked at the bottom of the blue band.
Descent	In normal descent, the AOA pointers are parked at the bottom of the blue band.
Approach	As the airplane slows, the AOA trends from the blue band toward the green/yellow transition. When on-speed at one g and full flaps, the Lower Pointer nears the green/yellow transition.
Landing	The pointers trend toward stall during landing.
Rollout	The pointers fade out at approximately 35 KIAS.

Table 8 - AOA "AUTO" Mode

Phase of Flight	Description of the AOA indicator
Taxi	"AOA AUTO" is displayed.
Takeoff	The AOA indicator with pointers will fade in at about 35 KIAS. AOA indications are not valid for takeoff.
Climb	In the clean configuration, the AOA pointers will be in the green band.
Cruise	The AOA indicator will fade to "AOA AUTO" when the Upper Pointer parks at the end of the blue band.
Descent	"AOA AUTO" is displayed.
Approach	The AOA Indicator fades in when the Upper pointer trends above the blue band. As the airplane slows, the AOA trends toward the green/yellow transition. When on-speed at one g and full flaps, the Lower Pointer nears the green/yellow transition.
Landing	The pointers trend toward stall during landing.
Rollout	The indicator fades out at approximately 35 KIAS and the AOA AUTO message fades in.

7.20.3 Pointer Definition

The following table shows the pointer definitions.

Table 9 - Pointer Definition

Pointers	Meaning
Upper Pointer (Flaps Up) 	The Upper Pointer indicates stall margin in the flaps up configuration.
Lower Pointer (Flaps Down) 	The Lower Pointer indicates stall margin in the full flaps down configuration.

7.20.4 Color Band Definition

The color bands mean the following:

Table 10 - Color Band Definition

Color Band	Meaning
Yellow/black hash-marked band	Very little stall margin.
Yellow band	Reduced stall margin.
Green band	AOA is well above stall.
Blue band	Normal cruise, normal descent. AOA is well above stall.