AF-3400,AF-3500, AF-4500

EFIS System - Engine Monitoring System – Moving Map

Patents 6,271,769 B1 and 6,940,425

User's Guide and Installation Manual

Version 6.4

8/20/2009

IMPORTANT PRE-INSTALLATION NOTICE

Before installing the monitoring system, READ THE LIMITED WARRANTY / AGREEMENT. There is information in the Limited Warranty / Agreement that may alter your decision to install this product. IF YOU DO NOT ACCEPT THE TERMS OF THE LIMITED WARRANTY / AGREEMENT DO NOT INSTALL THE PRODUCT. The product may be returned for a refund if you do not accept the terms of the Limited Warranty / Agreement.

Before starting the installation, make sure that your planned installation will not interfere with the operation of any controls. The installer should use current aircraft standards and practices to install this product. Refer to AC 43.13-2A, *Acceptable Methods, Techniques, and Practices - Aircraft Alterations* and AC 43.13-1B, *Acceptable Methods, Techniques, and Practices--Aircraft Inspection and Repair*.

Experimental instrument limited to use in experimental aircraft.
Not approved for use in aircraft with FAA type certificates.

Advanced Flight Systems Inc. www.Advanced-Flight-Systems.com
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AF-3400, AF-3500, AF-4500 Post Installation Check

CAUTION: Do not fly the aircraft until the following check list has been completed.

Never Power the system with an automotive battery charger and the aircraft battery disconnected.

1. Screen mounted following directions.
2. Magnetometer mounted following directions.
3. Screen Case has been properly grounded using case ground screw.
4. Wiring Harness is properly connected to screen.
5. ***All aircraft must have protection diodes installed on their Master Relay, Starter Relay*** and any other large relay. If your aircraft does not have the protection diode on the Master Relay your electrical buss will experience a voltage spike of 500+ Volts every time you turn off the master switch. If your EFIS or Engine Monitor is wired directly to the electrical buss it will be the device that absorbs the voltage spike and will eventually fail. ***All users must verify that they have the protection diodes installed before powering the EFIS or Engine Monitor.***
6. Trim Servo wires are wired correctly (before applying power).
7. Magnetometer calibration is complete
8. Fuel Tank calibration is complete and verified.
9. Airspeed V Speeds have been set in the EFIS calibration menu for your aircraft in knots.

   AIRSPEED.VNE, Never Exceed
   AIRSPEED.VNO, Normal Operation
   AIRSPEED.VFE, Flap Extend Speed
   AIRSPEED.VS1, Stall Speed Flaps Up
   AIRSPEED.VS0, Stall Speed Flaps Down
10. Pitot Static lines are connected correctly and the plane has passed a pitot static test.
11. Engine Warning parameters have been set in the EFIS calibration menu to match your Engine & Propeller.
12. Weight & Balance Page updated for ***Your*** Aircraft.
13. Engine ground run has been performed and the engine instruments are working.
14. Fuel Tank warning parameters have been set in EFIS calibration
15. You have read and understand the operation manual for the EFIS.
16. You have read and understand the operation manual for the Aircraft.
17. You have entered the correct check list pages in the EFIS and use them before each flight.
18. You have been properly trained in the operation of the Aircraft and you are able to recognize an EFIS failure and safely fly the aircraft without it.

AOA FLIGHT WARNING:

The EFIS may be shipped with AOA aircraft calibration data pre-installed. If you choose to use this data, you must verify the validity of the data or calibrate the AOA to meet your specifications before using. You must also read and understand the separate AOA manual before using the AOA instrument in flight.

LIMITED WARRANTY / AGREEMENT

Advanced Flight Systems Inc. (“AFS”) warrants its aircraft monitoring system instrument and system components to be free from defects in materials and workmanship for a period of one year commencing on the date of the first flight of the instrument or one year after the invoice date, whichever comes first. AFS will repair or replace any instrument or system components under the terms of this Warranty provided the item is returned to AFS prepaid.

This Warranty shall not apply to any unit or component that has been repaired or altered by any person other than AFS, or that has been subjected to misuse, abuse, accident, incorrect wiring, or improper or unprofessional installation by any person. THIS WARRANTY DOES NOT COVER ANY REIMBURSEMENT FOR ANYONE'S TIME FOR INSTALLATION, REMOVAL, ASSEMBLY OR REPAIR. AFS reserves the right to determine the reason or cause for warranty repair.

1. This Warranty does not extend to any engine, machine, aircraft, boat, vehicle or any other device to which the AFS monitoring system may be connected, attached, or used with in any way.

2. THE REMEDIES AVAILABLE TO THE PURCHASER ARE LIMITED TO REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE OF THE PRODUCT, AT THE SOLE DISCRETION OF AFS. CONSEQUENTIAL DAMAGES, SUCH AS DAMAGE TO THE ENGINE OR AIRCRAFT, ARE NOT COVERED, AND ARE EXCLUDED. DAMAGES FOR PHYSICAL INJURY TO PERSON OR PROPERTY ARE NOT COVERED, AND ARE EXCLUDED.

3. AFS is not liable for expenses incurred by the customer or installer due to AFS updates, modifications, improvements, upgrades, changes, notices or alterations to the product.

4. The pilot must understand the operation of this product before flying the aircraft. Do not allow anyone to operate the aircraft that does not understand the operation of the monitoring system. Keep the operating manual in the aircraft at all times.

5. AFS is not responsible for shipping charges or damages incurred during shipment.

6. No one is authorized to assume any other or additional liability for AFS in connection with the sale of AFS products.

7. IF YOU DO NOT AGREE TO ACCEPT THE TERMS OF THIS WARRANTY, YOU MAY RETURN THE PRODUCT FOR A FULL REFUND. IF YOU DO NOT AGREE TO ACCEPT THE TERMS OF THIS WARRANTY, DO NOT INSTALL THE PRODUCT.

8. This warranty is made only to the original purchaser and is not transferable. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR OBLIGATIONS, EXPRESS OR IMPLIED, ORAL OR WRITTEN. AFS EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER AGREES THAT IN NO EVENT SHALL AFS BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING DAMAGES TO THE ENGINE OR AIRCRAFT, LOST PROFITS, LOSS OF USE, OR OTHER ECONOMIC LOSS. EXCEPT AS EXPRESSLY PROVIDED HEREIN, AFS DISCLAIMS ALL OTHER LIABILITY TO THE PURCHASER OR ANY OTHER PERSON IN CONNECTION WITH THE USE OR PERFORMANCE OF AFS' PRODUCTS, INCLUDING BUT NOT LIMITED TO STRICT PRODUCTS LIABILITY IN TORT.

Table of Contents

MANUAL REVISIONS

Rev 5.5
Software version 5.11 updates (New altitude bugs, Autopilot, Flight Director, Weather, Traffic, Dual screen sync)

Rev 6.0
Software version 6 updates (Autopilot gains, knob control list, Flight Path marker, calibration menu from run mode, Dual AHRS cross check, Flight Director, Charts)

Rev 6.1
Software version 6.2.xx updates (%Power, Inputs for buttons)

Rev 6.2
ADVANCED Pilot Autopilot, Master Relay diodes.

Rev 6.3
Added % Power Tables, Fixed formatting

Rev 6.4
Fixed % Power Tables

INTRODUCTION

Advanced Flight Systems Inc. manufactures two different size EFIS and Engine Monitor systems. The AF-3400 uses a 6.5" display and the AF-3500 uses an 8.4" display. Both systems utilize the same hardware and can be purchased as an EFIS only "EF", Engine Monitor only "EM", or as a single screen with both EFIS and Engine Monitor boards installed "EE". Multiple systems can be easily connected to share all data between screens. Install an EFIS "EF" and an Engine Monitor "EM" screen and you will have the ability to display flight and engine instruments on both screens. Our EFIS Systems utilize a Crossbow AHRS which is an AFS customized version of the certified Crossbow AHRS500.

WARNING

It is possible for any instrument to fail and display inaccurate readings. Therefore, you must be able to recognize an instrument failure and you must be proficient in operating your aircraft safely in spite of an instrument failure. If you do not have this knowledge, contact the FAA or a local flight instructor for training. The ability for this product to detect a problem is directly related to the pilot's ability to program proper limits and the pilot's interpretation and observation skills. The pilot must understand the operation of this product before flying the aircraft. Do not allow anyone to operate the aircraft that does not know the operation of this product. A copy of this manual must be kept in the aircraft at all times.

The AF-3400/3500 will automatically turn on any time power is applied to the unit.

NOTE: The system is designed to remove a gauge needle from the screen if a transducer is disconnected.

Each gauge can have an upper and lower *caution* and *warning* limit. If a gauge is in the *caution* area the needle and value will turn yellow. If a gauge is in the *warning* area the needle and value will turn red.

If the engine RPM is greater than 500rpm and a gauge is in the *warning* area the gauge name will be displayed over button 1 in red and an audible warning will generated. For example if the oil pressure is low you should here "Check Oil Pressure", this will repeat every 5 seconds until the gauge is no longer in the warning area or you press button 1 to acknowledge the error and stop the audible warning for that gauge.

The system will give the audible warning "Check Fuel Computer" on startup if the fuel computer's gallons remaining value does not match the fuel tanks level. This feature (if turned on in Instrument Calibration) should warn you if you have added fuel and forget to adjust the fuel computer. The number of gallons that will generate an error is adjusted in Instrument Calibrate. Since the fuel levels are NOT accurate when the tanks are near full this value is doubled when the tanks show full.

See Instrument Calibration for directions on setting the upper and lower *caution* and *warning* limits.

Button Label **[Button1] [Button2] [Button3] [Button4] [Button5] [Knob/Button]**

Knobs and Buttons

The AF-3400/3500 has 5 buttons and one rotary knob with a push button for data input.

SYSTEM OPERATION

Power On / Off

For wiring information see APPENDIX C

Turning the Unit ON

The AF-3400/3500 will turn on anytime that power is applied to the Master or Backup power input and will stay running as long as there is power supplied to one of the inputs. If you have the optional internal battery the system can be turned on by pressing and holding **[Button 1]** for 2 seconds.

Turning the Unit OFF

The AF-3400/3500 will turn off when power is removed from the Master and Backup power inputs. If power is turned off and you have the optional battery installed you will get the following message:

If you press any of the buttons the EFIS will stay on using battery power.

Battery Shutdown

The AF-3400/3500 can be turned off when on battery power by pressing and holding **[Button 2], [Button 3], or [Button 4]** for three seconds. The unit will also turn off when on battery power if you do not have airspeed or RPM for 5 minutes or if the battery drained.

BATTERY OPERATION

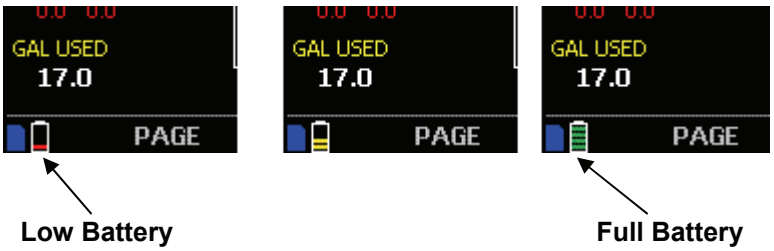
The optional internal battery is designed to allow the unit to operate in the event of an external power failure.

- The internal battery is a lithium ion battery and is recharged whenever input power is connected.
- When new, a fully charged battery is rated for 1 hour of normal operation. The screen will automatically dim when running on battery power to help conserve battery life.

If you lose external power in flight and the system is running on the internal battery you should land at the next available airport. Many factors can lower batter life;

DO NOT ASSUME THAT YOU HAVE ONE HOUR OF BATTERY LIFE.
NEVER TAKE OFF USING BACKUP BATTERY POWER.

When the unit is running on internal battery power a battery status ICON is displayed on the lower left hand corner of the display.



Screen Selection

You can rotate through the enabled screens on the unit by pressing the **[PAGE]** button1**.**

EFIS and EMS

EMS

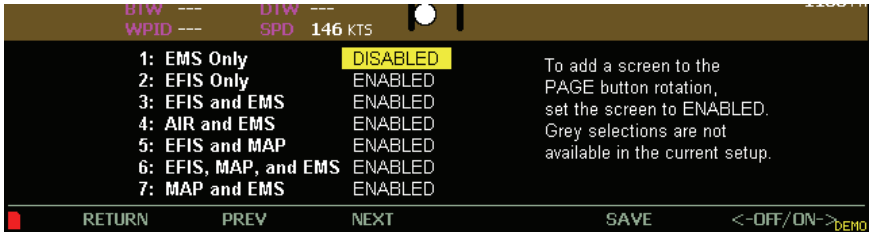
MAP and EMS

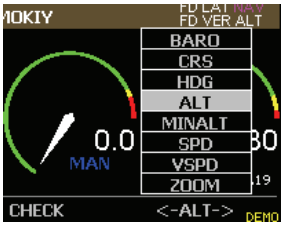
EFIS, MAP and EMS

EFIS and MAP

AIR and EMS

You can select what pages are in the screen rotation from the **[EFIS]** -> **[Settings]** -> **[More]** menu by pressing the <Page List> knob button. The knob is used to enable or disable each item. After selecting the desired pages be sure and press the [SAVE] button.





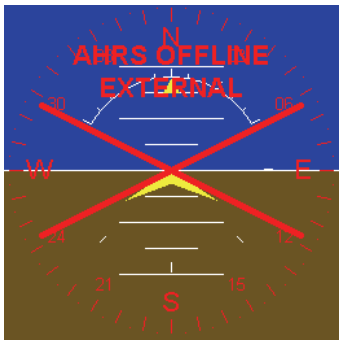
Knob List

You can select which items appear on the knob pop up list when you press the knob button from the **[EFIS]** -> **[Settings]** -> **[More]** -> **[Page List]** -> **[Knob List]** menu. The knob is used to enable or disable each item. After selecting the desired items be sure and press the [SAVE] button. Some items will appear on the list on certain pages even when turned off; **DIM** is always available on the checklist page, **ZOOM** is always available on a map page.

EFIS Flight Display

AHRS Alignment (Gyro)

When power is applied to the system the EFIS display will have a large RED X while the AHRS in initializing. The Aircraft should not be moved until the RED X disappears from the Screen (Approximately 40 seconds).



CAUTION:

If for any reason the RED X appears on the screen the Horizon Attitude, Heading, and Slip display **SHOULD NOT BE USED.**

Dual AHRS Monitoring

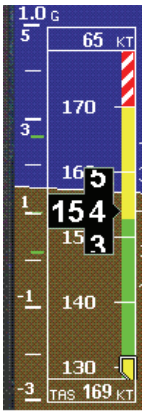
If you have a dual screen system with two AHRS units you can configure the screens to monitor both AHRS units. If a screen detects that there is an AHRS mismatch error in Roll, Pitch, or Heading you will get an AHRS MISMATCH error displayed on the center of the screen. See Dual AHRS configuration for proper setup.

Screen Dimming

The screen can be dimmed from the checklist page by turning the knob anytime the word **DIM** is displayed. If **DIM** is not displayed press the knob and select knob from the list.

Barometric Pressure/Altitude

The current barometer setting is displayed in the box below the altitude tape. The value is shown in either inches of Mercury or millibars. The current barometer setting can be adjusted by turning the knob anytime the word **BARO** is displayed. If **BARO** is not displayed press the knob until it is displayed. The current field elevation is stored in memory so that the altitude should be correct on power on.

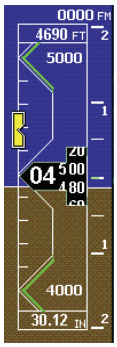


Airspeed

The airspeed is displayed on the left side of the screen using an analog 4 colored tape and digital readout. The airspeed range marks can be adjusted in Instrument Calibration under airspeed. The airspeed units are displayed in the True Airspeed box below the tape.

Horizon Roll and Pitch

The horizon (roll and pitch) works the same way that you would expect a traditional artificial horizon to work. The white line between blue and green stays parallel to the actual horizon regardless of the aircrafts pitch and roll. The parallel lines above and below the horizon line are the pitch indicator lines. Similarly the arrow rotating around the roll indicator gives you visual representation of your current roll angle. Each mark represents 10 degrees of roll with longer marks at -60, -30, 0, 30, 60. The pitch level line can be adjusted from the main EFIS page by pressing the following buttons **[EFIS] -> [SETTINGS] -> [PITCH ADJ]** . The screen knob is then used to adjust for pitch level.



Altitude

The altitude tape gives you a visual representation of your altitude. The digital readout points to your current altitude, thousands of feet are displayed using large numbers while hundreds of feet are displayed using smaller numbers. The green chevrons are located at 1000’ intervals for IFR cruising altitudes and the white chevrons are located at 500’ indicating VFR cruising altitudes.

Heading – EFIS DG

This heading is displayed like a standard slaved directional gyro. The digital readout in the pointer shows your current heading. If the EFIS DG is red the heading should not be relied on.

Skid/Slip Ball

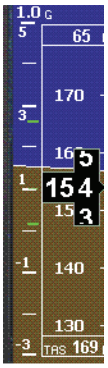
The skid/slip ball works like any standard mechanical one. If the ball is within the black lines, then you are in coordinated flight.

Standard Rate Turn

The required bank angle for a standard rate turn is indicated by a white triangle on the roll scale. If you align the yellow bank angle pointer with one of the white triangles you should complete a 180 deg turn in 1 minute. The required bank angle will change with airspeed and the triangles will disapear below 30 kts

Vertical Speed

The vertical speed is displayed using a bar located on the right side of the altimeter tape. The bar will be dark green and grow up for climbing and light green and grow down for descending. The digital vertical speed will be displayed on the top of the gauge or climbing and on the bottom of the gauge for descending.



G-Meter

The G-Meter is located next to the Airspeed tape. The current G loading will be displayed with a green bar. The G-Meter options are selected from the following menu:

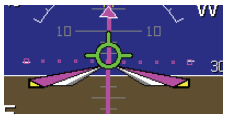
[EFIS] -> [G METER]

From the G Meter menu you can:

Turn the G Meter On/Off

Reset the G Meter.

The G Meter is limited to +/- 5 G's and will record the maximum and minimum G's that the aircraft has seen since the last time the Reset button was pressed with a green marker on the scale.



Flight Path Marker

The green flight path marker (FPM) or velocity vector shows where the aircraft is actually moving. The green target will only be centered under steady state flight conditions with no wind. Usually the target will be moving around the display showing where the airplane is going, not where the nose is pointed. If you have a strong cross wind from the left you will see the FPM move to the right. If you keep the FPM on the horizon line you will maintain level flight, even during steep turns.

EFIS Bugs (Airspeed, Altitude, Minimum Alt, Heading)

Altitude Bug

The Altitude Bug can be turned on and off from the **[EFIS] -> [NAVIGATION] -> [BUGS] -> [ALT]** menu. If the Altitude Bug is on and the text over the knob is **<-ALT->** the knob will set the desired altitude bug location. If the text is not <-ALT-> you should press the knob button until it appears. Holding the knob down for two seconds will sync the altitude bug to the current altitude. The box on the top of the altitude tape shows the current bug location and will have a black background when selected.

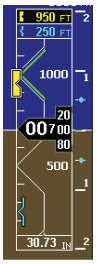
Altitude Alerting

The Altitude Alerting function provides visual and voice “ALTUTUDE” alerts when approaching the Altitude Bug.

- Upon passing through 1000 feet of the Selected Altitude, the Altitude Bug changes from White to Yellow
- When the aircraft passes within 200 ft of the Selected Altitude, the Altitude Bug changes from Yellow to Cyan, and the voice alert “ALTITUDE” is generated.
- After reaching the Selected Altitude the pilot flies outside of the deviation band (±200 feet of the Altitude Bug), the Altitude Bug changes from Cyan to Yellow, and the voice alert “ALTITUDE” is generated.

Altitude > 1000’ of Bug

1000’ > Altitude > 200’ of Bug



Altitude < 200’ of Bug

Minimum Descent Altitude/Decision Height Bug

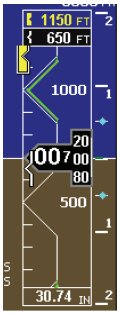
A barometric Minimum Descent Altitude Bug (MDA, or Decision Height, DH) is displayed whenever the altitude bug is turned on. If the MDA Bug is on and the text over the knob is **<-MIN ALT->** the knob will set the desired MDA bug location. If the text is not <-MIN ALT-> you should press the knob button until it appears. Holding the knob down for two seconds will sync the bug to the current altitude. The second box on the top of the altitude tape shows the current bug location and will have a black background when selected.

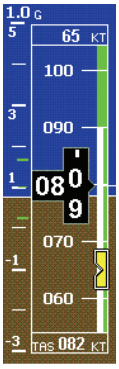
MDA/DH Alerting

The MDA Alerting function provides visual and voice “MINIMUMS” alerts when approaching the Bug.

- Upon passing through 100 feet of the Selected Altitude, the Bug changes from Cyan to White.
- After reaching the Selected Altitude the Bug changes from Cyan to Yellow, and the voice alert “MINIMUMS” is generated.

Altitude > 100' of MDA Bug **100' > Altitude > MDA Bug** **Altitude < MDA Bug "MIMIMUMS"**

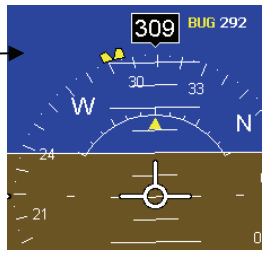




Airspeed Bug

The Airspeed Bug can be turned on and off from the **[EFIS] -> [NAVIGATION] -> [BUGS] -> [SPD]** menu. If the Airspeed Bug is on and the text over the knob is **<-SPD->** the knob will set the desired airspeed bug location. If the text is not <-SPD-> you should press the knob button until it appears. Holding the knob down for two seconds will sync the airspeed bug to the current airspeed. The box on the top of the airspeed tape shows the current bug location and will have a black background when selected

Heading Bug



The Heading Bug can be turned on and off from the **[EFIS] -> [NAVIGATION] -> [BUGS] -> [HDG]** menu. If the Heading Bug is on and the text over the knob is **<-HDG->** the knob will set the desired heading bug location. If the text is not <-HDG-> you should press the knob button until it appears. Holding the knob down for two seconds will sync the heading bug to the current magnetic heading. The text next to the heading box shows the current bug location and will have a black background when selected.

Clock/Timer Operation

The time functions can be accessed from the main screen by pressing the **[TIME]** button.

Clock Setting

Press the **[CLOCK]** then **[SET]** buttons to enter the date time adjustment section. The knob is used to adjust each field and the knob is pressed to move to the next field. The last field after the date is the current Zulu time offset.

Timer Functions

The system has a count down and count up timer that is accessed by pressing the **[TIMER]** button in the time menu. The timer value is adjusted with the knob is controlled using the buttons:

[START] [STOP] [RESET] [UP/DWN]

The Up or Down mode is displayed with an arrow on the screen. In Count Down mode the timer display will flash green when 0:00 is reached and you will get the voice alert "TIMER".

Once the timer is activated it is displayed on the upper left corner of the screen replacing the clock. The clock can be returned by pressing the **[TIME]** then **[CLOCK]** buttons.

Dual Screen Clock Setting

The current time on the other screen can be set by pressing the **[NET SYNC]** button from the time menu on the current display. When you press the **[NET SYNC]** button the time is sent over the Ethernet connection to the other screen and its clock is set to match the current screen.

Angle of Attack (AOA)

The EFIS can display an AOA if you have installed the optional AOA system. You will need to perform an in flight AOA calibration if your unit has not been loaded with precalibrated AOA data.

The AOA in flight settings can be adjusted from following Menu:

[EFIS] -> [SETTINGS] -> [AOA]

Button 2 in the AOA menu controls the AOA display.

OFF The AOA display is always off

ON The AOA display is always on

DECLUTTER The AOA display will be on if the angle of attack is greater than the AOA declutter segment in the EFIS AOA calibration menu. We have found the ideal setting for declutter is 8.

The segments are numbered using the following:

23 Warning RED Only
16 Approach Yellow lined up with the donut
12 L/D Max Split Green bar
6 Bottom Green Bar.

Flap Sensor
The AOA can use either the flap position sensor for the screen or the supplied switch connected to Input #3 on the main EFIS harness. The AOA Use Flap Angle Sensor should be set to YES if you have installed the Linear Flap Position Sensor for the screen in Instrument Calibration.

4. AOA
    13. Use Flap Angle Sensor YES/NO
    16. Declutter Segment 8

AOA Display

The center round donut will be green when the flaps are down and black when they are up. For a detailed explanation of the AOA system please refer to the separate AOA manual and the EFIS AOA calibration sheet. The numbers below the display are degrees angle of attack in tenths. If the AOA is properly calibrated you should get the following displays. As your angle of attack increases the display will lose bars.

L/D Max

This is the best engine out glide AOA.

Approach

This is the desired AOA for a normal approach.

Warning

This should indicate that you are 15% above stall and you will get the verbal “Angle Angle Push”.

STALL

This should indicate just as you reach the stalling AOA

EFIS Navigation

The EFIS can display a HSI when connected to a Nav radio, GPS, or GPS Navigator. The system has two main navigation needles Course and Bearing. You can individually select the navigation source for each needle from any radio connected to the unit. If you have a SL30 connected you will also get a second bearing needle when the standby nav frequency is enabled. The source label will indicate the radio type:

Label	Radio Type
NAV1, NAV2	SL-30 Nav/Comm Radio
GNAV1, GNAV2	GPS/NAV/Comm Navigator (430W,530W,480)
GPS1, GPS2,	GPS Radio

The CDI Needle and data is color coded to indicate the source of the data; Magenta for GPS data, Green for VOR or ILS data.

We currently support data from the following radios:

Radio	Interface	Supported Data
Garmin SL-30	RS-232	VOR, ILS
Garmin 430W/530W/480	RS-232 ARINC 429	GPS CDI GPS CDI, LPV, VOR, ILS
Garmin 196,296,396,496	RS-232	GPS CDI
GPS Radio with NMEA-0183	RS-232	GPS CDI

The navigation course and bearing needle sources are selected from the following menu:

[EFIS] -> [NAVIGATION]

From the navigation menu you can select following sources:

Course CDI needle source:
CRS/NONE, CRS/GPS1, CRS/NAV1, CRS/GNAV1,…..

Bearing needle source:
BRG/NONE, BRG/GPS1, BRG/NAV1, BRG/GNAV1,…..

VOR Navigation Display

The Green course indicator points to the current course that you have selected using the OBS setting. The OBS setting can be set using the knob on the EFIS when OBS is displayed over the knob (press the knob if OBS is not displayed). The current OBS setting is displayed in the text area. If the Nav radio is tuned to a VOR, this is the radial to fly. The SL-30 OBS setting can also be set using the OBS button on the radio. The radio identifier will also be decoded and displayed only if you are using a SL30 radio.

CDI

Each dot in the course deviation indicator indicates 2 degrees of deviation from the course radial.

VOR

If the radio is tuned to a standard VOR frequency and is giving a valid TO / FROM indication the display will show VOR in green letters. If the radio does not have a valid indication the display will show VOR and it should not be used for navigation.

BTA 

The BTA (Bearing To Active) displays the direct bearing to the active VOR station and will be displayed on the HSI as a yellow bearing needle. If you are flying directly to the VOR on the Course OBS setting the bearing needle will be under the Green course needle.

BTS

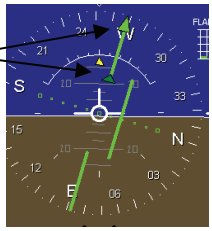
The BTS (Bearing To Standby) displays the direct bearing to the Standby VOR station if you have selected M (monitor) on the SL-30. The BTS will be displayed on the HSI as a orange line with a circle.

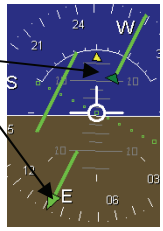
IDNT

IDNT displays the current nav frequency identifier decoded from the SL-30.

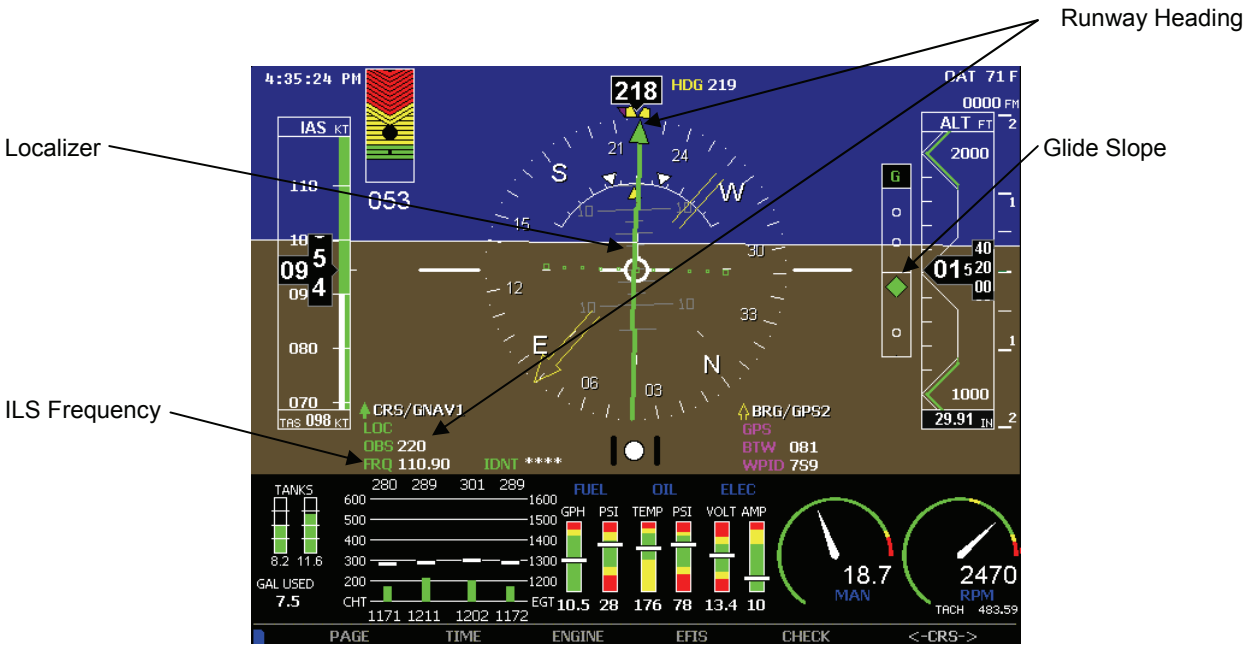
TO/FROM

The To/From radio flag will be displayed by a green triangle on the course needle.

TO 

FROM 

ILS Navigation Display



If the Nav Radio is tuned to an ILS frequency you should use the OBS setting to select the runway heading.

NOTE: The SL-30 will not let you adjust the OBS if you have selected an ILS freq and you must use the OBS knob on the EFIS to set the course indicator.

The course indicator is fixed to the rotation of the DG. The Green course indicator will only be displayed if you are tuned to a VOR or a localizer.

LOC

If the radio is tuned to a standard ILS frequency and is giving a valid indication the display will show **LOC** in green letters. If the radio does not have a valid localizer indication the display will show LOC and it should not be used for navigation.

GS

If the nav radio has a valid glide slope indication the display will show **GS** in green letters. If the radio does not have a valid glide slope flag it will display GS in red and it should not be used for navigation.

BC

If the nav radio is tuned to a localizer and is in back course mode **BC** will be displayed in green.

NOTE on Back Course: If you are flying a back course with an HSI and the SL-30 is NOT in back course mode you should set the course selector “OBS” to the front course heading so no reversal will be needed since the CDI indicator spins with the DG. If you have the SL-30 in back course mode, you must set the course selector to the heading of the back course runway or the CDI needle will be reversed.

GPS Navigation Display

Vertical Deviation Pointer

The Vertical Deviation Pointer (VDP) can be displayed from a WAAS GPS to indicate the baro-VNV vertical deviation when Vertical Navigation (VNV) is being used. The VDP should change to a diamond once you are on the approach and receiving glide slope information.

NOTE: Requires a 430W, 530W, or 480 along with the AF-ARINC adaptor module.

Glide Path Indicator

The Glide Path Indicator (GPI) can be displayed from a WAAS GPS and is analogous to the glideslope for GPS approaches supporting WAAS vertical guidance (LNAV+V,L/VNV, LPV)

NOTE: Requires a 430W, 530W, or 480 along with the AF-ARINC adaptor module.

CRS

The Magenta GPS course indicator points to the current course that you have selected on your GPS.

CDI

The GPS CDI scale should be automatically set by the remote WAAS radio using the ARINC data line:

APR: 0.06 nm / dot
TRM: 0.2 nm / dot
ENR: 1.0 nm / dot

TRK

The current GPS track over the ground is displayed on the HSI by a Magenta triangle. If there is a crosswind it will be different than your magnetic heading.

BTW

BTW displays the direct bearing to the active GPS waypoint and will be displayed on the HSI as a yellow line with two arrows. If you are flying directly to the waypoint on the GPS Course the BTW needle will be under the Magenta needle.

DTW

DTW displays the nautical miles to the current GPS waypoint.

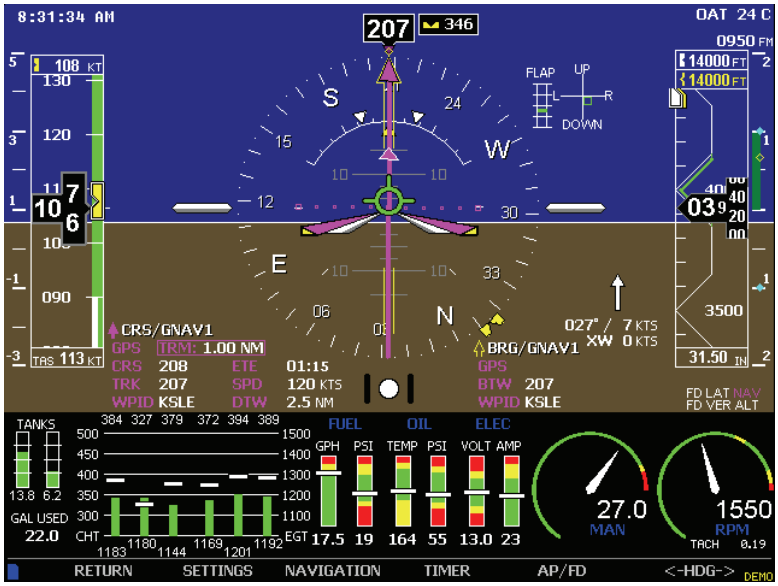
SPD

SPD displays the current ground speed in nautical miles per hour.

WPID

WPID displays the current waypoint ID from the GPS.

Autopilot Control / Flight Director



The autopilot and flight director are very closely connected and are controlled from the same source. If your aircraft has our ***ADVANCED Pilot*** autopilot it supports GPSS (GPS steering) and GPSV (GPS vertical steering) and the aircraft should closely follow the flight director when the autopilot is in EFIS Mode.

ADVANCED Pilot Autopilot Controls

The ADVANCED Pilot Autopilot is manufactured by TruTrak, it is very similar to the DigiFlight II VSGV and has all of the same wiring, configuration, and setup. You should follow the installation and configuration manual for the DigiFlight II VSGV from TruTrak.

The ADVANCED Pilot has the following modes controlled from the buttons on the face of the autopilot.

[AP] - Autopilot control mode. Pressing the AP button will cause the autopilot to turn on and follow the current ground track and the current vertical speed of the aircraft. The EFIS settings and controls will not have any effect on the autopilot. Once the autopilot is controlling the aircraft pressing the knob button will select the Track or Vertical Speed fields. Once the cursor is on the desired field you use the knob to adjust either the desired track or the desired vertical speed. The Autopilot can be turned off at any time by pressing the [AP] button or external button if you have one connected to the control wheel input line of the autopilot.

[EFIS] - EFIS control mode. Pressing the EFIS button will cause the autopilot to turn on and follow the current AP/FD settings from the EFIS. The Autopilot can be turned off at any time by pressing the [AP] button or external button if you have one connected to the control wheel input line of the autopilot.

EFIS Flight Director/Autopilot

The wings that come up when the flight director is enabled will show the aircraft positioning to follow. All the pilot has to do is keep the triangle in the wings as they move to follow the commanded source. A change in heading or track will command the wings to bank in the direction to acquire the new heading or track. A command to climb or descend to a new altitude will cause the wings to move up or down.

The Flight Director Wings are color coded based on the command source. The wing bar color will show the horizontal steering source and the triangle tip color shows the vertical steering source.

Gray	No Source
Red	Source Flagged
Yellow	Heading / Altitude Bug
Magenta	GPS
Green	VOR / ILS

Autopilot and Flight Director controlled by Heading and Altitude Bugs

Horizontal = GPS and Vertical = Altitude Bug

Autopilot and Flight Director controlled by CDI source = GPS

Autopilot and Flight Director controlled by CDI source = NAV (VOR or ILS)

CDI source is flagged as bad; Vertical = Altitude Bug

No Horizontal Nav source; Vertical = Altitude Bug

Turning on the AP/FD Mode

The flight director can be turned on from the following menu: [EFIS] -> [AP/FD] -> [FLTDIR ON/OFF]

Autopilot / Flight Director Control Settings

[EFIS] -> [AP/FD] -> [Settings]

LATERAL EFIS Autopilot Control Settings

PGAIN .1 Range (.01 – 2.0)
The LAT Gain setting controls how fast the aircraft will respond to errors in track or heading. With too low a setting the aircraft will hunt slowly and appear slow to respond in roll. With too high a setting the aircraft will hunt rapidly, and appear jittery.

IGAIN .000 Range (.001 – 1.0)
The lateral integral gain controls how fast the heading corrects to long term heading errors. We usually run this at 0.

IMAX 50 Range (1 – 100)
Maximum Integral error that is allowed.

VERTICAL EFIS Autopilot Control Settings

ALTBUG Altitude Bug Autopilot control settings

PALT 6.0 Range (.1 – 12.0)
Controls how fast the aircraft will respond to errors in altitude. With too low a setting the aircraft will hunt slowly and appear slow to respond in altitude. With too high a setting the aircraft will hunt rapidly, overshoot the altitude, and appear jittery.

IALT .005 Range (.001 – 1.0)
The integral altitude gain controls how fast the pitch corrects to long term altitude errors. We run this at .005 in our RV-10

IVS .002 Range (.001 – 1.0)
The integral Vertical speed gain controls how fast the pitch corrects to vertical speed errors in a climb or decent.

IMAX 500 Range (1 – 1000)
Maximum Integral error that is allowed in feet per second.

APPROACH Approach ILS Autopilot control settings

GSGAIN 3.0 Range (.1 – 10.0)
The Glide Slope gain controls how fast the aircraft will respond to altitude errors on the ILS glide slope. With too low a setting the aircraft will hunt slowly and appear slow to respond in altitude. With too high a setting the aircraft will hunt rapidly, overshoot the altitude, and appear jittery.

LOCGAIN .5 Range (.1 – 3.0)
The Localizer gain controls how fast the aircraft will respond to lateral errors. With too low a setting the aircraft will hunt slowly and appear slow to respond to errors. With too high a setting the aircraft will hunt rapidly, overshoot and appear jittery.

PITCH Pitch servo control settings

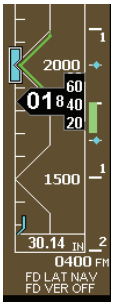
UPGAIN .40 Range (.1 – 1.0)
Controls how far the aircraft will pitch up for a set vertical speed in 1/100 of a degree.
1000 ft/m = 4.0 degrees

DWNGAIN .30 Range (.1 – 1.0)
Controls how far the aircraft will pitch down for a set vertical speed in 1/100 of a degree.

MAXCMD 1.0 Range (.1 – 5.0)
Controls how far the commanded pitch is allowed from the current pitch in degrees pitch.

DGAIN 0.00 Range (.00 – 5.0)
Derivative pitch command.

<-VSPD-> 500 FPM Range (0 – 2000FPM)
The vertical climb speed that the aircraft will use to change altitudes can be selected from the <-VSPD-> knob selection. The current setting is shown on the vertical speed tape as two small Cyan triangles. If the current setting will cause the aircraft to fly below the MIN SPD in climb the triangles will adjust the vertical speed so that the MIN airspeed is maintained. If the vertical climb speed is being limited by the Minimum airspeed setting the triangle will change color to orange.



AP/FD Lateral Modes

LAT HDG Aircraft will follow the Yellow heading bug on the HSI

LAT NAV Aircraft will usually follow the current CDI needle on the HSI. If the EFIS is detecting valid GPSS commands from the currently selected Nav source those commands will be used for the autopilot control. This will enable the autopilot to follow the turn anticipation and holds from a GPS navigator.

LAT ARM **Localizer**
Aircraft will follow the heading bug on the HSI until the ***CDI needle deflection is less than 80% AND the Current aircraft heading is within 30 degrees of the CDI course***.
The AP/FD status on the EFIS will show ARM unit switching to NAV mode.
GPS
Aircraft will follow the heading bug on the HSI until the ***CDI needle deflection is less than 80% AND the Current aircraft heading is within 90 degrees of the CDI course***.
The AP/FD status on the EFIS will show ARM unit switching to NAV mode.

LAT OFF Any GPSS steering commands from the navigation radio will be passed through to the Autopilot in the AF-ARINC module.

As long as the aircraft has enough of a turn and the LAT Gain is high enough the aircraft should try and use a standard rate turn for the bank angle.

AP/FD Vertical Modes

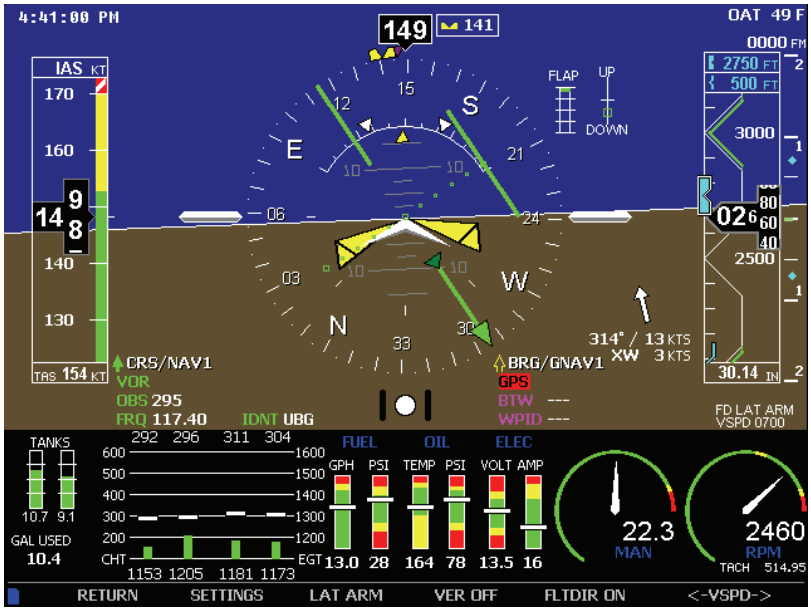
VER ALT Aircraft will follow the Yellow Altitude bug on the altimeter tape.

VER NAV Aircraft will usually follow the current GS needle on the EFIS. If the EFIS is detecting valid GPSV commands from the currently selected Nav source those commands will be used for the autopilot control.

VER ARM Aircraft will follow the Altitude bug until the GS needle deflection is less than 80%. ***If the vertical GS needle is lost in ARM or NAV mode the Autopilot and Flight director will switch back to following the heading bug after 5 seconds***. This enables vertical guidance to the altitude bug on a missed approach.

VER OFF Any GPSV steering commands from the navigation radio will be passed through to the Autopilot in the AF-ARINC module.

Autopilot / Flight director in ARM mode.



The AP/FD is currently tracking the Heading and Altitude Bugs. The FD/AP status text shows **FD LAT ARM** and the Flight director wings are yellow indicating that it is being controlled from the Bugs. As soon as the green VOR CDI needle moves in to 80% and the heading is within 30 degrees of the CDI course the FD wings will change to green and the status will change to **FD LAT NAV**.

For the autopilot to follow the EFIS commands you will need an autopilot that is capable of GPSS and GPSV ARINC steering commands. You will also need to have the optional AF-ARINC module connected to the EFIS and properly configured.

TruTrak Autopilot Control
For the TruTrak autopilot to follow the EFIS commands it will need to be in GPSS and GPSV mode.

TruTrak Settings
The following settings are a good starting point for the TruTrak autopilot

Lat Activity	3	Vert Activity	4
Lat Torque	12	Vert Torque	12
Bank Angle	High	Static Lag	2
Microactivity	0	Microactivity	0
GPSS Gain	26	Half Step	N

Flying an LPV Approach

The following example shows how to use the EFIS, Garmin 430W and TruTrak DigiFlightIIVSGV to fly the KUAO GPS 35 approach.

GPS LPV approach before getting vertical guidance from the 430W EFIS Vertical is in ARM and following the altitude bug. Notice the FD bar ends are yellow indicating that vertical guidance is from the Altitude bug.

We are now getting vertical guidance from the 430W, EFIS Vertical still in ARM

Set the Autopilot to HOLD and then back to GPSV (when at bug altitude) so that when it arms it will not climb or descend to last altitude.

EFIS VDI within 50% and switches from ARM to VNAV and the Autopilot changes to ARM

Autopilot ARM and holding altitude waiting for VDI to center

VDI is centered and autopilot switches from ARM to GPSV -> and starts down the glide slope

When we get to the FAF (CIGRU in this case) the VDI pointer will change to a Diamond, the autopilot will follow vertical guidance whenever you have the < or the Diamond pointer.

Moving Map Display

The system can display a moving map if you have purchased and installed the optional Mapping package. You will need to have the SD card installed with the mapping database for proper operation.

WARNING: The moving map is to be used as a reference only and is not to be used in place of current aviation charts or for primary navigation.

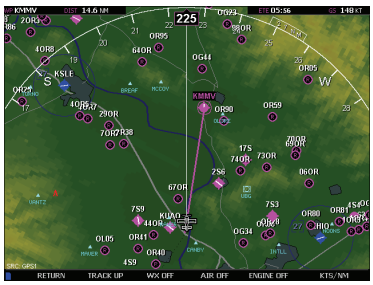
Map Features

Currently the map will display the following features for the United States Only:

1. Public and Private airports
2. Airspace
3. Intersections, VOR's
4. Obstructions
5. State Lines
6. Rivers
7. Major Roads
8. Cities

The moving map can be displayed as a partial screen along with the EFIS and/or Engine Monitor or as a complete page. You can also select if the airspeed and altitude tapes and engine monitor are displayed on the map from the **[MAP] -> [SETTINGS]** menu and selecting the **[AIR OFF] [Engine]** buttons.

EFIS-Engine-Map Page



Map Page Air & EMS OFF

Map Page with Air ON EMS OFF

Map Data Source

The current flight plan source that is displayed on the Map can be set from the following menu:

[MAP] -> **[SETTINS]** -> **[SRC/???]** where SRC/??? Can have the following options depending on the radios installed in the aircraft:

SRC/GNAV1	430W/530W/480 GPS Navigator Radio setup as GPS 1
SRC/GPS2	External GPS unit setup as GPS 2
SRC/MAP	Flight Plan activated from the EFIS Map

Private Airports

The **[MAP]** -> **[SETTINS]** -> **[PVT ON/OFF]** button gives you the option of displaying or not displaying private airports on the moving map screen.

Intersections

The **[MAP]** -> **[SETTINS]** -> **[INTS ON/OFF]** button gives you the option of displaying or not displaying Intersections on the moving map screen.

Zoom Range

The current zoom rang is displayed by an arc on the top of the map display with its current digital range. The zoom range can be adjusted using the knob anytime [ZOOM] is displayed. The map software will progressively declutter airports, intersections and obstacles from the screen as you zoom out farther.

Nearest Airport

Pressing the [NRST] button from the map menu will bring up a sorted list of the nearest eight airports displayed on the screen at the current zoom level. If you want to see the actual closest airports you should zoom in before pressing the **[NRST]** button. You can then use the knob so select the desired airport. Pressing the [INFO] button will display the information for the highlighted airport.

> **CAUTION** *If you want to see the actual closest airports you should zoom in before pressing the **[NRST]** button.*

Direct To Navigation

Pressing the [-D->] button from the map menu will enable you to select the desired airport to navigate to by using the knob.

Airport Info

Pressing the [INFO] button from the map menu will bring up multiple pages of airport info, including runways, frequencies and airport information.

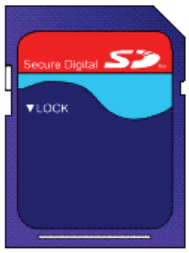
Airspace

Airspace is displayed on the moving map along with it vertical boundaries in a similar format to a sectional chart.

Track Mode

The desired map track mode can be selected from the **[MAP] -> [SETTINGS]** menu and selecting either [TRACK UP] or [NORTH UP]

Map Database Files



The moving map uses the following database files stored on the SD card, the SD card must be kept in the EFIS for the map to work. :

File Name	Description	Update Frequency
AFSTERUS.AFM	Terrain height information for the US	When Required
AFSVECUS.AFM	Vector data for US roads/rivers/lakes/cities	When Required
AFSMAPUS.AFM	Navigational data (airports, obstacles, navaids, …)	Every 28 Days

AFSMAPUS.AFM and AFSVECUS.AFM files have a version number associated with them, and will only work with a version of the system software that is compatible. When you download the map files, make sure that your version of the system software matches the map version. If it doesn't match, the map will not work.

Example:

AF3000 Series System Software Version 6.2.40-MV10 <-The MV10 is the map version

Map Data files Version MV10

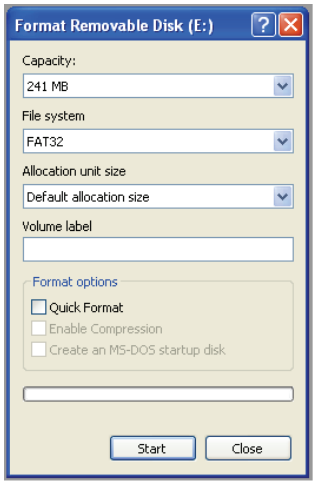
Map Database Update Procedure

1. **Format SD Card**
   Format the SD card on your PC for "FAT32". Right click your SD drive icon and click on format. You should also make sure it is set for FAT32.

2. **Download current Map database files**

Go to our website under the Support header -> Current Map Data.

www.advanced-flight-Systems.com



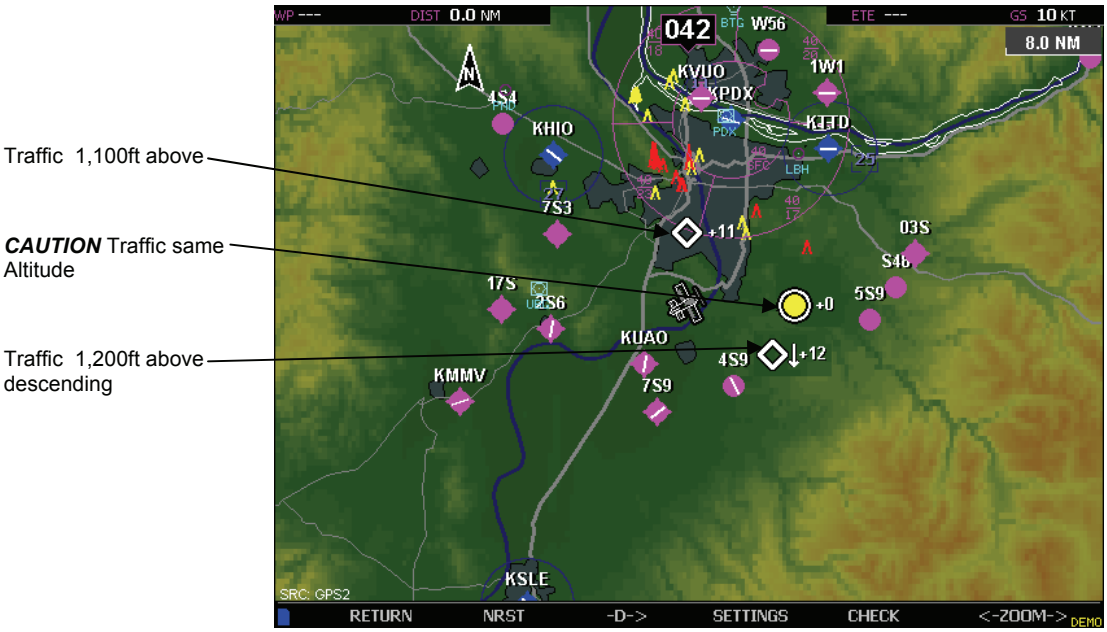
Right click each file and select ***Save Target As*** select your SD card drive as the target location and click ***Save*** to transfer each file to the SD card. Once you are finished you should have the following three files on your SD card:

AFSMAPUS.AFM	Airport and Airspace data
AFSTERUS.AFM	Terrain data for the USA
AFSVECUS.AFM	Roads, Rivers, Lakes and Cities

3. **Install SD Card into EFIS**

Traffic Display

WARNING: Traffic information displayed on the Map is provided for visually assisting in acquiring other aircraft. The aircraft should be maneuvered based only upon ATC guidance or positive visual acquisition of conflicting aircraft.



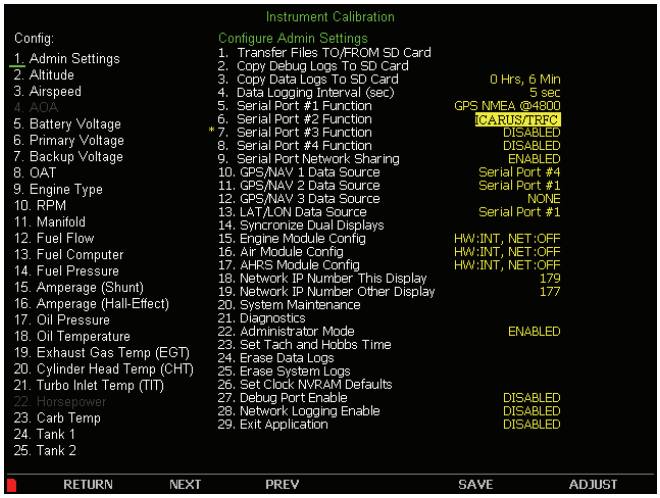
The AFS-Map can display traffic when connected to a Zaon XRX or Garmin GTX330 transponder.

Zaon XRX

XRX detects up to three threat aircraft from within your cockpit using a cutting-edge, proprietary, self-contained antenna design. With direction, locating and identifying traffic is simple and easy, and traffic information is displayed on the EFIS Map page. XRX delivers the three "dimensions" of traffic information that pinpoints where traffic is located: direction, range and relative altitude. Traffic accuracy is 0.2 NM on average for range, ±200 ft for altitude (defined by TSO standards set for transponder encoders), and ±22° for direction. For detailed Zaon information and capabilities: www.zaon.aero

Zaon EFIS Setup

After connecting the Zaon XRX to EFIS serial port #2 you will need to configure the serial port in the EFIS for ICARUS/TRFC. You will also need to configure the Zaon output to Garmin Traffic mode.



EXAMPLE Zaon connected to EFIS Serial Port #2

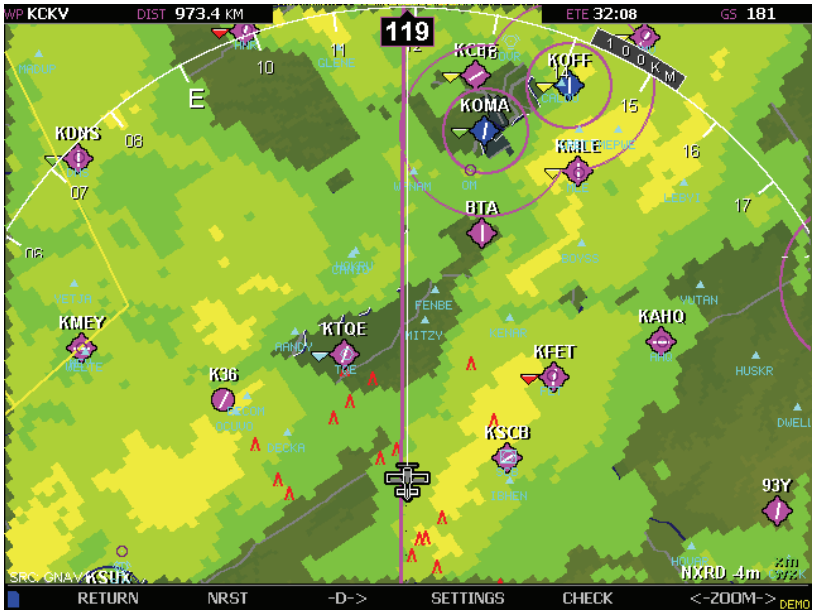
Garmin GTX330

The IFR-certified GTX 330 offers a Traffic Information Services (TIS) interface, giving you greater traffic awareness in some of the United States's busiest airports. TIS traffic from the GTX330 is displayed on the map, including location, direction, altitude and climb/descent information for nearby aircraft.

GTX 330 EFIS Setup

After connecting the GTX 330 to EFIS serial port #2 you will need to configure the serial port #2 for ICARUS/TRFC

XM Weather Display



CAUTION: NEXRAD weather data should only be used for long-range planning purposes. Inherent delays and relative age of the XM data can be experienced. NEXRAD weather cannot be used for short term weather avoidance.

Weather Module installation

The WeatherWorks XM Weather Module should be mounted on the inside of the aircraft and the antenna located on the aircraft glare shield. The XM Weather module should be powered from a 12V aircraft source. The weather receiver communicates with the EFIS screens using the Ethernet port. For a dual screen installation you will need to use a separate Ethernet HUB in the aircraft. If you have a single screen system you can plug the weather receivers Ethernet cord directly into the EFIS.

Screen Configuration Settings

One of the screens in the aircraft needs to be configured as the Weather Master and any additional screens should be set to Slave.

The screen with the Engine Monitor connections should be configured as the Weather Master in the ADMIN settings menu of calibration.

1. Admin Settings
   18. WX Module Config MASTER

Any additional screens should be configured as a Weather SLAVE in the ADMIN settings menu of calibration.

1. Admin Settings
   18. WX Module Config SLAVE

Network Ethernet hub

We recommend a Linksys 5-Port 10/100 Switch Model SD205, this is a 12V powered unit that has worked well in our RV-10.

XM Weather Service

After the installation is complete and you are able to move the aircraft outside so that the Antenna can receive the Satellite signal you will need to call XM to subscribe to a service plan. Currently the AFS software will display the following items from the “Aviator LT” XM WX Data Packages.

You will need your radio ID Number from the receiver when calling XM at the following number:

XM Activation 1-800-985-9200

XM Diagnostics

The XM status message and logo will indicated the current XM receiver status using the following messages:

Screen has found the receiver and is connecting to it.

Screen is receiving the XM data for the first time since turning on.

The XM/WX letters will flash from green to white as data is being received.

The receiver has lost communications and is resetting the unit.

NEXRAD

High resolution radar image of radar reflectivity.

Reflectivity is the amount of transmitted power returned to the radar receiver. The NEXRAD colors directly correlate to the level of detected reflectivity from the radar.

NEXRAD DATA AGE

The current age of the NEXRAD data is shown in the lower right hand corner of the map, 4 minutes old in this example.

NEXRAD LIMITATIONS

• NEXRAD base reflectivity does not provide sufficient information to determine cloud layers or precipitation characteristics. You cannot distinguish between wet snow, wet hail, and rain.

• NEXRAD base reflectivity is sampled at the minimum antenna elevation angle. An individual NEXRAD site cannot depict high altitude storms at close ranges. It has no information about storms directly over the radar site.

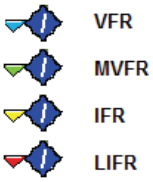
• When zoomed in a square block on the display represents an area of 2 ½ miles. The intensity level reflected by each square represents the highest level of NEXRAD data sampled within the area.

TFR's

Active TFR's are drawn in RED and future TFR's are YELLOW.

METARS

Airports with METAR data are displayed with a colored flag next to the airport symbol on the map.



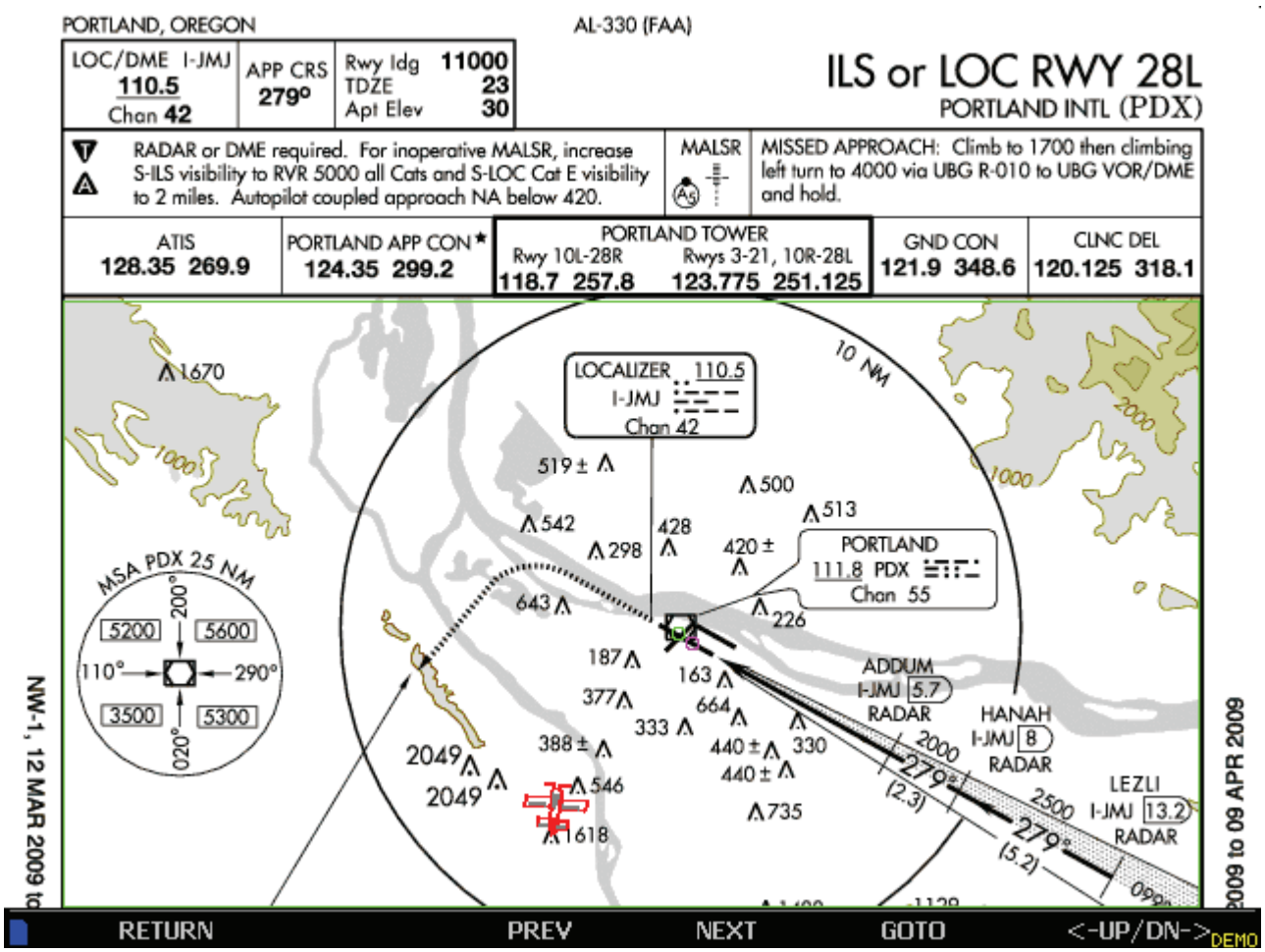
If an airport has METAR data a weather page will be added to the airport info after the frequency page, usually page 2.

IFR Approach Plates

The EFIS Map page has the ability to display an IFR approach plate if your data card contains a CHART directory and you have the approach plate file for the selected airport. Current approach plates are available for purchase from the Advanced Flight Systems web store. www.Advanced-Flight-Systems.com

The AFS approach plates are geo referenced and should display your current aircraft position if your location is on the approach plate area. If you have a traffic receiver traffic should be displayed on the approach plate. If the selected chart has the geo reference data it should show a green box around the airspace and a magenta circle located on the airport. If the magenta circle is not on the airport, you should not use the approach plate for aircraft position.

WARNING: It is the users responsibility to verify that the approach plates in the EFIS are current and up to date before using.



The CHART button is available from the MAP –D-> or Nearest menu and will bring up the first chart for the selected airport if the data is on the SD card. Once you have displayed a chart the screen will remember the current chart and pan position so that you can easily flip back and forth from the map. Use the PREV and NEXT buttons to select the available charts and the knob to pan the chart up and down.

Engine Monitor Display

The system can display the engine monitor on the bottom of the main EFIS page or as a full Engine page if the system has one of the following:

1. The screen has an engine monitor board installed in the case.
2. The screen is connected to another screen that has an engine monitor board installed with an Ethernet crossover cable.

Fuel Computer

The fuel computer is accessed from the main screen by pressing the **[ENGINE]** button followed by pressing the **[FUEL]** button.

WARNING

The GALS USED (Gallons Used) and GALS REM (Gallons Remaining) displayed is not a measurement of the fuel in the aircrafts tanks. The fuel amount calculated from the starting fuel level you programmed in the system, minus the fuel used while the engine was running. When the system is properly calibrated and fuel is added correctly the system will accurately measure the fuel used. It is imperative the pilot verify the calibration of the system over many tanks of fuel before using the "GALS REM" and/or "GALS USED" Modes as an indication of the fuel in the tanks or fuel used. Even after verifying the calibration of the system it should never be used as the primary indicator of fuel quantity in the tanks. It is important the pilot visually check/measure the fuel quantity for each tank before takeoff and crosscheck these readings against the Fuel Level Gauges and the Fuel Computer. It is important the pilot use preflight and flight planning techniques, in accordance with the FAR's, which will help insure the proper amount of fuel for the intended flight is on board the aircraft before takeoff. While in flight the fuel gauges and fuel computer should only be used to crosscheck the fuel calculations of the fuel onboard from flow rates specified in the specification for your aircraft and calculations of the fuel onboard from flow rates that you measured from previous flights. The use of this system does not eliminate or reduce the necessity for the pilot to use good flight planning, preflight and in-flight techniques for managing fuel. If you are not familiar with these techniques, contact the FAA to acquire proper training.

Calibration

The accuracy of the fuel computer is affected by the value of ***Counts per .01 gals*** (K Factor). The ***Counts per .01 gals*** (K Factor) sets the calibration of the instrument to match the flow transducer and the variations in the installation. After running a tank of fuel use the following formula to adjust the accuracy.

The ***Counts per .01 gals*** (K Factor) is adjusted from the Fuel Flow/Computer page in Instrument Calibration.

New Counts per .01 gals = (Old Counts per .01 gals) x (Disp GAL USED/PUMP GALS)

Fuel Computer Modes

The fuel computer display can set to display any of the following by pressing the **[MODE]** button. The mode label will be RED if the fuel computer gallons remaining amount does not match the fuel tanks.

Gallons Used -> Gallons Remaining -> Hours Remaining

If the system is connected to a GPS you will also have:

Kts per Gallon -> Miles per Gallon -> Gallons Remaining at Waypoint -> Gallons Required to Waypoint

WARNING: The Fuel Computer is only accurate when the fuel-flow sensor is calibrated properly and fueling stops are entered correctly.

GAL USED Gallons Used
Displays the gallons used since the last time the fuel computer was set.

GAL REM Gallons Remaining
Displays the gallons remaining, calculated from the last time the fuel computer was set.

HRS REM Hours Remaining
Displays the hours remaining, calculated from the last time the fuel computer was set and the current fuel flow rate.

WARNING!! The following are based on the current fuel flow and the GPS ground speed. If you change power settings or the Winds change they will not be correct!

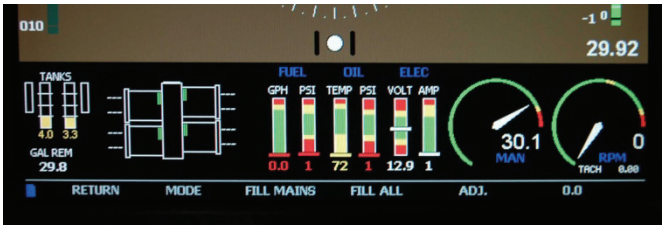
KTS/GAL Knots per Gallon
Displays the current ground distance traveled in nautical miles per gallon of fuel.

MILE/GAL Miles per Gallon
Displays the current ground distance traveled in statute miles per gallon of fuel.

GREM AT Gallons Remaining At Waypoint
Displays the fuel amount that should be remaining at the next GPS waypoint.

GREQ TO Gallons Required to next Waypoint.
Displays the fuel amount of fuel needed to get to the next GPS waypoint. This is based on the current fuel flow and GPS data.

Adding Fuel to the Fuel Computer



WARNING: Every time fuel is added or removed from the aircraft tanks one of the following operations must be done to protect the accuracy of the fuel computer.

TANKS FILLED

You can set the fuel computer to the programmed full tanks by pressing one of the following buttons in the fuel computer:

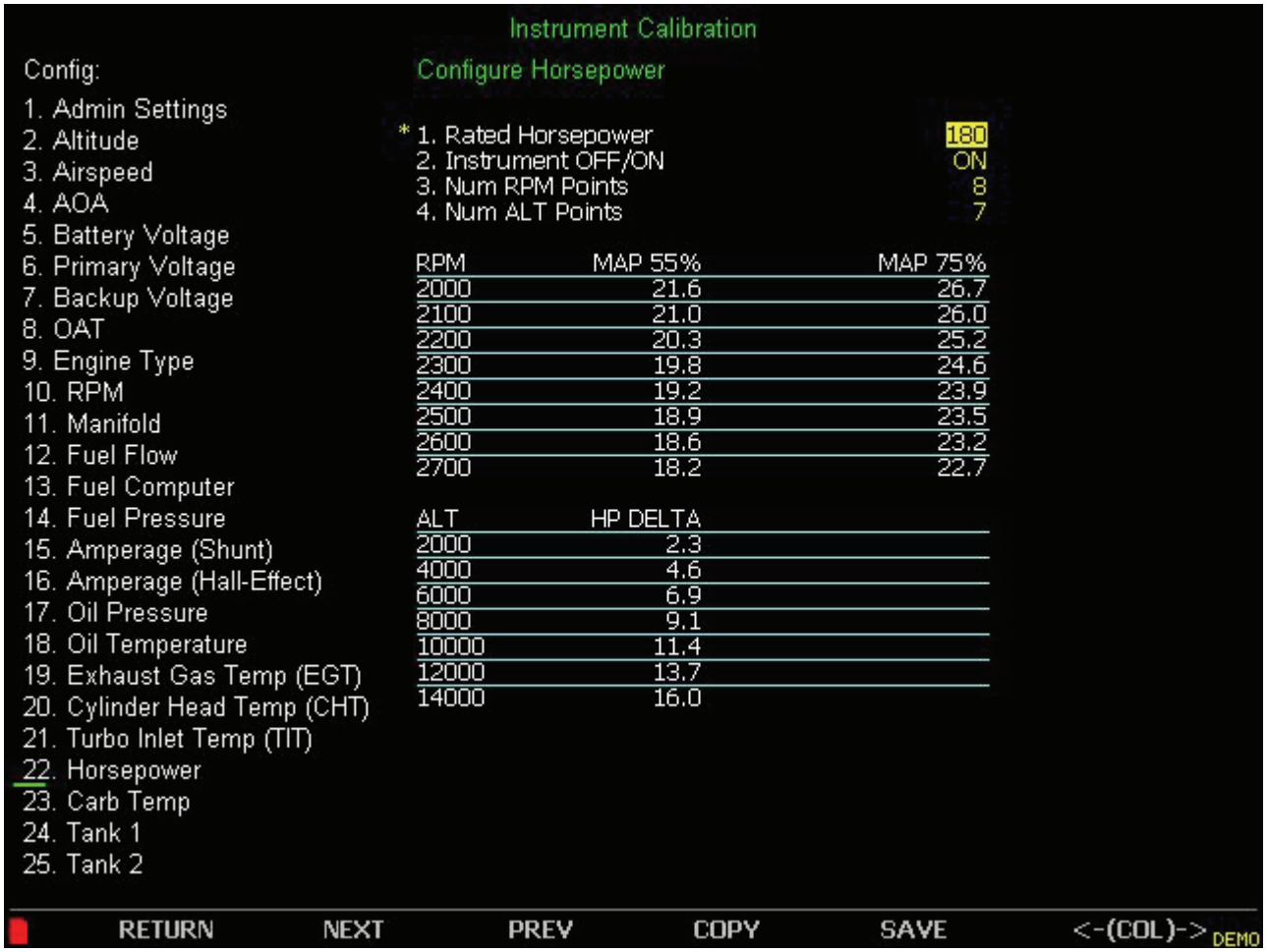
1. [**FILL MAINS**] If only the main tanks have been filled
2. [**FILL ALL**] If the main and tip tanks have been filled

WARNING: **If you press [FILL ALL] and have not added fuel to the tip tanks the fuel computer calculations will be incorrect**

You can add or subtract fuel to the computer by adjusting the [**KNOB**] for the correct amount and then pressing the **[ADJ]** button.

% Power Display

The system will display the estimated %Power using the Horsepower table in instrument calibration. You will need to configure the settings by using the appropriate data from your engine manual.



Warning: ***You should never lean your engine with power settings over the factory recommended level (generally 65% to 75% power).***

Leaning with high power settings can cause detonation. Always verify your power level with engine charts before leaning. As you lean past maximum horsepower (100F to 150F rich of peak EGT) your engine will lose power.

The following data is supplied only as a reference; you should use your Lycoming engine graphs to verify the accuracy of the display. The Delta HP number is the increase in actual HP that the engine will produce for the same manifold and RPM at increased Altitude.

Engine	O-360				
Rated HP	**180**				
RPM	**55% MAP**	**75% MAP**		**Altitude**	**Delta HP**
2000	21.6	26.7		2000	2.3
2100	21	26		4000	4.6
2200	20.3	25.2		6000	6.9
2300	19.8	24.6		8000	9.1
2400	19.2	23.9		10000	11.4
2500	18.9	23.5		12000	13.7
2600	18.6	23.2		14000	16
2700	18.2	22.7			

Engine	**O-320**				
Rated HP	**160**				
RPM	**55% MAP**	**75% MAP**		**Altitude**	**Delta HP**
2000	21.4	26.4		2000	2
2100	20.8	26		4000	4.1
2200	20	25.6		6000	6.1
2300	20.3	24.9		8000	8.1
2400	19.6	24.3		10000	10.1
2500	19.2	23.8		12000	12.2
2600	18.8	23.2		14000	14.2
2700	18.4	23.1			

Engine	**IO-540**				
Rated HP	**260**				
RPM	**55% MAP**	**75% MAP**		**Altitude**	**Delta HP**
2000	23.2	29.4		2000	5
2100	22.4	28.1		4000	9
2200	21.5	26.8		6000	13
2300	20.7	25.7		8000	17
2400	19.8	24.7		10000	21
2500	19.3	24		12000	25
2600	18.8	23.3		14000	29
2700	18.5	22.5			

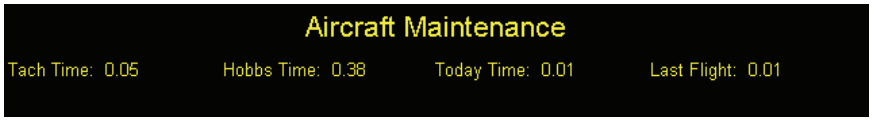
EGT/CHT Display Modes

The Exhaust Gas Temperatures (EGT) and Cylinder Head Temperatures (CHT) for every cylinder are continuously displayed in both analog and digital formats on the AF-3400/3500. The cylinders are laid out sequentially with cylinder #1 on the left followed by cylinder #2 to its right and so on. The graph uses small white bars for the CHT that are superimposed onto the larger EGT bars. The graph uses a dual scale that represents the CHT scale on the left side and the EGT scale on the right. The digital reading for each column is displayed above each bar for CHT and below for EGT. During normal operation the EGT and CHT bars will align themselves in a very easy to recognize pattern.

Leaning EGT Mode (Peak Detect)

The leaning peak detection mode is selected from the main screen by pressing the **[ENGINE]** -> **[EGT/CHT]** -> **[PK DET OFF]** buttons. As you lean the engine, the EGT bars for all cylinders will rise. As each cylinder reaches peak EGT a tattletale marker will appear at the top of that cylinder's bar. The current EGT is shown on the bottom of the bar, Peak EGT is displayed on the top and the degrees rich or lean of peak are displayed on the bar. If you start to richen the engine before all cylinders have peaked the unit will detect the EGT drop and display a false peak. The peak detection can be reset at any time by pressing the **[PK DET ON]** then **[PK DET OFF]** button.

Flight Times



Flight times are displayed on the top of the maintenance check list page. Press the **[CHECK]** button followed by the **[MAINT]** button.

Tach Time: Hours on engine above 1250 RPM.

Hobbs Time: Hours on engine above 0 RPM.

Last Flight: Hobbs time for the last flight.

Today: Hobbs time since 12:00 AM today.

Check Lists

To view your checklists pages press the [**CHECK**] button from the main screen. Use the [**NEXT**] and [**PREV**] buttons to scroll through the checklists. To return to the main screen press the Return button.

If the **[CHECK]** button is pressed the page that is displayed is controlled by the following:

ENGINE RPM	PAGE	Normal Use
0	1	Before Starting Engine
<1250	3	Before Takeoff Checklist
>1250	6	Emergency Checklist

This will make the emergency procedures check list easy to access in the event of an in flight emergency.

The checklist file is stored in the CHKLST.AFD file and can be transferred using the SD card from the EFIS Calibration startup screen (Hold Button 5 on power up).

1. Admin Settings
    1. Transfer Files
        2. Checklists file

The text for the checklists is stored in the following format and can be modified using Microsoft Word Pad on a PC.

```
# Lines are limited to 96 char long
#
# DO NOT USE COMMAS IN THE CHECKLIST TEXT !

CHKLST0.TITLE, BEFORE STARTING ENGINE
CHKLST0.LINE1, Preflight Complete
CHKLST0.LINE2, Spar Pins Secured - CHECK
CHKLST0.LINE3, Safety Belts - ON
CHKLST0.LINE4, Doors - LATCHED
CHKLST0.LINE5, Fuel Selector Valve - DESIRED TANK
CHKLST0.LINE6, Avionics  - OFF
CHKLST0.LINE7, Brakes - SET
CHKLST0.LINE8, Circuit Breakers - CHECK IN
CHKLST0.LINE9,
CHKLST0.LINE10,
CHKLST0.LINE11,
CHKLST0.LINE12,

CHKLST1.TITLE, ENGINE STARTING
CHKLST1.LINE1, Mixture - RICH
CHKLST1.LINE2, Prop - HIGH RPM
CHKLST1.LINE3, Master Switch - ON
CHKLST1.LINE4, Fuel Boost Pump (3 Sec)
CHKLST1.LINE5, Flaps - UP
CHKLST1.LINE6, Throttle - OPEN approx 1/4
CHKLST1.LINE7, Propeller Area - CLEAR
CHKLST1.LINE8, Ignition Switch - START
CHKLST1.LINE9, Oil Pressure – CHECK

CHKLST1.LINE10, Strobes - ON
CHKLST1.LINE11,
CHKLST1.LINE12,

CHKLST2.TITLE, BEFORE TAKEOFF 1/2

CHKLST2.LINE1, Brakes - SET
CHKLST2.LINE2, Spar Pins Secured - CHECKED
CHKLST2.LINE3, Doors - LATCHED
CHKLST2.LINE4, Flight Controls - FREE & CORRECT

CHKLST2.LINE5, Flight Instruments - SET
CHKLST2.LINE6, Altimeter - CORRECT PRESSURE
CHKLST2.LINE7, Fuel Selector Valve - DESIRED TANK
CHKLST2.LINE8, Mixture - RICH (below 3000ft)
CHKLST2.LINE9, Elevator and Aileron Trim - NEUTRAL
CHKLST2.LINE10, Throttle -- 1800 RPM
CHKLST2.LINE11, ...Magnetos - CHECK (175 max drop)
CHKLST2.LINE12, ...Prop - CHECK OPERATION

.

.
```

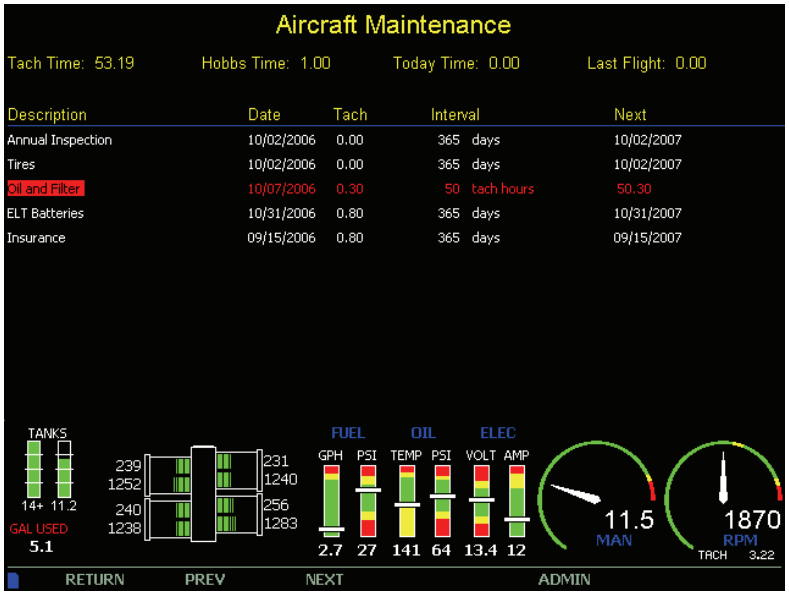
Maintenance Log

The system has an Aircraft Maintenance Log that can be setup to track any number user configurable items. Each item can be configured as a Tach time or calendar time controlled event. Once the time interval has expired the item will turn red indicating the need for service.

You can set any items Date and Tach Time to the current values from the Aircraft Maintenance page: **[ADMIN] -> [UPDATE]** buttons.

The Maintenance Log is selected from the following menu:

[CHECK] -> [MAINT]



The Maintenance settings are controlled by the file:

MAINT.AFD

The file is in the following format and can be modified using Microsoft Word Pad on a PC.

Units must be **tach hours** or **days**.

```
DESC, Annual Inspection
LASTDATE, 08-05-2006
LASTTACH, 210.80
INTERVAL, 250
UNITS, tach hours
NEXTLINE, 0
DESC, Tires
LASTDATE, 04-05-2005
LASTTACH, 95.10
INTERVAL, 365
UNITS, days
NEXTLINE, 0
DESC, Oil and Filter
LASTDATE, 06/19/2006
LASTTACH, 195.30
INTERVAL, 100
UNITS, tach hours
NEXTLINE, 0
DESC, ELT Batteries
LASTDATE, 08/05/2006
LASTTACH, 210.80
INTERVAL, 400
UNITS, days
NEXTLINE, 0
DESC, Insurance
LASTDATE, 08/05/2006

LASTTACH, 210.80
INTERVAL, 180
UNITS, days
NEXTLINE, 0
```

You can transfer the file to and from the SD card from the EFIS Calibration startup screen (Hold Button 5 on power up).

1. Admin Settings
    1. Transfer Files
        3. Maintenance

Weight & Balance Screen

The weight & Balance page is selected from the following menu:

[CHECK] -> [BALANCE]

The PREV & NEXT buttons are used to select the station and the knob is used to adjust the weight of the station or volume for fuel.

The weight & balance settings are controlled by the files:

AIRCRAFT.AFD Stations, Weights, Screen Location

AIRCRAFT.AFB Standard .BMP of the aircraft picture.

You can transfer the files to and from the SD card from the EFIS Calibration startup screen (Hold Button 5 on power up).

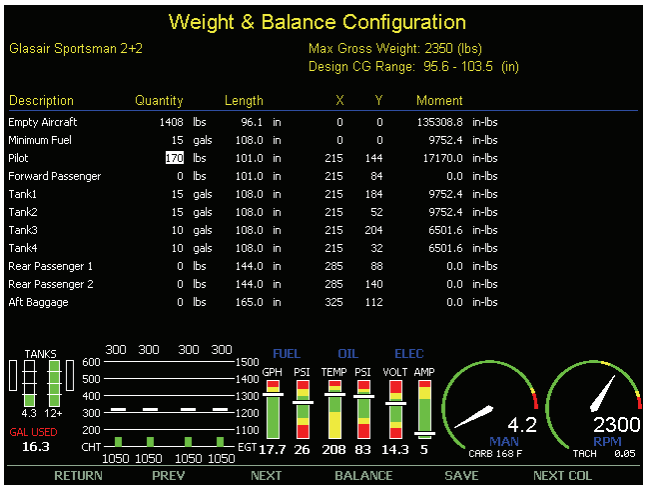
1. Admin Settings

    1. Transfer Files

        4. Weight & Balance

The normal weight & balance settings can be adjusted on the weight & balance page by pressing the **[STATIONS]** button. The X and Y on the stations page is the screen coordinates for the text on the aircraft bitmap. The Aircraft Type, Gross Weight and CG Range will need to be modified using Microsoft Word Pad and editing the AIRCRAFT.AFD file on a PC.

The aircraft bitmap can be changed using Microsoft Paint and editing the AIRCRAFT.AFB file, do not change the overall dimensions of the Bit Map.



Flight Data

Flight Data from the system is downloaded using the SD data card from the Maintenance checklist page. To download flight data do the following:

1. Place a SD card in Screen
2. Press **[CHECK] -> [MAINT.] -> [ADMIN]**
3. The last flight time will be displayed over the knob; you can select the amount of flight time to download using the knob.
4. Press **[DATA LOGS]** to transfer the selected stored flight data onto the SD Card.

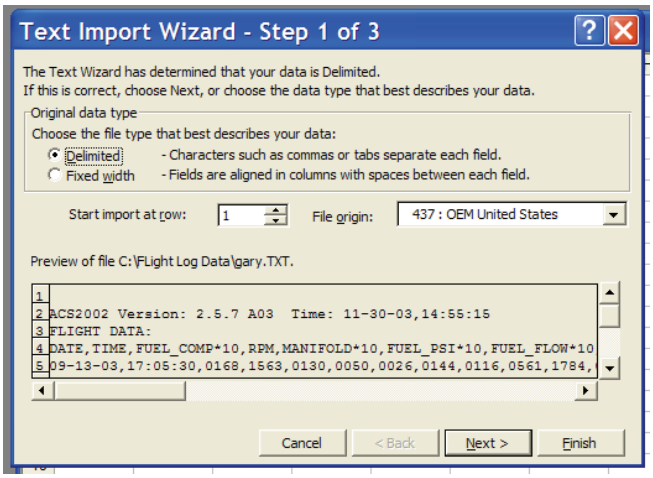
Importing Flight Data to Excel

Once you save data from the AF-3400/3500 Engine Monitor you can import the data into Microsoft Excel by the following procedure:

1. From Excel select File **Open**
2. Change the file type to All Files (*.*)
3. Open your SD drive folder
4. Select the *.ALD file to open. The data files are stored using the following name:

   ymmddhhm.ALD where
   y year
   mm month
   dd date
   hh hour
   m minute

5. The Text Import Wizard should start and press Next

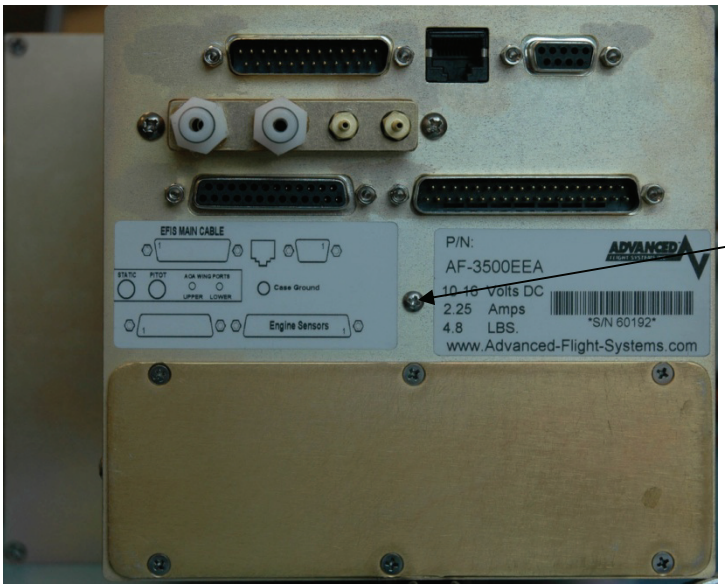


6. Select the Delimiters – Comma and then press Finish

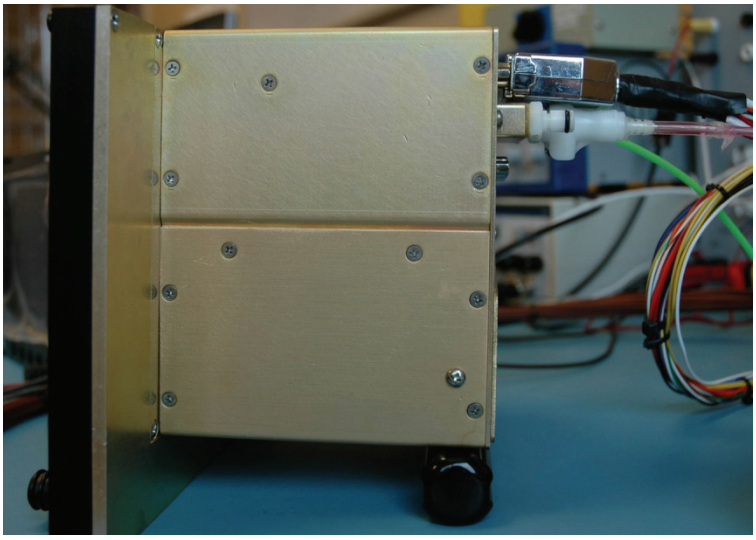
AF-3400/AF-3500 Installation

Mechanical Mounting

The Display should be mounted from the rear of the instrument panel with four 6-32 screws. Allow clearance for the connectors on the rear. See the Appendix B: for proper dimensions. The rear connectors are 5.5” from the front panel and the plugs require another 3” for clearance. The case ground screw in the middle of the decal should be connected to the main aircraft ground buss with a #18 ga wire.



Case Ground Screw



Electrical Connections

For wiring information see Appendix C:

The AF-3000 power requirement is 12 volts at 2.5 Amps, a 3 amp circuit breaker or fuse should be used for the system.

All wire should meet Mil Standard MIL-W-22759/16 (Tefzel insulation)

20 AWG wire is normally sufficient for the power supply and ground wires.

Pin 1	Red	Master Power
Pin 3	Black	Ground
*Pin 15	N/C	Backup Power

*Backup Power input is used for a dual electrical system.

CAUTION: The screen case and sensors must have a good ground to the aircraft battery. The case grounding screw should be connected with at least a 20 ga wire to the main aircraft ground buss.

Audio Connections

The harness is wired for a 560-ohm audio output that allows you to match the output impedance of the system to standard aircraft audio panel and intercom audio devices. If your radio or audio panel does not have an unswitched audio input you will need to purchase a audio mixer. Do not attempted to connect the EFIS audio to a music input on an intercom, they are not the same impedance and it will not be loud enough. Do not attempt to connect the EFIS audio along with a com radio to the same intercom input.

We recommend the following audio mixer if you do not have an audio panel:

http://www.fdatasystems.com/AP_60.htm

For wiring information see Appendix C:

Volume Adjustment

The volume can be adjusted from the calibration menu.

32. Test Audio

The range is (0%-100%) and is adjusted using the knob followed by pressing the **[SAVE]** button. The Test Audio menu will play all the sounds in the system.

EFIS Serial Data Connections

Each AF-3400/3500 screen has four serial ports that can be used for external equipment (GPS, NAV, Traffic, FADEC Engine, ect..) communication. Not all functions are available on all serial ports so you should review the options before wiring external equipment to a serial port.

If you have more than one screen installed in your aircraft and they are connected with Ethernet you can share the serial ports between screens. For the serial ports and navigation sources (GPS, NAV) to work properly you will need to configure the actual serial port number hardware settings as well as assign an EFIS navigation source to a serial port number. The following steps should be followed in order:

STEP 1
Serial Port # Function Hardware Setup

This is where you configure each serial port for the external device that is physically wired to the port. You will need to know which serial port each device is wired to on the screen and what the external devices communication settings are. From [Instrument Calibration] mode you should select the following menu to configure each Serial Port:

[1. Admin Settings] ->

Serial Port #	*Options*	*Notes*
5. Serial Port #1 Function	DISABLED	Nothing wired to port
	GPS NMEA @ 4800	External GPS with NMEA @ 4800 baud
	SL-30	Garmin SL30 radio connected
	ARINC	AF-ARINC module connected to port
	AVTN/ARNAV	430W/530W or GPS with Aviation format
	NMEA/AVTN	NMEA 9600 in / AVIATION out
	AFS GPS	AFS GPS
	TRAFFIC	Garmin Traffic format (GTX 330, Zaon, ADSB)
	AVTN/AVTN	Aviation In / Aviation Out
	TRAFFIC	Garmin format traffic unit
6. Serial Port #2 Function	DISABLED	Nothing wired to encoder port
	TRFC/ICARUS	Garmin Traffic IN / ICARUS ALT Out
	TRFC/SHADIN	Garmin Traffic IN / SHADIN Out
	GARMIN AT	GARMIN AT format, Dynon gray code converter
	MAGELLAN	Transponder set to MAGELLAN format
	NORTHSTAR	Transponder set to NORTHSTAR format
7. Serial Port #3 Function	DISABLED	Nothing wired to port
	EXT. AHRS	Dynon AHRS
	GPS NMEA @ 4800	External GPS with NMEA @ 4800 baud
	SL-30	Garmin SL30 radio connected
	ARINC	AF-ARINC module connected to port
	CHELTON	Chelton Engine Data Out
	AVTN/ARNAV	430W/530W or GPS with Aviation format
	FADEC SBC-100	FADEC Data In
	FADEC SBC-250	do not use
	OP TECH	OP Engine Data Out
	NMEA/AVTN	NMEA 9600 in / AVIATION out
	AFS GPS	AFS GPS
	TRAFFIC	Garmin Traffic format (GTX 330, Zaon, ADSB)
	AVTN/AVTN	Aviation In / Aviation Out
8. Serial Port #4 Function	DISABLED	Nothing wired to port
	EXT. AHRS	Dynon AHRS
	GPS NMEA @ 4800	External GPS with NMEA @ 4800 baud
	SL-30	Garmin SL30 radio connected
	ARINC	AF-ARINC module connected to port
	CHELTON	Chelton Engine Data Out
	AVTN/ARNAV	430W/530W or GPS with Aviation format
	FADEC SBC-100	FADEC Data In
	FADEC SBC-250	do not use
	OP TECH	OP Engine Data Out
	NMEA/AVTN	NMEA 9600 in / AVIATION out
	AFS GPS	AFS GPS
	TRAFFIC	Garmin Traffic format (GTX 330, Zaon, ADSB)
	AVTN/AVTN	Aviation In / Aviation Out

NOTES:

STEP 1 should be done for all screens in the aircraft and only configured for the equipment that is physically connected to that screens serial ports.

STEP 2

GPS/NAV # Data Source Software Setup

This is where you configure the three available EFIS CDI and Moving Map data sources (GPS/NAV 1,2,3) to their assigned serial ports. The data sources for multiple screens must be configured to the same navigation source. If you configure GPS/NAV1 as Serial Port 4 (ARINC Module connect to Port #4) on the left screen the right screen must be set GPS/NAV1 as Remote ARINC. This configures the EFIS to read the data from the ARINC port anytime **GNAV 1** is selected from either screen.

From [Instrument Calibration] mode you should select the following menu to configure each GPS/NAV Data Source:

[1. Admin Settings] ->

Serial Port #	*Options*	*Notes*
10. GPS/NAV 1 Data Source*	NONE	No connected Nav or GPS
	Serial Port #1	GPS or Nav Radio Connect to Serial Port #1
	Serial Port #2	GPS or Nav Radio Connect to Serial Port #2
	Serial Port #3	GPS or Nav Radio Connect to Serial Port #3
	Serial Port #4	GPS or Nav Radio Connect to Serial Port #4
	Remote GPS	GPS connected to remote screen
	Remote ARINC	GPS/NAV connected to remote screen ARINC
	Remove NAV	SL30 connected to remote screen.
11. GPS/NAV 2 Data Source**	NONE	No connected Nav or GPS
	Serial Port #1	GPS or Nav Radio Connect to Serial Port #1
	Serial Port #2	GPS or Nav Radio Connect to Serial Port #2
	Serial Port #3	GPS or Nav Radio Connect to Serial Port #3
	Serial Port #4	GPS or Nav Radio Connect to Serial Port #4
	Remote GPS	GPS connected to remote screen
	Remote ARINC	GPS/NAV connected to remote screen ARINC
	Remove NAV	SL30 connected to remote screen.
12. GPS/NAV 3 Data Source	NONE	No connected Nav or GPS
	Serial Port #1	GPS or Nav Radio Connect to Serial Port #1
	Serial Port #2	GPS or Nav Radio Connect to Serial Port #2
	Serial Port #3	GPS or Nav Radio Connect to Serial Port #3
	Serial Port #4	GPS or Nav Radio Connect to Serial Port #4
	Remote GPS	GPS connected to remote screen
	Remote ARINC	GPS/NAV connected to remote screen ARINC
	Remove NAV	SL30 connected to remote screen.
9. Serial Port Network Sharing	ENABLED	Enable on both screens for a dual screen system
	DISABLED	Disable for a single screen system
13. LAT/LON Data Source***	NONE	No GPS or Map software
	Serial Port #1	Map GPS source connected to Serial Port #1
	Serial Port #3	Map GPS source connected to Serial Port #3
	Serial Port #4	Map GPS source connected to Serial Port #4
	Remote GPS	Map GPS source on remote screen GPS
	Remote ARINC	Map GPS source on remote screen ARINC

NOTES:

****If you have an ARINC module it must be configured as the GPS/NAV1 Data Source.***
*****If you have a second ARINC module it must be configured as the GPS/NAV2 Data Source.***
******If you have an ARINC module it must be the LAT/LON Data Source***

Depending on the type of Nav Radio connected to the GPS/NAV data source it will be displayed on the screen as one of the following:

GNAVx	GPS Navigator 430W/530W/480
GPSx	GPS Only Unit
NAVx	SL30 Nav Radio

Where x is the order number of the GPS or Nav radio, a GPS Navigator has a GPS and a Nav radio and will be displayed as GNAV1 for the first unit and GNAV2 for the second.

EFIS Serial Port Configuration Examples

The following examples should help you configure your system:

<Example #1> Single Screen, Garmin 496, GTX 327 and SL30

5. Serial Port #1 Function	NMEA/AVTN	*Garmin 496 GPS*
6. Serial Port #2 Function	TRFC/ICARUS	*Garmin GTX 327 Transponder*
7. Serial Port #3 Function	SL-30	*SL30 Nav/Com*
8. Serial Port #4 Function	DISABLED	
9. Serial Port Network Sharing	DISABLED	
10. GPS/NAV 1 Data Source	Serial Port #1	*GPS 1*
11. GPS/NAV 2 Data Source	Serial Port #3	*NAV 1*
12. GPS/NAV 3 Data Source	NONE	
13. LAT/LON Data Source	Serial Port #1	

<Example #2> Single Screen with AF-ARINC, Garmin 430W, GTX 327 and SL30

5. Serial Port #1 Function	AVTN/ARNAV	*Garmin 430W GPS RS-232 Port*
6. Serial Port #2 Function	TRFC/ICARUS	*Garmin GTX 327 Transponder*
7. Serial Port #3 Function	SL-30	*SL30 Nav/Com*
8. Serial Port #4 Function	ARINC	*AF-ARINC Module -> 430W*
9. Serial Port Network Sharing	DISABLED	
10. GPS/NAV 1 Data Source	Serial Port #4	*GNAV 1*
11. GPS/NAV 2 Data Source	Serial Port #3	*GPS 2*
12. GPS/NAV 3 Data Source	NONE	
13. LAT/LON Data Source	Serial Port #4	

<Example #3> Single Screen with AF-ARINC, Garmin 430W, GTX327, FADEC Engine

5. Serial Port #1 Function	AVTN/ARNAV	*Garmin 430W GPS RS-232 Port*
6. Serial Port #2 Function	TRFC/ICARUS	*Garmin GTX 327 Transponder*
7. Serial Port #3 Function	FADEC SBC-100	*FADEC Engine Controller*
8. Serial Port #4 Function	ARINC	*AF-ARINC Module -> 430W*
9. Serial Port Network Sharing	DISABLED	
10. GPS/NAV 1 Data Source	Serial Port #4	*GNAV 1*
11. GPS/NAV 2 Data Source	NONE	
12. GPS/NAV 3 Data Source	NONE	
13. LAT/LON Data Source	Serial Port #4	

<Example #4> Dual Screen with AF-ARINC, Garmin 430W, GTX 330, SL30, 496
SCREEN 1 (430W, GTX330, SL30)

5. Serial Port #1 Function	AVTN/ARNAV	*Garmin 430W GPS RS-232 Port*
6. Serial Port #2 Function	TRFC/ICARUS	*Garmin GTX 330 Transponder*
7. Serial Port #3 Function	SL-30	*SL30 Nav/Com*
8. Serial Port #4 Function	ARINC	*AF-ARINC Module -> 430W*
9. Serial Port Network Sharing	ENABLED	
10. GPS/NAV 1 Data Source	Serial Port #4	*GNAV 1 -> 430W*
11. GPS/NAV 2 Data Source	Serial Port #3	*NAV 2 -> SL30*
12. GPS/NAV 3 Data Source	REMOTE GPS	*GPS 2 -> 496 from other screen*
13. LAT/LON Data Source	Serial Port #4	

SCREEN 2 (496)

5. Serial Port #1 Function	NMEA/AVTN	*Garmin 496*
6. Serial Port #2 Function	DISABLED	
7. Serial Port #3 Function	DISABLED	
8. Serial Port #4 Function	DISABLED	
9. Serial Port Network Sharing	ENABLED	
10. GPS/NAV 1 Data Source	REMOTE ARINC	*GNAV 1 -> 430W from other screen*
11. GPS/NAV 2 Data Source	REMOTE NAV	*NAV 2 -> SL30 from other screen*
12. GPS/NAV 3 Data Source	Serial Port #1	*GPS 2 -> 496 this screen*
13. LAT/LON Data Source	REMOTE ARINC	*MAP source from 430W*

AFS EFIS Serial Port Work Sheet **N_ _ _ _ _**

Screen 1

Serial Port #	Preferred Use	Device	Data Format	NAV Data Source Label (GNAVx GPSx NAVx)
Serial Port #1	GPS RS-232			
Serial Port #2	Encoder/Traffic			
Serial Port #3	SL30, AF-ARINC			
Serial Port #4	ARINC, AF-GPS			

Screen 2

Serial Port #	Preferred Use	Device	Data Format	NAV Data Source Label (GNAVx GPSx NAVx)
Serial Port #1	GPS RS-232			
Serial Port #2				
Serial Port #3				
Serial Port #4	AF-GPS			

External Device Configuration

AF-ARINC 429 ADAPTOR

The AF-ARINC adaptor provides 2 serial inputs for display of navigation data (VOR, ILS, GPS, LPV) from a Garmin 430W/530W/480 and 1 serial output. The ARINC 429 output can be connected to multiple ARINC 429 receivers; 430W, 530W, 480, and Autopilots that support GPS steering commands. The AF-ARINC module should be connected to EFIS Serial Port #3 or Serial Port #4.

For ARINC module wiring information see Appendix C, drawing number: 53620WD

Garmin 430W/530W

The 430W/530W should be wired for RS-232 Aviation format to serial port #1 along with their ARINC lines connected to the AF-ARINC module. *See Appendix C, drawing number: 53620WD*

EFIS Main Cable			*430W RS-232 Connection*	
Pin 10	TXD	----------	4001-57	RX
Pin 22	RXD	----------	4001-56	TX

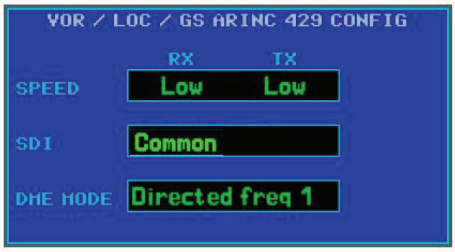
The 430W/530W needs the following software configuration settings:

1. MAIN ARINC 429 CONFIG

   Power up the 430W while holding the ENTER button and press [ENT] -> [ENT] to get to the Main ARINC 429 Config page. Configure the 430W using these settings. **OUT must be set to GAMA 429.**

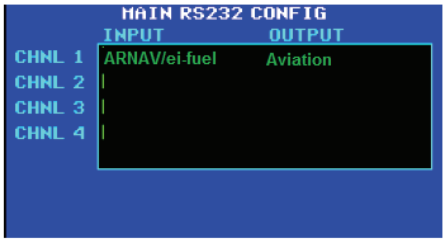
2. VOR / LOC / GS ARINC 429 CONFIG

   Turn the inside right knob around 14 clicks to configure the VOR/LOC/GS ARINC 429 to the following settings.



3. Serial Ports

   Select ARNAV/ei-fuel for the input and Aviation as the output.



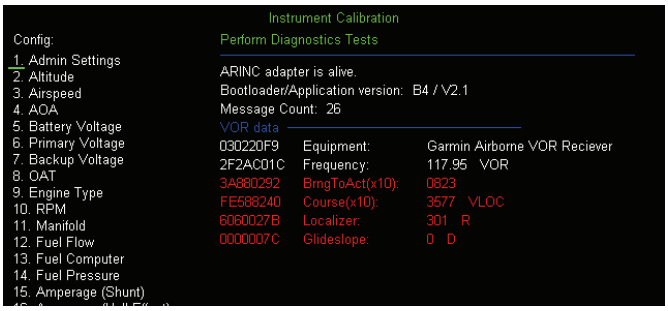
430W/530W ARINC 429 Verification Test

The 430W/530W communicates with the ARINC module using two separate serial ARINC ports. VOR data is sent on one ARINC port and GPS data is sent on the other ARINC port. You should verify that both ports are working after wiring and configuring the EFIS and 430W/530W.

1. **EFIS to AF-ARINC Module Communication Test**

   Boot the EFIS in CONFIG mode and select: 1. Admin Settings -> 21. Diagnostics -> 8. ARINC VOR Test

   If the ARINC module is wired to the EFIS correctly it should find the adaptor and you should see the **Message Count** increasing. If the EFIS does not find the adaptor the problem is between the AF-ARINC adaptor and the EFIS and you should check the following:



   - Power to the AF-ARINC module, you can remove the AF-ARINC cover and check for a green light.
   - Wiring between the EFIS serial port and ARINC Module.
   - Serial Port setup on the EFIS Admin Settings page.

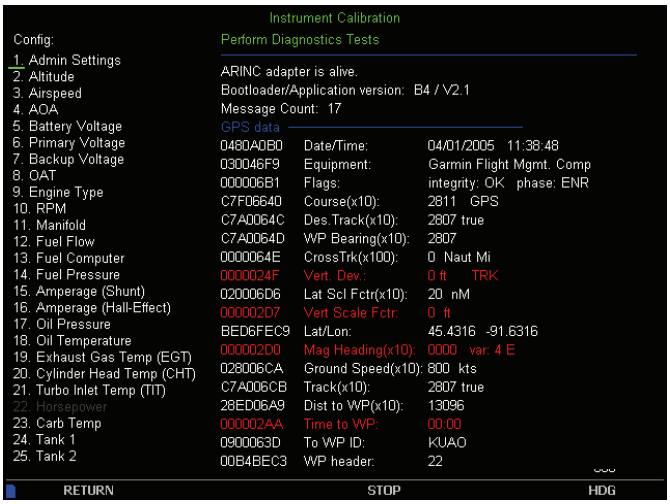
2. **ARINC to 430W/530W VOR Communication Test**

   If the ARINC VOR side is wired to the 430/530 correctly and configured you should see some or all of the VOR data from the radio. Data shown is RED is flagged from the radio and caused by a week VOR signal.

3. **ARINC to 430W/530W GPS Communication Test**

Select: 1. Admin Settings -> 21. Diagnostics -> 9. ARINC GPS Test

If the ARINC GPS side is wired to the 430/530 correctly and configured you should see some or all of the GPS data from the radio. Data shown is RED is flagged from the radio

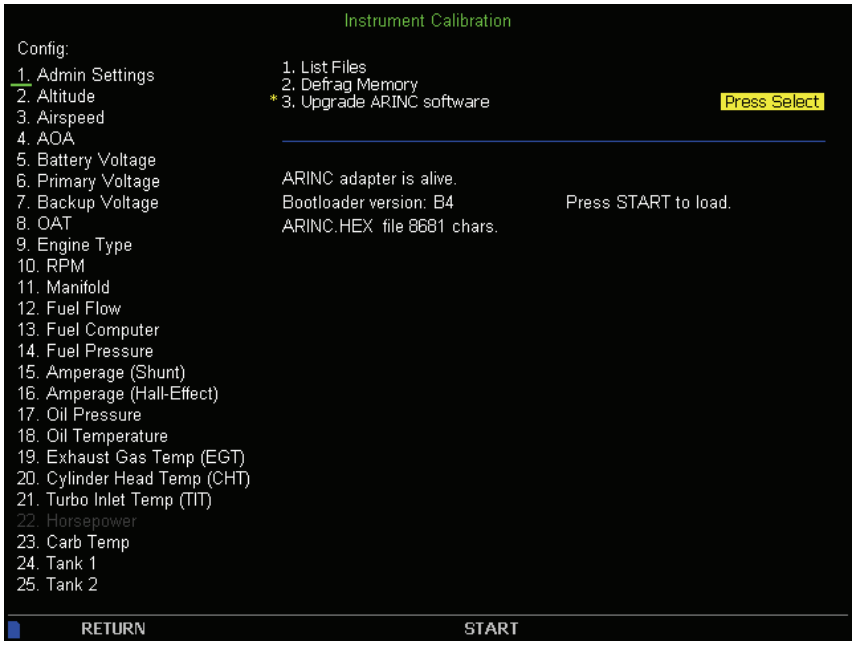


ARINC Module Software Updating

Boot the EFIS in CONFIG mode and select: 1. Admin Settings -> 20. System Maintenance -> 3. Upgrade ARINC Software

Procedure

1. Download the latest ARINC software from the AFS support page. http://www.advanced-flight-systems.com
2. Unzip the ARINC.zip file, and place the ARINC.HEX file onto a SD card.
3. Insert the card into the unit and navigate to the page shown at right.
4. Cycle power to the ARINC adaptor. If the ARINC module is powered on the same source as the EFIS the internal EFIS battery should keep the EFIS running during the power cycle.
5. Press the start button to begin loading the new code. The screen will say, “Loading….xxx”. Where xxx is the number of bytes transferred.



6. When the screen prints “Done.”, you can remove the card and reboot the ARINC module.
7. Verify that the ARINC software version was updated from the following menu after the EFIS is running in normal mode: [CHECK] -> [MAINT.] -> [ABOUT] The ARINC software version should be displayed in the list.

Now the ARINC module is ready for use.

Garmin SL30

The AF-3000 will send/receive data from a SL30 on EFIS Serial Port #3. The EFIS can get VOR/LOC/GS data from the SL30 and can set the OBS setting on the SL30. If the EFIS is also connected to a Garmin 396/496 it will pass through any radio frequency tuning commands to the SL30.

EFIS Main Cable			*SL30*	*37 Pin Connector*
Pin 4	TXD	----------	Pin 4	RX
Pin 5	RXD	----------	Pin 5	TX
Pin 21	GND	----------	Pin 3	GND

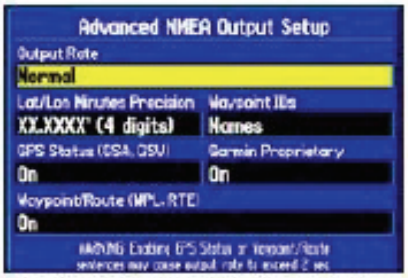
The ***Indicator Head Type*** setting should be set to ***NONE*** in the SL30. This will enable the OBS to be set from the SL30 buttons and from the EFIS.

Garmin 396/496

1. The 396/496 can send RS-232 data in NMEA 4800 Baud format ***or*** NMEA & VHF 9600 Baud. If you also have a SL30/SL40 connected you should use the NMEA & VHF 9600 Baud setting in the GPS. This will enable you to set the standby radio frequency on the SL30 from the GPS. Make sure that you use the same baud rate setting in the GPS and EFIS Admin setup.

2. ***The NMEA output rate on the 396/496 must be set to normal.***

   To access the Advanced NMEA Output Setup:
   a. Press MENU twice to open the Main Menu.
   b. Use the ROCKER to select Setup from the vertical tab list.
   c. Select Interface from the row of tabs along the top.
   d. Highlight the field below Serial Data Format. Press ENTER
   e. Select NMEAIn/NMEA Out. Press ENTER
   f. Press MENU to open the options menu. Select Advanced NMEA Setup and press ENTER.



Advanced NMEA Output Setup

Garmin GTX 327 / GTX 330 Transponder

The AF-3000 can act as the altitude encoder and send the current pressure altitude on EFIS Serial Port #2. The GTX 327 / GTX 330 should be configured for ICARUS altitude format. The EFIS can also be configured to receive traffic data from the GTX 330 for the moving map. The GTX 330 should be set for Serial 1 ICARUS Input and REMOTE/TIS output.

EFIS Serial Port	*EFIS Main Cable*	*GTX 327*	*GTX 330*
Serial Port #2 TXD	*Pin 13*	*Pin 19*	*Pin 22*
Serial Port #2 RXD	*Pin 25*	*none*	*Pin 23*

NOTE: The only time that an altimeter and your transponder altitude will agree is when you have the pressure set at 29.92. All transponders require pressure altitude referenced to standard pressure (29.92). The computers at the air traffic control center automatically adjust your altitude for the pressure offset. Why is this done? If it was not done this way the altitude that all the planes were reporting would be based on what ever setting a pilot had set and you would have a possibility for human error.

Chelton or OP EFIS

The AF-3400/3500 can send Airdata and Engine Data to a Chelton or OP EFIS from serial Port #3 or Port #4.

EFIS Serial Port	*Pin*	*Chelton*	*OP*
Serial Port #3 TXD	*EFIS Main Cable Pin 4*	*Pin*	*Pin*
Serial Port #4 TXD	*EFIS Aux (DB9) Port Pin 1*	*Pin*	*Pin*

See ***Serial Port # Function Hardware Setup*** for Serial Port configuration

EFIS Sensor Installation

Magnetometer Installation

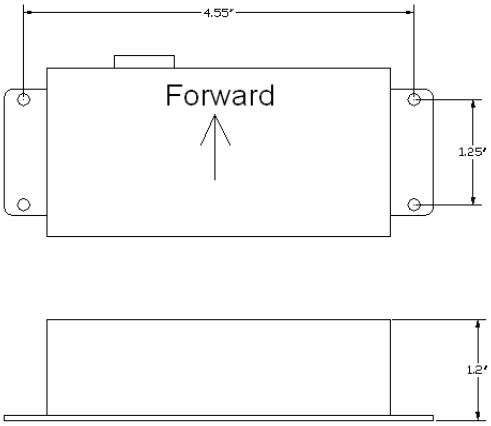
The Remote Magnetometer P/N: 8350-0480 must be mounted so that its orientation is as closely aligned with the AF-3400/3500 EFIS screen as possible. It should be mounted with the electrical connector facing toward the front of the plane, and the mounting tabs on the bottom. The bracket used to hold the remote magnetometer must account for all differences in angles between the EFIS and the remote Magnetometer. This includes pitch, roll, and yaw. We recommend you use an electronic level that reads to 1/10th of a degree to make sure it is aligned with the EFIS in pitch and roll to better than 2/10th of a degree. Dual Magnetometers should be mounted 10” apart from each other.

Mounting Location

The remote magnetometer must not be located within 24 inches of any large, moving, ferrous metal objects such as landing gear components, motors, steel control cables or linkage. Avoid any metallic objects that may change position between ground operations and flight operations, such as landing gear, flap actuators, and control linkages.

The remote magnetometer should not be located close to high current DC power cables or 400 cycle AC power cables and their associated magnetic fields. Wires carrying high currents, alternate currents, or intermittent currents can cause magnetic variations that will affect the unit. Keep wires with these characteristics at least 24 inches away from the remote magnetometer. These wires can include:

- Battery wires
- Strobe wires
- Autopilot control wires
- Position light wires



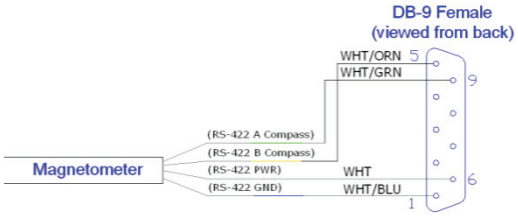
Mounting Hardware

The remote magnetometer should be mounted using 6-32 brass or aluminum screws and nuts.

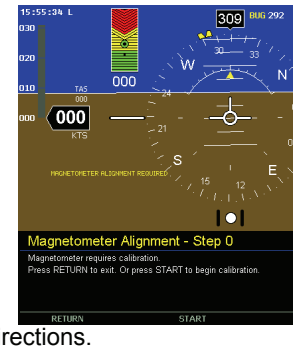
Wiring Connections

The remote magnetometer is connected to the EFIS Main Cable P/N: 53600 using the supplied 4 conductor shielded cable. Route the 4 conductor cable from the EFIS to the magnetometer, trim the cable to length and solder the DB-9 female plug using the following:

EFIS DB-25 Magnetometer



Magnetometer Alignment



You will need to perform a Magnetometer alignment after the system has been installed or any time the aircraft has had any major changes that could affect the magnetometer. The Magnetometer alignment will need to be performed in an area where you can easily rotate the aircraft. The alignment should be done with the engine stopped and the aircraft electronics on. You will need to be prepared to turn the plane and point the aircraft nose to Magnetic North.

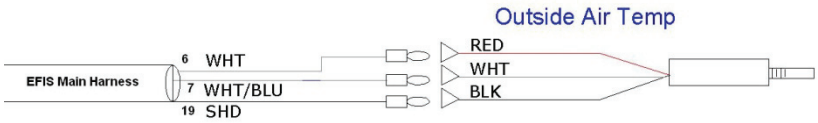
You can access the Magnetometer alignment menu from the following buttons:

EFIS -> SETTINGS -> AHRS -> MAG ALIGN

After accessing the MAG Align menu press the **START** button and follow the on screen directions.

Outside Air Temperature Transducer Installation

The OAT transducer P/N: 40305 is mounted on the airframe where the exhaust will not affect it. We have found that the bottom of the wing works well. The OAT sensor wires should be connected from the EFIS Main Harness to the sensor with Fast On Terminals, Butt Connectors or with solder and heat shrink.



For wiring information see Appendix C:

CAUTION Static Sensitive Part: Always ground yourself before wiring.

OAT Calibration

1. Place the AF-3400/3500 into Instrument Calibration mode. Use the [**NEXT**] button to scroll down to OAT and press [**SELECT**].
2. Adjust the Shift Adjust value until the OAT is reading correctly.
3. Press [**SAVE**]

Switch Inputs

The system has 3 hardware inputs that can be used to monitor an external switch. The inputs are labeled #1, #2, #3

Input #3 is normally used for an AOA Flap Switch.

For wiring information see Appendix C:

The Inputs will display the text on the AF-3000 Screen from the SYSTEM.AFD file when an Input is either grounded or open. A normally open or normally closed switch is selectable in the Inputs menu, see example below.

EXAMPLE
Input #1 should Alarm with “Door”

Boot the EFIS in Calibration mode and select:
34. Inputs
    1. Input 1 Label [**Press KNOB**] several times until cursor is on first letter.
        [**Turn KNOB**] until “D” appears (Capital and smaller case letters are available)
        [**Press KNOB**] [**Turn KNOB**] until “o” and so on...use the space character to delete remaining characters
        [**SAVE**]

EXAMPLE
Input #1 is a Normally Closed switch, meaning EFIS will alarm when switch is not grounded
34. Inputs

3. Input 1 Logic [**Turn KNOB**]

EXAMPLE
Input #1 should alarm if tip tank transfer pump is left on for 25 minutes

34. Inputs

2. Input 1 Usage [**Turn KNOB**] until TANK TRANSFER appears press

4. Input 1 Timeout (mm:ss) [**Turn KNOB**] until 25:00 appears

CAUTION: Do not turn off power before pressing the save button and exiting the calibration menu.

NOTE: If you do not want any Input text on the screen you should use a space in the label field.

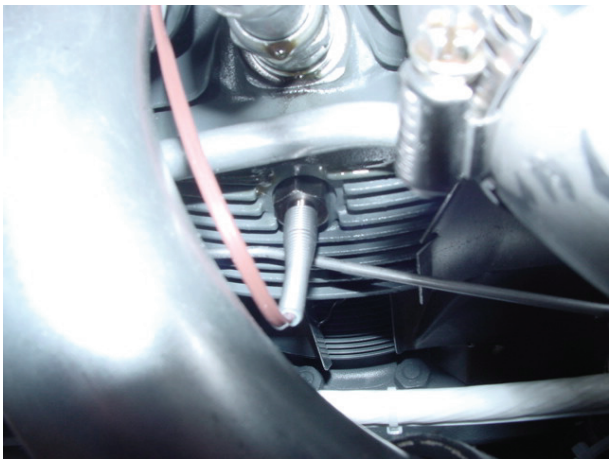
You may have to **reboot** AF-3000 unit before settings take effect.

Alarm Output

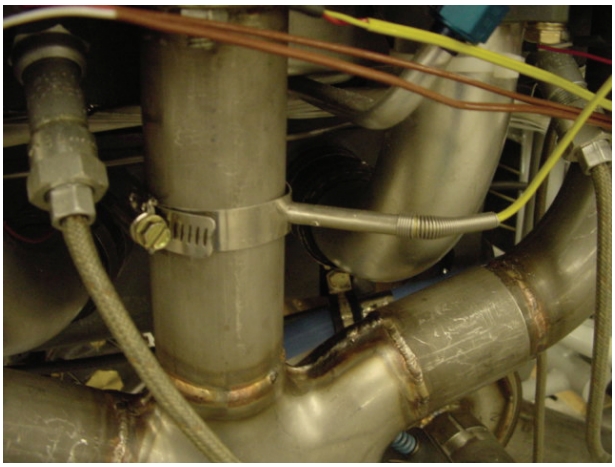
The system has an output that will be connected to ground if one of the gauges is in the RED warning band. The Alarm Output can be used to drive a master warning light on the panel.

For wiring information see Appendix C:

Engine Sensor Installation



Lycoming CHT Probe Location



EGT Probe Location

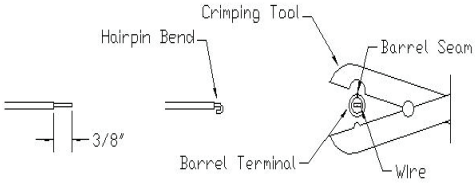
EGT/CHT Installation

1. Locate the EGT probes, P/N 40200, not less than 2” or more than 6” below the exhaust stack attachment flange. 3” to 4” is optimum, and try to mount all probes equal distance from the exhaust flanges. On curved stacks, assume probe tip is on stack centerline for determining distance to exhaust flange. Carefully center punch the probe hole locations such that the portions of the probes external to the exhaust pipes will not interfere with any parts of the engine or cowling. Drill holes with a #30 drill.
2. Carefully insert probe and clamp snugly with screwdriver.
3. Install CHT probes, P/N 40100, in threaded wells on cylinders. Torque probe bodies to 25-30 inch pounds.
4. Install terminals on #20 type J & K thermocouple wire
5. WIRES MUST HAVE A DRIP LOOP TO PREVENT OIL OR SOLVENT FROM RUNNING INTO THE PROBE.

This wire is very hard and will loosen inside a crimped brass or copper terminal, as there is no “cold welding” action like there is with crimped copper wire.

To prevent loosening of the crimp in service proceed as follows:

1. Strip wire exposing 3/8” of core conductor. Take care not to nick or cut the conductor.
2. Double end of wire back in hairpin bend so crimp is on doubled wire.
3. Crimp on a non-insulated barrel terminal using a crimping tool designed for non-insulated terminals. Be sure that the barrel seam is facing the rounded side of the crimping tool and not the crimping post as this will result in a poor crimp.
4. Place a drop of Alpha Metals 51022 liquid soldering flux (Ace Hardware) in open end of crimp and then heat and sweat in rosin core solder to fill the joint.



2. Fasten the extensions to the engine by means of clamps held by valve cover screws or by tying the extensions to intake tubes. If the extension goes up to a valve cover, provide some slack for a “drip loop” so that oil and engine cleaning solvents will drip off probe lead and not run into the end of the probe. It is important that the probe lead or extension wire be first clamped or tied to the engine before being tied to the engine mount or airframe, to keep “working” of the probe lead as it comes out of the body to a minimum. AVOID CONTACT OF LEADS WITH CYLINDER HEADS OR EXHAUST PIPES. USE SLEEVING OVER LEADS IF TYING TO IGNITION HARNESS. If leads cannot pass through firewall with other wiring, drill a 3/8” hole in firewall and use a neoprene grommet for each 4 to 6 leads, seal with a sealing compound.

JABIRU CHT Sensor

Jabiru engines require a 12mm ring-terminal CHT probe for each cylinder. First, slide the compression washer off the spark plug. Slide the 12mm ring-terminal probe onto the plug. Now, slide the spark plug compression washer back onto the spark plug. Reinstall the spark plug into the spark plug hole. Please refer to the documentation that came with your engine for more information.

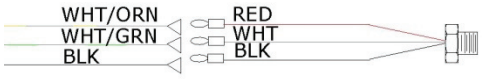
Propeller RPM Sensor Installation

The RPM sensor should be installed in the **non-impulse** coupled magneto if possible (Engines with one electronic ignition can install the sensor in the impulse mag). The correct magneto can be found in the engine manual. The sensor is screwed into the magnet vent port nearest the magneto-mounting flange where the magneto attaches to the engine. Replace the existing vent plug with the sensor. The RPM sensor wires should be connected to the Engine Harness with Fast On Terminals, Butt Connectors or with solder and heat shrink.

The RED sensor is for Slick Mags and the BLUE sensor is for Bendix mags.

CAUTION: Do not route RPM sensor wires with Magneto P leads or electron ignition wiring. Most Magnetos have two ports on opposite sides, one near the plug wires and one near the drive shaft. The sensor needs to be mounted in the port closest to the drive shaft.

Pin 31	White/Orange	+5V	RED
Pin 32	White	Signal	WHT
Pin 16	White/Blue	Ground	BLM



For wiring information see Appendix C:

ELECTRONIC IGNITION

The electronic ignition input is on connector pin 33. You will need to add a wire or using a pin extractor move the RPM wire from pin 32 to pin 33.

Engine Harness Pin 33 Electronic Ignition input.

P-Mags

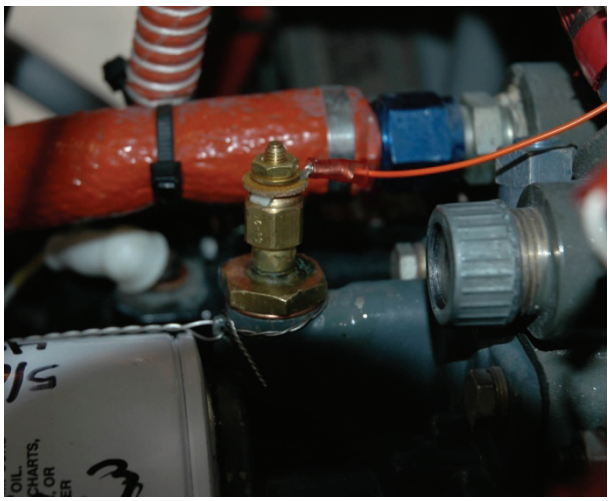
If using P-Mags you need to verify that they are in 12V RPM signal mode with the manufacturer and connect it to Pin 33 (Electronic RPM Input).

Oil Temperature Sensor Installation

The oil temperature sensor is mounted on the engine. Your engine manual should show the proper location for the sensor. The bushing is supplied with a crush type gasket that can only be used once. The location is usually near the filter and should be safety wired to the engine case. Replace the existing vent plug with the supplied bushing and sensor. The Oil Temperature Pressure sensor wire should be connected from the harness to the transducer by crimping a standard #8 ring terminal to the wire.

Pin 8 White/Brown

For wiring information see Appendix C:



Amp Transducer Installation

Shunt Transducer

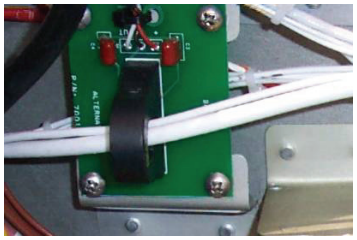
Mount the Shunt amp transducer to a stationary location in the main power wire from the Alternator.

The Shunt Amp transducer wires should be connected from the harness to the transducer by crimping two standard #8 ring terminal to the wires.

Pin 24	Orange/Green	+	Alternator Side
Pin 25	Orange/Purple	-	Battery Side

For wiring information see drawing number: 53900WD

Optional Hall Effect Transducer (Used for dual Alternator Systems)



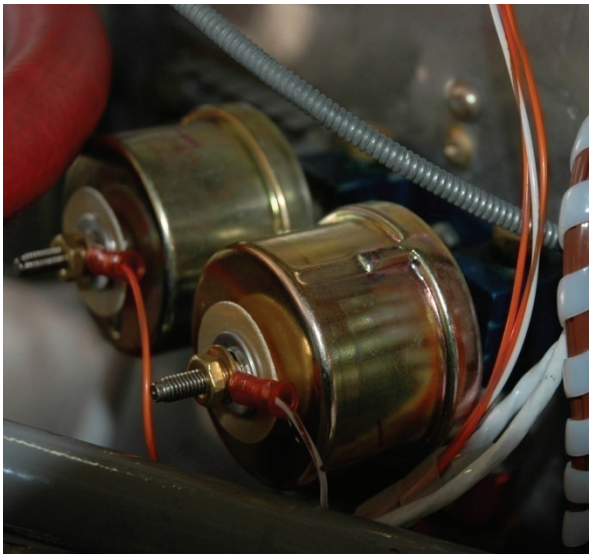
Mount the amp transducer in the cabin area to a stationary location. The amp transducer board should be mounted so that the bottom of the circuit board does not touch any metal. The amp transducer is designed to measure the current in the wire from the alternator. The wire from the alternator must pass through the transducer in the proper direction; the board is marked alternator on one side and battery on the other. You will need to crimp the Dsub male pins to the transducer wires.

CAUTION: Always ground yourself before wiring.

Pin 29	+10V	White/Orange
Pin 11	Signal	White
Pin 30	Ground	White/Blue

For wiring information see Appendix C:

Pressure Transducer Installation



Firewall Installation using Van's P/N: VA-168, 3-port manifold mounting block.

Oil Pressure Transducer Installation

Mount the oil pressure transducer with an Adel clamp to a stationary location. Connect the transducer with aircraft grade hose and fittings. You can find the proper oil pressure connecting port in your engine manual. Your engine must have a pressure fitting with a restrictor hole in it. The transducer is supplied with 1/8" NPT pipe thread connections. The case of the sender has to be connected to ground. The Oil Pressure transducer wire should be connected from the harness to the transducer by crimping a standard #8 ring terminal to the wire.

Pin 6 White/Yellow

For wiring information see Appendix C:

NOTE: The pressure rating (100psi or 10bar 150psi) can be found stamped on the bottom hex fitting of the transducer

0-100 PSI (P/N: 41,105) Transducer

0-150 PSI 10 bar (P/N: 41,115) Transducer

CAUTION: NEVER CONNECT THE PRESSURE TRANSDUCER DIRECTLY TO THE ENGINE.

Fuel Pressure Transducer Installation

Mount the fuel pressure transducer with an Adel clamp to a stationary location. Connect the transducer with aircraft grade hose and fittings. You can find the proper fuel pressure connecting port in your engine manual. Your engine must have a pressure fitting with a restrictor hole in it. The transducer is supplied with 1/8" NPT pipe thread connections. The case of the sender has to be connected to ground. The Fuel Pressure transducer wire should be connected from the harness to the transducer by crimping a standard #8 ring terminal to the wire

Pin 8 Brown

For wiring information see Appendix C:

NOTE: The pressure rating can be found stamped on the bottom hex fitting of the transducer

Carbureted Engines

0-16 PSI (P/N: 41205) transducer is used for carbureted engines

0-30 PSI 2 Bar (P/N: 41215*) transducer is used for carbureted engines.

*This transducer requires an airframe ground connection to one of the spade terminals.

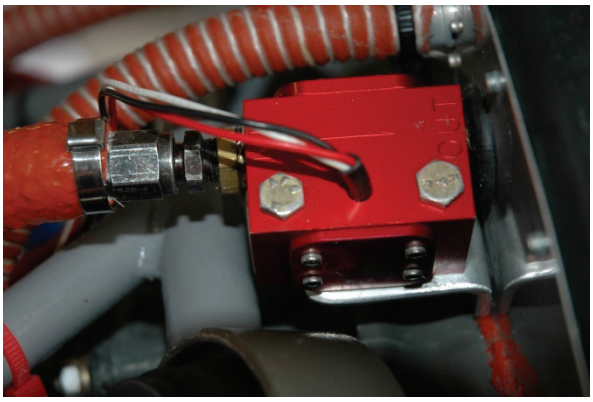
Injected Engines

0–60 PSI (P/N: 41305) transducer is used for fuel-injected engines

0–80 PSI 5 Bar (P/N: 41315) transducer is used for fuel-injected engines

CAUTION: NEVER CONNECT THE PRESSURE TRANSDUCER DIRECTLY TO THE ENGINE.

Fuel Flow Transducer Installation



The inlet and outlet ports in the fuel flow transducer have ¼" NPT threads. Use only ¼" NPT hose or pipe fittings to match. When assembling fittings into the inlet and outlet ports DO NOT EXCEED a torque of 180 inch lbs, or screw the fittings in more than 2 full turns past hand tight WHICHEVER HAPPENS FIRST. AFS will not be responsible for cracked castings caused by failure to use ¼" NPT fittings, overtorqing the fittings, or assembling them beyond the specified depth. Use only aircraft FUEL LUBE on the NPT fittings; ***NEVER USE TEFLON TAPE IN AN AIRCRAFT FUEL SYSTEM.***

A screen or filter should be installed upstream of the flow transducer to screen out debris which could affect rotor movement or settle in the V-bearings.

Mount the fuel flow transducer in a position so the three wire leads are pointed straight up. Use only smooth radius curves in the fuel line and place the transducer with 5" of straight line before and after. The transducer wires should be connected directly to the Analog Module using the cable provided. The shield should be connected to the Analog Module only. The transducer should be mounted according to the fuel metering device manufacturer's recommendations.

AFS has seen good results with the following mounting:

1. The transducer in a stationary location in line between the electric boost pump and the engine driven pump.
2. The transducer in a stationary location in line between the fuel injection servo and the distribution block.
3. The transducer in a stationary location in line between the Engine driven pump and the Carburetor.

NOTE: The Electronics International FT-60 (Red Cube) transducer is rated for .6 – 70+ GPH. AFS recommends that the Electronics International FT-90 (Gold Cube) transducer be used for applications requiring more than 35 GPH (350HP) or for gravity flow fuel systems without a fuel pump (Contact AFS to exchange transducers).

CAUTION: NEVER CONNECT THE FUEL FLOW TRANSDUCER DIRECTLY TO THE ENGINE WITHOUT COVERING WITH FIRE SLEEVE.

The Fuel Flow transducer wires should be connected from the harness to the transducer using the supplied fast on connectors.

Pin 15	Red	+5V
Pin 14	White	Signal
Pin 13	Black	Ground

For wiring information see Appendix C:

Manifold Pressure Transducer Installation

The manifold pressure transducer should be mounted on the firewall or in the cabin area. The transducer port is connected to the engine manifold pressure port with a ¼" ID hose and hose clamp. The manifold pressure port location can be found in the engine manual.

We used the following fittings to connect the transducer in our aircraft:

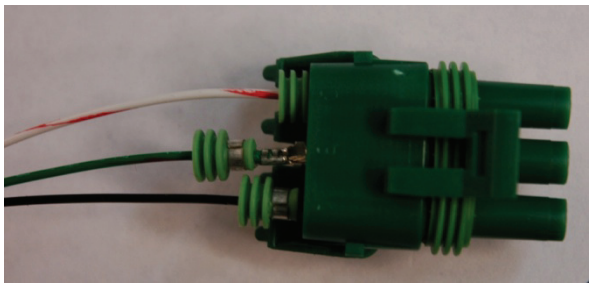
AN823-4	45 deg pipe to 37 deg flare fitting
471-4D	37 deg flare fitting for hose
306-4	¼" ID Black Hose

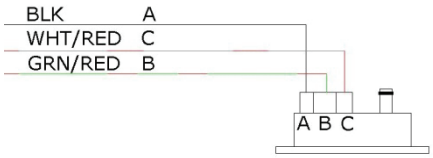
The transducer wires should be connected from the harness to the transducer using the supplied Weatherpack connector.

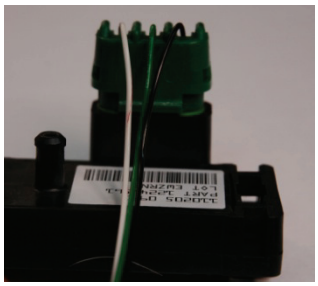
For information on crimping the Weatherpack pins:
http://www.weatherpack.com/pages/900563

The *Weatherpack* connector comes with three pins, three rubber seals, and a connector housing. Slide the three rubber seals onto the three wires and the pins onto the ends of the wires. Crimp the 3 pins onto the ends of the wires, ensuring that the long tabs that cradle the rubber seal wrap around the seal.

For wiring information see Appendix C:







Fuel Tank Level Sensor

Float Type

Any standard 40-240 Ohm float style probe should work without any problem. The single wire from the Engine Harness should be connected to the float sensor terminal. You should verify that the float mounting base is attached to the airframe ground. For the tank gauges to work properly the floats should freely move from the top to the bottom of the tank.

Capacitance Type

If your system was setup at the factory for Capacitance fuel tanks inputs you can use any probe or adaptor that puts out a 0-5 Volt DC signal. You ***MUST*** place a 1.5K OHM resistor in series with the fuel tank input wire to limit the voltage to 4 Volts.

Trim & Flap Position Installation

The system is designed to read the position transducer that is in the MAC trim servo. The MAC servo has 5 wires. The two white wires are for motor operation and the color-striped wires are for the position transducer.

The flap position can be measured by using the MAC linear position sensor P/N: POS-12
http://www.rayallencompany.com/products/indsens.html

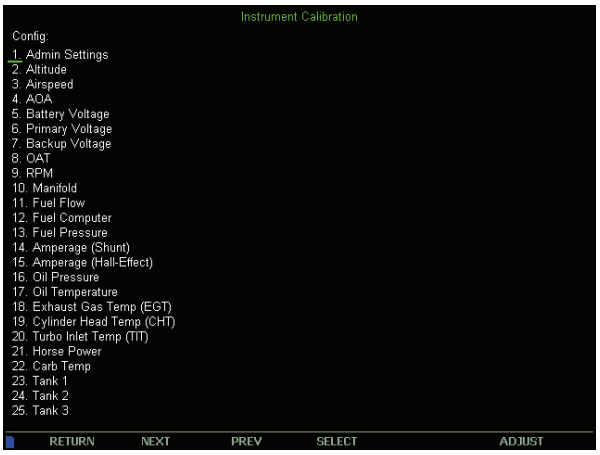
CAUTION: DO NOT connect the MAC indicators and the AF-3400/3500 to the MAC trim servos. The MAC trim indicators are +12V and the AF-3400/3500 is +10V. The power and ground wires connect to all the servo's.

CAUTION: Verify before turning the system on that you have the trim servo wiring correct. If the +10V or Ground connection is wired to the WHT/GRN wire on a servo ***you could damage the servo.***

Pin 2	Yellow	+10V	Trim WHT/BLU
Pin 3	Black	Ground	Trim WHT/ORN
Pin 34	Blue	Flap Posn	Trim WHT/GRN
Pin 35	Brown/Yellow	Elevator Posn	Trim WHT/GRN
Pin 36	Brown/Blue	Aileron Posn	Trim WHT/GRN
Pin 12		Rudder Posn	Trim WHT/GRN

For wiring information see Appendix C:

Instrument Calibration



Instrument calibration will allow you to calibrate the various instruments and set the desired warning levels.

To enter instrument calibration hold down button 5 while the system is starting. You should let up the button when ***Instrument Calibration*** is displayed. Calibration mode can also be entered from the run screen as long as you do not have any airspeed from the following menu:

CHECK -> MAINT -> ADMIN -> CALIBRATION ***Hold for 2 seconds***

A list of instruments will appear. You scroll through the list by using the [**PREV**] and [**NEXT**] buttons. There are multiple pages of instruments.

To calibrate an instrument press the [**SELECT**] button while the cursor is on the desired instrument. On the Right of your screen a calibration list will appear.

On the top right a number will appear. This is the digital value read by the sensor you are calibrating. This value will change if the condition the sensor is reading changes.

Below this number there will be a list of calibration data. Use [**NEXT**] and [**PREV**] buttons to scroll through the calibration list.

To adjust any of the warning values make sure the cursor is on the desired one and twist the knob until the value you desire is displayed.

When you have calibrated the instrument you can return to the main instrument list by pressing the [**RETURN**] button.

The following parameters can be set:

Max

The instrument displayed value at the top of the gauge

Red High At

The instrument displayed value when the needle turns red at the top of the gauge. You can set this parameter to the Max value if you do not want a top red band.

Yellow High At

The instrument displayed value when the needle turns yellow at the top of the gauge. You can set this parameter to the Max value if you do not want a top yellow band.

Yellow Low At

The instrument displayed value when the needle turns yellow at the bottom of the gauge. You can set this parameter to the Min value if you do not want a bottom yellow band.

Red Low At

The instrument displayed value when the needle turns red at the bottom of the gauge. You can set this parameter to the Min value if you do not want a bottom yellow band.

Minimum

The instrument displayed value at the bottom of the gauge

Audio On/Off

Turns on or off the audio warning feature.

Instrument On/Off

Turns on or off the entire instrument.

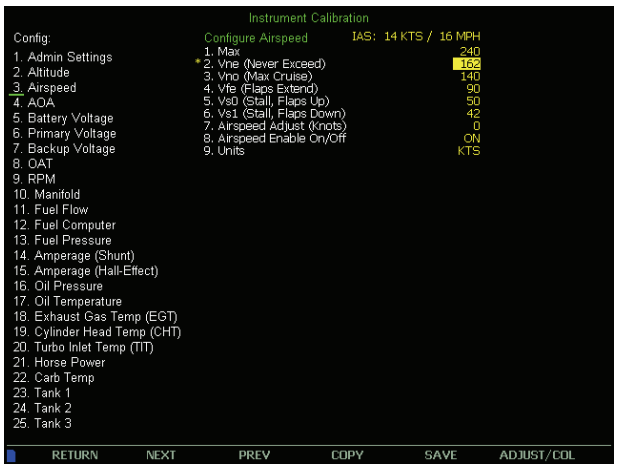
Calibration Tips:

- AF-3400/3500 systems are shipped with all sensors except Fuel Tanks and Trim / Flap sensors fully calibrated. Individual sensors should not need to be adjusted unless a new sensor is installed.
- The Amps transducer (Hall or Shunt) will need to have the zero current point set.

- Anytime you calibrate an Instrument and Enter the new data make sure to write that data down. You should keep a good record of this data with you at all time. That way if you accidentally set the default data you will have a record of what you have calibrated and will not have to do it again.
- When calibrating any temperature sensor wait until the calibration number stops changing (2-3 minutes) before recording it. This will help make the calibration more accurate.

To exit the calibration page press the [**RETURN**] button twice. This will return you to the usual startup. The calibration data you changed will be saved and used. Make sure to use caution while calibrating your instruments. Saving bad calibration data causes your instrument readings to be off.

Airspeed Color Range Settings



The Airspeed tape color range settings should be adjusted for your aircraft. All the speeds are in Knots.

Max: Top of the gauge Should be set to 240 KTS

Vne: Never Exceed Speed This is where the Red arc starts.

Vno: Normal Operation, This is the top of the green arc, bottom of the yellow.

Vfe: Flap Extend Speed, Top of the white arc.

Vs0: Stall Speed with the Flaps up.

Vs1: Stall Speed with the Flaps Down.

Airspeed Adjust: This should normally be 0, it can be used to offset the airspeed readings.

Airspeed Enable: This should normally be On, it can be used to turn off the airspeed gauge.

Units: Knots or MPH, the ***Airspeed tape range V Speeds are always set in knots.***

Altimeter Check

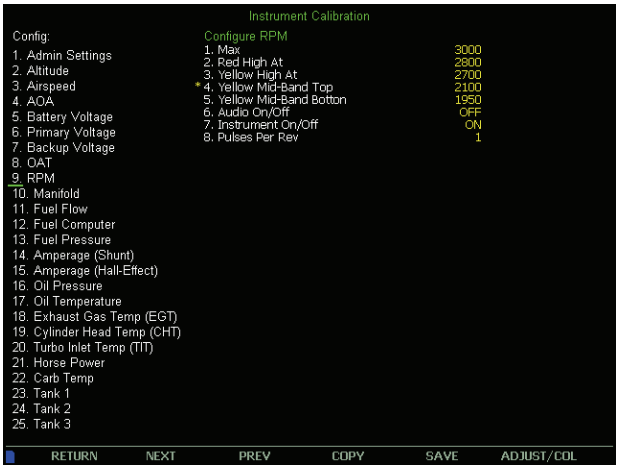
The altimeter check should be performed on an as-needed basis. If the altimeter is found to be out of specification, the following adjustment can be performed from the EFIS Calibration menu:

2. Altitude

    3. Altitude Adjust (FT)

After making an adjustment, ensure that the altimeter meets the tolerances allowed between 0 and 30,000 feet. If this adjustment does not correct the unit contact Advanced Flight Systems Inc. for service.

RPM Calibration



The RPM Gauge has three unique features that are slightly different than the standard gauge options. These features include:

Yellow Mid Band Top: Used to depict prop operating mid range restrictions. This should be set to 0 if your prop does not have any.

Yellow Mid Band Bottom: Used to depict prop operating mid range restrictions. This should be set to 0 if your prop does not have any.

Pulses Per 2 Revolutions: The systems needs to know how many pulses the RPM input will see in two propeller rotations. The following data should help select the correct number to use.

1. Standard RPM sensor with Slick Mag 4 Cylinders: Pulses = 2
2. Standard RPM sensor with Slick Mag 6 Cylinders: Pulses = 3
3. Standard RPM sensor with Lasar Mag 4 Cylinders: Pulses = 4
4. Standard RPM sensor with Lasar Mag 6 Cylinders: Pulses = 6
5. Electronic Ignition 4 Cylinders: Pulses = 4
6. Electronic Ignition 6 Cylinders: Pulses = 6

Trim Calibration

From the Calibration menu select:

Item 26 Elevator

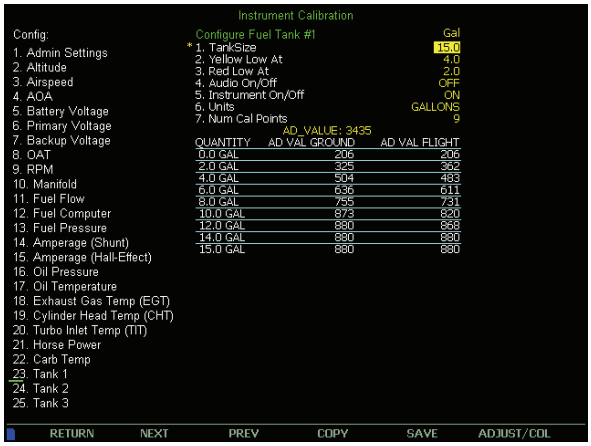
Item 27 Aileron

Item 28 Flap Position

The calibration menu lets you set the up, down, center position and turn the gauge on or off. You set each position by running the trim servo to the correct position and then pressing the copy button.

CAUTION: Do not turn off power before pressing the save button and exiting the calibration menu.

Fuel Tank Calibration



The AF-3400/3500 stores two sets of calibration numbers for each tank. The AF-3400/3500 uses the ground calibration numbers when the Airspeed is less than 30kts (1700 RPM for Engine Monitor only). The flight calibration numbers are used when the airspeed is greater than 30kts (1700 RPM for Engine Monitor only). This feature enables the fuel gauges to read correct on the ground for a tail wheel equipped airplanes. If your plane does not have a tail wheel you should set the ground and flight data to the same calibration number.

Steps To Calibrate a Tank:

1. Place the AF-3400/3500 into Instrument Calibration mode. Use the [**NEXT**] button to scroll down to Tank 1 (Left Main) or Tank 2 (Right Main), Tank 3 Left Aux, Tank 4 Right Aux.
2. Verify that the Tank is Empty.
3. Enter the max size of the Tank in the Tank Size field.
4. Set the Audio On/Off Setting. If you set this to ON you will get an Audio warning if the fuel level is below the Red Low At setting.
5. Set the Instrument On/Off Setting. If you set this to ON the tank will be displayed.
6. Enter the number of calibration points; you must have at least two points. You could use four points (zero, ¼, ½, ¾, Full) or one point for every 2 gallons. Every calibration point must have a Quantity that is higher than the previous one.
7. Use [**NEXT**] to Scroll down to the tank calibration data. The calibration data is displayed in two columns, one for ground and one for flight. Use the knob button to switch between ground and flight data columns. The current AD_VALUE reading for the tank is displayed at the top of the table.
8. Starting at 0 Gallons press the [**COPY**] button or use the knob to record the current AD_Value to the correct fuel amount and attitude (ground or flight).
9. You will need to fill and record a reading for each attitude (ground and flight). If you have a tail wheel aircraft, the best way to do this is to record the ground data then lift the tail and record the flight data after the fuel reading has settled. Repeat this for each increment until the tank is full.
10. Press the [**SAVE**] button to save the data to permanent memory and [**RETURN**] to exit Tank Calibration.

CAUTION: Do not turn off power before pressing the save button and exiting the calibration menu.

Calibration Tips:

When lifting the tail you should set it on something, so the level you lift it to will be consistent. You should also wait until the reading stops changing before setting it.

Fuel tank sensors are not accurate when the tank is near full. Once you notice the reading not changing much or not corresponding with the rest of the readings during calibration the last few entries in the fuel calibration data should be set to the same value.

If the tanks do not consistently show full you should lower the digital value for the tank full data.

The fuel gauge will only show the digital fuel amount for the highest reading that the float changed with a plus sign indicating that the correct fuel amount is not known but is over the last reading. The analog gauge will show full for the last changing reading. It is normal for an 18-gallon tank to show 16+ when it is full. This indicates that the float stopped changing at 16 gallons and this is the highest fuel reading that can be detected by the float in the tank.

Administrative Settings

System Files

The system has the following files in flash memory.

Calibration data files for the sensors:

AIRDATA.AFC	Airspeed, Altimeter, AOA, System Voltages
ENGINE.AFC	Engine Sensors
EGTCHT.AFC	EGT and CHT Sensors
HORSEPWER.AFC	Engine Horse Power Parameters
TANKS.AFC	Calibration data for all fuel tanks
AOA.AFC	Calibration data for AOA

Instrument range settings data files:

(max, min, red, yellow, green arcs)

AIRDATA.AFD	Airspeed, Altimeter, System Voltages
ENGINE.AFD	Engine gauges

Checklists & Maintenance data files:

CHKLST.AFD	Check Lists
MAINT.AFD	Maintenance items

System settings data files:

NVRAM.AFD	Backup of NV Ram
SYSTEM.AFD	System Network, Hardware Installed
EFIS.AFD	EFIS screen system settings

Data Logging files:

ymmddhhm.ALD	Flight and Engine data logs
ymmddhhm.ALS	System debug logs
ymmddhhm.ALR	Ram memory logs

y	year
mm	month
dd	date
hh	hour
m	minute

Multiple Screen Setup

Multiple screens (EFIS and Engine Monitor) can be connected together to enable data sharing by using a standard Ethernet cross over cable or Ethernet hub plugged into the back of the units. Once the screens are connected with the cable you will need to configure each screen for transmit and receive in the calibration menu.

Every screen on the Network must have a unique IP Number, we use the following format for multiple screens:

EFIS Screen with no Engine Board
15. Network IP Number this screen 175

Screen with Engine Board
15. Network IP Number this screen 176

Screen #3 with no Engine Board
15. Network IP Number this screen 177

The ***16. Network IP Number Other screen setting*** controls which other screen the EFIS data will be displayed from. Any screen that does not have an AHRS should have this set to the address of the remote screen with the AHRS that it will display EFIS data from or compare AHRS data with.

Dual AHRS Configuration

CAUTION

For Dual AHRS cross checking to work you should always set the ***AHRS Module Config*** to TXD and the ***Network IP Number Other screen*** to the address of the remote AHRS.

Multiple Screen Configuration Examples

The following examples should help you configure your system:

<Example #1> AF-3500EF EFIS and AF-3500EM Engine Monitor

AF-3000EF EFIS Screen #1

1. Admin Settings
    - 12. Engine Module Config HW:OFF, NET:RXD
    - 13. Air Module Config HW:INT, NET:TXD
    - 14. AHRS Module Config HW:INT, NET:TXD
    - 15. Network IP Number this screen 175
    - 16. Network IP Number Other screen 176

AF-3000EM Engine Monitor Screen #2

1. Admin Settings
    - 12. Engine Module Config HW:INT, NET:TXD
    - 13. Air Module Config HW:OFF, NET:RXD
    - 14. AHRS Module Config HW:OFF, NET:RXD
    - 15. Network IP Number this screen 176
    - 16. Network IP Number Other screen 175

<Example #2> AF-3500EF EFIS and AF-3500EE EFIS-Engine Monitor (AHRS Cross Checking)

AF-3000EF EFIS Screen #1

1. Admin Settings
    - 12. Engine Module Config HW:OFF, NET:RXD
    - 13. Air Module Config HW:INT, NET:TXD
    - 14. AHRS Module Config HW:INT, NET:TXD
    - 15. Network IP Number this screen 175
    - 16. Network IP Number Other screen 176

AF-3000EE EFIS-Engine Monitor Screen #2

1. Admin Settings
    - 12. Engine Module Config HW:INT, NET:TXD
    - 13. Air Module Config HW:INT, NET:OFF
    - 14. AHRS Module Config HW:INT, NET:TXD
    - 15. Network IP Number this screen 176
    - 16. Network IP Number Other screen 175

<Example #3> AF-3500EF EFIS and AF-3500EE EFIS-Engine Monitor and AF-3400MFD

AF-3500EF EFIS Screen #1

1. Admin Settings

12. Engine Module Config	HW:OFF, NET:RXD
13. Air Module Config	HW:INT, NET:TXD
14. AHRS Module Config	HW:INT, NET:TXD
15. Network IP Number this screen	175
16. Network IP Number Other screen	176

AF-3500EE EFIS-Engine Monitor Screen #2

1. Admin Settings

12. Engine Module Config	HW:INT, NET:TXD
13. Air Module Config	HW:INT, NET:OFF
14. AHRS Module Config	HW:INT, NET:TXD
15. Network IP Number this screen	176
16. Network IP Number Other screen	175

AF-3400MFD Screen #3

1. Admin Settings

12. Engine Module Config	HW:OFF, NET:RXD
13. Air Module Config	HW:OFF, NET:RXD
14. AHRS Module Config	HW:OFF, NET:RXD
15. Network IP Number this screen	177
16. Network IP Number Other screen	176

Dual Screen Data Configuration

Any time engine or EFIS settings are changed you should transfer the files to both screens. One screen can get some of the configuration files from the neighboring screen in the Admin Menu. If ***both screens*** are on the Admin Page in the EFIS Calibration menu, select:

14. Request Remote Files

This will force the screen to get the configuration data files from the remote screen for those items that this screen is setup to receive and will reboot with the new files.

If the screen is setup to receive ***Air Module Data*** the following files will be transferred:

AIRDATA.AFD	Airspeed, Altimeter, System Voltages
AOA.AFC	AOA Calibration

If the screen is setup to receive ***Engine Data*** the following files will be transferred:

ENGINE.AFD	Engine Gauges
TANKS.AFC	Engine Gauges

APPENDIX A: SPECIFICATIONS

PHYSICAL

AF-3400

Weight 4.6 Lbs

Panel Cut Out 6” x 5.55”

Mounting (Qty 4) 6-32” Screws

AF-3500

Weight 4.8 Lbs

Panel Cut Out 7.5” x 6.656”

Mounting (Qty 4) 6-32” Screws

Power Requirements

10 to 16 VDC

2 Amps

For a dual screen system both screens will need a power connection on each ***EFIS Main Connector.***

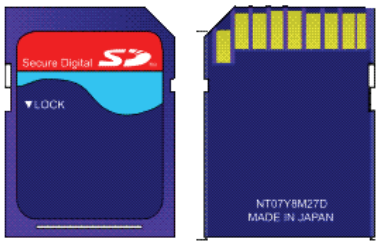
EFIS Main Connector

Pin 1	Primary Power	Master Power input for the screen
Pin 15	Backup Power	Alternate Power input for the screen

NOTE: Both power inputs can be displayed on the EFIS or Engine Monitor Screen.

SD Card

The AF-3400/3500 has a standard size **Secure Digital** (**SD**) memory card slot in the upper left hand corner for : Software Loading, Data Transfer, and Map Databases. Do not use SD memory cards that are over 2 Gigabytes in size.



Clock Battery

The internal clock battery should be replaced every 5 years.

P/N: 71702 Lithium Battery 12.5 x 2.5mm CR1225

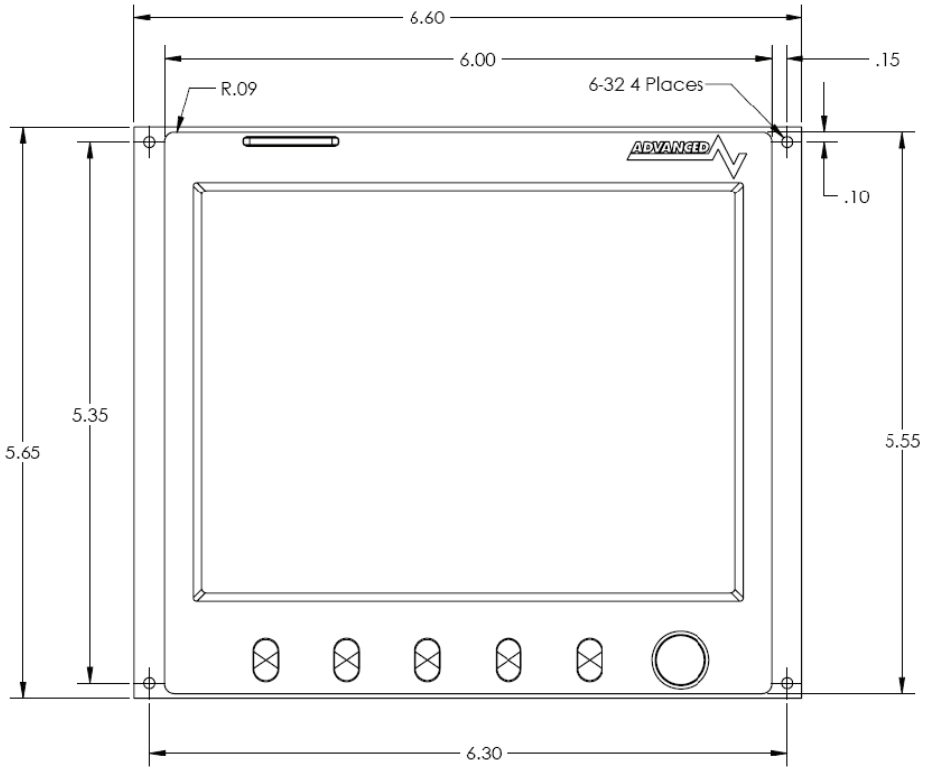
Backup Battery

The internal backup battery life should be check at annual and replaced when needed.

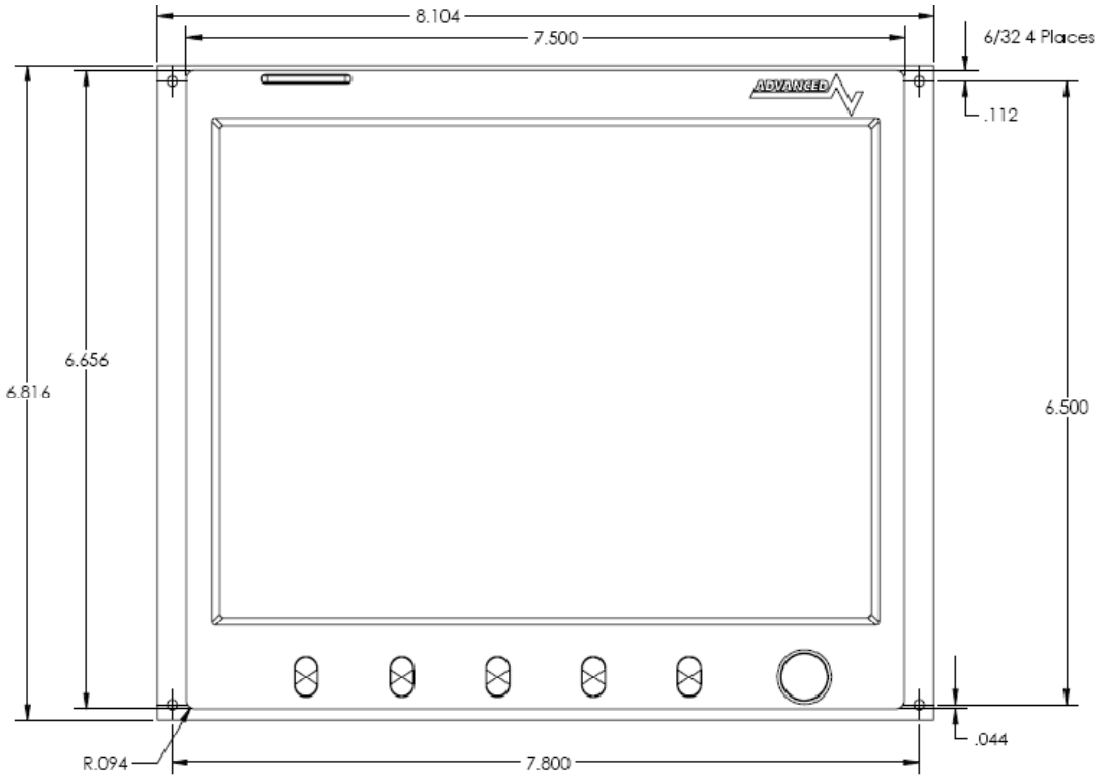
P/N: 717200 Lithium Battery 7.4V 2.2 Ah

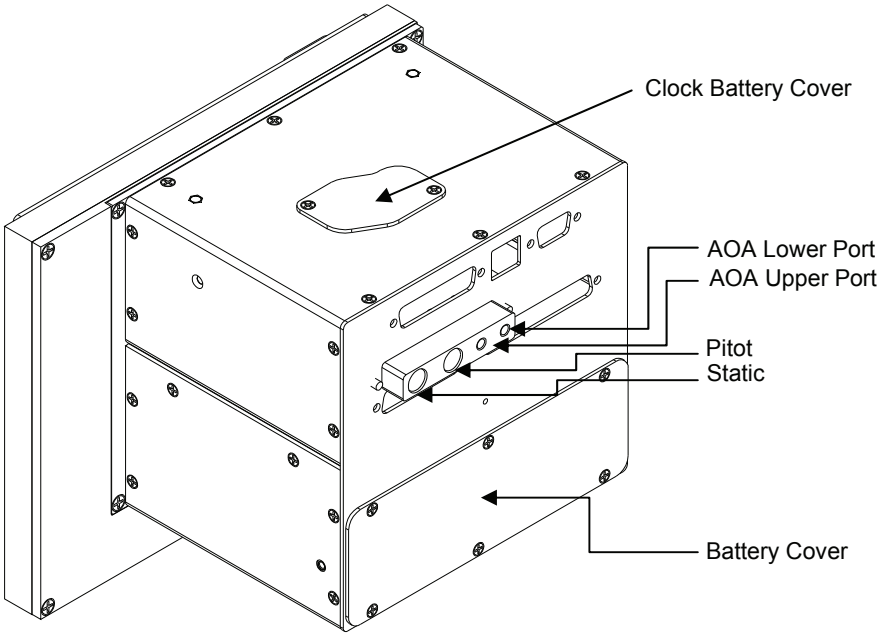
APPENDIX B: MOUNTING

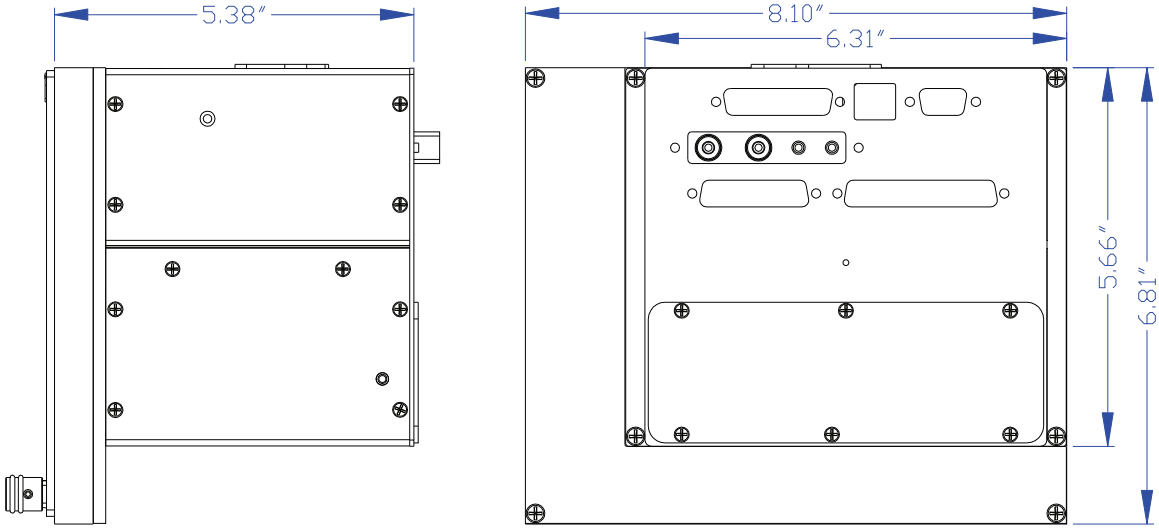
AF-3400 Mounting



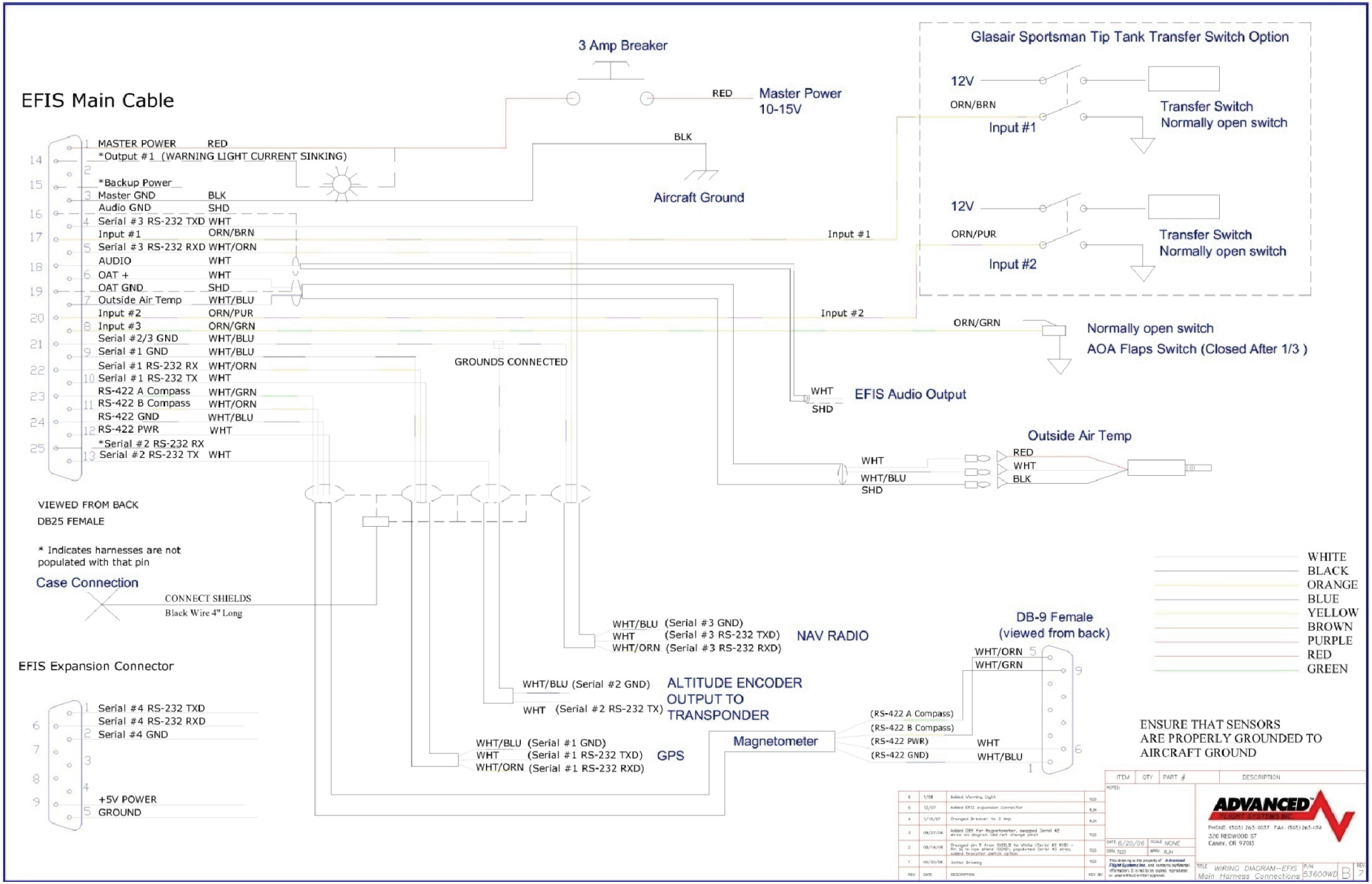
AF-3500 Mounting

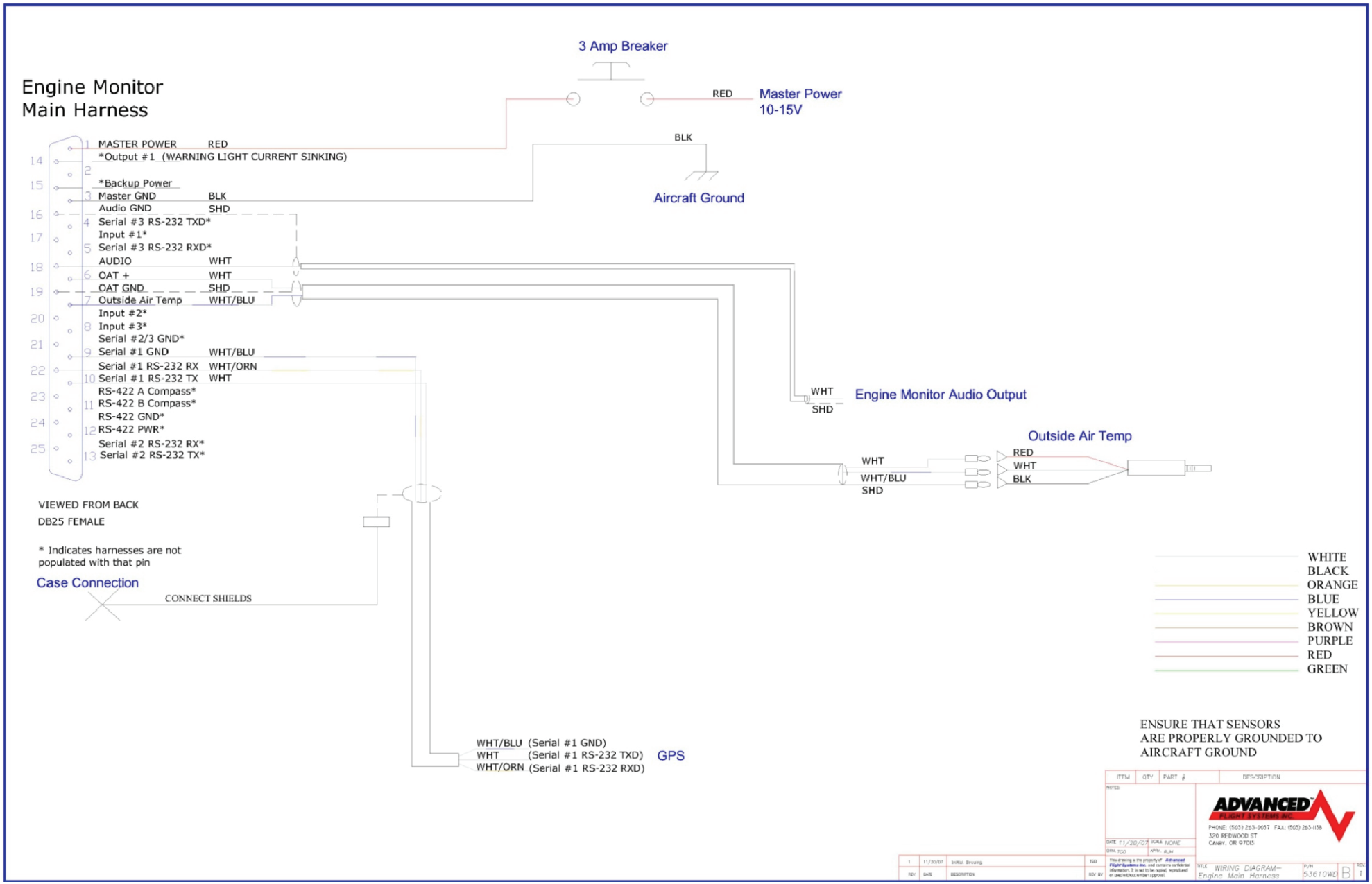


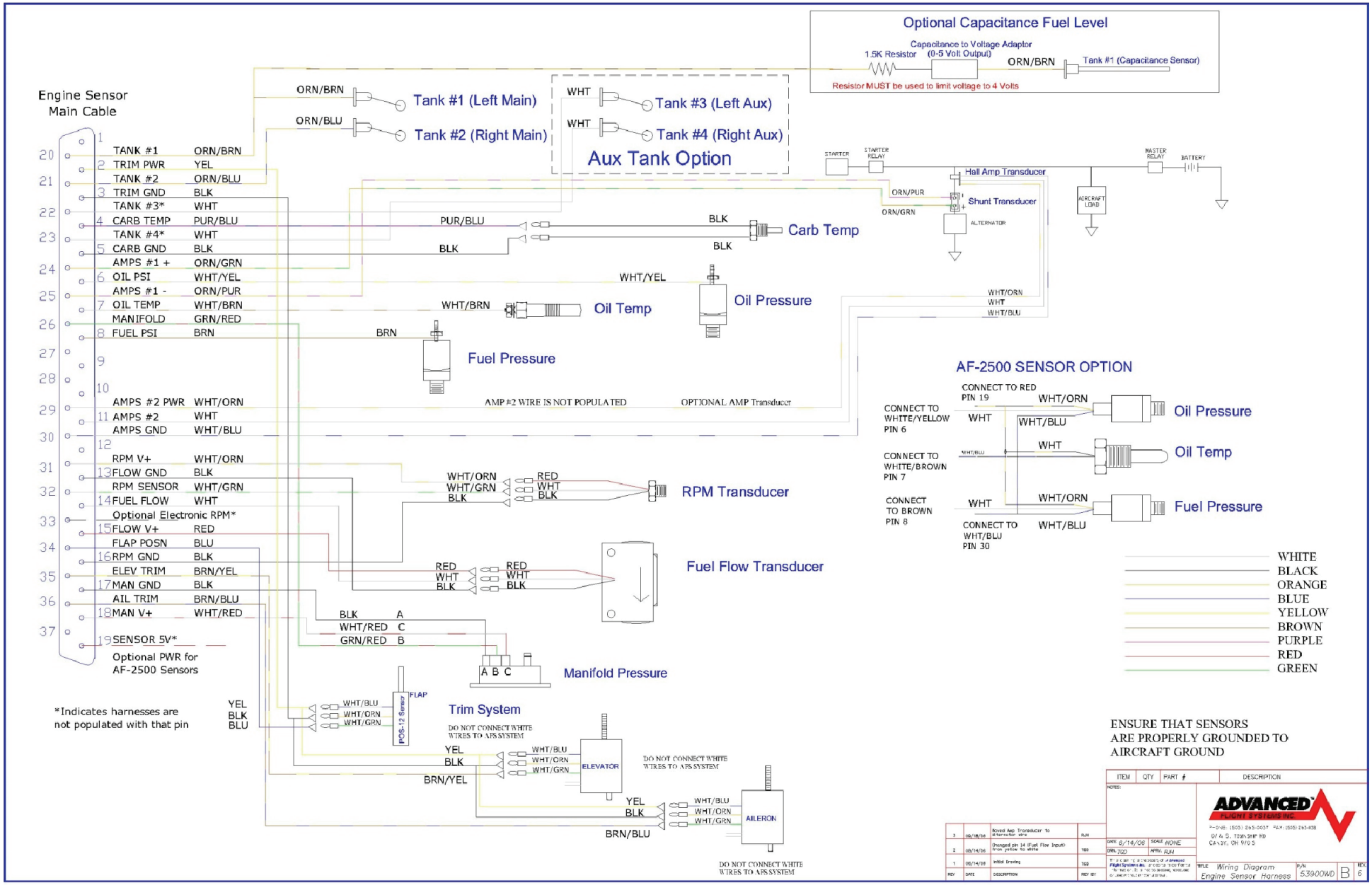

Clock Battery Cover
AOA Lower Port
AOA Upper Port
Pitot
Static
Battery Cover

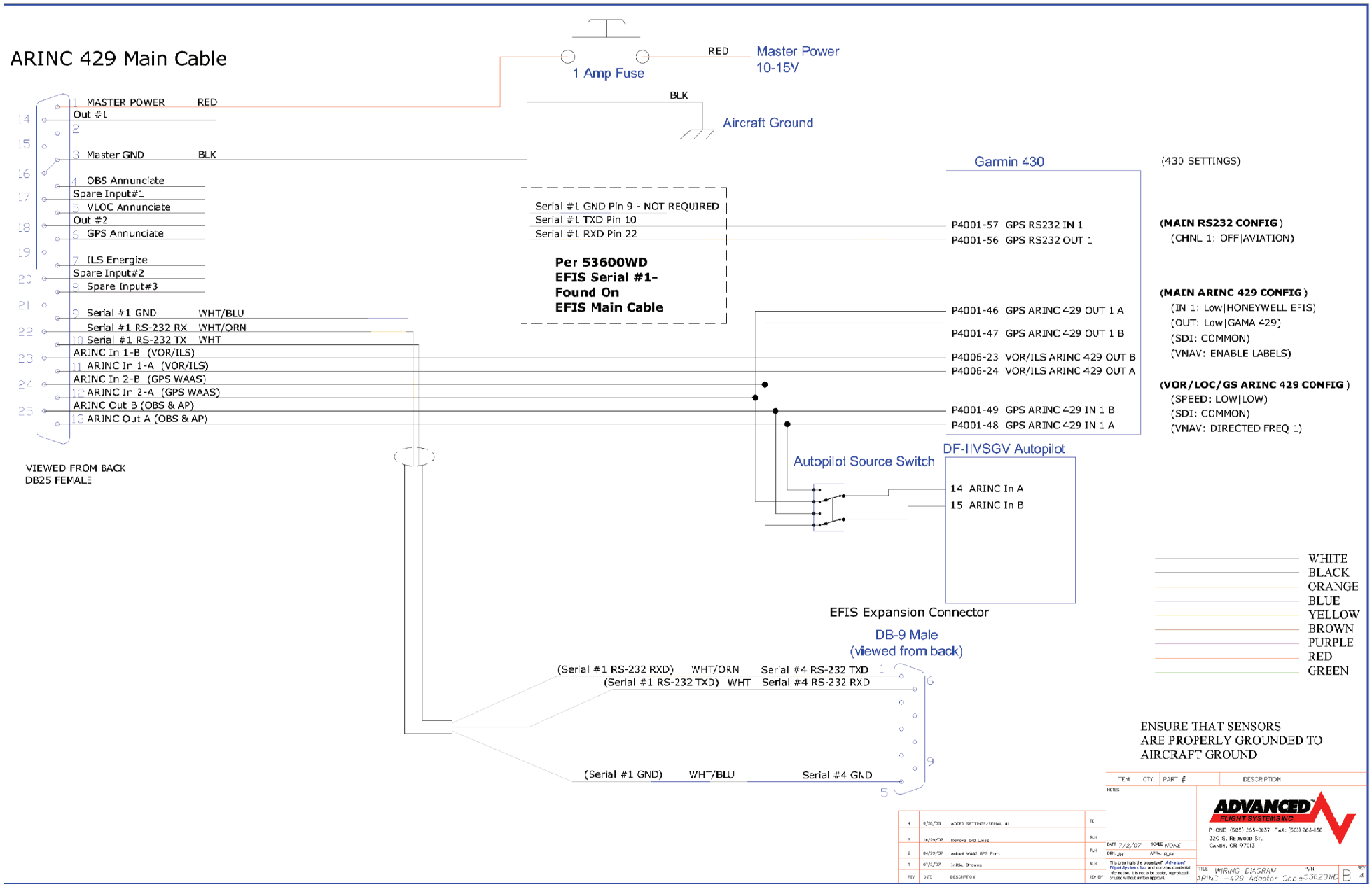

5.38″
8.10″
6.31″
5.66″
6.81″

APPENDIX C: SCHEMATICS


EFIS Main Cable
1 MASTER POWER RED
*Output #1 (WARNING LIGHT CURRENT SINKING)
2 *Backup Power
3 Master GND BLK
Audio GND SHD
4 Serial #3 RS-232 TXD WHT
Input #1 ORN/BRN
5 Serial #3 RS-232 RXD WHT/ORN
AUDIO WHT
6 OAT + WHT
OAT GND SHD
7 Outside Air Temp WHT/BLU
Input #2 ORN/PUR
8 Input #3 ORN/GRN
Serial #2/3 GND WHT/BLU
9 Serial #1 GND WHT/BLU
Serial #1 RS-232 RX WHT/ORN
10 Serial #1 RS-232 TX WHT
RS-422 A Compass WHT/GRN
11 RS-422 B Compass WHT/ORN
RS-422 GND WHT/BLU
12 RS-422 PWR WHT
*Serial #2 RS-232 RX
13 Serial #2 RS-232 TX WHT
VIEWED FROM BACK
DB25 FEMALE
* Indicates harnesses are not populated with that pin
Case Connection
CONNECT SHIELDS
Black Wire 4" Long
EFIS Expansion Connector
1 Serial #4 RS-232 TXD
Serial #4 RS-232 RXD
2 Serial #4 GND
3
4
5 +5V POWER
GROUND
3 Amp Breaker
RED
Master Power
10-15V
BLK
Aircraft Ground
Glasair Sportsman Tip Tank Transfer Switch Option
12V
ORN/BRN
Input #1
Transfer Switch
Normally open switch
12V
ORN/PUR
Input #2
Transfer Switch
Normally open switch
Input #1
Input #2
ORN/GRN
Normally open switch
AOA Flaps Switch (Closed After 1/3)
GROUNDS CONNECTED
WHT
SHD
EFIS Audio Output
Outside Air Temp
WHT
WHT/BLU
SHD
RED
WHT
BLK
WHT/BLU (Serial #3 GND)
WHT (Serial #3 RS-232 TXD)
WHT/ORN (Serial #3 RS-232 RXD)
NAV RADIO
WHT/BLU (Serial #2 GND)
WHT (Serial #2 RS-232 TX)
ALTITUDE ENCODER OUTPUT TO TRANSPONDER
WHT/BLU (Serial #1 GND)
WHT (Serial #1 RS-232 TXD)
WHT/ORN (Serial #1 RS-232 RXD)
GPS
Magnetometer
(RS-422 A Compass)
(RS-422 B Compass)
(RS-422 PWR)
(RS-422 GND)
WHT
WHT/BLU
DB-9 Female
(viewed from back)
WHT/ORN 5
WHT/GRN
9
6
1
WHITE
BLACK
ORANGE
BLUE
YELLOW
BROWN
PURPLE
RED
GREEN
ENSURE THAT SENSORS ARE PROPERLY GROUNDED TO AIRCRAFT GROUND
ITEM QTY PART # DESCRIPTION
NOTES:
ADVANCED
PHONE (503) 263-6037 FAX: (503) 263-158
326 REDWOOD ST
Canby, OR 97013
DATE 6/20/06 SCALE NONE
DRN TGD APRV RJH
TITLE WIRING DIAGRAM—EFIS Main Harness Connections
P/N 53600WD B REV 7
6 1/08 Added Warning Light TGD
5 12/07 Added EFIS expansion connector RJH
4 1/15/07 Changed Breaker to 3 Amp RJH
3 09/27/06 Added DB9 for Magnetometer, swapped Serial #2 wires on diagram (did not change pinx) TGD
2 08/14/06 Changed pin 5 from SHIELD to White (Serial #3 RXD - Pin 10 is now shield (GOOD); populated Serial #3 wires; added Transfer Switch option TGD
1 06/20/06 Initial Drawing TGD
REV DATE DESCRIPTION REV BY


Engine Monitor
Main Harness
3 Amp Breaker
RED
Master Power
10-15V
BLK
Aircraft Ground
1 MASTER POWER RED
*Output #1 (WARNING LIGHT CURRENT SINKING)
2
*Backup Power
3 Master GND BLK
Audio GND SHD
4 Serial #3 RS-232 TXD*
Input #1*
5 Serial #3 RS-232 RXD*
AUDIO WHT
6 OAT + WHT
OAT GND SHD
7 Outside Air Temp WHT/BLU
Input #2*
8 Input #3*
Serial #2/3 GND*
9 Serial #1 GND WHT/BLU
Serial #1 RS-232 RX WHT/ORN
10 Serial #1 RS-232 TX WHT
RS-422 A Compass*
11 RS-422 B Compass*
RS-422 GND*
12 RS-422 PWR*
Serial #2 RS-232 RX*
13 Serial #2 RS-232 TX*
14
15
16
17
18
19
20
21
22
23
24
25
WHT
SHD
Engine Monitor Audio Output
Outside Air Temp
WHT
WHT/BLU
SHD
RED
WHT
BLK
VIEWED FROM BACK
DB25 FEMALE
* Indicates harnesses are not populated with that pin
Case Connection
CONNECT SHIELDS
WHT/BLU (Serial #1 GND)
WHT (Serial #1 RS-232 TXD)
WHT/ORN (Serial #1 RS-232 RXD)
GPS
WHITE
BLACK
ORANGE
BLUE
YELLOW
BROWN
PURPLE
RED
GREEN
ENSURE THAT SENSORS
ARE PROPERLY GROUNDED TO
AIRCRAFT GROUND
ITEM QTY PART # DESCRIPTION
NOTES:
ADVANCED FLIGHT SYSTEMS INC.
PHONE: (503) 263-0037 FAX: (503) 263-1158
520 REDWOOD ST
CANBY, OR 97013
DATE 11/20/07 SCALE NONE
DRN. TGD APRV. RJH
1 11/20/07 Initial Drawing TGD
REV DATE DESCRIPTION REV BY
This drawing is the property of Advanced Flight Systems Inc. and contains confidential information. It is not to be copied, reproduced or used without WRITTEN APPROVAL.
TITLE WIRING DIAGRAM– Engine Main Harness
P/N 53610WD
B
REV 1


Optional Capacitance Fuel Level
Capacitance to Voltage Adaptor
(0-5 Volt Output)
1.5K Resistor
ORN/BRN
Tank #1 (Capacitance Sensor)
Resistor MUST be used to limit voltage to 4 Volts
Engine Sensor
Main Cable
ORN/BRN
Tank #1 (Left Main)
ORN/BLU
Tank #2 (Right Main)
WHT
Tank #3 (Left Aux)
WHT
Tank #4 (Right Aux)
Aux Tank Option
1 TANK #1 ORN/BRN
2 TRIM PWR YEL
TANK #2 ORN/BLU
3 TRIM GND BLK
TANK #3* WHT
4 CARB TEMP PUR/BLU
TANK #4* WHT
5 CARB GND BLK
AMPS #1 + ORN/GRN
6 OIL PSI WHT/YEL
AMPS #1 - ORN/PUR
7 OIL TEMP WHT/BRN
MANIFOLD GRN/RED
8 FUEL PSI BRN
9
10
AMPS #2 PWR WHT/ORN
11 AMPS #2 WHT
AMPS GND WHT/BLU
12
RPM V+ WHT/ORN
13 FLOW GND BLK
RPM SENSOR WHT/GRN
14 FUEL FLOW WHT
Optional Electronic RPM*
15 FLOW V+ RED
FLAP POSN BLU
16 RPM GND BLK
ELEV TRIM BRN/YEL
17 MAN GND BLK
AIL TRIM BRN/BLU
18 MAN V+ WHT/RED
19 SENSOR 5V*
Optional PWR for
AF-2500 Sensors
*Indicates harnesses are
not populated with that pin
PUR/BLU
BLK
Carb Temp
BLK
BLK
WHT/YEL
Oil Pressure
WHT/BRN
Oil Temp
BRN
Fuel Pressure
AMP #2 WIRE IS NOT POPULATED
OPTIONAL AMP Transducer
STARTER
STARTER RELAY
Hall Amp Transducer
ORN/PUR
ORN/GRN
Shunt Transducer
ALTERNATOR
AIRCRAFT LOAD
MASTER RELAY
BATTERY
WHT/ORN
WHT
WHT/BLU
AF-2500 SENSOR OPTION
CONNECT TO RED
PIN 19
WHT/ORN
CONNECT TO
WHITE/YELLOW
PIN 6
WHT
WHT/BLU
Oil Pressure
CONNECT TO
WHITE/BROWN
PIN 7
WHT/BLU
WHT
Oil Temp
CONNECT
TO BROWN
PIN 8
WHT
WHT/ORN
Fuel Pressure
CONNECT TO
WHT/BLU
PIN 30
WHT/BLU
WHITE
BLACK
ORANGE
BLUE
YELLOW
BROWN
PURPLE
RED
GREEN
WHT/ORN
WHT/GRN
BLK
RED
WHT
BLK
RPM Transducer
RED
WHT
BLK
RED
WHT
BLK
Fuel Flow Transducer
BLK A
WHT/RED C
GRN/RED B
A B C
Manifold Pressure
YEL
BLK
BLU
WHT/BLU
WHT/ORN
WHT/GRN
FLAP
POS-12 Sensor
Trim System
DO NOT CONNECT WHITE
WIRES TO AFS SYSTEM
YEL
BLK
BRN/YEL
WHT/BLU
WHT/ORN
WHT/GRN
ELEVATOR
DO NOT CONNECT WHITE
WIRES TO AFS SYSTEM
YEL
BLK
BRN/BLU
WHT/BLU
WHT/ORN
WHT/GRN
AILERON
DO NOT CONNECT WHITE
WIRES TO AFS SYSTEM
ENSURE THAT SENSORS
ARE PROPERLY GROUNDED TO
AIRCRAFT GROUND
ITEM
QTY
PART #
DESCRIPTION
NOTES:
ADVANCED
FLIGHT SYSTEMS INC
DATE 8/14/06
SCALE NONE
DRN. TGD
APRV. RJH
TITLE Wiring Diagram
Engine Sensor Harness
P/N 53900WD
B
REV 6
3 08/18/06 Moved Amp Transducer to Alternator wire RJH
2 08/14/06 Changed pin 14 (Fuel Flow Input) from yellow to white TGD
1 08/14/06 Initial Drawing TGD
REV DATE DESCRIPTION REV BY


ARINC 429 Main Cable
1 Amp Fuse
RED
Master Power
10-15V
BLK
Aircraft Ground
1 MASTER POWER RED
Out #1
2
3 Master GND BLK
4 OBS Annunciate
Spare Input#1
5 VLOC Annunciate
Out #2
6 GPS Annunciate
7 ILS Energize
Spare Input#2
8 Spare Input#3
9 Serial #1 GND WHT/BLU
Serial #1 RS-232 RX WHT/ORN
10 Serial #1 RS-232 TX WHT
ARINC In 1-B (VOR/ILS)
11 ARINC In 1-A (VOR/ILS)
ARINC In 2-B (GPS WAAS)
12 ARINC In 2-A (GPS WAAS)
ARINC Out B (OBS & AP)
13 ARINC Out A (OBS & AP)
VIEWED FROM BACK
DB25 FEMALE
Serial #1 GND Pin 9 - NOT REQUIRED
Serial #1 TXD Pin 10
Serial #1 RXD Pin 22
Per 53600WD
EFIS Serial #1-
Found On
EFIS Main Cable
Garmin 430
(430 SETTINGS)
P4001-57 GPS RS232 IN 1
P4001-56 GPS RS232 OUT 1
(MAIN RS232 CONFIG)
(CHNL 1: OFF|AVIATION)
P4001-46 GPS ARINC 429 OUT 1 A
P4001-47 GPS ARINC 429 OUT 1 B
P4006-23 VOR/ILS ARINC 429 OUT B
P4006-24 VOR/ILS ARINC 429 OUT A
(MAIN ARINC 429 CONFIG)
(IN 1: Low|HONEYWELL EFIS)
(OUT: Low|GAMA 429)
(SDI: COMMON)
(VNAV: ENABLE LABELS)
(VOR/LOC/GS ARINC 429 CONFIG)
(SPEED: LOW|LOW)
(SDI: COMMON)
(VNAV: DIRECTED FREQ 1)
P4001-49 GPS ARINC 429 IN 1 B
P4001-48 GPS ARINC 429 IN 1 A
DF-IIVSGV Autopilot
Autopilot Source Switch
14 ARINC In A
15 ARINC In B
EFIS Expansion Connector
DB-9 Male
(viewed from back)
(Serial #1 RS-232 RXD) WHT/ORN Serial #4 RS-232 TXD
(Serial #1 RS-232 TXD) WHT Serial #4 RS-232 RXD
(Serial #1 GND) WHT/BLU Serial #4 GND
WHITE
BLACK
ORANGE
BLUE
YELLOW
BROWN
PURPLE
RED
GREEN
ENSURE THAT SENSORS
ARE PROPERLY GROUNDED TO
AIRCRAFT GROUND
ITEM QTY PART # DESCRIPTION
NOTES
ADVANCED FLIGHT SYSTEMS INC.
P-ONE (503) 265-0037 FAX: (503) 265-4136
320 S. Redwood St.
Canby, OR 97013
DATE 3/2/07 SCALE NONE
DRN JM APVD FLH
This drawing is the property of Advanced Flight Systems Inc. and contains confidential information. It is not to be copied, reproduced or used without written approval.
TITLE WIRING DIAGRAM
ARINC -429 Adapter Cable
P/N 53620WD
B
REV A
4 8/28/08 ADDED SETTINGS/SERIAL #1 TE
3 10/29/07 Remove 1-B Lines FLH
2 04/29/07 added WAAS GPS Port FLH
1 07/6/07 Initial Drawing FLH
REV DATE DESCRIPTION REV BY

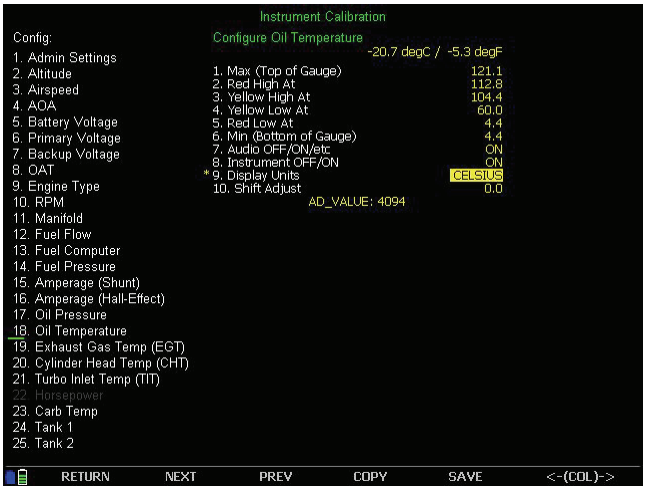
APPENDIX D: METRIC UNITS

Each gauge has Display Units or Units in Calibration that can be changed to display alternate units.

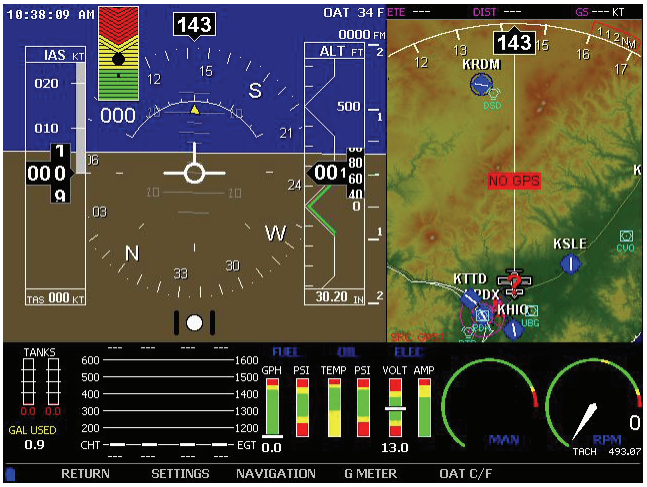
EXAMPLE
Oil Temperature

Boot the EFIS in Calibration mode and select:
18. Oil Temperature
9. Display Units [**TURN KNOB**] [**SAVE**]

CAUTION: Do not turn off power before pressing the save button and exiting the calibration menu.



OAT units can be changed on the main screen from the **[EFIS]** or **[ENGINE]** menu by selecting the **[OAT C/F]** button.



Available Units

Altitude
- FEET/INHG
- METER/INHG
- FEET/MBAR
- METER/MBAR

Airspeed
- KTS
- MPH

Temperatures (EGT, CHT, TIT, Carb, Coolant, Oil, OAT)
- Fahrenheit
- Celsius

Manifold
- InHg
- MBAR

Fuel Flow, Fuel Computer, Fuel Tanks
- Liters
- Gallons

Fuel Pressure, Oil Pressure
- PSI
- MBAR

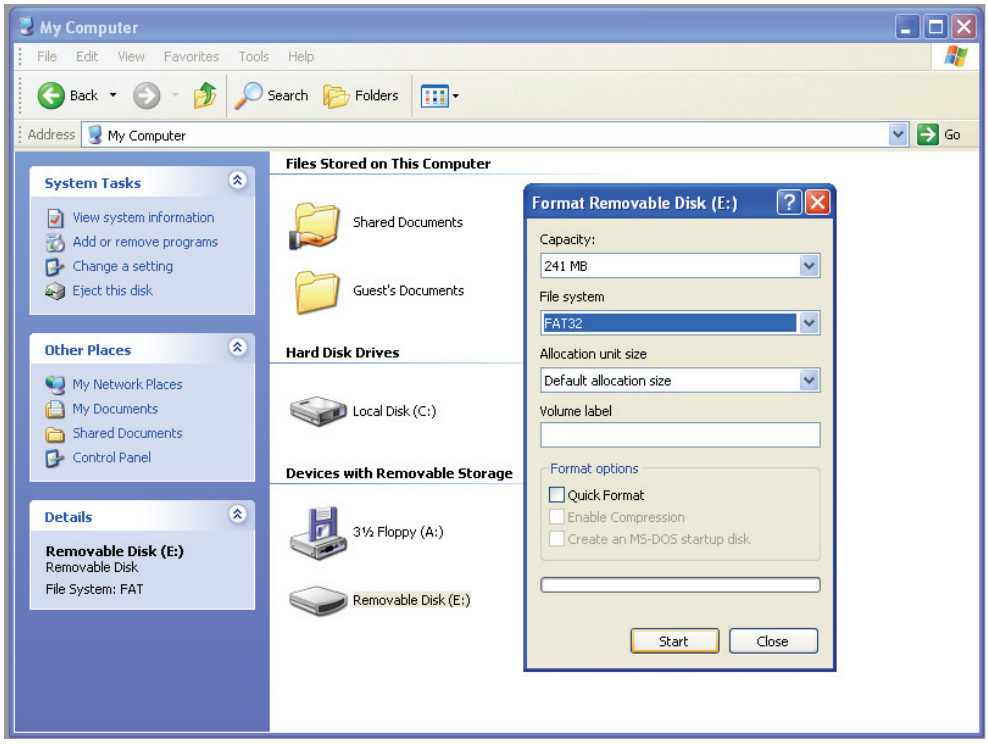
APPENDIX E: Software Updates

PROCEDURE

1. Format the SD card with your PC. Select the FAT 32 option in the format window. Format is typically a right-mouse-click option in the Windows File Explorer. See picture below. Be sure to select the SD card and not any other drive on your computer. Formatting will erase all data from the selected drive.

2. Download the latest version of software file onto the SD Card: http://www.advanced-flight-systems.com
3. Insert the SD data card into the slot on the AF-3000 unit.
4. Power on unit with Master Power not Internal Battery.
5. Remove the card after the system has installed the new software, 2 to 3 minutes.
6. Verify that your ARINC adaptor does not require updated software using the software install notes.

CAUTION: If the SD data card is left in the system with the new software file, it will install software every time power is turned on.



APPENDIX F: Aerosance FADEC Interface

The Engine Monitor can be configured to display engine data from an
Aerosance SBC FADEC control unit with a RS-232 data connection connected to EFIS Serial Port #3

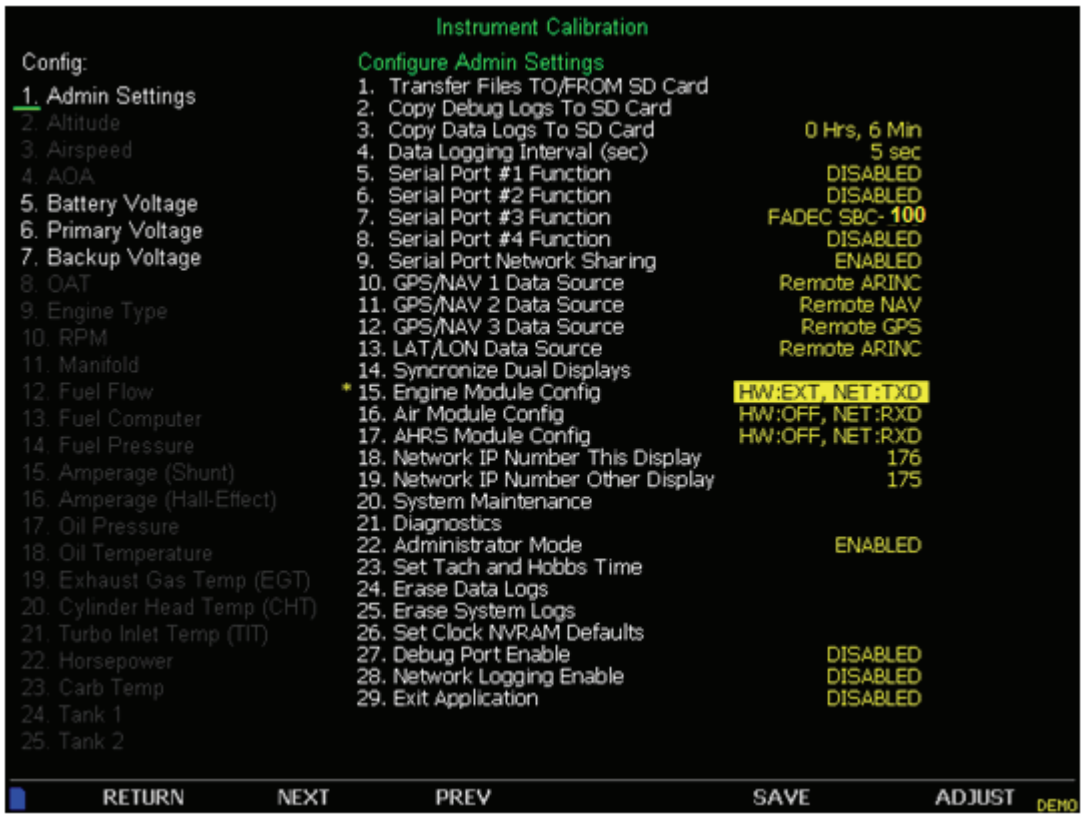
Wiring Connections:

Aerosance SBC	*Function*	*EFIS Main Cable*
TXD	*Serial Port #3 RXD*	*Pin 5*
GNDSerial	*SerialPort #3 GND*	*Pin 21*

Administration Settings:

The following must be set for the engine data to be displayed:

1. Serial Port *#number* Function *set to* **FADEC SBC 100**
2. 15. Engine Module Config *set to* **HW:EXT, NET:TXD**



Registration Information

To receive important notification of Service Bulletins, and service difficulty reports, please EMAIL the following information to:

Info@Advanced-Flight-Systems.com

Or Mail to:

Advanced Flight Systems Inc.
320 S. Redwood St.
Canby OR 97013 USA

*Owner's Name:*_____

Address: _____

_____

City: _____

*State:*_____*Postal Code ZIP:* _____

Country: _____

Home telephone: _____

Business Telephone: _____

E-mail: _____

Aircraft Model and N#: _____

*Engine Model :*_____

*System Model #:*_____*Serial Number:*_____

*Installer:*_____