



# Avidyne PFD

**Cirrus Transition Course**

2/12/05

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# General

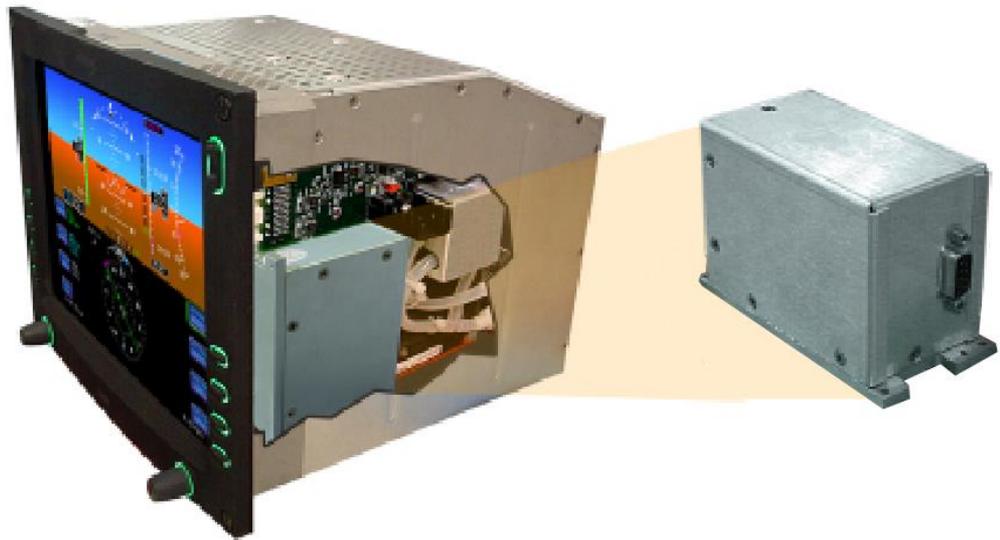
▶ The Avidyne PFD incorporates the functionality of:

- Horizontal Situation Indicator (HSI)
- Vertical Speed Indicator
- VOR/LOC/GS Indicators
- Attitude Indicator
- Airspeed Indicator
- Turn Coordinator
- Altitude, Airspeed & VSI Bugs
- Flight Director (Optional)

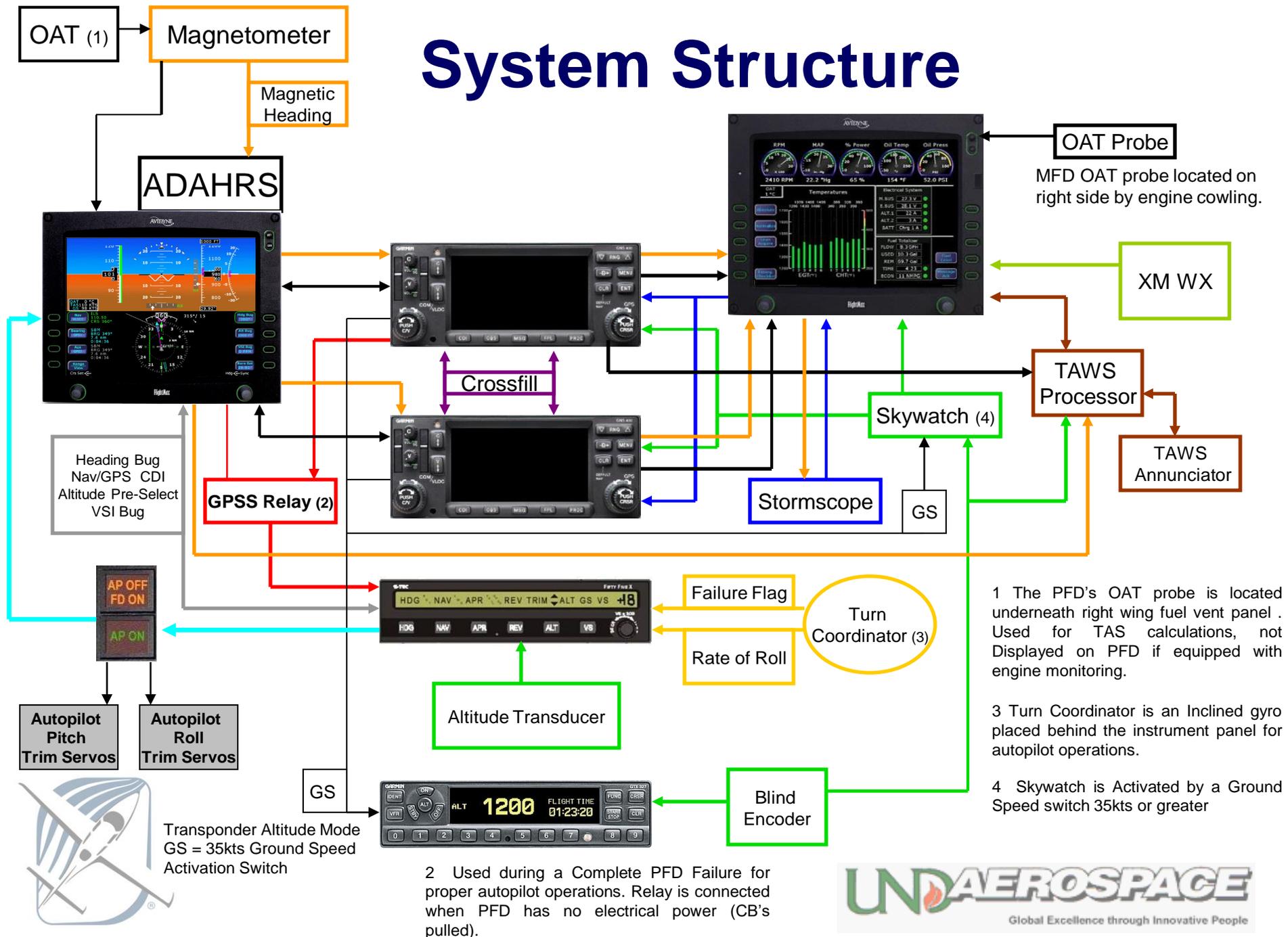


# General

- ▶ The flat panel liquid-crystal display is integrated with an Air Data / Attitude Heading Reference System (ADAHRS)
- ▶ Magnetometer (Magnetic Heading information)
- ▶ Three axis solid state gyro and accelerometer system
- ▶ AHRS Provides:
  - Pitch
  - Roll
  - Yaw



# System Structure



1 The PFD's OAT probe is located underneath right wing fuel vent panel . Used for TAS calculations, not Displayed on PFD if equipped with engine monitoring.

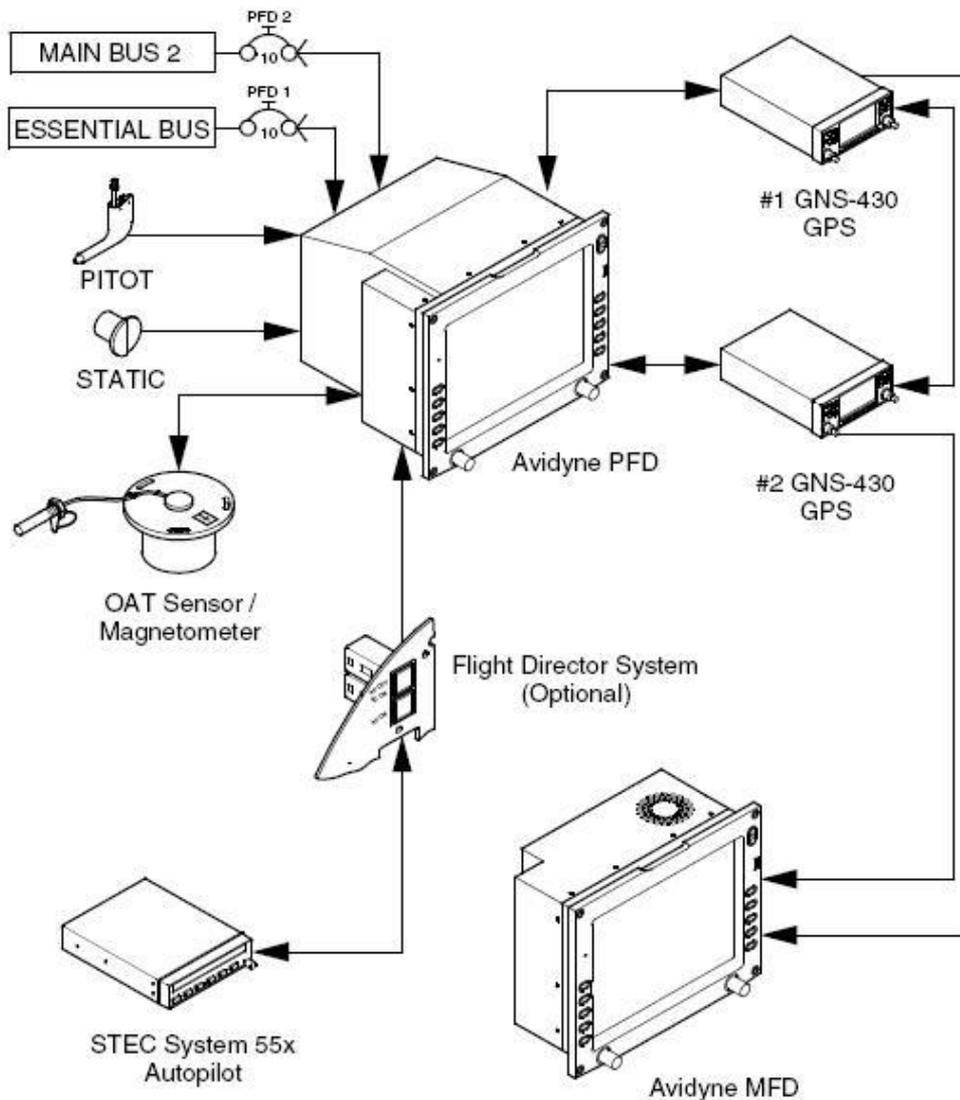
3 Turn Coordinator is an Inclined gyro placed behind the instrument panel for autopilot operations.

4 Skywatch is Activated by a Ground Speed switch 35kts or greater

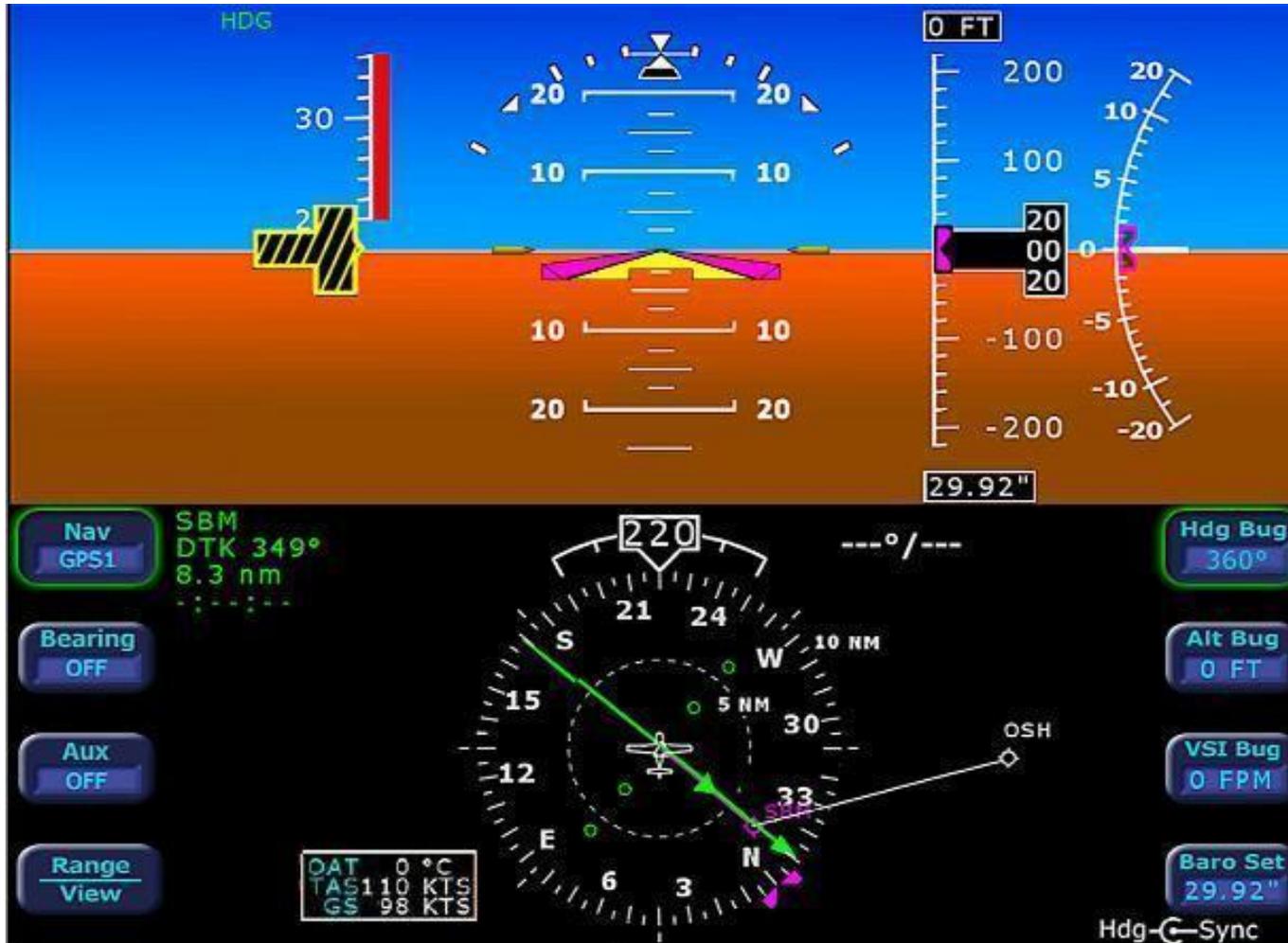
2 Used during a Complete PFD Failure for proper autopilot operations. Relay is connected when PFD has no electrical power (CB's pulled).

Transponder Altitude Mode GS = 35kts Ground Speed Activation Switch

# PFD w/ FD System Schematic



# ADI Symbology



# ADI Symbology

1. **Air Data** - Displays True Airspeed (TAS) and Ground Speed (GS) in knots, and Outside Air Temperature (OAT) in degrees Celsius. Invalid data is displayed as dashes (---).

*OAT may not be displayed on the PFD when the aircraft is equipped with an EX5000 MFD and EMax engine monitor.*

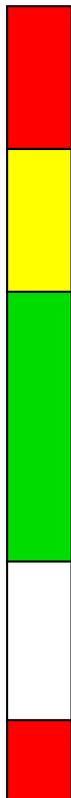
2. **Airspeed Window** - Displays current indicated airspeed in knots. Hash marks are displayed below 20 knots.

3. **Airspeed Tape** - Indicated airspeed with a display range from 20kts. to 300kts. Each minor graduation represents 2 knots and each 10 knot major graduation is labeled.



# \* ADI Symbology

## ▶ Airspeed Tape



- **Red Band:** Never exceed speed, **VNE**, up to top of the airspeed tape.
- **Yellow Band:** Maximum structural cruise speed, **VNO**, up to never exceed speed, **VNE**.
- **Green Band:** No flap stall speed, **VS**, up to maximum structural cruise speed, **VNO**.
- **White Band:** Full flap stall speed, **VSO**, up to maximum flap extension speed, **VFE**.
- **Red Band:** 20 kts. up to full flap stall speed, **VSO**.



# ADI Symbology

## Turn Indicator

- The **Blue** rate of turn indicator displays the current rate of turn.
  - The indicator is marked for 1/2 and full standard rate of turn.
  - Typical bank angles for a standard rate of turn are approximately  $27^\circ$  in cruise conditions\*.
- When a **Blue** arrowhead is present it indicates a value beyond 1 1/2 standard rate.

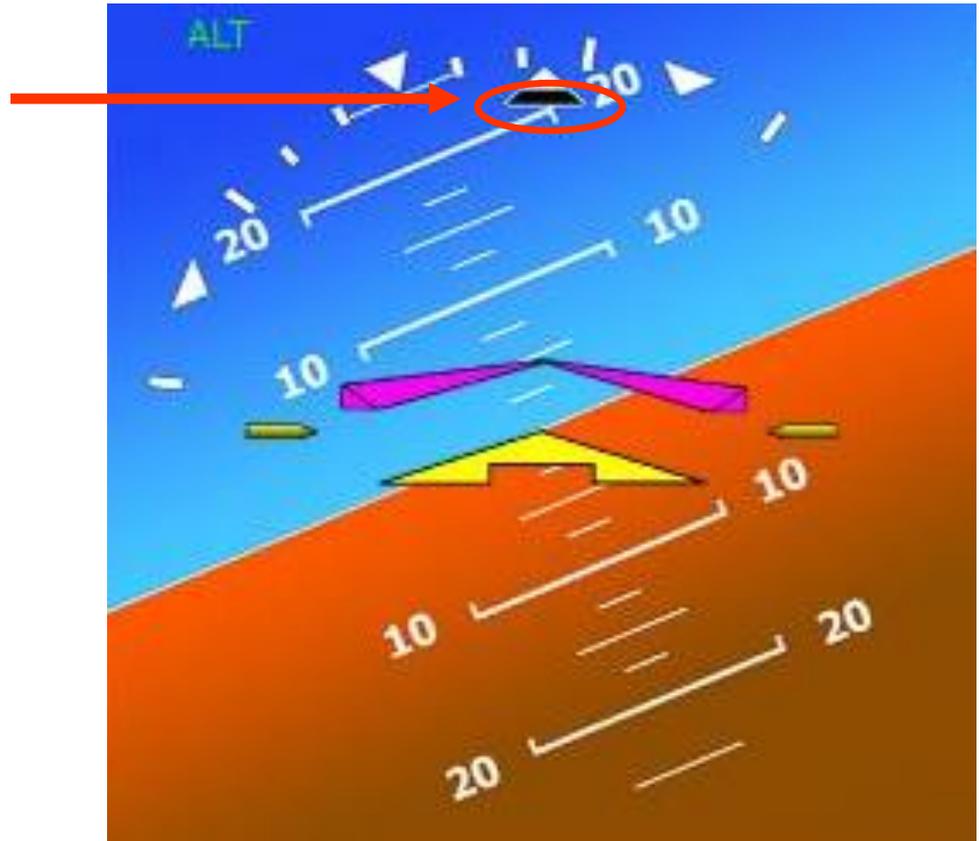


Note :A rule of thumb for determining the approximate bank angle required for a standard-rate turn is to divide the **true airspeed** by 10 and add one-half the result. For example, at 180 knots, approximately  $27^\circ$  of bank is required ( $180/10 = 18 + 9 = 27$ ) for a standard rate turn. Normal cruise speed is approximately 180 knots true in SR22 at 75% power setting ,

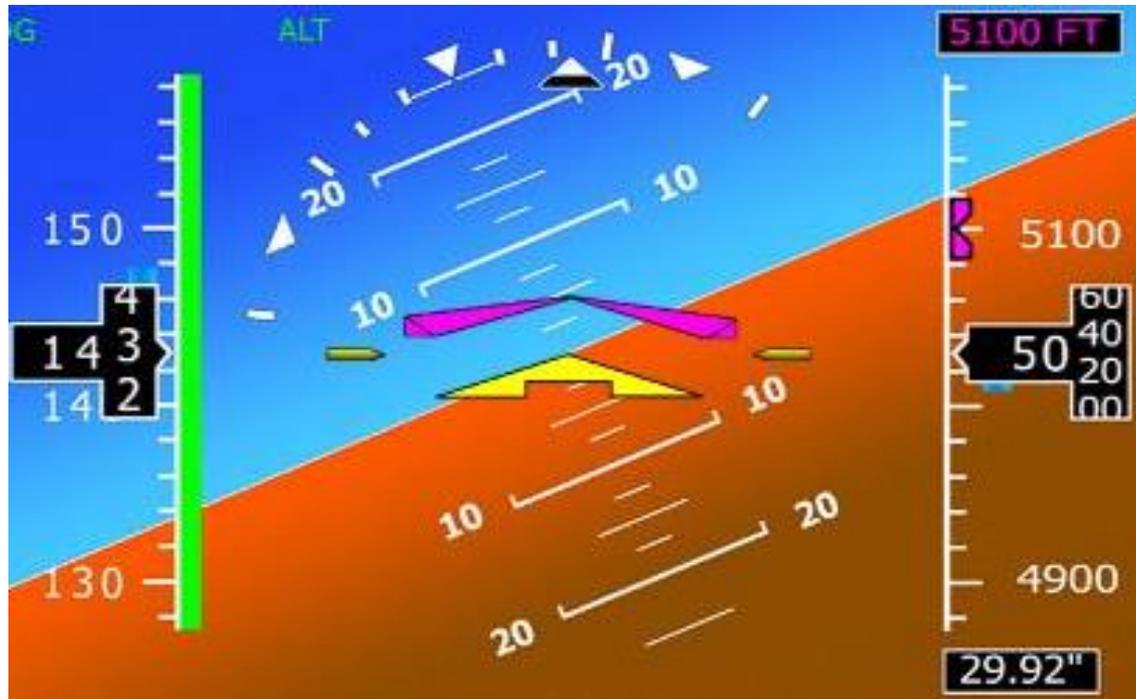
# ADI Symbology

## ▶ Inclinometer

- Represented as black trapezoid below angle of bank indicator
- The black trapezoid is centered under the roll pointer in coordinated flight.
- Full scale deflection is the width of the trapezoid.



# ADI Symbology



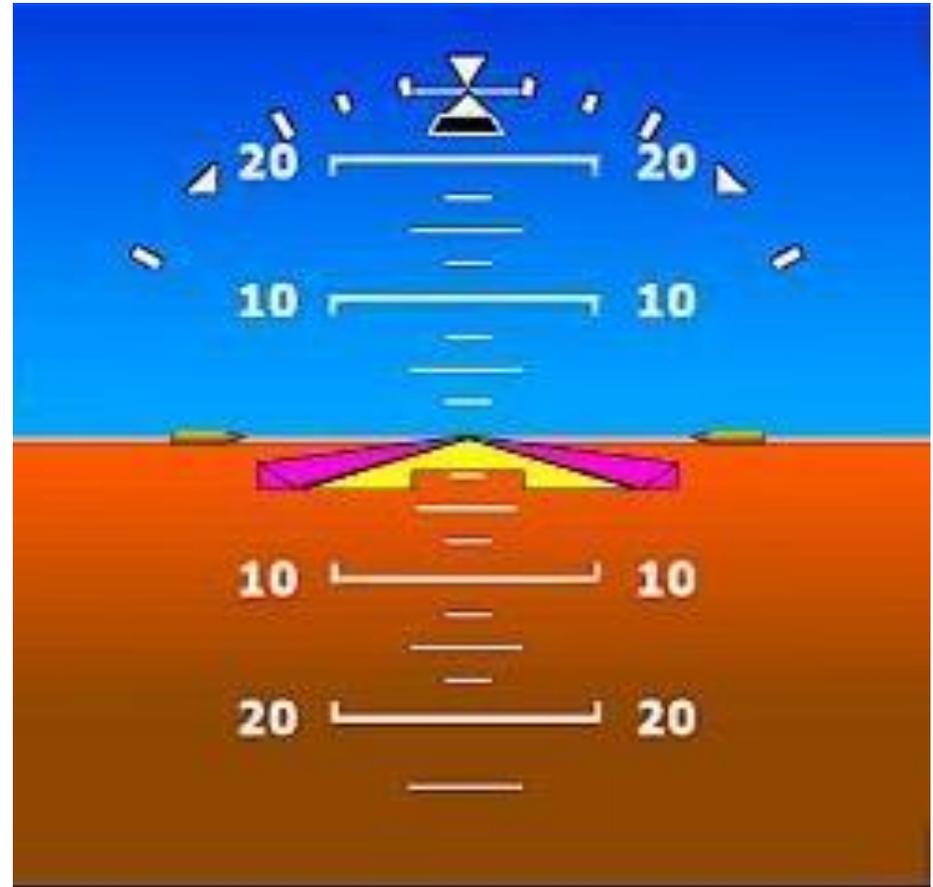
- ▶ **Aircraft Reference Symbol-** Current aircraft pitch angle is represented by the apex of the **yellow** wedge against the pitch ladder. In wings level flight, the two **yellow** outriggers also serve as pitch angle representations.
- ▶ **Flight Director Steering Command Bars -** Displays the accuracy of the pilot or autopilot tracking the autopilot commands. The pilot or autopilot is to steer the airplane toward the command bars until the delta shaped reference is tucked into the steering command bars.



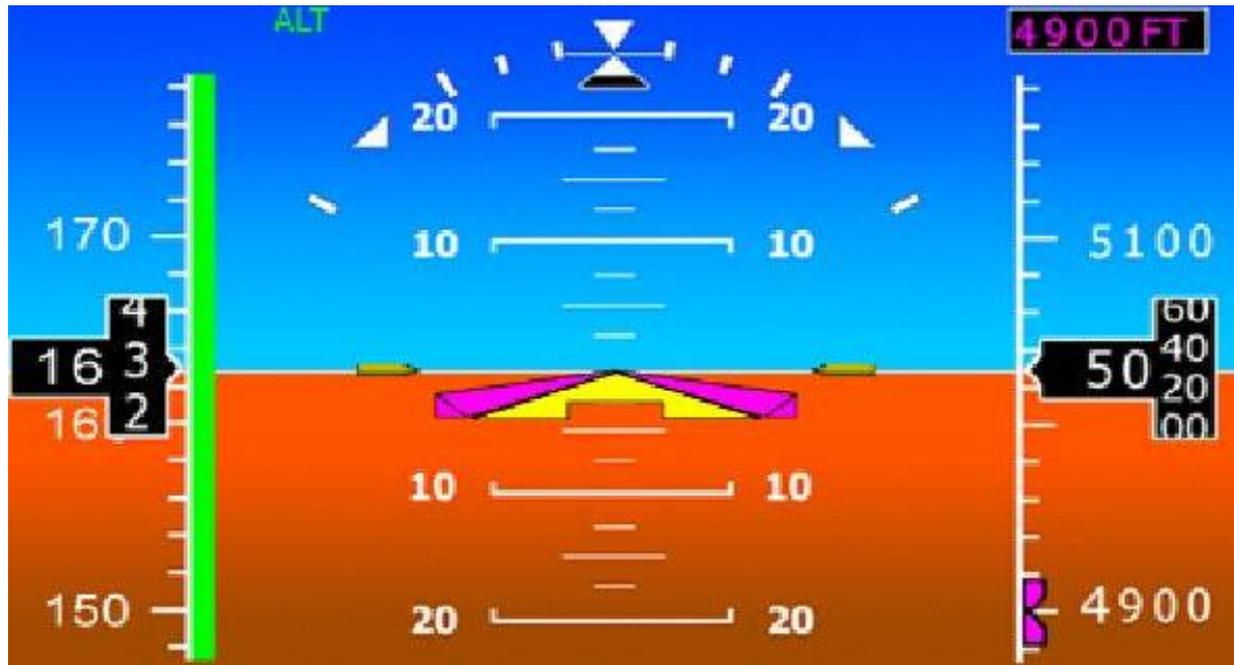
# ADI Symbology

## ► Attitude Indicator

- **Yellow Wedge** – aircraft reference
  - **Magenta Command Bars** shown w/ Flight Director Equipped AC's and AP ENGAGED.
- **Bank Scale**
  - 0°, 10°, 20°, 30°, 45° , and 60°
- **Pitch Scale**
  - Graduations every 2.5° within  $\pm 20^\circ$
  - Graduation every 5° for pitch  $+30^\circ / -20^\circ$



# ADI Symbology

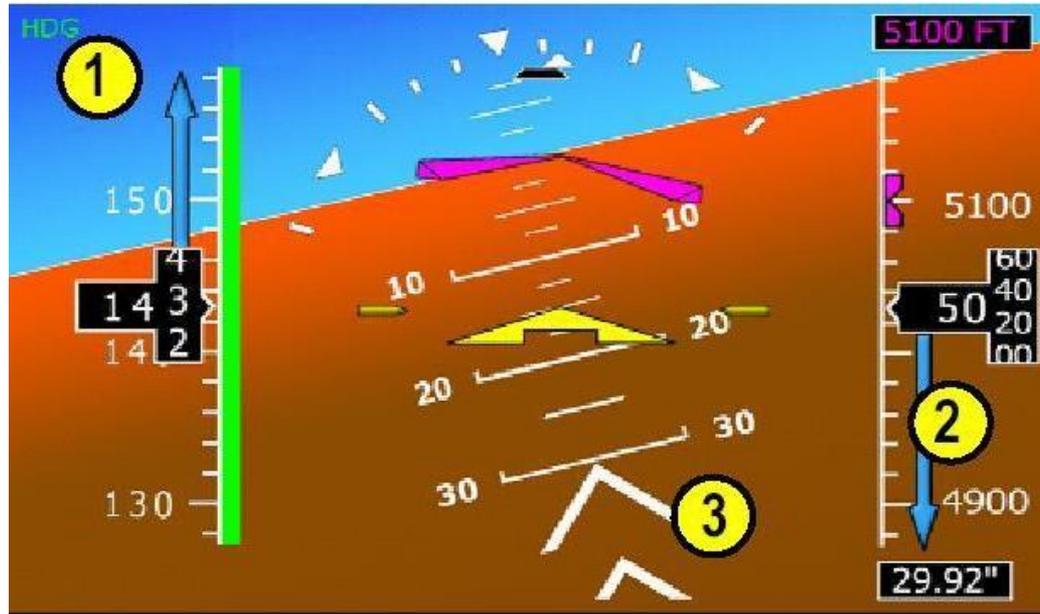


Level flight may be obtained by placing the apex of the aircraft reference symbol (“**yellow wedge**”) on the horizon line in cruise conditions of 6000’ MSL at 160 KIAS.



The pitch angle for level flight will vary with flight conditions, depending on speed, altitude and weight. There is no manual adjust capability (i.e. parallax adjust.)

# Trend Indicators



- **1** Airspeed Trend Arrow depicted as a **Blue** band.  
Visible when airspeed changes at a rate greater than .8 knots / second.  
Indicates where the airspeed is predicted to be in 6 seconds.
- **2** Altitude Trend Arrow depicted as a **Blue** band.  
Indicates where the altitude is predicted to be in 6 seconds (changes in altitude greater than 240 feet / min). An arrowhead indicates a value beyond the current tape field of view.
- **3** Excessive Pitch Chevrons  
Appear at +50° / -30° pitch angles  
±90° pitch attitudes small circles appear



# Symbology

## ▶ Compass Rose

- Heading digitally represented at top of heading indicator

## ▶ Heading Bug

- Digitally displayed adjacent to “HDG Bug” line select key
- Magenta Bug displayed over compass rose
- Pushing in the right hand knob will Sync the heading bug to current heading.



# Symbology

## ▶ Altitude Tape

- +200 /- 220 feet from current altitude shown
- 20 foot graduations ticks
- -1000 to 25,000 foot scale

## ▶ Altitude Pre-select

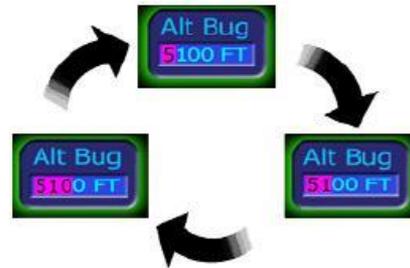
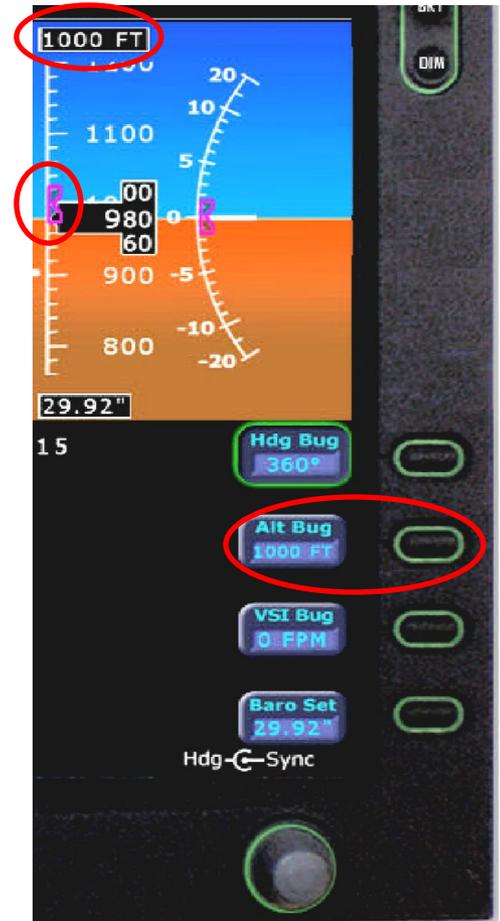
- Digital display at top of altitude tape.
- When the selected value is outside the current altimeter field of view, the bug is positioned at the appropriate end of the tape and remains in partial view.



# Symbology

**Altitude Bug Button (Alt Bug)-** When selected, allows the right knob to control the position of the altitude bug and the autopilot altitude pre-select value. The range of values is the same as the altitude tape.

The Alt Bug has three resolution setting modes: 1,000 ft, 100 ft, and 10 ft. The default adjustment position is at the 1,000 ft mode and each button press steps the adjustment position down one place. The selected numeric value appears in the button and in the Altitude Pre-select window on top of the altitude tape.



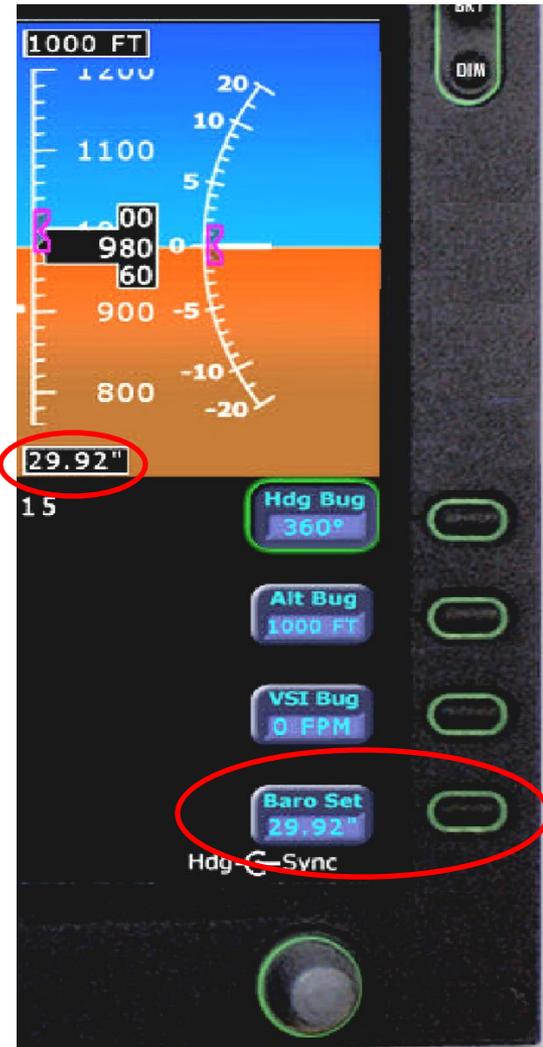
# Symbology

## Barometric Correction Setting Button

**(Baro Set)**- When selected, allows the right knob to control the value of the barometric correction setting. The range of allowable values is 27.50" to 31.50".

The selected value appears in the button label and in the Barometric Correction Setting window.

Pushing in the right hand knob will Sync the altimeter setting to 29.92"

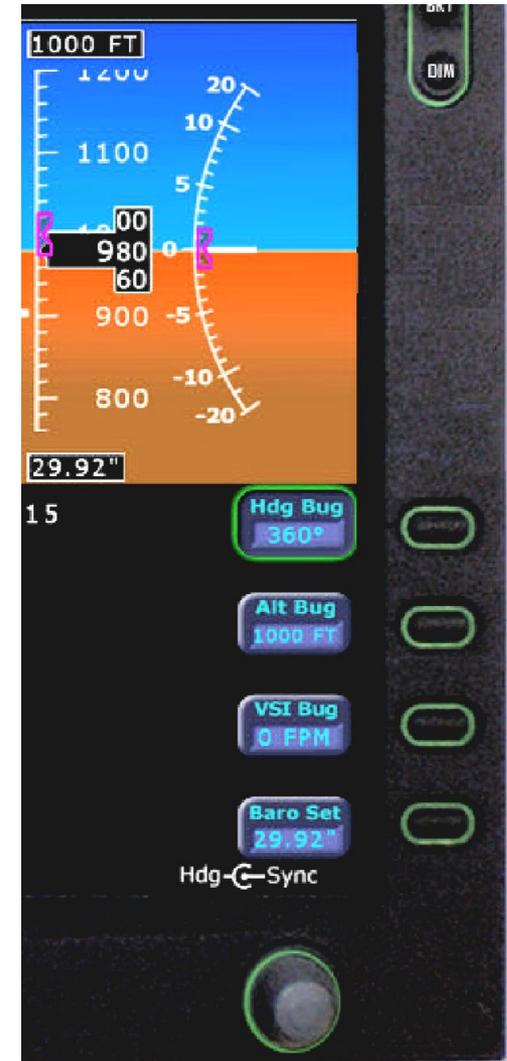
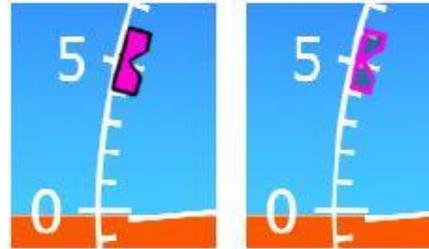


\* Note: The Baro setting and bug settings are saved across power cycles starting with Software 530-00123-000 Rev 01 and higher.



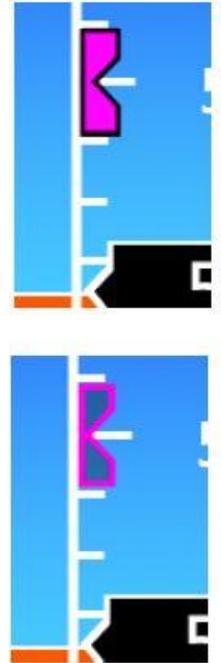
# Symbology

- ▶ **Vertical Speed Indicator**
  - Analog presentation between +2000 & -2000 fpm
  - Digital presentation in excess of 2000 fpm on the top or bottom of the VSI arc.
- ▶ **Vertical Speed Preselect**
  - **Magenta Bug** displayed between +/- 1600 fpm
  - Digital presentation adjacent to “VSI Bug” line select key
  - Pushing in the right hand knob will Sync the VSI bug within 50FPM of current vertical speed.



# Symbology

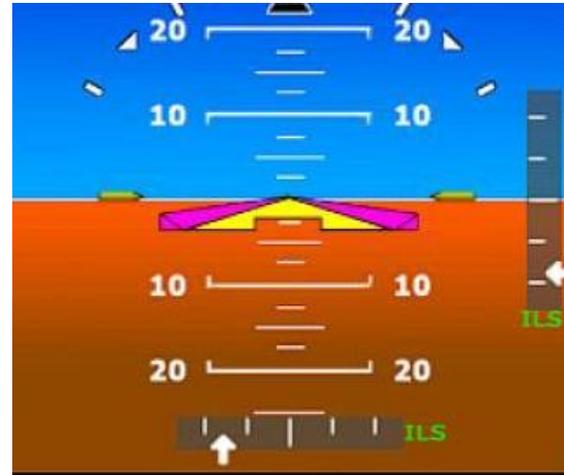
- ▶ A solid **Magenta** Heading, Altitude, or VSI (55X only) bug indicates that the function is currently coupled to an active mode of the autopilot. A hollow **Magenta** bug indicates that the function is not currently coupled to the autopilot in an active mode. In other words, a hollow bug indicates manual or “hand-flying” status.



# Symbology

## ► Navigation selection

- Active source selection cycled using “Nav” line select key
- Available sources:
  - GPS 1
  - VLOC 1
  - GPS 2
  - VLOC 2
- Displayed as **Green** needle on heading indicator
- HDI Localizer and glideslope indicators are displayed adjacent to pitch ladder.



# Symbology

## ► Bearing selection

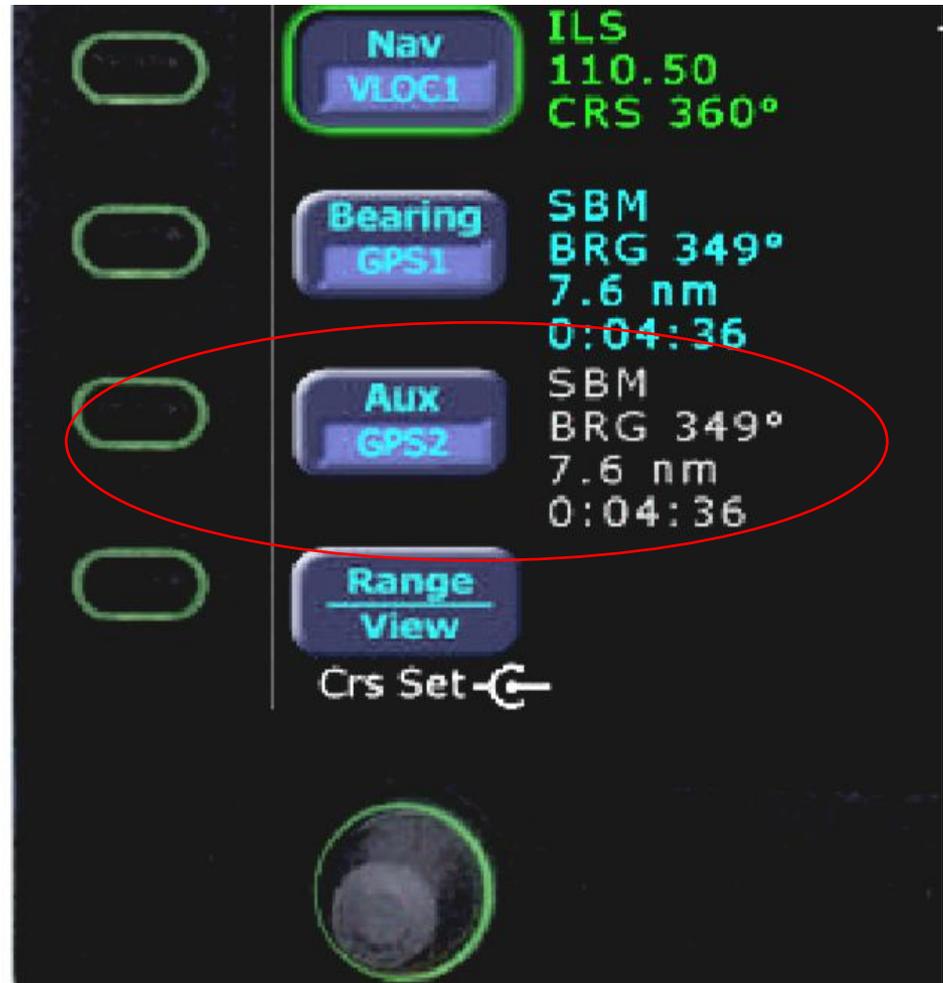
- Data source cycled using “Bearing” line select key
- Available sources:
  - GPS 1
  - VLOC 1
  - GPS 2
  - VLOC 2
- Displayed as **Blue** double-barbed needle on heading indicator
- Acts as a RMI, a course can not be set



# Symbology

## ▶ Aux selection

- Data source cycled using “Aux” line select key
- Displayed digitally adjacent to “Aux” status indicator
  - Includes Bearing to
  - Distance & time to active waypoint show up only with a GPS waypoint
- No needle representation on HSI



# Symbology

## ► Range / View selection

When selected, the **1** Range/View button allows the left knob to control the HSI's moving map range and view.

Pushing the left knob will cycle the HSI through the four HSI views.

### • Available views:

- 360° w/ Moving Map
- 360° w/o Moving Map
- 120° w/ Moving Map
- 120° w/o Moving Map



# Symbology

## ▶ 1 Range / View selection

Turning the left knob will change the HSI moving map range (when in view).

Only two of the four allowable modes will contain a moving map depiction.

- **Available ranges:**

- 2 NM
- 5 NM
- 10 NM
- 20 NM
- 50 NM
- 100 NM
- 200 NM



# Symbology

## Wind Vector

- Shows current wind in knots & direction
- GPS 1 or 2 Derived depending on NAV source selected

## Projected Ground Track

- Shows your current ground track
- GPS 1 or 2 Derived depending on NAV source selected





# Flight Director System

- ▶ In flight director equipped aircraft, when a horizontal and a vertical mode of the autopilot is being used, a set of flight director command bars will indicate the required steering of the aircraft to achieve the commanded tracking from the autopilot.



# Flight Director Modes

- ▶ The flight director is a display of the flight profile commanded from the autopilot.

In the Cirrus installation, a remote switch on the instrument panel allows the control of the autopilot modes between autopilot “AP”, and flight director “FD”.

“FD” mode is a manual mode in which the pilot is expected to manually fly toward the **Green** “Command Bars”.

- ▶ The flight director command bars are limited to  $\pm 30^\circ$  in roll and  $\pm 15^\circ$  in pitch.



NOTE: A small amount of jitter of the command bars in FD mode is considered normal.

# Flight Director System

## Remote Panel Switches

The two lighted push-buttons installed on the upper, LH side of the instrument panel next to the PFD. The remaining portion of the Flight Director system is entirely software dependant.



# Flight Director System

- ▶ In flight director only mode, “**FD**” will be displayed in the autopilot annunciation field, the command bars will be visible and **Green**, and the pilot is expected to actuate the flight controls as required to track the command bars.



# Flight Director System

- ▶ In autopilot mode, “**AP**” will be in the autopilot annunciation field, the command bars will be visible and **Magenta** and the aircraft should track the bars.

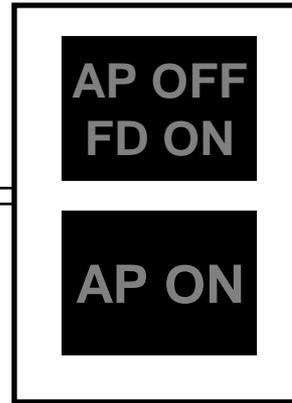


# Flight Director On Startup

AP RDY



Remote Panel  
Push Switches



Autopilot /  
Flight Director



Autopilot  
Pitch  
Trim Servos

Autopilot  
Roll  
Trim Servos

Aircraft Start up is shown, the Autopilot is Ready to go but is not Active. The Flight Director Command Bars will not be displayed.



# Autopilot ON and Activated

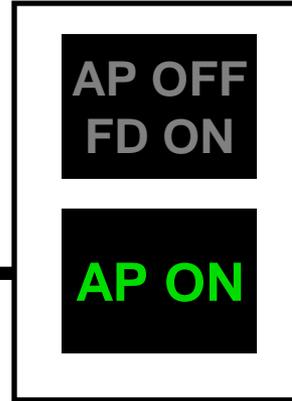
**HDG or NAV**

**ALT VS AP**



Auto pilot Mode Annunciators are shown on top of PFD Screen.

Remote Panel Push Switches



Autopilot / Flight Director



Servos are Active and in use by autopilot

Autopilot Pitch Trim Servos

Autopilot Roll Trim Servos



Autopilot was turned on by pressing the HDG and VS or ALT buttons on the Autopilot display to activate.

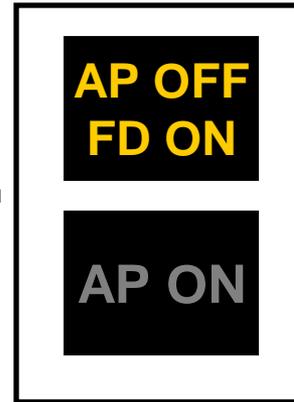
# Flight Director Only Mode

HDG or NAV

ALT VS FD



Remote Switch



Autopilot / Flight Director



Servos are NOT in use by the autopilot.

Autopilot Pitch Trim Servos

Autopilot Roll Trim Servos

Flight Director Command Bars may be turned on by following the previous steps and then pressing the AP OFF/FD ON panel switch



# PFD Initialization



# Initialization Software Revision *530-00123-000-REV05 & Above*

- ▶ The Initialization screen displays immediately after power is turned on.
- ▶ The first initialization box is displayed for 30 seconds in normal alignments. It is imperative to remain stationary during that time.
- ▶ The third line, **OK TO TAXI IN X SECONDS**, indicates when it is permissible to taxi while the system is still aligning.
- ▶ Air data (airspeed, altitude, vertical speed) will become valid prior to attitude data.



*\* NOTE: For faster alignments (3 minutes recommended Rev 05 PFD or above), it is recommended that the aircraft not be moved until alignment is complete. The OK TO TAXI screen is provided for increased flexibility during ground operations, but it may extend alignment time.*



# Initialization Software Revision *530-00123-000-REV05 & Above*

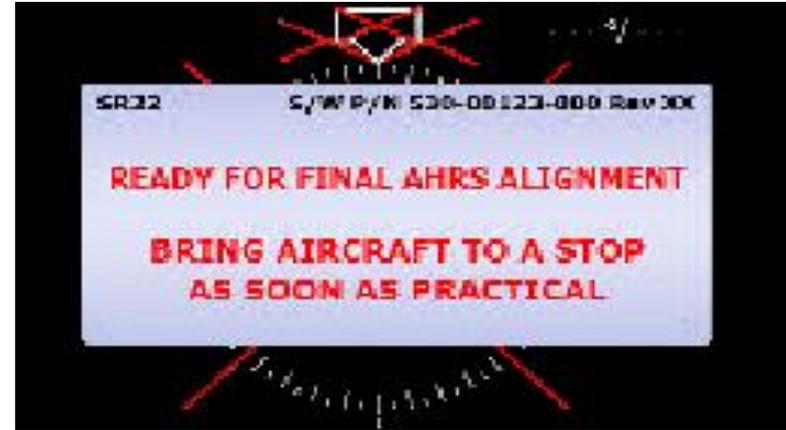
- ▶ At the completion of that 30 second period, the following message is displayed.
- ▶ This display will be up for approximately 90 seconds during which movement is acceptable.
- ▶ Movement beyond that 90 second window will extend overall warm-up duration.



\* Note that the overall software version number is listed in the box as is the aircraft that the V-speeds are set up for.

# Initialization Software Revision 530-00123-000-REV05 & Above

- ▶ When the system is approaching its final alignment phase, the message changes to indicate that the pilot should bring the aircraft to a stop as soon as it is practical.\*
- ▶ **Final AHRS Alignment** screen will change to show a 40 second count down timer
- ▶ Typical total alignment time is 3 minutes but may take longer if the aircraft is subjected to forward motion at this time.



\*Note: The **Ready for Final AHRS Alignment** screen will be presented for several seconds, even if and after the aircraft is stationary.

# Initialization Software Revision *530-00123-000-REV05 & Above*

- In the event that the AHRS is unable to complete its alignment, the following display is presented.
- If this occurs, wait approximately an extra 2 minutes in this state.
- If the system picks back up on the alignment, a normal PFD will result.
- If the display does not clear itself, contact a service center and provide the displayed error code.



# Initialization Software Revision *530-00123-000-REV05 & Above*

## ► Default configuration:

- **HDG Bug:** The value just prior to previous shutdown.
- **Altitude Bug:** The value just prior to previous shutdown.
- **Altitude Bug Mode:** Set to Thousands mode
- **VSI Bug:** The value just prior to previous shutdown.
- **Baro Set:** The value just prior to previous shutdown.
- **Nav:** GPS 1
- **Bearing Pointer:** Off
- **Aux:** Off
- **View:** 360° Compass Rose w/ Moving Map
- **Range:** set at 10nm



# Initialization all revisions

- ▶ Until a flight plan is activated in GPS/Nav 1, the HSI will show a red “X” in place of the CDI.
- ▶ Or a valid navigation signal is detected in VLOC mode.





# ILS Procedures

- ▶ To perform an Autopilot-Coupled Approach, ensure the approach has been loaded and activated in the Garmin 1 GPS unit and that selected Nav source is VLOC 1. Verify that the correct final approach course and frequency is selected in the primary Nav source box.
- ▶ At that point, the NAV button on the autopilot control head should be pressed to activate Nav mode. The autopilot will intercept the inbound course at a 45 degree angle.

The APR button on the Autopilot control head can be pressed to activate the automatic glideslope capture capability if ALT (altitude) holding mode is on. The autopilot will then track the glideslope and localizer.

- ▶ It is recommended that the altitude bug be set to the published approach decision height to serve as a visual reference during the approach.
- ▶ Verify that the correct baro setting is entered in both the PFD and the standby altimeter and that they indicate the approximately the same altitude.



# LOC BC Procedures

- ▶ To perform an Autopilot-Coupled LOC BC Approach, ensure the approach has been loaded and activated in the Garmin 1 GPS unit and that selected Primary Nav source is VLOC 1.

Using the PFD Course Knob, reset the final approach course to the Front Course value and make sure the correct frequency is selected. The PFD will automatically detect if it is on the localizer back course, the HDI source label indicates “LOC BCRS” and both the HDI and CDI will display correct sensing.

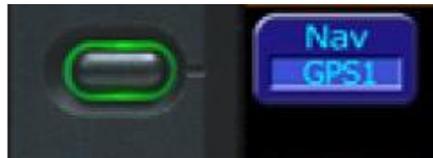
The REV button on the autopilot control head should be pressed to activate REV mode. The autopilot will intercept the LOC BC course (the back course of the localizer) at a 45 degree angle.

- ▶ It is recommended that the altitude bug be set to the published Minimum Decent Altitude to serve as a visual reference during the approach.
- ▶ Verify that the correct baro setting is entered in both the PFD and the standby altimeter and that they indicate the approximately the same altitude.



# Enroute Navigation

- ▶ Press the NAV button on the autopilot control head twice to engage GPSS mode. The autopilot will then begin tracking the GPS steering commands from the primary nav source in PFD (can be from GPS 1 or 2) .



The autopilot control head and the PFD will indicate “GPSS”. GPSS mode is the recommended navigation mode during autopilot operations due to increased accuracy.

- ▶ GPSS mode must not be used on the final approach segment of a VLOC approach (ILS, LOC or non-GPS-overlay VOR). GPSS mode must be deselected (NAV or APR mode selected) prior to the turn onto the final approach course.



# GPSS

## CAUTION

If a VLOC is selected in NAV on the PFD and GPSS mode is engaged on the autopilot, the autopilot will track the active flight plan in GPS1 if VLOC1 is selected or GPS2 if VLOC2 is selected and not track VLOC1 or VLOC2 as the selected source in NAV on the PFD.

Therefore the course deviation on the PFD CDI and the course deviation flown by the autopilot can be different. This situation may be confusing and should be avoided. During this condition, the normally green “**GPSS**” annunciation on the PFD screen changes to

**GPSS**

an amber to alert the pilot to this condition.



# Altitude Preselect

## CAUTION

If an altitude capture is attempted to a target altitude above current aircraft altitude and a negative value has been set in the VSI Bug, the system will not proceed with the altitude capture but will transition into altitude hold mode instead. The same is true for target altitudes below current aircraft altitude but positive values set in the VSI Bug.



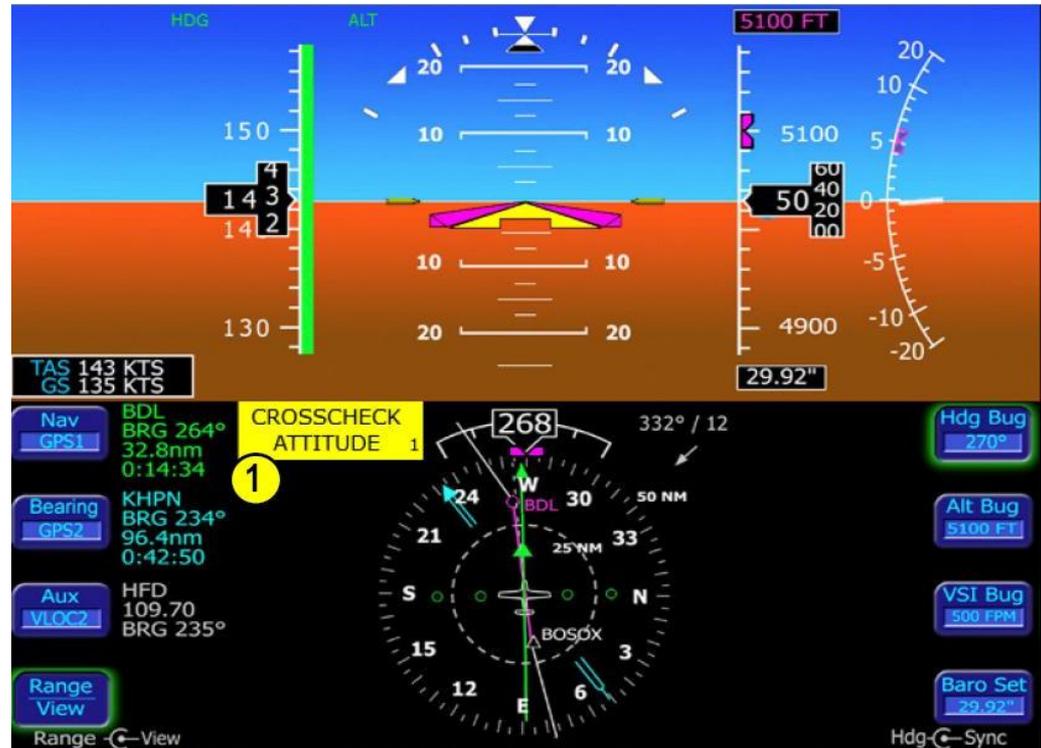
# Invalid Sensor Data

- ▶ **Cross Check Attitude**
- ▶ **Air Data Failure**
- ▶ **Heading Reference Failure**



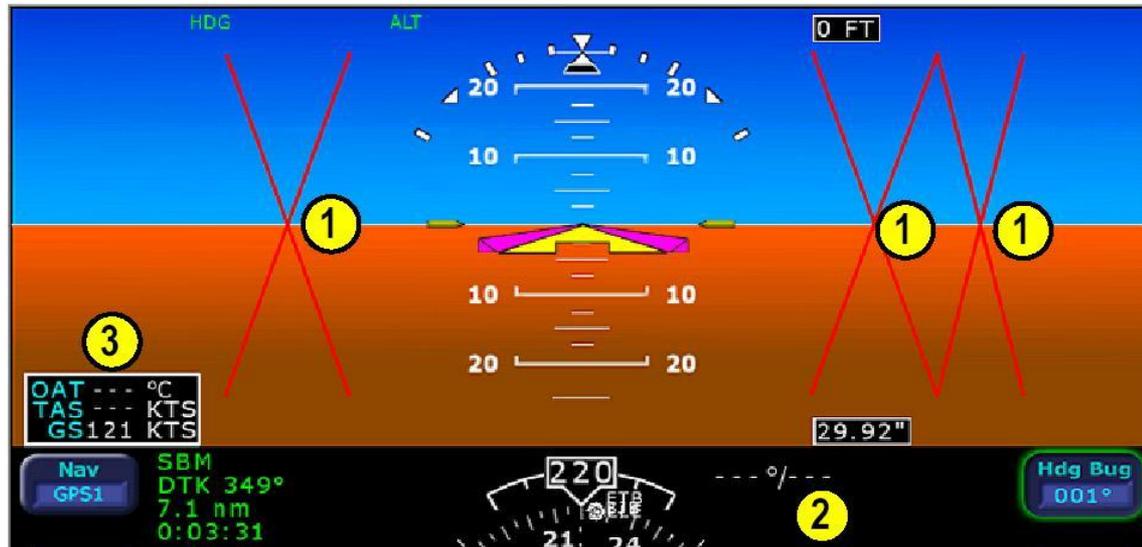
# \* Cross Check Attitude

- The pilot should scan standby instruments
- The warning message is automatically removed when the self-check monitor confirms the PFD attitude is valid.



# \*Air Data Failure

- ▶ **1 Air Data Failure**
  - Shown by **Red X's**
  - Airspeed, Altimeter and VSI disappear
- ▶ Refer to standby Airspeed Indicator and Altimeter
- ▶ Autopilot Altitude Pre-select function will not work.



\* Note OAT and TAS (3) will be replaced by dashes along with wind speed and direction (2).



# Air Data Failure Procedure

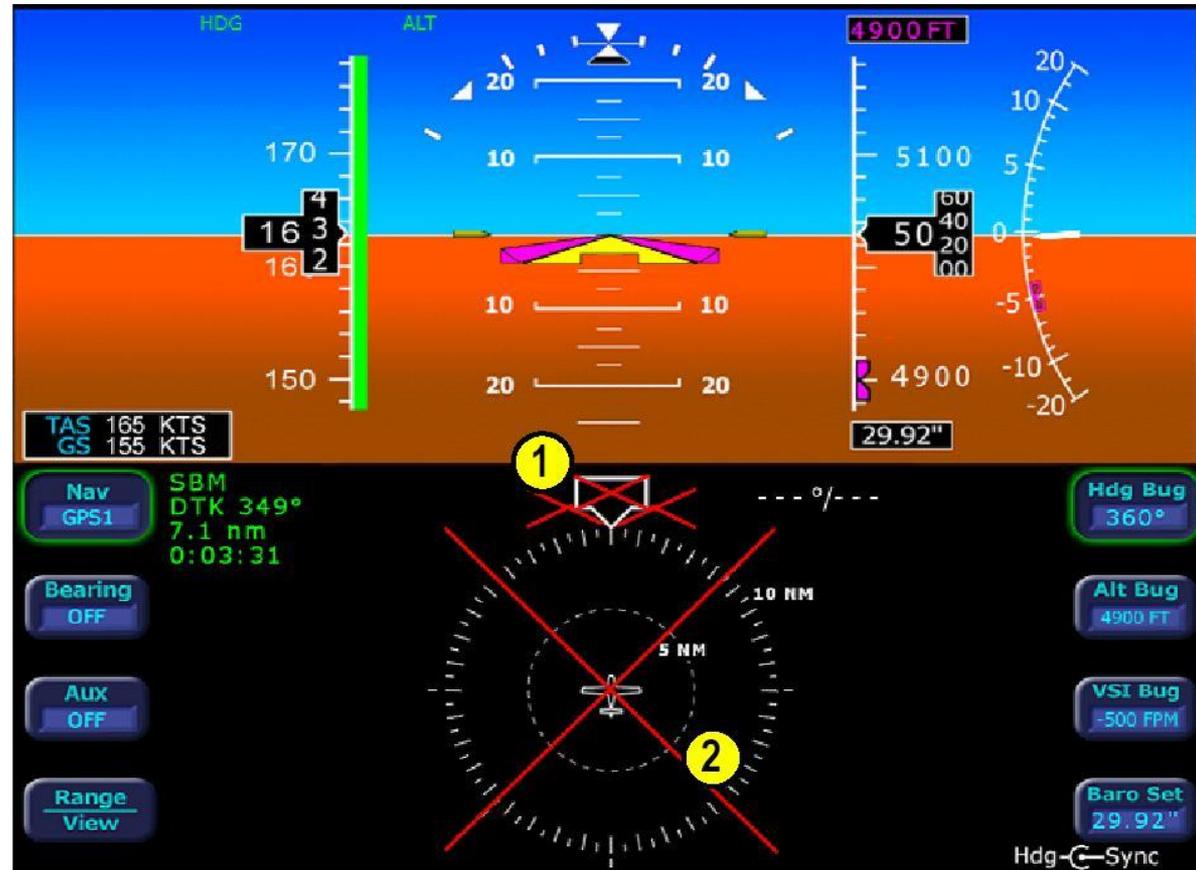
- ▶ **If this occurs, revert to the mechanical backup airspeed indicator and altimeter. Cross referencing the PFD attitude to the backup ADI is recommended during flight with invalid air data.**
- ▶ **When air data is determined to be valid, the display of air data will be restored.**
- ▶ **Select Alternate Static Source.**



# Heading Reference Failure

## Inoperable

1. Heading Indicator
  2. HSI
- Heading Bug  
Rate of Turn Indicator  
Moving Map Feature



MFD will switch to Display GPS Ground Track automatically with Software 530-00123-000 rev 5 and above

TAWS will be Inoperable

Sky watch will work on MFD will Software 530-00123-000 rev 5 and Garmin Skywatch and Stormscope pages will automatically switch to TRK ( Ground Track mode)

# PFD Recoverable Failure & Warmstart Recovery



# \*Recoverable Attitude Data Failure

## Failure

In the unlikely event of a recoverable attitude data failure, all normal button labels will be removed and:

1. Attitude data will be removed from the display and replaced with a red “X” and;
2. An “**Attitude Fail - Refer to backup gauges**” message will be displayed and;
3. A “**Fast Erect**” button label and message will be displayed;
4. When the “**Fast Erect**” button is pressed, the message will change to “**Maintain straight and level flight**” until the 10 second count-down timer expires. At that point, all attitude data will be restored.



Use the backup instruments and/or outside visual references to obtain straight and level conditions.

It is imperative that straight and level flight is obtained prior to pressing the “**Fast Erect**” button.



# Warmstart Recovery

Software **530-00159-000 Rev 00** or higher:

The PFD is capable of performing a Warmstart (Quick Restart) from a fully aligned condition when subjected to a power loss of less than 20 seconds.

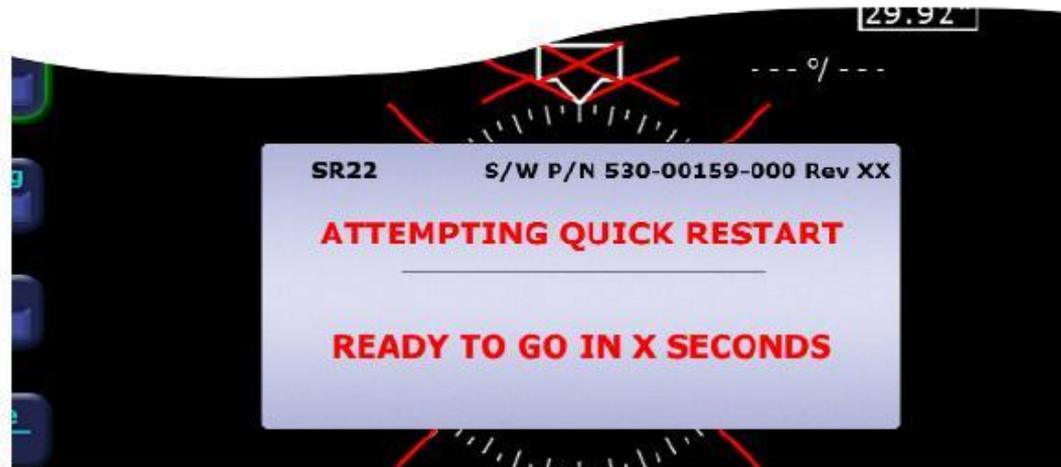
In this event, the **“PLEASE STANDBY”** message in the warmup box is displayed for approximately 2 seconds followed by the **“ATTEMPTING QUICK RESTART ---”** message and its countdown.

There is no requirement to limit dynamic maneuvering during this warmstart attempt.

***Note: 2 warmstart attempts in a row without a successful alignment between attempts will result in a full alignment attempt.***



# Warmstart Recovery



# \*Recoverable AHRS Failure

- USE Standby Instruments
- If in IMC proceed to nearest VFR conditions do not re-enter IMC



# \* AHRS Failure

1. Attitude data will be removed from the display;
2. An “Attitude Fail - Refer to Backup Gauges” message will be displayed;
3. Wind vector data will be removed from the display;
4. Heading data will be removed from the display and;
5. HSI navigation data will be removed from the display.
6. It **MAY BE POSSIBLE** to recover from this failed attitude condition by pulling both PFD circuit breakers for less than 20 seconds. This will initiate a warmstart as described earlier.

*Use back-up instruments for attitude and heading for the remainder of the flight.*

*During IFR flights, proceed to the nearest VMC conditions and do not re-enter IMC.*

*Consider using the autopilot to reduce workload. Use GPSS mode to maintain flight plan route, when equipped with a System 55X.*



# Non-recoverable Failures



# Non-recoverable Failures

- ▶ **Lamp or LCD failure**
  - Bezel Keys are lit, no display screen
  - Check Brightness Controls
- ▶ **With the PFD circuit breakers pulled, autopilot lateral control is available in GPSS steering mode through GPS 1 and autopilot vertical control is available through the Vertical Speed (VS) and Altitude (ALT) modes on the autopilot display head.**



# Limitations

1. The PFD integrates with separately approved sensor installations. Adherence to limitations in appropriate installation POH supplements is mandatory.
2. The Avidyne FlightMax Entegra-Series PFD Pilot's Guide, P/N 600-00081-000, Revision 03, or latest revision, must be available to the pilot during all flight operations.
3. Flight under Instrument Flight Rules (IFR) is not permitted with the PFD or any standby indicator (attitude indicator or magnetic compass) inoperative. *Refer to Kinds of Operation Equipment List.*

• **Note** •

***The Avidyne PFD software version is displayed on the PFD during system startup.***

4. *Serials 0002 and subsequent before installation of PFD software version 530-00123-XXX-REV05 (where X can be any digit from 0 to 9)*

**Backcourse approaches are prohibited.**



# Limitations

***When the PFD is coupled with the Autopilot System, the following Limitations apply:***

5. Autopilot operation is prohibited above 185 KIAS.
6. The autopilot must not be engaged for takeoff or landing.
7. The autopilot must be disengaged for missed approach, go-around, and bailed landing.
8. Flaps must be set to 50% for autopilot operation in Altitude Hold at airspeeds below 95 KIAS.
9. Flap deflection is limited to 50% during autopilot operations.
10. The autopilot must be disconnected in moderate or severe turbulence.
11. Minimum engage height for the autopilot is 400 ft AGL.



# Limitations

## • WARNING •

***Autopilot may not be able to maintain all selectable vertical speeds. Selecting a vertical speed that exceeds the aircraft's available performance may cause the aircraft to stall.***

12. Minimum speed with the autopilot engaged is 1.2Vs for the given configuration.

***For VOR/GPS and ILS glideslope and localizer intercept, capture, and tracking, the following limitations apply:***

- a. The autopilot must be disengaged no later than 100 feet below the Minimum Descent Altitude
- b. The autopilot must be disconnect during approach if course deviation exceeds 50%. The approach should only be continued by “hand-flying” the airplane.
- c. The autopilot must be disengaged at the Decision Height.
- d. 12 knot maximum crosswind component between the missed approach point and outer marker.
- e. The intercept of the localizer shall occur at least 5 miles outside of the outer marker.



# Limitations

- f. If the crosswind component is greater than 12 knots and less than 17 knots, the intercept shall occur at least 10 miles outside of the outer marker.
- g. The intercept angle shall be no greater than a 45-degree intercept.
- h. The ILS is flown at normal approach speeds, and within any STC or TC speed constraints and as defined in this flight manual.
- i. The flaps should be extended in the approach configuration prior to the Outer Marker. No further changes in the flap configuration should be made throughout the autopilot coupled approach.
- j. The glideslope is approached in such a manner to allow automatic arming of the glideslope, or if the glideslope is manually armed no more than 15% above the glideslope.

