SkyView

Pilot's User Guide

This product is not approved for installation in type certificated aircraft

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For use with firmware version 3.0

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Revision History

Revision	Revision Date	Description
A	December 2009	Initial release
B	March 2010	Document number changed to 101321-001. Minor style, grammar, and cross reference changes and corrections. Added information regarding autopilot servos in applicable sections. Addressed screen synchronization in applicable sections. SV-D700 and SV-D1000 Operation Chapter updates: • Added the Menu Navigation Section • Clarified the How to Turn the System On or Off Section • Expanded the How to Manually Adjust the Backlight Brightness or Dim Level Section • Expanded the How to Enter the Joystick Function Menu Section • Added the How to Check Installed Database Statuses Section • Added the How to Configure the Top Bar Section PFD Operation Chapter updates: • Added the ADAHRS Source Section • Added the GPS Source Section • Added “push to synchronize” instructions for applicable bugs Moving Map Operation Chapter updates: • Added an important note regarding Moving Map requirements • Added the GPS Source Section • Added the Terrain Data Section • Added the Aviation Data Section Corrected the Onscreen Alerts Section in the Alerts Chapter.

Revision	Revision Date	Description
C	May 2010	Document number changed to 101321-002. Minor style and grammar changes and corrections. Updated the guide to include HSI operation information. Updated the guide to include Autopilot operation information. Updated the guide with more Moving Map content.
D	June 2010	Document number changed to 101321-003. Clarified intended use of Synthetic Vision. Added information about synthetic vision depictions of runways and obstacles. Added EMS menu, lean mode, engine timers, and fuel computer information. Clarified map Magnetic North pointer. Added navigation mapping software information. Added Trial Navigation Mapping Software information and operation instructions. Added external alarm light behavior.
E	October 2010	Added information about User Waypoint power user feature that is fully documented on wiki web page. Added information about menu changes that may be present in SLSA and other aircraft that SkyView is integrated into as an OEM component. Added transponder operation information and specifications. Added traffic display information for both MAP and PFD pages. Added a better description of the combined EGT/CHT gauge. Added Synthetic Vision licensing information. Added Navigation Mapping Software Licensing and updated operation information.

Revision	Revision Date	Description
G	March 2011	Revision F skipped to obtain version parity between Installation Guide and Pilot's User Guide. Added description of GPS Steering control of Autopilot. Pitch Trim Indicator behavior and performance expectations clarified. Added servo weights. Added product registration information. Described improved loss of external power with backup battery connected behavior. Added information about G meter. Added information about new/improved Navigation Mapping Software purchase, licensing, and operation.

Table 1–SkyView Pilot's User Guide Revision History

Table of Contents

1. Introduction

Thank you for purchasing the Dynon Avionics SkyView system. This chapter provides some important cautionary information and general usage instructions for this guide.

The printed version of this guide is in grayscale. Some figures and diagrams contain important color information. Reference the electronic version of this guide to view it in color.

Before You Fly

We strongly recommended that you read this entire guide before attempting to use SkyView in an actual flying situation. Additionally, we encourage you to spend time on the ground familiarizing yourself with the operation of the system. While first learning to use the system in the air, we recommend you have a backup pilot with you in the aircraft. Finally, we encourage you to keep this guide in the aircraft with you at all times. This document is designed to give you quick access to information that might be needed in flight. *In a flying situation, it is the pilot's responsibility to use the system and the guide prudently.*

Warning

Dynon Avionics' products incorporate a variety of precise, sensitive electronics. SkyView products do not contain any field/user-serviceable parts. Units found to have been taken apart may not be eligible for repair under warranty. Additionally, once a Dynon Avionics unit is opened up, it is not considered airworthy and must be serviced at the factory.

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Please take a moment to register your Dynon Avionics SkyView system at register.dynonavionics.com. Registering your products with Dynon ensures that your contact information is up-to-date. This helps verify product ownership and can expedite warranty claims. You can also optionally sign up to receive other Dynon news and product announcements. Dynon will not share your contact information with third parties or send you announcements without your explicit consent.

About this Guide

This guide helps you configure and get acquainted with SkyView's many functions and facilitates quick access to vital information. For detailed technical and installation information, refer to the SkyView System Installation Guide.

In the electronic (.PDF) version of this guide, page and section references in the Table of Contents and elsewhere act as hyperlinks taking you to the relevant location in the guide. The latest electronic version (.PDF) of this guide may be downloaded from our website at docs.dynonavionics.com.

This guide discusses the most common operation scenarios. If you have an operational issue that is not discussed in this guide, you can find additional operational information on Dynon's internet sites:

- wiki.dynonavionics.com–Dynon's Documentation Wiki provides enhanced, extended, frequently updated online documentation contributed by Dynon employees and customers.
- forum.dynonavionics.com–Dynon's Online Customer Forum is a resource for Dynon Avionics customers to discuss installation and operational issues relating to Dynon Avionics products. The Forum is especially useful for pilots with uncommon aircraft or unusual installation issues. For customers that cannot call Dynon Technical Support during our normal business hours, the Forum is a convenient way to interact with Dynon Avionics Technical Support. The Forum allows online sharing of wiring diagrams, photos, and other types of electronic files.

The following icon is used in this guide.

This icon denotes information that merits special attention.

2. System Overview

This chapter provides a general overview of the various parts of SkyView as well as a theory of operation. The information in this chapter serves as a reference only and helps familiarize you with the inner workings of the units. It should not be used for diagnostic or reparative work.

Dynon Avionics provides periodic firmware updates that enable new functionality. Use the contact information mentioned earlier in this guide as resources for staying current on firmware availability for SkyView equipment. Reference the SkyView System Installation Guide for instructions on how to update firmware on SkyView equipment.

SV-D700 and SV-D1000

This guide refers to the SV-D700 and SV-D1000 as displays.

Functions

SkyView displays can act as a Primary Flight Display (PFD) with Synthetic Vision, an Engine Monitoring System (EMS), and a Moving Map in a variety of customizable screen layouts. All data is sourced from other modules on its SkyView network. Subsequent chapters in this guide address PFD, EMS, and Moving Map functions in more detail.

Power

SkyView displays require between 10 and 30 volts DC for operation. Approximate current consumption of a SkyView system at 12 and 24 volts DC is 3.5 amps and 1.8 amps, respectively. It is acceptable to have SkyView turned on during engine start.

The current draw figures provided do not include autopilot servo power draw as they receive power directly from the aircraft and not from SkyView. Be sure to include servo power requirements when considering your overall power budget.

Each SkyView display supports an optional external SV-BAT-320 Backup Battery. When connected, the battery's charge level is automatically managed by the display. This ensures that SkyView has a fully charged backup battery in case of emergency. Reference the SkyView System Installation Guide for more details regarding current consumption while charging a backup battery.

A battery is fully charged when it reaches 12.25 volts and should power a typical SkyView system for at least 60 minutes. If SkyView has switched to the backup battery due to a power loss in your aircraft, it is advised that you land as soon as possible.

Serial I/O

SkyView displays have five RS-232 serial ports for connection to compatible equipment. All serial ports are wired into the SkyView Display Harness (SV-HARNESS-D37). All serial ports have configurable baud rates and data formats for use as general purpose inputs and outputs.

USB

SkyView displays have three USB ports. Two are built into the back of the display and one is wired into the SkyView Display Harness for convenience. USB ports are used for firmware updates and backups, database updates, and configuration file uploads and downloads. Each SkyView display ships with a USB flash drive for use in these instances. Reference the SkyView System Installation Guide for instructions on how to use the USB ports for the operations mentioned above.

Display

The SV-D700 display is a 7-inch, 800 by 480 pixel, 1200+ nit TFT active matrix LCD screen. The SV-D1000 display is a 10.2-inch, 1024 by 600 pixel, 1350+ nit TFT active matrix LCD screen. SkyView displays utilize LED backlighting technology for increased lifespan, more uniform brightness, superior dimmability, and reduced power consumption.

Displays are capable of automatic screen backlight level management. Reference the SkyView System Installation Guide for instructions on how to enable this feature.

Joysticks and Buttons

User interaction takes place via the two joysticks and eight buttons along the bottom of the display's bezel.

Additional Functionality

SkyView displays have four discrete inputs and left and right audio outputs. These features are not supported in the current release of SkyView, but will be supported in a future firmware release.

SV-ADAHRS-20X

This guide uses SV-ADAHRS-20X to refer to both the SV-ADAHRS-200 and the SV-ADAHRS-201. The SV-ADAHRS-200 and SV-ADAHRS-201 are identical in performance and are designed to work together as a redundant ADAHRS solution. An SV-ADAHRS-200 must be installed in your SkyView system in order to use an SV-ADAHRS-201.

The primary flight instruments on your SkyView PFD are generated using a group of calibrated sensors built into the SV-ADAHRS-20X ADAHRS module. All sensors are solid state–that is, there are no moving parts. These sensors include accelerometers, which measure forces in all three directions; rotational rate sensors, which sense rotation about all three axes; pressure transducers for measuring air data; and magnetometers on all three axes for measuring magnetic heading. These sensors form the core of Dynon's Air Data Attitude and Heading Reference System (ADAHRS).

Table 2 describes which inputs and sensors are used within the ADAHRS module to generate the different displayed instruments.

	GPS*	Pitot	Static	AOA	Magnetometers	Rate Sensors	Accelerometers
Ball							✓
Altitude			✓				
Airspeed		✓	✓				
AOA		✓		✓			
Turn Rate	✓	✓	✓			✓	✓
Heading	✓	✓	✓		✓	✓	✓
Attitude	✓	✓	✓			✓	✓

Table 2–Instruments and Sensors (*GPS only used when airspeed from pitot and static is not available)

Attitude Calculation

The SkyView artificial horizon display (attitude) is generated via a complex algorithm using a multitude of sensors as described in Table 2. In normal operation SkyView uses airspeed to provide superior attitude accuracy.

GPS Assist

In the event of airspeed loss (due to icing or other blockage) an accurate attitude is maintained if there is an accurate GPS ground speed source. When in this mode, a magenta GPS ASSIST message is displayed on the PFD and the ground speed is displayed below the indicated airspeed (IAS) indicator. If the connectivity with the GPS fails while in GPS assist mode, the attitude continues to be displayed, using the last known GPS ground speed as a reference. This mode is flagged on the horizon with a yellow CROSS CHECK ATTITUDE message. In the very rare case that this sequence of events occurs, the ADAHRS' attitude accuracy is reduced; use other references in the aircraft to cross-check against the SkyView display.

Compass Accuracy Effects on Synthetic Vision, Map Performance, and Autopilot

It is critical that the magnetic heading be as accurate as possible for optimal Synthetic Vision and Moving Map performance. The ADAHRS must be installed correctly, calibrated, and operating well *in all attitudes*.

SV-EMS-220

The engine gauges on your SkyView Engine Page are generated from the data acquired by the SV-EMS-220 Engine Monitoring module and its sensors. This module supports popular four and six-cylinder engine installations and can measure a variety of engine and environmental parameters such as RPM, manifold pressure, oil temperature and pressure, exhaust gas temperature (EGT), cylinder head temperature (CHT), fuel levels for multiple tanks, voltage, current, fuel pressure, fuel flow, carburetor air temperature, coolant pressure and temperature, flap and trim potentiometers, external contacts, and general purpose temperature sensors. Certain configurations of the SV-EMS-220 module also support 7-cylinder engines.

SV-GPS-250

The SV-GPS-250 GPS Receiver module is an optional externally mounted 5 Hz WAAS enabled GPS receiver designed specifically for use with SkyView. It supplies GPS data in NMEA format and automatically sets the time on SkyView.

The SV-GPS-250's WAAS capability does not allow it to be used as a primary navigation source in an IFR environment where a TSO'd WAAS GPS may be required. It does mean that it utilizes the WAAS GPS satellite to improve its positional accuracy compared to a non-WAAS enabled GPS.

SV-BAT-320

The SV-BAT-320 Backup Battery is an optional backup battery for use with SkyView. It can power a typical SkyView system for at least 60 minutes in the event of failure of the aircraft electrical system.

Autopilot Servos

SV32, SV42, and SV52 servos enable SkyView to operate as an autopilot.

3. SV-D700 and SV-D1000 Operation

After reading this chapter, you should be familiar with basic SkyView display operation. For details regarding specific procedures (e.g., adjusting the barometer), refer to the PFD, EMS, and Moving Map operation chapters.

The SkyView SV-D700 and SV-D1000 displays are identical in functionality and presentation. The only difference is in the size and resolution of the screen.

Screen Synchronization

If you have multiple SkyView displays in your aircraft, the system will synchronize important information between them. Actions such as setting baro, bugs, engaging the autopilot, or acknowledging warnings only need to be done on one display.

Some settings such as screen layout and map range zoom are not synchronized on purpose. Firmware sensor configuration file (.sfg) updates must also be done to each screen individually. Navigation and obstacle databases may or may not synchronize, depending on whether the displays are connected together via Ethernet. Reference the SkyView System Installation Guide for more information on this topic.

Display Bezel Layout

Figure 1 illustrates the front of an SV-D1000 display and its important parts.

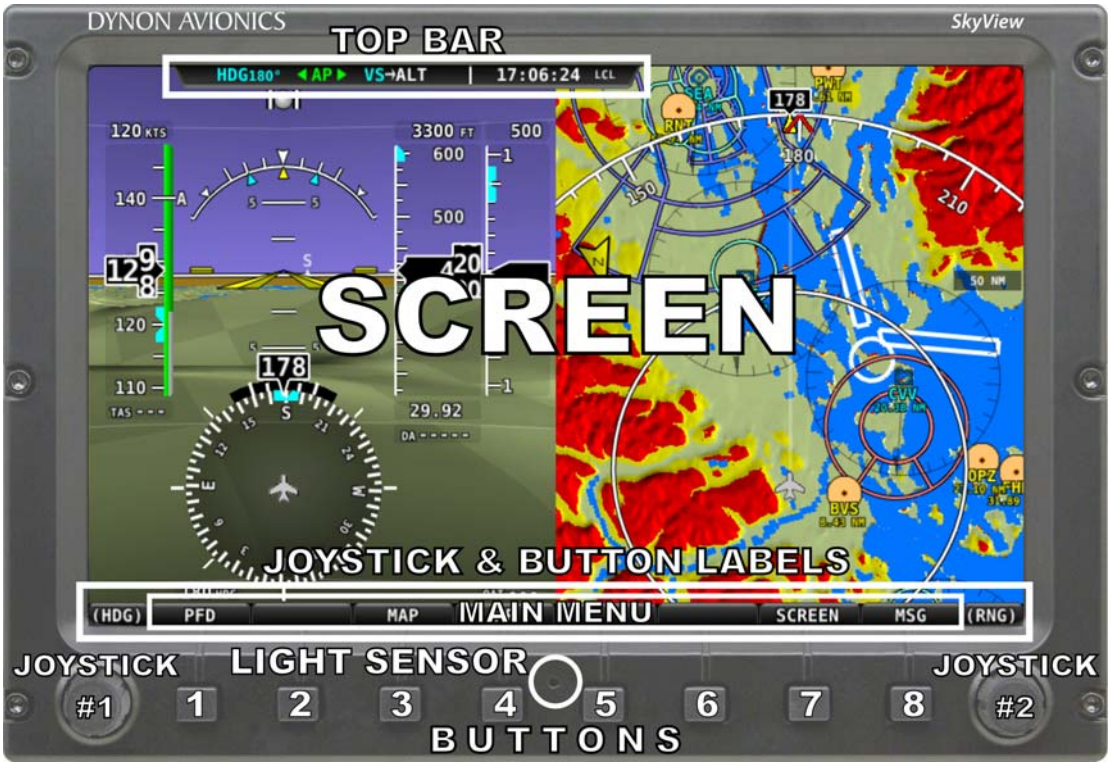


Figure 1–SkyView Display Front Bezel Layout

Note the Top Bar, screen, joystick and button labels, light sensor, two joysticks and eight buttons.

The Top Bar is user configurable and displays important textual information. The Top Bar in the current release of SkyView only shows time and autopilot status. Future firmware updates will enable expanded functionality. Reference the How to Configure the Top Bar Section of this guide for details on how to configure the Top Bar.

The screen shows PFD, Engine, and Moving Map data, configuration information, and system alerts. Its layout is user configurable. Reference the Screen Layout Configuration Section for instructions on how to configure the layout of your screen.

Joystick and button labels are also on the screen. *Joystick and button functionality is contextual based on what is onscreen and these labels show the user the current function.* For example, the (RNG) label above joystick #2 in Figure 1 shows that turning that joystick will either increase or decrease the range the user can see on the Moving Map.

The set of button labels displayed immediately after the display turns on is referred to as the *Main Menu*.

Each SkyView display has an integrated light sensor in the front bezel. This light sensor can be used for automatic backlight level management. Reference the SkyView System Installation Guide for instructions on how to configure the display for automatic backlight level management.

Joystick and Button Operation

Joysticks and buttons are used for various functions including powering the unit on and off, entering and navigating menus, and adjusting values.

Operation Basics

Joysticks can be turned and moved. Specific joystick behavior is addressed in subsequent sections of this guide when necessary.

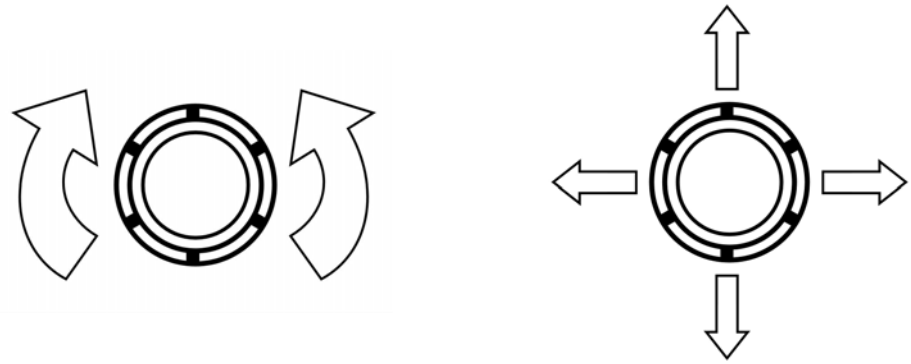


Figure 2–Joystick Turn (left) and Movement (right) Directions

A button has a function if there is a label above it. If there is no label, there is no function. The figure below shows an example button label.

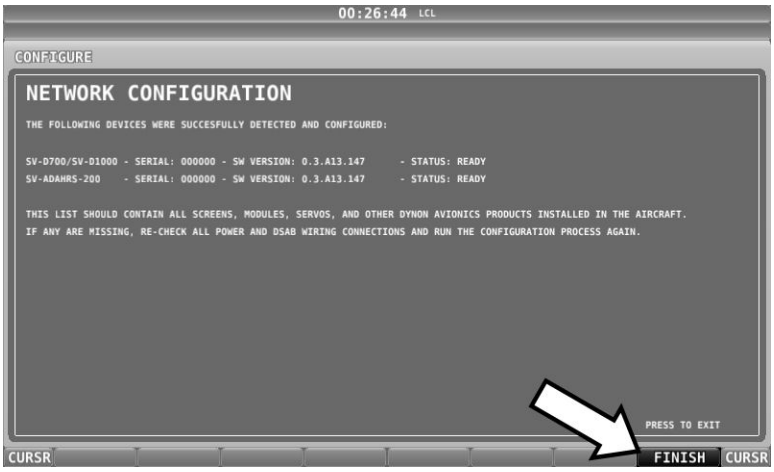


Figure 3–Example Button Label

When you press a button, its label is highlighted. When you release the button, its action is invoked.

Button labels are called out in all capital letters such as BACK, EXIT, FINISH, and CLEAR. This guide directs users to press a button by using its label. For example, when this guide asks you to press FINISH, it is asking you to press the button with the FINISH label above it.

Joystick and Button Operation Example

Some parameters may need to be adjusted using a joystick. When setting values with the joystick, each character (symbol, letter or digit) must be selected and adjusted successively.

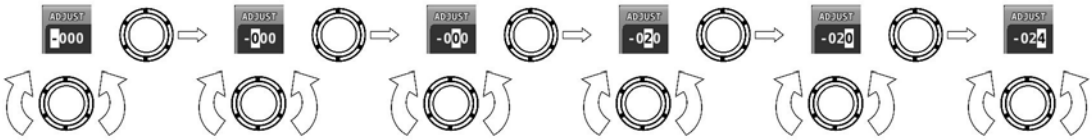


Figure 4–Adjusting Successive Characters with a Joystick

In this example, the first time you turn the joystick, you toggle between the "-" and "+" symbols. To change the succeeding characters, you must move the cursor joystick to the right. In this example, you first adjust the "-" or "+" character, move the joystick right, then adjust the one hundreds digit, and so forth. Once you have adjusted the value appropriately, press ACCEPT or move the joystick to the right again.

At times, the next item in the menu path in this guide may be a joystick selection OR a button push—the correct choice will be apparent.

Menu Navigation

All menu navigation in this guide starts at the In Flight Setup Menu.

After the display turns on, you will see a screen similar to the one in Figure 1. This guide refers to the label bar at the bottom of the screen as the *Main Menu*.

Throughout this guide, the ">" character is used to indicate a sequence of menu selections or other actions you would take as you navigate the menu system. Menu selections which are followed by "…" indicate full-screen wizard interfaces which guide you through the appropriate steps. These wizard interfaces are not described in detail in this guide, as the on-screen instructions provide adequate information.

SkyView menus follow this structure: SETUP MENU > MENU > ... > MENU > PAGE or WIZARD. The setup menus (In Flight Setup or Setup) are the root of most menu navigation. Each nested menu is more specific than the previous one and there is no set limit for the number of nested menus before reaching a page. A page or wizard is at the end of the chain and it is where the user can perform a specific action such as create a system software backup, configure a SkyView network, or set up the layout of the onscreen engine gauges. Wizards employ easy-to-follow onscreen instructions.

For example, SETUP MENU > SYSTEM SETUP > MEASUREMENT UNITS > BAROMETER indicates entering the SETUP MENU, then selecting SYSTEM SETUP, then selecting MEASUREMENT UNITS, and then entering the BAROMETER Menu to select INHG, MBAR, or MMHG.

Table 3 is a summary of menu navigation.

Desired Menu Action	User Action
Enter the Setup Menu	Simultaneously press and hold buttons 7 and 8 (if airspeed is greater than zero, you will enter the In Flight Setup Menu)
Scroll through different menus	Turn either joystick OR Move either joystick up or down
Enter menu	Move either joystick toward the right
Return to previous menu	Move either joystick toward the left (saves settings) OR Press BACK (saves settings) OR Press CANCEL (does not save settings)
Save adjusted value	Press ACCEPT
Reset adjustable value	Press DEFAULT
Save settings and return to Main Menu	Press EXIT

Table 3–Menu Navigation Summary

Basic Display Operation Procedures

This subsection covers basic operation procedures for displays. *Detailed instructions for various menus and individual menu items are described in the SkyView System Installation Guide.*

How to Turn the System On or Off

Table 4 summarizes the procedures for toggling SkyView system power states.

SkyView System Displays	Toggle SkyView System Power
One display	Toggle primary power state OR Toggle display power by pressing and holding button 1
Multiple displays	Toggle primary power state OR Toggle all displays off or on by pressing and holding button 1 on each display.

Table 4–How to Toggle SkyView System Power State

Loss of External Power with Backup Battery Connected

If external power is lost to a display that is connected to a backup battery, it will either stay on for an additional 30 seconds or stay on indefinitely depending on whether or not the aircraft is in flight. This feature minimizes backup battery discharge when on the ground and master/external power is shut off normally. It also reduces pilot workload during an actual in-flight power loss.

If the aircraft is not in flight, SkyView displays the message “POWERING DOWN IN xx SECONDS” while counting down from 30 seconds. During this countdown, the menu displays the buttons STAY ON and PWR OFF at the bottom of the screen. Press PWR OFF to turn off the SkyView display immediately. Press STAY ON to keep the SkyView display on via the connected backup battery. If STAY ON is pressed, the display will continue to use the backup battery to power itself until the battery’s charge is depleted or the display is turned off manually pressing and holding button 1. Finally, if neither button is pressed before the countdown expires, the display will automatically turn off after 30 seconds to conserve the backup battery charge.

If the aircraft is in flight, SkyView displays the message “AIRCRAFT POWER LOST” with no additional count down. This ensures that active pilot action is required to turn off a display when power is lost in-flight and backup battery power is available. The STAY ON and PWR OFF buttons are still offered, but the display will stay on indefinitely unless PWR OFF is pressed.

How to Reboot the Display

Press and hold buttons 1, 2 and 5 simultaneously to instantly reboot the system. This may be helpful if you need to cycle power after changing certain settings and for general troubleshooting.

How to Manually Adjust the Backlight Brightness or Dim Level

Press SCREEN on the Main Menu and then press DIM (this is the Dim Menu). To decrease or increase the backlight brightness press DEC- or INC+, respectively. To set the backlight brightness to 100%, press FULL. Press BACK twice to exit the Dim Menu and return to the Main Menu.

If the display is set to automatic or external backlight brightness control, this operation will toggle the backlight brightness control to manual mode. You can determine if there was a change in control mode by the label over button 7 in the Dim Menu. If the display was set to manual mode in the Setup Menu, there will be no label. If the display was set to automatic or external, the label will toggle between MANUAL and AUTO or MANUAL and EXTERNAL, respectively.

Reference the SkyView System Installation Guide for instructions on specifying the display's backlight brightness control method.

How to Enter the Joystick Function Menu

Move a joystick up, down, left, or right to enter its Joystick Function Menu. These menus are used to specify which bug that joystick adjusts if turned. For example, joystick 1 could be set to adjust the heading bug and joystick 2 could be set to adjust the altitude bug.

Figure 5 illustrates the joystick menu.

Figure 5–Joystick Menu

To set the function of a joystick:

1. Move a joystick up, down, left, or right to enter a Joystick Function Menu.
2. Choose the joystick function by moving the joystick up or down.
3. Confirm the highlighted function by moving the joystick left or right.

If the Map Page is onscreen, the joystick closest to the Moving Map is labeled (RNG) and is used to adjust the map's range and cannot be assigned a different function.

How to Enter the In Flight Setup Menu

When airspeed is greater than zero or groundspeed is greater than 15 knots, simultaneously pressing and holding buttons 7 and 8 when on the Main Menu will open the In Flight Setup Menu. This menu gives users access to SkyView system tools which may be useful during flight such as the Flight Angle Pitch Adjust Page and the Angle of Attack Calibration Wizard.

You may also access the Setup Menu from the In Flight Setup Menu by using the ENTER FULL SCREEN SETUP MENU… option.

How to Check Installed Database Status

Enter the Installed Databases Page (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU > LOCAL SCREEN SETUP > INSTALLED DATABASES) to see which databases are installed and their respective versions.

How to Adjust Time Zone Offset

Enter the Time Zone Offset Page (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU > SYSTEM SETUP > TIME > TIME ZONE OFFSET) and adjust the time zone accordingly.

How to Configure the Top Bar

The Top Bar is the strip across the top of the screen. It displays textual information such as the clock and autopilot status. Future software updates will use this space for information such as radio status.

Enter the Top Bar Setup Page to configure the Top Bar (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU or > LOCAL SCREEN SETUP > TOP BAR SETUP).

Screen Layout Configuration

SkyView can display many combinations of PFD, Engine, and Moving Map data in full-screen and partial-screen configurations as well as distribute this data across multiple displays. Each display in the system can also have its own layout. This section tells you how to configure the display(s) in your SkyView system.

SkyView displays only display data from connected modules. For example, if an SV-EMS-220 module is not present on the network, the display will not show any engine data.

The following table lists the amount of screen space you can allot for a given page. Note that pages may also be turned off by the user.

Page	100%	80%	50%	40%	20%	OFF
PFD	✓	✓	✓	✓		✓
Engine	✓		✓		✓	✓
Map	✓	✓	✓	✓		✓

Table 5–Onscreen Data Allotments

The following diagram illustrates example screen layout configurations.

Figure 6–Example Screen Layout Configurations

Manufacturers that install SkyView into their aircraft can choose to standardize the screen layouts that are available. When a SkyView system is set up this way, the SCREEN button will instead be the DIM button, as all of the other layout options are pre-set by the manufacturer and can not be adjusted.

To configure the SkyView screen:

1. Press SCREEN on the Main Menu.
2. Press PFD, ENGINE, or MAP to toggle the display state of a page.
3. Press LAYOUT to toggle between different layouts of your chosen pages.
4. Press BACK to save the configuration and return to the Main Menu.

Also use the steps above to toggle the display state (i.e., on or off) of a page.

4. PFD Operation

One of the main functions of SkyView is its Primary Flight Display (PFD) with Synthetic Vision. This chapter highlights the layout of the PFD page, its symbology, and contains instructions for adjusting bugs.

SkyView's PFD requires data from an SV-ADAHRS-20X module. Synthetic vision further requires valid GPS data.

The heading/track, altitude, and vertical speed bugs are used to control the SkyView Autopilot.

ADAHRS Source

SkyView systems support multiple SV-ADAHRS-20X modules for redundancy and manage failure scenarios by automatically switching to backup modules when needed.

If you need to check the status of or reconfigure your ADAHRS source:

1. Enter the ADAHRS Source Selection Page (IN FLIGHT SETUP MENU > ADAHRS SOURCE SELECTION…).
2. Choose or check the status of an ADAHRS source. The ADAHRS noted as ACTIVE is the primary source. All other functioning ADAHRS in the system will be noted as ONLINE.
3. Press BACK to exit the ADAHRS Source Selection Page or press EXIT to return to the Main Menu. Either of these actions will save the ADAHRS source settings.

GPS Signal Source

SkyView's PFD contains display elements – such as Synthetic Vision, ground speed, and the HSI - that depend on GPS information to work.

Reference the GPS Source Section in SV-MAP-270 Navigation Mapping Software Operation chapter of this guide for information about how SkyView utilizes and prioritizes the available GPS sources that are used for this purpose.

PFD Page Layout

The PFD Page as shown in Figure 7 displays important flight information and synthetic vision.

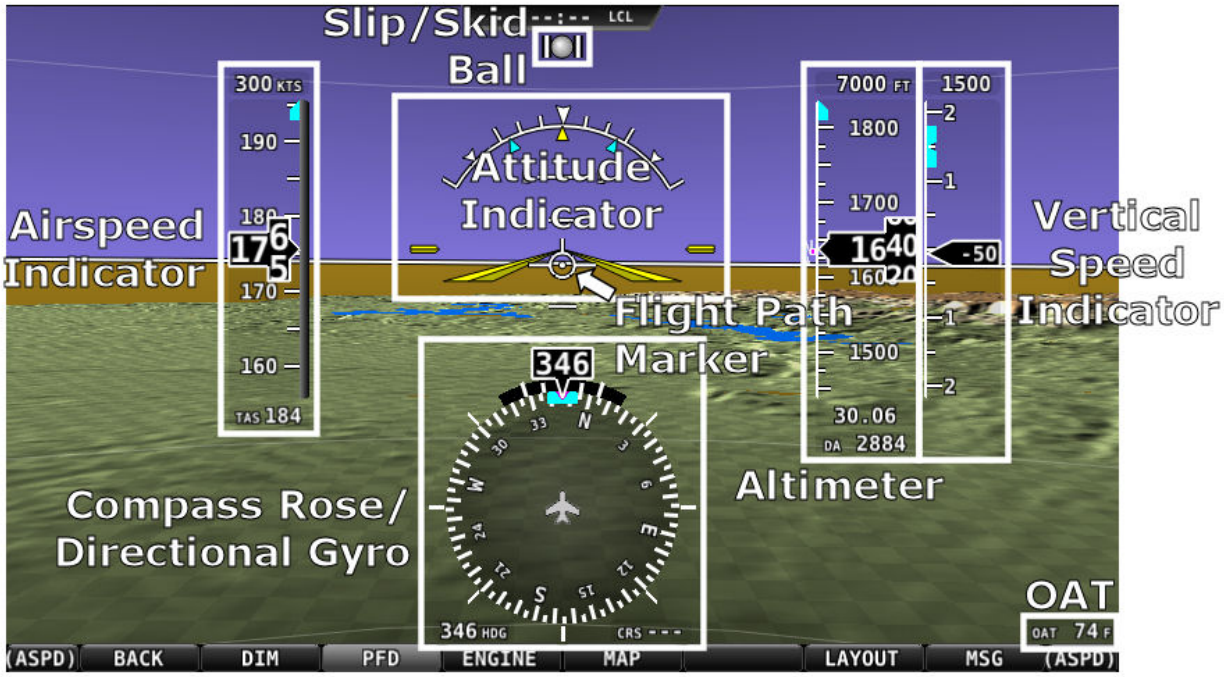


Figure 7–SkyView PFD

The primary information shown on the PFD includes:

- Synthetic Vision
- Airspeed Indicator with Airspeed Bug and Airspeed Trend Rate
- Attitude Indicator with Pitch Warning Indicators (Pitch Warning Indicators not shown in Figure 7)
- Flight Path Marker
- Altimeter with Altitude Bug, Altitude Trend Rate, Barometer Setting, and Density Altitude
- Vertical Speed Indicator with Vertical Speed Bug
- Compass Rose/Directional Gyro with Heading Bug
- Slip/Skid Ball
- Angle of Attack Indicator (not shown in Figure 7)
- OAT

The PFD in Figure 7 is a basic depiction and does not include any HSI or autopilot information.

PFD Menu

The PFD Menu is accessible from the Main Menu by pressing PFD (MAIN MENU > PFD). Users can reset the baro, toggle synthetic vision on or off, and configure the bearing and NAV sources.

Back

Press BACK to return to the Main Menu.

G Meter

Press G METER to toggle the G meter on and off. When the G meter is displayed, it replaces the HSI/Compass Rose, though numerical magnetic heading above the HSI area remains. The G meter shows an analog “needle” that indicates the instantaneous G loading of the aircraft. Depending on how the G meter is configured, the analog range may have yellow and/or red caution ranges configured to visually indicate aircraft G limits are being approached. Instantaneous G information is also shown digitally in the center of the gauge.

Figure 8 - G meter on PFD

The smaller digital numbers above and below the larger instantaneous G number are the maximum and minimum Gs that the aircraft has experienced since the G meter was last reset. Press PFD > RESET G to manually reset the G meter. The G meter may also be set up to automatically reset the min/max G readings every time SkyView starts up.

The G meter can also be configured to “pop up” automatically under certain conditions. When configured this way, the G meter will appear automatically when the aircraft’s instantaneous G loads exceed thresholds that have been selected. Once the G meter has appeared, it will remain on the display until the instantaneous aircraft G loading falls back below those thresholds.

See the SkyView Installation Guide for further information about G meter configuration.

Synthetic Vision (SYNVIS)

Synthetic Vision depictions of terrain, runways, obstacles, and other information are meant as informational aids only. These depictions should not be used as the primary means for obtaining situational awareness of these features in flight.

Terrain data is obtained from third party sources. Dynon cannot independently verify the accuracy of terrain data at all geographical points.

When valid GPS data is available and Synthetic Vision is licensed on a SkyView display, the PFD features integrated synthetic vision. Synthetic Vision displays the terrain directly ahead of the aircraft. Terrain is graphically represented in sectional chart color variations which represent topographical elevations and water features. Terrain is textured with a subtle checkerboard pattern to aid in identifying aircraft movement.

You may toggle the synthetic vision system off or on. Press PFD on the Main Menu and then press SYNVIS.

Figure 9 contains an example SkyView synthetic vision view.

Figure 9–SkyView Synthetic Vision View

Runways on Synthetic Vision

Runways are depicted at airports for which runway information is available in the US only. See the Moving Map Operation section for more information about aviation data availability. Note that in many cases, the information in the synthetic vision depiction may not match the actual physical markings seen in real life. In fact, in many cases, the synthetic vision depiction has more information! The following information is shown on Synthetic Vision runways:

- Runway edge lines
- Runway centerline

- Runway numbers
- Runway thresholds / displaced thresholds
- Aiming point markings: two white strips drawn 1000’ after the threshold on runways 4000’ and longer
- Runway width threshold markings: drawn immediately after the runway threshold, these groups of parallel lines visually indicate the width of the runway in the following manner according to runway width:
    - 0’-59’ wide: no lines
    - 60’-74’ wide: 4 lines
    - 75’-99’ wide: 6 lines
    - 100’-149’ wide: 8 lines
    - 150’-199’: 10 lines
    - 200’+: 12 lines

Obstacles on Synthetic Vision

Obstacles are only depicted when the Navigation Mapping Software is licensed or in its 30 flight hour free introductory trial mode. See the SV-MAP-270 Navigation Mapping Software Operation section for more information about map licensing and obtaining obstacle data.

Obstacles are only shown on synthetic vision if their highest point is within 1000 feet below your aircraft's GPS altitude. If the highest point of an obstacle is within 100 feet below your current GPS altitude to anywhere above you, it will be red. If the highest point of the obstacle is between 100 and 1000 feet below your current GPS altitude, the obstacle will be yellow. This is the same color scheme used on the map page as described in the Topography with Terrain Proximity Alerts Section.

Obstacles are shown at their actual height above the ground. In other words, if the flight path marker is above the top of an obstacle in the synthetic vision version, your aircraft should clear it in real life as well.

The tower symbology used to denote different types of obstacles is the same as used in the moving map depiction. See the Moving Map Symbology section of this guide for more information.

Traffic on Synthetic Vision

When a device that can receive traffic information is installed and configured, traffic can be displayed within the Synthetic Vision display to improve situational awareness.

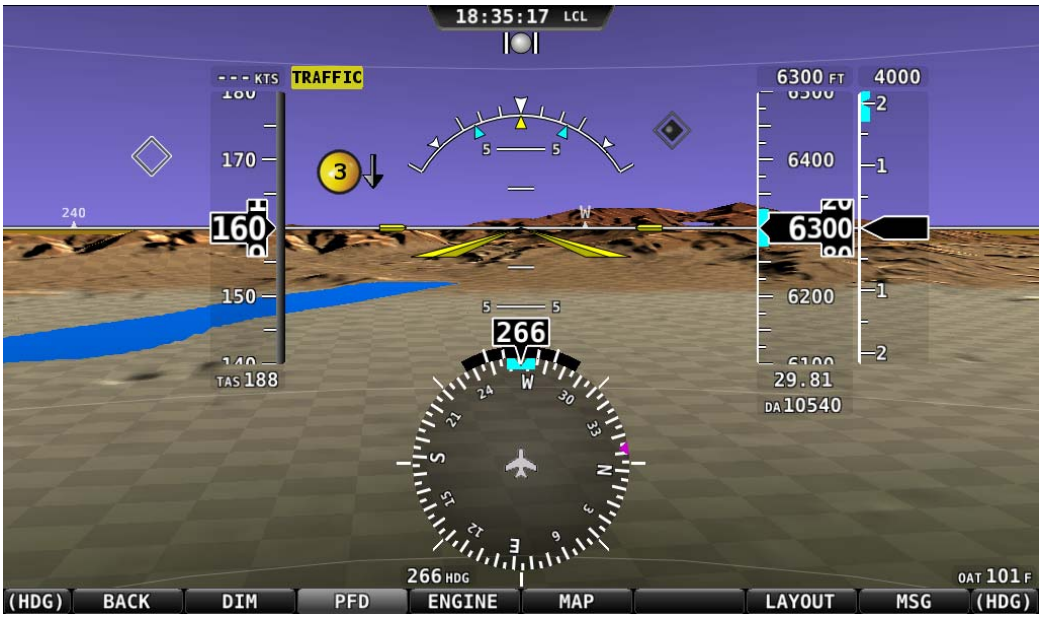


Figure 10 - Traffic Display on Synthetic Vision

Traffic information is informational only, and does not relieve the pilot-in-command of their responsibility to see and avoid traffic.

	Traffic is displayed as reported by the device sending it to SkyView. The precision and accuracy of the location of traffic targets may vary from device to device, and this may impact how accurately the position is represented on the SkyView display. TIS traffic updates, such as those received by the SV-XPNDR-26X, may be anywhere from 2-12 seconds old due to radar latency and other technical factors. Be sure to understand the traffic-detection capabilities of your traffic device thoroughly so you understand how to best interpret the position of the traffic displayed on SkyView.

Traffic targets are displayed using the same symbols that are used on the Map page display of traffic. See the traffic section in the SV-MAP-270 Navigation Mapping Software Operation section for complete descriptions of the types of targets that may be shown. Unlike the Map page display, however, relative altitude is not provided numerically on Synthetic Vision. Instead, relative altitude is depicted by having the traffic symbols appear either above or below the zero pitch line, just like they would be if you were looking at traffic out the window. For example, in Figure 10 above, all of the traffic targets being displayed are above our current altitude. Similarly, traffic targets that are shown to the left or right of the center of the attitude indicator are not directly ahead of you.

Traffic displayed on the PFD page can be configured to include just Traffic Advisories (TA), all targets, or no targets. See the SkyView Installation Guide for information on how to configure how traffic is displayed.

Note that traffic is not visually scaled for distance. In other words, targets always appear the same size on the Synthetic Vision depiction, no matter how far away they are. However, yellow Traffic Advisory Targets (threats) are displayed larger than the diamond shaped Proximity Advisory Targets and Non-Threat Targets to accentuate their increased importance.

Figure 11 - Traffic Advisory on Synthetic Vision

Figure 12 - Proximity Advisory on Synthetic Vision

Figure 13 - Non Threat on Synthetic Vision

Additionally, yellow Traffic Advisory targets contain a number within them that represents how far away they are (in miles, nautical miles, or kilometers, depending your system setup) from your aircraft. The yellow Traffic Advisory target in Figure 10, for example, is 3 miles away, to the left, above, and descending.

Figure 14 - Traffic Alert

When a Traffic Advisory target is present, a yellow Traffic Alert message appears on the PFD Page near the top of the IAS tape. Note that Traffic Advisory targets behind your aircraft will generate alerts. They can be seen on the Map Page, but will be not be visible on the Synthetic Vision display as Synthetic Vision only shows the view in front of the aircraft.

Bearing Source 1 (BRG 1)

Press this button to cycle through the available installed bearing sources for the first bearing needle.

NAV Source (NAVSRC)

SkyView's Navigation Mapping Software course information can be displayed on the SkyView HSI display when it is navigating to an active waypoint. It is always the GPS0 source.

Press this button to cycle the HSI through the different navigation data sources that are connected to the SkyView system (e.g., GPS 0-4 and NAV 1-4). Reference the SkyView System Installation Guide for more information regarding external serial device installation and configuration.

Bearing Source 2 (BRG 2)

Press this button to cycle through the available installed bearing sources for the second bearing needle.

Bugs

Enter the Bugs Menu to configure which bugs are on or off. Reference the PFD Symbology Bugs Section for more information.

MSG

The Message Box is present in the PFD Menu and contains important SkyView system alerts.

PFD Symbology

Bugs

The SkyView PFD makes use of airspeed, altitude, vertical speed, and heading (or track) bugs. Note that the altitude, vertical speed, and heading (or track) bugs are used for autopilot control if autopilot servos are installed. Instructions for setting bugs are detailed in subsequent sections of this guide.

The airspeed, altitude, and vertical speed bugs are located above their respective tapes and the heading (or track) bug is located to the lower left of the compass rose/directional gyro.

You can toggle the display state of bugs using the following procedure. Note that bugs that are used as control mechanisms for autopilot axes (i.e., HDG, ALT, and VS) cannot be toggled off if their respective autopilot servo is installed.

1. Press PFD while on the Main Menu.
2. Press BUGS.
3. Press HDG, ALT, IAS, or VS to toggle the display state of each respective bug. *If a bug label is highlighted, it will show up on the PFD and in the joystick menu.*
4. Press BACK to return to the PFD Menu.

A bug is only adjustable if it is on and it is an option in the Joystick Menu. Bugs that are turned off are displayed as "- - - " with their respective units (e.g., "- - - FT" for an altitude bug).

When all bugs are turned on, all bugs are available in the Joystick Menu as illustrated in Figure 15.

Figure 15–All Bugs On

For example, if the vertical speed bug (VS) is off, it is not an option in the Joystick Menu as illustrated in Figure 16. The same is true for other bugs.

Figure 16–Vertical Speed Bug Off

If all bugs are off, none of them show up in the Joystick Menu as illustrated in Figure 17. Also note how the heading bug is displayed (i.e., "- - - HDG" above the BACK label).

Figure 17–All Bugs Off

As mentioned earlier, if autopilot servos are installed, the bugs used to control them are not configurable in this menu (i.e., they are always on) and have grayed-out text to denote this as illustrated in Figure 18.

Figure 18–Autopilot Control Bugs Grayed Out

Airspeed Indicator

The airspeed indicator is displayed on the left side of the PFD and incorporates an airspeed tape with a digital readout, true airspeed (TAS), airspeed trend indicator, and airspeed bug. Figure 19 is an example SkyView airspeed indicator.

Units can be set to miles per hour, nautical miles per hour (knots), or kilometers per hour. Reference the SkyView System Installation Guide for instructions on how to change the displayed units.

The airspeed tape displays indicated airspeed including gray, white, green, yellow, and red ranges to provide a graphical representation of aircraft speed in relation to the aircraft's limits. These ranges are controlled by setting the airspeed limitations for the aircraft. Refer to the SkyView System Installation Guide for instructions on how to configure the airspeed limitation color thresholds.

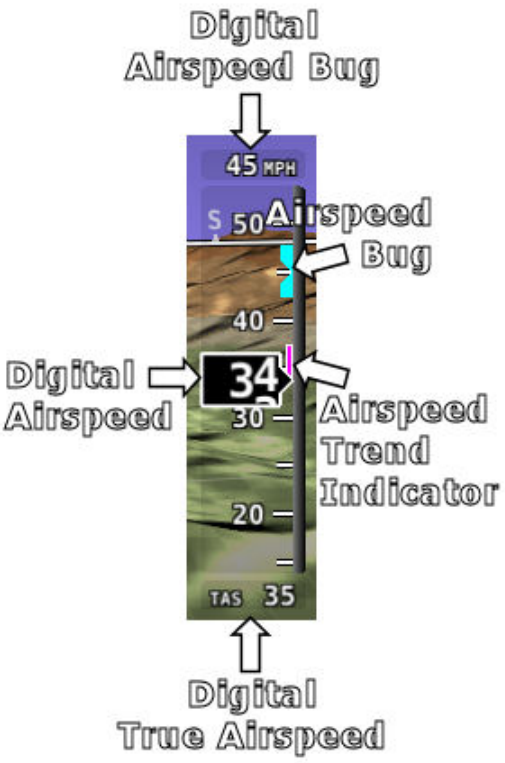


Figure 19–Example Airspeed Indicator

The indicated airspeed (IAS) digits scroll up and down, simulating an analog airspeed indicator. The rate of change of the digits provides a sense of the increase or decrease in speed.

The airspeed trend indicator (ATI) is displayed as a magenta bar on the airspeed tape. It grows proportionally in the direction of the rate of change (acceleration or deceleration). The ATI is scaled to indicate a 6-second airspeed trend which means that if the acceleration is kept constant, the airspeed will end up at the number indicated at the end of the trend line after 6 seconds have passed.

True airspeed (TAS) is digitally displayed at the bottom of the airspeed tape.

Airspeed Bug

The airspeed bug is displayed in cyan on the airspeed tape and its associated digital readout is displayed at the top of the airspeed indicator.

To set the airspeed bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (ASPD).
3. Move the joystick left or right to close the menu (this is optional).

(ASPD) will now display over that joystick and turning the joystick will adjust the airspeed bug. *You may also synchronize the bug to current airspeed by pressing and holding the joystick to the left or right for 2 seconds.*

Attitude Indicator

Attitude indicator symbology is displayed on PFD and incorporates a roll scale with roll pointers and a zero pointer reference, pitch scale with horizon lines, and water line symbology. Figure 20 is an example SkyView attitude indicator.

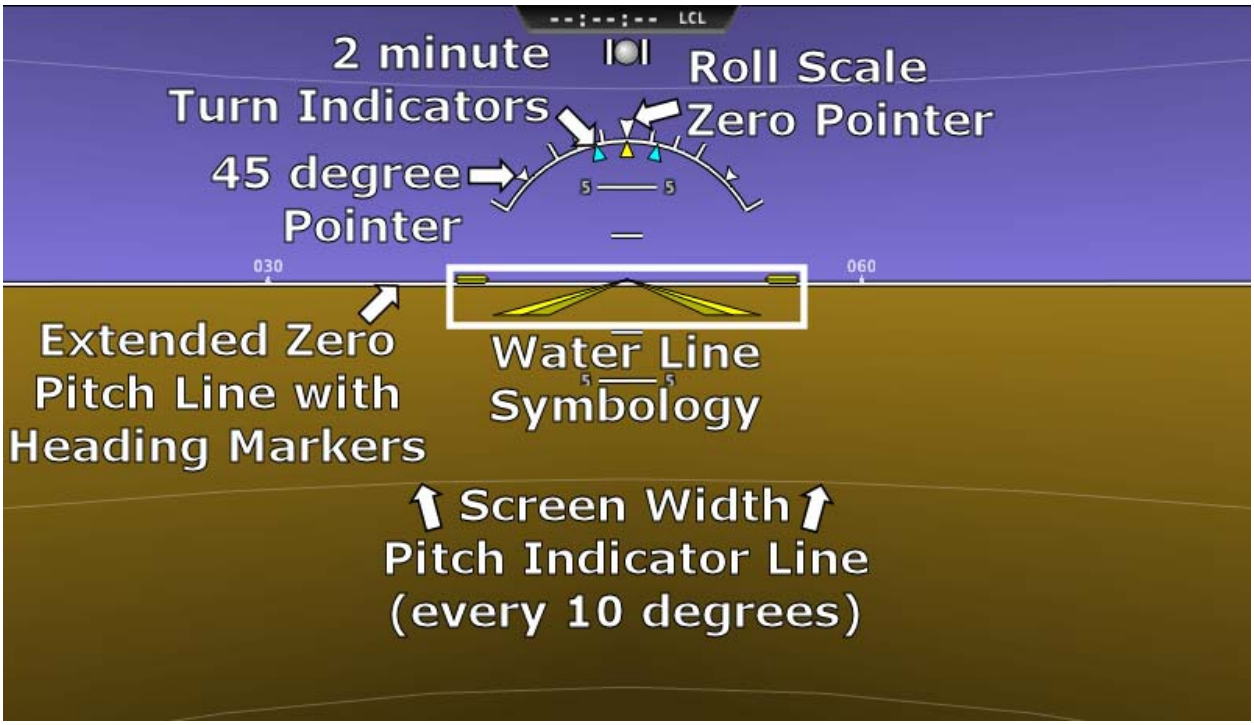


Figure 20–Example Attitude Indicator

The roll scale contains tick marks at 10, 20, 30, and 60 degrees and larger white triangles at 0 and 45 degrees. The roll pointer (small yellow triangle on the bottom side of the roll scale) points to your current bank angle. The roll scale will rotate 360 degrees. When the aircraft is wings level, the roll pointer aligns with the roll scale zero point. The water line symbology also indicates wings level flight.

The pitch scale has tick marks in 2.5 degree increments and every 10 degree tick mark provides a horizon line across the width of the screen. If the displayed pitch on the screen requires adjustment to match the view outside, use the Flight Angle Pitch Adjust Page in the In Flight Setup Menu (IN FLIGHT SETUP MENU > FLIGHT ANGLE PITCH ADJUST…). The pitch may be adjusted to a maximum of ±20 degrees.

The extended zero pitch line features heading markers every 30 degrees to help maintain directional awareness when attention is being paid to the attitude indicator.

Flight Path Marker

The flight path marker as shown in Figure 21 is an icon that is superimposed on the PFD. It depicts the actual trajectory that the aircraft is flying through space. In contrast, the attitude indicator displays the direction that the aircraft is pointed.

Figure 21– Example Flight Path Marker

The flight path marker is extremely helpful in correlating and distinguishing between aircraft attitude and flight path, giving the pilot a better understanding of what the aircraft is doing. Given this, the marker can also be a valuable aide for avoiding terrain when used with Synthetic Vision.

Several examples of Flight Path Marker behavior:

- If the aircraft's nose is pitched up, but the marker stays on the horizon, this indicates that the aircraft is not climbing or descending. You will see this behavior during slow flight.
- Many aircraft do not cruise at an exactly level attitude. In these cases, it is normal to have a small amount of upward pitch indicated, even when you are flying straight and level.
- If the marker is to the left or right of the attitude indicator's aircraft symbol, this indicates that the path over the ground is different than the direction the aircraft is pointing. This depicts the effects of wind or a slip attitude.
- If the aircraft is climbing out of a canyon and the marker is above the terrain ahead, this indicates that the aircraft, at its current trajectory, will clear that terrain.
- If the aircraft is climbing out of a canyon and the marker is overlaid on the terrain ahead, this indicates that the aircraft, at its current trajectory, will impact the terrain.
- If the marker is pointed at a runway threshold during and approach, that is where you will be when you land if you keep the same approach path to the runway.

Altimeter

The altimeter is displayed on the right side of the PFD. It incorporates an altitude tape and digital readout, density altitude (DA), barometer setting, and altitude bug. Figure 22 is an example SkyView altimeter.

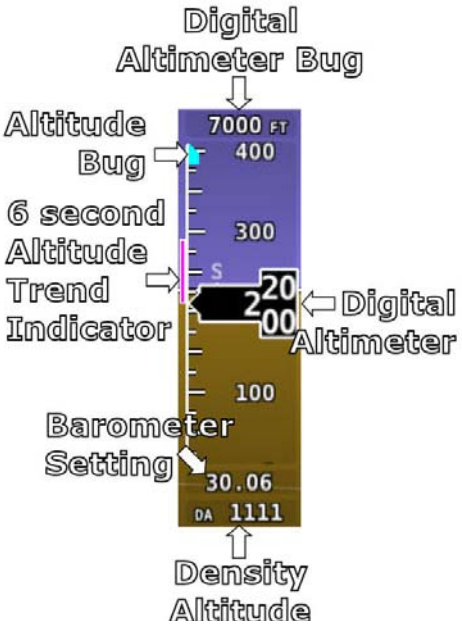


Figure 22–Example Altimeter

The altitude tape displays 200 units above and below the current altitude digital readout. Each tick represents 25 units, with every 50 unit tick drawn slightly longer to differentiate them. Units can be set to feet or meters. Reference the SkyView System Installation Guide instructions on how to change the displayed units.

The digital readout scrolls up and down in the manner of an analog altimeter. The rate of change of the digits provides a sense of the increase or decrease in altitude.

A 6 second altitude trend indicator based on current vertical speed is represented as a magenta bar on the altimeter. The behavior of the altitude trend indicator is similar to the behavior of the airspeed trend indicator.

DA will display "----" if an OAT probe is not connected to the SkyView ADAHRS module.

Barometer Setting

To change the barometer setting:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (BARO).
3. Move the joystick left or right to close the menu (this is optional).

(BARO) will now display over that joystick and turning the joystick will adjust the barometer setting. *You may reset baro (i.e., 29.92 in Hg, 1013 mbar, or 760 mm Hg) by pressing and holding the joystick to the left or right for 2 seconds.*

Altitude Bug

The altitude bug is displayed in cyan on the altitude tape and its associated digital readout is displayed at the top of the altimeter. *The altitude bug is used as a target for the pitch axis of the SkyView Autopilot when a pitch axis servo is installed.*

The reaction of the autopilot to an altitude bug change depends on the state of the pitch axis, its armed mode of operation, and the current state of the aircraft. Reference the Autopilot Operation Section for more information.

To set the altitude bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (ALT).
3. Move the joystick left or right to close the menu (this is optional).

(ALT) will now display over that joystick and turning the joystick will adjust the altitude bug.

You can synchronize the altitude bug with the current altitude by pressing and holding the ALT joystick to the left or right for 2 seconds.

If the autopilot is engaged and the altitude bug is changed to more than 100 feet away from the current altitude, the autopilot enters vertical speed mode and the text in the Top Bar changes to VS→ALT to indicate this new mode.

Reference the Autopilot Operation Chapter for more information regarding autopilot functionality, symbology, and operation information.

Vertical Speed Indicator

The vertical speed indicator (VSI) is displayed to the immediate right of the altimeter and incorporates a vertical speed tape, vertical speed pointer (with digital readout), and bug. Figure 23 is an example SkyView VSI.

The VSI tape can display ±1000 units, ±2000 units, or ±4000 units. Units can be set to feet or meters. Reference the SkyView System Installation Guide for instructions on how to change the displayed units and the indicator scale.

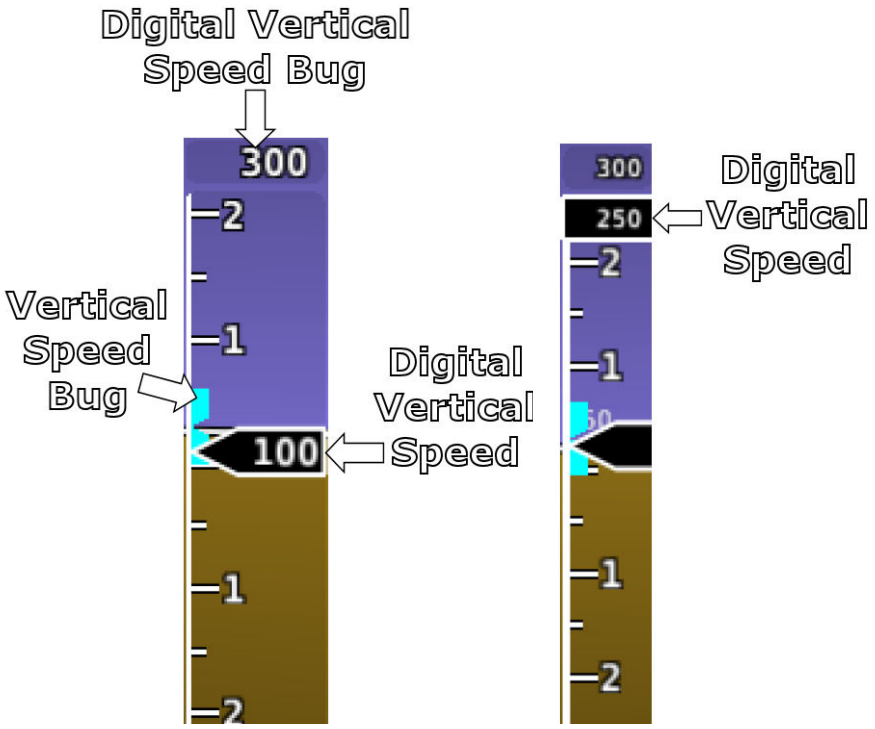


Figure 23–Example Vertical Speed Indicator. Partial Screen PFD Version on Right.

The vertical speed pointer scrolls up and down the VSI tape, simultaneously displaying the instantaneous vertical speed in both analog and digital formats. If there is very little or no vertical speed, the pointer appears blank. When the PFD is configured as a 40% page, the digital vertical speed readout appears above or below the VSI tape as shown in Figure 23, but the analog sliding behavior of the pointer is the same as described above.

Vertical Speed Bug

The vertical speed bug is displayed in cyan on the right side of the VSI tape and its associated digital readout is displayed at the top of the VSI. This bug is used as an initial target for the pitch axis of the SkyView Autopilot when the pitch axis servo is installed and engaged in the vertical speed bug (VS:BUG) mode of operation.

To set the VSPD bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (VSPD).
3. Move the joystick left or right to close the menu (this is optional).

(VSPD) will now display over that joystick and turning the knob will adjust the VSPD bug. *You may also synchronize the bug to the current vertical speed by pressing and holding the joystick to the left or right for 2 seconds.*

Notes on vertical speed bug autopilot control settings:

- If the current altitude is below the altitude bug, the vertical speed bug may only be adjusted to a new value that is greater than or equal to the current setting.
- If the current altitude is above the altitude bug, the vertical speed bug may only be adjusted to a new value that is less than or equal to the current setting.

Reference the Autopilot Operation Chapter for more information regarding autopilot functionality, symbology, and operation information.

Compass Rose/Directional Gyro

The compass rose/directional gyro is displayed on the lower center of the PFD and incorporates a magnetic heading compass rose, magnetic heading digital display, turn rate indicator, ground track GPS pointer, heading bug, and heading bug digital display. Figure 24 is an example SkyView compass rose/directional gyro.

The compass rose displays in heading-up orientation. The cardinal points are displayed as letters, and 30 degree increments are displayed numerically without the trailing zero (e.g., 330 degrees is displayed as 33). The numeric display at the top of the compass rose indicates magnetic heading.

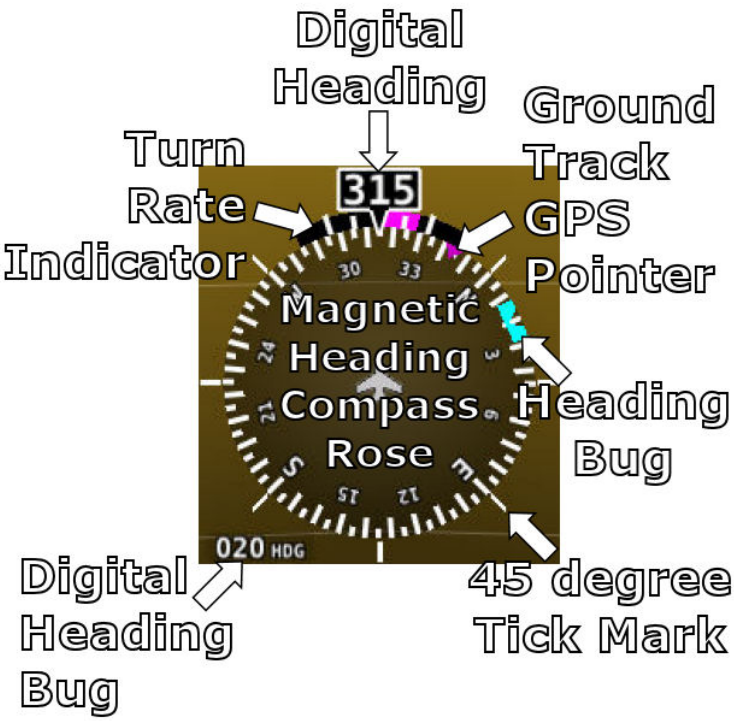


Figure 24–Example Compass Rose/Directional Gyro

The turn rate indicator is displayed as a curved magenta bar along the top, outside curve of the compass rose. The bar grows in the direction that the aircraft is currently turning and is anchored at the arrow of the numeric display. The minor tick marks to the immediate right and left of the numeric display arrow represents a half-standard-rate-turn. The major tick marks to the left and right of the minor tick marks represent a standard rate turn of 3 degrees per second.

The ground track GPS pointer is displayed as a magenta triangle on the inner edge of the compass rose.

Heading/Track Bug

If your SkyView system includes an autopilot, the heading (HDG) bug is replaced by a track (TRK) bug when the autopilot is flying in GPS ground track (TRK) mode. The bug is displayed in cyan on the inner edge of the compass rose. The digital display of the bug is displayed to the lower left of the compass rose.

To set the heading/track bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (HDG) or (TRK).
3. Move the joystick left or right to close the menu (this is optional).

(HDG) or (TRK) will now display over that joystick and turning the joystick will adjust the bug.

You can synchronize the heading/track bug to the current heading or track by pressing and holding the joystick to the left or right for 2 seconds.

Reference the Autopilot Operation Chapter for more information regarding autopilot functionality, symbology, and operation information.

HSI

When a valid NAV or GPS source is connected to your SkyView system, its data can be displayed on and around the DG in a standard HSI presentation. Refer to the SkyView System Installation Guide for details on how to connect and configure these data sources. The following sections describe the HSI display elements.

HSI Source

There are two primary types of sources, GPS and radio. Anytime a GPS is being used as an HSI source, all of the HSI data is colored magenta. When a radio is being used as the source, its data is in green. To the left of the DG, a textual info item describes the data source of the HSI. It can be any of GPS, NAV (VOR), BC (back course) or LOC (localizer). Additionally, each GPS or radio source is also numbered to prevent confusion in systems that have multiple devices. To cycle through the available sources, press NAVSRC in the PFD Menu.

Course Indicator

The course indicator has an arrow at its end which points to the currently selected course. When a GPS source is selected, course direction is normally set implicitly by the programmed route. When a NAV radio source (only Garmin SL30 in firmware version 2.0) is selected, the course direction can be set on the radio. To maintain course regardless of wind condition, line the course needle (with centered CDI) up with the GPS ground track pointer. The course indicator is fixed to the rotation of the DG, so it is easy to see which way you must turn to get on course. When tuned to a LOC, course is nominally set to the runway heading. Note that when the Garmin SL30 is tuned to a LOC/ILS frequency, it disables its own OBS knob. Because of this you must adjust course on the SL30 before switching over to an LOC/ILS frequency.

Course Deviation Indicator (CDI)

The CDI indicates how far to the left or right you are from the selected course. When in NAV mode, full scale deviation indicates ten degrees of deviation from the VOR radial that has been chosen as the course. When tuned to a localizer, full scale represents 2.5 degrees of deviation. When following a GPS course, full scale represents 5 nautical miles of deviation. When on course, the course indicator and the CDI make a solid line, making it easy to see when there is little error in your aircraft's position. Unlike a CDI indicator found in basic aircraft, the CDI needle on an HSI rotates with the DG and course indicator. By turning the aircraft towards the CDI needle you reduce your deviation.

To/From Indicator

Because an HSI rotates the course line on top of the DG, the to/from indicator always points at the physical VOR/LOC transmitter, or towards the GPS waypoint. If it is pointing the same

direction as the arrow at the end of the course line, then that is a "to" indication. If it is pointing the opposite direction of the arrow at the end of the course line, then that is a "from" indication.

Bearing Pointers

These arrows show you the bearing directly to a radio station or waypoint–in other words, the track that you would need to fly to go directly to it. BRG 1 is yellow in color and is depicted with a single arrow head when displayed on the HSI display. BRG 2 is orange in color and has a double arrow head. There is also a textual information item for each bearing pointer that describes its source and direction. Each of the bearing pointers can be cycled between all available bearing sources by pressing BRG 1 or BRG2 in the PFD Menu.

Glideslope/VNAV Indicator

This only appears when tuned to an ILS or a GPS with vertical navigation output. When displaying an ILS glideslope, full deflection is 0.5 degrees.

HSI Info Items

Textual info items that provide additional data about the HSI source are displayed to the left of the HSI display. The information available depends on the data being provided by the HSI source. Examples of info items that may be displayed include DTW (distance to waypoint), ID (VOR identifier), and frequency.

Wind Vector

Wind vector information is located just above the OAT display on the PFD. The winds aloft arrow indicates the wind direction relative to your current direction of flight. The wind strength, direction, and cross wind component are also textually provided. If SkyView cannot make an accurate winds aloft calculation, the arrow is not displayed and the numbers are replaced by dashes. The display of winds aloft requires an active GPS connection and an OAT probe. In very light winds, the wind speed number is not displayed, although the arrow is.

Slip/Skid Ball

The action of the slip/skid ball simulates an analog slip/skid ball and provides a visual representation of lateral acceleration. When the ball is within the two vertical lines, the aircraft is in coordinated flight. Figure 25 is an example SkyView slip/skid ball.

Figure 25– Example Slip/Skid Ball

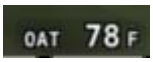
Angle of Attack Indicator

The Angle Of Attack (AOA) Indicator will display only when a Dynon AOA/Pitot probe has been properly installed and calibrated. During normal flight, the AOA Indicator will display green. As the AOA approaches and then reaches critical, the green and yellow bars will disappear, leaving only red. Figure 26 is an example SkyView AOA indicator.

A thorough explanation of AOA and the principles of operation of Dynon's AOA Pitot probe are beyond the scope of this guide. Detailed information about AOA and Dynon's approach to AOA is available at www.dynonavionics.com/docs/SkyView_AoA.html.

Figure 26– Example AOA Indicator

OAT



Outside air temperature (OAT) as shown in Figure 27 is displayed in the very lower-right corner of the PFD. Units can be set to degrees Fahrenheit or degrees Celsius. Reference the SkyView System Installation Guide for instructions on how to change the displayed units. If OAT is not valid (i.e., disconnected or damaged), then "OAT ---" is displayed.

Figure 27– Example OAT

Pitch Warning Indicators

The SkyView PFD shows large red arrows as pitch warning indicators in extreme attitudes (i.e., 45 degrees or greater pitch up or down). These indicators point to the horizon and indicate which way to maneuver to attain a level attitude. Indicators are accompanied with a small sliver of sky or ground bordered with a white dashed horizon line, depending on the current attitude. Figure 28 illustrates the pitch up warning arrows with the slivers of ground.

Figure 28–Unusual Pitched Up Warning Arrows

Top Bar

The clock is part of the Top Bar which is always displayed regardless of the screen layout.

The clock is always displayed centered at the top of the screen in all screen display modes on the Top Bar in 24 hour/military format. Time is initially sourced from a GPS feed and is only displayed when valid GPS data is being received or if (primary or battery) power has been maintained continuously since valid GPS data was received. If there has never been an initial GPS time set or time has been lost due to loss of power,"--:--:--" is displayed. When valid GPS data is received again, time will be displayed.

Figure 29–Example SkyView Clock

Reference the How to Configure the Top Bar Section of this guide for instructions on how to configure the Top Bar.

5. EMS Operation

This chapter describes SkyView EMS functionality and a few of the advanced ways to use it to monitor the health and operation of your engine.

This chapter references the Engine Information page. This page should have been configured during SkyView installation. Reference the SkyView System Installation Guide for more information.

Engine Page Layout

The three Engine pages (100%, 50%, and 20%) should have been configured during installation. The appearance of the 20% and 50% Engine pages are not scaled down versions of the 100% Engine page. They are unique layouts and must be laid out individually.

The Engine Page as shown in Figure 30 displays important engine parameters acquired using an SV-EMS-220 module, its sensors, and other advanced engine monitoring features.

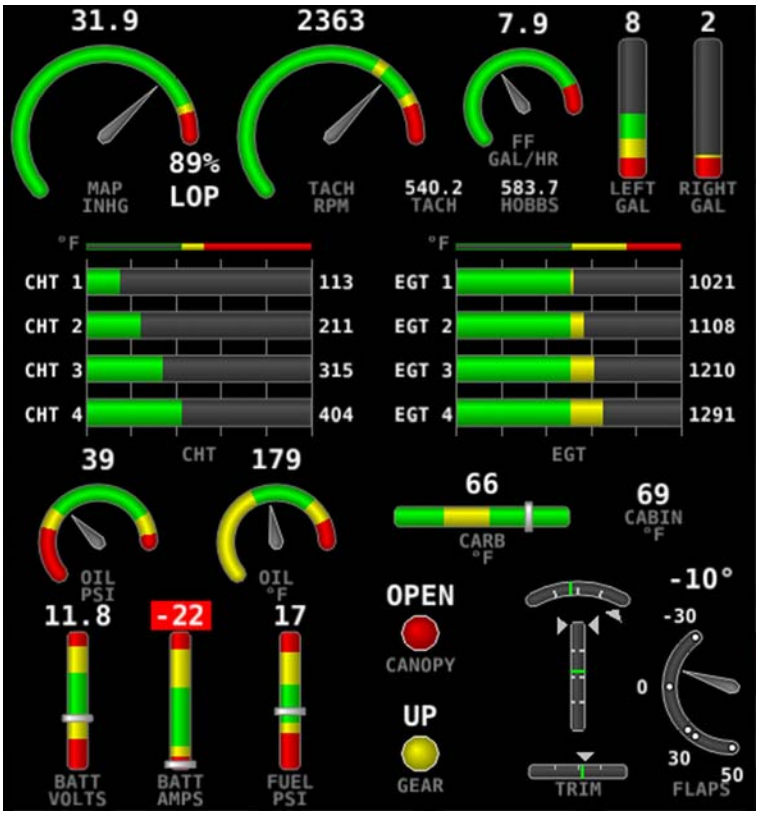


Figure 30–Example 50% SkyView Engine Page

Its appearance is determined using the Screen Layout Editor under the EMS Setup Menu and should have been configured during installation. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

Combined CHT/EGT Gauge

The combined CHT/EGT Gauge shown in Figure 31 displays all of the engine's CHTs and EGTs in one compact gauge. EGTs are displayed numerically down the right side of the gauge. They are represented graphically by the solid yellow/green/red bar graph. CHTs are displayed numerically on the left side of the gauge. They are graphically represented by the white "tick marks" that overlay the EGT bars. When caution or alarm points are red, this tick mark changes colors with the numbers. This representation allows all CHTs and EGTs to be displayed in a way that affords quick comparison of their values, whether raw data or a graphical comparison is preferred.

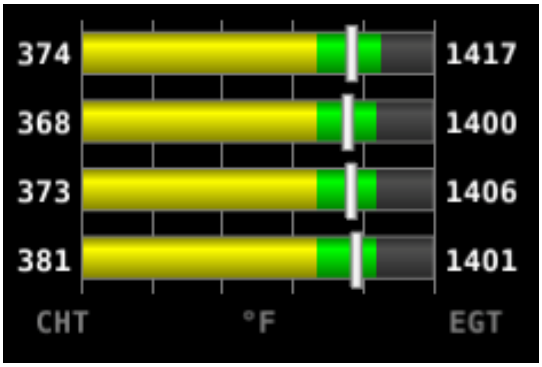


Figure 31 - Combined CHT/EGT Gauge

Engine Menu

LEAN

The engine monitor provides multiple methods to assist you in setting the mixture of your engine for various functions. The first, and most basic, is to just watch the EGT display as the engine is richened or leaned. You can watch for the EGTs to peak and then richen or lean as desired from that point. The engine monitor also includes a leaning function to automate this process.

To activate leaning mode, press LEAN. With this mode activated, LEAN highlights, and the label "LEAN" is displayed underneath the EGT bars to clearly differentiate it from the normal operating mode. This is depicted in Figure 32.

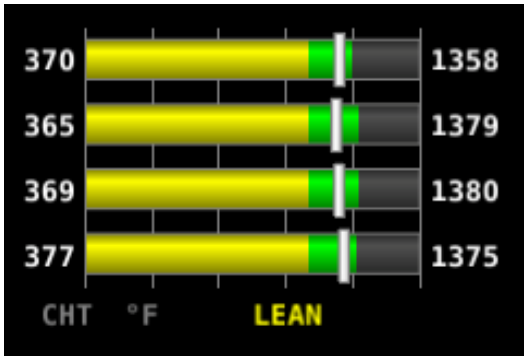


Figure 32–Entering Lean Mode

As each cylinder peaks, the cylinder numbers on the left side of the EGT bars are replaced by a number indicating the cylinder peak sequence, followed by the difference from its peak temperature (on combined EGT/CHT graphs pages, this information replaces the EGT temperature itself due to space constraints). Given this information, you may set your mixture more accurately to achieve a given EGT delta value on either the rich or lean side of peak EGT. This is depicted in Figure 33.

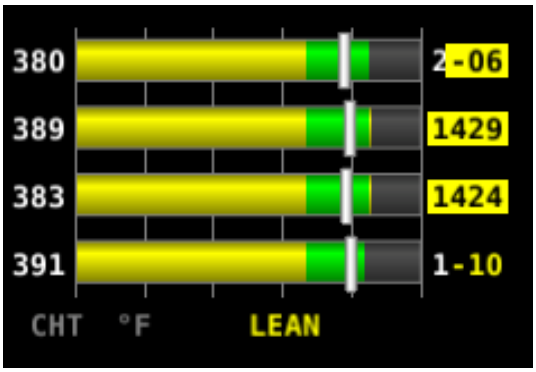


Figure 33–EGTs Peaking

After the last cylinder peaks during a leaning operation the difference in fuel flow between the first and last cylinder peaks is displayed. If the fuel flow decreases, it is shown as Lean of Peak. If fuel flow increases, it is shown as Rich of Peak. This is depicted in Figure 34.

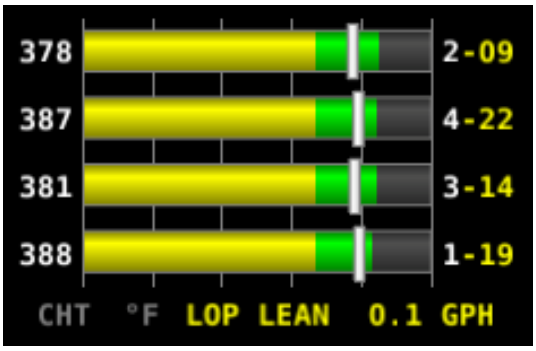


Figure 34–Lean of Peak

To exit the Lean mode, press LEAN again; the EGT/CHT display then returns to its normal state.

For best results, lean carefully by making small adjustments and allowing some time for temperatures to stabilize before leaning further. In addition to the EGT temperatures, you can also watch the fuel flow rate and CHT temperatures. Carefully read and follow your engine manufacturer's leaning recommendations for best performance.

On some engines, when given the proper set of inputs, the EMS can also calculate lean-of-peak or rich-of-peak operation in real time. To do this, the EMS needs access to OAT, MAP, RPM, Altitude and fuel flow, and be used on a normally aspirated Lycoming or Continental engines. This information is based on Lycoming and Continental power charts and is updated in real time. The leaning information has three states, LOP, ROP, and PK (Peak). This information can be used to determine when it is safe to lean the engine, and if the current operating state is near peak or not. While this information is based on published charts, you should independently verify via manual leaning that this data matches your install and engine.

FUEL

FUEL primarily contains controls for adjusting the fuel computer. See the dedicated Fuel Computer section for details on fuel computer operation.

CLR TMR

Press CLR TMR to reset both the Engine Trip Timer and the Flight Trip Timer to 0 hours. See the Timers section for more information on timer functions.

Timers

SkyView has internal tach , Hobbs, and other timers that each run at different times. EMS timers are available for placement on the Engine pages via the Screen Layout Editor. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

Tach time is a measure of engine time normalized to a cruise RPM. The cruise RPM parameter must be set properly on the Engine Information page to generate a correct tach time.

Hobbs time is a simple timer that runs whenever the oil pressure is above 15 PSI or the engine is above 0 RPM. It essentially runs when the engine does.

The Engine Run Timer is a Hobbs style timer that records the time your engine has been running during your current flight. It resets the first time the engine is started after SkyView is powered on. This allows you to view your previous flight's Engine Run Time anytime before you start your engine before a flight.

The Engine Trip Timer is a Hobbs style timer that records the time your engine has been running. Unlike the Hobbs time, it can be reset by pressing EMS > CLR TMR.

The Total Flight Timer runs any time that SkyView determines that the aircraft is in flight. SkyView uses the presence of significant airspeed or GPS speed to decide whether the aircraft is flying. This timer can only be reset in the Setup Menu.

The Flight Trip Timer runs any time that SkyView determines that the that the aircraft is in flight, just like the Total Flight Timer. Unlike the Total Flight Timer, it can be reset by pressing EMS > CLR TMR.

Fuel Computer

The Fuel Remaining, Fuel Used, Fuel Efficiency, Fuel at Waypoint, and Range values are not directly measured. These values are calculated based upon measured flow rates and *user input* of fuel quantity. Do not use these values as primary indicators.

By using the optional fuel flow sensor and GPS information together, SkyView can generate and display different info items that pertain to your aircraft's computed fuel state and performance. They are available for placement on the Engine pages via the Screen Layout Editor. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

The Fuel Remaining info item displays the current amount of fuel computed on board, based on your input of the aircraft's starting fuel state and the amount of fuel that has the fuel flow sensor has seen flow through it.

The Fuel Used info item displays the amount of fuel that has been used during your flight. Note that Fuel Used resets itself when the unit detects that oil pressure has exceeded 15 PSI for the first time after being powered on. This allows you to view the fuel used value from your last flight before engine start.

The Time Remaining info item displays how much time is estimated remaining before the aircraft is out of fuel.

The Fuel Efficiency info item displays how efficiently the aircraft is using fuel with respect to the speed it is traveling over the ground (mi/gal, kt/gal, km/ltr).

The Fuel at Waypoint info item displays how much fuel will remain at the next waypoint. This info item uses the current HSI nav source for waypoint information, and only displays information when there is a waypoint being navigated to. It assumes you are flying directly at the waypoint and does not adjust for non-direct flights.

The Fuel Range info item displays the distance the aircraft can travel at its current GPS ground speed before it is out of fuel.

Fuel Menu (Adjusting the Fuel Computer)

To obtain accurate data, you must reset the fuel computer every time you add fuel to the aircraft. SkyView can assist with this through the Fuel Auto Detect setting described in this section.

Fuel computer adjustments are made under the EMS > FUEL menu. When FUEL is pressed, the window in Figure 35 is displayed:

Figure 35–Fuel Computer and Fuel Menu

- Fuel Added/Subtracted is the amount of fuel that you have told the fuel computer to presently add or subtract from the previous total fuel state.
- Total Fuel is the total amount of fuel on board. This is the number that ultimately needs to be correct in order for the fuel computer to accurately perform its calculations.
- Measured Fuel is the amount of fuel measured by the resistive or capacitance senders, if installed. If these are well-calibrated, then the Total Fuel and the Measured Fuel lines should be very close to each other.

There are a few different ways to adjust the fuel computer's fuel state:

- While the FUEL menu is displayed, turn the FUEL knob to add or subtract fuel. This is limited to adjustments that set the Total Fuel to between 0 and the total fuel capacity as defined in the Setup Menu.
- Press FULL to have SkyView recall a previously programmed amount of fuel which represents the full fuel load of the aircraft. See the SkyView System Installation Guide for information about how to set this value.
- Press PRESET to have SkyView recall a previously programmed amount of fuel which represents different fuel loading besides "full". This is commonly used in aircraft that have visual tabs in the tanks to easily fill to a non-full but well-defined fuel state.. See the SkyView System Installation Guide for information about how to set this value.
- Press MATCH to have SkyView automatically add/subtract the appropriate amount of fuel so that Total Fuel matches the Measured Fuel value that the physical fuel tank sensors are measuring. Press ACCEPT to confirm the new displayed Total Fuel and exits the FUEL menu,
- Press CANCEL to discard any changes made to the Total Fuel and exits the FUEL menu.

Beware that the value that SkyView adjusts the fuel computer when MATCH is used is only as accurate as your fuel level sensor measurements.

Auto Fuel Detect

The fuel computer can optionally be configured to detect when fuel has been added while SkyView was off, as would be the case during a normal refueling operation. When configured to detect fuel additions, SkyView will automatically display the FUEL menu upon startup as a reminder to adjust the fuel computer.

6. Transponder Operation

Dynon Avionics offers two transponder modules that can be connected to SkyView. When installed and configured, SkyView displays gain an integrated transponder that is controlled directly from the SkyView screen.

The SV-XPNDR-262 is a Class 2 Mode S transponder that is limited to use beneath 15,000 feet and under 175 knots. The SV-XPNDR-261 is a Class 1 Mode S transponder that can be used above those limitations. Throughout this manual, they are often referred to together as the SV-XPNDR-26X for instructions that apply to both versions. Be sure that your aircraft is operated within the limitations of the transponder model that is installed in your aircraft.

When connected to a capable GPS, the SV-XPNDR-26X will output ADS-B OUT messages via its 1090ES capability.

The SV-XPNDR-26X transponder is controlled using the SkyView's on-screen menu system. This allows the transponder to be mounted separately from the instrument panel, and reduces the amount of panel space taken by the transponder. SkyView also provides pressure altitude directly to the transponder, eliminating the need for a separate altitude encoder.

Transponder Status

When the transponder is installed and configured, the top bar will display transponder status as shown in the following figure:

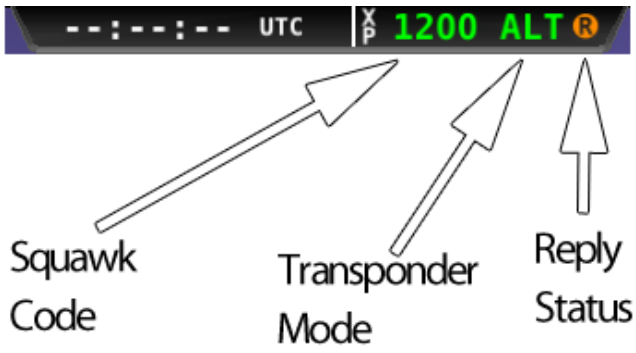


Figure 36 - Transponder Status Area in Top Bar

The transponder status area is comprised of the following status elements:

- Squawk Code: This code is transmitted when the transponder is in a broadcast mode.
- Transponder Mode: Displays the current operating mode and status of the transponder. Modes in which the transponder will reply to interrogations are colored green, while other modes, such as standby and errors, are in yellow or red. The different modes possible include:

a. SBY: The transponder is on, but will not reply to any interrogations.

b. GND: The transponder will respond to Mode S ground interrogations from surface movement radar.

c. ON: The transponder will respond to all interrogations, but altitude reporting is suppressed.

d. ALT: The transponder will respond to all interrogations.

e. IDT: Displayed while the transponder is broadcasting an ident after the IDENT button is pressed at ATC's request.

f. Big red "X" (covering entire transponder status area): Indicates an error, either with the transponder itself or in the communication between the transponder module and SkyView. The transponder is not responding to interrogations. Check the wiring and settings between the transponder module and SkyView if you are authorized to maintain your aircraft. Contact Dynon Avionics for further assistance.

- Reply Status: The reply indicator illuminates when the transponder replies to interrogations.

When connected properly, third party transponders such as the Garmin GTX 330 and GTX 327 can provide status as described above. However, they can not be controlled from the SkyView display as the SV-XPNDR-26X can.

Transponder Menu

Figure 37 - Transponder Menu Example

When the Dynon SV-XPNDR-26X transponder module is installed and configured, the Transponder Menu becomes accessible from the Main Menu by pressing XPNDR (MAIN MENU > PFD). All transponder operation can be accomplished from this menu. There is no dedicated or separate control panel needed (or available). Due to the momentary way in that the transponder controls are used, the XPNDR menu is conveniently cleared after a few seconds of inactivity.

Note that there are some situations when the selected transponder mode may be different from the status annunciated in the Transponder Status Area. For example, if you select ALT mode, but there is a squat switch installed, it will keep the transponder in GND mode until the aircraft has become airborne. The requested ALT mode would then be activated.

BACK

Press BACK to return to the Main Menu.

GND

Press to set the transponder to ground mode. In ground mode, the transponder will respond to Mode S ground interrogations from surface movement radar. When active, the GND button will remain highlighted in this menu, and GND is annunciated in the transponder status area in the top bar. When the transponder is in ground mode, pressing GND again will turn ground mode off and put the transponder in standby mode.

ON

Press to set the transponder to respond to all interrogations, but with altitude reporting suppressed. When active, the ON button will remain highlighted in this menu, and ON is annunciated in the transponder status area in the top bar. When the transponder is on in this mode, pressing ON again will turn put the transponder in standby mode.

ALT

Press to set the transponder to respond to all interrogations with altitude reporting. When active, the ALT button will remain highlighted in this menu, and ALT is annunciated in the transponder status area in the top bar. When the transponder is on in this mode, pressing ALT again will turn put the transponder in standby mode.

CODE

Press to type in a squawk code. If you make a mistake while typing a squawk code, stop typing and after a few seconds the CODE menu will exit automatically without changing the squawk code. Codes that are standardized include:

1200	VFR code in the USA
7000	VFR code commonly used in Europe.
7500	Hijack code
7600	Loss of communications
7700	Emergency code

VFR

Press to quickly tune the VFR squawk code. This is usually 1200 in the US and 7000 in Europe. Refer to the Installation Guide to set the VFR code that this button tunes. Once pressed, the VFR button will remain highlighted until the transponder code is changed to show that you are in VFR mode. Press the button while VFR is highlighted to return the transponder to the last code tuned.

IDENT

Press to ident when requested to “ident” by ATC. IDT will be displayed in the Transponder Status Area for the next 18 seconds as the transponder sends the ident signal. Note that if a button is pressed to change the transponder mode or to turn it off, that action will be delayed until the ident transmission completes.

Reported Pressure Altitude

At times it may be useful to know the altitude that is being reported to the transponder. Since SkyView sends pressure altitude to the SV-XPNDR-26X, setting BARO to 29.92 will display the pressure altitude being transmitted to the transponder in the normal SkyView altitude display on the PFD page.

ADS-B OUT Transmissions

If SkyView has a valid GPS signal and a SV-XPNDR-26X module is installed and working, it automatically provides ADS-B output at the appropriate integrity level for the GPS signal being used.

ADS-B OUT transmissions that meet the 2020 FAA ADS-B equipment mandate require that a TSO 146c GPS signal be directly provided from the GPS to a capable ADS-B device (such as the SV-XPNDR-26X). For this purpose, a dedicated serial input is provided on the SV-XPNDR-26X module that allows an appropriate GPS receiver serial output to be connected directly to the SV-XPNDR-26X. At the time of writing, the SV-XPNDR-26X is certified to TSO C166a. The FAA has recently mandated TSO C166b for NextGen implementations, and a TSO-C166b software upgrade for the transponder is planned. The current SV-XPNDR-26X is compatible with Aviation format GPS outputs, used by Bendix/King, Garmin and others, as well as some high-end GPS modules not likely to be used in a homebuilt or LSA aircraft. The popular Aviation format output will not meet all the integrity requirements of the FAA NextGen system, and therefore our TSO C166b software will include additional GPS interfaces as they become available. This means that currently, the SV-XPNDR-26X’s ADS-B transmissions are not at a high enough integrity level to meet the FAA’s 2020 ADS-B equipment mandate.

Refer to the installation guide for information on connecting a TSO 146c GPS directly to the SV-XPNDR-26X for this compliance.

7. SV-MAP-270 Navigation Mapping Software Operation

This chapter outlines what users should expect from SkyView's Navigation Mapping Software capabilities and also covers operations that are specific to this function.

SkyView's Moving Map requires valid GPS and terrain data to function as a real time, track up, look down topographical map. Aviation data is further required to show airspaces, airports, airport identifiers and VOR's overlaid on top of the map. More information about these three requirements is contained in this chapter.

The current release of the SkyView Moving Map supports zooming, but not panning. Panning will be added in a future firmware update.

Use of the Navigation Mapping Software beyond an initial 30 flight hour free trial period requires the purchase of an Navigation Mapping Software license. This section contains detailed information about how this purchase is made and the software activated in your SkyView system.

Starting with SkyView software version 3.0, the SV-MAP-270 Navigation Mapping Software is available for purchase for a one-time $500 charge. The Navigation Mapping Software replaces the free trial of the map that was previously available.

In place of the unlimited free trial period that existed prior to version 3.0, all SkyView systems have a 30 flight hour free trial of the Navigation Mapping Software that allows you to try it out before you purchase it. After the 30 flight hour free trial period expires, the MAP menu and all navigation and mapping features will cease to be available until a Navigation Mapping Software License is activated. Additionally, other features that rely on aviation/obstacle databases, such as the depiction of runways and obstacles on synthetic vision, are also unavailable without a Navigation Mapping Software License.

License Information

The SV-MAP-270 Navigation Mapping Software license is activated by purchasing a license code from Dynon Avionics and entering it into your SkyView system. Only **one** Navigation Mapping Software license is needed in a SkyView system, no matter how many displays are attached. That license is applied to only one display, but that display stores the license information for the entire system. In normal use, license information is shared with all displays connected via SkyView Network to allow the Navigation Mapping Software to be operated on any screen.

Checking License Status

If the MAIN MENU > MAP menu can be entered on every display in the system and SkyView doesn't present the "MAP TRIAL MODE" message when the MAP page is first displayed on boot, Navigation Mapping Software is licensed for use in your Aircraft.

If Navigation Mapping Software is not available, then either the system is not licensed or there is no valid aviation database in the system. To determine which of these is the case, check the status of the license in the Setup Menu under SETUP MENU > LOCAL SCREEN SETUP > LICENSE. See the SkyView Installation Guide for more details about using Setup to check licenses.

In some cases, SkyView may display one of the following messages when the Map page is first displayed after boot:

- LICENSED DISPLAY OFFLINE - XX HOURS REMAIN: The system is licensed, but the display that actually stores the license is not currently connected. If the display that stores the license is not returned to the system when this countdown expires, the display will revert to an unlicensed state. This feature is intended to allow the map to continue to function in the even that the display that stores the license fails or is out of the airplane for repair.
- MAP TRIAL MODE - XX HOURS REMAIN: The system is not licensed, but the Navigation Mapping Software is in its 30 free flight hour introductory trial period. At the end of this period, the map will cease to function until a license is purchased. Note that this timer is only checked on boot. If it expires during a flight, the Navigation Mapping Software will remain available for the remainder of that flight.

Features Overview

Once licensed, the following features are enabled as long as SkyView has the appropriate high resolution terrain database installed for the region of the world that you are flying in, and an aviation database installed.

- Use of MAP menu and features, including:
    - Display of airport, airspace, obstacles, traffic, and other aviation data that is available (capabilities depend on available databases and other installed equipment).
    - All Navigation Mapping Software features available via the MAP menu.
    - Display of obstacles and runways on Synthetic Vision (if Synthetic Vision is licensed).
    - All future updates to the SV-MAP-270 Navigation Mapping Software product (databases may incur additional costs).

Purchasing and Installing a Navigation Mapping Software License

A license can be purchased in one of two ways:

1. Call Dynon Avionics directly at 425-402-0433 with your SkyView display model (SV-D100 or SV-D700) and serial number (as displayed on the case sticker, or in SETUP MENU > LOCAL SCREEN SETUP > SCREEN HARDWARE INFORMATION). An SV-MAP-270 Navigation Mapping Software License Code can be purchased for the entire aircraft you wish to enable the Navigation Mapping Software on. This six character License Code is then entered in SETUP MENU > LOCAL SCREEN SETUP > LICENSE > LICENSE CODE. If you have more than one display in the aircraft, choose one to install it onto and provide

information for only that display. Once any display is licensed, all connected displays in the Aircraft can use the Navigation Mapping Software.

2. An SV-MAP-270 SkyView Navigation Mapping Software Certificate may be purchased from Dynon Avionics or any authorized Dynon Avionics retailer. This certificate can be redeemed for a license code that can be entered in SETUP MENU > LOCAL SCREEN SETUP > LICENSE > LICENSE CODE. To redeem a certificate simply follow the instructions on the certificate itself. Similar to the above, you will need to redeem your certificate by visiting license.dynonavionics.com with your SkyView display model and serial number ready. Alternatively, you can call Dynon Avionics directly at 425-402-0433 to redeem a certificate.

Databases

In addition to being Licensed, SkyView utilizes a variety of databases to display information on the moving map and present options for navigation. These include:

- Terrain data: A high resolution terrain database data is used to display the topographic map. Available worldwide for free from Dynon Avionics.
- Aviation data: Airports, nav aids, airspace, airport information, etc. Available for free for US customers from Dynon. Jeppesen-provided data available for all other customers worldwide.
- Obstacles data: Available for free for US customers from Dynon. Jeppesen-provided data available for all other customers worldwide.

Viewing Information about Installed Databases

The Installed Databases Page (SETUP MENU > LOCAL SCREEN SETUP > INSTALLED DATABASES) allows users to see the databases installed on their equipment as well as their respective versions and expiration dates. The sections below outline the various databases that are installed in SkyView.

Terrain Data

SkyView uses high resolution terrain data to display the base topographic map on the MAP page, as well as to display Synthetic Vision on the PFD page. SV-D1000s and SV-D700s ship preloaded with terrain data for North America (includes the continental United States, part of Alaska, most of Canada, Mexico, part of Central America, and the West Indies). Dynon offers downloadable high resolution terrain data files for other regions of the world on its website at www.dynonavionics.com/docs/terrain.html.

To update the terrain data in a SkyView display, download the appropriate file onto a USB flash drive (a 4 GB drive is included with every SkyView display) and then reference the Loading Databases Section of this guide for instructions on how to import the file onto a SkyView display.

Aviation/Obstacle Databases

Aviation and obstacle databases are used to display airports, runways, nav aids, airspace, obstacles, and other aviation data on the moving map. It also makes allows SkyView to provide detailed information about aviation features. SkyView can also provide navigation to these aviation features.

US Customers Only - Free Dynon Aviation and Obstacle Data

Aviation and Obstacle data is available free-of-charge for US customers. Go to downloads.dynonavionics.com, to download these databases to a USB memory stick. Reference the Loading Databases section below of this guide for instructions on how to import the file onto a SkyView display. Aviation data is updated every 28 days. Obstacle data is updated every 56 days.

Worldwide Customers - Jeppesen NavData® and Obstacle Data Services

Aviation and Obstacle for customers outside the US is available from Jeppesen. Only one update or annual subscription purchase is needed per airplane. To purchase Jeppesen data:

- Visit www.JeppDirect.com/viewavionics for data subscription information from Jeppesen for your SkyView display.
- To order service, please call Jeppesen at:

U.S. & Canada	United Kingdom	Europe (except UK), Middle East, Africa and Asia	Australia
Toll-Free: 1-866-498-0213 Direct: 1-303-328-4030	Toll-Free: 0 (800) 085 5377 Direct: +44 129 384 2400	Toll-Free: 0 800 5377 3736 Direct: +49 6102 5070	Direct: +61 261 202 999

- Reference the Loading Databases section below of this guide for instructions on how to import the file onto a SkyView display.

Additional technical support from Jeppesen can be found online at http://www.jeppesen.com/support/technical-support.jsp

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Loading Databases

3. Download database file(s) from downloads.dynonavionics.com
4. Copy the file onto your USB flash drive. *The file must be in the root directory of the drive in order to be recognizable by the display.*
5. Insert the USB flash drive into one of the display's USB sockets.
6. Go to the Load Files Wizard (SETUP MENU > SYSTEM SOFTWARE > LOAD FILES…).
7. Select a file and press:

   a. LOAD to load the file onto the system.
8. Exit Setup
9. In SkyView systems that have more than one display, databases are automatically synchronized to other connected displays provided that those displays are connected via Ethernet. If they are, and you have the MAP page up on other displays, you may see a SYNCHRONIZING DATABASES message appear as this process occurs. If you do not have your displays connected via Ethernet, simply load the database to each screen individually.

Removing Databases

SkyView automatically removes databases when new ones are installed. They can also be removed manually by going to SETUP MENU > LOCAL SCREEN SETUP > INSTALLED DATABASES. Highlight the database you wish to remove, and then press the REMOVE button.

The FAA periodically publishes Aviation Data updates. It is the user's responsibility stay current with these updates and keep their equipment up to date.

GPS Source

The SkyView System Installation Guide contains comprehensive instructions for physically installing, electrically connecting, and configuring a GPS device to work in a SkyView system. This guide assumes these steps have been properly executed. You should be familiar with the information in the SkyView System Installation Guide regarding this topic.

SkyView's Moving Map display depends on the system having a valid GPS source. In the event of the failure of the primary GPS source used to display the Moving Map, SkyView will automatically use other available GPS sources that are configured in the system. SkyView determines which GPS source to use by using the following prioritized list of GPS sources:

POS 1 ▸ GPS 1 ▸ GPS 2 ▸ GPS 3 ▸ GPS 4 ▸ POS 2 ▸ POS 3 ▸ POS 4

See the SkyView System Installation Guide for more information on setting up GPS sources.

If you need to check the status of your GPS source:

1. Enter the Serial Port Setup Menu (IN FLIGHT SETUP MENU > ENTER FULL SCREEN SETUP MENU… > LOCAL SCREEN SETUP > GPS FIX STATUS).

Moving Map Page Layout

The Moving Map Page as shown in Figure 38 displays a real-time topographical map in track-up mode. The map is sourced from a database that is stored inside the display and correlated to your current position using a GPS feed.

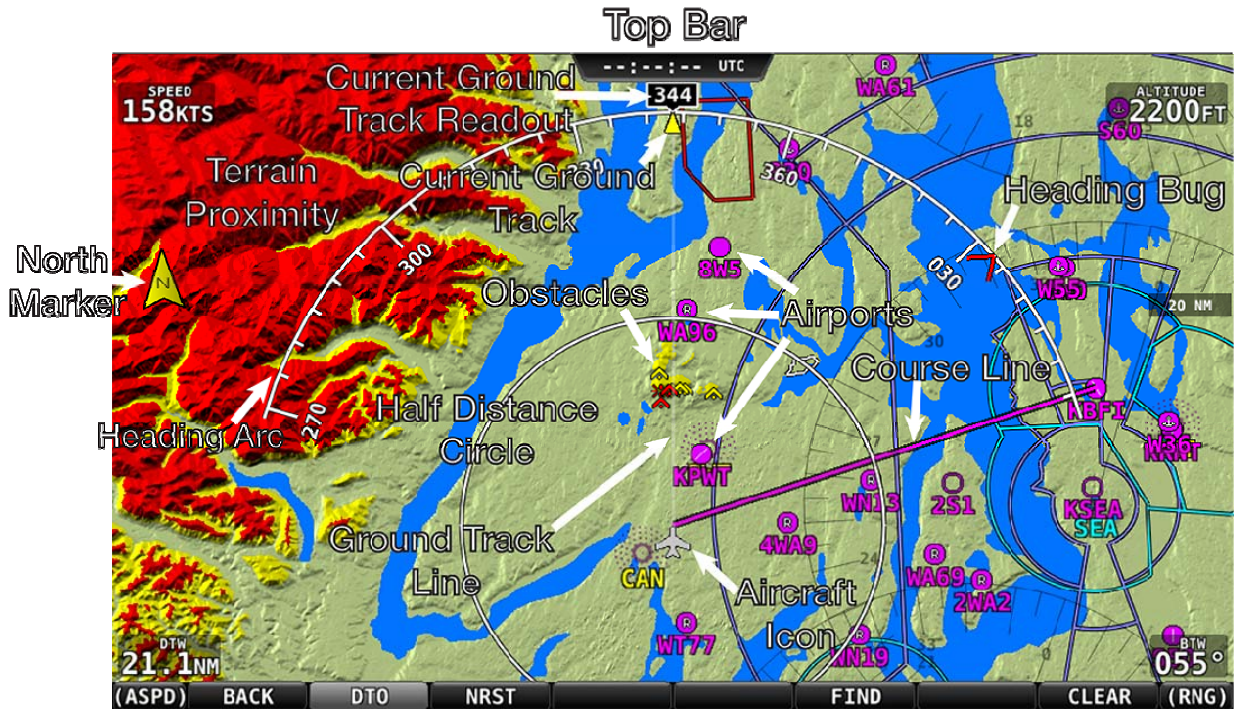

Figure 38–SkyView Moving Map

The following items are displayed on the Moving Map Page shown in Figure 38:

- Topography (terrain and bodies of water) with Terrain Proximity Alerting
- Aircraft Icon with Ground Track Line
- Half Distance Circle and Range
- Heading Arc, Current Ground Track, Heading Bug, Magnetic North Marker
- Configurable Info Items. Examples include GPS Ground Speed (SPEED), GPS Altitude (ALTITUDE), Distance to Waypoint (DTW), and Bearing to Waypoint (BTW).
- Course line (only displayed when actively navigating to an aviation waypoint)
- Airports with runways (if known)
- Obstacles
- Airspace (with floors/ceilings)

SkyView uses a map projection that does not distort distance. This means that the courses - which are the ideal “great circle” routes - appear as straight lines on the screen.

Moving Map Symbology

Topography with Terrain Proximity Alerts

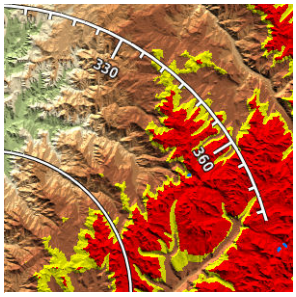

Figure 39–Topography with Terrain Proximity

SkyView's Terrain Proximity Alerting should not be used as the primary terrain avoidance tool. It should be used as an aide with primary navigation instruments, charts, and other tools.

Moving map terrain is displayed in sectional chart color variations, representing various topographical elevations. Major bodies of water are displayed as solid blue.

The SkyView Moving Map also adds Terrain Proximity Alerting:

- *Yellow* terrain is between 100 and 1000 feet below the aircraft's current altitude.
- *Red* terrain is within 100 feet below or above the aircraft's current altitude.

Aircraft Icon with Ground Track Line

The aircraft icon as shown in Figure 40 represents your aircraft on the Moving Map Page. The ground track line represents the projected ground track of the aircraft. The aircraft icon in the figure below denotes that SkyView has obtained a GPS fix. When GPS communication is present, but a fix has not been obtained, a question mark (?) shows up on top of the icon.

Figure 40–Aircraft Icon (left) and Ground Track Line (right)

Range and Half Distance Circle

The range parameter is the distance on the map between the aircraft icon and the heading arc (the heading arc is described in the next section). The distance between the aircraft icon and the half distance circle is half the specified range.

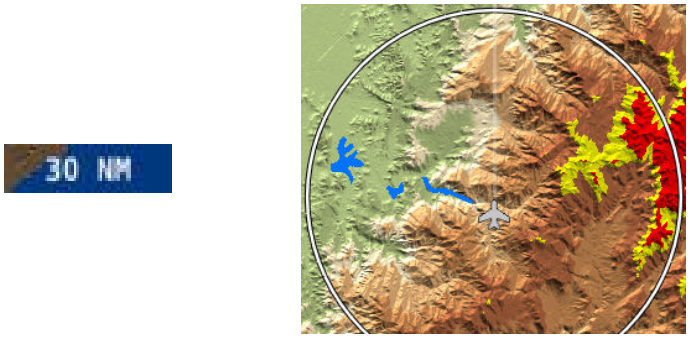

Figure 41–Range and Half Distance Circle

The range value is displayed in the lower right hand corner of the Map Page, regardless of page size. Turn the (RNG) joystick to adjust the range. Range can be adjusted between 0.5 and 800 units. Units can be set to miles, nautical miles, or kilometers. Reference the SkyView System Installation Guide instructions on how to change the displayed units.

The heading arc is explained in the next section.

Heading Arc, Current Ground Track and Marker, Heading Bug, North Marker, and Course Line

Current ground track symbology displays magnetic heading when the aircraft is on the ground.

The heading arc as shown in Figure 42 displays a total of 150 degrees and is centered on the current ground track.

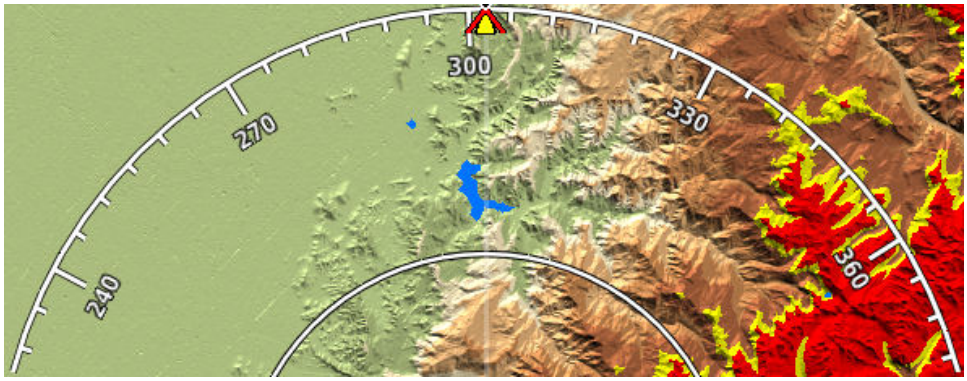

Figure 42–Heading Arc

The current ground track as shown in Figure 43 is displayed in two ways: the digital readout and the yellow triangle.

Figure 43–Current Ground Track

The heading bug as shown in Figure 44 is represented with a red triangle. Reference the Heading/Track Bug Section for instructions on how to adjust the heading bug.

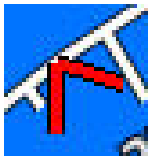

Figure 44–Heading Bug

The north marker as shown in Figure 45 is represented with a yellow arrow marked with an “N” and points to Magnetic North.

Figure 45–North Marker

The magenta course line shown in Figure 46 appears whenever the Navigation Mapping Software is navigating to an active waypoint. It is the shortest path between the two points that it connects on the map.

Figure 46 - Course Line

Obstacles

SkyView's moving map represents obstacles using the same symbology found on sectional charts, as shown in Figure 47 and Figure 48. Only high-intensity lighted obstacles are shown as lit.

Obstacles are shown on the full map from minimum zoom level up to, but not including, 80 NM. When shown, the geographic location of the obstacle is represented by the tip on single icons and the point directly between the tips of group icons.

Obstacles are only shown on the moving map if their highest point is within 1000 feet below your aircraft's GPS altitude. If the highest point of an obstacle is within 100 feet below your current GPS altitude to anywhere above you, it will be red. If the highest point of the obstacle is between 100 and 1000 feet below your current GPS altitude, the obstacle will be yellow. This is the same color scheme mentioned in the Topography with Terrain Proximity Alerts Section.

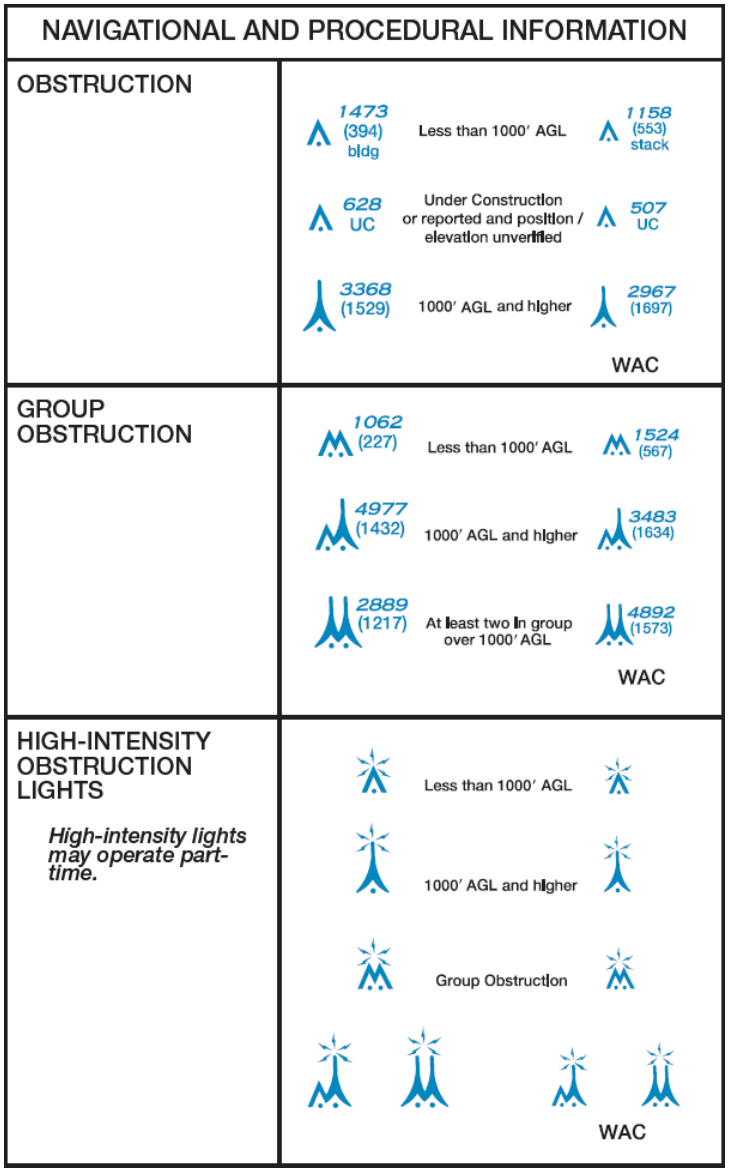

Figure 47–FAA Sectional Chart Obstruction Key

Figure 48–Obstacles on the Map

Airspace

Figure 49 - Airspace Altitudes on the Map

SkyView's moving map represents different classes of airspace with the colors specified in Table 6. Airspaces are displayed from the minimum zoom level up to, but not including, 200 NM. No airspaces are displayed at zoom levels of 200 NM or greater.

The floors and ceilings of airspaces are shown within each airspace segment in the familiar sectional-style notation.

Airspace Class	Color
B	Solid dark blue
C	Solid magenta
D	Light blue
E	Not shown
Restricted and Prohibited	Red
Warning	Orange
Military Operations Area (MOA)	Yellow
Alert	White
National Security Area (NSA)	White
Mode C Veil	Not shown
Temporary Flight Restrictions (TFR)	Not shown
Air Defense Identification Zone (ADIZ)	Not shown

Table 6–Airspace Colors

Navaids

SkyView's moving map displays navaids such as VORs, fixes, and NDBs.

VORs

SkyView's moving displays VORs, VOR-DMEs, and VORTACs with the same icons used on sectional charts as shown in Figure 50.

VOR **VOR-DME** **VORTAC**

Figure 50–Moving Map VOR Icons

Each VOR has a floating identifier which hovers near its icon as well as a gray compass rose ring that shows the orientation of the VOR's radials.

Fixes

SkyView represents a fix using a light blue triangle with a six character name underneath as shown in Figure 51.

Figure 51–Moving Map Fix

NDBs

SkyView represents a NDB using the same symbol that is used on a sectional chart with a three character name underneath as shown in Figure 52.

Figure 52–Moving Map NDB

Airports

SkyView represents an airport with a circle and a text name. If more information is provided in the database, a modifier may be added to the icon. A line in the circle represents the direction of the primary runway. Other symbology may be used in the circle such as an "R" to denote a private airport, an anchor to denote a seaplane base, or a ring to denote a military airport.

Airport **Airport (primary runway direction indicated)** **Private Airport** **Seaplane Base** **Public Airport (no hard surface runway)**

Figure 53–Moving Map Airport Example Icons

Traffic

When a device that can receive traffic information is installed and configured, traffic can be displayed on the Map Page to improve situational awareness. See the SkyView Installation Guide for details on how to turn the display of traffic on and off.

Figure 54 - Traffic Display on Map Page

SkyView can receive traffic information from a variety of devices. This currently includes TIS traffic supplied by the SV-XPNDR-26X or Garmin GTX 330 Transponders, passive traffic from the Zaon XRX, and the NavWorx ADS-B receivers.

Traffic is displayed on the Map Page in the location that it is reported to be in by the connected traffic device.

Traffic information is informational only, and does not relieve the pilot-in-command of their responsibility to see and avoid traffic.

	Traffic is displayed as reported by the device sending it to SkyView. The precision and accuracy of the location of traffic targets may vary from device to device, and this may impact how accurately the position is represented on the SkyView display. For example: TIS traffic updates, such as those received by the SV-XPNDR-26X, may be anywhere from 2-12 seconds old due to radar latency and other technical factors. Be sure to understand the traffic-detection capabilities of your traffic device thoroughly so you understand how to best interpret the position of the traffic displayed on SkyView.

Traffic Target Information

Figure 55 - Traffic Target

Traffic is displayed using a set of symbols that are commonly used in aviation for traffic/TCAS systems. As seen in Figure 55, this includes:

- A symbol that depicts the type of traffic. It can be a Traffic Advisory Symbol, Proximity Advisory Symbol, or Non-Threat Symbol. These are further discussed later in this section. Data being received by a TIS device, such as the SV-XPNDR-26X, is limited to 8 simultaneous targets by the inherent capability of the TIS system. If there are more than 8 traffic targets that are potential threats, the TIS ground station determines the highest priority targets and transmits them to your aircraft.
- Relative altitude in hundreds of feet is displayed above the symbol as a signed integer. So, the target in Figure 55 is +08, or 800 feet higher than our aircraft. This area is blank if the altitude of a target is not known.
- An up or down arrow to the right of the traffic symbol indicating whether the aircraft is climbing or descending, if available from the traffic source. No arrow is shown when an aircraft is maintaining altitude, or if climb/descend information is not available. Traffic from TIS traffic sources such as the SV-XPNDR-26X will not show a vertical speed component unless it is greater than +/-500 fpm
- If available from the traffic device, an orange vector arrow that starts at the target and points in the aircraft's direction of travel. This length of the vector represents where the aircraft is expected to be in one minute based on its current trajectory.
    - The data received by at TIS devices (such as the SV-XPNDR-26X) does not include the speed of aircraft since it is not sent by the ground-based TIS equipment. SkyView therefore assumes that all TIS targets are travelling at 150 knots.
    - TIS additionally only provides the direction that individual traffic targets are moving in to the nearest 45° increment (0 °, 45°, 90°, etc). This limitation may be noticed as a seemingly abrupt change in aircraft direction on the display as the traffic direction "snaps" from one 45° increment to the next when the TIS device updates an aircraft's direction.

Traffic displayed on the MAP page can be configured to include just Traffic Advisories (TA), all targets, or no targets. See the SkyView Installation Guide for information on how to configure how traffic is displayed.

Traffic Advisory (TA) Targets

Figure 56 - Traffic Advisory (TA) Symbol

Figure 57 - TA Symbol (off-screen)

These are targets that have a high chance of ending up near the aircraft. They will often be lower priority targets that then become higher priority targets as they approach. SkyView considers a target a threat if the device providing traffic reports that it is a threat. The TIS system considers a target to be a threat if it is calculated to be within 1/4 mile of your aircraft at its closest approach within 30 seconds (20 seconds if the target is not reporting altitude). Other traffic devices may have different criteria for reporting traffic as threats. Refer to their documentation for more information.

If a target is a Traffic Advisory but can not be displayed on the screen because its location is beyond the edge of the map at its current zoom level, it will appear at the edge of the Map Page, half shaded as seen in Figure 57 above (the darkly shaded area of the Traffic Advisory Symbol will always point towards the edge of the screen). This ensures that you are aware of the threat regardless of map zoom level. Note that the orange vector arrow may not be visible when a Traffic Advisory is off the screen.

Proximity Advisory Targets

Figure 58 - Proximity Advisory

Proximity have less of a chance of being a factor based on their position, but are not a Traffic Advisory because they are not converging with your aircraft within the next 30 seconds. A Proximity Advisory symbol is shown on the map when it is closer than 5 nm and within +/- 1200 ft of your altitude, but doesn't meet the criteria to trigger a Traffic Advisory.

Non-Threat Targets

Figure 59 - Non-Threat

Non-threat Targets are any other detectable aircraft that are neither Traffic Advisory Targets nor Proximity Advisory Targets.

Traffic Receiver Status

Figure 60 - Traffic Status

A widget in the lower right area of the Map Page annunciates the status of the traffic receiver. Possible states include:

- OK SkyView is receiving traffic data from the device and there is at least one target present.
- NONE SkyView is receiving traffic data from the device, and there are no targets present.
- FAIL A traffic device is configured, but no data is being received.

The following two states apply to TIS traffic devices only:

- COAST SkyView has been receiving traffic from a TIS device, but not in the last 6 seconds. After 12 seconds of no TIS traffic updates, the next "no traffic" status below is displayed.
- TFC SkyView is receiving traffic data from a TIS device but there is no TIS radar coverage available.

Traffic Alert

Figure 61 - Traffic Alert

The above alert is shown on both the PFD Page (near the top of the IAS tape) and the Map Page (lower right) whenever there are Traffic Advisory Targets present.

MAP Menu

The MAP Menu is accessible from the Main Menu by pressing MAIN MENU > MAP.

BACK

Press BACK to return to the Main Menu.

D→

The D→ (Direct-To) button is used to start and cancel navigation to a waypoint when an airport or navaid is selected in the FIND or NRST window. See the Navigation Mapping Software section below for more information.

NRST

Press NRST (Nearest) to bring up a window that displays the nearest airports and navaids. See the Navigation Mapping Software section below for more information.

FIND

Press FIND to search for airports and navaids by their identifier. In future firmware versions, this feature will expand to include other search methods.

Navigation Mapping Software

SkyView's Navigation Mapping Software course information can be displayed on the SkyView PFD's HSI display when it is navigating to an active waypoint. It is always the GPS0 source.

Find an Airport or Navaid by Identifier

To find an airport or navaid, press MAP > FIND. A window like the one seen in Figure 62 will be displayed.

Figure 62–Moving Map Find Window

You can find airports, navigation aids, and fixes by identifier, facility name, or city*. To do this, move the MAP joystick up/down to move between identifier (top), facility name (middle), and city* (bottom) fields; Once you have selected the field you wish to use to search, rotate the knob to change the highlighted character. Move the joystick right to select the next character and continue until the desired facility is shown.

Once the desired facility is shown, press D→ to navigate to the selected facility or press INFO for more information about it.

*Search by city not available when Jeppesen aviation databases are used.

Nearest Airports and Navaids

To quickly bring up a list of the nearest airports and navaids, press MAP > NRST. A window similar to the one seen in Figure 63 will be displayed.

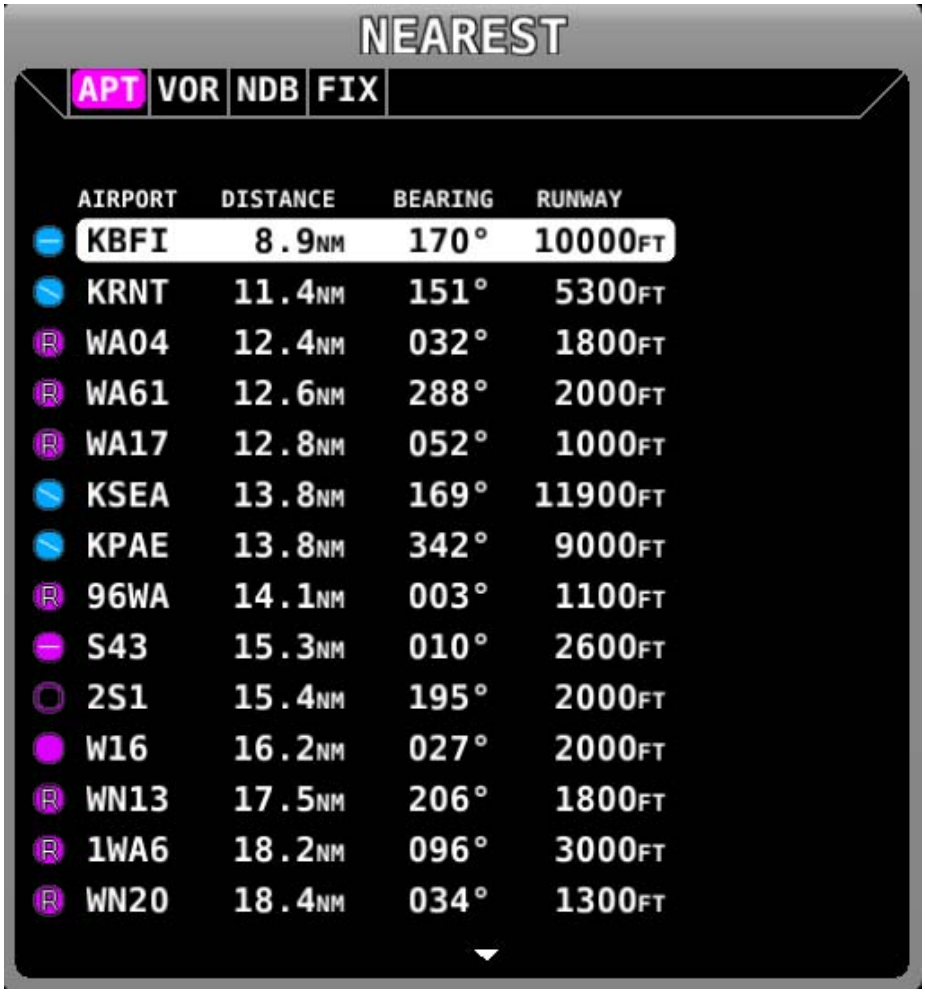

Figure 63–Moving Map Nearest Window

The top bar of tabs each contains a category of aviation features. They include APT (airports), NDB, VOR, FIX (fixes). Move or rotate the joystick left and right among the tabs to select the category you are interested in. Rotate or move the knob up/down to highlight different items in the list. Once the desired facility is shown, press D→ to navigate to the selected facility or press INFO for more information about it.

Detailed Facility Information

When the INFO button is pressed, detailed information about the selected facility is displayed. Information is arranged into tabs of organized information. For example, information about a airports is divided into AIRPORT, COMMS, RUNWAY, and REMARKS tabs. Move the joystick left and right to select these different tabs of information at the top of the window

Some tabs have more information than can fit on the screen at once. In this case, turning the knob or moving it up/down will scroll or change the information displayed. For example, some airports have multiple runways listed under the RUNWAYS tab. Once the RUNWAYS tab is

selected, different runway information can be displayed by turning or moving the CURSR knob up/down.

Figure 64 - Airport Info

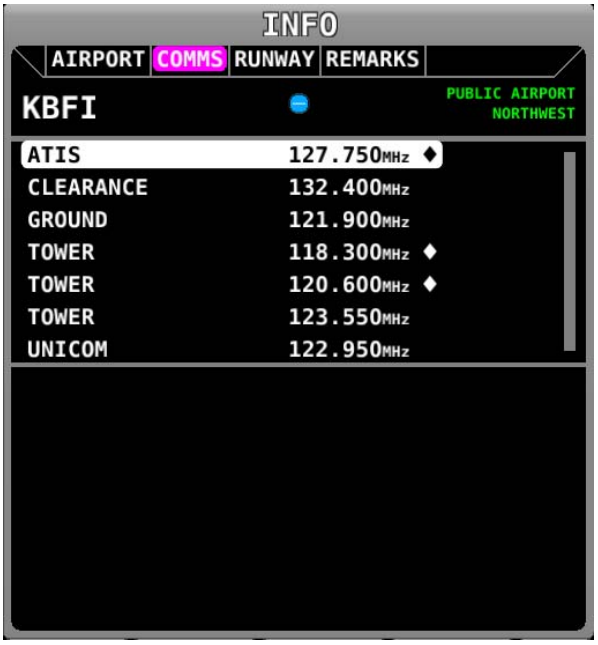

Figure 65 - Airport Comms Info

Figure 66 - Airport Runway Info

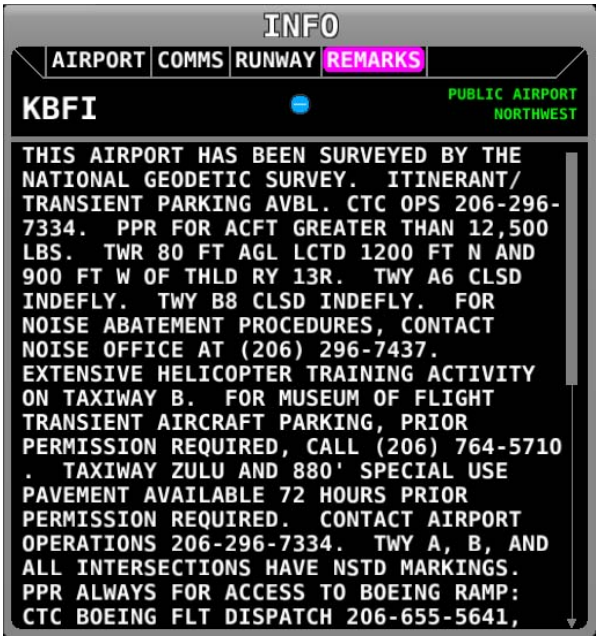

Figure 67 - Airport Remarks

Information available for different types of facilities include:

- Name
- Type (public/military/private*/vor/ndb/etc.)
- Identifier
- Current distance/bearing to facility
- Region
- Field elevation
- Parking availability*
- Communications frequencies
- ATIS/AWOS Frequencies
- Traffic pattern altitude/direction*
- Runway information, including pattern directions* and surface type*
- Lighting type*
- Parking/Fuel availability*
- Remarks*

Note that not all information is available for all facility types and that the depth of information may differ from airport to airport. Typically, larger public airports have the most information available. Small private airports may have very little or no information available.

* These items are not in Jeppesen databases and are only available with Dynon-provided US-only data.

Navigate to a Selected Airport or Navaid

To navigate to an airport or navaid via a direct course from your present position, press D→ in either the Find, Nearest, or Info windows when the desired airport or navaid is highlighted. This instantly makes the selected item an active waypoint that SkyView is navigating to, and automatically closes the Find or Nearest window.

A magenta course line is created that starts from your current location and ends at the selected waypoint. It is the shortest path between your current location and that waypoint. The PFD can also display the course on the HSI. It is always GPS0. The D→ button in the MAP menu will remain highlighted to indicate there is an active waypoint. A PFD, HSI, and map depiction that shows this is shown in Figure 68 below.

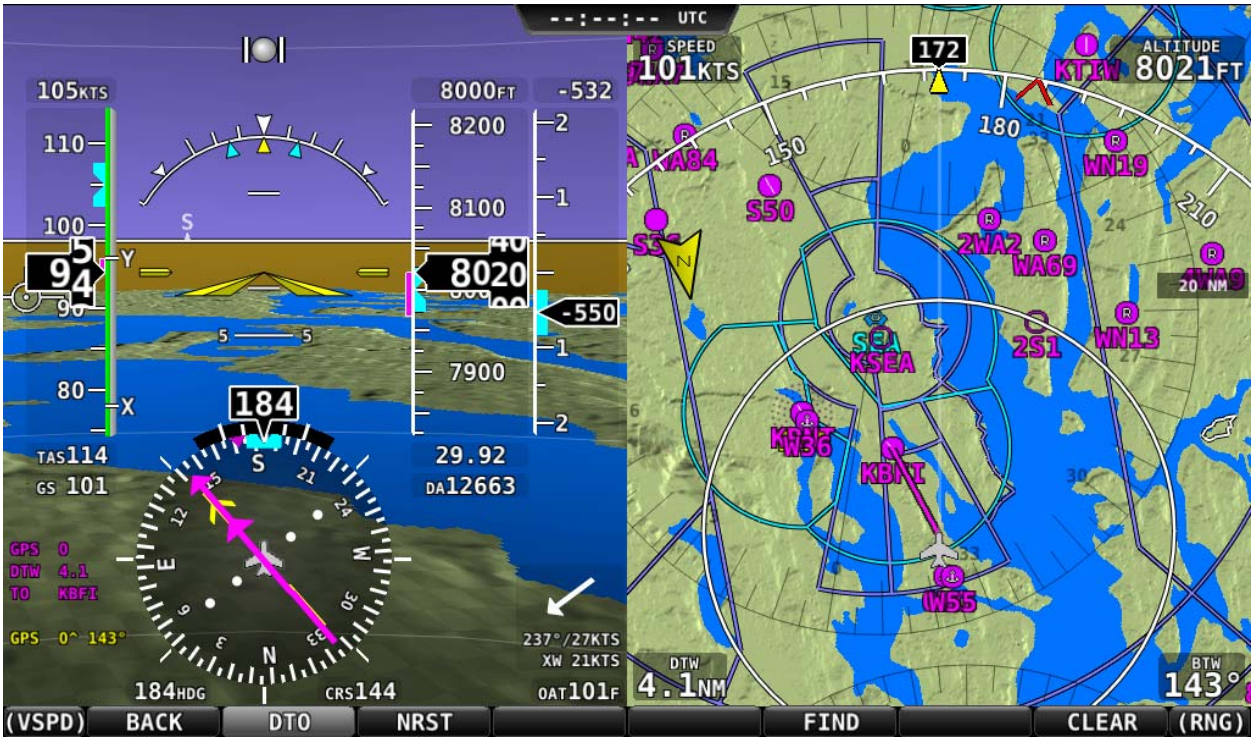

Figure 68–Map/HSI After Navigation Activated

Clearing the Active Waypoint

Press DTO when it is highlighted to bring up the current waypoint information. From the resulting menu, press CLEAR to clear the active waypoint and cancel navigation.

SkyView User Waypoints

SkyView supports a "User Waypoint" feature. A User Waypoint is a point on the Earth which shows up as a yellow pushpin on the SkyView terrain map. User Waypoints are also searchable via the “USR” tab on the “Nearest” window. The “USR” tab only appears if there are User Waypoints stored in SkyView. User waypoints are loaded into the system via USB stick after they are created via a free program called Google Earth and then converted for use with SkyView with a Dynon-provided utility. See http://wiki.dynonavionics.com/SkyView_User_Waypoints for full instructions on how to create, load, and use User Waypoints. For customers that have been using the SkyView User Waypoints with previous versions of SkyView firmware: The wiki contains an updated version of the Dynon “USR Export Utility” utility which is required in order to send SkyView User Waypoints to SkyView version 3.0 and later.

Settings

Go to SETUP MENU > MAP SETUP to adjust the following map options:

- Information Items–Use these settings to display useful information items in the four corners of the MAP page. Items available for display include:

    - Ground Speed
    - GPS Altitude
    - Bearing to waypoint
    - Distance to Waypoint
- Max Zoom Levels–Use these settings to specify the largest zoom range that the various aviation features and facilities are displayed.

8. Autopilot Operation

This chapter guides you through the functionality, symbology, and operation of the SkyView Autopilot. It assumes that the autopilot servos have been properly installed, calibrated, tested, and tuned according to the procedures in the SkyView System Installation Guide.

Horizontal Autopilot Functionality

This section summarizes the horizontal functionality (i.e., the roll axis) of the SkyView Autopilot system. After reading this section, the user should be familiar with the different roll axis autopilot modes of operation and how they will affect the aircraft.

Heading Hold/Select Mode

The autopilot holds and/or turns the magnetic heading of the aircraft to match the current heading bug when the roll axis is engaged in heading (HDG) mode.

Track Hold/Select Mode

The autopilot holds and/or turns the GPS ground track of the aircraft to match the current track bug when the roll axis is engaged in track (TRK) mode.

NAV Mode

The autopilot controls the aircraft to center the CDI needle on the HSI when the roll axis is engaged in navigation (NAV) mode. This assumes that a valid and active navigation source is selected on the HSI.

Functionality Common to All Horizontal Modes

Turns to new headings in HDG and TRK modes are governed by the roll axis mode chosen during servo installation (e.g. bank angle or turn rate). Turns in both modes are bank angle limited. Turns in the turn rate mode are also governed by the turn rate target. These modes and their limiting parameters are configured in the Roll Axis Menu (IN FLIGHT SETUP MENU > ENTER FULL SCREEN SETUP MENU… > AUTOPILOT SETUP > ROLL AXIS).

In bank angle mode, the autopilot banks the aircraft up to the bank angle target defined during servo setup. The bank angle the autopilot actually uses may be lower at times if performance requires a slower turn (e.g., rolling in to or out of a turn).

In turn rate mode, the autopilot turns the airplane at up to the turn rate target defined during servo setup. *In this mode of operation, the autopilot may frequently adjust the bank of the aircraft to maintain a constant turn rate.* A slower turn rate may be utilized if autopilot performance requires a slower turn (e.g., rolling in to or out of a turn). The turn rate may also be limited by the maximum bank angle setting if turn rate requested by the autopilot requires a higher bank angle than configured.

Regardless of the mode, the autopilot turns the aircraft the direction that results in the shortest turn required to achieve the target heading or track when in HDG or TRK mode, respectively.

Vertical Autopilot Functionality

This section summarizes the vertical functionality (i.e., the pitch axis) of the SkyView Autopilot system. After reading this section, the user should be familiar with the pitch axis autopilot mode of operation and how it will affect the aircraft.

Altitude Hold/Select Mode

The autopilot holds altitude or climbs/descends the aircraft to match the altitude target set by the altitude bug. Note that there is always an altitude target set by the altitude bug. When the aircraft intercepts this altitude while the autopilot is engaged, the autopilot levels off the aircraft's attitude and holds the altitude.

The rate of climb or descent during autopilot controlled changes in altitude is governed by the VS bug. There are two VS modes for the pitch axis that affect its behavior *only* when it is engaged: VS:DFLT and VS:BUG. If the pitch axis is engaged in either mode and you adjust the VS bug, the autopilot reacts to the change.

If the pitch axis mode is set to VS:DFLT, the VS bug is automatically set to the default climb or descent vertical speed when the pitch axis is engaged, depending on the current altitude and the target altitude (e.g., if your current altitude is below the target altitude, the autopilot uses the default climb VS when engaged). These default speeds are configured in the Pitch Axis Menu (IN FLIGHT SETUP MENU > ENTER FULL SCREEN SETUP MENU… > AUTOPILOT SETUP > PITCH AXIS).

If the pitch axis mode is set to VS:BUG, the autopilot uses the current VS bug as its target rate of change when engaged. The only exception to this rule is if the VS bug is set to a value that is in the opposite direction of the target altitude. For example, the autopilot will use the default descent VS specified in autopilot setup when you engage the pitch axis if your target altitude is set to a value below your current altitude and your VS bug is set to a positive VS. The VS bug will also simultaneously change to reflect this.

Note that the autopilot will only fly changes in altitude within the minimum and maximum airspeed limits defined by the user during initial autopilot installation and configuration. It will also not allow vertical acceleration to exceed +2G and -1G. If these airspeed or G limits are hit, the autopilot will not pull or push on the pitch axis in a way that would exceed these limits.

Control Wheel Steering Functionality

Refer to the Control Wheel Steering Section near the end of this chapter.

Top Bar Autopilot Symbology

The SkyView Top Bar Autopilot Status Area uses text, shapes, and colors as visual indicators to inform the pilot of the autopilot modes and statuses. This section outlines the symbology used on the Top Bar. *Note that this section does not address how to operate the autopilot system–it only addresses what you will see on the Top Bar during autopilot operation.* Refer to the AP Menu and Autopilot Operation and Procedures sections for configuration and operating instructions. Figure 69 is an example Top Bar with autopilot status.

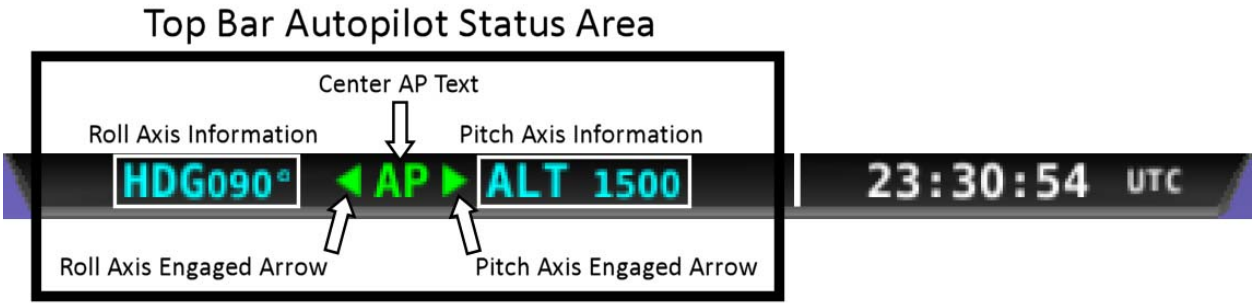

Figure 69–Example Top Bar with Autopilot Status

The important items to note are:

- Text color
- Center AP Text
- Roll and Pitch Axes Engaged Arrows
- Roll and Pitch Axes Information

All of these items are described in more detail in the following sections.

Note that the Top Bar is always on regardless of the screen layout and cannot be turned off. The visual indicators are contextual and are based on the installed autopilot axes (e.g., if there is no roll axis hardware, there will not be roll axis indicators) and are always present for installed axes.

Center AP Text and Roll and Pitch Axes Arrows

The AP text and arrows to the left and right of it are used to indicate the engagement state of the autopilot system axes. *Table 7 addresses AP text and roll and pitch axes engagement arrows and does not address specific roll and pitch information. It is best viewed in full color.*

AP Text and Roll and Pitch Arrow Appearance	AP Roll Axis State	AP Pitch Axis State
HDG090° ALT 1500 --:--:-- UTC	DISENGAGED	DISENGAGED
HDG090° ◀AP ALT 1500 --:--:-- UTC	ENGAGED	DISENGAGED
HDG090° AP▶ VS→ALT --:--:-- UTC	DISENGAGED	ENGAGED
HDG090° ◀AP▶ VS→ALT --:--:-- UTC	ENGAGED	ENGAGED
HDG090° ◀AP ALT 1500 --:--:-- UTC	RECENTLY DISENGAGED	DISENGAGED
HDG090° AP▶ ALT 1500 --:--:-- UTC	DISENGAGED	RECENTLY DISENGAGED
HDG090° ◀AP▶ VS→ALT --:--:-- UTC	RECENTLY DISENGAGED	ENGAGED
HDG090° ◀AP▶ ALT 1500 --:--:-- UTC	ENGAGED	RECENTLY DISENGAGED

Table 7–AP Text and Roll and Pitch Axes Arrows

Roll Axis Information

Roll axis mode, target, and status information is to the left of the AP text. Figure 70 is an example of roll axis information in the Top Bar.

Figure 70–Roll Axis Information in the Top Bar

In the example above, the roll axis is engaged in heading mode and either turning toward or holding the aircraft's magnetic heading at 90°.

Heading Mode

HDG is displayed in the roll axis information area when the roll axis is armed or engaged in heading mode. The white numerical value to the right of HDG - as shown in Figure 71 - is the target magnetic heading. Note that the AP text and roll arrow are absent from the figure indicating that the roll axis is disengaged.

Figure 71–Roll Axis Example: Heading mode, 90° target magnetic heading, disengaged

A heading value in blue denotes that the roll axis is engaged and is turning toward or holding that heading as shown in Figure 72. Note that the AP text and roll arrow are present. This also indicates that the roll axis is engaged.

Figure 72–Roll Axis Example: Heading mode, engaged and holding 90° magnetic heading

Track Mode

TRK is displayed in the roll axis information area when the roll axis is armed or engaged in track mode. The white numerical value to the right of TRK- as shown in Figure 73 - is the target ground track. Note that the AP text and roll arrow are absent from the figure indicating that the roll axis is disengaged.

Figure 73–Roll Axis Example: Track mode, 90° target ground track heading, disengaged

A track value in blue denotes that the roll axis is engaged and is turning toward or holding that track as shown in Figure 74. Note that the AP text and roll arrow are present. This also indicates that the roll axis is engaged.

Figure 74–Roll Axis Example: Track mode, engaged and holding 90° ground track heading

NAV Mode

NAV is displayed in the roll axis information area when the roll axis is armed or engaged in navigation mode. The NAV text will either be green or magenta, depending on the NAV data source. Green text denotes NAV data from a NAV radio such as a Garmin SL30 as illustrated in Figure 75 and Figure 76.

Figure 75–Roll Axis Example: Navigation mode, VOR, disengaged

Figure 76–Roll Axis Example: Navigation mode, LOC, engaged

Magenta text denotes NAV data from a GPS source as illustrated in Figure 77 and Figure 78.

Figure 77–Roll Axis Example: Navigation mode, GPS, disengaged

Figure 78–Roll Axis Example: Navigation mode, GPS, engaged

Some GPS units, such as the Garmin 430/430W, have the ability to output GPS Steering (GPSS) commands to the Autopilot. When in GPSS mode, the autopilot listens to direct bank angle requests as they are provided by the GPS. In contrast, when in normal GPS NAV mode, SkyView

determines the bank angle needed to fly onto and maintain a desired course line. Essentially, a GPSS outputting GPSS commands is asserting more direct control of the Autopilot. One feature of GPSS is the GPS's ability to start turns before a waypoint-induced change of direction to have the aircraft "round the corner" instead of overlying the waypoint first. When GPSS commands are seen by SkyView they are automatically followed:

Figure 79 - Roll Axis Example: Navigation mode, GPS Steering, engaged

Roll Slip

You may see this during periods of turbulence or if the strength of the servo is not sufficient to actuate the control surface.

If slipping occurs on the roll servo, SkyView displays a slip warning as illustrated in Figure 80.

Figure 80–Roll Axis Slip Indicator

Reference the SkyView System Installation Guide for more information regarding servo slippage.

Roll Error

If a roll error occurs, an error message is simultaneously displayed in the Top Bar and the AP Menu as illustrated in Figure 81 and Figure 82.

Figure 81– Roll Axis Example: Top Bar Error Message

Figure 82–Roll Axis Example: AP Menu Error Message

A roll error occurs when the servo cannot be engaged. It may indicate that the servo is unpowered, has not been configured, or has failed. Consult the SkyView System Installation Guide for information regarding installation, configuration, and calibration of SkyView servos.

Roll Axis Information Top Bar Summary

Table 8 summarizes the roll axis information in the Top Bar from the previous sections.

Top Bar Appearance	Roll Axis Mode	Roll Axis State	Heading
	HDG	DISENGAGED	FUTURE TARGET
	HDG	ENGAGED	TARGET OR CURRENT

Top Bar Appearance	Roll Axis Mode	Roll Axis State	Heading
TRK090° ALT 1500 17:08:47 UTC	TRK	DISENGAGED	FUTURE TARGET
TRK090° ◀AP ALT 1500 17:08:54 UTC	TRK	ENGAGED	TARGET OR CURRENT
NAV ALT 1500 17:08:54 UTC	NAV RADIO	DISENGAGED	N/A
NAV ◀AP ALT 1500 17:08:54 UTC	NAV RADIO	ENGAGED	N/A
NAV ALT 1500 17:08:54 UTC	NAV GPS	DISENGAGED	N/A
NAV ◀AP ALT 1500 17:08:54 UTC	NAV GPS	ENGAGED	N/A
SLIP ◀AP▶ VS→ALT 22:07:58 UTC	SLIP	SLIP	N/A
ROLL ERR ALT 1500 18:35:44 UTC	ERROR	DISENGAGED	N/A

Table 8–Top Bar Roll Axis Information Summary

Pitch Axis Information

Pitch axis mode, target, and status information is to the right of the AP text. Below is an example of pitch axis information in the Top Bar.

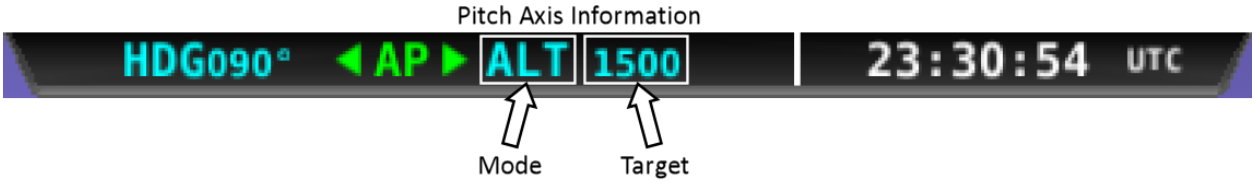

Figure 83–Pitch Axis Information in the Top Bar

Altitude Mode

ALT is displayed in the pitch axis information area when the pitch axis is armed or engaged in altitude mode. The value to the right of ALT is either the target or current altitude. Note that the altitude value in the Top Bar is displayed without units. The unit of measurement for the value in the Top Bar is either in feet or meters, depending on the chosen unit set in the Measurement Units Menu (IN FLIGHT SETUP MENU > ENTER FULL SCREEN SETUP MENU… > SYSTEM SETUP > MEASUREMENT UNITS). The white numerical value to the right of ALT - as shown in Figure 84 - denotes the autopilot's target altitude. Note that the AP text and roll arrow are absent from the figure, indicating that the pitch axis is disengaged.

Figure 84–Pitch Axis Example: Altitude mode, target 1500, disengaged

An altitude value in blue denotes that the pitch axis is holding that altitude as shown in Figure 85. Note that the AP text and roll arrow are present indicating that the pitch axis is engaged.

Figure 85–Pitch Axis Example: Altitude mode, engaged and holding 1500

VS Mode

When the autopilot is changing altitude, the Top Bar denotes that the active mode is VS (blue text) and the target is the value of the altitude bug (white text). The arrow between VS and ALT denotes a sequence. All of this information is illustrated in Figure 86.

Figure 86–Pitch Axis Example: Vertical Speed mode, engaged and changing altitude to match altitude bug

Once the autopilot reaches the target altitude, the mode is automatically switched over to ALT and the Top Bar will be similar to Figure 85.

Pitch Trim Indicator

When the autopilot is flying the aircraft in ALT mode, a Pitch Trim Indicator can appear in the Top Bar. This indicator alerts you when the pitch servo detects excessive load on the elevator which would result in a large pitch excursion when the autopilot is disengaged. If trim is needed, the altitude target value or future state will be replaced by **TRIM** and then alternate between the word TRIM and either an up or down symbol (i.e., ▲ or ▼). To eliminate the excessive trim forces that the autopilot is trying to overcome, trim in the direction the arrow indicates. Adjust the trim in small increments and wait a few seconds between adjustments to see whether the adjustment is sufficient to remove the out-of-trim indication.

During turbulence and small bumps the trim indicator may flash on and off. Do not take action based on the trim indicator until it remains on for several seconds.

The Pitch Trim Indicator is designed to detect SIGNIFIGANT out of trim conditions that are causing the autopilot to use more than minimal force to control the aircraft. It is not designed to keep the aircraft perfectly in trim, as you would when hand-flying the aircraft. The lack of a Pitch Trim Indicator should not be interpreted to mean that the aircraft is perfectly in trim. Therefore, when the autopilot is disconnected, the aircraft may not be in perfect trim, even when a Pitch Trim Indicator was not being displayed while the autopilot was flying the aircraft. You should always assume positive physical control of the aircraft when disengaging the autopilot.

Pitch Slip

You may see this during periods of turbulence or if the strength of the servo is not sufficient to actuate the control surface.

If slipping occurs on the pitch servo, SkyView displays a slip warning as illustrated in Figure 87.

Figure 87–Pitch Axis Slip Indicator

Reference the SkyView System Installation Guide for more information regarding servo slippage.

Pitch Error

If a pitch error occurs, an error message is simultaneously displayed in the Top Bar and the AP Menu as illustrated in.

Figure 88–Pitch Axis Example: Top Bar Error Message

Figure 89–Pitch Axis Example: AP Menu Error Message

A pitch error occurs when the servo cannot be engaged. It may indicate that the servo is unpowered, has not been configured, or has failed. Consult the SkyView System Installation Guide for information regarding installation, configuration, and calibration of SkyView servos.

Pitch Axis Information Top Bar Summary

Table 9 summarizes the pitch axis information in the Top Bar from the previous sections.

Top Bar Appearance	Pitch Axis Mode	Pitch Axis State	Target
HDG089° ALT 1500 20:03:42 UTC	ALT	DISENGAGED	1500
HDG089° AP ▶ ALT 1500 20:05:04 UTC	ALT	ENGAGED	1500 and Holding
HDG089° AP ▶ VS→ALT 20:03:50 UTC	VS	ENGAGED	ALT MODE
TRK329° ◀ AP ▶ ALT TRIM 21:57:49 UTC	ALT	ENGAGED	TRIM UP or DOWN
TRK329° ◀ AP ▶ SLIP 22:06:54 UTC	SLIP	SLIP	N/A
HDG089° PTCH ERR 20:10:33 UTC	ERROR	ERROR	N/A

Table 9–Top Bar Pitch Axis Information Summary

Control Wheel Steering Indicators

SkyView uses the indicators shown in Figure 90 to denote that the autopilot is in control wheel steering mode.

Figure 90–Control Wheel Steering Indicators

Reference the Control Wheel Steering Section for more information.

Airspeed Indicator

SkyView uses the indicator shown in Figure 91 to denote that the aircraft airspeed is outside of the specified autopilot airspeed range as specified during installation. *When SPD is displayed in the Top Bar the autopilot cannot be engaged.*

Figure 91–Airspeed Indicators

During autopilot-controlled altitude changes, the autopilot causes the aircraft to climb or descend at a vertical speed governed by either the default climb and descent speeds configured during installation or by the vertical speed bug. When the autopilot is engaged and aircraft airspeed rises above the maximum, the autopilot enters an airspeed hold mode, pitching the aircraft up to prevent exceeding the maximum airspeed. When the aircraft's altitude rises above the target ALT bug and the autopilot cannot pitch the aircraft down without going above the maximum airspeed, SkyView displays:

REDUCE POWER

Likewise, when the autopilot is engaged and aircraft airspeed drops below the minimum, the autopilot enters an airspeed hold mode, pitching the aircraft down to prevent dropping below the minimum airspeed. When the aircraft's altitude drops below the target ALT bug and the

autopilot cannot pitch the aircraft up without going below the minimum airspeed, SkyView displays:

ADD POWER

Reference the SkyView System Installation Guide for information regarding maximum and minimum airspeed parameters for the pitch axis.

AP Menu

The AP Menu is accessible from the Main Menu by pressing AP (MAIN MENU > AP). Users can arm different autopilot axis modes of operation, engage and disengage the autopilot axes, and initiate 180 degree turns from current heading or track in the AP Menu.

If you find the need to perform other autopilot-related actions such as tuning the roll or pitch axis or configuring Disengage/CWS Button modes and behavior, reference the SkyView System Installation Guide.

Figure 92 illustrates where to find the AP button in the Main Menu.

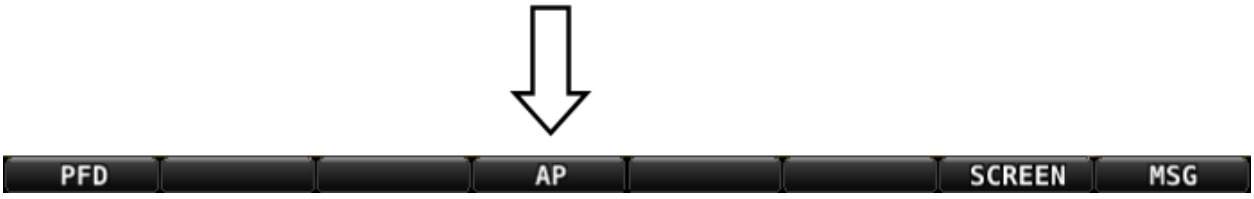

Figure 92–Press AP in the Main Menu to enter the Autopilot Menu

The Autopilot Menu is illustrated in Figure 93.

Figure 93–AP Menu

All of the buttons in Figure 93 are explained in the following sections in the order they show up in the AP Menu from left to right.

Back

Press the BACK button to return to the Main Menu.

HDG:[ON or OFF], TRK:[ON or OFF], or NAV:[ON or OFF]

Button 2 in the AP Menu has several purposes. It indicates the armed roll axis mode, the state of the axis, and is a way for the user to engage or disengage the roll axis.

The mode is indicated with a prefix: HDG, TRK, or NAV.

- **HDG** indicates the roll axis is armed in heading mode.
- **TRK** indicates the roll axis is armed in ground track mode.
- **NAV** indicates the roll axis is armed in navigation mode.

Two visual indicators are used to denote the state of the roll axis: text and the appearance of the button label. An ON suffix means the roll axis is engaged. An OFF suffix denotes that the roll axis is disengaged. When engaged, the roll axis button label is highlighted (e.g., 

).

You may engage or disengage the roll axis by pressing button 2.

Roll Axis Mode

Button 3 in the AP Menu opens the menu where a user may set the autopilot roll axis mode. The mode can be set to heading (HDG), GPS ground track (TRK), or navigation (NAV) mode. Pressing HDG, TRK, NAV, or BACK immediately exits the Roll Axis Mode Menu.

Setting SYNC in the Roll Axis Mode Menu only affects the behavior of the roll axis at the point of engagement. When highlighted, SYNC configures the autopilot to synchronize the roll axis target with the current heading or track when the roll axis is engaged. Pressing SYNC does not exit the Roll Axis Mode Menu.

ALT:[ON or OFF]

Button 4 in the AP Menu has two purposes. It indicates the state of the pitch axis and is a way for the user to engage or disengage the pitch axis.

Two visual indicators are used to denote the state of the pitch axis: text and the appearance of the button label. An ON suffix denotes that the pitch axis is engaged. An OFF suffix denotes that the pitch axis is disengaged. When engaged, the pitch axis button label is highlighted (i.e., 

).

Users may engage or disengage the pitch axis by pressing button 4.

Pitch Axis Mode

Button 5 in the AP Menu opens the menu where a user may set the autopilot pitch axis mode. The mode can be set to vertical speed default (VS:DFLT) or vertical speed bug (VS:BUG) mode. Pressing VS:DFLT or VS:BUG immediately exits the Pitch Axis Mode Menu.

Setting SYNC in the Pitch Axis Mode Menu only affects the behavior of the pitch axis at the point of engagement. When highlighted, SYNC configures the autopilot to synchronize the pitch axis target with the current altitude when the pitch axis is engaged. Pressing SYNC does not exit the Pitch Axis Mode Menu.

180°

Press 180° to initiate an autopilot controlled 180 degree turn from the current heading while maintaining the current altitude. The autopilot will turn the aircraft to the left with the pitch axis in altitude hold mode.

MSG

The Message Box is present in the Autopilot Menu and contains important SkyView system alerts.

Autopilot Operation and Procedures

How to Arm or Change the Roll Mode

Use this procedure to set the roll axis mode to heading (HDG), track (TRK), or navigation (NAV) mode. Also use this procedure to toggle SYNC.

1. Enter the AP Menu (MAIN MENU > AP).
2. Press button 3 (MODE) to enter the Roll Axis Mode Menu.
3. Set the roll mode by pressing HDG, TRK, or NAV. As mentioned before, pressing HDG, TRK, or NAV will immediately change the mode and exit the Roll Axis Mode Menu.
4. Press BACK to return to the AP Menu if you only pressed SYNC, as pressing SYNC toggles the SYNC but does not back out of the MODE menu.

The mode change is immediately displayed in the Top Bar. *Note that changing the mode does not engage the axis.* If the axis is already engaged when the mode is changed, the mode change is immediately displayed in the Top Bar and the behavior of the autopilot changes to reflect the new mode.

If you turn SYNC on while the roll axis is disengaged, the Top Bar heading or track target will display HOLD (in white text). When the roll axis is engaged, the autopilot synchronizes the heading or track bug with the current direction, the target text in the Top Bar turns blue and displays the bug setting, and the autopilot holds the heading or track. If the roll axis is already engaged when you press SYNC, the roll axis will cancel all commands and hold the current heading or track.

How to Arm or Change the Pitch Mode

Use this procedure to set the pitch axis mode to vertical speed default (VS:DFLT) or vertical speed bug (VS:BUG) mode. Also use this procedure to toggle SYNC.

1. Enter the AP Menu (MAIN MENU > AP).
2. Press button 5 (MODE) to enter the Pitch Axis Mode Menu.
3. Set the pitch mode by pressing VS:DFLT or VS:BUG. You may also press SYNC. As mentioned before, pressing VS:DFLT or VS:BUG will immediately change the mode and exit the Pitch Axis Mode Menu.
4. Press BACK to return to the AP Menu if you only pressed SYNC.

If you toggle SYNC while the pitch axis is disengaged, the Top Bar altitude target will display HOLD (in white text). When the pitch axis is engaged, the autopilot synchronizes the altitude bug with the current altitude, the target text in the Top Bar turns blue and displays the bug setting, and the autopilot holds the altitude. If the pitch axis is already engaged when you press SYNC, the pitch axis will cancel all commands and hold the current altitude.

How to Engage or Disengage the Roll Axis in the AP Menu

Use this procedure to engage or disengage the roll axis in the AP Menu.

1. Enter the AP Menu (MAIN MENU > AP).
2. Press button 2 to engage or disengage the roll axis (i.e., ON = engaged and OFF = disengaged).
3. Press BACK to return to the Main Menu.

Note that the roll axis immediately engages in the selected mode after you press button 2 and its label indicates ON. The Top Bar also indicates this with green AP text and a green roll engaged arrow.

If the roll axis is set to SYNC, it will hold the current heading or track upon engagement.

How to Engage or Disengage the Pitch Axis in the AP Menu

Use this procedure to engage or disengage the pitch axis in the AP Menu.

1. Enter the AP Menu (MAIN MENU > AP).
2. Press button 4 to engage or disengage the pitch axis (i.e., ON = engaged and OFF = disengaged).
3. Press BACK to return to the Main Menu.

Note that the pitch axis immediately engages in the selected mode after you press button 4 and its label indicates ON. The Top Bar also indicates this with green AP text and a green roll engaged arrow.

If the pitch axis is set to SYNC, it will hold the current altitude upon engagement.

How to Disengage the Autopilot with the Disengage/CWS Button

The primary function of the Disengage/CWS Button is to disengage the autopilot. Disengage the autopilot by pressing the Disengage/CWS button. After the Disengage/CWS Button is pressed, the servos are disengaged and cannot control the aircraft.

In addition to software triggers, the servo disengage line controls an electrical circuit that prohibits the servo from operating.

How to Engage the Autopilot with the Disengage/CWS Button

The Disengage/CWS Button may be used to engage the autopilot if it is configured to do so in the Autopilot Setup Menu. If HOLD TO ENGAGE is set to YES, pressing and holding the Disengage/CWS Button for more than 2 seconds engages both autopilot axes. Note that after 2 seconds, the autopilot status indicator in the Top Bar shows CWS CWS as shown in Figure 90. This indicates that the servos are in Control Wheel Steering mode and are waiting for the button to be released before engaging. Once they do engage, they will engage in one of the modes mentioned in the Control Wheel Steering Section below.

Reference the SkyView System Installation Guide for information on how to configure Disengage/CWS Button options.

Control Wheel Steering

Control wheel steering allows you to be flying under autopilot control, press and hold the Disengage/CWS Button, fly to a new heading and/or altitude, and then release the button to re-engage the autopilot. The Top Bar looks like Figure 90 while the system is in control wheel steering mode. When you release the Disengage/CWS button, the autopilot re-engages in one of two modes: HOLD HEADING/ ALTITUDE, and LAST HEADING/ALTITUDE.

Instructions for configuring the modes and the expected behavior of each mode is fully explained in the SkyView System Installation Guide, however a brief description of each mode is included here as well.

- **OFF** is the default setting and disables control wheel steering. Setting control wheel steering to OFF does not disable the disengage or engage functions of the button.
- **HOLD HEADING/ALTITUDE** configures the autopilot to hold the current heading and/or altitude when you exit control wheel steering mode.
- **LAST HEADING/ALTITUDE** configures the autopilot to return the aircraft to the heading and/or altitude the autopilot was set to before you entered control wheel steering mode.

Note that if, control wheel steering mode is active and the airspeed changes such that it is outside the maximum and minimum limits configured for the pitch axis during installation, releasing the Disengage/CWS Button will not re-engage the autopilot. The autopilot can only be re-engaged when airspeed is within the acceptable range.

How to Change Autopilot Target Heading, Track, or Altitude

The SkyView Autopilot uses heading (or track), vertical speed, and altitude bugs as targets during operation. If these bugs are adjusted when the autopilot is engaged, the Top Bar immediately displays the new values and the autopilot immediately reacts and changes course or altitude. If these bugs are adjust when the autopilot is disengaged, new target values are set and displayed in the Top Bar and the autopilot will change course and/or altitude when engaged.

Reference the respective sections in the PFD Operation Chapter for instructions on how to adjust these bugs.

9. Alerts

SkyView annunciates important notifications onscreen or in a message window. This chapter describes SkyView alert behavior and how to acknowledge them.

Onscreen Alerts

SkyView notifies users with a large red X and a descriptive label if a failure occurs. A red X may overlay an entire page if a data source such as an EMS module fails or a red X may overlay a single widget if a single engine sensor fails.

For example, the PFD would look like Figure 94 if ADAHRS in the system fail:

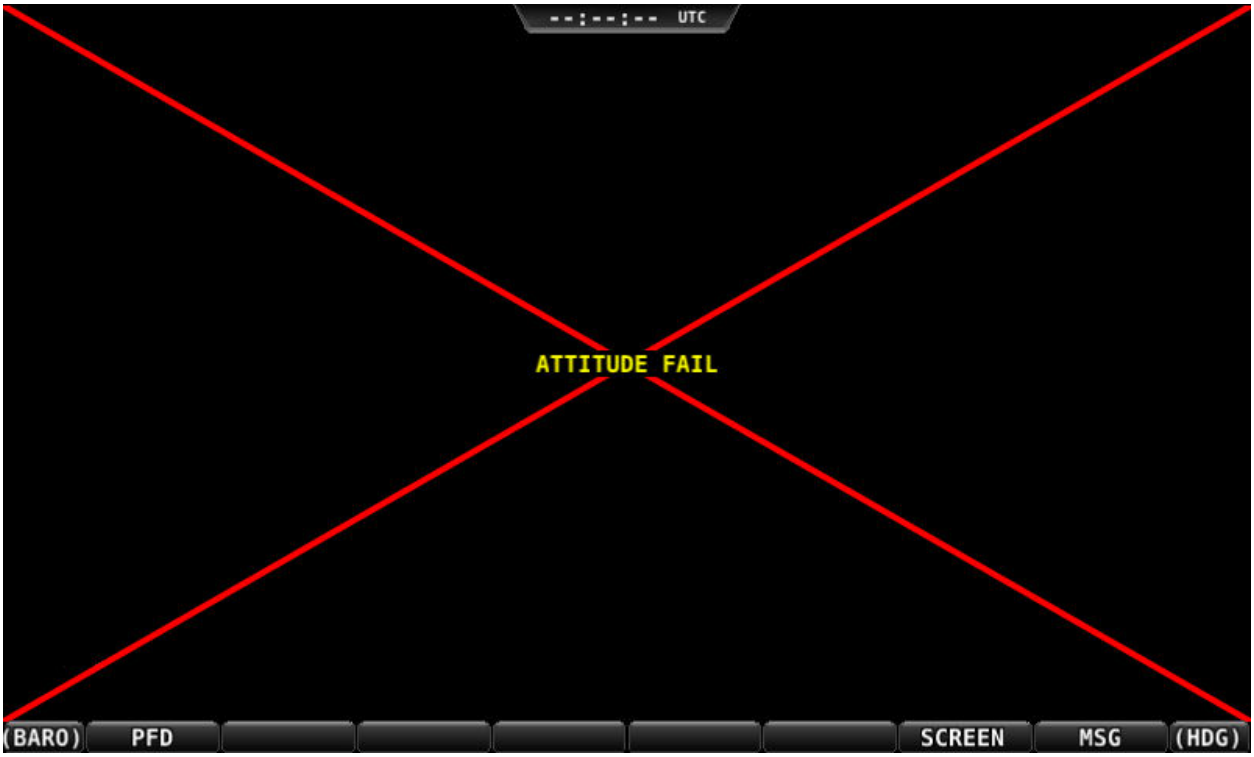

Figure 94–Example SkyView Failure

Some ongoing alerts will display until acknowledged. An example of this is loss of primary power resulting in SkyView operating from backup battery. In this condition there will be an initial notification which requires user acknowledgement.

Message Window

The message window shows basic user notification messages, non-critical but important warning messages, and critical condition alarms. Use the message window to display and acknowledge alerts.

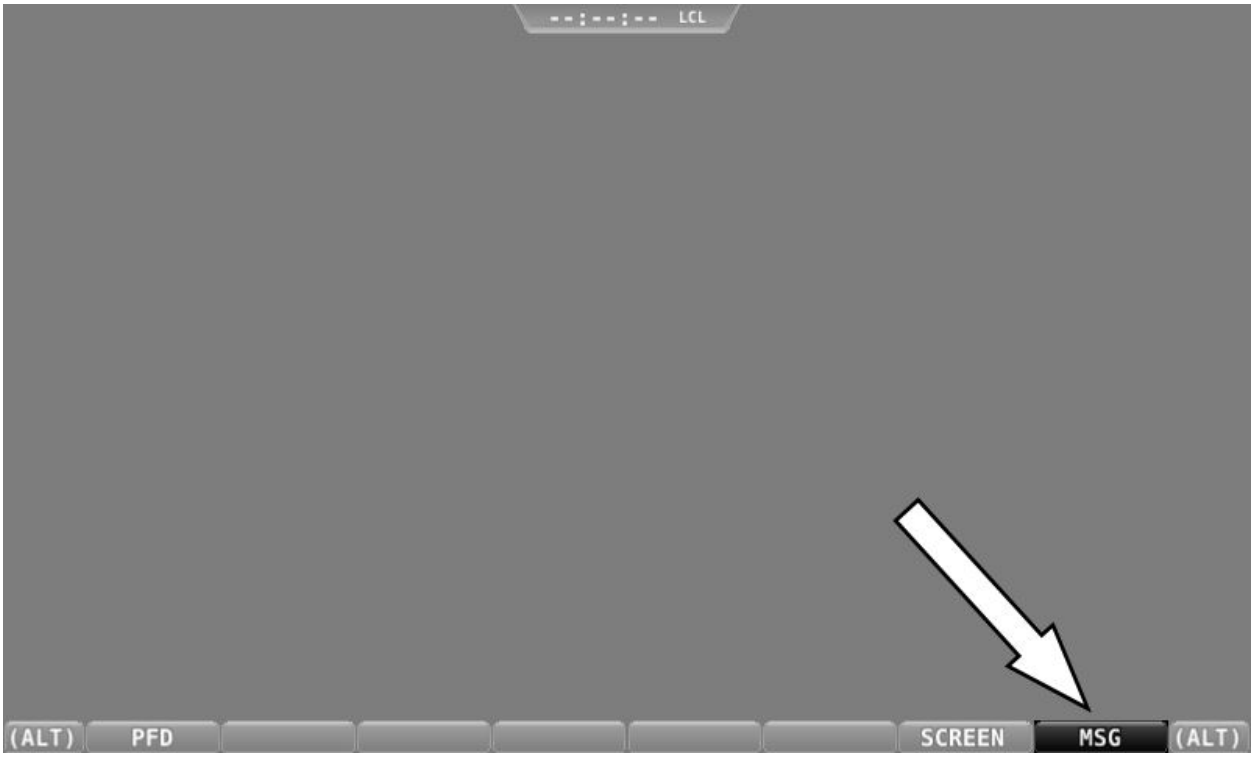

Figure 95–Message Window Button

Press MSG to display the message window as depicted in Figure 95. Once onscreen, it looks like Figure 96.

Figure 96–Message Window

The message window is divided into two sections. The top section displays Engine alarms and warnings, while the bottom section displays all other system messages. The windows are dynamically sized for each message line being displayed. Each section can show a maximum of 5 message lines at once, while 6 total message lines can be displayed between the two sections at any one time. If SkyView has more messages than the window will allow, the messages are prioritized and displayed until acknowledged. Once acknowledged, messages are cleared or de-prioritized to make way for other messages that have not yet been displayed.

Alarm Indicators

Alarms are only triggered when their respective sensors are configured as self-clearing or latching alarms. If a sensor's alarm is configured as off, no alarm will trigger, even if that sensor's measurement enters a range defined as red. Reference the SkyView System Installation Guide for more information regarding alarm configuration.

Any time an alarm set point is exceeded, a few things occur:

- The MSG label blinks (see Figure 97) in the lower right hand corner of the screen.
- The measurement's value blinks and is highlighted red (if displayed).
- If installed, an external alarm light will flash.

Figure 97–Blinking Message Button Label

If the alarm condition pertains to something that is not currently displayed on the screen, the only visible alert will be the blinking MSG label.

Engine Sensor Alarm Format

Engine sensor alarms are triggered when a sensor's measurement enters a red range on its Engine widget. Widgets and ranges should have been configured during installation. Reference the SkyView System Installation Guide for more information.

Engine sensor alarms follow this format:

[SENSOR NAME] [#] [LO/HI]

For example, if oil temperature enters the red range of its widget, you will see an "OIL HI" alarm in the message box.

If exhaust gas temperature probe #4 enters the red range of its widget, you will see an "EGT 4 HI" alarm in the message box.

Alarm Acknowledgement

To acknowledge an alarm, press MSG. Pressing MSG opens the message window, displays the current alarm(s), and stops the blinking of the relevant alarm. Note that self-clearing alarms may not need acknowledgement if the alarm condition ceases.

Figure 98–Unacknowledged (left) and Acknowledged (right) Alarms

Note that, even when acknowledged, the MSG label will remain red and the alarming onscreen widget's numeric value will continue to blink and remain highlighted red until that alarm condition ceases.

Alarms automatically rearm when their alarm conditions cease.

If installed, the optional external alarm light will either remain lit after acknowledgement (while the alarm condition continues to exist) or may extinguish with acknowledgement. Instructions for adjusting this behavior are discussed in the SkyView System Installation Guide.

Multiple Alarms

Any time multiple alarms occur simultaneously, they are handled in the following way:

1. Each numeric value and gauge posts its alarm by being highlighted red and blinking (if displayed).
2. The MSG label blinks.
3. Alarm messages in the message window are stacked into memory and presented in the order in which they occurred.
4. If a message was not displayed due to lack of room, these messages are not acknowledged, and thus the MSG button starts flashing again on closure of the message window.
5. When the last alarm is acknowledged, the message window is cleared and the MSG button is no longer red.

All alarmed parameters remain in their alarmed state until the alarm condition no longer exists.

10.Appendix A: SkyView System Specifications

SV-D700 and SV-D1000 Quick Specifications

SV-D700 Mechanical	7.64” wide x 5.51” tall x 2.14” deep (194 x 140 x 55 mm) 2 lb 6.1 oz (1.08 kg) not including SV-HARNESS-D37
SV-D1000 Mechanical	10.32” wide x 7.06” tall x 2.14” deep (262 x 180 x 55 mm) 3 lb 0.7 oz (1.38 kg) not including SV-HARNESS-D37
Operating Temperature	-22° to 140° F (-30° to +60° C)
Power	Voltage Input: 10 - 30 volts DC Power: ~3.5 amps at 12 volts DC; +1.5 amps with battery ~1.8 amps at 24 volts DC; +0.7 amps with battery
Connections	(1) 37-pin D-sub male connector (2) 9-pin D-sub male connector (2) USB 2.0 A-series jacks (1) RJ45 Ethernet jack
SV-D700 Screen	Type: Thin film transistor, active matrix LCD Brightness: 1200+ nit, light emitting diode Size: 7.0” diagonal (178 mm) widescreen Resolution: 800 x 480 color pixels
SV-D1000 Screen	Type: Thin film transistor, active matrix LCD Brightness: 1350+ nit, light emitting diode Size: 10.2” diagonal (259 mm) widescreen Resolution: 1024 x 600 color pixels
Inputs, Outputs, and Communication Ports	(1) Primary power and ground input (1) Backup battery (SV-BAT-320) input (5) Serial RS-232 Ports (Left and Right) Audio outputs (4) Contact inputs (3) USB Ports (2 on back, 1 on main display harness) (2) SkyView Network Ports

SV-ADAHRS-20X Quick Specifications

Mechanical	4.71” wide x 1.22” tall x 2.61” deep (120 x 31 x 67 mm) 8.2 oz (0.23 kg)
Operating Temperature	-22° to 140° F (-30° to +60° C)
Connections	(1) 9-pin D-sub male connector (1) 2-wire connector (3) 1/8” NPT female threaded fittings
Sensor Inputs	(1) 2-wire OAT for use with SV-OAT-340 Pitot, Angle of Attack, and Static pressure ports
Other Inputs, Outputs, and Communication Ports	(1) SkyView Network Port

SV-XPNDR-26X Quick Specifications

Mechanical	1.9” high x 2.5” wide x 6.4” deep (48 x 66 x 160mm) .77lbs. (350g)
Operating Temperature	-4° to 148° F (-20C° to +70° C)
Connections	(1) 25-pin D-sub male connector (1) Antenna connector (TNC)
Transponder Capabilities	Mode S Transponder: Class 1 (SV-XPNDR-261) or Class 2 (SV-XPNDR-262); ADS-B OUT via 1090ES; TIS Traffic Input.

SV-ARINC-429 Quick Specifications

Mechanical	4.75” wide x 1.09” tall x 2.61” deep (120 x 27 x 67 mm) 6 oz (0.17 kg)
Operating Temperature	-4° to 148° F (-20C° to +70° C)
Connections	(1) 25-pin D-sub female connector (1) 9-pin D-sub male connector
Other Inputs, Outputs, and Communication Ports	(1) SkyView Network Port (1) ARINC-429 TX (2) ARINC-429 RX (w/ Aviation Format serial RX for data augmentation)

SV-EMS-220 Quick Specifications

Mechanical	6.35” wide x 1.09” tall x 2.99” deep (162 x 28 x 76 mm) 9.6 oz (0.27 kg)
Operating Temperature	-22° to 140° F (-30° to +60° C)
Connections	(1) 37-pin D-sub male connector (1) 25-pin D-sub female connector (1) 9-pin D-sub male connector
Sensor Inputs	(2) Voltmeters (0 to 30 volts DC) (11) General Purpose (3) General Purpose Enhanced (2) Fuel Flow (1) Amps (differential) (1) Manifold Pressure (2) General Purpose Thermocouple (Left and Right) RPM (Left and Right) RPM (6) CHT (6) EGT

Other Inputs, Outputs, and Communication Ports	(1) +12 volt DC auxiliary sensor power output (1) +5 volt DC auxiliary (fuse limited at 500 mA) sensor power output (1) SkyView Network Port (1) External Alarm Light Output

SV-GPS-250 Quick Specifications

Mechanical	2.19” wide x 0.75” tall x 3.44” deep (56 x 19 x 88 mm) 6.7 oz (0.19 kg)
Operating Temperature	-40° to 140° F (-40° to +60° C)
Connections	(1) Power wire (1) Ground wire (1) Serial TX (NMEA format; 5 Hz update rate) (1) Serial RX

SV-BAT-320 Quick Specifications

Mechanical	3.30” wide x 2.10” tall x 3.90” deep (162 x 28 x 76 mm) 9.6 oz (0.27 kg)
Operating Temperature	Charge: 32° to 113° F (0° to +45° C) Discharge: -4° to 140° F (-20° to +60° C)
Connections	(1) 3 pin power

Autopilot Servo Quick Specifications

SV32 Mechanical	2.47” wide x 4.20“ tall x 3.98” deep (63 x 107 x 101 mm) 2 lbs (0.91 kg)
SV42 Mechanical	2.47” wide x 5.13“ tall x 3.98” deep (63 x 130 x 101 mm) 3 lbs (1.36 kg)
SV52 Mechanical	2.47” wide x 6.05“ tall x 3.98” deep (63 x 154 x 101 mm) 4 lbs (1.81 kg)
Operating Temperature	-22° to 167° F (-30° to +75° C)
Connections	(1) Power wire (1) Ground wire (1) SkyView Network Port (4 unterminated wires, no connector) (1) AP Disengage / Control Wheel Steering Button (unterminated wire, no connector)
SV32 Torque	36 inch pounds
SV42 Torque	55 inch pounds
SV52 Torque	72 inch pounds

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Version 2, June 1991

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