

FlightMax EX5000

Multi-Function Display

Pilot's Guide



Revision History		
Date	Revision	Description
Dec 16, 2003	00	ECO 03-289
Feb 17, 2004	01	ECO 04-024

System Configuration

When contacting your dealer or Avidyne technical support, and when logging onto www.myavidyne.com for the first time, please have your FlightMax EX5000 serial number and Subscriber Communicator serial number available:

FlightMax EX5000 S/N _____

Datalink Subscriber Communicator S/N _____

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Consult the Flight Manual Supplement (FMS) provided with the aircraft and/or sensors prior to operation. The FMS contains information specific to your installation and it may contain operating limitations applicable to your aircraft configuration.

Introduction

The FlightMax EX5000 Multi-Function Displays (MFD) provide a pictorial view of your flight situation based on input from your GPS navigator. It utilizes on-board database information for mapping off-route navigation data such as nearby airports, VORs, NDBs, special-use and restricted airspace, etc., as well as terrain, interstate highways, bodies of water, and obstacles.

The EX5000 uses RS-232 to interface to external sensors such as GPS, Goodrich WX-500 Stormscope Sensor, and Ryan TCAD Traffic Sensor, if installed. The EX5000 additionally offers ARINC 429 data bus capability. When interfaced via ARINC 429 to a Garmin GNS 430/420-series GPS, the EX5000 will display the curved paths associated with instrument approaches including DME arcs, holds, and procedure turns. The EX5000 will also provide traffic display capability when interfaced with the Goodrich Skywatch® traffic sensor, if installed.



The controls on the bezel of the FlightMax EX5000 are placed to allow you quick and intuitive access to the information you need, when you need it.

Operation

General

The EX5000 startup is automatic once power is applied. The system performs a brief hardware self-test, then systematically initializes its functions. After the system has been initialized (less than a minute after power-on), the title screen appears on the system page. Database currency information is also presented. It is here that the pilot is warned of any expired databases.

When the MFD is ready for use, the message "Press any bezel key to continue" is displayed.

Operational Controls

- 1) **PhotoCell Light Sensor** - Automatically compensates display brightness for varying lighting conditions.
- 2) **Brightness Control** - Manually adjusts display brightness level.
- 3) **Data Port** - Provides a front panel access point for loading database updates and downloading recorded engine data.
- 4) **Buttons** - Used to select modes or change the display as indicated. Active when label appears on the screen adjacent to the key.
- 5) **Page Control** - Left knob provides quick access to the various MFD pages. The current page is highlighted in the lower left corner of the screen.
- 6) **Range & Cursor Control** - Right knob controls the Map's range. When other pages are selected, the right knob provides item selection control.
- 7) **Message Bar** - The message bar is used to keep the pilot informed about critical and advisory information from the MFD. When information needs to be conveyed the message bar appears as the lowest right button.

The message bar can display only one message at a time. If more than one message is available, the message bar will display the highest priority message on top. The key associated with the Message must be depressed to clear messages and view those underneath.

Map Page - Controls

Line select keys on the left side of the bezel provide access to sensor modes. Line select keys on the right side of the bezel access the mapping functions, and control how the Map is viewed.



Map Page - Controls

- 1) Sensor Functions** - Control overlay and modes of available sensors. Buttons are only displayed for those sensors that are installed in the aircraft.

Traffic button with TAS (SkyWatch or BendixKing) cycles through traffic sensor modes and overlay in the following order:
Above ->Normal ->Below ->Unlimited (UNLIMITD) ->Traffic Overlay Off (DSPLY OFF)

Traffic button, with Ryan TCAD, cycles through traffic sensor modes and overlays based on the phase of flight as calculated from the TCAD. The modes are: Ground, Terminal, Standard, Enroute, Unlimited, Approach, Departure and Display off.

Intruders are displayed as they are received from and identified by the sensor. The threat level assigned to an intruder is the threat level specified by the sensor when it transmits the intruder data. Threat data, range, bearing, altitude, ID, and closing direction are defined by the sensor and the type of sensor used in your system.

Lightning button cycles through lightning sensor modes and overlay in the following order: Strike ->Cell ->Lightning Overlay Off (DSPLY OFF)

The lightning sensor maps thunderstorm activity by monitoring electrical discharge activity within a 200-mile radius of the aircraft. Lightning strikes less than 25NM distant are not displayed if the display range is set to less than 25NM. If the display range is set to greater than 25NM, all lightning strikes will be displayed.

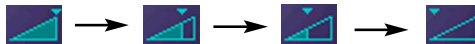
Clear Strikes button removes lightning symbols to allow for the refresh of lightning data.

Weather button cycles through Datalink weather modes and overlay based on the Datalink data requested from the Datalink Setup Page. With all data requested, the order is: ALL (Nexrad, METARS and Airmets) ->REPORTS (METARS and Airmets) -> NEXRAD -> Datalink Weather Display Off.

- 2) Map Functions** - Control basic look of the map in terms of orientation, number of elements, and base map.

View line select key orients the map for either Track/Heading Up or North Up. FORWARD view orients the map with Track/Heading Up and the aircraft symbol at the bottom of the screen. CENTER view orients the map with Track/Heading Up and the aircraft symbol centered on the screen. NORTH UP orients the map with North Up.

Declutter line select key allows you to quickly choose from four levels of database Nav Map detail from most to least:



Base Map line select key selects from three levels of map detail, starting with contoured terrain with interstate highways, water base map, and political boundaries. Pressing the key removes contoured terrain with Interstates, while leaving water and political boundary references. Push again to view the flight plan on a traditional EFIS-style black background.



- 3) Range Control** - Controls the map's range and allows you to range down to 1NM scale and out to 1500NM scale. The nineteen selectable ranges are 1, 2, 5, 10, 15, 20, 30, 40, 50, 75, 100, 150, 200, 300, 400, 500, 750, 1000, 1500.

(Note: Terrain base map is automatically removed and Nav database information is fully decluttered at 750NM and higher ranges).

Map Page - Symbology

The MFD's map presentation depicts your aircraft's position in relation to flight plan, nearby airports, terrain, traffic, lightning, weather, special use airspace, and other nav aids.



- 1) Data Blocks (Left & Right)** - View navigation and engine data in data blocks in the upper corners of the display. See Data Block Edit (page 27) for options.
- 2) Sensor Status Box** - Displays Nexrad data status and age, and the status of traffic and lightning sensors, if installed.
- 3) Heading/Track Indicator** - Three triangles around the compass rose provide actual track, desired track, and heading indications. The H/T Block provides digital readout of the current heading, or actual track. Map orientation is indicated in the triangle to the right of the H/T Block.

H/T Block **031** H/T Block

 Desired Track
 Actual Track
 Heading

 Track Up
 Heading Up
 North Up

- 4) Obstacles** - The MFD's database contains towers and other obstacles greater than 200 feet AGL. Obstacles can be displayed with MSL altitude label. Symbols for Obstacles:

 200' AGL to <1000'AGL

 Groups of obstacles within 1NM of each other

 1000' AGL or higher

 Groups of obstacles 1000' AGL or higher and within 1NM of each other.

Map Page - Symbolology

- 5) **Compass Rose/Range Ring** - Displays a 360-degree or 120-degree compass circle or arc and also indicates current range setting. The range number is the distance from the airplane symbol to the compass arc.
- 6) **Terrain Scale** - Shows highest and lowest limits of terrain in displayed area. Legend colors in between these numerics represent terrain elevations. Blue obstacle clearance number shows the top of the highest obstacle, when greater than the highest displayed terrain. Terrain data is not displayed when your aircraft's latitude is greater than 75 degrees (north or south).
- 7) **Special Use Airspace** - The MFD uses several different line styles to convey special use and class airspaces. Class B is solid blue line, Class C is solid magenta line. Class D is dashed blue line, MOA, Warning, and Alert areas are solid yellow lines, and restricted and prohibited areas are solid red lines. Reference Table 5 and associated note (Page 35).
- 8) **Airport Runway Diagrams** - Runway layouts of your destination airport and nearby airports are displayed. As you range in, the scaled runway diagram with heading labels shows your exact location in proximity to the field.
- 9) **Flight Plan** - The active flight plan from the GPS is displayed on the map. The current leg is displayed in magenta and all remaining legs are shown in white. When you select an approach procedure on the Garmin 430, all approach segments including holds, DME arcs, procedure turns, etc., are shown
- NOTE: The Garmin GNS 430/GNC 420 does not differentiate curved flight path segments from straight segments when interfaced with the MFD via an RS232 interface. Therefore, the MFD will connect the beginning and end waypoints of a curved segment, such as a DME arc, with a straight line. Under these circumstances, the straight line must be ignored. Approach procedures should be flown using the GNS 430/GNC 420 navigator's CDI as the primary reference. Consult your avionics installation facility to determine if your MFD is interfaced to the GNS 430/GNC420 via ARINC 429 or RS232.
- 10) **Traffic Indications** - Shows traffic symbol relative to current position and includes relative altitude (when available) with respect to airplane symbol. See traffic sensor user's manual for further details. 
- 11) **Lightning Indications** - Shows lightning strikes geographically referenced if configured. Strikes represented by yellow "X" in Strike Mode, and by yellow "+" in Cell Mode. Lightning strikes are displayed for three minutes. 
- 12) **Airplane Symbol** - Shows the position of your aircraft in relation to the moving map and the selected view. 

Map Orientation Control

The pilot can control the orientation of the map and sensor data displayed on the MFD with the Map View button. MFD traffic and lightning symbols are positioned relative to the aircraft symbol nose. When the Map View is North-Up extra pilot effort may be needed to locate traffic outside the aircraft. Set Map View to Center or Forward to display this data consistent with typical dedicated traffic and lightning sensor displays.

Using Datalink

Your EX5000 comes equipped with an integrated datalink function that allows you to stay completely tuned in to the current weather, SUA, and TFR conditions along your route of flight. Since this function is completely integrated, there is nothing "special" or new that you need to learn to make it work for you.

You will need to log on to *MyAvidyne.com* and follow the simple account setup instructions in order to establish an Avidyne datalink account. Be sure to have your datalink subscriber communicator (SC) serial number handy. You will need it to open your account. You can view your SC s/n on the EX5000 Datalink Setup Page. Once your account is activated, you may immediately begin enjoying the advantages of the EX5000's satellite-based datalink capability. In addition, your *MyAvidyne.com* datalink account provides you with access to your billing and usage statements, as well as providing pre-flight weather links and planning tools. You can set your datalink user preferences online prior to your flight, and they will be downlinked to your EX5000 via satellite the next time you fly.

When you power the EX5000 up, it will immediately begin sending position data to tell the satellite network where you are and that you are about to begin a flight. Weather data will begin transferring to your airplane based upon your user preferences. No action is required to begin receiving weather (You will have to pull your airplane out of the hangar so that the satellite receiver can interrogate and locate a satellite).

Upon entry of a flight plan into your primary GPS receiver, your EX5000 will automatically download the weather for your route of flight without any additional action required. Additional updates will be provided while enroute based upon the update rate that you have selected online or on the EX5000's datalink setup page.

AVIDYNE

Datalink Setup
Use to establish the amount of weather data to be transmitted

☒ Datalink Enabled SC s/n AQ0500009999

Data Zone: Current Position

Flight Path Radius [NM]: 400

NEXRAD Resolution: Low

Request Interval [minutes]: 10

☒ METARs

☒ AIRMETs / SIGMETs

☒ SUA Status / TFRs

Factory Defaults

Datalink Refresh

Up

Down

Change Value

Back to Setup

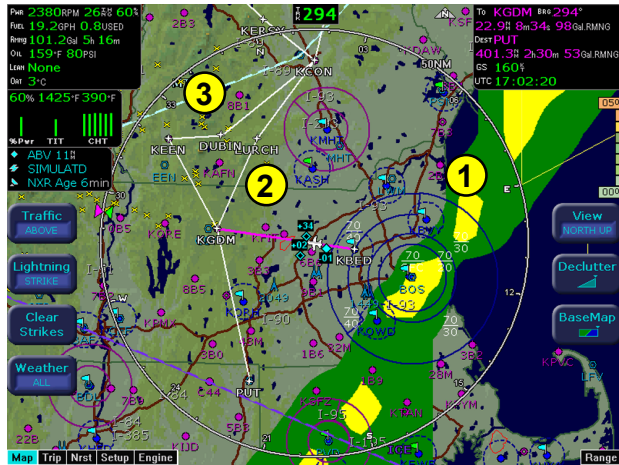
Map Trip Nxt **Setup** Engine

Select

Using Datalink

The Weather Overlay button allows you to add Nexrad Graphical METARs and Airmets weather images onto the map display.

- 1) NEXRAD data is displayed in a four-color format consistent with weather radar data. The NEXRAD age is displayed in the sensor status box. The displayed age is calculated based on the time the national NEXRAD composite image is created. The actual radar data may be slightly older than the displayed NEXRAD age. A legend for the NEXRAD display is available on the trip page.



- 2) Graphical METARs are displayed as small upright flags. These offer you a chance to look at the "bigger picture" for weather along your route of flight. A legend for the graphical METARs is available on the Trip Page.
- 3) Airmet/Sigmet data is overlaid with lines that alternate between single and triple thick. The thick side of the line indicates the inside of the affected region. The regions are labeled according to the type of Airmet/Sigmet, and the label is located in the interior of the depicted region. (see Table 6)

CAUTION: Datalink weather should only be used for strategic planning purposes. Datalink weather should not be used for tactical weather avoidance. Local conditions may have changed since your last weather update.

NOTE: The National Weather Service only provides NEXRAD for the Continental United States (CONUS). The EX5000 will not depict NEXRAD images for areas outside of CONUS.

The boundary of the available weather coverage area is shown by hash marks. The intent of the datalink weather boundary is to clearly show when there is actual weather in the area, versus when there may be weather in a given area but it is not displayed. If you would like to expand the amount of data displayed (and therefore move the boundary farther from your flight plan) you can do this on the Datalink Setup Page or at *MyAvidyne.com*.

Trip Page

The Trip Page is continuously updated during flight. The distance and the time values are updated with each new positive fix from the GPS. The route legs advance with each waypoint message. Turning the left knob one detent to the right from the Map page brings up the Trip Page, which shows the remaining legs in the current flight plan and other data being received by the MFD from the GPS. If the flight plan doesn't fit on the screen, an ellipse (...) is shown in the next to last line. The destination is always displayed, on the last line. A "No Flightplan Available" message is displayed if there is no flight plan entered or if the GPS has failed.



1) Current ground speed and track

2) Flight Plan information from your GPS. Active waypoint is shown in magenta.

Displayed data:

WPT - Waypoint identifier as received from the GPS

BRG - Bearing to current waypoint

DTK - Desired track to waypoint

DIST (NM) - Cumulative great circle distance of each flight plan leg

ETE - Cumulative estimated time en route to waypoint in H:MM format for each flight plan leg at current ground speed.

ETA - Estimated time of arrival to waypoint in HH:MM formatted for airplane local time.

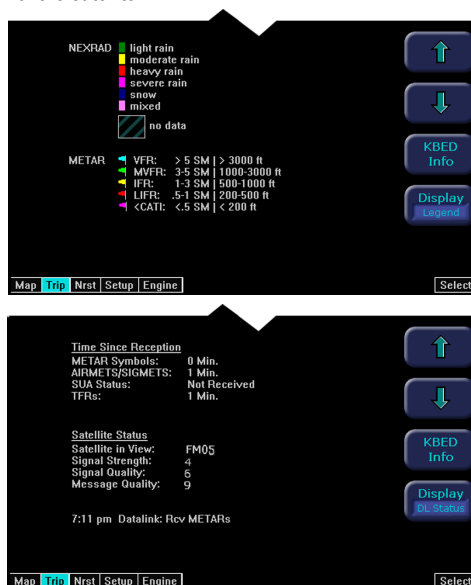
Fuel Remaining - Available with Engine and Fuel Monitor function. Displays remaining fuel at each waypoint in gallons.

Nrst METAR - Available with Datalink enabled. Displays Graphical METAR and reporting point identifier.

When conducting a Direct To flight plan, the MFD will supply METAR information for several intermediate reporting stations along your route. These will be shown as blank lines on the flight plan list, with "Wx" in the first column, and the METAR flag in its normal position in the right column. Selecting one of the intermediate points will display the text METAR on the lower half of the screen. The intermediate METAR stations will be removed from the list as you pass them during your flight.

NOTE: When the MFD is interfaced to a Garmin GNS-430/GNC-420 via RS-232, the GPS may send duplicate waypoints while in approach mode. These duplicate waypoints may affect the distance and time readings on the trip page. Approach procedures should be flown using the GPS as the primary source of navigation information. Consult your avionics installation facility to determine if your MFD is interfaced to the Garmin GNS-430/GNC-420 via ARINC 429 or RS-232.

- 3) **Course Deviation Indicator (CDI)** - Shows lateral distance (Crosstrack deviation) from desired course, providing continuous navigation reference when viewing the Trip page.
- 4) **Local and UTC time** in HH:MM:SS using a 24-hour clock format.
- 5) **Destination Airport Information** - Provides quick access to airport information for the destination airport, when available.
- 6) **Display Button** - By pressing the adjacent button, you can toggle through Textual METARS, NEXRAD/METAR Legend, and Datalink Status. The Satellite Status values have been normalized to values between 0 and 10 to allow easy determination of the satellite link.



Satellite in View - Displays the name of the satellite the system is currently using.

Signal Strength/Signal Quality - Signal Status represents the overall health of the satellite signal. The higher these value are, the better the signal strength. You should normally see values between 4 and 10.

Message Quality - Even when the signal strength is good, messages may be dropped if the local interference level is too high. You should see values between 7 and 10 during normal operation.

- 7) **Text METAR** - The translated METAR is displayed for the selected flight plan waypoint. Note that if the selected waypoint is not reporting weather, the METAR information will be reported from the nearest METAR station.
- 8) **Select Knob** - Moves the cursor over the desired waypoint in the flight plan, which selects the plain-English textual METAR to be displayed along the bottom half of the screen.
- 9) **Select Buttons** - These buttons can be used instead of right knob to move cursor

Nearest Page (NRST)

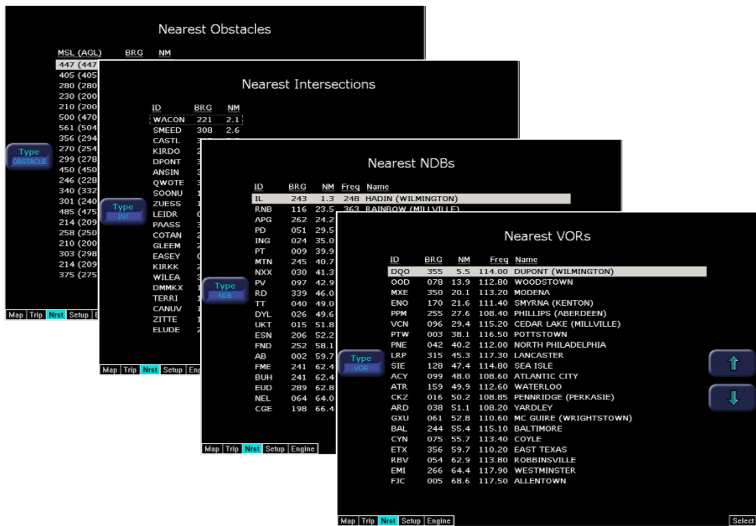
From the Trip page, turning the left knob one detent to the right brings up the NRST Page. The Nearest Page brings up the nearest airports within 60NM of your present position. Through the line select keys, you will also have access to detailed information about each airport. The line select keys also allow you to view the nearest VORs, NDBs, Intersections, and Obstacles.



Nearest Page (NRST)

1) **TYPE** - Cycles through the various data types in the following order:

Airports ->VORs ->NDBs ->Intersections ->Obstacles



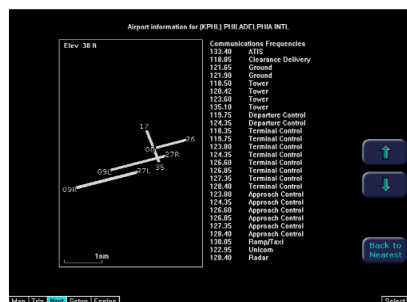
2) **NRST List** - Shows a list of the nearest data including identifier, bearing, distance, frequency, and name for airports, VORs, and NDBs. Identifier, bearing, and distance are displayed for intersections, and MSL (and AGL) height, bearing, and distance are displayed for obstacles.

3) **Selection Control** - Use line select keys or right knob to move the cursor up or down to highlight a specific airport or other data type.

4) **FILTER** - Press to see all airport types (SHOW ALL) or only the airport types as defined on the Airport filter page (ON) (Reference Set Up Pages - Airport Filter, Page 25). The Filter line select is only visible on the Nearest Airport page.

5) **Airport Info** - Provides quick access to airport information for the airport highlighted. Airport Info line select only appears when viewing the Nearest Airport page.

6) **Graphical METAR** - Displays the current reported conditions for that airport, if the airport has weather reporting.



Engine Instruments - Engine Page

The MFD Engine page is used to display the health and performance status of the aircraft engine. Most of the engine indications are transmitted to the MFD via a remotely mounted engine data acquisition unit (DAU) while the remainder are calculated by the FlightMax EX5000.



The Engine page is divided into four main sections plus an OAT gauge:

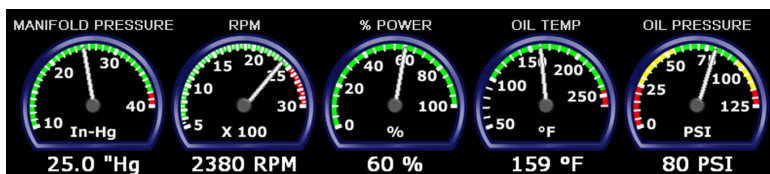
- 1) Gauges** - Provides dial and numeric readouts of Manifold Pressure, RPM, Percent Power, Oil Temperature, and Oil Pressure.
- 2) Electrical** - Monitors electrical bus voltage and alternator output current.
- 3) OAT** - Monitors the outside air temperature (OAT).
- 4) Fuel** - Provides Fuel Quantity, Fuel Flow, Fuel Used, Fuel Remaining, Time Remaining, and Fuel Economy.
- 5) Cylinder Temperatures** - Full display of Exhaust Gas Temperature (EGT) and Cylinder Head Temperature (CHT) for all cylinders.

NOTE: Turbo-charged aircraft display a Turbine Inlet Temperature (TIT).

Engine Instruments - Cautions and Warnings - In order to assist the pilot in monitoring engine health, the MFD will highlight any engine parameters that are not within normal operating conditions. "Caution zone" readings will cause the appropriate numeric indicator to turn yellow while "Warning zone" readings will cause a red indication. To supplement aircraft cockpit annunciators, the warning zone engine parameter conditions trigger a message to be displayed in a message bar on the bottom of the MFD screen, if the condition persists for greater than 5 seconds (10 seconds for TIT). Acknowledging the message will take the user to the Engine Page, if not already displayed. The message bar will be removed automatically if the cautionary condition goes away. See page 42 for the Engine cautions message.

Check RPM

Engine Instruments - Gauges, Electrical, & OAT



1) Engine Gauges

MANIFOLD PRESSURE - Displays current engine power in inches of mercury as measured at the engine's induction system and reported by the DAU.

RPM - Displays current engine speed in revolutions per minute as reported by the DAU.

% POWER - Indicates the current percent power being made by the engine. This indication is calculated by the MFD based on interpolating Piper flight test data using engine RPM, manifold pressure, outside air temperature, pressure altitude, and Fuel Flow. Percent Power is limited between 50% and 85% on the Saratoga II-TC and the Piper 6XT. Percent power is limited to 50% or 75% on the Saratoga II-Hp and the Piper 6X.

OIL TEMP - Displays the current engine oil temperature in degrees Fahrenheit as reported by the DAU.

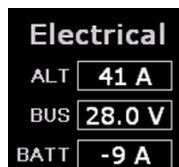
OIL PRESSURE - Displays the current engine oil pressure in pounds per square inch (PSI) as reported by the DAU.

2) Electrical Gauges

ALT - Indicates the amount of current in Amps being produced by the alternator as reported by the DAU.

VOLTS - Indicates the current bus voltage in volts as reported by the DAU.

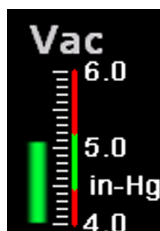
BATT - Indicates the amount of current in Amps being discharged or charged from/to the battery as reported by the DAU.



- 3) **Outside Air Temperature (OAT)** - Indicates the ambient air temperature as reported by the Avidyne PFD. This will either be displayed in degrees Fahrenheit or degrees Celsius as selected by the pilot using the temperature units control.



- 4) **Vacuum Pressure Gauge** - Indicates the current vacuum pressure, used by the backup gauges, as reported by the DAU. The Vacuum Pressure gauge is an optional display dependent on particular aircraft installation. If the aircraft does not have a compatible vacuum system, the Vacuum Pressure gauge will not be displayed.

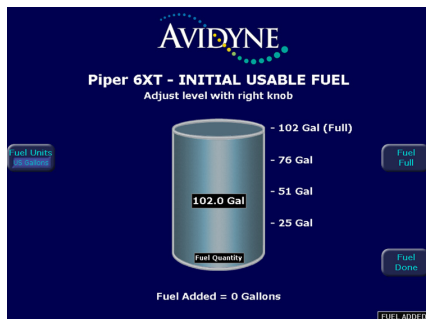


Engine Instruments - Fuel Usage

4) Fuel Usage

Fuel Initialization Page - Displayed on startup or when the "Initial Fuel" button is pressed. The MFD will display the fuel initialization page and ask the pilot to input the amount of fuel added to the aircraft.

A Button for "Fuel Full" is available to quickly set the fuel level to a full tank. In addition, the right knob can be used to fine tune the amount of fuel added.



When the desired amount has been entered, pressing the "Fuel Done" button will exit the fuel initialization page.

NOTE: It is critical to accurately enter the actual onboard fuel quantity on the initial fuel page to ensure accuracy of the fuel totalizer functions. Aircraft pre-flight inspection should include visual identification of the actual fuel in each tank in accordance with aircraft POH procedures. After the amount of fuel has been visually confirmed, this amount should be entered into the MFD initial fuel page. Inaccurate fuel entry can result in a misleading indication of fuel or time remaining, which could lead to fuel starvation, loss of engine power, and forced landing.

NOTE: Be sure to cross-check fuel quantity and fuel remaining during flight. Fuel quantity is the amount of fuel in the tanks, as measured by the tank probes. See the aircraft POH for any limitations on the fuel measurement. Fuel remaining, however, is the amount of fuel remaining based on a calculation using the initial fuel amount entered by the pilot, and the fuel flow integrated over the time of the flight so far.

In the fuel area of the Engines Page, the MFD displays Fuel Quantity, Fuel Flow, Fuel Used, Fuel Remaining, Time Remaining, and Fuel Economy.

QUANTITY - Displays the current measured fuel quantity in U.S. gallons as two vertical bars, one each for the left and right main wing tanks.

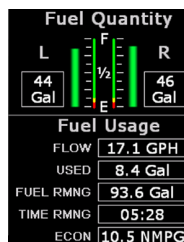
FLOW - Displays the current fuel flow in gallons per hour as reported by the DAU.

USED - Displays the total amount of fuel used since the last engine start as reported by the DAU.

FUEL RMNG - Displays the total amount of fuel remaining in gallons. This indication is calculated by the MFD based on the starting fuel entered by the pilot on the fuel initialization page and fuel used as reported by the DAU.

TIME RMNG - Displays the amount of time remaining before the total useable fuel on board will be consumed. This indication is also calculated by the MFD based on the fuel remaining, and fuel flow as reported by the DAU. This value is only displayed when the GPS ground speed is greater than 50 knots.

ECON - Displays the current fuel economy in nautical miles per gallon. This indication is based on the fuel flow as reported by the DAU and the ground speed as reported by the GPS. This value is only reported if the GPS ground speed is greater than 50 kts.



Engine Instruments - Temperatures

5) Engine Page - Cylinder Temperatures

Turbine Inlet Temperature - Indicates the Turbine Inlet Temperature in degrees Fahrenheit for Saratoga II-TC and Piper 6XT Aircraft. The numeric TIT indication is above the bar along with an up/down trend arrow.

Exhaust Gas Temperature (EGT) - Indicates the exhaust gas temperature of each cylinder in degrees Fahrenheit as a bar graph. The individual EGT of each cylinder is also displayed as a numeric indication above each bar. An up or down trend arrow will also appear below this numeric indication to indicate whether a cylinder's EGT is rising or falling.

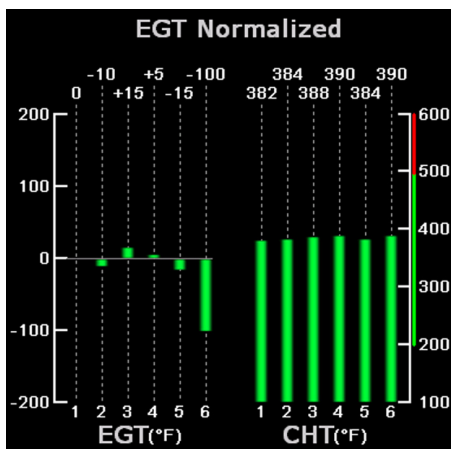
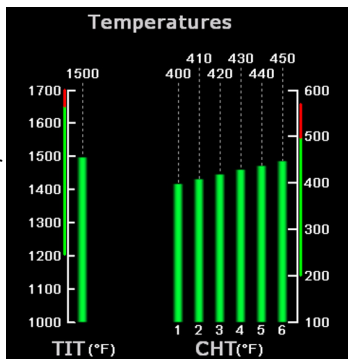
Cylinder Head Temperature (CHT) -

Indicates the temperature in degrees Fahrenheit of each engine cylinder head as reported by the DAU. The individual temperature of each cylinder is also displayed as a numeric indication above each bar. A white up or down trend arrow will also appear above or below this numeric indication to indicate whether a cylinder is rising or falling in temperature.

Absolute - Selects the "absolute" mode for EGT/TIT display. Absolute mode is the default display mode, which indicates the current exhaust gas temperature for each cylinder.

Normalize - Selects the "normalize" mode for the EGT/TIT display. Upon activation, the display will establish all of the current EGT's or TIT at a zero point.

In Normalized mode, the bar graphs will indicate overall changes in temperature rather than displaying the actual temperature values as in absolute mode.



Engine Instruments - Lean Assist For Best Economy (Saratoga II HP& Piper 6X)

The MFD is equipped with a lean assist function which is used to set the optimum mixture for various operating conditions. The MFD will automatically detect whether the pilot is leaning for best power or best economy and provide visual messages to guide the pilot toward the correct mixture setting.

NOTE: It is very important to adjust the mixture slowly and continuously. Leaning the mixture too quickly could disrupt the MFD's ability to accurately track the peak EGT, and could result in a mixture setting damaging to the engine. Always be sure to monitor Oil Temperature and CHT readings, to ensure they stay within specified limits.

CAUTION: If at any time during the Lean Assist process the engine begins to run roughly, richen the mixture slightly until the roughness abates.

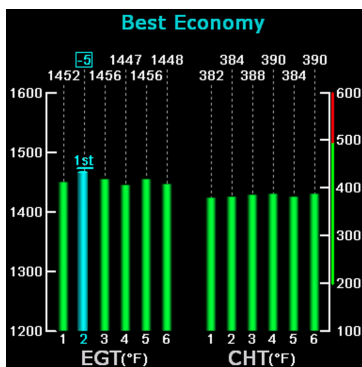
Leaning for Best Economy

- 1) In order to lean the engine for best economy, begin by pressing the "Lean Assist" button and smoothly lean the mixture control. Best Economy leaning should only be undertaken at power levels below 75%.

NOTE: If the percent power display is not available, consult the aircraft POH performance charts to determine current aircraft percent power prior to engine leaning.

- 2) The MFD will annunciate "Looking for 1st Peak" at the top of the temperatures section of the display.
- 3) As the EGT's rise, the first cylinder will reach peak EGT and the MFD Engine Page will annunciate "Best Economy," indicating that the best economy mixture has been achieved. Due to EGT variation, the MFD may occasionally detect a false peak and annunciate "Best Economy," even though the EGTs continue to rise.
- 4) If the mixture is leaned too far to the lean side, past the Best Economy setting, the MFD shall annunciate "Too Lean." The pilot should slowly enrichen the mixture until the annunciation switches back to "Best Economy."
- 5) After the desired engine lean setting is achieved, press the "Normalize" or "Absolute" button to exit the Lean Assist function.

The Lean State is also displayed in the "Lean" datablock on the Map Page.



Engine Instruments - Lean Assist For Best Power & Data Blocks (Saratoga II HP & Piper 6X)

Leaning for Best Power

- 1) In order to lean the engine for best power, begin by pressing the "Lean Assist" button and smoothly lean the mixture control.
 - 2) The MFD will annunciate "Looking for 1st Peak" at the top of the temperatures section of the display.
 - 3) When leaning for best power, the final mixture setting is based on first cylinder to peak. As the mixture is leaned look for a rise in EGT. (For this example assume that cylinder #2 is the first to peak.)
 - 4) As cylinder #2 peaks the display will annunciate "Best Economy" and the #2 cylinder bar graph will turn cyan.
 - 5) At this point the pilot should then begin to richen the mixture.
 - 6) As the mixture is richened the display will first annunciate "Looking for #2 to Peak (Rich)," and then "Peak Detected (Rich)" as it determines the peak temperature. Finally, it will display "Best Power" when the optimum best power mixture has been achieved, between 80-100° rich of peak.
- If the mixture is adjusted too far to the rich side, past the Best Power setting, the MFD shall annunciate "Rich of Best Power." The pilot should slowly lean the mixture until the annunciation switches back to "Best Power."
- 7) After the desired engine lean setting is achieved, press the "Normalize" or "Absolute" button to exit the Lean Assist function. The Lean State is also displayed in the "Lean" Map page Datablock.
 - 8) To return to a Best Economy setting after using Best Power, move the mixture to full rich and then press the Lean Assist button to go to the beginning of the Lean Assist procedure.



Engine Instruments - Lean Assist For Best Economy (Saratoga II TC & Piper 6XT)

Engine Instruments Lean Assist

The MFD is equipped with a lean assist function which is used to set the optimum mixture for various operating conditions. The MFD will automatically detect whether the pilot is leaning for best power or best economy and provide visual messages to guide the pilot toward the correct mixture setting.

NOTE: It is important to adjust the mixture slowly and continuously. Leaning the mixture too quickly could disrupt the MFD's ability to accurately track the peak TIT, and could result in a mixture setting damaging to the engine.

CAUTION: If any of the CHT's exceed 435°F or TIT exceeds 1660°F, the Lean Assist function will be halted. Reducing power and increasing fuel flow is recommended.

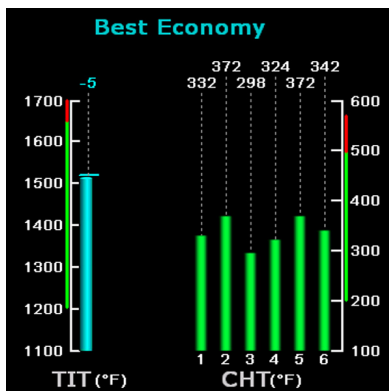
Leaning for Best Economy

CAUTION: If at any time during the Lean Assist process the engine begins to run roughly, richen the mixture until the roughness abates.

- 1) In order to lean the engine for best economy, begin by pressing the "Lean Assist" button and smoothly lean the mixture control. Best Economy leaning should only be undertaken at power levels below 75%.
- 2) The MFD will annunciate "Looking for Peak" at the top of the temperatures section of the display.
- 3) As the TIT rises, the peak TIT will be detected and the MFD Engine Page will annunciate "Best Economy," indicating that the best economy mixture has been achieved. Best Economy is indicated for temperatures between peak TIT and 20°F to the lean side of Peak.

If 1650°F is detected prior to the TIT peak, the MFD will indicate "Best Economy". Best Economy will be indicated for temperatures from 1660°F to 1600°F.

- 4) If the mixture is leaned too far to the lean side, past the Best Economy setting, the MFD shall annunciate "Too Lean." The pilot should slowly enrichen the mixture until the annunciation switches back to "Best Economy."
- 5) After the desired engine lean setting is achieved, press the "Normalize" or "Absolute" button to exit the Lean Assist function. The Lean State is also displayed in the "Lean" datablock on the Map Page.



Engine Instruments - Lean Assist For Best Power (Saratoga II TC & Piper 6XT)

Leaning for Best Power

When leaning for best power, the final mixture setting is based on the peak TIT minus 125°F. The Lycoming Operator's manual recommends the best power be achieved by adjusting the mixture from a full rich position.

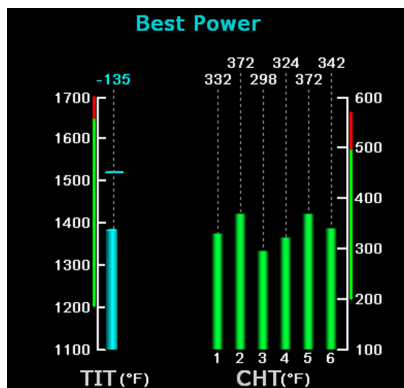
- 1) In order to lean the engine for best power, begin by pressing the "Lean Assist" button and smoothly lean the mixture control.
- 2) The MFD will annunciate "Looking for Peak" at the top of the temperatures section of the display.
- 3) When Best Economy is detected, richen the mixture.
- 4) As the mixture is richened the display will first annunciate "Set mixture to full rich". When a full rich mixture is detected the annunciation will change to "Lean to 125° Below Peak TIT."

NOTE: The MFD will wait for TIT to stabilize before commanding this step.

When the mixture is leaned to full rich, the manifold pressure and RPM may change slightly, re-adjust as necessary.

When the TIT Best Power Temperature is achieved the display will annunciate "Best Power".

- If after Best Power is reached the TIT becomes more than 145° below peak, the display will be "Rich of Best Power."
 - If after Best Power is reached the TIT becomes less than 105° below peak, the display will be "Lean of Best Power".
 - In either Lean or Rich of Best Power cases, the pilot should slowly adjust the mixture to the Best Power TIT.
- 5) After the desired engine lean setting is achieved, press the "Normalize" or "Absolute" button to exit the Lean Assist function. The Lean State is also displayed in the "Lean" Map page Datablock.
 - 6) To return to a Best Economy setting after using Best Power, move the mixture to full rich and then press the Lean Assist button to go to the beginning of the Lean Assist procedure.



Engine Instruments - Data Blocks on Map Page

Data Blocks in the upper left and right corners of the Map page can be configured to show engine instrument information.



The “Lean” data block shows the status of the Lean function. After leaning to Best Economy or Best Power on the Engine Page, press the “Absolute” or “Normalize” button to exit the Lean Assist mode.

On the Map Page, the Lean data block will show “Economy” or “Power” when the Lean Assist procedure is completed and exited.

Other Lean data block states are:

Leaning... - Displayed when you switch back to the map page before the Lean Assist mode was exited.

Incomplete - When the Lean Assist mode is exited prior to achieving Best Power or Best Economy.

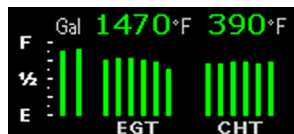
FF Change - When the lean state is changed by a fuel flow adjustment.

Pwr Change - When the lean state is changed by a power adjustment.

Sensor Status Box and Engine Instrument Data Blocks on Map Page

The Engine Sensor Status Box provides textual and graphical representation of the Fuel Quantity, Percent Power, EGT or TIT, and CHT. The numeric readouts for EGT and CHT show the current hottest cylinder temperature. The default datablock display is Fuel Quantity EGT or TIT, and CHT, but other combinations are available.

See the Data Block Setup section on Page 36 for additional information.



Engine Instruments - Data Log

The FlightMax EX5000 Engine Monitor provides full-time recording of time, position, pressure, altitude, and critical engine performance parameters. The MFD will log up to 30 hours of recorded data, which can be downloaded via the MFD's bezel-accessible data port.

In order to download the stored engine data log files:

- 1) Turn power OFF to the MFD.
- 2) Install compatible blank USB disk into the Data Loader drive.
- 3) Connect one end of the interconnect cable to the Data Loader and the other end to the MFD data port on the front panel.
- 4) Apply power to the MFD by turning ON the master switch.
- 5) The Data Log Transfer screen is displayed.
- 6) Press the "Proceed" button. Do not turn off the MFD or disconnect the interconnect cable during a data transfer.
- 7) The data transfer is complete when disk is automatically ejected from the Data Loader drive and the "Press Any Bezel Key" message is displayed.
- 8) Remove the Data Loader and interconnect cable and store in a safe place.

The disk will contain up to 30 hours of engine data in two file formats; an ASCII text file which can be opened in most spreadsheet programs (.log), and a Jeppesen Track file (.txt) which is compatible with Jeppesen FliteStar.

Setup Pages - Main

From the Nearest pages, turning the left knob one detent to the right brings up the Setup Pages, which are used to set user preferences and sensor settings.



- 1) **Message List** including sensor status. This is a record of the messages displayed in the bottom right button of each page. The highest priority and most recent messages appear at the top of the list.
- 2) **Software build number, software part number and release date** are displayed here. Expiration dates for on-board databases are also shown on this page.
- 3) **Setup Menu** - Line select keys to select specific setup functions including: Airport Filter, Declutter Settings, Data Block Editing, System Time.
- 4) **Datalink Setup** - To configure the Datalink function.
- 5) **Traffic Standby (Available only if a Skywatch traffic sensor is installed)** - Switches SkyWatch traffic sensor back into standby mode only while on the ground. To view traffic data while on the ground press Traffic button in Map page. When the traffic sensor is in standby mode the Traffic button will be **Traffic Self Test**. When selected, the MFD initiates a 30 second self test of the SkyWatch traffic sensor.
- 6) **Lightning Strike Test (Available only if a lightning sensor is installed)** - Initiates a self test of the lightning sensor.
- 7) **Swap to GPS X** - Swaps between GPS1 and GPS2 as to which unit is providing position information from an ARINC GPS source and flight plan data to the moving map.

Setup Pages - Airport Filter

The Airport Filter page allows you to set criteria for nearest airport searches of the database. You can select towered and/or non-towered airports, the type of surfaces you prefer to land on, and the minimum runway length based on your particular aircraft or type of flying. The values selected on this page also dictate the types of airports that get displayed on the map.

The screenshot shows the 'AVIDYNE Airport Filter Setup' interface. At the top is the AVIDYNE logo. Below it, the title 'Airport Filter Setup' is followed by instructions: 'Use to limit airports displayed on Map and in Nearest list' and a note: 'Note: Nearest list can be unfiltered using 'Show All''. The main area contains three sections: 1) 'Type' with checkboxes for 'Towered' and 'Non-Towered'; 2) 'Surface' with checkboxes for 'Hard', 'Soft', and 'Water'; and 3) 'Min Runway Length (ft)' with a dropdown menu currently set to 'Show All'. On the right side, there are three buttons: 'Prev Item', 'Next Item', and 'Back to Setup'. At the bottom, there is a navigation bar with tabs: 'Map', 'Trip', 'Nrst', 'Setup' (which is highlighted), and 'Engine'. To the right of the navigation bar is a 'Change Value' button. Numbered callouts (1-6) point to the 'Type' section, 'Surface' section, 'Min Runway Length' dropdown, 'Prev Item' button, 'Change Value' button, and 'Back to Setup' button respectively.

1) **Airport Type** - Select Towered, Non-Towered, or both.

2) **Surface** - Select between hard, soft and/or water surfaces.

NOTE: Display of airports with both hard surface and water runways requires that the hard surface box be checked.

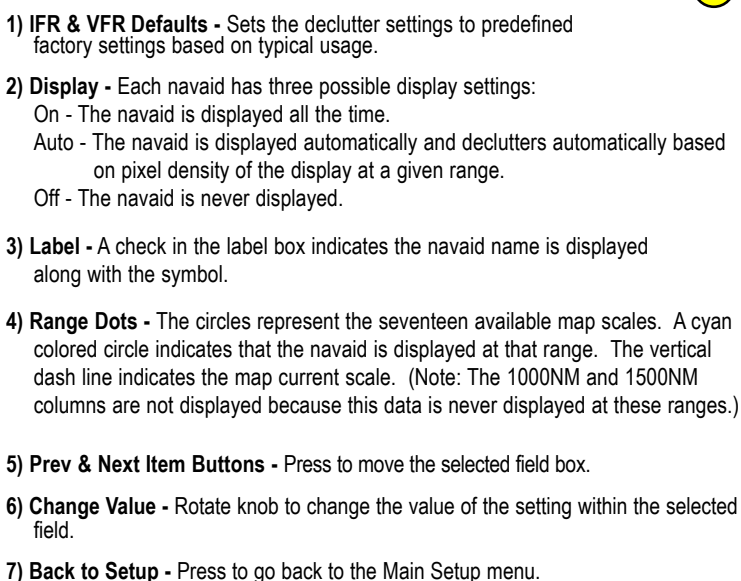
3) **Minimum Runway Length** - select the minimum runway length in hundreds of feet from 2000ft - 7000ft. or show all lengths.

4) **Prev & Next Item Buttons** - Press to move the selected field box.

5) **Change Value** - Rotate knob to change the value of the setting within the selected field.

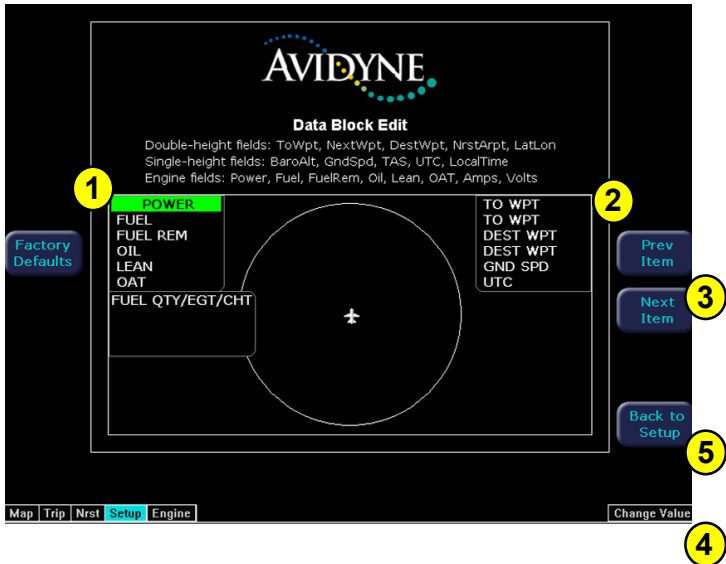
6) **Back to Setup** - Press to go back to the Main Setup menu.

The Declutter page is used to define the navigation symbols and default display settings for the Declutter button. Individual items can be selected for display or a pre-defined group of items can be selected by choosing VFR or IFR defaults.



Setup Pages - Data Block Edit

Data blocks in the upper corners of the Map Page can be edited to display information from a list of available data types. A series of dashes represents data that is invalid or unavailable.



- 1) Left Data Block** - Allows up to 6 lines of data for display and 4 slots for FUEL QTY/TIT/CHT or FUEL QTY/EGT/CHT datablocks. Data block automatically resizes based on number of lines selected. Data block disappears if all lines are blank.
- 2) Right Data Block** - Allows up to 6 lines of data for display. Data block automatically resizes based on number of lines selected. Data block disappears if all lines are blank.
- 3) Prev & Next Item Buttons** - Press to move the selected field box.
- 4) Change Value** - Rotate knob to change the value of the setting within the selected field.
- 5) Back to Setup** - Press to go back to the Main Setup menu.

See Table 7 (Page 36) for full description of Navigation data available for display in Data Blocks.

See Table 8 (Page 37) for full description of Engine data available for display in Data Blocks.

Setup Pages - System Time

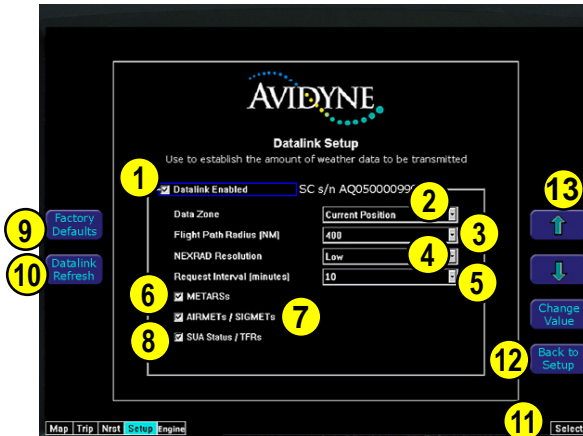
The System Time page allows you to set the EX5000 time, the current time zone offset and the amount of time the line select key menu labels stay up on the Map page before decluttering.

The screenshot shows the AVIDYNE System Time setup page. At the top is the AVIDYNE logo. Below it, the title "System Time" is followed by the instructions "Configure Time, Time Zone offset and Menu Timeout" and "Menu Timeouts apply only to Map page". The page contains several input fields: Year (2003), Month (06), Day (30), Hour (3 PM), Minute (03), and Second (20). A Time Zone dropdown menu is set to "[GMT-05:00] Eastern Time (US & Canada)". Below this is a box showing time comparisons: GPS (Mon, 06/30/03 07:03:00 PM), Local (Mon, 06/30/03 03:03:20 PM), and GMT (Mon, 06/30/03 07:03:20 PM). A Menu Timeout dropdown is set to "Never". On the right side, there are three buttons: "Prev Item", "Next Item", and "Back to Setup". At the bottom, there is a navigation bar with "Map", "Trip", "Nrst", "Setup" (highlighted), and "Engine". A "Change Value" button is at the bottom right. Numbered callouts are placed around the interface: 1 points to the Time Zone dropdown, 2 points to the Menu Timeout dropdown, 3 points to the "Prev Item" button, 4 points to the "Change Value" button, 5 points to the "Back to Setup" button, and 6 points to the time comparison box.

- 1) **Time Zone** - Set the time zone based on your location.
- 2) **Menu Timeout** - Set the amount of time that the line select menus stay on Map page from the following choices (in seconds): 5, 10, 20, 30, 40, 50, 60, Never.
- 3) **Prev & Next Item Buttons** - Press to move the selected field box.
- 4) **Change Value** - Rotate knob to change the value of the setting within the selected field.
- 5) **Back to Setup** - Press to go back to the Main Setup menu.
- 6) **Times** - GPS time is displayed if EX5000 is receiving a valid time from a connected GPS Receiver. Local time is the GMT time with the Time Zone correction. GMT time is Greenwich Mean Time either from the GPS Receiver or manual pilot entry.

NOTE: If the user wishes to set UTC time as the local time setting, select "(GMT) Casablanca, Monrovia" for the Time Zone selection box.

Setup Pages - Datalink Setup



The Datalink Setup page allows you to configure your datalink preferences, including the ability to enable or disable datalink. You can also configure these preferences on the internet by visiting MyAvidyne.com. Changes made to these settings will be processed 10 seconds after the "Back to Setup" button is pushed or the page knob is rotated. If the page is re-entered within 10 seconds, the settings return to their previous state.

Figure 34 - EX5000 Datalink Setup Page

- 1) **Datalink Enabled** - Gives the pilot the option of turning the Datalink system on or off.
- 2) **Coverage Area** - Switches weather coverage area between "Current Position" and "Flight Plan."
- 3) **Coverage Radius (NM)** - Selects 50, 100, 200, 300 or 400 nautical mile radius around the aircraft or flightplan as the display area for depicting weather.
- 4) **NEXRAD Resolution** - Selects High, Medium, Low, and Off NEXRAD resolution. The "Low" setting uses the least message units and "Off" setting turns the NEXRAD requests and overlay off.
- 5) **Request Interval** - Selects the time between weather updates. Options are: Maximum Rate, 10, 20, 30, and 60 minute update intervals. Maximum Rate provides weather updates as soon as they become available.
- 6) **METARs** - Turns graphical and textual METAR reporting on and off.
- 7) **AIRMETS / SIGMETs** - Turns AIRMET/SIGMET reporting on and off.
- 8) **SUA Status / TFRs** - Turns the Special Use Airspace (SUA) and Temporary Flight Restrictions (TFRs) reporting on or off.
- 9) **Factory Defaults** - Sets the Datalink Setup to the following values:
 Coverage area- Flight Plan
 Coverage Area - 200 NM
 NEXRAD Resolution - Medium
 Request Interval - 20 minutes
 METARs and AIRMETS/SIGMETs - "ON"
 SUA Status/TFRs - "ON"
- 10) **Request Refresh** - Initiates a request for a weather update.
- 11) **Change Value** - Rotate knob to change the value of the setting within the selected field.
- 12) **Back to Setup** - Press to go back to the Main Setup menu.
- 13) **Prev & Next Item Buttons** - Press to move the selected field box.

Traffic Mode

If a traffic sensor (TAS) is installed in the aircraft, a specific traffic display can be accessed for traffic alerts.

- 1) **Message Ack** button displays a dedicated traffic page designed to give the pilot maximum traffic situational awareness. This is a specially configured Map page with the following settings:

View - center, with heading (or track) up

Range - 10 NM

Base Map - no terrain or political boundaries

Declutter - no symbol or airspace depictions

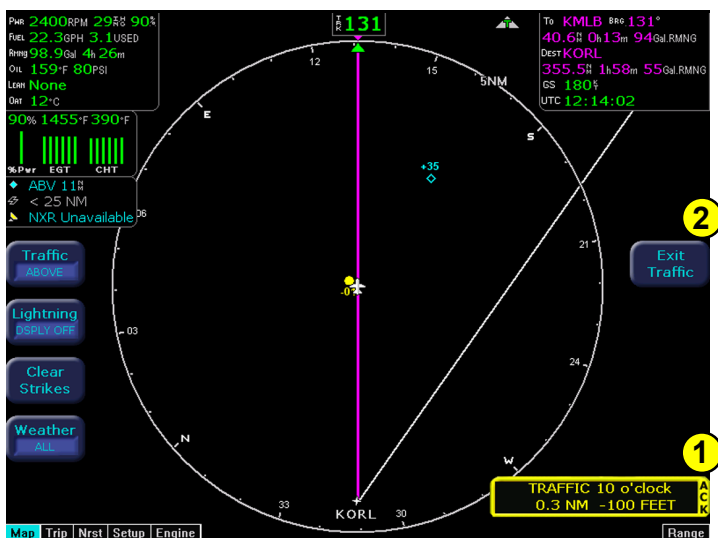
Datalink Weather - not displayed

Lightning - not displayed

Flight Plan - displayed

Up to 5 non-bearing intruders (traffic threats reported by the traffic sensor without valid bearing) are listed below the airplane symbol. Acknowledging the TA message will remove it from the message bar, allowing other messages to be displayed. The TA message will be automatically removed when the threat is reduced or the intruder is no longer present.

- 2) **Exit Traffic** button restores the Map page to the previous settings. If the Map page is restored prior to acknowledging a TA, the message will remain displayed and acknowledging it will once again bring up the dedicated traffic display.



EX5000 MFD in Traffic Mode

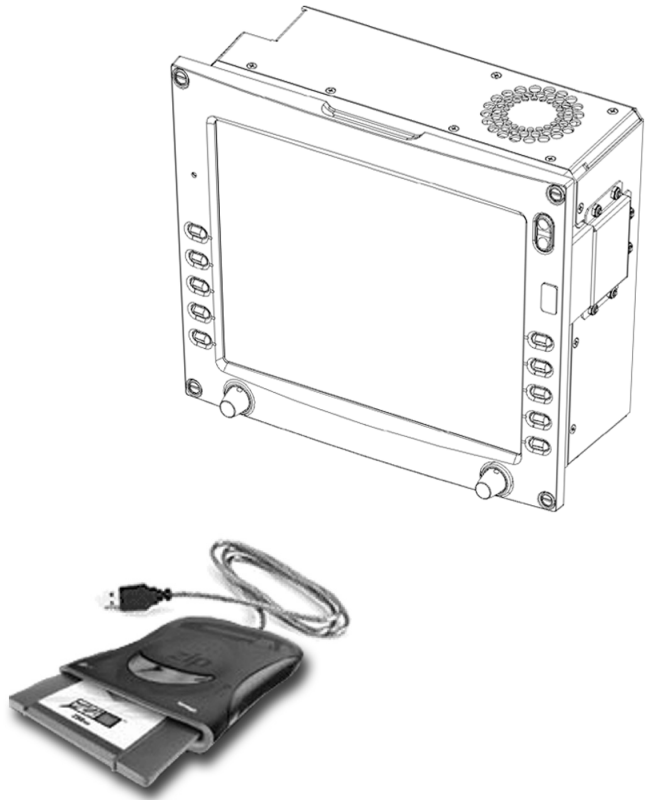
NOTE: Traffic information is provided to the pilot as an aid to visually acquiring traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive acquisition of conflicting traffic.

Database Updates

The MFD is delivered with a current complete database of airports, nav aids, airways, navigational fixes and obstacles. This data is displayed on the moving map to provide navigational information and situational awareness.

The navigation data for the MFD includes copyrighted data compilations owned by Jeppesen Sanderson, Inc., for which Avidyne has been granted a limited, non-exclusive license to use. The copyrighted subject matter may be used only in connection with the ordinary and intended use of the MFD as described in this manual. Use for any other purpose, or reproduction or copying of any portion of said copyrighted subject matter, is strictly prohibited.

The database region map and Update Procedures are on Page 43.



Appendix - Tables

Table 1: Color Code for Sensor Status Block	
Symbol	Status
Traffic  Lightning  Datalink 	If the symbol is filled in with blue, the system is reporting a healthy status and is being displayed in the mode listed in the sensor status block.
Traffic  Lightning  Datalink 	If the symbol is empty (outline only) and blue, that function is reporting a healthy status, but is turned off for display on the Map page.
Traffic  Lightning  Datalink 	If the symbol is filled with yellow, the system is unable to display data from that particular sensor. This may be due to a communication error, the sensor is not healthy, or there is a configuration problem.
Traffic  Lightning  Datalink 	If the symbol is empty (outline only) and yellow, that function is not able to display data due to the same reasons as above, and is turned off from display on the map page.

Appendix - Tables

Symbols

The MFD's Map uses symbols contained in its navigational database, based on your navigational mode and flight situation. Map can display the following database items:

- Airports
- Nav aids (VORs and NDBs)
- Airways (Victor and Jet)
- Intersections, waypoints and other named fixes
- Class B, C, and D airspace
- Obstacles (>200' AGL)

- Certain classes of special use airspace(Prohibited, Restricted, Warning, Alert, and Military Operating Areas)

Navigational symbols used by Map are shown in Table 2 through Table 6.

Table 2: Map Symbols - Navigational Fixes

Symbol	Item	Description
	NDB	All NDBs
	VOR	All VORs
	Intersection	Terminal, Jet, and Victor airway waypoints (intersections)

Appendix - Tables

NOTE: The various airport types are derived directly from the Jeppesen navigation database.

Table 3: Map Symbols - Airports

Surface			Airport Type
Hard	Soft	Water	
			Towered
			Towered
			Non-Towered
			Non-Towered

NOTE: The larger airport symbols are displayed as the map scales are reduced to the smaller ranges.

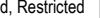
Table 4: Map Symbols - Other

Symbol	Item	Symbol	Item
	Flight Plan (inactive leg)*		Single Low Obstacle >= 200' AGL <1000' AGL
	Flight Plan (active leg)		Low Obstacles within 1NM of eachother >= 200' AGL <1000' AGL
	Map Orientation		Single Obstacle >=1000' AGL
	Owship Symbol		Obstacles within 1NM of eachother >=1000' AGL
	Flight Plan, Course Waypoints		

* -If all legs are shown in white, the GPS is not reporting the active leg of the flight plan.

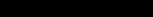
Appendix - Tables

Table 5: SUA and TFR Status

Region Type	Status							
	Inactive		Unknown		Pending		Active	
	Line	Label	Line	Label	Line	Label	Line	Label
Prohibited, Restricted	Dashed	Inact	Single	Unk	Single	Pend	Triple	Act
								
Warning, Alert, MOA	Dashed	Inact	Single	Unk	Single	Pend	Triple	Act
								
TFR	Dashed	N/A	N/A	N/A	Single	N/A	Triple	N/A
			N/A					

NOTE: For adjacent or overlaying types of Special Use Airspace (e.g. Restricted Areas or Prohibited Areas within larger MOAs), some masking of the border lines may occur. Pilots must reference current aeronautical charts for accurate boundaries.

Table 6 : AIRMET and SIGMET Boundaries

Line Color		Type	Label
	Bright blue	Mountain AIRMET	MTN
	Dark yellow	IFR AIRMET	IFR
	Orange	Turbulence AIRMET	TURB
	Blue	Icing AIRMET	ICE
	Dark red	SIGMET AIRMET	SIG
	Blue gray	Convective SIGMET	CSIG

Appendix - Tables

Table 7: Data Block Information

Name	Descriptions	Range
TO WPT	Name of, bearing and distance to the "To" waypoint in the active flight plan. Note that the bearing is from your present position directly to the fix. If you are off course, it will differ from your planned course. Also displays ETE (Estimated Time En route).	5 characters (Name) 1 to 360 degrees 0.0 to unlimited NM.
NEXT WPT	Name of, bearing and distance to the "To" waypoint in the active flight plan. Also displays ETE (Estimated Time En route).	5 characters (Name) 1 to 360 degrees 0.0 to unlimited NM. H:MM:SS
DEST WPT	Name of and distance to final destination waypoint in system distance units. Distance is measured along planned route.	5 characters 0.0 to unlimited NM.
NRST ARPT	Identifier of, bearing and distance to the nearest airport.	5 characters (Name)
LAT/LON	Current latitude and longitude in degrees and decimal minutes.	N/S 0 to 90° 0' E/W 0 to 180° 0'
BARO ALT	Barometric Altitude	Based on data from FMS or GPS (see Note)

NOTE: The Baro Altitude is received from the FMS or GPS (via 429). The FMS/GPS calculates the altitude based on the barometric pressure entered into the FMS by the pilot. This display is used to verify what has been put into the FMS/GPS. Do not rely on this display for terrain separation.

Appendix - Tables

Table 7: Data Block Information (continued)

Name	Descriptions	Range
GND SPD	Current ground speed in system speed units.	0.0 to 999.9 knots
TRUE AIRSPD	Actual airspeed	From FMS
UTC TIME	UTC (or "Zulu") time	0 to 23h 59m 59s
LOCAL TIME	Local data and time. Derived from UTC time with time zone setting applied.	0 to 23h 59m 59s

Table 8: Engine Instrument Data Block Information

Name	Descriptions	Range
POWER	RPM Manifold Pressure (MP) Percent Power (%)	0 - 3,500 RPM 0- 36 Inches of Hg 0 - 200%
FUEL	Fuel Flow & Gallons Used	0.0 to 44 GPH 0.0 to 102 Gal.
FUEL RMNG	Fuel Amount & Time Remaining	0.0 to 102 Gal. 0 to 23h 59m
OIL	Oil Temperature & Oil Pressure	0 - 300° 0 - 150 PSI
LEAN STATE	Status of "Lean" setting: Best Economy Best Power In process of leaning Leaning interrupted Power change after lean Throttle change after lean Not leaned	Economy Power Leaning... Incomplete Pwr Change FF Change --- (blank)
OAT	Outside Air Temperature	-40°F to 212° F -40°C to 100°C
Electrical	Bus Voltage (Volts) and	0 - 36 VDC
	Alternator outputs (Amps) Battery Output (Amps)	0 - 100 A -99 - +100A

Appendix - Nav Messages

NAV Messages & Colors	Meaning	Recommended Pilot Action
Nav Source Data is valid	GPS/FMS indicates that the computed position data is valid.	Acknowledge
Nav Source Data is Not valid (err=x)	Your GPS/FMS has not computed a valid position or is not supplying valid data. Flight Plan will not be presented on the Radar display.	Check GPS for valid position. Have maintenance check GPS/FMS and installation.
Nav Source Can't Open Port	The GPS/FMS interface cannot open the assigned port. Generally indicates a configuration error.	Have maintenance check configuration and installation.
Nav Source Reconnecting...	EX5000 is attempting to reconnect to the port that is connected to the GPS/FMS.	Acknowledge
Nav Source is Not Communicating	EX5000 does not detect any data being sent from the GPS/FMS.	Have maintenance check configuration and installation.
Nav Source Data Format Error	Invalid data is coming from your GPS/FMS. If persistent, generally indicates a configuration error.	Have maintenance check configuration and installation.
Heading Data is NOT Valid	GPS/FMS is configured as the Map heading source and that data ceases to be available or becomes invalid.	Have maintenance check configuration and installation.
Heading Data is Valid	GPS navigator is configured as the Map heading source and that data becomes valid following an acknowledgement of an invalid message.	Acknowledge

Appendix - Traffic Messages

Traffic Messages & Colors	Meaning	Recommended Pilot Action
Traffic Sensor is Operating Normally	Traffic sensor is operating in a normal state from a recoverable fault that was previously acknowledged.	Acknowledge
Traffic <Bearing> / <Distance> / <Relative Altitude>	Traffic Advisory	Acknowledge to go to dedicated traffic page and begin looking for traffic.
Traffic <Distance> / <Relative Altitude>	Traffic Advisories with no bearing information.	Acknowledge to go to dedicated traffic page and begin looking for traffic.
Traffic <Bearing> / <Distance>	Traffic Advisories with no relative altitude information.	Acknowledge to go to dedicated traffic page and begin looking for traffic.
Traffic <Distance>	Traffic Advisories with no bearing and no relative altitude information.	Acknowledge to go to dedicated traffic page and begin looking for traffic.
Traffic Sensor is in Stand- By	MFD receives a "Stand- By" transmission from the traffic sensor.	Pressing "Traffic" button to select a traffic mode. Have maintenance check configuration and installation if message persists.
Traffic Sensor is in Self- Test	Traffic sensor is in self test mode.	Acknowledge
Traffic Sensor is Not Communicating	Traffic sensor is not transmitting data.	Have maintenance check configuration and installation
TCAD Altitude Unavailable	TCAD sensor is not receiving altitude information.	Have maintenance check configuration and installation
Traffic Heading Source Failed	TAS is configured as the Map Heading source and a "fatal heading fault" is received.	Have maintenance check configuration and installation
Traffic Heading Source is Valid	Traffic sensor is configured as the Map Heading source and is valid.	Acknowledge

Appendix - Lightning Messages

Lightning Messages & Colors	Meaning	Recommended Pilot Action
Lightning Sensor is Operating Normally	Lightning source is operating in a normal state from a recoverable fault that was previously acknowledged.	Acknowledge
Lightning Sensor is in Noise- Monitor Mode	Lightning source is in Noise- Monitor Mode.	Have maintenance check configuration and installation.
Lightning Sensor is in Demo Mode	Lightning source is in Demo Mode.	Have maintenance check configuration and installation.
Lightning Sensor is in Test Mode	Lightning sensor in a self- test mode.	Acknowledge
Lightning Sensor ERROR	MFD receives a "recoverable fault" notification.	Have maintenance check configuration and installation.
Lightning Sensor has FAILED	MFD receives a "fatal fault" notification.	Have maintenance check configuration and installation.
Lightning Sensor is Not Communicating	MFD receiving no data from the lightning sensor.	Have maintenance check configuration and installation.
Lightning Ahead	Stormscope is indicating discharge activity horizontally within $\pm 22^\circ$ of the aircraft nose and within 75nm.	Determine location of lightning and avoid.
Lightning Heading Source Failed	Stormscope is configured as a heading source and a "fatal heading fault" is received.	Have maintenance check configuration and installation.
Lightning Heading Source OK	Stormscope is configured with heading input.	Acknowledge
Lightning Antenna Location Changed	Stormscope antenna location disagrees with MFD setting.	Have maintenance check configuration and installation.

Appendix - Datalink Messages

Datalink Messages & Colors	Meaning	Recommended Pilot Action
Datalink Sensor is Operating Normally	Satellite communicator is operating normally after a recoverable fault was previously acknowledged.	Acknowledge
Datalink Sensor is NOT Communicating	Satellite communicator has stopped communicating.	Restart system. If problem persists, contact Avidyne.
Datalink Sensor Configuration Error	COMM port is configured incorrectly.	Restart system. If problem persists, contact Avidyne.
Datalink Sensor Data is Invalid	MFD receives a "recoverable fault" notification.	Have maintenance check configuration and installation.
Datalink METAR symbols > 90 minutes	METARs are older than 90 minutes from their time of reception.	Go to Datalink Setup page and request refresh.
Datalink AIRMETs/ SIGMETs > 90 minutes	AIRMETs/ SIGMETs are older than 90 minutes.	Go to Datalink Setup page and request refresh.
Datalink SUA Status > 90 minutes	SUA Status data are older than 90 minutes.	Go to Datalink Setup page and request refresh.
Datalink TFRs > 90 minutes	TFR data are older than 90 minutes.	Go to Datalink Setup page and request refresh.
Datalink Data not yet received	Datalink is Enabled and no Datalink data has been received within 10 minutes of MFD initialization complete.	Acknowledge
Datalink Airmets/ Sigmets not yet received	AIRMETs/ SIGMETs are selected and they are not received within 15 minutes of the initial datalink update.	Acknowledge
SUA Status not yet received	SUA Status/ TFRs are selected and SUA Status is not received within 15 minutes of the initial datalink update.	Acknowledge
TFRs not yet received	UA Status/ TFRs are selected and TFRs are not received within 15 minutes of the initial datalink update.	Acknowledge
METARs Symbols not yet received	METARs are selected and they are not received within 15 minutes of the initial datalink update.	Acknowledge
Datalink: Idle	No data being sent or recieved.	None necessary.
NXR Invalid	NEXRAD temporarily not able to be displayed.	Wait for next NEXRAD update. Check system in Setup pages.

Appendix - Engine Messages

Engine Messages & Colors	Meaning	Recommended Pilot Action
Engine Sensor Unit is Operating Normally	Engine DAU is operating in a normal state from a recoverable fault that was previously acknowledged.	Acknowledge
Engine Sensor Unit is Not Communicating	MFD receiving no data from Engine DAU.	Have maintenance check configuration and installation.
Engine Sensor Unit Configuration Error	MFD receiving invalid data from the Engine DAU.	Have maintenance check configuration and installation.
Check Oil Temp	MFD has detected an oil temperature outside the normal operating range.	Acknowledge, Examine Oil Temperature on Engine Page. Take corrective action and land immediately, if necessary.
Check Oil Press	MFD has detected an oil pressure outside the normal operating range.	Acknowledge, Examine Oil Pressure on Engine Page. Take corrective action and land immediately, if necessary.
Check Volts	MFD has detected bus voltage outside the normal operating range.	Acknowledge, Examine Voltage Indicator on Engine Page. Take corrective action and land as soon as practical.
Check CHT	MFD has detected a cylinder head temperature higher than the normal operating range.	Acknowledge, Examine CHT indicators on Engine Page. Take corrective action as required.
Check RPM	MFD has detected RPM outside the normal operating range.	Acknowledge, Examine RPM indicator on Engine Page. Take corrective action as required.
Check Manifold Pressure	-MFD has detected Manifold Pressure outside the normal operating range.	Acknowledge, Examine Manifold Pressure indicator on Engine Page. Adjust engine power setting as required.
Check TIT	MFD has detected TIT outside the normal operating range.	Acknowledge, Examine TIT indicator on Engine Page. Take corrective action as required.
Low Left Fuel Quantity/ Low Right Fuel Quantity	MFD has detected fuel below normal operating range.	Acknowledge, Examine Fuel indicators on Engine Page. Take corrective action and land as soon as practical.
Check Vacuum	MFD has detected Vacuum outside the normal operating range.	Acknowledge, Examine Vacuum indicator on Engine Page. Take corrective action as required.

PFD Messages

PFD Messages & Colors	Meaning	Recommended Pilot Action
PFD is Operating Normally	PFD is operating in a normal state from a recoverable fault that was previously acknowledged.	Acknowledge
PFD is Not Communicating	MFD receiving no data from PFD.	Have maintenance check configuration and installation.

Appendix - Navigation Database Update Procedure

The MFD utilizes a Jeppesen NavData™ database of airports, nav aids, airways, and navigational fixes. Navigation data is updated on 28-day cycles, and it is recommended that the database should be kept current.

To perform a data update:

1. Turn power OFF to the MFD.
2. Install data disk into the dataloader.

Connect one end of the interconnect cable to the dataloader and the other end to the MFD data port on the front panel.

NOTE: Ensure that the dataloader is supported and not dangling by the cable. This may cause an intermittent connection, which will result in an unsuccessful data update.

3. Apply power to the MFD by turning ON the avionics master switch.

The Data Loader screen is displayed.

NOTE: If the "Press Any Bezel Key" message is displayed, the dataloader drive was not detected by the MFD. Check the connection between the dataloader drive and the MFD. Restart procedure at step 1.

4. Press the "Proceed" button. Do not turn off the MFD or disconnect the interconnect cable during a data load. The data load is complete when the "Press Any Bezel Key" message is displayed.

Remove the dataloader drive and interconnect cable and store in a safe place.



Databases are available for two regions of the world.

Region I - Americas

Region II - International (does not include Americas)

Appendix - Failure Indications

Loss of Position

If the position source becomes unavailable or invalid, the following conditions will occur:

- All traffic, and lightning data is removed from the display.
- The aircraft symbol is removed from the display.
- The compass labels (N, S, E, and W) are removed from the display.
- The map will remain static, centered on last known good position.
- The map orientation annunciation is removed from the display.
- The map is oriented True North Up.

Recommended course of action:

- For aircraft equipped with dual GPS, select the Setup Page and press the "Swap to GPS X" button.
- For aircraft equipped with a single GPS, follow the GPS supplier troubleshooting guide.

When position data is restored, Map will resume normal operations.

Loss of Heading/Track

If the heading/track source becomes unavailable or invalid, the following conditions will occur:

- All traffic, and lightning data is removed from the display.
- The aircraft symbol is replaced by a direction-less symbol (a white + symbol).
- The compass labels (N, S, E, and W) are removed from the display.
- The map and flight plan data will continue to be displayed.
- The map orientation annunciation is removed from the display.
- The heading/track indicator will display a series of dashes ("---").
- The map is oriented True North Up.

Recommended course of action:

- Call your Avidyne Customer Service representative.

When heading/track is restored, Map will resume normal operations.

Appendix - Failure Indications

Unhealthy Sensor

Map monitors the "health" of the sensors (traffic and lightning) by means of a signal pulse. Map looks for a signal every three seconds from each sensor. If it doesn't see this signal it assumes the sensor has failed in some way. When this happens, the following occurs on the display:

- Sensor data is removed from the overlay display.
- The word "FAIL" is displayed in the sensor's status line in yellow.
- The sensor symbol changes from cyan to yellow (if the sensor was on).

Recommended course of action:

- Select the Setup Page and perform Self-Test for the applicable sensor.

CMOS Battery Failure

In the event of an internal battery failure, the following message will occur after system start-up:

WARNING: Check system time. Check database expiration date. Press any bezel key to continue.

This message indicates that the internal battery that maintains system date and time settings has failed, in which case the following system defaults are used:

Date - Jan 01, 2000
Time- 00:00:00 (local)

These defaults will be overridden when GPS date and time are sent to the MFD via ARINC 429 from the GPS navigator.

This message alerts the pilot to check the navigation database expiration date and verify that the database has not expired, since the system will not automatically recognize it. The system should be returned to Avidyne for CMOS battery replacement.

Engine DAU Failure

In the event of an engine data acquisition unit (DAU) failure, any affected indicators will show a failure indication by:

Dial Gauges: Needle Pointer removed
Numeric Readouts: Displayed as three white dashes
Bar Graphs: Disappear

Recommended Action: For failure of single indicators, land as soon as practical and consult a maintenance facility. If all indicators have failed, check and/or cycle the circuit breaker for the engine DAU. If the function is not restored, land as soon as practical and have a maintenance facility inspect the system.

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