

# FlightMax EX5000C

# FlightMax EX3000C

## Multi-Function Display

### Pilot's Guide for Cirrus SRV, SR20, & SR22



<b>Revision History</b>		
<b>Date</b>	<b>Revision</b>	<b>Description</b>
Mar 09, 2004	00	Initial Release
Mar 23, 2004	01	ECO-04-049
May 28, 2004	02	ECO-04-100
Sep 02, 2004	03	ECO-04-120

The Following checklists are supported by MFD software 530-00162-000:

<b><i>SW Part Number</i></b>	<b><i>MFD Checklist Version</i></b>	<b><i>Aircraft and Serial Number Range</i></b>	<b><i>Cirrus Checklist PIN</i></b>
530-00162-000	1.04	SR20 S/N 1005-1147	11934-001 Change: A5
		SR20 S/N 1148-1267	11934-002 Reissue: A2
		SR20 All Electric S/N 1268 and later SRV All	11934-003 Reissue: A2
		SR22 All	13772-001 Reissue: A2

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***An approved Flight Manual Supplement (FMS) will be provided by your installer. The FMS contains information specific to your installation. It contains any operating limitations that may apply.***

## Introduction

The FlightMax EX5000C/EX3000C and EX3000C Multi-Function Displays (MFD) provide a pictorial view of your flight situation based on input from ur GPS navigator. Each uses on-board database information for mapping navigation data such as nearby airports, VORs, NDBs, special-use and other airspace, etc., as well as terrain, water, and obstacle databases. The FlightMax MFDs also offer the following standard and optional features:

- Display of normal and emergency checklists.

- Display of Engine instruments with

- Display of lightning information from a WX-500 lightning sensor.

- Full ARINC-429 databus capability, supporting display of curved flight paths, procedure turns, and holding patterns from a compatible GPS navigator.

- Display of traffic information from L-3 Skywatch, Ryan TCAD, or Garmin TIS traffic systems.

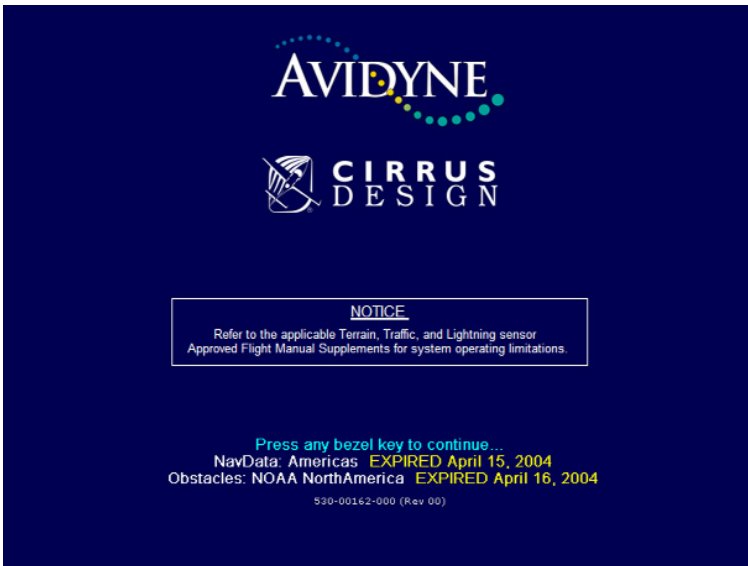
- Display of terminal proceture charts using the CMax function.

- Display of weather and flight restriction information when interfaced with an external broadcast datalink receiver.

- Display of TAWS terrain information when interfaced with an installed EGPWS system.

MFD 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.



# Operation



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

## Operational Controls

- 1.) **PhotoCell Light Sensor** - Automatically compensates display brightness for varying lighting conditions.
- 2.) **Brightness Control** - Adjusts display brightness level.
- 3.) **Data Port** - Provides a front panel access point for loading database updates.
- 4.) **Buttons** - Used to select modes or change the display as indicated. Active when label appears on the screen adjacent to the key.
- 5.) **Emerg. Checklist** - Emergency Checklist line select key is always active to provide quick access in the event of an emergency.
- 6.) **Page Control** - Left knob provides quick access to the Trip Page, Nearest Page, TAWS Page (when so equipped), Chart Page (when so equipped), Checklist Pages, Setup Pages, and the Engine Page (when so equipped). Current page is highlighted in lower left corner of screen.
- 7.) **Range & Cursor Control** - Right knob controls the Map's range. When other pages are in view, the right knob provides selection control.
- 8.) **Message Bar** - The message bar is used to keep the pilot informed about critical as well as routine information from the MFD. When information needs to be conveyed the message bar appears next to the bottom 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 first. The ACK button 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 and pages. 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.

**Traffic** button cycles through traffic sensor modes. See page 11 for more information on traffic modes. 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.

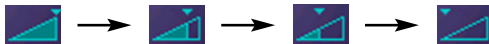
**Lightning** button cycles through lightning sensor modes and overlay in the following order: Strike ->Cell ->Lightning Overlay Off (DSPLY OFF). The lightning sensor maps thunderstorm activity by monitoring electrical discharge activity within a 200-mile radius of the aircraft. Lightning strikes less 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 current lightning symbols to allow for the refresh of lightning data, when using a WX-500 lightning sensor.

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

**View** button orients the map for either Track/Heading Up or North Up. FORWARD and CENTER views are oriented with Track/Heading Up. North Up orients the map to true North, with the ownship symbol rotated to show track/heading.

**Declutter** button controls the four levels of navigation database detail on the Map from most to least:



**Base Map** button controls the base map layers:

TERRAIN - Color-contoured terrain, bodies of water, and political boundaries.

BASE - Bodies of water and Political boundaries

NONE - No base map

## 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, special use airspace and other nav aids.



## Map Page - Symbology

- 1.) Data Blocks (Left & Right)** - View navigation and engine (when equipped with engine monitor) data in data blocks in the upper corners of the display. See Data Block Edit (page 63) for options.
- 2.) Sensor Status Box** - Displays the status of the lightning and traffic sensors installed on the aircraft. See table 1 on page 66 for more information on status box symbols. (Optional Engine Instrument Sensor Status Box described on Page 58).
- 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



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.



200' AGL to <1000'AGL



1000' AGL or higher



Groups of obstacles within 1NM of each other



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

- 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 6 and associated note (Page 71).

# Map Page - Symbology



## Map Page - Symbology

- 1.) **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. (Note: Not depicted in diagram on previous page.)
- 2.) **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 (when connected via the ARINC 429 BUS).

**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.**

- 3.) **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. When available, TIS installations will show a ground track "stinger" for each intruder, indicating the intruder's track as measured by ground radar.



- 4.) **Lightning Indications** - Shows lightning strikes geographically referenced if configured with WX-500 sensor. Strikes represented by yellow "X" in Strike Mode, and by yellow "+" in Cell Mode. Lightning strikes are displayed for three minutes.



- 5.) **Ownship Symbol** - Shows the position of your aircraft in relation to the moving map and the selected view.



- 6.) **Interstate Highways** - Are depicted as brown lines whenever terrain is selected to be shown. Interstates are labeled in white. (e.g. I-95)

## 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 sensor symbols are positioned relative to the aircraft 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.

# Traffic Mode

When a Traffic Advisory (TA) is reported from the traffic sensor, the MFD displays a traffic alert message in the Message Bar. Acknowledging the traffic alert by pressing the button adjacent the message bar 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 - 5 NM

Base Map - no terrain or political boundaries

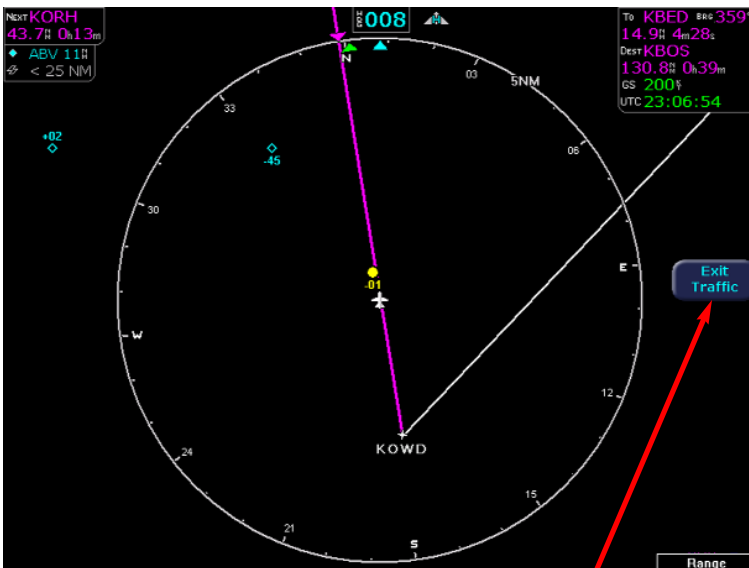
Declutter - no symbol or airspace depictions

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 from the Traffic mode 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.



1

EX5000C MFD in Traffic Mode

## Traffic Mode

- 1.) **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.

**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.**

**Note: Traffic limitations and operational ranges depend on the installed traffic sensor. For TAS or TCAD sensors, see the corresponding sensor Pilot Guide. For TIS sensors, see Section 1-3-5 of the Aeronautical Information Manual.**

The available Traffic button modes are listed below. For more information on specific traffic sensor modes, consult the user documentation for the specific traffic sensor.




For Skywatch TAS, the Traffic modes are ABOVE, NORMAL, UNLIMTD, BELOW, and DSPLY OFF.

For TIS, the Traffic modes are DSPLY ON and DSPLY OFF.

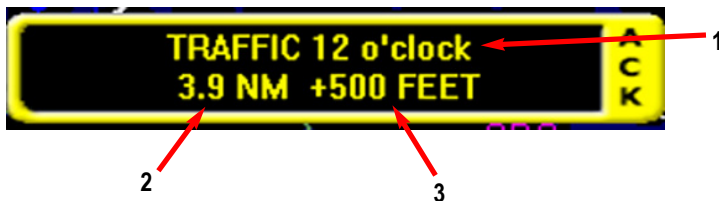
For TCAD, the Traffic modes are GROUND, TERMINAL, STANDARD, ENROUTE, UNLIMITED, APPROACH, and DSPLY OFF. Note that some TCAD installations will support the automatic switching of modes by the TCAD unit. This current mode will always be reported on the MFD screen.

# Traffic

Aircraft traffic detected by a Traffic Sensor are referred to as intruders and are displayed as one of three symbols. If a compatible TIS system is installed and intruder track information is available, the appropriate symbol will be shown with a "stinger" which depicts the current ground track of the intruder, as detected by ATC radar systems. It should be noted that the traffic sensor intruder track information is known to an accuracy within 45° of true intruder track. This should be taken into account when visually acquiring the reported traffic. Also note that intruder traffic could maneuver at any time, and the current intruder track direction does not guarantee the intruder will continue along that track. For traffic sensors without track information (e.g. TAS), traffic symbols are shown without the track symbology. The traffic symbols are:

Symbol	Type	Meaning
	Traffic Alert (TA) [shown with intruder track]	Traffic that is within the alert zone defined by the traffic sensor.
	Proximate Traffic [shown without intruder track]	Traffic that is not within an alert zone, but is close to your position.
	Other Traffic [shown with intruder track]	Traffic that is detected by the traffic sensor, but determined not to be a current threat.

Note that aircraft without operating transponders will not be seen by traffic sensors.



Traffic alert information is displayed in the message bar as in the example above.

- 1.) Relative bearing of target.
- 2.) Range in nautical miles.
- 3.) Relative altitude, for example, -200 would be 200 feet below.

## Traffic

If the intruder altitude and vertical speed are known, they are displayed alongside the intruder symbol. The number immediately above or below the traffic symbol indicates the relative altitude of the intruder to your position, in hundreds of feet. An arrow next to an intruder symbol shows the direction of any vertical movement of the intruder that is in excess of 400 feet per minute. For example, in the Traffic Alert example shown above, the intruder is 500 feet below and is climbing. In addition, this example with an intruder track shows the intruder is moving along a track approximately 45 degrees to the right of our current map alignment. (i.e. if the MFD map is set for North Up, the intruder is flying a track somewhere between 023 and 067. This is the accuracy limit of the intruder track data.)

TIS interface is only available on the EX5000C. For TIS installations, the following may be reported in the Traffic status block on the EX5000C Map page:

**OPER** - the TIS sensor is operating normally.

**CST 00:00** - the TIS sensor has temporarily lost the information feed from ground-based radar and is in "coast" mode. The MFD will continue to display the traffic last received, while the CST timer will count the seconds since the last valid data.

**RMV 00:00** - after 12 seconds of coasting, the TIS sensor will remove the traffic display and display RMV, and continue to count the time since the last valid data.

**UNAVAIL** - more than 60 seconds have passed since valid data was received, or TIS data is not available at the current aircraft location.

**SBY** - the TIS sensor is in standby mode.

**DATA FAIL** - the TIS sensor has reported an internal fault. Traffic information will be removed from display.



## CMax Chart Page (Optional)

The CMax function allows you to view Jeppesen Terminal Procedure charts on your Entegra MFD. Types of charts available include instrument approach procedures, arrivals, departures, airport diagrams, and various taxiway and airspace diagrams typical to Jeppesen printed charts. To use the CMax function, you need to have a valid chart data subscription from Jeppesen Sanderson, Inc. See the Avidyne CMax Data Update Guide manual for information on how to load the chart data.

The greatest addition to situational awareness come from charts that are geo-referenced. A chart is geo-referenced when the chart data supports a correlation of chart position to actual latitude and longitude coordinates. This allows an ownship symbol and flight plan legs to be accurately represented on the chart. If a chart is not geo-referenced, the ownship and flight plan legs cannot be drawn on the chart. Most Jeppesen approach charts and airport diagrams are geo-referenced; most arrival, departure, and miscellaneous charts are not.

**Note: The display of instrument approach procedure charts is for pilot reference and situational awareness. The Chart page should not be used as the primary means of aircraft guidance - use an approved CDI.**

## CMax Chart Page

### Chart Page

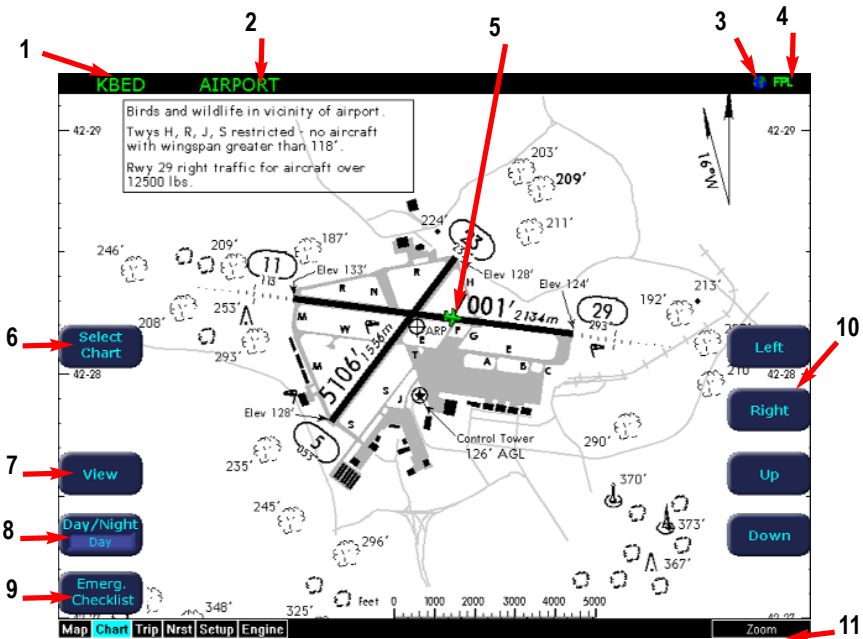
The CMax function is found on the MFD as the "Chart" page, listed in the Page Selector bar if CMax is enabled on your MFD. The Chart page is capable of having two charts ready for viewing at any one time: an airport diagram, and a procedure chart (or other miscellaneous chart associated with that airport). The airport and associated charts are selected on the Chart Selection Page.

The MFD Startup Screen reports the valid dates for the currently loaded chart data. If the date for the next update has passed, the Startup Screen will report this in yellow cautionary text. If the chart data becomes more than 10 weeks out of date, access to the charts shall be revoked until new chart data is loaded.

On power up, if your MFD is receiving a valid position from your GPS unit, the Chart page will default to display the airport diagram of your current position. An approach procedure chart will not be displayed until one is selected. If no valid GPS position is available at start-up, the Chart page will default to the Chart Selection Page for manual selection of a chart.

On landing, if the Chart page is being displayed, the MFD will automatically switch to display the Airport diagram for the current location when the GPS Ground Speed drops below 50 knots.

# CMax Chart Page



The Chart Screen shows the airport diagram of the current airport, with ownship symbol for current aircraft position, if the airport diagram is geo-referenced.

- 1.) **Airport Identifier** - the airport identifier for the current airport is displayed in green.
- 2.) **Chart Name** - the name of the current chart being displayed, also in green.
- 3.) **Geo-referenced Symbol** - a globe is shown when the displayed chart is geo-referenced. If the chart is not geo-referenced, the globe symbol is crossed out.
- 4.) **Flight Plan Symbol** - an FPL symbol indicates the option to display the current flightplan is turned on. If the display of flightplan is turned off, the FPL symbol is crossed out. Note that if a chart is not geo-referenced or no flightplan is received from the GPS, the flightplan cannot be displayed even if the option is selected.
- 5.) **Ownship** - displays the current position of the aircraft. The chart nominally remains fixed and the ownship symbol moves across the chart with aircraft movement.
- 6.) **Select Chart button** - brings the user to the Selection Page for the selection of a new chart for display. See the description of the Selection Page below.

## CMax Chart Page

7.) **View button** - controls which portion of the chart is being displayed. See details below.

8.) **Day/Night button** - Toggles the chart display mode between the Day and Night modes. The Day display is black text on a white background, while the Night display is white text on a black background. Other colors such as water or shaded terrain are also adjusted between Day and Night modes. The MFD starts up with a default to Night mode.

9.) **Emerg. Checklist. button** - provides one-touch access to the Emergency Checklist page.

10.) **Pan Buttons** - The pan buttons manually move the chart on the screen. They only appear when the current view is able to be panned. Most information view pages, such as headers, are not able to be panned, while the plan view of each chart typically is.

11.) **Zoom control** - Zooms the chart for close-up examination of a specific area. The label only appears when the current view is able to be zoomed. Most information view pages, such as headers, are not zoomable. If the user has panned the chart, using the right knob to zoom all the way out to the full-screen chart size will also re-center the chart on the screen.

# CMax Chart Page

A typical approach procedure chart is shown below:



1.) **Display Airport button** - The Display Airport button is displayed when the current procedure chart is being displayed. Pressing the Display Airport button allows you to swap between display of the loaded procedure chart and display of the associated airport diagram.

2.) **Flight Plan** - The flight plan is overlaid on the chart plan view when the flight plan display option is selected (on Selection page) and the chart is geo-referenced. If a flight plan is expected and does not appear, check that the correct airport and approach have been selected.

3.) **Flight Plan active leg** - The active leg of the current flight plan, if it appears on the chart, is depicted in magenta. The non-active legs are shown in green.

**NOTE:** The ownship symbol on the Chart page is always oriented according to the current GPS ground track. Therefore, the ownship is always pointed in the direction the aircraft is moving, and does not show any crab angle induced by crosswind components.

# CMax Chart Page

## View button

For ease of use and readability, the chart is divided into sections which are shown individually. Pressing the View button toggles through the available views for that chart. For procedure charts, the views are generally Plan View (seen above), Header, Profile, and Minimums. The Header view contains general chart information and appropriate communications frequencies, the Profile view includes the profile view of the approach procedure, and the Minimums view shows the descent minimums for the approach. The Header, Profile, and Minimums views also feature a small "preview pane" of the Plan View, which, although too small to read all chart details, gives the user a general overview of the approach for situational awareness. The flightplan and ownship symbol are also displayed on the preview pane.

LOC 124.6	Final Appch Crs 113.15	GS 124.4	ILS 1456 (123.27)	DA(H) 383 (289')	Apt Elev 133'
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MISSED APCH Climb to 2000' direct SKR NDB and hold.

Header View

1 Min 113° → 20° 1700'

MM 03 510'

DA 133'

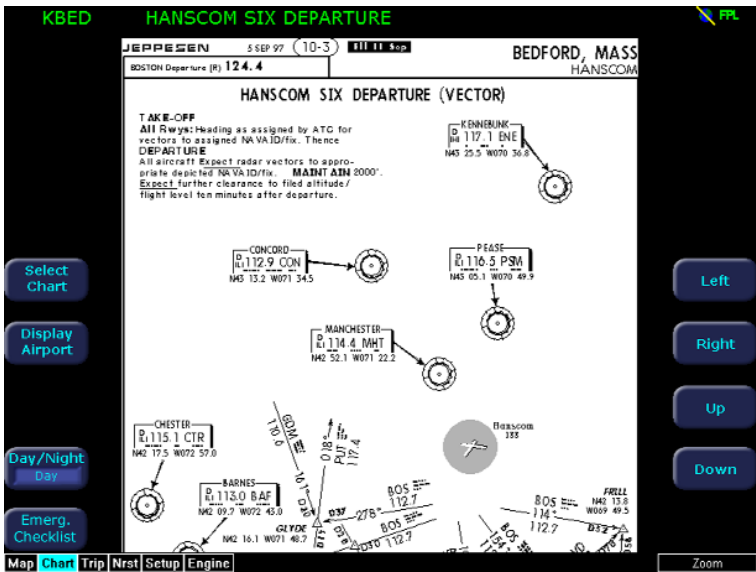
2000' D 251'

Profile View

Category	ILS DA(H) 383' (289')	LOC (GS null) MIDALY 660' (527')	CIRCLE TO LAND
A	383' (289')	660' (527')	680' (547')-1
B	383' (289')	660' (527')	720' (587')-1
C	383' (289')	660' (527')	720' (587')-1 1/2
D	383' (289')	660' (527')	780' (647')-2

Minimums View

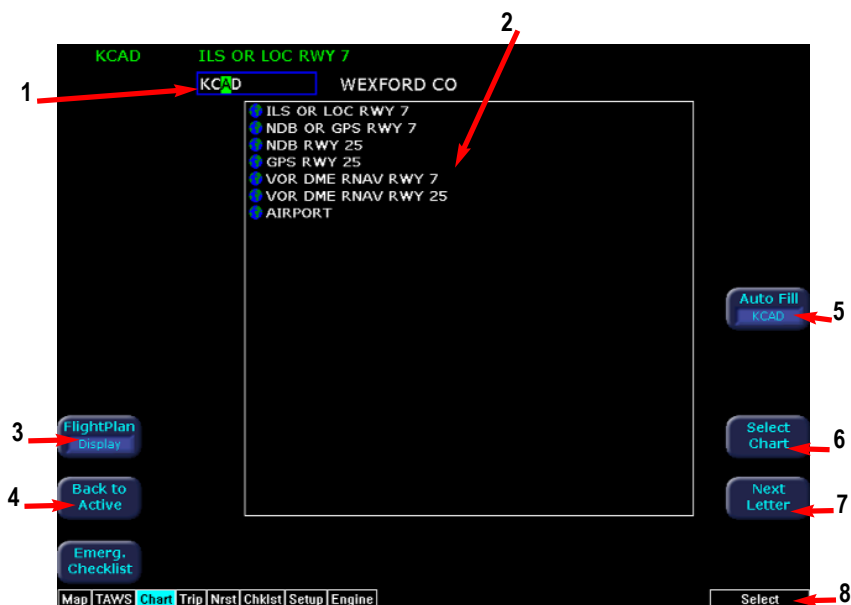






# CMax Chart Page

## Selection Screen



**1.) Airport Entry Field** - The Airport Entry Field is used to enter an airport identifier in order to select a chart associated with that airport. On startup, the field will be pre-filled with the current position airport. If the MFD cannot determine a valid position, the field will be left blank. At all times, the airport identifier may be manually selected in this field. The MFD will attempt to auto-complete an airport entry from the user's coverage area as the first characters are entered. When the desired airport identifier is in the entry field, pressing the List Charts button will move the selection cursor to the Chart Selection list. You are only allowed to select airports within the coverage area for your Chart data subscription. The name of the airport in the Airport Entry Field is listed directly below.

**2.) Chart Selection List** - All of the available charts for the airport in the Airport Entry Field are listed here. The list of charts will not appear until the user has selected an airport in the entry field, and then pressed the List Charts button to switch from selecting an airport to selecting the desired chart. Note that although the majority of charts listed are indeed instrument approach procedure charts and are generally referred to in this documentation as procedures, the list also includes other types of charts such as airspace diagrams, taxi diagrams, special instructions, and other miscellaneous charts. Charts are only listed for those airports that are part of the user's subscription coverage area. The Charts are listed in the Jeppesen chart index order.

## CMax Chart Page

**3.) FlightPlan button** - Toggles the display of the flight plan overlay on the chart Plan View between Display and Off. Changes to this selection are effective immediately.

**4.) Back to Active button** - The Back to Active button returns the user to the chart display screen. Any inputs to the Airport Entry Field or Chart list are abandoned. Changes to FlightPlan display status, however, are preserved.

**5.) Auto Fill button** - When pressed, moves the detected destination airport listed on the button into the Airport Entry Field.

**6.) Select chart** - Moves the active selection cursor from the Airport Entry Field to the Chart Selection list.

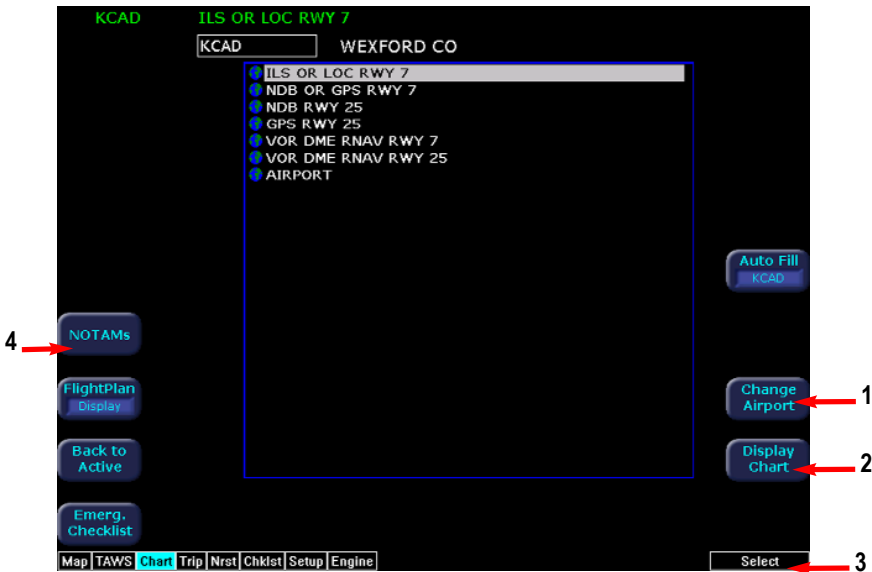
**7.) Next Letter button** - The Next Letter button moves the cursor within the Airport Entry Field to the next character location.

**8.) Select knob** - Selects the character for the current cursor position when entering an airport identifier. The character selection goes from A to Z, then 0 to 9, with wrapping to the beginning.

**Note:** The Auto Fill button automatically detects the destination airport if the final waypoint is an airport or a waypoint that is part of an instrument approach procedure. However, for some approaches, the Auto Fill button is displaying the desired destination airport before pressing the button. The Auto Fill button will not be displayed under the following conditions:

- An Airport cannot be determined due to GPS limitations.
- When the feature is not supported by some GPS models.
- The current airport destination is not available in your chart data coverage area.

# CMax Chart Page



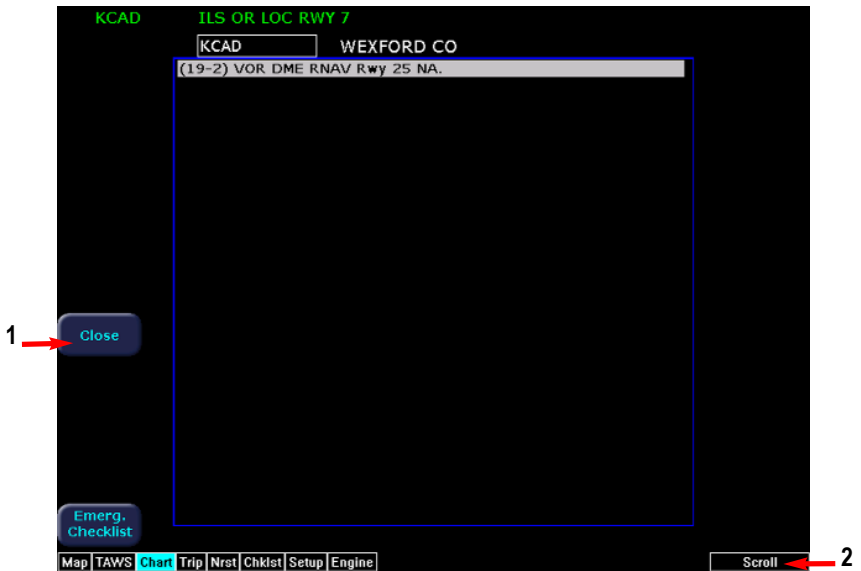
1.) **Change Airport button** - Pressing the Change Airport button returns to the Airport Entry Field for entry or modification of the selected airport identifier.

2.) **Display Chart button** - Once a valid airport has been entered in the Airport Entry Field and the user presses the List Charts button to move the selection control to the Chart Selection list, the Display Chart button becomes active. Pressing the Display Chart button will load the selected chart and display it on the Chart page. Remember that the associated Airport diagram is also automatically made available on the Chart page when a procedure chart is loaded by pressing Display Chart. Note that as a valid chart, the Airport diagram is listed in the Chart Selection list, however, it is not usually necessary to load the Airport chart, since it is always accessible on the Chart Page by pressing the Display Airport button.

3.) **Select knob** - When the Chart Selection list is the active selection area, the right knob controls the selection of charts from the list. If the list of charts is longer than the available space, scrolling will bring the remaining chart names into view.

4.) **NOTAMs button** - The NOTAMs button brings up a window listing the associated NOTAMs for the airport currently entered in the Airport Entry Field. See below for more information.

## CMax Chart Page



Pressing the NOTAMS button from the Selection page brings up a window of NOTAMS that are associated with that airport. NOTAMS specific to that airport are listed first, with any general NOTAMS listed at the end. Note that these are chart NOTAMS that address changes to information contained on the charts, and do not include local or regional operational NOTAMS which should be obtained before any flight.

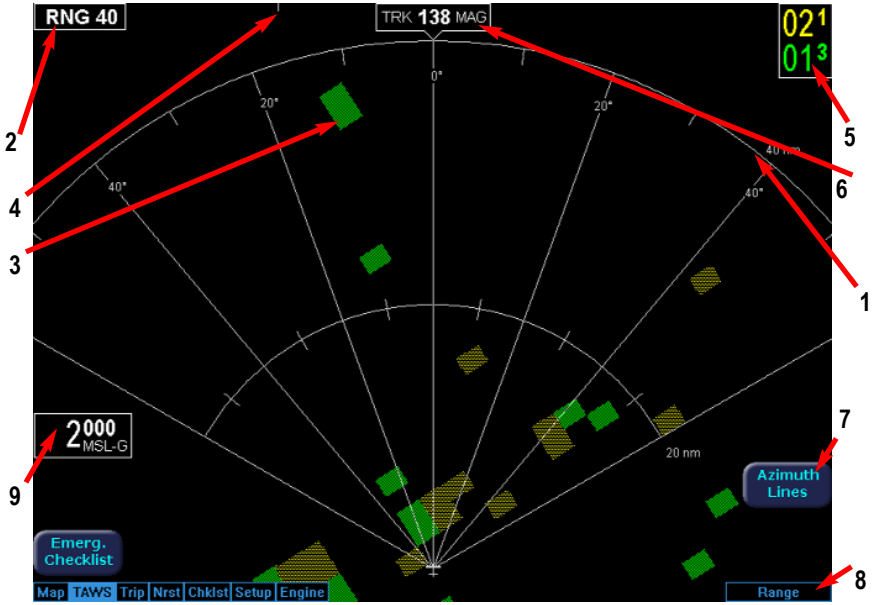
**1.) Close button** - Pressing the Close button closes the NOTAMS window and returns the user to the Selection page.

**2.) Scroll knob** - The Scroll knob scrolls the list of NOTAMS. If the list is longer than the screen area, scrolling will bring the remaining items into view.

Charts Copyright Jeppesen Sanderson, Inc.

# TAWS Operation (Optional)

If your MFD system has been configured with an EGPWS system, rotating the Page knob to "TAWS" will allow you to view the TAWS display page.



## TAWS Display Page

**1) Range Rings** - Range rings are shown as solid white lines. The distance to the outer ring is shown in the Range annunciation. The inner ring is one half the range of the outer ring.

**2) Range Annunciation** - The range number indicates the currently selected range as selected by the Range knob. The supported ranges are 2.5, 5, 10, 20, 40, 80, 160, 240, and 320 nm. At start up, the MFD TAWS range defaults to 80nm.

**3) Terrain Data** - Terrain data is depicted as color areas representing various elevations relative to your aircraft and potential hazard situations

**4) Scan Marker** - The marker is a short white line that moves across the top of the display area. It indicates the current position of the scan.

**5) Peaks Mode Elevations** - Appears only when your EGPWS has been installed with the "Peaks Mode" option selected. The two numerical values correspond to the highest terrain/obstacle elevation displayed and the bottom elevation of the lowest color band displayed. Elevations are expressed in feet above sea level, with the hundreds digit displayed half size, i.e. 108 is equal to 10,800 feet and 010 is equal to 1,000 feet. If there is no appreciable difference in elevation (flat terrain) only the highest value is displayed. The color of each elevation value is the same as the color of the terrain display containing that elevation (green, yellow, or red). During a terrain alert, threatening terrain will be displayed as bright red and/or bright yellow. The elevation value

## TAWS Operation

colors are not modified in this case, but continue to correspond to the colors that would appear in the TAWS display under normal circumstances, and represent the actual elevation of the terrain relative to the aircraft.

**6) Display Orientation** - This annunciation describes the orientation of the TAWS display. If heading is available to the EGPWS, the TAWS display orientation is "heading up", with the aircraft's heading to the top of the display. The Display Orientation annunciation will show: HDG ### MAG where ### is the aircraft's magnetic heading as reported by the EGPWS. If Heading is lost or not available to the EGPWS, the EGPWS may use magnetic ground track instead, and the Display Orientation annunciation will change to TRK ### MAG, where ### is the aircraft's magnetic ground track. In certain locales, for example near the magnetic poles, magnetic variation may become unreliable. In these cases, the Display Orientation switches to the "true" value, for example, HDG ### TRU or TRK ### TRU. If neither heading nor ground track is available, the terrain will not be displayed and the blue message "TAWS Display Unavailable" will be presented.

**7) Azimuth Lines** - There is an "Azimuth Lines" button (4th from top on the right). When pressed, labeled azimuth lines appear every 20 degrees. Press it again to remove the azimuth lines.

**8) Range Knob** - Changes the TAWS display range. During the short delay between the pilot's request for a new range (by turning the range knob) and the actual presentation of display data at the new range, a "Requested Range Annunciation" is displayed. This is a dashed box immediately below the Range Annunciation, containing the new range that has been requested. If too many TAWS range requests are made before the EGPWS completes a full scan, the display may temporarily say "TAWS Failed", but will resume normal operation within a few seconds.

**9) Geometric Altitude** - Presents current geometric altitude as calculated by the EGPWS.

**CAUTION: MSL-G is based on an internally calculated geometric altitude by the TAWS. Geometric altitude is the height above MSL derived from GPS. It represents the aircraft's calculated height above MSL and serves as the reference altitude for color-coding of the TAWS terrain display and as the input to the TAWS look-ahead algorithm. Because it is derived from GPS altitude, this reference altitude will often differ from corrected barometric altitude. The geometric altitude, which may be in error by 100 feet or more, is not to be used for navigation. It is presented to provide the crew with additional situational awareness of true height above sea level upon which TAWS terrain alerting and display is based.**

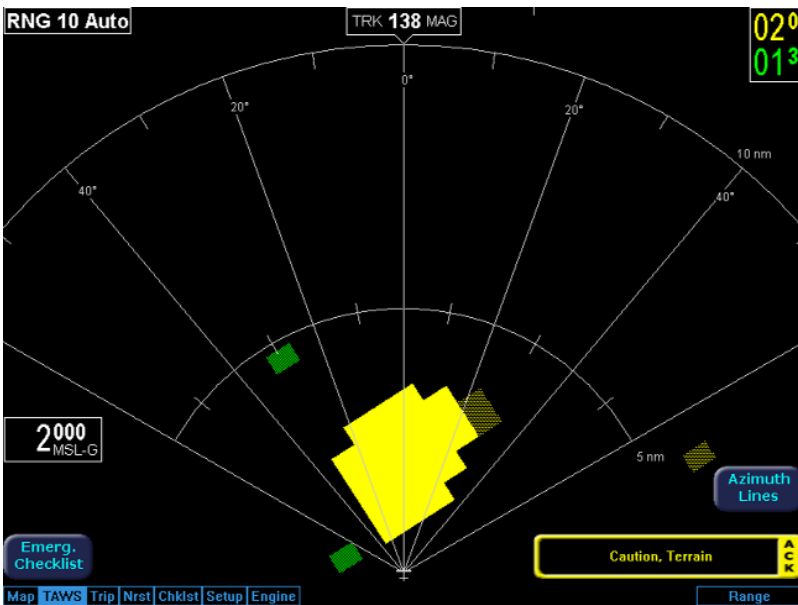
# TAWS Operation

Terrain and obstacle alerts are the most critical situations displayed by TAWS. There are two levels of alerts:

**Caution** - Possible terrain or obstacle conflict within 40-60 seconds.

**Warning** - Possible terrain or obstacle conflict within 30 seconds.

When a caution alert is triggered, the terrain or obstacle that caused the alert is displayed in bright yellow, as shown below. In addition, a message describing the nature of the alert is presented in the message bar.

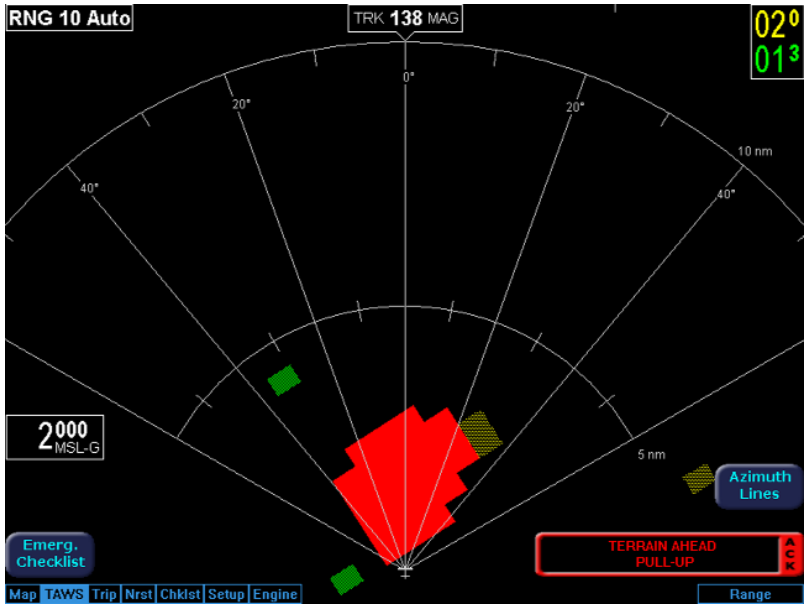


**Terrain Caution Condition**

At the maximum range settings of 240nm and 320nm, terrain data for portions of the display beyond 320 nm may not be available. At these range settings, portions of the display representing distances greater than 320 nm may be black even though significant terrain may be present. The occasional loss of this display data occurs at the extreme limits of the EGPWS, which in no way compromises safety or terrain awareness.

## TAWS Operation

When a warning alert is triggered, the terrain or obstacle that caused the alert is displayed in bright red. In addition, a message describing the nature of the alert is presented in the message bar.



### Terrain Warning Condition

When a caution or warning alert is active, the display image surrounding the target is enlarged somewhat to allow the terrain or obstacle to be better seen on the display. See Appendix for a complete listing of TAWS messages.

If a terrain or obstacle alert occurs while a page other than TAWS Display is being displayed, a terrain or obstacle alert message is displayed in the Message Bar. When the pilot acknowledges this message, the MFD will automatically switch to the TAWS Display page. The message bar will be removed from the display when the EGPWS is no longer in alert status, or if the pilot acknowledges the message from the TAWS page.



# TAWS Reference

## Auto-Range

If the EGPWS has been installed with the "auto range" option selected, the terrain display range will automatically be set to 10nm whenever a terrain or obstacle alert takes place, overriding the current range selection. To remind the pilot that the range has been changed automatically, the text "Auto" is added in the range annunciation. Manual range control is not disabled by auto-range. The pilot may reset the range to any desired value.

## Simultaneous Alerts














If a terrain or obstacle alert and Traffic Advisory (TA) are issued at the same time, TAWS will have priority, and the terrain or obstacle alert message will be presented in the Message Bar. When the pilot acknowledges the alert, the MFD will switch to the TAWS Display page. After the pilot acknowledges the TAWS message from the TAWS page, the TA will be presented in the Message Bar. If the pilot then acknowledges the TA, the dedicated Traffic page will pop up.

If a TA occurs while a terrain or obstacle alert is in progress and the TAWS display page is being displayed, the MFD will remain in TAWS Display and the TA message will appear in the Message Bar. Acknowledging the TA message will pop up the Traffic page.

## Terrain Messages and Error Indications

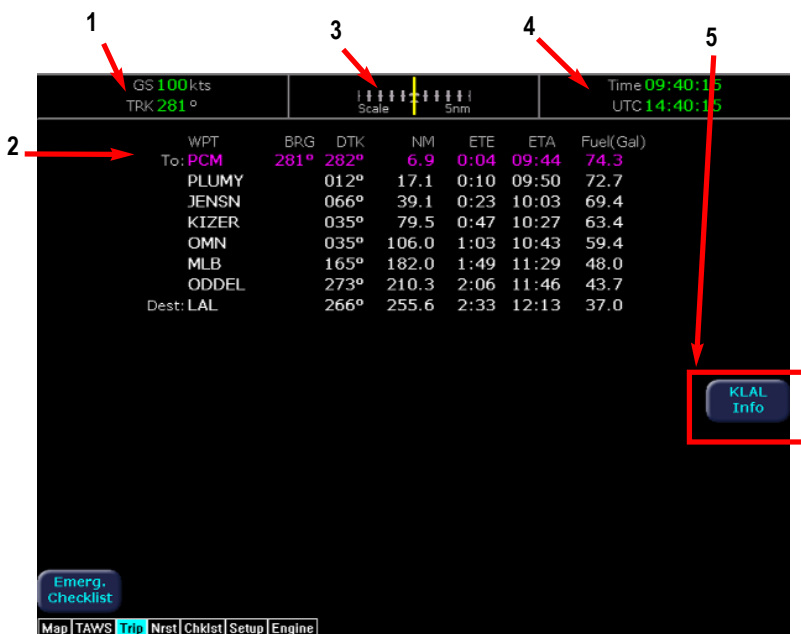
The TAWS display may present messages in the Message Bar. Press ACK button to acknowledge TAWS Page messages and remove them from the message bar. Large text annunciations will remain. See Appendix for a listing of possible TAWS messages.

## TAWS Reference

Color	Meaning
Solid Red 	Terrain/Obstacle threat area, a warning is generated.
Solid Yellow 	Terrain/Obstacle threat area, a caution is generated.
50% Red Dots 	Terrain/Obstacle that is more than 2,000 feet above aircraft.
50% Yellow Dots 	Terrain/Obstacle that is between 1,000 and 2,000 feet above aircraft.
25% Yellow Dots 	Terrain/Obstacle that is 500 (250 with gear down) feet below to 1,000 feet above aircraft altitude.
Solid Green  (Peaks Only)	Shown only when no Red or Yellow Terrain/Obstacle areas are within range on the display. Highest Terrain/Obstacle not within 500 (250 with gear down) feet of aircraft altitude.
50% Green Dots 	Terrain/Obstacle that is 500 (250 with gear down) feet below to 1,000 feet below aircraft altitude.
50% Green Dots  (Peaks Only)	Terrain/Obstacle that is the middle elevation band when there is no Red or Yellow terrain areas within range on the display.
16% Green Dots 	Terrain/Obstacle that is 1,000 to 2,000 feet below aircraft altitude.
16% Green Dots  (Peaks Only)	Terrain/Obstacle that is the lower elevation band when there is no Red or Yellow terrain areas within range on the display.
Black 	No significant terrain/obstacle.
16% Blue  (Peaks Only)	Water at sea level elevation (0 feet MSL).
Magenta Dots 	Unknown terrain. No terrain data in the data base for the magenta area shown.

## 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 to Trip on the Page Bar 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 "ellipses" (...) is shown in the next to last line. The destination line is always displayed. All flight plans are from the GPS. 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

NM - Cumulative great circle distance of each flight plan leg in nautical miles.

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 local time.

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

### 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.

**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.**

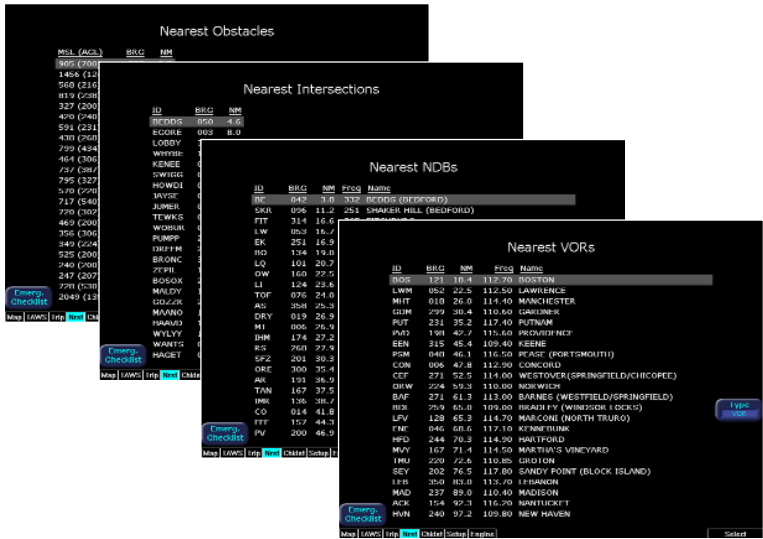
## Nearest Page (NRST)

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 100NM 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.

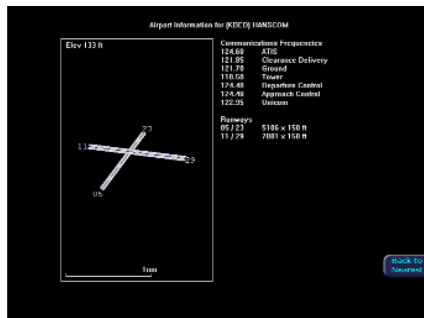


# Nearest Page (NRST)

- 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 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 61). 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. The Airport Info line select button only appears when viewing the Nearest Airports.



# Broadcast Datalink Weather (optional)

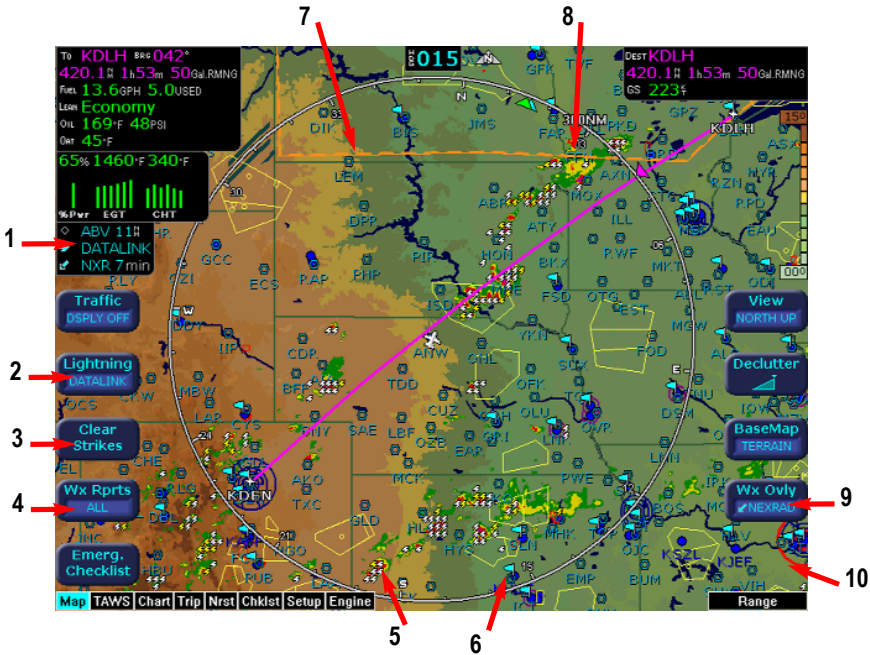
## Introduction

The Entegra MFD supports an optional Broadcast Weather Datalink function, which is received via the XM satellite network. To use this capability you will have to have an external broadcast receiver as well as an XM Datalink service plan. Further details on service subscription and activation can be found in the Appendix.

When you power-up the MFD and broadcast receiver, weather data will begin automatically transferring to your airplane via the XM satellite network; no further action is required on your part (if necessary, you will have to move your airplane out of the hangar so that the satellite receiver can "see" a satellite).

## Map page

The Map page is the primary display for the datalink weather information. Displayed on the Map page are NEXRAD radar images, lightning strike information, AIRMETs/SIGMETs, graphical METAR symbols, and TFRs.



1) Sensor Status Block - with Broadcast datalink installed, the Sensor Status Block gives the status of the weather information presented. The Lightning sensor status will reflect if the lightning information displayed on the Map is from the broadcast datalink, or from the on-board lightning sensor, if installed. The broadcast datalink sensor status is shown on the bottom line of this block, and indicates if the external broadcast satellite receiver is reporting a good operational status. The age of the most recent NEXRAD radar image is also listed. See Table 1 in the Appendix for more detail on the Sensor Status Block icons.

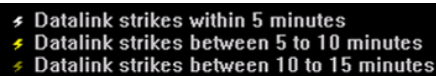
## Broadcast Datalink Weather (optional)

2) Lightning button - controls the display of lightning information on the Map page. Pressing the button toggles between Datalink and Display Off, or if a WX-500 lightning sensor is installed, between Strike, Cell, Datalink, and Display Off. Lightning will not be displayed from both Datalink and WX-500 at the same time.

3) Clear Strikes button - clears the current lightning strike symbols from the screen for WX-500, if installed. Does not clear datalink Lightning

4) Wx Rprts button - controls the display of METAR symbols, AIRMETs, and SIGMETs on the Map page. Pressing the button toggles through All, METARS, SIGMET, AIRMET, and Display Off.

5) Lightning strike symbols - Lightning information from the XM broadcast satellite is matched to grid coordinates with a resolution of approximately 2 NM. Overlapping lightning symbols may be decluttered for clarity. The lightning strike symbols for datalink lightning are shaded according to their age, with strikes older than 15 minutes removed from display:



6) METAR symbols - each METAR reporting station shown on the Map page will have a METAR condition flag displayed. The color of the METAR flag indicates the current conditions at that airport:

METARS	Color	Condition
VFR:	Blue	> 5 SM   > 3000 ft
MVFR:	Green	3-5 SM   1000-3000 ft
IFR:	Yellow	1-3 SM   500-1000 ft
LIFR:	Red	.5-1 SM   200-500 ft
<CATI:	Pink	<.5 SM   < 200 ft

7) AIRMETS/SIGMETs - AIRMETs and SIGMETs are shown as ribbed lines enclosing the area of the advisory and are color coded and labeled as to their type. For more details, see Table 6 in the Appendix.

8) NEXRAD radar images - The XM broadcast NEXRAD images are delivered with a resolution of approximately 1 NM. The MFD smoothes the edges of the NEXRAD images, so that the images are not distracting at smaller zoom ranges. The NEXRAD colors conform to aviation standards, with green, yellow, red, and magenta depicting varying intensities of rainfall, and with shades of blue for snow and shades of pink for mixed precipitation. A handy legend for the NEXRAD colors is found on the Trip page:



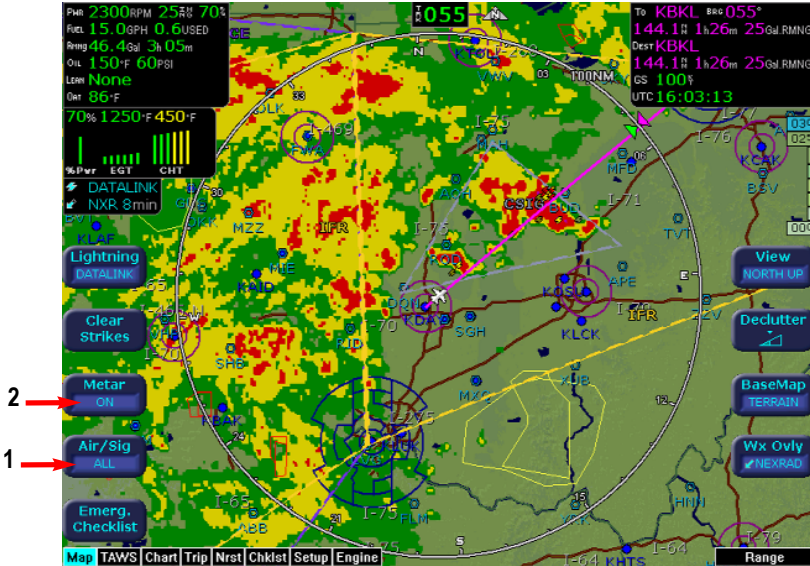
9) Wx Ovly button - controls the display of the NEXRAD overlay on the Map page. Pressing the button toggles between Broadcast NEXRAD radar images and Display Off.

10) TFR - Temporary Flight Restrictions are also reported over the Broadcast datalink. TFRs are shown with solid red lines on the Map page. Note that at a full Map declutter setting (all navigation data and airspace removed), TFRs will also be removed from the display.



## Broadcast Datalink Weather (optional)

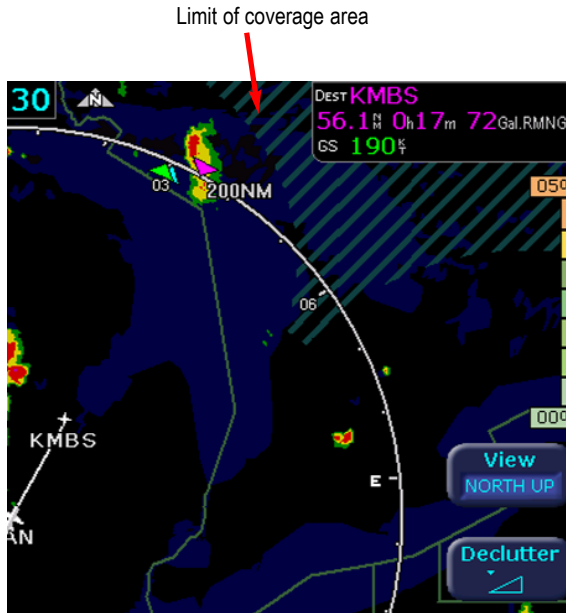
Without a Traffic sensor installed, the MFD takes advantage of the available buttons and the "WX Reports" button is split into two buttons, "Air/Sig" and "Metars", as shown below.



- 1.) The Air/Sig button controls the display of AIRMETs and SIGMETs, and pressing it toggles between ALL, AIRMET, SIGMET, and OFF.
- 2.) The Meteor button controls display of the graphical METAR symbols on the Map page, and pressing it toggles between ON and OFF.

## Broadcast Datalink Weather (optional)

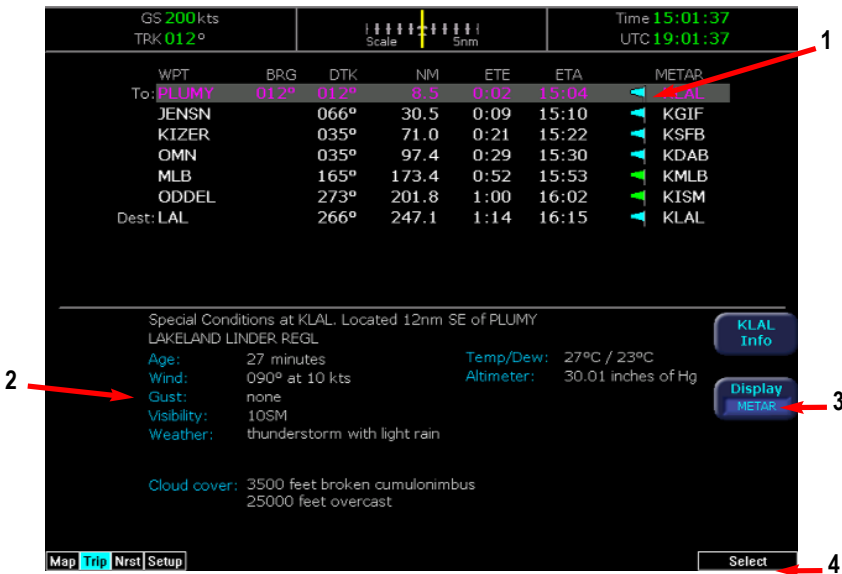
Weather data coverage from the XM Broadcast weather datalink includes the continental United States. Outside this area, weather information is not provided. The boundary of the coverage area is shown on the Map page as a "hatched" pattern, as seen in this excerpt near the Canadian border. Some remote areas of the United States may not have NEXRAD coverage. See the Aeronautical Information Manual (AIM) for more information on NEXRAD coverage areas.



# Broadcast Datalink Weather (optional)

## Trip page with Broadcast Datalink

The MFD Trip page also displays weather information from the broadcast weather datalink. Each waypoint on the current active flightplan is associated with a METAR reporting point. For non-airport waypoints, the nearest METAR is used. The general conditions are reported with the same METAR flags as used on the Map page, here shown in a column for each waypoint. The full translated text METAR for the currently-highlighted waypoint is shown in the lower portion of the Trip page. If legs on the flightplan exceed 100 miles in length, the MFD will select "intermediate waypoints" in between the waypoints of the leg, in order to provide greater situational awareness of the weather conditions along the route.



1) METAR symbols - Using the same METAR condition symbols as the Map page, a METAR report is shown for each flightplan waypoint.

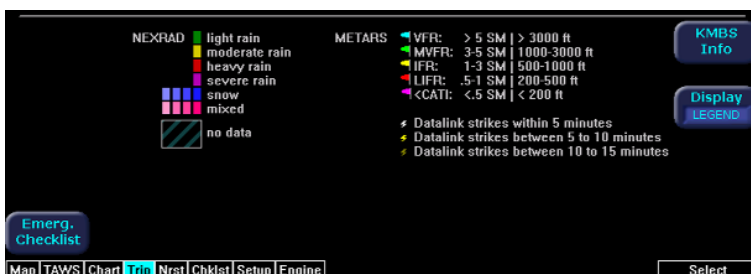
2) METAR text - the METAR is translated into plain English and presented for the currently-selected waypoint. If the METAR report is for an airport near the waypoint, the distance and direction from the waypoint is shown.

3) Display button - controls the display in the bottom half of the Trip page. Pressing this button alternates between METAR, Legend, and Status. (see below)

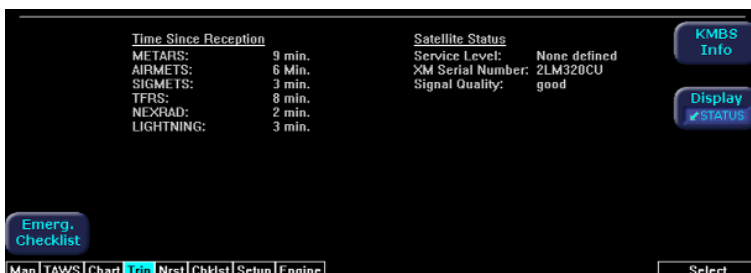
4) Select knob - use the right Select knob to move the highlight up and down the waypoint list to view the text METAR for the waypoints on the route.

## Broadcast Datalink Weather (optional)

When Legend is selected on the Display button, the lower part of the Trip page displays a legend for all of the datalink weather symbology used on the EX5000C.



When Status is selected on the Display button, the current status of the Broadcast datalink, including the time since last reception of the different types of weather data, is shown on the bottom of the Trip page. Note that different data types are sent at different rates, for instance NEXRAD radar images are sent about twice as often as METAR information. The datalink status display also shows the current signal quality and receiver serial number, as reported by the Broadcast satellite receiver.



Note that your Service Level may be reported as "None defined" (like the example above), if your weather data subscription has only recently been activated. Once the datalink receiver has confirmed your Service Level, it will be displayed here, for instance, "Aviator" or "Aviator Pro". This process may take a day or two to be triggered, depending on your MFD usage, but you will still receive datalink weather information in the meantime. Your broadcast datalink receiver will enter an "activation mode" to confirm your Service Level, which will prevent weather data from being received for a few minutes while this occurs.

### Nearest page with Broadcast Datalink

The MFD Nearest page also displays METAR information received via the broadcast datalink. Similarly to the Trip page, the METAR symbols are displayed in a column next to the Nearest airports list, for all airports that have weather reporting stations. Airports that do not report METARs do not have a METAR symbol shown.

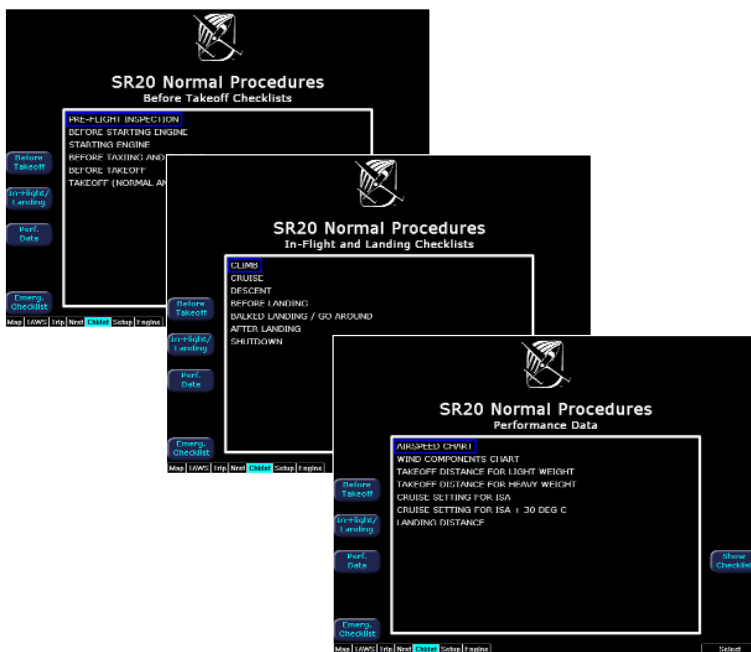
# Checklist - Normal

Turning the left knob to "Chklist" on the page bar brings up the Checklist Page, which provides a list of all the Normal Procedure checklists.



# Checklist - Normal

- 1.) **Checklist Types** - Provides access to the top-level Normal checklists for each phase of flight including: Before Takeoff, In Flight, Landing/Post Flight, Performance Data.



- 2.) **Available Checklists** - Menu of checklists within each type. Pushing the Select key takes you directly to the highlighted checklist. Normal Checklists will automatically sequence in order as checked off.
- 3.) **Selection Control** - Use right knob to move the blue outlined box up or down to highlight a specific checklist within each menu for viewing.
- 4.) **Show Checklist** - Press Show Checklist to view the highlighted Data checklist.

# Checklist - Normal

**Preflight Walk-Around**

1. Cabin
  - a. Required Documents ..... On Board+
  - b. Avionics Power Switch ..... OFF
  - c. Bat Master Switch ..... ON
  - d. Fuel Quantity ..... Check
  - e. Fuel Selector ..... Select Fullest Tank
  - f. Flaps ..... 100%(Down)
  - g. Vacuum and Oil Annunciators ..... On
  - h. Lights ..... Check Operation
  - i. Bat Master Switch ..... OFF
  - j. Vacuum and Oil Annunciators ..... Out
  - k. Alternate Static Source ..... NORMAL
  - l. Circuit Breakers ..... IN
  - m. Fire Extinguisher ..... Charged and Available
  - n. Emergency Egress Hammer ..... Available
2. Left Fuselage
  - a. Com 1 Antenna (top) ..... Condition and Attachment
  - b. Wing/fuselage Fairing ..... Check
  - c. Com 2 Antenna (underside) ..... Condition and Attachment
  - d. Baggage Door ..... Closed and Secure
  - e. Static Button ..... Clear
  - f. Parachute Cover ..... Sealed and Secure
3. Empennage
  - a. Tiedown ..... Remove
  - b. Horizontal and Vertical Stabilizers ..... Condition
  - c. Elevator ..... Freedom of Movement
  - d. Rudder ..... Freedom of Movement
  - e. Attachment hinges, bolts and cotter pins ..... Secure
4. Right Fuselage

\*CHECKLIST CONTINUED BELOW\*

Map | TAWS | Trip | Nrst | **Chklist** | Setup | Engine

Select

1 points to 'Select' button  
 2 points to 'Back' button  
 3 points to 'Done' button  
 4 points to 'Next Checklist' button

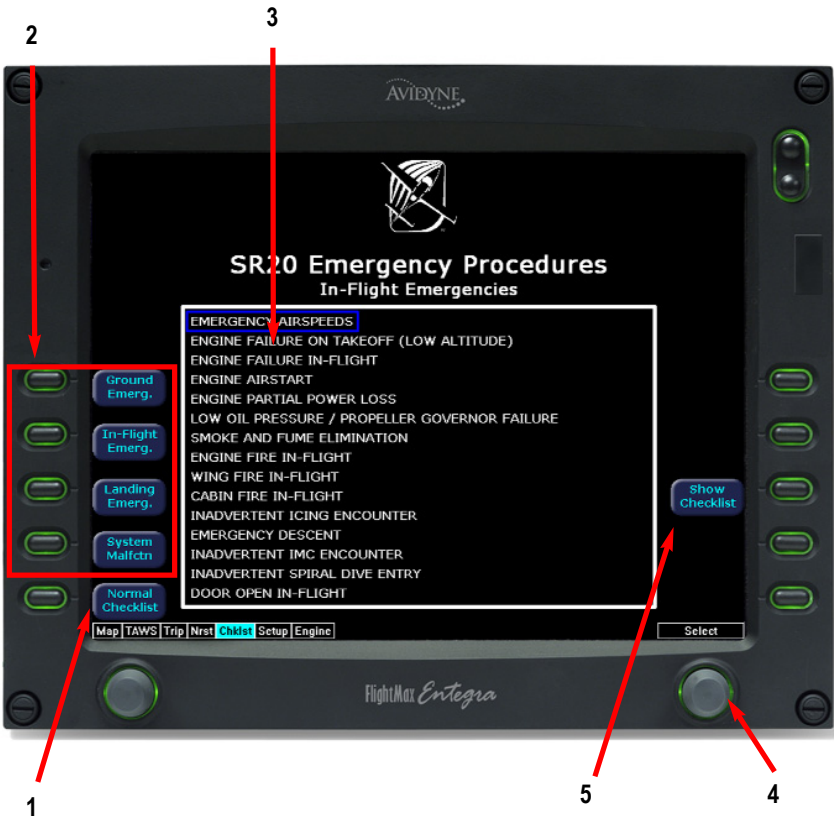
## Checklist - Normal

- 1.) Once inside a Checklist, the right knob can be used to move up and down the checklist. The current step in the checklist is highlighted in magenta and has an arrow pointing to it from the right side.
- 2.) Pressing "Done" changes the current checklist item to green, places a checkmark to the right of it, and automatically steps down to the next checklist item.
- 3.) Pressing "Back" brings you back to the menu of checklists in each type.
- 4.) When the checklist of interest is completed as indicated by all steps green and checked off, press "Next Checklist" to view the next checklist in sequence.
- 5.) A means to reset a partial or completed checklist is available to the pilot. Pressing "Reset Checklist" removes all checkmarks and turns the steps back to white. The "Reset Checklist" button appears after one or more steps have been checked completed. (Note: Not depicted in diagram on previous page.)



## Checklist - Emergency

The MFD includes complete Emergency checklists, with one-button access from any page being displayed by pressing the “Emerg. Checklist” line select key in the lower left corner.



Rotating the page selector knob to CHKLST brings up the checklist page.

# Checklist - Emergency

- 1.) **Normal Checklist** - Press the Normal Checklist button to return to the selection of normal operating checklists.
- 2.) **Checklist Types** - Provides access to the top-level Emergency checklists for each phase of flight including: Ground Emergency, In-Flight Emergency, Landing Emergency, and System Malfunctions.



- 3.) **Available Checklists** - Menu of checklists within each type. Pushing the Show Checklist key takes you directly to the desired list.
- 4.) **Selection Control** - Use right knob to move the blue outlined box up or down to highlight a specific checklist within each menu for viewing.
- 5.) **Show Checklist** - Press "Show Checklist" to view the highlighted checklist.

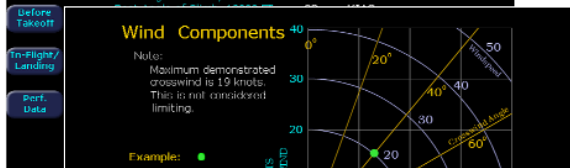
# Checklist - Performance Data

### Airspeeds for Normal Operation

Takeoff Rotation		
Normal, Flaps 50%	70	KIAS
Short Field, Flaps 50%	65	KIAS
Obstacle Clearance, Flaps 50%	75	KIAS

Enroute Climb, Flaps UP		
Normal, S.L.	100	KIAS
Normal, 10000 FT	90	KIAS
Best Rate of Climb, S.L.	94	KIAS
Best Rate of Climb, 10000 FT	89	KIAS
Best Angle of Climb, S.L.	81	KIAS



### Takeoff Distance

Weight 2500 LB

Liftoff Airspeed 65 KT  
50' Obstacle Airspeed 71 KI

Temperature ~ C

	0	10	20	30	40	ISA
S.L. Roll	813	878	946	1016	1090	912
50 FT	1212	1303	1398	1496	1597	1350

### Takeoff Distance

Weight 2900 LB

Liftoff Airspeed 69 KT  
50' Obstacle Airspeed 76 KI

Temperature ~ C

	0	10	20	30	40	ISA
S.L. Roll	1195	1291	1391	1495	1603	1341
50 FT	1757	1890	2027	2169	2316	1958

### Cruise Performance

ISA + 30° C Conditions

Pres. Alt.	RPM	MAP	Power	KTAS	GPH
2000	2700	27.0	91%	167	14.2
ISA + 30° (41° C)	2500	25.4	72%	153	11.3
4000	2500	22.9	62%	145	10.7
2500	2700	25.8	85%	166	13.4
ISA + 30° (37° C)	2500	24.0	72%	156	11.2
4000	2500	22.2	62%	146	10.7

### Cruise Performance

ISA Conditions

Pres. Alt.	RPM	MAP	Power	KTAS	GPH
2000	2700	27.0	95%	165	15.0
ISA (11° C)	2500	25.4	75%	151	11.6
4000	2500	22.9	65%	143	10.8
ISA (7° C)	2700	25.8	89%	164	14.0
2500	2500	24.0	75%	154	11.6
ISA (3° C)	2500	22.3	65%	146	10.5
6000	2700	24.0	82%	163	13.1
ISA (3° C)	2500	21.0	65%	140	10.6
8000	2700	22.2	75%	160	11.6
ISA (-1° C)	2500	21.2	65%	151	10.5
10000	2500	18.9	55%	141	9.5
ISA (-5° C)	2700	20.6	72%	160	11.2
12000	2500	20.0	64%	153	10.5
ISA (-9° C)	2500	18.5	55%	144	9.5
14000	2700	19.0	67%	150	10.7
ISA (-13° C)	2500	19.0	59%	151	9.9
2500	2500	16.8	50%	140	8.9
2700	2700	17.6	62%	156	10.2
2900	2500	17.6	55%	149	9.5
3100	2500	16.5	50%	143	9.0

## Checklist - Performance Data

The Performance Data tables and charts are accessible from the Normal Procedures page. All data is derived directly from the aircraft POH.

The five tables/charts available are:

- 1) Airspeeds for Normal Operation
- 2) Wind Components
- 3) Takeoff Distances
- 4) Cruise Performance
- 5) Landing Distances

In all airspeed and performance tables, the POH contains the most complete data available.

# Engine Instruments - Engine Page

When equipped with optional Engine Instrumentation capability, the MFD provides an Engine page which is accessed by turning the left knob all the way to the right. This 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 sensor interface unit (SIU) while the remainder are calculated by the FlightMax MFD.

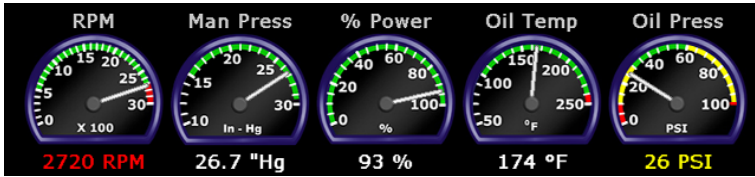


The Engine page is divided into four main sections plus an OAT gauge:

- 1.) **Gauges** - Provides analog and digital readouts of RPM, Manifold Pressure, Percent Power, Oil Temperature, and Oil Pressure.
- 2.) **Electrical** - Monitors electrical bus voltages and battery current (where applicable).
- 3.) **OAT**- Digital outside air temperature (OAT) gauge.
- 4.) **Fuel** - Provides Fuel Flow, Fuel Used, Fuel Remaining, Time Remaining, and Fuel Economy information.
- 5.) **Cylinder Temperatures** - Full display of Exhaust Gas Temperature (EGT) and Cylinder Head Temperature (CHT) for all six cylinders.

**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 annunciation to turn yellow while "Warning zone" readings will cause a red indication.

# Engine Instruments - Gauges, Electrical, & OAT



## 1.) Gauges

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

**Manifold Pressure** - Indicates the current engine intake manifold pressure reported by the SIU.

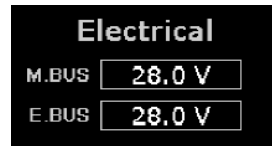
**Percent Power** - Indicates the calculated percent of maximum rated power currently being produced by the engine. This indication is calculated by the MFD based on engine RPM, manifold pressure, outside air temperature, and fuel flow.

**Oil Temperature** - Indicates the current engine oil temperature in degrees Fahrenheit as reported by the SIU.

**Oil Pressure** - Indicates engine oil pressure in pounds per square inch (PSI) as reported by the SIU.

## 2.) Electrical

**M. BUS (BUS in single-bus models)** - Indicates the current voltage of the main bus in volts as reported by the SIU.



**E. BUS (dual-bus models only)** - Indicates the current voltage of the essential bus in volts as reported by the SIU.

**BATT (single-alternator models only)** - Indicates the current charge or discharge condition of the aircraft battery in amps. A "Chrg" annunciation indicates that available electrical power is being used to charge the battery. A "Dschg" annunciation indicates that the electrical system is operating at maximum capacity and that battery power is being consumed.

The battery current is displayed only when the alternator is not supplying current. BATT will indicate the battery discharge rate to aid the pilot in shedding electrical load.

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



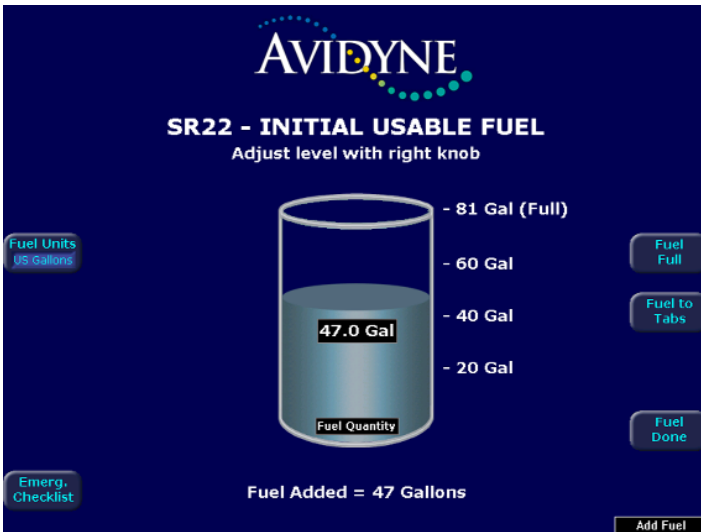
# Engine Instruments - Fuel Usage

## 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.

Buttons for "Fuel Fill" and "Fuel to Tabs" are available to quickly set commonly used fuel amounts. 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.



## Engine Instruments - Fuel Usage

From the Engines Page, the MFD displays Fuel Flow, Fuel Used, Fuel Remaining, Time Remaining, and Fuel Economy.

**Flow** - Displays the current fuel flow in gallons per hour as reported by the SIU.

**Used** - Displays the total amount of fuel used since the last engine start as reported by the SIU.

**Rem** - 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 flow as reported by the SIU.

**Time** - 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 setting from the fuel initialization page and fuel flow as reported by the SIU. This value is only displayed when the GPS ground speed is greater than 50 knots.

**Econ** - Displays the the current fuel economy in nautical miles per gallon. This indication is based on the fuel flow as reported by the SIU and the groundspeed as reported by the GPS. This value is only displayed when the GPS ground speed is greater than 50 knots.

Fuel	
FLOW	16.7 GPH
USED	5.3 Gal
REM	41.7 Gal
TIME	02:29
ECON	12.0 NMPG

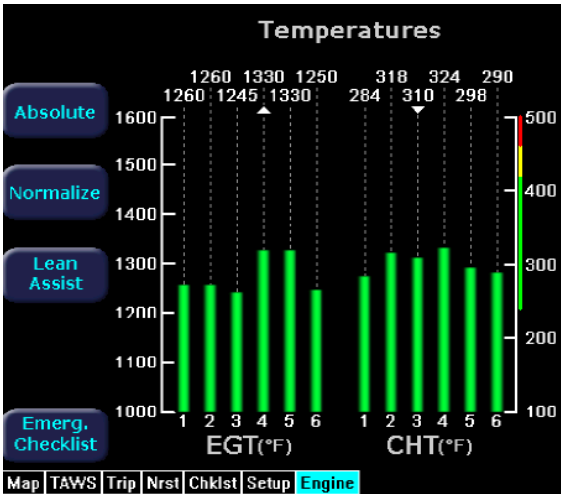


# Engine Instruments - Temperatures

## 5.) Engine Page - Cylinder Temperatures

**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.

These indications are reported by the SIU and in combination with the Lean Assist function are used to aid the pilot in leaning the aircraft's engine for desired performance.



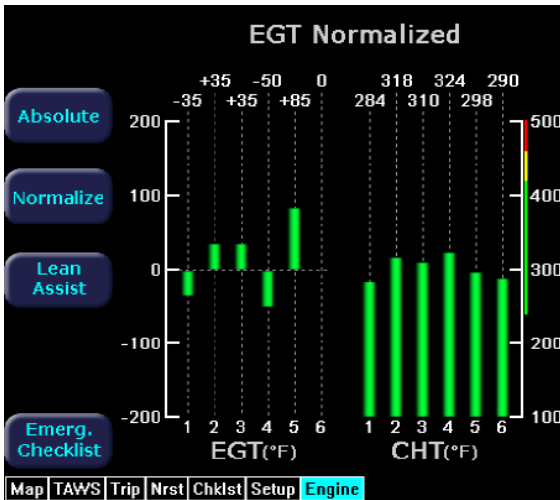
# Engine Instruments - Temperatures

**Cylinder Head Temperature (CHT)** - Indicates the temperature in degrees Fahrenheit of each engine cylinder head as reported by the SIU. 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 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 display. Upon activation, the display will establish all of the current EGT's at a zero point.

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



# Engine Instruments - Lean Assist

## Engine Instruments Lean Assist

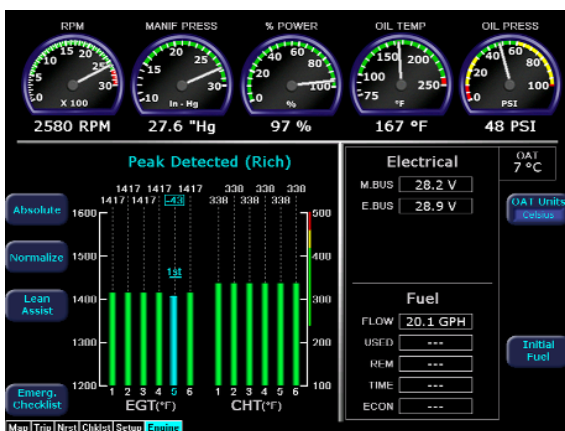
The MFD is equipped with a lean assist function which is used to set the optimum mixture for various operating conditions. The MFD will automatically detect whether the pilot is leaning for best power or best economy and provide visual messages to guide the pilot toward the correct mixture setting.

### 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 announce "Looking for First 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 #5 is the first to peak.)

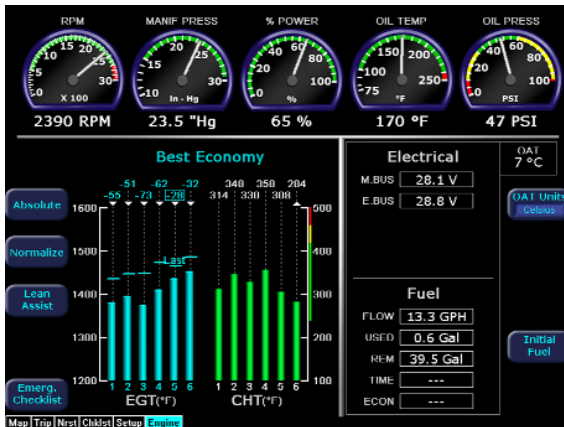
- 4.) As cylinder #5 peaks the display will announce "Peak Detected" and the #5 cylinder bar graph will turn cyan.
- 5.) At this point the pilot should then begin to richen the mixture.
- 6.) As the mixture is richened the display will first announce "Looking for #5 to Peak (Rich)," and then "Peak Detected (Rich)" as it determines the peak temperature. Finally, it will display "Best Power" when the optimum best power mixture has been achieved.
- 7.) After the desired engine lean setting is achieved, press the "Normalize" or "Absolute" button to exit the "Lean Assist" function.



# Engine Instruments - Lean Assist & Data Blocks

## Leaning for Best Economy

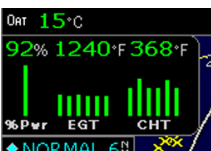
- 1.) In order to lean the engine for best economy, begin by pressing the “Lean Assist” button and smoothly lean the mixture control.
- 2.) The MFD will announce “Looking for First Peak” at the top of the temperatures section of the display.
- 3.) As the EGT rise the first cylinder will reach peak EGT followed by the second cylinder. Continue to slowly lean the mixture.
- 4.) After the third cylinder peaks, the annunciation will change to “Looking for Last Peak.”
- 5.) When leaning for best economy, the final mixture setting is based on the last cylinder to peak. As the mixture is leaned further, the last cylinder will eventually peak, and the MFD will announce “Last Peak Detected.”
- 6.) Continue leaning until the MFD announces “Best Economy” which will indicate that the best economy mixture has been achieved.
- 7.) After the desired engine lean setting is achieved, press the “Normalize” or “Absolute” button to exit the “Lean Assist” function.



# Engine Instruments - Data Blocks on Map Page

## Sensor Status Box and Engine Instrument Data Blocks on Map Page

The Engine Sensor Status Box (PWR/EGT/CHT) provides textual and graphical representation of the Percent Power, EGT, and CHT (for the hottest cylinder). If selected, it is positioned below the other left data blocks.



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.

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.

See the Data Block Setup section on Page 63 for additional information.

## Engine Instruments - Data Log

The EMax Engine Monitor provides full-time recording of time, position, and critical engine performance parameters. The MFD will log up to 100 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 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 avionics 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 (.txt), and a Jeppesen Track file (.log) which is compatible with Jeppesen FliteStar.

**NOTE: Earlier versions of the FlightMax MFD dumped out engine data in .log and .txt files with names of the form Engine\_mmddyy\_hhmmss.\*, where mm/dd/yy and hh:mm:ss are the date and time the MFD was powered on. For newer MFDs, the form of the name has been changed to Engine\_yymmdd\_hhmmss.\***

## Setup Pages - Main

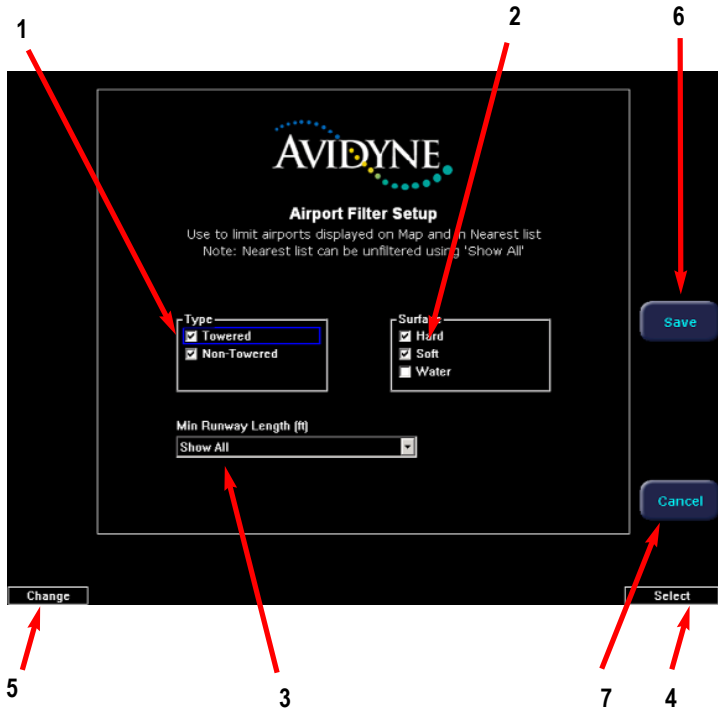
From the Checklist pages, turning the left knob one detent to the right brings up the Setup Pages, which are used to set user preferences and sensor settings.



- 1.) **Message List** including sensor status. This is a record of the messages displayed in the message bar. If more messages are active than space allows, the right knob will allow scrolling.
- 2.) **Software build number, system 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.) **Traffic Standby** - 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.
- 5.) **Traffic Self Test** - Initiates a 30 second self test of the SkyWatch traffic sensor only while on the ground. This button replaces the Traffic Standby button after the Traffic sensor has entered Standby.
- 6.) **Lightning Strike Test** - Initiates a self test of the lightning sensor.
- 7.) **Nav Src** - Swaps between GPSA and GPSB as to which unit is providing position information 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.



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 from 2000ft. - 7000ft. or show all lengths.

4.) **Selection Control** - Use right knob to move the blue field selector.

5.) **Change Control** - Use left knob to change the value or status of the selected field.

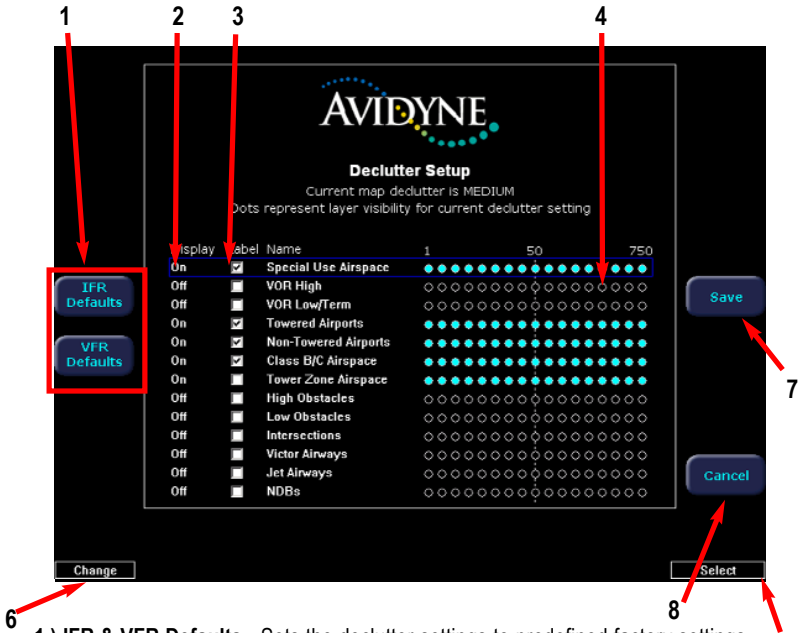
6.) **Save** - Saves settings and returns to main setup page.

7.) **Cancel** - Cancels any changes and returns to main setup page.



# Setup Pages - Declutter

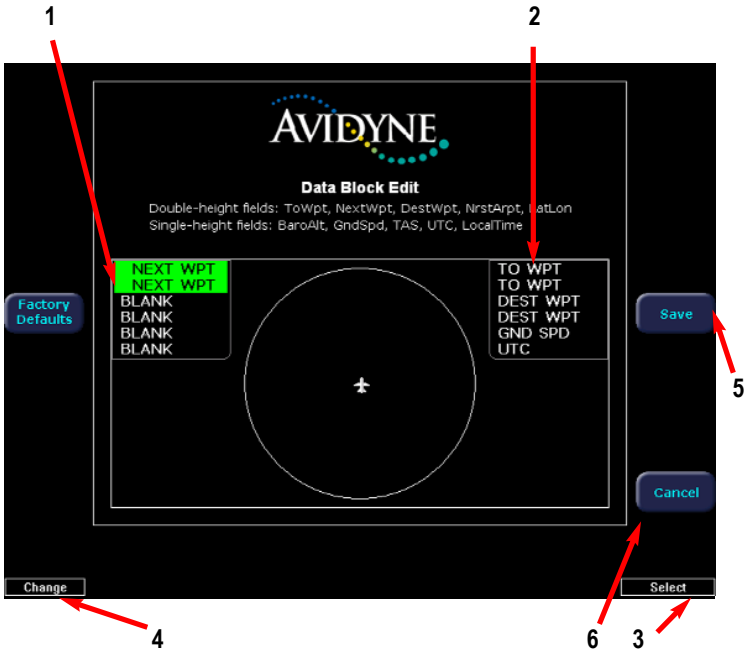
The Declutter page is used to define the navigation symbols and default display settings for the Declutter button. Individual items can be selected for display or a pre-defined group of items can be selected by choosing VFR or IFR defaults.



- 1.) **IFR & VFR Defaults** - Sets the declutter settings to predefined factory settings based on typical usage.
- 2.) **Display** - Each navaid has three possible display settings:  
 On - The navaid is displayed all the time.  
 Auto - The navaid is displayed automatically and declutters automatically based on pixel density of the display at a given range.  
 Off - The navaid is never displayed.
- 3.) **Label** - A check in the label box indicates the navaid name is displayed along with the symbol.
- 4.) **Range Dots** - The circles represent the seventeen available map scales. A cyan colored circle indicates that the navaid is displayed at that range. The vertical dash line indicates that the navaid is displayed at that range. The vertical dash line indicates the map current scale. (Note: The 1000NM and 1500NM columns are not displayed because this data is never displayed at these ranges.)
- 5.) **Selection Control** - Use right knob to move the blue field selector.
- 6.) **Change Control** - Use left knob to change the value or status of the selected field.
- 7.) **Save** - Saves settings and returns to main setup page.
- 8.) **Cancel** - cancels any changes and returns to main setup page.

## 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.



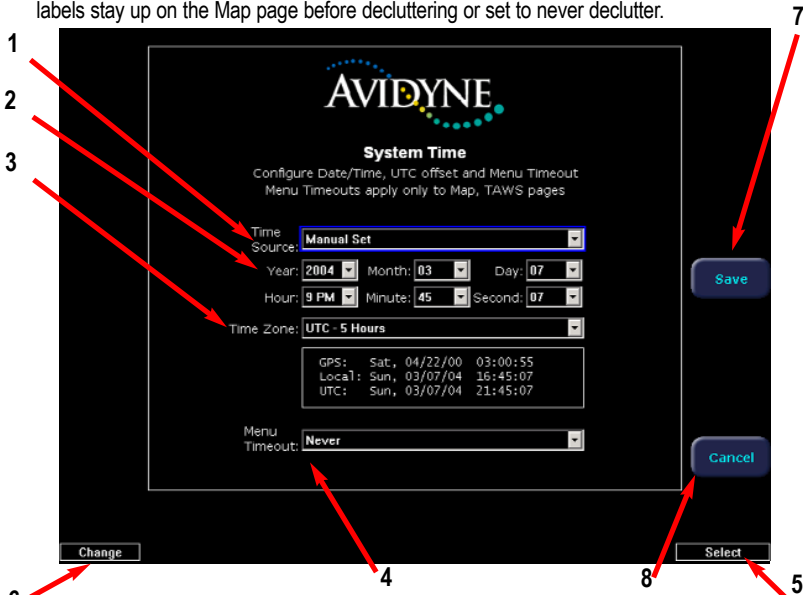
- 1.) **Left Data Block** - Allows up to 6 lines of data for display. Data block automatically resizes based on number of lines selected. Data block disappears if all lines are blank.
- 2.) **Right Data Block** - Allows up to 6 lines of data for display. Data block automatically resizes based on number of lines selected. Data block disappears if all lines are blank.
- 3.) **Selection Control** - Use right knob to move the green field selector.
- 4.) **Change Control** - Use left knob to change the value or status of the selected field.
- 5.) **Save** - Saves settings and returns to main setup page.
- 6.) **Cancel** - Cancels any changes and returns to main setup page.

See Table 6 (Page 72) for full description of Navigation data available for display in Data Blocks.

See Table 7 (Page 73) 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 “time zone offset” based on your location relative to UTC. In addition, you can set the amount of time the line select key menu labels stay up on the Map page before decluttering or set to never declutter.



- 1.) **Time Source** - Selects the time source. For the current implementation, “Auto” and “GPS” will both receive current time data from the attached GPS unit.
- 2.) **Time and Date Setting** - If manual time source is selected, it allows the manual adjustment of the current UTC value.
- 3.) **Time Zone** - Set the time zone for your location, based on an offset from UTC.
- 4.) **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.
- 5.) **Selection Control** - Use right knob to move the blue field selector.
- 6.) **Change Control** - Use left knob to change the value or status of the selected field.
- 7.) **Save** - Saves settings and returns to main setup page.
- 8.) **Cancel** - Cancels any changes and returns to main setup page.

If the MFD time has drifted noticeably from the current GPS time, ensure the GPS unit(s) are receiving valid GPS information and enter the System Time page. Change the “Time Source” setting from “Auto” to “GPS”, then return the setting to “Auto” and press the “Save” button. If the “Time Source” was previously not set to “Auto”, change the setting to “Auto” and press the “Save” button. This will re-sync the MFD time.

## Nav Database Updates

The MFD is delivered with a current database of public-use airports, nav aids, airways, navigational fixes and obstacles. This data is displayed on the moving map to provide situational awareness, as well as to provide information such as runway layouts and radio frequencies.

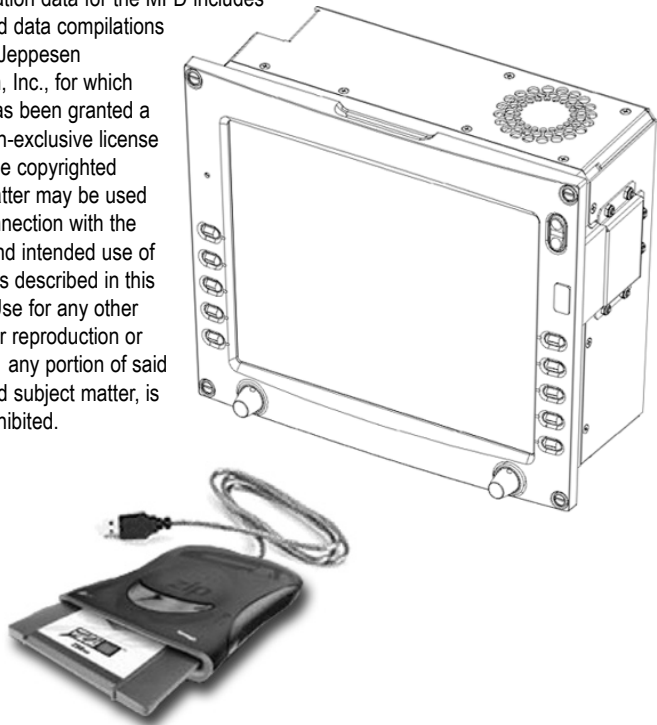
The database is stored within the MFD and is not updated in any way by information coming from a GPS. Updates to the MFD database are available from Jeppesen Sanderson, Inc. every 28 days and may be purchased either individually or on a subscription basis.

Database updates are distributed in CD-ROM format. Loading the update into the MFD is a two-step process and requires the use of an Avidyne Data Loader and a PC running Windows 98, XP, or 2000. The database region map and Update Procedures are on page 80.









**NOTE: The Avidyne Data Loader is the only device which can be used to transfer data into the MFD. It is not possible to connect the MFD directly to a laptop or to use a “flash drive” of any type.**

**NOTE: Connect only an Avidyne-approved Data Loader to the MFD dataport. Attempting to insert other devices of any type may damage the MFD.**








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.



## Appendix - Tables

Table 1: Color Code for Sensor Status Block	
Symbol	Status
Traffic  Lightning 	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 	If the symbol is empty (outline only) and blue, that function (Traffic or Lightning) is reporting a healthy status, but is turned off for display on the Map page.
Traffic  Lightning 	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 	If the symbol is empty (outline only) and yellow, that function (Traffic or Lightning) 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

<b>Table 2: Broadcast Datalink Sensor Status Block (optional)</b>	
<b>Symbol</b>	<b>Status</b>
	If the symbol is solid cyan, then NEXRAD imagery is currently being displayed on the Map Page. The Broadcast signal is Marginal, Weak, or None.
	If the symbol is animated black with a cyan stripe, then NEXRAD imagery is turned off for display on the Map page, but the NEXRAD data is valid and the broadcast signal quality is Good.
	If the symbol is animated cyan with a black stripe, then NEXRAD imagery is currently being displayed on the Map page. The broadcast signal quality is Good.
	If the symbology is empty (outline only), then NEXRAD imagery is turned off for display on the Map page and the broadcast signal quality is Marginal, Weak, or None.
	If the Symbol is solid yellow, then NEXRAD imagery is selected for display, but it is not shown because the NEXRAD data is invalid. The broadcast signal quality is Marginal, Weak, or None.
	If the symbol is animated black with a yellow stripe, then NEXRAD imagery is turned off for display on the Map page and the NEXRAD data is invalid. The broadcast signal quality is Marginal, Weak, or None.
	If the symbol is animated yellow with a black stripe, then NEXRAD imagery is selected for display, but it is not shown because the NEXRAD data is invalid. The broadcast signal quality is Good.

## 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, NDBs and Waypoints)
- Airways ( Victor and jet)
- Intersections, waypoints and other named fixes
- Class B and Class C controlled airspace
- Tower Zone 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 3 through Table 7.

## Appendix - Tables

Table 3: 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 4: Map Symbols - Airports**

Fuel			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 5: 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		Interstate Highway

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

## Appendix - Tables

**Table 6: Line Styles for Airspace and Airways**

Item	Color	Label
Military Operations Area	Yellow	ID Label
Alert Airspace	Yellow	ID Label
Warning Airspace	Yellow	ID Label
Restricted Airspace	Red	ID Label
Prohibited Airspace	Red	ID Label
Class B	Blue	Elevation
Class C	Magenta	Elevation
Tower Zone Airspace	Dashed Blue	None
Victor Airways	Dark Yellow	ID Label
Jet Airways	Dark Yellow	ID Label

**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.

# 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. Distance is measured direct.	5 characters (Name) 1 to 360 degrees  0.0 to unlimited NM.
TO WPT + ETE	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.  H:MM:SS
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
blank	Blank space	

**Table 8: Engine Instrument Data Block Information**

Name	Descriptions	Range
POWER	RPM Manifold Pressure (MP) Percent Power (%)	0 - 3,000 RPM 10- 35 Inches of Hg 0 - 100%
FUEL	Fuel Flow & Gallons Used	0.0 to 99.9 GPH 0.0 to 99.9 Gallons
FUEL REM	Fuel Amount & Time Remaining	0.0 to 99.9 Gallons 0 to 23h 59m
OIL	Oil Temperature & Oil Pressure	75° - 250° 0 - 100 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 140° F -40°C to 60°C
AMPS	Battery Current	-59 to 59 Amperes  Chg or Disch
VOLTS	Voltmeter - Monitors main bus and essential bus	0.0 to 36.0 VDC

## Appendix - TAWS Messages

TAWS Messages & Colors	Meaning	Recommended Pilot Action
Caution Obstacle	EGPWS Obstacle caution	Fly to avoid obstacle.
Caution Terrain	EGPWS Terrain caution	Fly to avoid terrain.
OBSTACLE AHEAD, PULL UP	EGPWS Obstacle Warning	Pull up to avoid obstacle.
TERRAIN AHEAD, PULL UP	EGPWS Obstacle Warning	Pull up to avoid terrain.
TAWS Display Initializing	During its startup phase, this Message is displayed. While TAWS display is initializing, the TAWS page is painted with magenta dots overlaid by the large text annunciation TAWS DISPLAY INITIALIZING.	The Message should clear spontaneously. If the test fails or does not terminate refer to the EGPWS pilot's guide.
TAWS Sensor Self Test	The EGPWS is performing a Self-Test. A distinctive color test pattern will be displayed. The large text annunciation, "TAWS SENSOR SELF-TEST" is presented over the test pattern. The text will remain until the self test is finished.	If the test fails or does not terminate refer to the EGPWS pilot's guide.
TAWS Display Inhibited	When the pilot inhibits EGPWS alerts by means of the separate EGPWS control panel, the TAWS display page is painted with magenta dots overlaid by the large text annunciation TAWS DISPLAY INHIBITED.	Check to see if the control settings are correct. If the EGPWS is not inhibited and if this message persists, contact maintenance.
TAWS Display Unavailable	The EGPWS is unable to supply the MFD with a reliable TAWS display, probably because one of its inputs from another device in the aircraft is incorrect or unreliable. When the TAWS Display is unavailable due to this condition, the TAWS Display page is painted with magenta dots overlaid by the large text annunciation TAWS DISPLAY UNAVAILABLE.	Check to see that EGPWS is powered up. Have maintenance check configuration and installation.
TAWS Display Failed	Indicates a failure in either the MFD or EGPWS. Whenever the condition occurs the TAWS page is painted with Magenta dots overlaid by the large text annunciation TAWS DISPLAY FAILED.	Execute a thorough EGPWS self test. Have maintenance check EGPWS configuration.
TAWS Not Communicating	Indicates that the EGPWS sensor is powered down or incorrectly attached to the MFD. Whenever the TAWS Display is unavailable due to this failure, the TAWS display page is painted with magenta dots overlaid by the large text annunciation TAWS NOT COMMUNICATING.	Check to see that EGPWS is powered up. Have maintenance check configuration and installation.

## Appendix - TAWS Messages Cont.

TAWS Messages & Colors	Meaning	Recommended Pilot Action
TAWS Failed	Indicates that the EGPWS sensor is reporting an internal fault. Whenever this condition occurs the TAWS page is painted with Magenta dots overlaid by the large text annunciation TAWS FAILED.	Execute a thorough EGPWS self test. Have maintenance personnel inspect the EGPWS for faults.
TAWS: Check Altitude	Indicates the EGPWS has detected a conflict in altitude information.	Compare TAWS geometric altitude to current MSL altitude. Have maintenance personnel inspect EGPWS if gross altitude mismatch continues.

## 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
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 Sensor 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 - Broadcast Datalink Messages (optional)

Lightning Messages & Colors	Meaning	Recommended Pilot Action
Broadcast Receiver Not Communicating	MFD has received no data from the broadcast receiver for 5 minutes.	Have the wiring from broadcast receiver to the MFD inspected.
Broadcast Antenna is Disconnected	The broadcast datalink antenna or cable is not properly connected to the receiver.	Have the broadcast antenna connection inspected.
Broadcast Receiver is operating Normally	The broadcast receiver is operating in a normal state from a recoverable fault that was previously acknowledged	Acknowledge
Broadcast Data not yet received	The MFD did not receive broadcast weather data within the first 10 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast NEXRAD not received	The MFD did not receive broadcast NEXRAD data within the first 15 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast METARs not received	The MFD did not receive broadcast METAR data within the first 15 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast AIRMETs not received	The MFD did not receive broadcast AIRMET data within the first 15 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast SIGMETs not received	The MFD did not receive broadcast SIGMET data within the first 15 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast TFRs not received	The MFD did not receive broadcast TFR data within the first 15 minutes of operation after power-on.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast Lightning not received	The MFD did not receive broadcast Lightning data within the first 15 minutes of operation after power-on	Monitor datalink system during flight, have system inspected if performance does not improve. Use onboard lightning detection system, if installed.
Broadcast NEXRAD >120 min	Broadcast NEXRAD data age since creation is greater than 120 minutes. NEXRAD data can no longer be displayed.	Monitor datalink system during flight, have system inspected if performance does not improve.

## Appendix - Broadcast Datalink Messages cont. (optional)

Lightning Messages & Colors	Meaning	Recommended Pilot Action
Broadcast METARS >120 min	Broadcast METAR data age since creation is greater than 120 minutes. METAR data can no longer be displayed.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast AIRMETS >90 min	Broadcast AIRMET data age since reception is greater than 90 minutes. AIRMET data can no longer be displayed.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast SIGMETS >90 min	Broadcast SIGMET data age since reception is greater than 90 minutes. SIGMET data can no longer be displayed.	Monitor datalink system during flight, have system inspected if performance does not improve.
Broadcast TFRs > 90 min	Broadcast TFR data age since reception is greater than 90 minutes. TFR data can no longer be displayed.	Monitor datalink system during flight, have system inspected if performance does not improve.

## 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.

Database updates are available for two regions of the world: *Americas*, which covers North and South America, and *International*, which includes worldwide data *excluding* North and South America.



Updates are purchased directly from Jeppesen Sanderson, Inc. Contact Jeppesen at 800-621-5377 or visit their website at [www.jeppesen.com](http://www.jeppesen.com).

### To perform a database update:

1. Connect the dataloader to any available USB port on a PC running Windows 98, XP, or 2000. Insert ZIP-100 data disk into dataloader.
2. Insert the database update CD-ROM obtained from Jeppesen into the PC's CD-ROM drive. The "Avidyne Navigation Data" window should automatically appear. If it does not, click on Start->Run->Browse, then select the drive letter for your CD-ROM drive, double-click on FlightMaxInstall.exe, then click OK.
3. Click on the button labeled "Install Flightmax Navigation Data Disk to ZIP-100".
4. The system will then copy all the necessary update files from the CD-ROM into the dataloader.
5. Remove the Data Disk from the dataloader and disconnect the dataloader from the PC. Bring both the dataloader and the data disk to the MFD at the aircraft.

## Appendix - Navigation Database Update Procedure

6. Turn power OFF to the MFD.
7. 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.**

8. 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.**

9. 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.

# 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 an installed heading source becomes unavailable or invalid, the MFD will automatically switch to using GPS track for map alignment.

If the track source also 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:

- Have avionics wiring inspected.

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

## System Time Failure

If the MFD date/time differs substantially from the correct date/time (i.e. more than a week in error), enter the System Time page from the Setup Page and use the Manual Set option to set the correct time. If this occurs on a regular basis, contact your maintenance facility.

# 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.

## Saturated Map/ Degraded Performance

If all display elements are forced on via the Declutter Setup Page, quick declutter setting on Map Page is set to maximum, and Map Range is set greater than 400NM, Map performance will be very slow. In some cases, Map will cease to operate and power will need to be cycled to restore functionality.

This condition is not expected to be encountered since enabling all display elements renders the Map unreadable due to display density.

Recommended Setting:

Select IFR or VFR Default declutter setting.

## Engine SIU Failure

In the event of an engine sensor unit, or SIU, 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 sensor interface unit (SIU). If the function is not restored, land as soon as practical and have a maintenance facility inspect the system.

## Appendix - Broadcast Datalink Service Purchase and Activation Instructions

In order to receive and display Broadcast Datalink weather and airspace, you must purchase service from XM Radio and have your receiver activated by XM Radio. XM Radio will request 4 items of information from you.

- Your Name
- Weather Service Package
- Broadcast Receiver ID Number (to locate this read below) \_\_\_\_\_
- Credit Card Information

Select between Aviator and Aviator Lite weather service offered by XM Radio based on the weather data products you would like to receive.

Weather Data Product	XM WX Package	
	Aviator Lite	Aviator
High Resolution NEXRAD	X	X
TFRs	X	X
Precipitation Type (at surface)	X	X
METARs	X	X
AIRMETs		X
SIGMETs		X
Lightning		X

Choose the **Aviator** to receive full functionality from your MFD. Visit [www.xmradio.com/weather/aviation](http://www.xmradio.com/weather/aviation) for information on pricing.

Obtain the ID of the Broadcast receiver installed in your aircraft by viewing the **MFD Trip page**. Press the **Display** button to view **Status** and carefully record your **XM Serial Number**. (There is no "I" (eye), "o" (oh), "S" or "F" used.)

To place your order contact XM Satellite Radio's Listener Care Center at 1-800-985-9200 and speak with an XM Satellite Radio representative. Be prepared with all of the information above.

## **Appendix - Broadcast Datalink Service Purchase and Activation Instructions**

XM Radio will activate your receiver by sending a unique activation code to your receiver for 24 hours after your call. Your receiver must receive this code to receive weather data. Move your aircraft outside and power on the MFD and receiver or go flying. When your receiver receives the activation code the MFD will display the weather data and it will indicate the XM weather service you purchased as Service Level on the Trip Page. The MFD's Service Level indication may take several flights to synchronize to the correct level but you will still receive and see the weather products you have purchased.

If 24 hours passes before you can get to your aircraft contact XM Satellite Radio's Listener Care Center again or visit [www.xmradio.com/activation](http://www.xmradio.com/activation) to enter your receiver ID number to enable the activation code for your receiver for an additional 24 hours.

Contact Heads Up Technologies for problems relating to your receiver or assistance with service.

e-mail: [service@heads-up.com](mailto:service@heads-up.com),  
Phone: (972) 980-4890 Ext. 142.





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