

BENDIX/KING®

KMD 550/850

Multi-Function Display

Pilot's Guide



For Software Version 01/10 or later

Revision 3 May/2002

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INTRODUCTION

All of us at Honeywell congratulate you on choosing this product. You are now the owner of one of the most sophisticated yet simple-to-use multifunction displays available today. We understand you probably can't wait to see it in action but before you try to use it do please take the time to read through this manual and understand its many interesting and useful features. Time spent in familiarizing yourself with your new KMD 550/850 unit will be more than repaid by trouble-free operation later, and more importantly safe and accurate navigation.

We have made the operation of this unit as intuitive as possible through the use of Power Keys and on-screen help, thus reducing pilots' dependence on the manual. You should very quickly find that handling it efficiently and expertly becomes second nature to you. Don't be afraid to experiment. No matter which key you activate, your unit will not be damaged. If you do get into a mess, simply switch off and back on again to reset all functions. We must mention just one word of caution. **Never remove the database card while the unit is switched on and never attempt to switch the unit on when there is no database card installed.**

We thank you for your decision to purchase a KMD 550/850 and wish you many happy and safe hours flying.

Whenever you are using the unit for navigation in the air you should treat it as a supplemental display system. You should always carefully compare indications from your KMD 550/850 unit with the information available from all other navigation sources including GPS, NDBs, VORs, DMEs, visual sightings, charts, etc. For safety, any discrepancies observed should be resolved immediately.

This equipment is not a replacement for your chart. It is intended as an aid to navigation only. The database within the equipment has been compiled from the latest official information available, and although every care has been taken in the compilation, the manufacturers will not be held responsible for any inaccuracy or omissions therein. **NEVER USE THE TERRAIN DISPLAYED ON THIS EQUIPMENT AS YOUR SOLE REFERENCE FOR TERRAIN AVOIDANCE.**

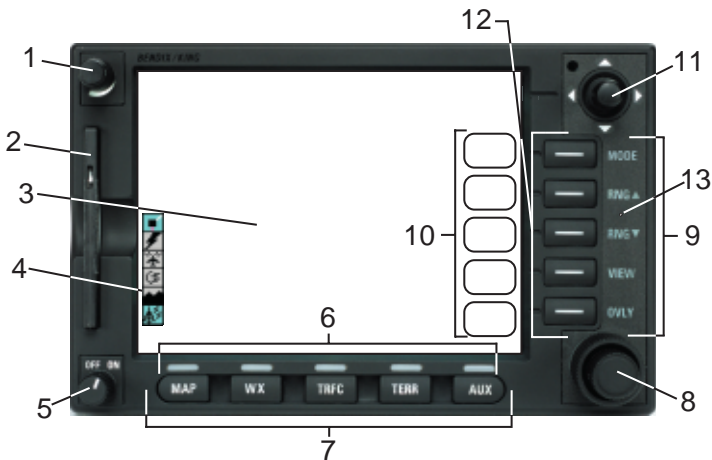
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GENERAL INFORMATION

This section of the manual provides an overview of the software architecture and display presentation of the KMD 550/850 Multifunction Display.

This manual also provides an explanation of each of the individual displays that the KMD 550/850 unit presents.

The operating system of the Bendix/King KMD 550/850 keeps to a minimum the number of key presses necessary to activate the various functions, especially those most frequently used in the air. The provision of a joystick makes it considerably easier to operate the unit and allows for fast and efficient access to most functions.

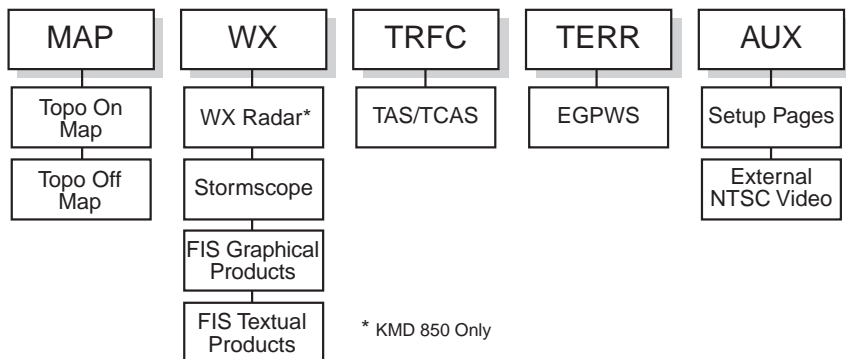


1. Brightness Control
2. Data Card
3. Display
4. Available Functions Legend
5. On/Off Control
6. Function Select Indicators
7. Function Select Keys
8. Control Knobs (Inner and Outer Knob)
9. Power Labels
10. Soft Labels
11. Joystick
12. Power Keys
13. Fault Indicator

See Appendix A for a description of Functions Legend and map display icons.

FUNCTION SELECT KEYS

These keys are used to select available data sources (as indicated on the key) for display on the LCD. When a function key is pressed, the annunciator above it will illuminate to show that this function is presently being displayed. Pressing the same Function Select Key multiple times will sequence through the available pages associated with that function. The following diagram shows the available pages under each function. Note that not all pages will be available in all installations.



POWER KEYS

These five keys are used to manipulate the page being displayed. Their present functionality can be indicated by the use of Soft Labels on the left side of the key or Power Labels on the right side of the key.

POWER LABELS

When the Power Label is illuminated on the right side of the key, that key's function is dedicated to the function described by the label and that function is active. The following is a list of the dedicated functions:

- MODE- Pressing this key will sequence through all available modes associated with the displayed page.
- RNGΔ- Pressing this key will increase the range scale one level on the displayed page. Range scales on other pages will not be affected.
- RNG∇- Pressing this key will decrease the range scale one level on the displayed page. Range scales on other pages will not be affected.
- VIEW- Pressing this key will sequence through the available views associated with the displayed page.

- OVLY- Pressing the Overlay Key allows data from more than one source to be displayed simultaneously on the display. Soft Labels will indicate which data sources are available for overlay.

SOFT LABELS

Soft Labels are located to the left of the Power Keys in the LCD area. The description indicated in the label describes the key's present function related to the displayed page. Whenever a new function is selected, by pressing a key with a Soft Label, a new display is shown along with its new key labels. This capability of displaying Soft Labels that are only applicable to a particular screen is referred to as 'Soft Keying', and allows one key to perform multiple functions without the complications of multiple key presses on a conventional keypad.

JOYSTICK

This is a pointing device which moves a mouse-like pointer around the display. It is primarily used for pointing at items on the map for further information and for measuring range and bearing to specific points. When the WX function is selected, the joystick controls antenna tilt angle and track. It is also used to modify configuration settings on the AUX setup pages.

CONTROL KNOB

The inner and outer Control Knobs, located in the lower right of the unit, have various functions as indicated by a soft label when active. For example, if the weather (WX) Function Select Key is pressed, the inner knob may control the gain on the weather radar. The outer knob will act as the radar function selector for ON, Standby (SBY) and Test (TST).

FAULT INDICATOR

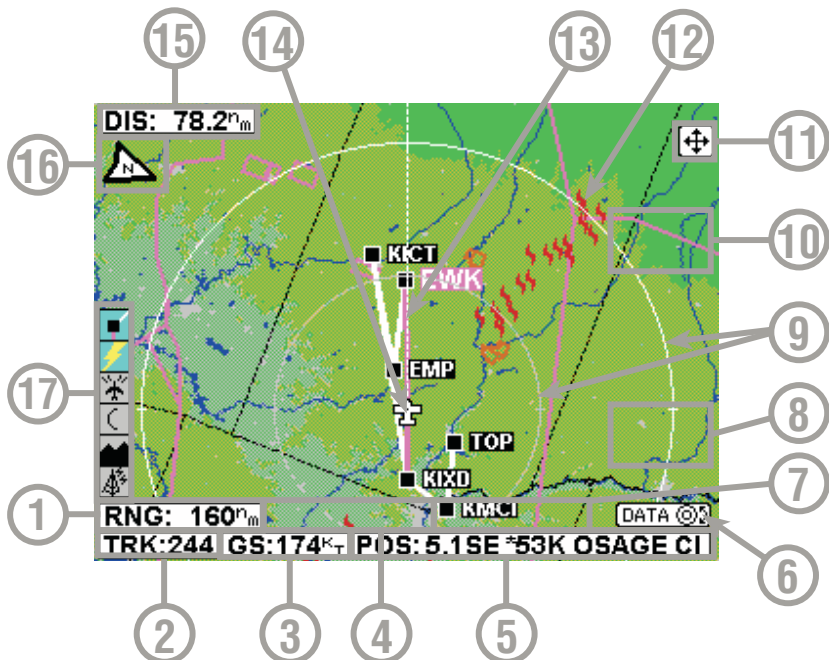
The Fault Indicator is located between the Range buttons. If this tiny "F" is illuminated, a system hardware problem exists. This could be caused by the unit failing a self test or an improper installation configuration.

If the Fault Indicator appears, cycle the unit power. If the fault re-occurs, the unit needs to be taken to an authorized service center to correct the configuration or repair the unit.

NOTE:

IF THE FAULT INDICATOR IS LIT, ALL DISPLAYED DATA SHOULD BE TREATED AS SUSPECT AND CROSS-CHECKED FOR ACCURACY BEFORE USE.

The following illustration describes the data that appears on the Map Display Page.



- 1 Display Range - RNG:####nm
- 2 Current Track - TRK:###
- 3 Current Ground Speed - GS:####kt
- 4 Distance to Pointer - PDIS: ###.nm
- 5 Position Readout - Current aircraft position
- 6 Control Knob Label - Indicates Control Knob is active for data entry
- 7 Bearing to Pointer - PBRG: ###
- 8 MORE INFO Soft Label
- 9 Range Rings - Outer ring radius is selected range, inner ring radius is one half the selected range
- 10 RESET STICK Soft Label
- 11 Joystick Label
- 12 Lightning Overlay
- 13 GPS Flight Plan Overlay - Current GPS flight plan
- 14 Aircraft Symbol - Indicates present position. Stylized airplane when heading input is present, a plus symbol with no heading.
- 15 Distance to Waypoint - DIS:###.nm
- 16 North Pointer
- 17 Available Functions - Displays icons representing data available (black) and displayed (color)

STORMSCOPE™ OPTION

The KMD 550/850 has the ability to interface and control a Goodrich WX-500 or WX-1000E Stormscope™ 'black box' thunder storm sensor. When the Stormscope™ interface is on and the overlay is enabled, lightning icons will also appear on the display.

OBSTACLE LABELS

Obstacles are labeled with two numbers. The first number is the height of the obstacle in FEET ABOVE MSL. The second number (in brackets) is the height of the obstacle in FEET AGL.

MAP TOPOGRAPHIC AND URBAN AREAS DISPLAY

On all TOPO ON map displays, the land is shaded to show rising ground in seven elevation levels similar to those seen on a paper chart. In addition, all built up or urban areas are shaded light gray. Oceans, rivers and lakes are blue. The levels and colors for the terrain shading vary with the data card installed and are depicted as follows:

TERRAIN

| <u>Color</u> | <u>Atlantic (MSL)</u> | <u>Americas & Pacific (MSL)</u> |
|--------------|-----------------------|-------------------------------------|
| Light Green | 0 -499 feet | 0 -999 feet |
| Medium Green | 500 - 999 feet | 1000 - 1999 feet |
| Dark Green | 1000-1999feet | 2000-2999 feet |
| Light Brown | 2000-2999 feet | 3000-4999 feet |
| Medium Brown | 3000-4999 feet | 5000-8999 feet |
| Dark Brown | 5000-8999 feet | 9000-12999 feet |
| Dark Red | 9000 feet and above | 13000 feet and above |

NOTE:

Topographic elevation data is not available for certain areas of SOUTH AMERICA centering on the Amazon Basin and in EUROPE a larger portion of the Ukraine bordering Russia. Please exercise extreme caution when flying in these areas because all terrain is displayed as less than 1000 feet/500 feet respectively, on the KMD 550/850.

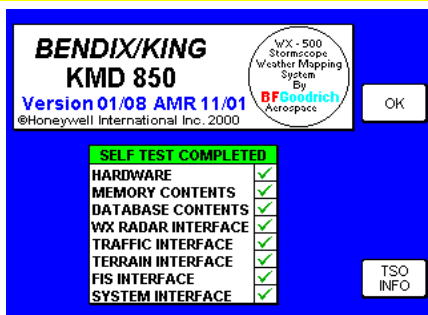
A color key can be displayed on the TOPO ON Map display. Move the joystick pointer to any terrain area away from icons or control areas and press the MORE INFO Key.

CAUTION

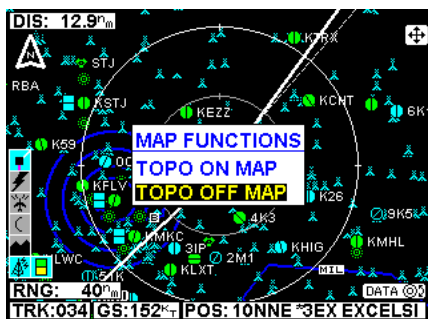
NEVER USE THE TOPOGRAPHIC ELEVATION DISPLAYED ON THIS EQUIPMENT AS YOUR SOLE REFERENCE FOR TERRAIN AVOIDANCE.

STARTUP DISPLAY

This display will be seen after power-up. The Stormscope™ logo will only be present if a WX-500 Stormscope™ is installed and enabled. Notice the self test results are also displayed. Pressing the **OK** Soft Key will show the next display. The expiration date of the Jeppesen database must be acknowledged by again pressing the **OK** soft key.

**POP-UP HELP DISPLAYS**

Pop-up status displays are shown if a Function Key or available Power Key is pressed and held for longer than 2 seconds. These can help provide a reference for monitoring the status of selected functions and overlays. The first example is a **MAP** Function Select Key pop-up. Second is the pop-up displayed when pressing and holding the **OVLY** Key.



OPERATION

SELECTING A MAP DISPLAY

Press the **MAP** Function Select Key to toggle between TOPO ON or TOPO OFF. With TOPO ON classes of data are displayed as a specific color. With TOPO OFF all cartographic data is automatically removed and the Jeppesen Nav Data is presented on a black background.

A color key can be displayed on the Map display when in TOPO ON mode. Move the joystick pointer to any terrain area away from icons or control areas and press the **MORE INFO** Key. A color key will be displayed as in Figure 3. To exit, clear by moving the joystick and press the **RESET STICK** Key.

USING THE MAP

After power-up, the map will initially be displayed at a range setting of 80nm.

If there is no valid GPS or FMS position fix data available, the words **NO EXTERNAL POSITION DATA** will be shown across the center of the display in a box. If the fix is lost at any time during normal operation of the unit, the same **NO EXTERNAL POSITION DATA** box will be overlaid on the map.

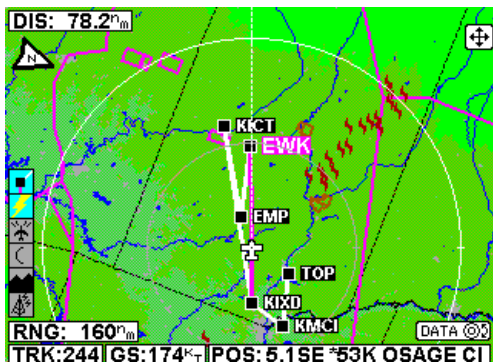
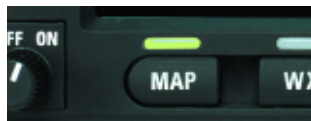


Figure 1 - TOPO ON

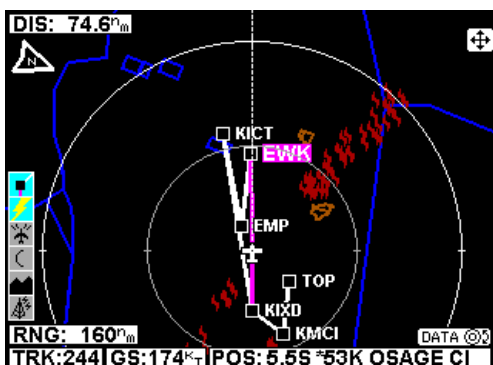


Figure 2 - TOPO OFF

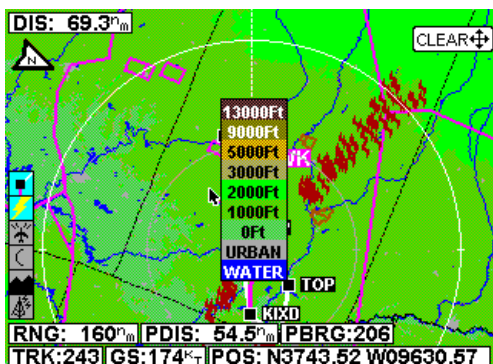


Figure 3

Operation

NOTE: Do not use the map for navigation while this message is displayed.

The map will be shown in either North Up orientation or Track Up orientation depending upon the setting selected in the Map Setup section and reflected by the North Pointer in the upper left of the display. The **DIS** field in the upper left of the display indicates distance to waypoint.

The displayed data is updated every second. Press the **RNG** Δ (range up) or **RNG** ∇ (range down) key at any time to zoom the map in and out to whichever one of the twelve pre-set scales desired. The available range settings are 1, 2.5, 5, 10, 20, 40, 80, 160, 320, 500, 1000 and 2000nm. The levels of detail appearing at each zoom level can be changed in the Map Setup section.



When active, Auto Zoom automatically adjusts the range setting up or down as needed to keep the flight plan active waypoint within the viewable area of the Map display. The flight plan must be overlaid on the Map display for Auto Zoom to be enabled.

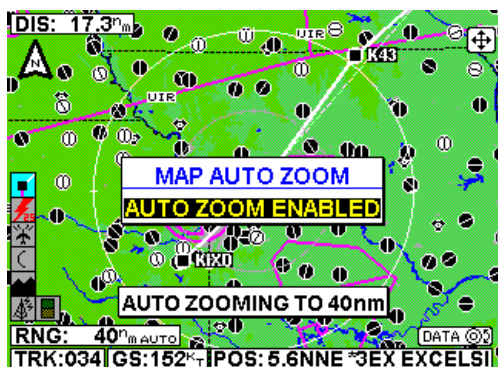


Figure 4

Auto Zoom is enabled in either of the following ways:

1. Pressing **RNG** Δ while on the 2000nm range setting.
2. Pressing and holding either **RNG** Key for 2 seconds or more. While the **RNG** Key continues to be pressed, a hold-to-help box will be displayed as shown in Figure 4.

While Auto Zoom is enabled, **AUTO** is displayed in small black text to the right of the current range setting (see Figure 4).

Auto zoom can be canceled in one of the following ways:

1. Pressing either **RNG** Key.
2. The flight plan becomes invalid.
3. The flight plan overlay is removed via the **OVLY** menu.

The small boxes marked **TRK:** and **GS:** display your present track and ground speed. Track will be magnetic (i.e.: true with local variation automatically taken into account).

The box marked **POS:** will display your present position as a distance

and bearing from the nearest item in the database. The geographical item used to describe the position is chosen on the basis of the **POSITION REF**: setting in the Map Setup.

If you have chosen **VORs** as the position reference, your position will be reported as a distance (range) and bearing from the nearest VOR. If you have chosen **VORs & AIRPORTS** as the position reference and your position is within 5nm of a VOR, your position will be reported as a distance and bearing from that VOR even if there is an airport nearer (i.e. VORs have priority). If there is no VOR within 5nm then your position will be reported with respect to the nearest VOR or airport with no priority being given for either.

If you have chosen **ALL DATA** as the position reference, your position will be reported against a table of priorities. If your position is within five miles of an airport, it is your distance and bearing from that airport that will be displayed, even if there is a navaid, user waypoint or town nearer. **All airport names are shown preceded by an asterisk character (*) in order to distinguish them from towns or cities with similar names that may have significantly different locations.** If your position is found to be within five miles of a VOR beacon and more than five miles from an airport, then your position will be shown with respect to the VOR beacon, even if there is a user waypoint, NDB or town nearer. NDBs have next priority with towns last.

DATA INTERROGATION

As soon as the joystick is moved, a display similar to Figure 5 will be displayed. The map freezes in its present position with respect to the joystick pointer. A line appears between present position and the joystick pointer. (The reason the map is made to stop moving is that this makes accurate positioning of the joystick pointer much easier.) The aircraft icon will still be displayed in the proper location on the map.



Figure 5

Simultaneously, boxes labeled **PDIS** and **PBRG** are displayed. These show the distance and bearing from present position to the joystick pointer. This function can be used to measure distance and bearing to any point on the map. The window formed by the extremities of the display can be moved around the map by "bumping" the display borders left, right, up or down with the pointer. The **RNG** Δ and **RNG** ∇ keys can still be used to zoom the map in and out. Press **RESET**

Operation

STICK and the joystick pointer will vanish, the display will return to the moving map, and the map will be placed back in its present position at the zoom level that was selected prior to activating the joystick. If the joystick is not moved for 30 seconds, the display will time-out back to the moving map.

In addition to finding it useful for measuring distances and bearings, the joystick can be used for other tasks. By placing the pointer over any data icon and pressing **MORE INFO**, a display similar to Figure 5 will appear. Additional data and information on the selected item is displayed.

AIRPORT INFORMATION

As shown in Figure 6, you can display airport information by placing the joystick pointer over an airport icon and pressing **MORE INFO**. All the information given here is derived from the built-in Jeppesen database. Runway surfaces are shown as an **H** for hard and an **S** for soft. Lighting is shown as an **L** for lit and a **U** for unlit.

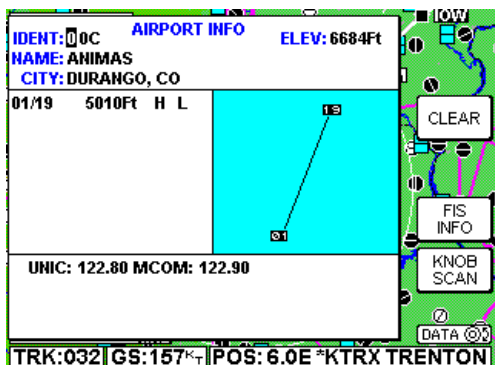


Figure 6

In addition to using the joystick to get airport information, the Control Knob may also be used. Sometimes it is not desirable to pan the map to an airport location some distance from the present position. In this case simply turn either knob and the **AIRPORT INFO** Page will appear as in Figure 6.

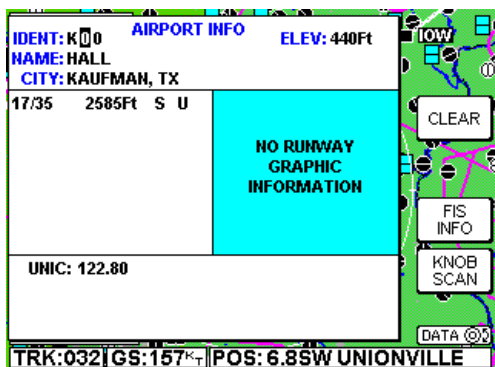


Figure 7

Finding Airports by Entering Identifier

1. The cursor will be over the first character of the airport identifier. Select the desired character by turning the inner knob.
2. Turn the outer knob one click clockwise to move the cursor to the next character field as shown in Figure 7. Turn the inner knob to select the desired character.

3. Continue changing fields and entering characters until the desired airport information is displayed.
4. Press the **CLEAR** Soft Key to return to the moving map or press the **FIS INFO** Soft Key (if FIS is installed) to view the FIS TEXT Page for the selected airport. Then press the **MAP** key to return to the moving map.

Finding Airports by Scanning Identifiers

1. The cursor will be over the first character of the airport identifier as shown in Figure 6. Select the desired character by turning the inner knob.
2. Turn the outer knob one click clockwise to move the cursor to the next character field as shown in Figure 7. Turn the inner knob to select the desired character.
3. Press the **KNOB SCAN** Soft Key. Note that the Control Knob label has changed to **SCAN** and the cursor is on the last two character fields. See Figure 8.
4. Turning the inner knob will now sequence through all airport identifiers in the database beginning with **KM**, which were the first two characters selected in Figure 8.

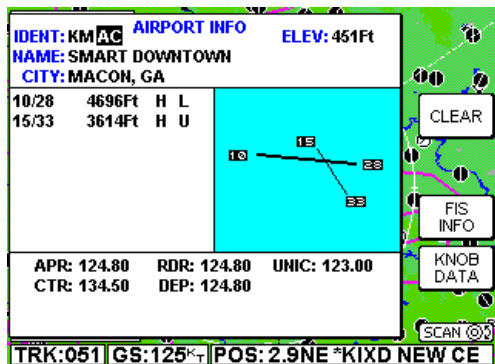


Figure 8

The outer knob may be used to select one or all the fields for scanning. The more characters selected in the identifier, the shorter the scan list.

5. Press the **CLEAR** Soft Key to return to the moving map or press the **FIS INFO** Soft Key (if FIS is installed) to view the FIS TEXT Page for the selected airport. Then press the **MAP** key to return to the moving map.

Finding Airports by Name or City

When the identifier of the desired airport is known (or a part thereof), the methods previously described can be used for selection. However, if the identifier is not known, the name of the airport can be entered. The system will also allow entry of just the first few characters of the airport name to help find it in the database. If neither the identifier nor the location name is known, the city/state can be scanned.

To Enter Airport Name:

The following example shows entering **EAGLE GROVE MUN** as an airport.

1. If necessary, press the **KNOB DATA** Soft Key so that **DATA** is displayed as the Control Knob label.

2. Turn the outer knob clockwise to select the first character in the name field as shown in Figure 9.

3. Turn the inner knob to select an **E** as in Figure 10.

4. Turn the outer knob clockwise until the cursor is positioned for the next character. Turn the inner knob to select an **A** as in Figure 11.

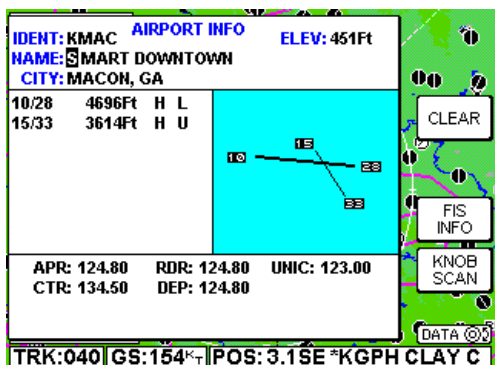


Figure 9

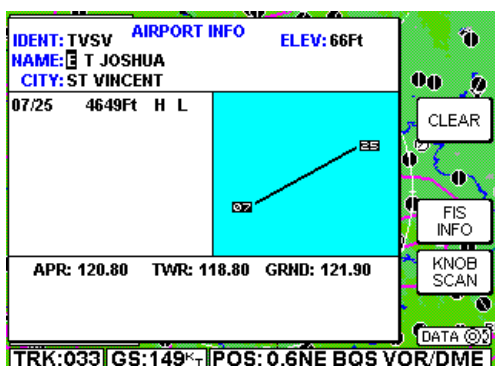


Figure 10

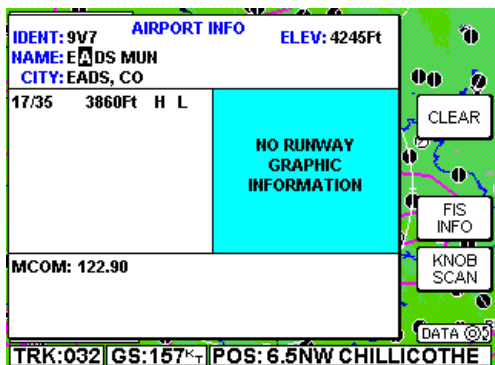


Figure 11

5. Turn the outer knob clockwise until the cursor is positioned for the next character. Turn the inner knob to select a **G** as in Figure 12.

6. Since **EAGLE** is now displayed, turn the outer knob clockwise until the cursor is positioned for the next character entry as shown in Figure 13.

7. Turn the inner knob to select a **G** as in Figure 14. The desired airport is now displayed because it is the first database instance with a **G** in this field.

8. Press the **CLEAR** Soft Key to return to the moving map or press the **FIS INFO** Soft Key (if FIS is installed) to view the FIS TEXT Page for the selected airport. Then press the **MAP** key to return to the moving map.

To Scan for Airport Name:

The following example shows scanning for **EAGLE GROVE MUN** as an airport.

1. Repeat Step 1 through 5 of the previous procedure.

2. Press the **KNOB SCAN** Soft Key. The Control Knob label will now display **SCAN**.

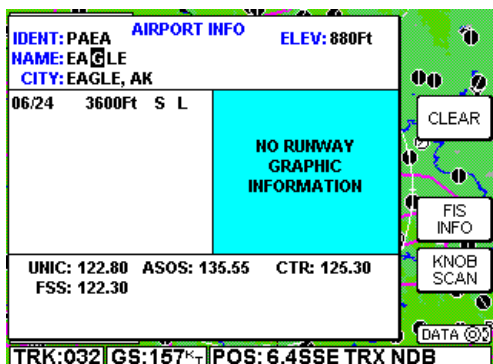


Figure 12

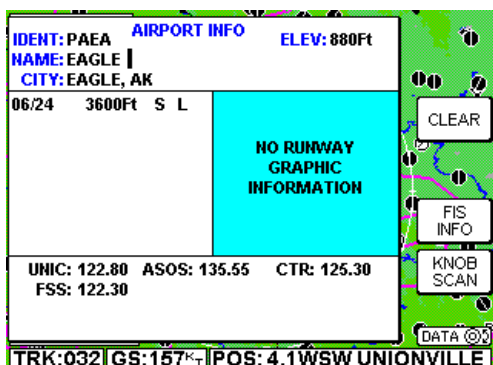


Figure 13

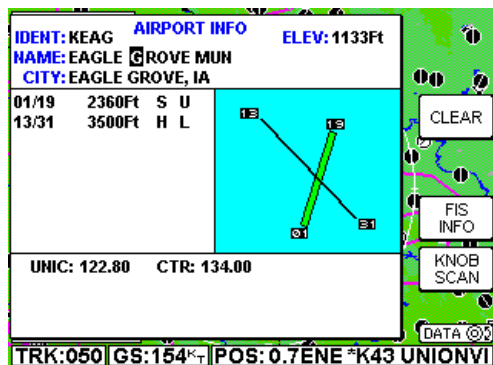


Figure 14

Operation

3. Turn the outer knob clockwise until the cursor is positioned as in Figure 15.

4. Turn the inner knob to sequence through all the airport names in the database beginning with **EAGLE**, stopping at the desired name as in Figure 16.

NOTE: This same method may be used with the name of the city where the airport is located.

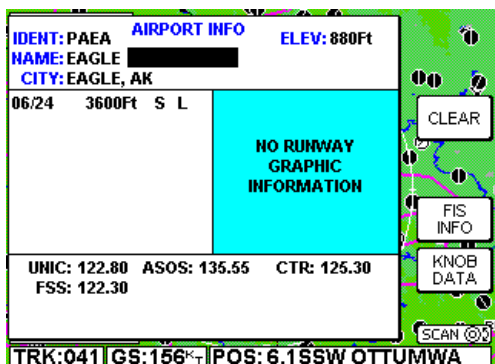


Figure 15

5. Press the **CLEAR** Soft Key to return to the moving map or press the **FIS INFO** Soft Key (if FIS is installed) to view the FIS TEXT Page for the selected airport. Then press the **MAP** key to return to the moving map.

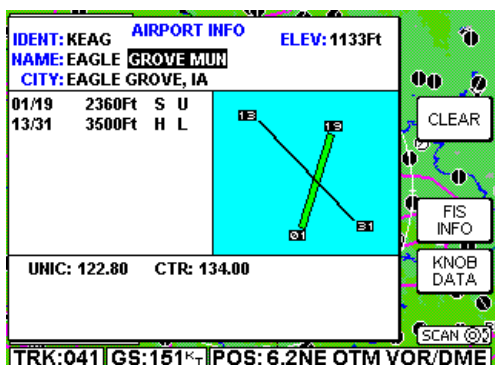


Figure 16

As explained previously, you can access additional Navaid information by placing the joystick pointer over a VOR or NDB icon and pressing **MORE INFO**. Full details of the Navaid are listed, type, frequency and ident as shown in Figure 17. The fifth line in the box is a visual representation of the Morse Code identifier.



Figure 17

GENERAL ICON INFORMATION

As explained previously, you can display additional information about an icon by placing the joystick pointer over any data icon that is not an airport, VOR or NDB and pressing **MORE INFO**. All available information concerning the chosen data item is then listed.

AIRSPACE INTERROGATION

In order to interrogate a piece of airspace on the Map display, move the joystick operated pointer and point at one of the airspace boundaries. After releasing the joystick, the software will search the airspace database and after a short time will re-draw the piece of airspace to which you have pointed in a bolder line with a basic information tag attached.

IMPORTANT:

When a single airspace boundary line is shared by two different pieces of airspace (which is very common), the airspace with the lower vertical limit will always be highlighted.

Once it is determined the piece of airspace highlighted is the piece for which information is wanted (you may have to zoom out to verify this, but beware, some airspace switches off as you zoom out dependent on the settings made in Map Setup), press **MORE INFO** and additional information will be displayed as in Figure 18.



Figure 18

The information shown on this display is all the information

from the internal Jeppesen database that is relevant to the airspace selected. If some of the fields are blank or say **SEE CHART**, this means that Jeppesen data is not available for that particular item.

DISPLAY FLIGHT PLAN DATA

If the host GPS is outputting data in the Bendix/King equivalent ARNAV R-30 (RS232) data sentence format, in LEG mode, the active flight plan will be sent to the KMD 550/850 and can be displayed as an overlay on the map (see Overlaying Data). An exception to this is during the curved flight segments of approaches (i.e. DME arcs, procedural turns and holds) when most GPS units stop outputting flight plan data but continue to output positional data. During a DME arc or procedural turn, the KMD 550/850 will continue to show position, track and ground speed but the curved line depicting the arc or turn will not be displayed. In OBS mode, some GPS units will not be able to provide flight plan data. Present position is still provided and flight plans will be displayed as soon as the mode is returned to LEG.

Operation

If the KLN 94 is supplying the GPS data, and the KLN 94 is configured to produce the "Enhanced RS-232 GPS bus", the KMD 550/850 will display the curved paths including DME arcs, Procedure Turns and Holding Patterns. Figure 19 is an example of a DME arc display.

*Important Note for Garmin
GPS Users*



Figure 19

Although Garmin products output the Bendix/King equivalent ARNAV R-30 (RS232) data sentence format, when put into OBS Mode some Garmin GPS units stop sending all data including GPS position. In these circumstances your KMD 550/850 will display an error message saying NO EXTERNAL GPS DATA since it is not receiving present position.

In the case of DME arcs, turns and holds, some Garmin GPS units send the flight plan information as if there was no arc or curved flight path. Therefore the KMD 550/850 has no option but to connect the beginning and end waypoints of the arc or curve with a straight line. Under these circumstances the line on the KMD 550/850 MUST BE IGNORED.

OVERLAYING DATA

Some data from functions not currently selected on the Function Select Keys can be displayed on the selected function. By pressing the **OVLY** Key a display similar to Figure 20 will be displayed. The base display will reflect the current function selected on the Function Select Keys. Available overlay options will be displayed as Soft Labels. Pressing the soft key associated with the desired overlay will toggle between overlay on and off. Pressing **SAVE & EXIT** will return to the selected function. The overlay status will remain as saved until changed again by pressing the **OVLY** Key. The following table shows the available overlay options based on the function presently being displayed. Note that not all options are available in all installations.

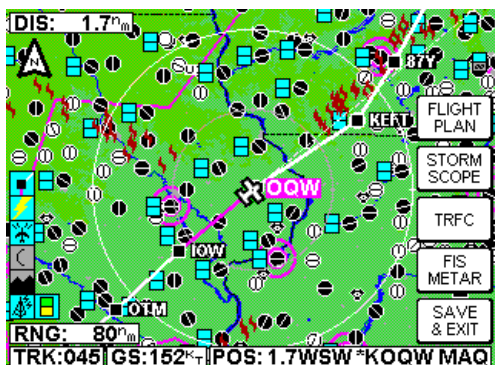


Figure 20

OVERLAY TYPE

| <u>DISPLAY</u> | <u>FLIGHT PLAN</u> | <u>STORMSCOPE</u> | <u>TRAFFIC</u> | <u>FIS METAR</u> |
|-----------------------|--------------------|-------------------|----------------|------------------|
| MAP - TOPO ON | Yes | Yes * | Yes * | Yes |
| MAP - TOPO OFF | Yes | Yes * | Yes* | Yes |
| WX - Weather Radar | Yes * | Yes | Yes | No |
| WX - Stormscope™ | Yes * | N/A | No | No |
| WX - NEXRAD | Yes | Yes* | No | No |
| WX - Graphical METARs | Yes | No | No | N/A |
| TERR | Yes | Yes * | Yes* | No |
| TRFC | Yes* | No | N/A | No |

*requires remote heading input

DISPLAYING WEATHER RADAR (KMD 850 ONLY), STORMSCOPE™ OR FLIGHT INFORMATION SERVICES

Pressing the **WX** Function Select Key will sequence through weather radar, Stormscope™ and FIS. For operation of the weather radar and FIS, see the separate section pertaining to the desired function if provided.



DISPLAYING TRAFFIC

Pressing the **TRFC** Function Select Key to display traffic. For operation of the Traffic Function, see the separate section on traffic operation if provided.



SELECTING THE ENHANCED GROUND PROXIMITY WARNING SYSTEM

Pressing the **TERR** Function Select Key to display EGPWS. For operation of the EGPWS, see the separate section on EGPWS operation if provided.



VIDEO DISPLAY

If the unit has a NTSC video source connected, pressing **AUX** will display the video. Note that on the video display no icons are shown.



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SYSTEM SETUP

This section of the manual is designed to provide step by step instructions for the setup of the KMD 550/850. Note that not all features discussed in this section are available in all installations.

INTRODUCTION

The KMD 550/850 unit is operated via a joystick, a series of 5 Power Keys located along the right side of the unit, a series of Function Select Keys located along the bottom, and an inner and outer Control Knob. The joystick allows movement of the pointer in MAP mode and is used to select and change setup fields. The appropriate key labels for a particular page are configured in software and displayed alongside the appropriate key. The rotary brightness control is used for adjusting the brightness of the display.

MAP SETUP

Press the **AUX** Function Key to display Figure 21. Press the **MAP SETUP** Key to display Figure 22. Use the joystick to select and change the desired fields.

***NOTE:** If a configuration password is requested, map setup may not be allowed.*

ORIENTATION: Set either in Track Up or North Up.

AIRPORT NAME: Labels airports in MAP MODE either with ICAO code, airport or city names.

COORD SYSTEM:

Determines whether the unit operates with reference to Lat/Long, UTM or OSGB.

***Note:** OSGB is only defined for Great Britain.*

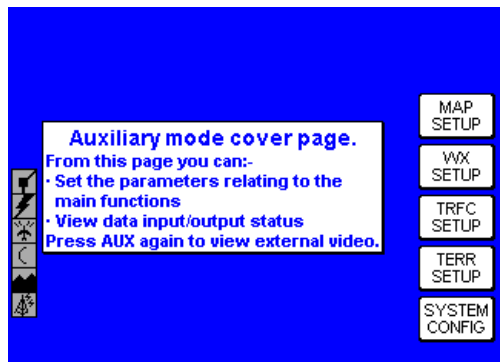


Figure 21

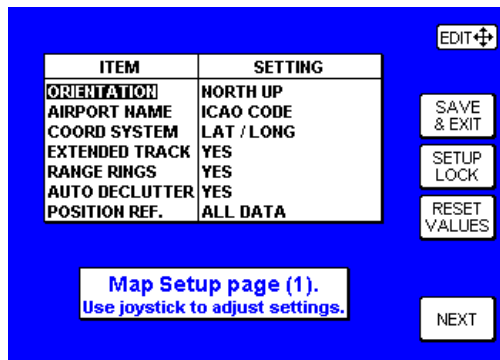


Figure 22

System Setup

EXTENDED TRACK: Turns on or off the extended track line, which is drawn ahead of the present position in the direction of the present track.

RANGE RINGS: Turns range rings on or off in MAP Mode.

AUTO DECLUTTER: Turns on or off. If a higher priority icon label (Airport) is found to clash with a lower priority icon label (City) already on the display, the lower priority icon label will be removed.

POSITION REF: Defines the reference to which the present position is given in MAP MODE, either to all available data, VORs only or VORs and Airports only.

Press the **NEXT** Key to display Figure 23. Use the joystick to select and change the desired fields.

ICON: Shows the symbol used to designate the associated item.

TOPO ON/TOPO OFF: Shows the color associated with the selected item when the topographic map is on or off.

| ITEM | ICON | TOPO ON | TOPO OFF | ICON MAX | NAME MAX | MIN |
|-----------|------|---------|----------|----------|----------|-----|
| AIRPORTS | ● | ■ | ■ | 80 | 40 | 1 |
| VORs | ☆ | ■ | ■ | 80 | 40 | 1 |
| NDBs | ⊙ | ■ | ■ | 40 | 20 | 1 |
| INTs | ▲ | ■ | ■ | OFF | OFF | 1 |
| CITIES | • | ■ | ■ | 40 | 20 | 1 |
| OBSTACLES | ▲ | ■ | ■ | 40 | 10 | 1 |
| LIGHTNING | ⚡ | ■ | ■ | 320 | - | 1 |
| HELIPADS | Ⓜ | ■ | ■ | OFF | OFF | 1 |
| TRAFFIC | ◇ | ■ | ■ | 40 | - | 1 |
| VRPs | ⊕ | ■ | ■ | 40 | 20 | 1 |

Map Setup page (2).
Use joystick to adjust point feature zoom levels.

Figure 23

ICON MAX: This field can be set to the maximum range, in nautical miles, that this item's symbol is displayed on the map display.

NAME MAX: This field can be set to the maximum range, in nautical miles, that the text name of this item is displayed on the map display.

MIN: This field can be set to the minimum range, in nautical miles, that this item's symbol and text name is displayed on the map display.

| ITEM | LINE | TOPO ON | TOPO OFF | LINE MAX | NAME MAX | MIN |
|--------------|------|---------|----------|----------|----------|-----|
| V. AIRWAYS | --- | ■ | ■ | OFF | OFF | 1 |
| MAJOR ROADS | == | ■ | ■ | 40 | 20 | 1 |
| PRIME ROADS | --- | ■ | ■ | 20 | 10 | 1 |
| OTHER ROADS | --- | ■ | ■ | 10 | 5 | 1 |
| RAILROADS | +++ | ■ | ■ | 20 | - | 1 |
| RIVERS/LAKES | --- | ■ | ■ | 320 | - | 1 |
| URBAN | --- | ■ | ■ | 160 | - | 1 |

Map Setup page (3).
Use joystick to adjust line and area feature zoom levels.

Figure 24

Press the **NEXT** Key to display Figure 24. Use the joystick to select and change the desired fields.

LINE: Shows the symbol used to designate the associated item.

TOPO ON/TOPO OFF: Shows the color associated with the selected item when the topographic map is on or off.

LINE MAX: This field can be set to the maximum range, in nautical miles, that this item's symbol is displayed on the map display.

NAME MAX: This field can be set to the maximum range, in nautical miles, that the text name of this item is displayed on the map display.

MIN: This field can be set to the minimum range, in nautical miles, that this item's symbol and text name is displayed on the map display.

Press **NEXT** to display Figure 25. Again, use the joystick to select and change the desired fields. The previous field descriptions also apply to this display. After making all desired changes, press the **SAVE & EXIT** Key to save all changes and exit the setup function. Figure 21 will again be displayed. At any time the **RESET VALUES** key can be pressed to return to the default settings on that particular display.

| ITEM | TOPO ON | TOPO OFF | LINE MAX | NAME MAX | MIN |
|-------------|---------|----------|----------|----------|-----|
| HIRAIR | [Pink] | [Blue] | 160 | 80 | 80 |
| CLASS B/CTA | [Pink] | [Blue] | 80 | 40 | 1 |
| CLASS C/TMA | [Pink] | [Blue] | 80 | 40 | 1 |
| TOWER/CTZ | [Pink] | [Green] | 20 | 20 | 1 |
| DANGER | [Brown] | [Brown] | 160 | 80 | 1 |
| RESTRICTED | [Brown] | [Brown] | 160 | 80 | 1 |
| PROHIBITED | [Brown] | [Brown] | 160 | 80 | 1 |
| MILITARY | [Pink] | [Blue] | 80 | 40 | 1 |
| OTHER SUA | [Pink] | [Blue] | 160 | 80 | 1 |

Map Setup page (4).
Use joystick to adjust airspace zoom levels.

Figure 25

WX-500 STORMSCOPE™ SETUP

Press the **WX SETUP** Key shown in Figure 21. Figure 26 will now be displayed.

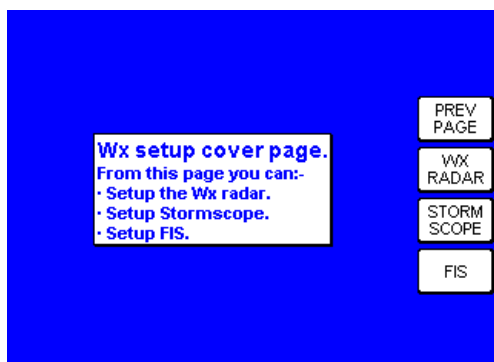


Figure 26

Press the **STORM SCOPE** Key to display Figure 27.

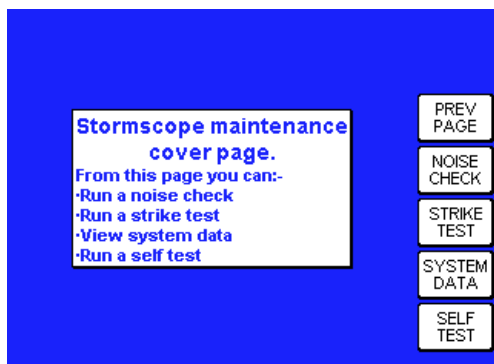


Figure 27

Press the **NOISE CHECK** Key to display the noise check display in Figure 28.

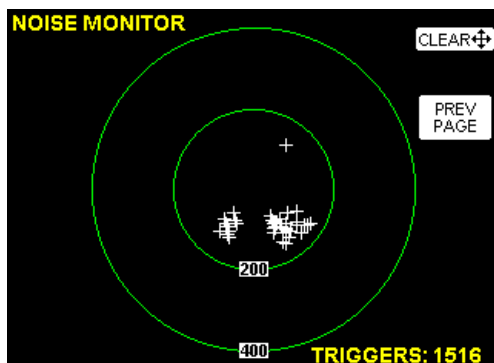


Figure 28

Press the **PREV PAGE** Key to again display Figure 27. Press the **STRIKE TEST** Key to display the strike test page shown in Figure 29.

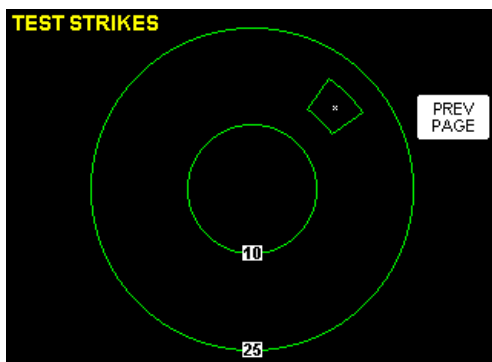


Figure 29

Press the **PREV PAGE** Key to again display Figure 27. To perform a system self test, press the **SELF TEST** Key and the self test page will be displayed as shown in Figure 30.



Figure 30

After the Self Test is complete, Figure 31 will be displayed.

Press the **PREV PAGE** Key to again display Figure 27. Press **PREV PAGE** again to exit stormscope setup.

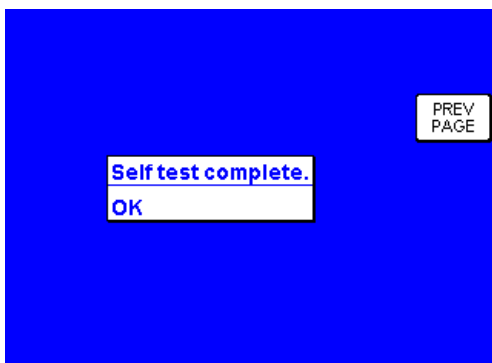


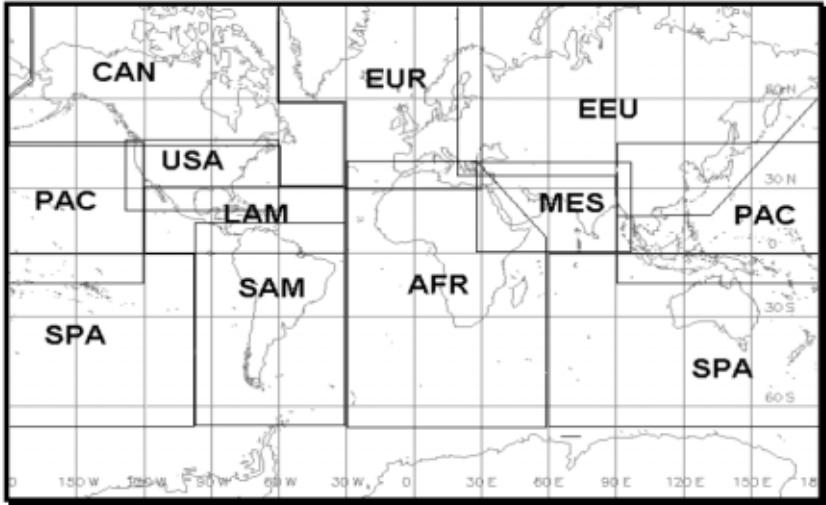
Figure 31

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DATA CARDS

DATA AREAS

Honeywell produces three data cards based on the ICAO/ARINC geographic areas for KMD 550/850 that cover the entire world. Each card for each area contains the operating software, the appropriate Jeppesen aeronautical data, cartographic data and topological data to a high resolution. Also included is a low resolution map of the rest of the world.



The ten ICAO/ARINC areas along with their three letter identifiers are:

| | | |
|--------------------|--------------------------|---------------------------|
| AFR Africa | CAN Canada | EEU Eastern Europe |
| EUR Europe | LAM Latin America | MES Middle East |
| PAC Pacific | SAM South America | SPA South Pacific |
| USA USA | | |

These areas are combined to produce three data cards covering the entire world that contain the following data:

| | |
|------------|--|
| AMR | Americas - comprising CAN, USA, LAM, SAM |
| ATI | Atlantic International - comprising EUR, AFR, EEU, MES |
| PAI | Pacific International - comprising PAC, SPA, EEU, MES |

CHANGING THE DATA CARD

To change the data card follow these simple steps:

1. Turn off the KMD 550/850.
2. Grasp the data card and pull it straight out of its socket.
3. With the card facing upward, as indicated on it's label, insert the new data card being careful to align the card with the socket then press the new card firmly into place.
4. Turn the unit on and check for correct operation. If the new data card contains a newer version of operating software the unit will update the operating system to this newer version. Status bars will be displayed during the update process.

DATABASE INFORMATION

Due to Honeywell's policy of continual development and routine database updates, new data cards will become available every 28 days. As a registered owner of a KMD 550/850, you will be offered a 1/3/6/12 monthly data card subscription.

DATABASE CYCLE INFORMATION

Keeping the database current in the KMD 550/850 is the user's responsibility. Honeywell maintains its databases to be current at all times to the latest Jeppesen 28-day data cycle.

For data card subscriptions and FIS subscribers, contact Wingman Services at the following numbers:

1-800-247-0230 if calling within the United States or Canada

(913) 712-3145 if calling from outside the United States or Canada

(913) 712-3904 FAX

e-mail: nav.database@honeywell.com

Visit Wingman Services at www.bendixking.com

DEFINITIONS, ACRONYMS AND ABBREVIATIONS

DEFINITIONS

Alphabetic: any of the following characters (b/ is a space): b/ABCDE-FGHIJKLMNOPQRSTUVWXYZ

Alphanumeric: any of the following characters (b/ is a space): b/ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

Baud: bits per sec

Barometric Altitude: pressure altitude corrected for barometric altimeter setting

Bearing To User Waypoint: bearing from the present position to the active user waypoint measured clockwise relative to true or magnetic north (true is implied unless magnetic is specified)

Cross Track Error: distance from the present position to the nearest point on the desired course, and the direction (right or left) from the desired course to the present position

Cursor Field: a character position or group of adjacent character positions on which a cursor can appear

Data Field: a character position or group of adjacent character positions which display a single data item; a data field may be a single character cursor field, or may contain multiple characters.

Data List: an ordered list of data elements which a given cursor field can accept

Desired Track: The angle that the desired flight path makes with respect to true north at the point nearest the present position. Magnetic desired track uses the local magnetic variation.

Distance To Waypoint (DIS): distance from the present position to the active waypoint

Ground Speed: absolute value of the rate of change of position

Headwind: difference between true airspeed and ground speed when true airspeed is more than ground speed

Knots: Nautical Miles/hr

Special Use Airspace: any of the following: prohibited area, restricted area, warning area, alert area, MOA, Class CARSA, Class BTCA, unknown, danger, caution, training, CTA, or TMA type.

Definitions, Acronyms & Abbreviations

Tailwind: difference between ground speed and true airspeed when ground speed is more than true airspeed.

Track: angle of the aircraft's path over the ground measured clockwise relative to north.

ACRONYMS AND ABBREVIATIONS

| | |
|---------------|--|
| AC: | Alternating Current |
| ACT: | Active (user waypoint or flight plan) |
| ADF: | Automatic Direction Finder |
| AGL: | Above Ground Level |
| AMR: | Americas data area |
| ANSI: | American National Standards Institute |
| APR: | Approach |
| APT: | Airport |
| ARTCC: | Air Route Traffic Control Center |
| ASCII: | American Standard Code for Information Interchange |
| ASOS: | Automated Surface Observation System |
| ATC: | Air Traffic Control |
| ATF: | Aerodrome Traffic Frequency |
| ATI: | Atlantic International data area |
| ATIS: | Automatic Terminal Information Service |
| A/C: | Aircraft |
| baud: | or Baud Rate; a measurement of data transmission speed |
| BRG: | Bearing |
| CAA: | Civil Aviation Authority |
| CAS: | Calibrated Airspeed |
| com: | communication |
| CDI: | Course Deviation Indicator |
| CTA: | Control Area |
| CTAF: | Common Traffic Advisory Frequency |
| CTR: | Control Zone |

| | |
|---------------|--|
| CTZ: | Control Tower Zone |
| dB: | decibels |
| DEP: | Departure |
| DC: | Direct Current |
| DIS: | Distance |
| DME: | Distance Measuring Equipment |
| DOT: | United States Department of Transportation |
| EFIS: | Electronic Flight Instrument System |
| EGPWS: | Enhanced Ground Proximity Warning System |
| ELT: | Emergency Locator Transmitter |
| ESA: | Enroute Safe Altitude |
| ETE: | Estimated Time Enroute |
| FAA: | Federal Aviation Administration |
| FAR: | Federal Aviation Regulations |
| FIR: | Flight Information Region |
| FIS: | Flight Information Services |
| FPL: | Flight Plan |
| FPM: | Feet Per Minute |
| FSS: | Flight Service Station |
| ft: | feet |
| FT: | Feet |
| G: | Gravitational Acceleration = $32.2 \text{ ft/sec}^2 = 19.3 \text{ kt/sec}^2$ |
| GAL: | Gallons |
| GCO: | Ground Communications Outlet |
| GPS: | Global Positioning System |
| GRND: | Ground |
| hr: | hour |
| HSI: | Horizontal Situation Indicator |
| Hz: | Hertz |
| IEEE: | Institute of Electrical and Electronics Engineering |
| IFR: | Instrument Flight Rules |

Definitions, Acronyms & Abbreviations

| | |
|--------------|------------------------------------|
| in.: | inches |
| INT: | Intersection |
| kHz: | kilohertz |
| Kt.: | Knots |
| KΩ: | Kilohms |
| LAT: | Latitude |
| LB: | Pounds |
| LED: | Light Emitting Diode |
| LON: | Longitude |
| LONG: | Longitude |
| LRU: | Line Replaceable Unit |
| m: | meters |
| mA: | milliamperes |
| MATZ: | Military Air Traffic Zone |
| mB: | millibars |
| MCOM: | Multicom |
| MHz: | Megahertz |
| mi: | statute miles |
| min: | minutes |
| MOA: | Military Operation Area |
| MSA: | Minimum Safe Altitude |
| MSL: | Mean Sea Level |
| msec: | milliseconds |
| NDB: | Non-Directional Beacon |
| nm: | Nautical Miles |
| NPA: | Non Precision Approach |
| NVM: | Non Volatile Memory |
| OBI: | Omni-directional Bearing Indicator |
| OBS: | Omni-directional Bearing Selector |
| OSGB: | Ordnance Survey of Great Britain |
| PAI: | Pacific International data area |

| | |
|--------------|--|
| PETE: | Pointer ETE |
| RAD: | Radial |
| REF: | Reference |
| RMI: | Radio Magnetic Indicator |
| RTCA: | Radio Technical Commission for Aeronautics |
| sec: | seconds |
| TAS: | True Airspeed |
| TAT: | Total Air Temperature |
| TD: | Time Difference |
| TMA: | Terminal Control Area |
| TOPO: | Topographical Data (i.e. coastlines, terrain, rivers, lakes etc) |
| TSO: | Technical Standard Order |
| TWR: | Tower |
| UIR: | Upper Information Region |
| UNIC: | Unicom |
| UNS: | Unspecified |
| UTC: | Universal Coordinated Time (same as Greenwich Mean Time) |
| UTM: | Universal Transverse Mercator |
| V: | Volts |
| VDL: | VHF Data Link |
| VHF: | Very High Frequency |
| VOR: | Very High Frequency Omni-directional Radio Range |
| VRP: | Visual Reference Point |
| W: | Watts |
| wpt: | Waypoint |
| µsec: | microsecond |
| µV: | microvolts |
| °C: | degrees Celsius |
| °F: | degrees Fahrenheit |

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WX-500 STORMSCOPE™ OPERATION

INTRODUCTION

The Bendix/King KMD 550/850 is capable of being interfaced to a Goodrich WX-500 Stormscope™ Series II Weather Mapping Sensor. The WX-500 detects electrical discharges associated with thunderstorms within a 200 nm radius of the aircraft. The information is then sent to the KMD 550/850 and will display the location of the thunderstorms both on the map displays and on a dedicated Stormscope™ display.

For a detailed description of the WX-500 and how to interpret the lightning display and a list of error codes, please reference the WX-500 Stormscope™ User's Guide.

FUNCTIONAL DESCRIPTION

The antenna detects the electric and magnetic fields generated by intra-cloud, inter-cloud, or cloud-to-ground electrical discharges that occur within a 200 nm radius of the aircraft and sends the resulting "discharge signals" to the processor. The processor digitizes, analyzes, and converts the discharge signals into range and bearing data then stores the data in memory. The WX-500 processor then communicates this information to the KMD 550/850 as 'strikes' and 'cells'. The WX-500 updates the KMD 550/850 every two seconds.

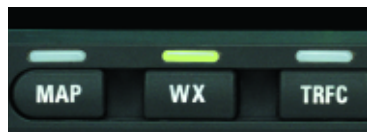
OPERATION

As mentioned earlier, the WX-500 is controlled through the KMD 550/850. The focus on this section is to provide both background information and a more detailed explanation of the operating procedures. The following text assumes you have both the WX-500 and the KMD 550/850 switched on and that you have selected the Stormscope™ display using the **WX** Function Select Key on the KMD 550/850.

SELECTING STORMSCOPE™ OR WEATHER RADAR

Pressing the **WX** Function Select Key will toggle between Stormscope™ and/or Weather Radar, depending on available options.

The weather radar function is only available in the KMD 850. For operation of the weather radar, see the separate section on weather radar operation if provided.



POWER-UP

At power-up, the WX-500 executes a power-up self test. The self test takes approximately 25 seconds to ensure that all major WX-500 functions are operating properly. During this period you may receive a **NO DATA RECEIVED FROM STORMSCOPE** message, this is normal. Functions tested include antenna reception, memory and microprocessor functions. An error message is displayed if a fault is detected.

HEADING STABILIZATION

Some aircraft are equipped with a remote heading reference, such as an HSI with a slaved directional gyro. This allows the heading stabilization feature to automatically adjust the position of the discharge points on the display when the aircraft changes heading. The heading information comes from a remote heading source installed in the aircraft that has been connected to the WX-500. If this heading information is valid, the WX-500 and KMD 550/850 will use it. In the absence of an external heading reference, such as an aircraft with only a directional gyro, the KMD 550/850 will not allow stormscope strikes to be overlaid on the Map display, nor will it allow flight plan data to be overlaid on the stormscope display.

CLEAR ALL DISCHARGE POINTS

Clearing the discharge points periodically while monitoring thunderstorms is a good way to determine if the storm is building or dissipating. Discharge points in a building storm will reappear faster and in larger numbers. Discharge points in a dissipating storm will appear slower and in smaller numbers. To clear the discharge points, move the joystick on the KMD 550/850.

Clearing the display is especially important if an external heading reference is not used with the system. The display should be cleared after changes in heading in order to make the displayed strikes reflect their true position in relation to the aircraft.

SWITCH BETWEEN WEATHER VIEWS

The KMD 550/850 can display the Stormscope™ data in one of two views, either all round (360°) or forward looking only (120°). To switch the display press the **VIEW** button to toggle between the displays. Figure 32 is an example of the all round view and Figure 33 shows the forward looking view.



SWITCH BETWEEN DISPLAY MODES

The KMD 550/850 can display the Stormscope™ data in one of two modes, either Cell Mode or Strike Mode. To switch the display between modes press the **MODE** button. The currently selected weather display mode is indicated on the top left of the display and will toggle between **CELL MODE** and **STRIKE MODE** with each press of the button as shown in Figures 32 and 33. The mode selected here will remain in effect until you change it, unless the unit is turned off and back on.

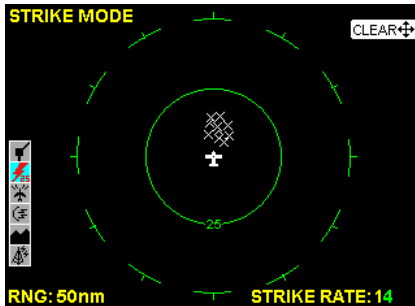


Figure 32

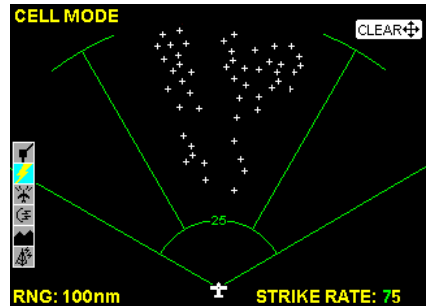


Figure 33

Cell Display Mode

When viewing the dedicated Stormscope™ display, if cell display mode is selected, the KMD 550/850 plots a "+" symbol (discharge point) on the display when it detects associated discharges within the selected range and view. The KMD 550/850 will plot another "+" close to the first for each additional discharge determined to be associated with the group. The KMD 550/850 will not plot a "+" for any discharge not associated with a group unless it's detected within a 25 nm radius of the aircraft. The effect of this clustering algorithm is to display the location of storm cells instead of individual discharges. The cell display mode is most useful during periods of heavy electrical discharge activity. Using the cell display mode during these periods frees the pilot from sifting through a display full of discharge points to determine exactly where the storm cells are located.

If discharges are detected within 25 nm of the aircraft, the normal stormscope icon in the Functions Legend will change to one such as that shown here.



Strike Display Mode

If the strike display mode is selected, the KMD 550/850 immediately plots an "x" symbol (discharge point) on the display for each individual discharge it detects within the selected range and view. The strike display mode plots discharge points on the display in relation to where the discharges are actually detected instead of plotting them close to an associated group of discharge points as is done in the cell display mode. The strike display mode is most useful during periods of light electrical activity because it may plot discharges associated with a building thunderstorm sooner than the cell display mode would.

If discharges are detected within 25 nm of the aircraft, the normal stormscope icon in the Functions Legend will change to one such as that shown here.



CHANGING DISPLAY RANGE

To change the displayed range of the Stormscope™ display, press the **RNG Δ** or **RNG ∇** keys. With each press of the keys, the display changes to display the electrical discharge activity detected within the new range. The range indicator will also change to display the numerical value of the new range (25, 50, 100, or 200 nm). This new range corresponds to the distance from the aircraft to the outer range ring on the display.



Your KMD 550/850 stores electrical discharge information for all ranges simultaneously to provide you with an instant, up-to-date display of electrical discharge activity when you select a new range.

As you move from one range to the next, the 25 nm range is always indicated by the solid inner ring to advise you of your close proximity to thunderstorms. You may also notice that the discharge points are progressively larger on the shorter ranges and smaller on the longer ranges. This effect makes it easier to spot clusters of discharge points in any range.

OPERATION IN STORMSCOPE™ MODE WITH FLIGHT PLAN OVERLAY

If the KMD 550/850 is receiving Flight Plan information from the GPS and a valid heading input is available, the Flight Plan lines and waypoints may be displayed on the Stormscope™ displays in the form of an overlay. Press the **OVLY** key and select Flight Plan by pressing the appropriate Softkey as in Figure 34.

NOTE: In order to align the lightning strikes correctly to the flight plan lines, heading information is necessary.

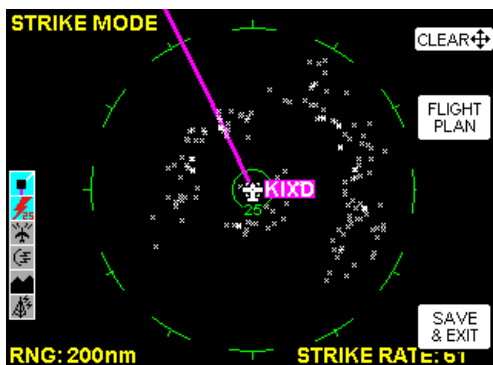


Figure 34

OPERATION IN MAP DISPLAY

The majority of the text in this section refers to the dedicated Stormscope™ displays on the KMD 550/850. It is also possible however to see thunderstorm cell or strike data while in the Map display. Press the **OVLY** key and select Storm Scope by pressing the appropriate Softkey as in Figure 35.

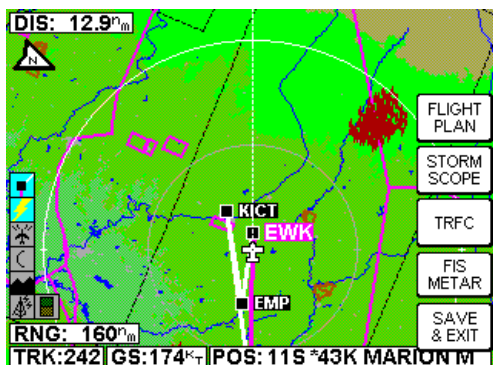






Figure 35

NOTE: Lightning data will only be displayed on the map if a heading reference is available in the form of an external heading reference input (described previously).

Any settings made while in the dedicated Stormscope™ displays (i.e. cell/strike mode, clear etc) will be carried over into the Map display. Lightning strikes must be cleared from the stormscope display using the joystick.

The following shows the lightning icons as they appear on the Map display. The range at which lightning icons are displayed is selectable on Map Setup Page 2.

| Lightning Icon | Color | Used On Pages | Additional Requirements |
|--|---------------|---------------------------|---|
|  | Red | MAP (TOPO-ON or TOPO-OFF) | The small solid icon is used when the display selected range is 25 nm or greater. |
|  | White | WX , TRFC, TERR | |
|  | Red Outline | MAP (TOPO-ON or TOPO-OFF) | The large outlined icon is used when the display selected range is less than 25 nm. |
|  | White Outline | WX , TRFC, TERR | |

CAUTION

Because the accuracy of the stormscope sensor is limited, do not rely on the placement of lightning icons for map range settings less than 25 nm.

WX-1000E STORMSCOPE™ OPERATION

INTRODUCTION

The Bendix/King KMD 550/850 is capable of being interfaced to a Goodrich WX-1000E Stormscope™ Series II Weather Mapping Sensor. The WX-1000E detects electrical discharges associated with thunderstorms within a 200 nm radius of the aircraft. The information is then sent to the KMD 550/850 and will display the location of the thunderstorms both on the map displays and on a dedicated Stormscope™ display.

For a detailed description of the WX-1000E and how to interpret the lightning display, please reference the WX-1000E Stormscope™ User's Guide.

FUNCTIONAL DESCRIPTION

The antenna detects the electric and magnetic fields generated by intra-cloud, inter-cloud, or cloud-to-ground electrical discharges that occur within a 200 nm radius of the aircraft and sends the resulting "discharge signals" to the processor. The processor digitizes, analyzes, and converts the discharge signals into range and bearing data then stores the data in memory. The WX-1000E processor then communicates this information to the KMD 550/850 as areas of detected lightning (not individual lightning discharges).

If areas of lightning are detected within 25 nm of the aircraft, the normal stormscope icon in the Functions Legend will change to one such as that shown here.

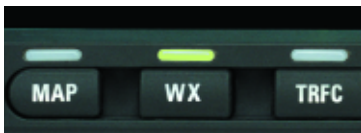


OPERATION

As mentioned earlier, the WX-1000E lightning information is displayed on the KMD 550/850. The focus on this section is to provide both background information and a more detailed explanation of the operating procedures. The following text assumes you have both the WX-1000E and the KMD 550/850 switched on and that you have selected the Stormscope™ display using the **WX** Function Select Key on the KMD 550/850.

SELECTING STORMSCOPE™ OR WEATHER RADAR

Pressing the **WX** Function Select Key will toggle between Stormscope™ and/or Weather Radar, depending on available options.



The weather radar function is only available in the KMD 850. For operation of the weather radar, see the separate section on weather radar operation if provided.

POWER-UP

At power-up, the WX-1000E executes a power-up self test. The self test takes approximately 15 seconds to ensure that all major WX-1000E functions are operating properly. During this period you may receive a **NO DATA RECEIVED FROM STORMSCOPE** message, this is normal. Functions tested include antenna reception, memory and micro-processor functions. An error message is displayed if a fault is detected.

SWITCH BETWEEN WEATHER VIEWS

The KMD 550/850 can display the Stormscope™ data in one of two views, either all round (360°) or forward looking only (120°). To switch the display press the **VIEW** button to toggle between the displays. Figure 36 is an example of the all round view and Figure 37 shows the forward looking view.

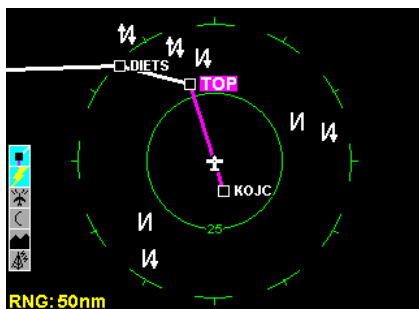


Figure 36

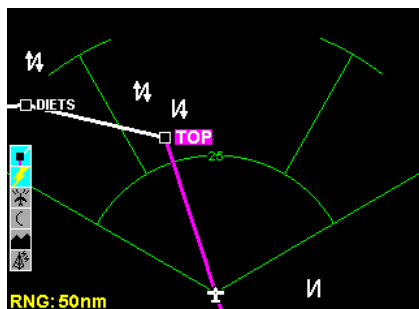


Figure 37

CHANGING DISPLAY RANGE

To change the displayed range of the Stormscope™ display, press the **RNG Δ** or **RNG ∇** keys. With each press of the keys, the display changes to display the lightning activity detected within the new



range. The range indicator will also change to display the numerical value of the new range (25, 50, 100, or 200 nm). This new range corresponds to the distance from the aircraft to the outer range ring on the display.

As you move from one range to the next, the 25 nm range is always indicated by the solid inner ring to advise you of your close proximity to thunderstorms.

OPERATION IN STORMSCOPE™ MODE WITH FLIGHT PLAN OVERLAY

If the KMD 550/850 is receiving Flight Plan information from the GPS and the heading input is valid, the Flight Plan lines and waypoints may be displayed on the Stormscope™ displays in the form of an overlay. Press the **OVLY** key and select Flight Plan by pressing the appropriate Softkey as in Figure 38.



OPERATION IN MAP DISPLAY

The majority of the text in this section refers to the dedicated Stormscope™ displays on the KMD 550/850. It is also possible however to see thunderstorm discharge data while in the Map display. Press the **OVLY** key and select Storm Scope by pressing the appropriate Softkey as in Figure 39.

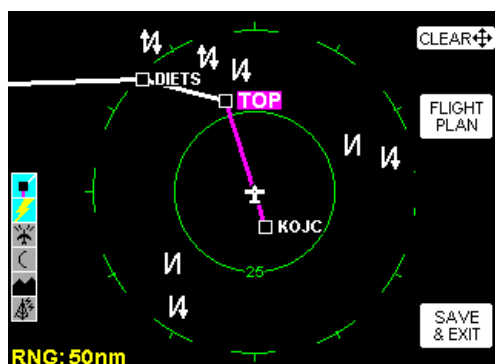


Figure 38

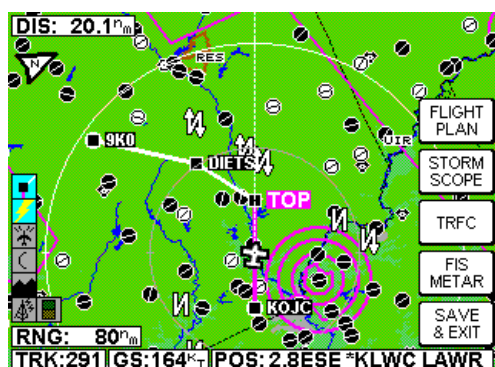








Figure 39

WX-1000E Stormscope™ Operation

The following shows the lightning icons as they appear on the Map display. The range at which lightning icons are displayed is selectable on Map Setup Page 2.

| Lightning Icon | Intensity Level | Color | Used On Pages | Comments |
|--|-----------------|-------------------------|---------------|--|
|  | 1 (Light) | White with Black border | MAP, WX, TERR | The small solid icon is used when the display selected range is 25 nm or greater. <i>The WX-1000E indicates areas of lightning detected (not individual discharges). Light activity (level 1) is an area with up to 8 strikes/minute; moderate (level 2) is an area with 9-25 strikes/minute and heavy (level 3) is an area with 26 or more strikes/minute.</i> |
|  | 2 (Moderate) | | | |
|  | 3 (Heavy) | | | |
|  | 1 (Light) | White with Black border | MAP, WX, TERR | The large outlined icon is used when the display-selected range is less than 25 nm. <i>The larger icon reminds the user that the accuracy of lightning placement is not as good as that suggested by the map scale.</i> |
|  | 2 (Moderate) | | | |
|  | 3 (Heavy) | | | |










CAUTION









Because the accuracy of the stormscope sensor is limited, do not rely on the placement of lightning icons for map range settings less than 25 nm.











APPENDIX A














DISPLAY ICONS















The following is a list of possible map icons on the TOPO ON Map and TOPO OFF Map.












| Feature | Conditions | Icon / Colors | | Other Characteristics |
|--------------------------|------------|--|---|--|
| | | TOPO on | TOPO off | |
| Political Boundary Lines | |  Dashed black line | Not displayed | When the 500 nm Range is selected, the name of the political region will be displayed with a white on black label. |
| Railway Lines | |  Dark gray line with black marks | Not displayed | May be enabled or disabled based on Map Setup page (3) setting. |
| Roads | Major |  Dark gray double line with white on black iconic label | Not displayed | May be enabled or disabled based on Map Setup page (3) setting. |
| | Prime |  Dark gray line with black on white iconic label | Not displayed | May be enabled or disabled based on Map Setup page (3) setting. |
| | Other |  Dark gray thin line with black on white iconic label | Not displayed | May be enabled or disabled based on Map Setup page (3) setting. |
| Victor Airways | |  Dashed cyan line with black on white label |  Thick dashed cyan line with black on white label | May be enabled or disabled based on Map Setup page (3) setting. Highlighted when the line is designated with the joystick pointer. |
| Heliroutes | |  Dashed blue line with black on white label |  Dashed blue line with black on white label | May be enabled or disabled based on Map Setup page (3) setting. Highlighted when the line is designated with the joystick pointer. |

| Feature | Conditions | Icon / Colors | | Other Characteristics |
|-------------------|-------------|--|---|---|
| | | TOPO on | TOPO off | |
| Airspace Boundary | FIR/UIR |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "FIR", "UIR" or "F/U" as appropriate for the airspace type. |
| | Class B/CTA |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "B" or "CTA" as appropriate for the airspace type. |
| | Class C/TMA |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "C" or "TMA" as appropriate for the airspace type. |
| | Class D/CTR |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "D" or "CTR" as appropriate for the airspace type. |



















| Feature | Conditions | Icon / Colors | | Other Characteristics |
|---------|------------|--|---|---|
| | | TOPO on | TOPO off | |
| | Tower/CTZ |  Dashed magenta line with black on white label |  Green dashed line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "CTZ" or "MATZ" as appropriate for the airspace type. |
| | Danger |  Solid red line with black on white label |  Solid red line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. |
| | Restricted |  Solid red line with black on white label |  Solid red line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. |
| | Prohibited |  Solid red line with black on white label |  Solid red line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. |
| | Military |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. |

















| Feature | Conditions | Icon / Colors | | Other Characteristics |
|----------------------|--|--|---|--|
| | | TOPO on | TOPO off | |
| | Other SUA (Radar Area, Alert, Caution, Training, Warning or unspecified) |  Solid magenta line with black on white label |  Solid blue line with black on white label | May be enabled or disabled based on Map Setup page (4) setting. Highlighted when the line is designated with the joystick pointer. The boundary label will be "RAD", "ALT", "CTN", "TNG", "WNG" or "UNS" as appropriate for the airspace type. |
| Cities | |  Black icon with white on black label | Not displayed | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the city name. Highlighted when the icon is designated with the joystick pointer. |
| Intersections (INTs) | |  Black icon with white on black label |  White icon with white on black label | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the intersection identifier. Highlighted when the icon is designated with the joystick pointer. |
| Obstacles | Lighted - Tall |  Black icon with white on black label |  Cyan icon with white on black label | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the MSL elevation followed by the AGL elevation in parentheses (e.g. "1546 (590)"). Highlighted when the icon is designated with the joystick pointer. |
| | Lighted - Short |  Black icon with white on black label |  Cyan icon with white on black label | |
| | Unlighted - Tall |  Black icon with white on black label |  Cyan icon with white on black label | |
| | Unlighted - Short |  Black icon with white on black label |  Cyan icon with white on black label | |

| Feature | Conditions | Icon / Colors | | Other Characteristics |
|----------|----------------------------------|---|---|---|
| | | TOPO on | TOPO off | |
| NDBs | |  Black icon with white on black label |  Green icon with white on black label | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the NDB's identifier. Highlighted when the icon is designated with the joystick pointer. |
| VORs | With DME |  Black icon with white on black label |  Green icon with white on black label | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the VOR's identifier. Highlighted when the icon is designated with the joystick pointer. |
| | Without DME |  Black icon with white on black label |  Green icon with white on black label | |
| Airports | Has hard runway + IFR approach |  Solid black circle with line representing primary runway and white on black label |  Solid green circle with black line representing primary runway and white on black label | May be enabled or disabled based on Map Setup page (2) setting. When enabled, the airport label will identify the ICAO code, City name or airport name based on Map setup page (1) setting. Highlighted when the icon is designated with the joystick pointer. If the database does not have runways for the airport, then the icon will not indicate a runway (no line will be displayed). |
| | Has hard runway, no IFR approach |  Solid black circle with line representing primary runway and white on black label |  Solid cyan circle with black line representing primary runway and white on black label | |
| | IFR approach available |  Solid black circle with line representing primary runway and white on black label |  Solid green circle with black line representing primary runway and white on black label | |
| | Soft or unknown runways |  Outline black circle with line representing primary runway and white on black label |  Outline cyan circle with cyan line representing primary runway and white on black label | |

| Feature | Conditions | Icon / Colors | | Other Characteristics |
|-------------------------|-----------------------|---|---|---|
| | | TOPO on | TOPO off | |
| Airport Runways | Primary, hard surface |  Thick black line with white on black label at each end. |  Thick white line with white on black label at each end. | Runways are depicted for Airports within 5 nm of the current position when the selected range is 10 nm or less and the display of airport icons is enabled on Map setup page (2). Runway ends are labeled with the proper runway identifier if the selected range is 1 nm. For selected ranges 2.5 nm through 10 nm, the runways are not labeled. |
| | Other hard surface |  Thin black line with white on black label at each end. |  Thin white line with white on black label at each end. | |
| | Primary, soft surface |  Thick green line outlined in black with white on black label at each end. |  Thick green line outlined in white with white on black label at each end. | |
| | Other soft surface |  Thin green line outlined in black with white on black label at each end. |  Thin green line outlined in white with white on black label at each end. | |
| Helipads | |  Black on white icon with white on black label |  White on black icon with white on black label | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the city name. Highlighted when the icon is designated with the joystick pointer. |
| Visual Reference Points | |  Black on white with white on black label | Not Displayed | May be enabled or disabled based on Map Setup page (2) setting. The label will indicate the VRP name. Highlighted when the icon is designated with the joystick pointer. |

The following shows the various icons that may be seen in the functions legend, which is displayed in the lower left of the display. Remember, not all installations will have all available functions.

| Icon | Colors | Description |
|---|---|---|
|  | Black symbol with a magenta line below and a white line above on a cyan background. | Flight plan information being received and displayed. |
|  | Black on gray | Flight plan information being received but not displayed. |
|  | Yellow on cyan | Stormscope information being received and displayed. |
|  | Red on cyan | Stormscope information being received and displayed. Strikes have occurred within the last 3 minutes within 25 nm. |
|  | Black on gray. | Stormscope information being received but not displayed. |
|  | Red on gray | Stormscope information being received but not displayed. Strikes have occurred within the last 3 minutes within 25 nm. |
|  | Black on gray with red slash | Stormscope information not being received / data invalid. |
|  | Black on cyan | Weather radar in standby mode being displayed. Note that since the OVLY key is never enabled on the WX page when the radar is in standby mode, "Hold To Help" text is not available |
|  | Black on cyan | Weather radar in active mode being displayed. |
|  | Black on gray | Weather radar in standby mode, not being displayed. |
|  | Black on gray | Weather radar in active mode, not being displayed. |
|  | Black on gray with red slash | Weather radar data invalid / not being received. Previously in standby. |
|  | Black on gray with red slash | Weather radar data invalid / not being received. Previously active. |
|  | Black on cyan | Traffic Sensor in standby mode being displayed. |
|  | Black on cyan | Traffic Sensor active; data being displayed. |
|  | Black on gray | Traffic Sensor in standby mode, not being displayed. |
|  | Black on gray | Traffic Sensor active; not being displayed. |
|  | Black on gray with red slash | Traffic Sensor data invalid / not being received. |

| Icon | Colors | Description |
|---|---|--|
|  | Brown on cyan | EGPWS with warnings enabled, being displayed. |
|  | Brown on cyan with Yellow "!" | EGPWS with warnings disabled, being displayed. |
|  | Black on gray | EGPWS with warnings enabled, not being displayed. |
|  | Black on gray with Yellow "!" | EGPWS with warnings disabled, not being displayed. |
|  | Black on gray with red slash | EGPWS data invalid/not being received. |
|  | Black on a cyan background. | No FIS data is currently being received but previously received data is being displayed on the present page. |
|  | Black on a cyan background. | FIS data is currently being received from a signal and displayed on the present page. |
|  | Black on gray | FIS data not being received nor displayed on the present page. |
|  | Black on gray | FIS data is currently being received from a signal but not displayed on the present page. |
|  | Black on gray with red slash | Fault with connection or data link radio. |
|  | Black on gray | FIS graphical METAR overlay is available but not displayed. |
|  | Black, green, yellow on cyan | FIS graphical METAR overlay is enabled and displayed. |
|  | Black on gray | FIS data not being received. FIS graphical METAR overlay is available but not displayed. |
|  | Black, green and yellow on cyan | FIS data not being received. FIS graphical METAR overlay is enabled and displayed. |
|  | Black on gray with red slash | VDL Radio Fault. FIS graphical METAR overlay is available but not displayed. |
|  | Black on gray with red slash (left Icon). Black, green and yellow on Cyan (right Icon). | VDL Radio Fault. FIS graphical METAR overlay is enabled and displayed. |

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