

Bendix/King®  
Safety Display System  
Electronic Horizontal Situation Indicator  
For Units Having “-2”, “-3” and “-4” Software



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## Revision History and Instructions

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Page i            Updated page number for 1.1.11.

Page 1-2        Changed callout from Course Arrow to Course Pointer in Figure 1-1.

Page 1-8        Removed the word yellow from 1.1.15.

Page 1-12      Changed callout from Course Deviation Indicator to Course Deviation Pointer in Figure 1-6.

Page 3-2        Changed callout from Glideslope Flag (pointer removed) to Course Deviation Flag (pointer removed). Also removed Glideslope Scale callout and arrow from Figure 3-2.

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Manual            KI 825 Pilot's Guide

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This is the original version of this publication..

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# KI 825 Pilot's Guide

006-18280-0000 (April 2008)

For Units Having Software Version 80-5205-X-4

The software version number is displayed in the upper left corner of the KI 825 display for several seconds when it is first turned on after a “cold start”. In the figure below the software version is 80-5205-X-3. For this version it will read 80-5205-X-4.

*Note: The KI 825 performs a cold start only when power has been off for five minutes or longer. If the software version number is not displayed when power is applied to the unit, turn power off for at least five minutes before reapplying power.*



In this Pilot's Guide the operational description is applicable to all software versions unless “*Software Version -2 Only*”, “*Software Version -3 Only*” or “*Software Version -4 Only*” is specifically indicated in the text.

Operational characteristics of software version 80-5205-X-4, is similar to 80-5205-X-3 but have the following enhancements:

1. VNAV or vertical deviation is provided when the selected navigational source is a GPS and it is in approach phase.

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Operational characteristics of software version 80-5205-X-3 are similar to 80-5205-X-2 but have the following enhancements:

1. Allows for the option of separate day and night display dimming ranges controlled by an external day/night switch. See section 2.5.
2. Requires the user to press the MENU button in order to change the displayed navigation sensor and to utilize the memory load function. See sections 2.2, 2.3, 2.7, and 2.13.
3. Allows for the option of an external switch to be utilized in changing between GPS and VOR in addition to the existing method of navigation sensor selection from the KI 825 menu. See section 2.14.
4. Removes the “CLR” option prompt on the right side of the MENU when clearing lightning strikes from the 360 Map and Arc Map displays. *Note, there is no operational change to this feature. This change was made to improve consistency in the use of options prompts.* See section 2.4.
5. Provides for more optimized installation interfaces with units like the Garmin GNS 430/530 such that GPS/VLOC switching can now be accomplished from both the GNS 430/530 and from the KI 825. This includes the capability of having the GNS 430/530 change the KI 825 displayed navigation sensor during an automatic GPS to ILS transition. See sections 2.15 and 2.16.
6. Allows for an installation option to not utilize the KI 825’s standard course storage feature. This provides more efficient operation when utilizing the automatic GPS to ILS switching capability offered by units such as the Garmin GNS 430/530. See section 1.1.4.



- 
5. Provides for more optimized installation interfaces with units like the Garmin GNS 430/530 such that GPS/VLOC switching can now be accomplished from both the GNS 430/530 and from the KI 825. This includes the capability of having the GNS 430/530 change the KI 825 displayed navigation sensor during an automatic GPS to ILS transition. See sections 2.15 and 2.16.
  6. Allows for an installation option to not utilize the KI 825's standard course storage feature. This provides more efficient operation when utilizing the automatic GPS to ILS switching capability offered by units such as the Garmin GNS 430/530. See section 1.1.4.

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## INTRODUCTION

The KI 825 combines critical flight information in an easy-to-use, high-resolution presentation. At the touch of a button, a pilot can configure the presentation to display only what's required for the phase of flight. It contains all of the hardware and software functions necessary to display information to the pilot concerning the operation of a Horizontal Situation Indicator (HSI) or Navigation Map Display.

The KI 825 combines the display functions of the standard Directional Gyro with VOR/LOC course deviation indication, glideslope/vertical deviation (Vertical VNAV deviation is only available with Software version 4), and bearing.

When interfaced to a GPS system, the KI 825 will display a GPS flight path with waypoint indications. When interfaced to a lightning detection system, it will provide the pilot information concerning storm activity.

Due to different aircraft system configurations, such as number of or type of interfaces for the NAV or GPS systems or presence of lightning systems, some features or capabilities of the EHSI may not be available for a particular aircraft installation.

This Pilot's Guide will introduce you to the KI 825 and walk you through the step-by-step operation of its many features. This guide assumes you have basic operating knowledge of a Horizontal Situation Indicator and explains how you can make full use of the KI 825 Safety Display System in place of an electromechanical HSI.

More importantly, the KI 825 is a flight instrument intended to help minimize pilot workload, reduce cross cockpit scanning, and increase situational awareness. Even with the KI 825's substantial capabilities, don't forget to exercise good basic piloting techniques in responsibly and safely flying your aircraft.

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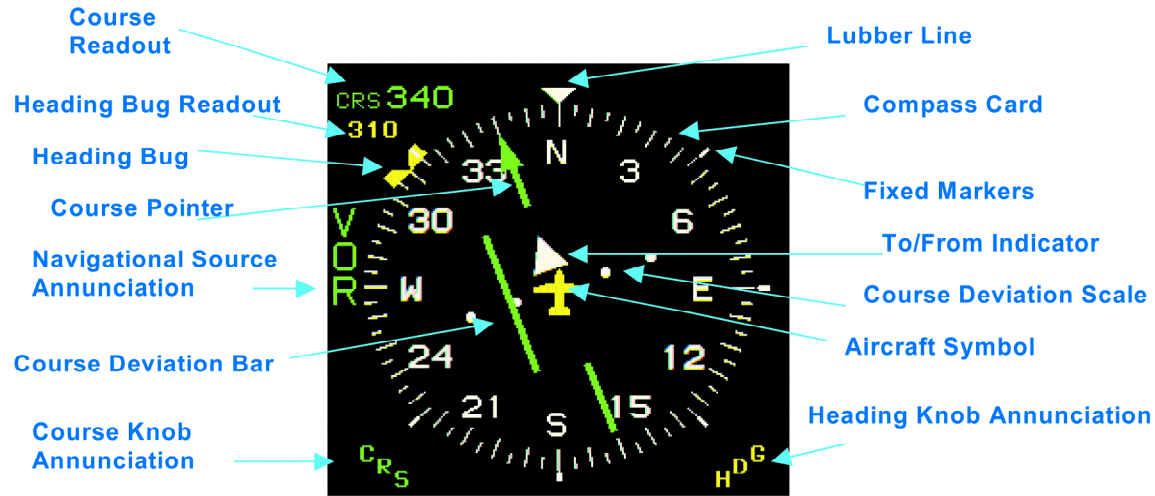


Figure 1-1 HSI Mode



Figure 1-2 HSI Mode w/ILS



Figure 1-3 HSI Mode w/GPS

## 1. DISPLAY BASICS

The KI 825, with pilot control, can be operated in any one of three modes: HSI mode, 360 Map mode, and Arc Map mode.

In HSI mode, the KI 825 displays navigational information in the standard 360-degree compass format. The display contains information such as compass card, navigational source indicator, heading bug, bearing pointer, course arrow with course deviation indicator, course readout, TO/FROM indicator, groundspeed and time-to-station, glideslope indicator (vertical deviation), and error flags. While in HSI mode, the moving map and lightning overlays are not available.

In 360 Map mode, the KI 825 displays navigational information in a 360-degree compass format. The same navigational information that is available in HSI mode is displayed except there is no course arrow and the CDI is moved to the bottom of the display. In addition, the KI 825 can display GPS moving map information, including flight plan and direct to waypoints, course lines, and map scale. The lightning overlay may also be displayed while in this mode.

In Arc Map mode, the KI 825 displays the same information as it does in the 360 Map mode but the display only shows approximately 45 degrees each side of aircraft heading.

### 1.1 HSI MODE

This section describes the contents of the HSI mode and the elements common to 360 Map and Arc Map modes. The HSI mode is an electronic representation of a standard electromechanical HSI. While in HSI mode, the moving map and lightning overlays are not available. Figures 1-1 to 1-3 are on a foldout page for reference as the section is being reviewed.

#### 1.1.1 COMPASS CARD

A 360-degree rotating compass card indicates aircraft heading. The heading is shown with respect to magnetic north. A fixed yellow symbolic aircraft in the center of the compass card indicates the aircraft's relationship to the horizontal situation display. The compass card is divided into 5-degree increments with the 10-degree divisions being longer to help with identification of the current heading. Fixed 45-degree markers are positioned around the outside of the compass card.



### **1.1.2 AIRCRAFT SYMBOL**

The EHSI contains a fixed aircraft symbol at the center of the display. This symbol is for positional reference and serves the same purpose as those contained on mechanical HSI units. This symbol may be configured for fixed-wing aircraft or rotorcraft during installation.

### **1.1.3 LUBBER LINE**

This line represents a heading reference index. This line is an extension of the nose of the fixed aircraft symbol and does not move.

### **1.1.4 PRIMARY NAVIGATIONAL SOURCE ANNUNCIATION**

The navigation source selected by the pilot is annunciated vertically on the left side of the display next to the compass card.

Two types of navigation sources are possible: VOR and GPS. When the selected navigational source is a VOR and a localizer frequency is tuned, the VOR annunciation will be changed to a LOC annunciation. Up to two of each type of navigational sources can be annunciated.

The color of the navigational source annunciation will be cyan for GPS (when not in approach phase) and green for GPS (when in approach phase) and for VOR.

The last course setting (before a navigational source change) is stored in the indicator and recalled when the navigational source is reselected. (e.g., VOR is the selected navigational source with the course set at 300°. The navigational source is changed to GPS and the course changes to 240°. When VOR is reselected as the navigational source, the course returns to 300° automatically). The EHSI does not differentiate between VOR1 and VOR2 or GPS1 and GPS2 when storing course settings.

*(Software Versions -3 and -4 Only)* The course storage feature described in the previous paragraph may be disabled at the time of KI 825 installation if the feature is not desired. The most common reason to have this feature disabled is to optimize the automatic GPS to ILS switching capability provided by units such as the Garmin GNS 430/530. When disabled, the course pointer doesn't change position when switching between GPS and ILS navigation sensors.

*Note 1: The EHSI's ability to annunciate navigational source numerals (e.g., VOR 1, VOR 2, GPS 1, GPS 2) is dependent on the number and type of each navigational source as well as the method used to interface the navigational sources to the KI 825.*

*Note 2: The EHSI may not display a primary navigational source annunciation if the aircraft is configured to utilize external relay switching instead of utilizing the KI 825's internal switching.*

### **1.1.5 SELECTED HEADING**

A notched heading bug (amber) is manually rotated around the compass card by the heading set knob. The heading bug indicates selected heading, and once set, rotates with the compass card. A clockwise (CW) rotation of the knob produces clockwise (CW) rotation of the heading bug and vice versa. The knob response will be dependent on the speed of rotation. A heading control annunciator is displayed next to the knob. A three-digit numeric heading readout is an indication of the position of the heading bug and is located on the top left corner of the display just below the course readout.

### **1.1.6 COURSE POINTER**

When the primary navigational source is a VOR, the selected course pointer is manually rotated around the compass card by the course set knob. The pointer indicates the desired navigation course. The color of the course pointer matches the color of the primary navigational source annunciation.

When the primary navigational source is a GPS operating in the LEG mode, the course pointer is replaced with a desired track (DTK) and the course set knob is not active.

When the primary navigational source is a GPS operating in OBS mode, the course set knob is used to select the desired OBS course. A clockwise (CW) rotation of the course set knob produces CW rotation of the course pointer and vice versa. A course control annunciator is displayed next to the knob.

### **1.1.7 COURSE READOUT**

The course readout is depicted by a three-digit numeric display located in the upper left corner of the display and is preceded by CRS (DTK if source of data is a GPS that is in LEG mode). The color of this display is the same as the selected course pointer.

### **1.1.8 COURSE DEVIATION DISPLAY**

The course deviation scale (two white dots on each side of the aircraft symbol) provides a reference for the course deviation bar. The course deviation bar is the center bar of the course pointer. The course deviation bar indicates the centerline of the selected navigation course or localizer course in relation to the aircraft. The course deviation scale and pointer rotate with the compass card when set.

In the event of a NAV system failure, the deviation bar is removed.

### **1.1.9 BEARING POINTER**

The bearing pointer is represented by a white, single-bar, disconnected arrowhead and tail located at the edge of the compass card. The bearing pointer indicates the relative bearing to the selected bearing source. If the bearing source is a VOR and a ILS/LOC frequency is tuned, the bearing pointer is removed from the display.

If a valid NAV signal is not being received, the bearing pointer is removed from the display.

### **1.1.10 BEARING SOURCE ANNUNCIATION**

The bearing source selected by the pilot is annunciated in the lower left corner of the display preceded by a small arrow icon. Two types of navigation sources are possible: VOR or GPS. Up to two of each system can be annunciated (e.g., VOR 1, VOR 2) depending on the interface.

The color of the annunciation will be the same as the bearing pointer.

If the bearing source is a VOR and an ILS/LOC frequency has been tuned, the bearing pointer will be removed.

*Note: The bearing pointer source annunciation will only show numerals (e.g., VOR 1, VOR 2, GPS 1, GPS 2) if there is more than one VOR or more than one GPS interfaced as bearing pointers.*

### **1.1.11 DISTANCE READOUT TO SELECTED NAV SOURCE WAYPOINT**

When GPS is the selected NAV source, GPS distance is displayed in the upper right corner of the indicator. A range flag consisting of four dashes replaces the numeric display, whenever the distance reading is invalid. The range of the display will be 0.0 to 9999. Tenths of nautical miles are shown whenever the distance is less than 100 nautical miles. DME distance is not displayed.

### ***1.1.12 DISTANCE READOUT TO SELECTED BEARING SOURCE WAYPOINT***

When GPS is the selected navigational source for the bearing pointer, distance is displayed in the lower right corner of the indicator. A range flag consisting of four dashes replaces the numeric whenever the distance reading is invalid. The range of the display will be 0.0 to 9999. Tenths of nautical miles will be shown whenever the distance is less than 100 nautical miles. DME distance is not displayed.

### ***1.1.13 TO/FROM DISPLAY***

The TO/FROM indicator is a white triangle, located inline with the course pointer. If the navigation signal presented to the EHSI is not valid, TO/FROM symbol will be removed from the display.

### ***1.1.14 GLIDESLOPE (VERTICAL DEVIATION) DISPLAY***

A white, stationary, vertical scale located on the right side of the indicator is the reference for the glideslope/vertical deviation pointer. The pointer is arrowhead shaped, and the color matches the NAV source annunciator.

The glideslope (vertical deviation) scale is visible when an ILS/LOC frequency is selected or when the selected navigational source is a GPS and it is in approach phase. (Vertical VNAV deviation is only available with Software version 4)

### ***1.1.15 GROUNDSPED READOUT***

The groundspeed readout may be displayed if a GPS is selected as the primary navigational source. The groundspeed readout is located in the upper right corner beneath the distance indicator followed by the suffix "KT" for knots. The range of the display will be from 0 to 999. A groundspeed error flag consisting of dashes will replace the numeric display whenever the groundspeed is invalid. Either groundspeed or time-to-station may be displayed in this location.

### ***1.1.16 TIME-TO-STATION READOUT***

The time-to-station readout may be displayed if GPS is selected as the primary navigation source. Time-to-station (TTS) readout is a numeric display located in the upper right corner beneath the distance indicator.

The range of the display for the hours and minutes will be from 0:00 to 9:59. For times greater than 9:59, the time field will be blank. A TTS error flag consisting of yellow dashes and a colon replaces the numeric display whenever the time-to-station is invalid. Either time-to-station or the groundspeed may be displayed in this location.

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Figure 1-4 360 Map Mode

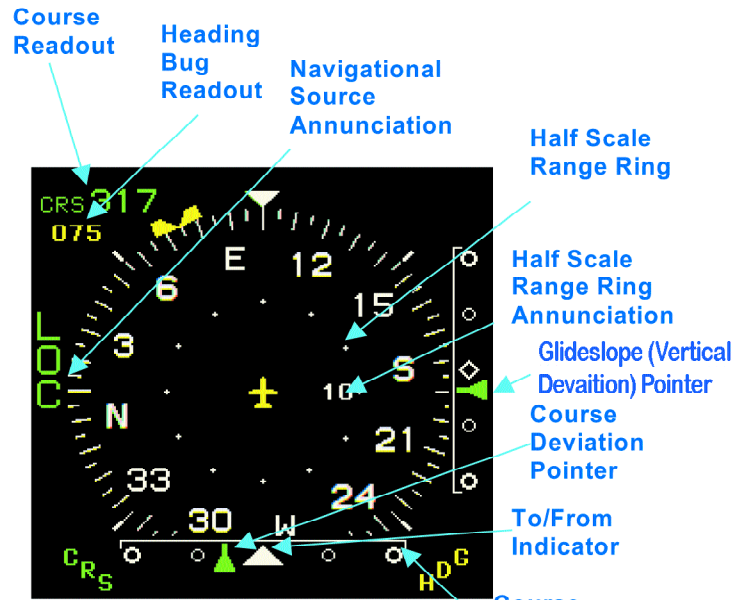


Figure 1-5 360 Map Mode w/ILS

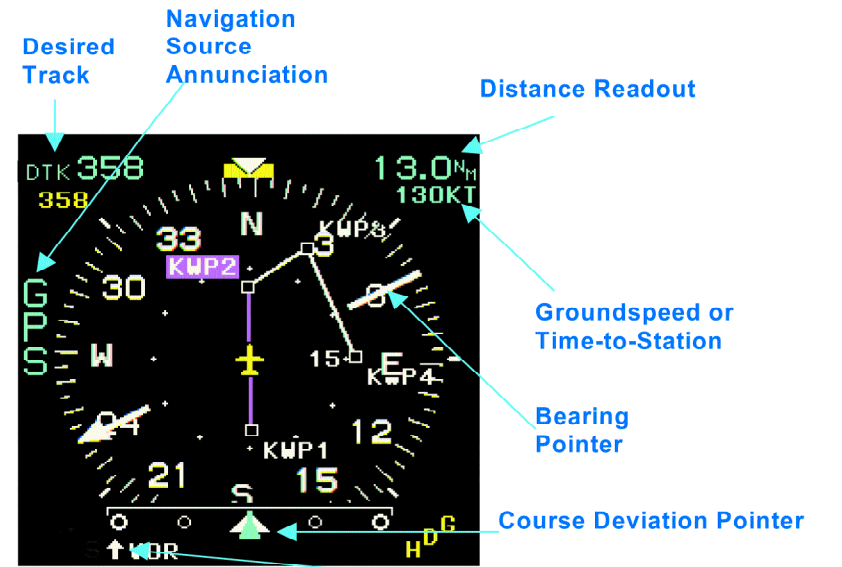


Figure 1-6 360 Map Mode w/GPS

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Helicopter Symbol



Time-to-Station or Groundspeed

Figure 1-7 Helicopter Symbol

## **1.2 360 MAP MODE**

This section outlines differences between 360 Map mode and HSI mode. The 360 Map mode allows the presentation of lightning information (from a Goodrich WX-500 Stormscope® (if interfaced) and GPS moving map. The lightning overlay is fully described in Sections 1.4 and 2.10. Figures 1-4 to 1-7 are on a foldout page for reference as the section is being reviewed.

### ***1.2.1 MAP MODE SELECTED COURSE***

The numeric selected course readout in the upper left corner of the display functions the same in the 360 Map mode as in the HSI mode.

When the selected NAV source is GPS (operating in the LEG mode), the direct-to-waypoints and active flight plan are displayed on the map.

If the primary NAV sensor is GPS operating in OBS mode, and if the active waypoints are within the selected map range, the selected course line is drawn through the waypoint's center. As the selected course is changed, the course line will rotate about the waypoint.

If the primary NAV sensor is a GPS and the navigation information becomes invalid, the waypoint symbol and course line, are removed. No moving map is displayed when insufficient data is present to calculate and plot the primary NAV sensor map.

No navigation information is displayed on the moving map when VOR is selected as the primary navigation source. Lightning information may still be displayed when VOR is selected as the primary navigation source.

### ***1.2.2 360 MAP COURSE DEVIATION INDICATOR***

A stationary white scale along the bottom center of the display provides reference for the course deviation pointer to indicate the position of the aircraft in relation to the navigation course. This deviation scale provides a conventional CDI presentation.

### ***1.2.3 TO/FROM DISPLAY***

The center indicator of the course deviation scale becomes the TO/FROM indicator. A white up arrowhead indicates TO, and a white down arrowhead indicates FROM. If the TO/FROM signal input is in not valid, the TO/FROM indicator is removed and the center indicator changes to a white, unfilled diamond.

**1.2.4 MOVING MAP SYMBOLOGY**

The following table lists the EHSI Moving Map Symbology and colors.

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>SYMBOL</b>
Flight plan waypoint icon	Up to 25 waypoint icons are displayed depending on the number of waypoints supplied by the GPS system and the current selected display range.	Black square outlined with white
Inactive waypoint identifier	Identifiers are up to five characters as supplied by the GPS flight plan	White text on black background
Active (TO) waypoint identifier	Identifiers are up to five characters as supplied by the GPS flight plan	White text on magenta background
Active Leg	The active flight plan or direct-to segment (leg) is shown in magenta.	Magenta line
Inactive Leg	Legs of the flight plan which are not currently active	White line

ITEM	DESCRIPTION	SYMBOL
Map Range	<ol style="list-style-type: none"> <li data-bbox="334 185 654 456">1. Full Scale Range Ring: The outside edge of the compass rose tick marks (in 360 Map and Arc Map modes). The range is identified by doubling the half scale range annunciator numeral.</li> <li data-bbox="334 488 654 792">2. Half Scale Range Ring: A circle identified with plus signs (+) and displayed halfway between the aircraft symbol and the outside edge of the compass rose tick marks.</li> <li data-bbox="334 824 654 1092">3. Half Scale Range Annunciator: A numeral located on the right side of the half scale range ring, indicating the half scale range (e.g., a 6 indicates a full scale range of 12 NM).</li> </ol>	<ol style="list-style-type: none"> <li data-bbox="682 185 928 272">1. White tick marks on black background.</li> <li data-bbox="682 488 928 576">2. White plus signs (+) on black background.</li> <li data-bbox="682 792 928 880">3. White numeral on black background.</li> </ol>

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Figure 1-8 Arc Map Mode

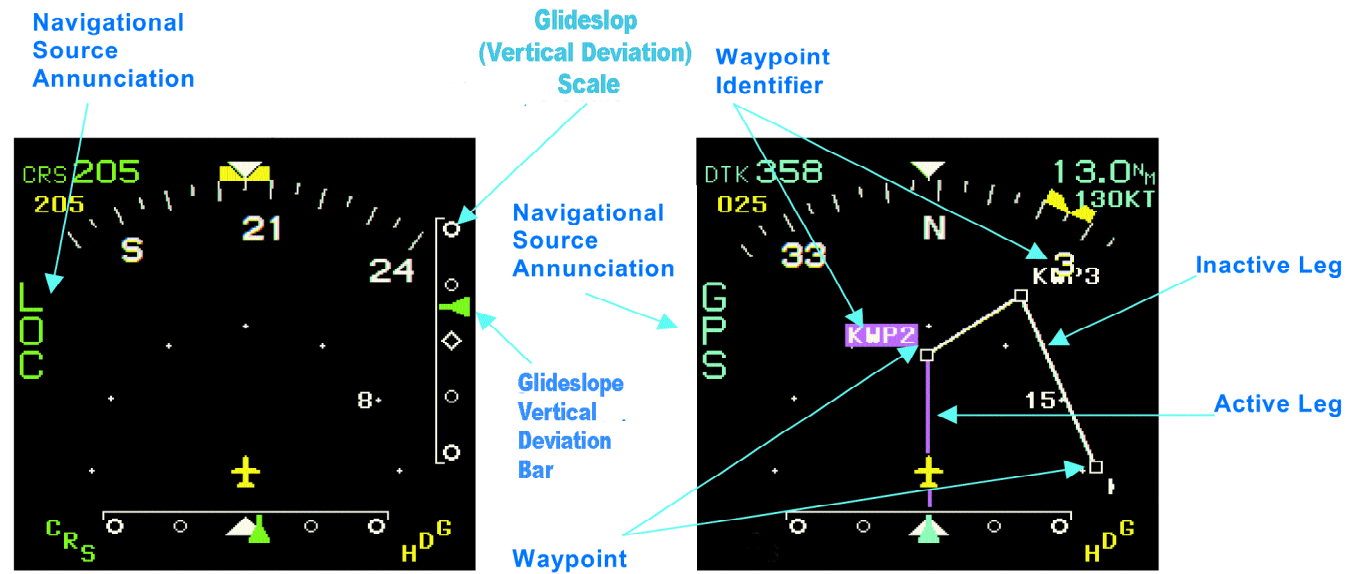


Figure 1-9 Arc Map Mode w/ILS

Figure 1-10 Arc Map Mode w/GPS

### **1.3 ARC MAP MODE**

The Arc Map mode is an exploded view of the 360 Map mode, but only 45° either side of the aircraft heading is visible, providing enhanced viewing and ease of reading when displaying multifunction features. The Arc Map mode range ring operates the same as in the 360 Map mode, with the only exception being that seven range dots are visible. The lightning overlay is fully described in Section 1.4 and 2.10. Figures 1-8 to 1-10 are on a foldout page for reference as the section is being reviewed.



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Small  
Lightning  
Symbols



Figure 1-11 Small Lightning Symbols

Medium  
Lightning  
Symbols



Figure 1-12 Medium Lightning Symbols

Large  
Lightning  
Symbols



Figure 1-13 Large Lightning Symbols

## **1.4 LIGHTNING DISPLAY OVERLAY**

The EHSI displays weather avoidance information from a Goodrich WX-500 Stormscope®. The lightning overlay will present electrical discharges as an overlay to the normal EHSI functions. This overlay is only available when the EHSI is in either 360 Map or Arc Map modes. Figures 1-11 to 1-13 are on a foldout page for reference as the section is being reviewed.

### ***1.4.1 DISPLAY SYMBOLS***

A white symbolic lightning bolt indicates strike or cell locations. These lightning bolts are maintained on the display for a period of up to 3 minutes. The smallest size is used for display ranges of greater than 20 NM, the medium size for ranges of 16 and 20 NM, and the large size for the 10 NM range.

### ***1.4.2 LIGHTNING ANNUNCIATION***

A white annunciation located on the lower left corner of the display indicates if the lightning overlay is operating in Cell (CELL), Strike (STRK) mode, or not selected (Blank). The annunciation in white of XXX, where XXX is a number representing the approximate number of strikes per minute, is located directly below the lightning mode annunciation.

Lightning is only displayed when the maximum range is 10 NM or greater. If the selected range is less than 10 NM, a lightning notification message "No Lightning Display" will be present for 5 seconds, the EHSI is otherwise configured to display lightning.

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Figure 2-1 Operating Controls

## 2. BUTTONS, KNOBS, AND MENU OPTIONS

The following sections define the available menu choices, the function of the MENU button, and the operation of the right and left rotary knobs. Figure 2-1 is on a foldout page for reference as the section is being reviewed.

### 2.1 AUTO HEADING BUG SYNCHRONIZATION

To rapidly set the heading bug to the aircraft's current heading, momentarily press the MENU button to enter the menu mode. Next, press the MENU button again to exit menu mode and hold for 1 second. The heading bug will position itself to the current heading. Five seconds after auto synchronization, the heading bug will operate normally and can be manually adjusted using the right knob.

### 2.2 MENU MODE OPERATIONS

In Menu mode, a menu is shown on the display allowing the user to configure the display as desired for various phases of flight or personal preference. In order to enter Menu mode, press the MENU button once. To exit the Menu mode, press the MENU button again. Or, if no adjustments are made for 20 seconds, the EHSI will automatically exit Menu mode. While in Menu mode, menu items will appear on the left side of the display. Selecting a menu item is accomplished by rotating the left knob. The currently selected menu item will be displayed in reverse video (blue text on a white background). Once the desired menu item is selected, the options available for that menu item appear on the right side of the display. The currently selected option will be highlighted in reverse video.

*(Software Version -2 Only)* Selecting an option from the menu list is accomplished by rotating the right knob. As the option is highlighted, the display and EHSI operation are immediately updated to match the selection. The exceptions to this real-time selection process are discussed in "Memory Functions" and "Clear Lightning Strikes."

*(Software Versions -3 and -4 Only)* Selecting an option from the menu list is accomplished by rotating the right knob. As the option is highlighted, the display and EHSI operation are immediately updated to match the selection for the following menu items: brightness (BRITE), range (RNG), display mode (MODE), bearing pointer source (BRG), lightning overlay (LGHTN), and groundspeed or time-to-station (GSTTS). The MENU button operation field will show "MENU OFF" for these menu items. For the navigation source (NAV), memory functions (MEMRY), and clear lightning strikes (CLR) menu items the pilot must take additional action to implement the change (normally pushing the MENU button). The MENU button



operation field will show “Press To Select” or “Press to Clear” as a prompt to press the MENU button. See “Navigation Source” (section 2.7), “Memory Functions” (section 2.12), and “Clear Lightning Strikes” (section 2.11) for additional details.

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Figure 2-2 Menu Mode

## 2.3 MENU DYNAMICS

A menu selection will not be displayed if it is not available due to the configuration of the aircraft. For example, if the instrument is not configured to interface with a Goodrich WX-500 Stormscope®, the Lightning mode and Clear Lightning Strikes menu items will not be shown. Figure 2-2 is on a foldout page for reference as the section is being reviewed.

If a menu selection is not available due to current menu choices, it will be displayed but it will be cyan (light blue) lettering with a blue background, indicating that function is disabled. For example, if the selected display mode is HSI mode, the range has no effect and will consequently be disabled (e.g., RNG is shown in cyan). Once a change has been made which allows a function to be available for the new setup, the menu items will be enabled. Menu choices that are available will be displayed in white lettering with a blue background.

Even though the lightning overlay is only allowed during the two map modes, the lightning menu item will always be available if a Goodrich WX-500 Stormscope® is interfaced to the KI 825. If the lightning menu item is selected while the current mode is set to HSI, the unit will automatically switch the mode to 360 Map.

*(Software Version -2 Only)* The Menu Button operation field will show MENU OFF for all menu items, with two exceptions: The Memory menu item, when a SAVE menu option is currently selected, in which case it will show HOLD FOR SAVE; and the “Clear Lightning Strikes” item, in which case it will show “Press to Clear”.

*(Software Versions -3 and -4 Only)* The MENU button operation field appears above the MENU button when the menu is being displayed to indicate the function of the button. It can show several different prompts depending on the situation. In most instances it displays “MENU OFF” to indicate that pressing the MENU button removes the menu from the display. The MENU button operation field will show “Press To Select” when it is necessary to press the MENU button to complete a selection. This is required when changing the navigation source or utilizing the LOAD memory function. The MENU button operation field will show “HOLD FOR SAVE” when the SAVE memory function is being used. The MENU button operation field will show “Press to Clear” when the “Clear Lightning Strikes” menu item has been selected.

## 2.4 MENU ITEMS

Item	Menu Prompt	Options	Options Prompt		
Display Brightness	BRITE	Adjust Brightness	ADJST		
Map Range	RNG	2 NM 6 NM 10 NM 16 NM 20 NM 30 NM 40 NM 60 NM 80 NM 160 NM 320 NM	2 NM 6 NM 10 NM 16 NM 20 NM 30 NM 40 NM 60 NM 80 NM 160 NM 320 NM		
Navigation Source	NAV	See notes 1, 2 and 3	See notes 1, 2 and 3		
		GPS 1	GPS	GPS 1	GPS
		GPS 2		GPS 2	
		VOR 1	VOR	VOR 1	VOR
		VOR 2		VOR 2	
Display Mode	MODE	Standard HSI 360 Map Arc Map	HSI 360 ARC		

### MENU MODE LAYOUT (Sheet 1 of 2)

#### Notes:

1. If the EHSI is configured for only one GPS system, GPS annotation will be used in place of GPS 1 and GPS 2.
2. If the EHSI is configured for only one VOR system, VOR annotation will be used in place of VOR 1 and VOR 2.
3. For software version -2 the order displayed is GPS 1, GPS 2, VOR 1, VOR 2. For software version -3 and -4 the order displayed is GPS 1, VOR 1, GPS 2, VOR 2.
4. The "CLR" option prompt was removed for -3 and -4 software. No change to operation.

<b>Item</b>	<b>Menu Prompt</b>	<b>Options</b>		<b>Options Prompt</b>	
Bearing Pointer Source	BRG	See notes 1, 2 and 3		See notes 1, 2 and 3	
		VOR 1 VOR 2	VOR	VOR 1 VOR 2	VOR
		GPS 1 GPS 2	GPS GPS 1	GPS 2	GPS
		NONE	NONE	NONE	NONE
Lightning Overlay	LGHTN	Cell mode Strike mode Off		CELL STRK OFF	
Clear Lightning Strikes	CLR	Clear Lightning Strikes		CLR See note 4	
Memory Functions	MEMRY	Load Memory 4 Load Memory 3 Load Memory 2 Load Memory 1 Current configuration Save Memory 1 Save Memory 2 Save Memory 3 Save Memory 4		LOAD4 LOAD3 LOAD2 LOAD1 ACTV SAVE1 SAVE2 SAVE3 SAVE4	
Groundspeed or Time-to-Station	GSTTS	Groundspeed Time-to-Station		GS TTS	

*MENU MODE LAYOUT (Sheet 2 of 2)*

## 2.5 DISPLAY BRIGHTNESS (BRITE)

The brightness of the display may be adjusted from this menu item by turning the right knob clockwise to increase brightness and counterclockwise to decrease brightness.

*NOTE: When power is first applied to the unit, it “wakes up” with the display brightness set to whichever of the following is the brightest: (1) the brightness selected prior to the last power down or (2) a low-level factory default setting.*

There is also a shortcut to the display brightness adjustment menu item: With the EHSI not in the Menu mode, press and hold the MENU button for 2 seconds to permit adjustment of the display brightness.

*(Software Versions -3 and -4 Only)* If an aircraft has a day/night switch used for dimming annunciators and displays at night, the KI 825 may have been connected to this switch at the time of installation. If connected, the brightness of the display is adjusted from the BRITE menu item in the normal manner. However, there is a separate brightness adjust range for the day position and another, dimmer range for the night position. If the KI 825 is not connected to a day/night switch it operates as described in the paragraphs above.

## 2.6 RANGE (RNG)

The Range menu allows the selection of the display range used in the 360 Map or the Arc Map display modes. If the range is less than 10 and a lightning overlay is being shown, the unit will announce NO LIGHTNING.

## 2.7 NAVIGATION SOURCE (NAV)

The Navigation Source menu allows the selection of the primary navigation source.

*(Software Versions -3 and -4 Only)* When the right knob has been used to select the desired navigation source the pilot must take one of the following actions to implement the change:

- Press the MENU button to select the navigation source and turn off the menu mode.
- Or
- Turn the left knob to select another menu item (other than NAV) from the list.

*Note: If one of the above actions is not taken, the display will return to the previously selected navigation sensor when the menu times out after 20 seconds.*

*Note: See also section 2.14 for an alternate means of changing the navigation source.*

## **2.8 DISPLAY MODE (MODE)**

The display mode menu item allows the selection of the current display mode. Menu options include:

- HSI mode - Displays standard HSI information in a 360-degree view about the aircraft and acts as a standard HSI display. If the display mode is changed to HSI Mode while the lightning overlay is shown, the unit will annunciate NO TRFC/LGHTN.
- 360 Map mode - Displays navigational information in a 360-degree view about the aircraft, including GPS map information for direct-to and active flight plan waypoints. The lightning overlay may also be displayed in this mode.
- Arc Map mode - Displays an exploded view of the 360 Map mode, but only 45 degrees either side of the aircraft heading is visible. The lightning overlay may also be displayed while in this mode.

## **2.9 BEARING POINTER SOURCE (BRG)**

The Bearing Pointer Source menu item allows the selection of the bearing pointer source.

## **2.10 LIGHTNING OVERLAY (LGHTN)**

The lightning overlay is available only if the EHSI is configured with a Goodrich WX-500 Stormscope®. The lightning menu allows the selection of the lightning overlay.

If the LGHTN menu item is selected while in HSI mode, the option on the right is initially blank. If the lightning option is changed to CELL or STRK mode, the EHSI will automatically change the display mode to 360 Map mode and will annunciate MODE CHANGED. If the range is less than 10 NM and lightning mode is in cell or strike, NO LIGHTNING is annunciated. This annunciation takes precedence over the MODE CHANGED annunciation.

The lightning overlay menu item contains three options:

- Cell mode - The EHSI displays clusters of electrical activity indicating storm cell areas.
- Strike mode - The EHSI displays individual electrical discharges.



- Off - Lightning overlay is not displayed.

*NOTE: Refer to the Goodrich WX-500 Stormscope® operator's manual for additional information on Cell and Strike modes.*

## 2.11 CLEAR LIGHTNING STRIKES (CLR)

Pressing the MENU button when the Clear Lightning Strikes is currently selected clears all existing discharge points being displayed.

*Note: If another indicator (e.g., a KMD850) is the master display for the Goodrich WX-500 Stormscope®, the lightning icons can only be cleared from the KI 825 with an external switch (optional).*

## 2.12 MEMORY FUNCTIONS (MEMRY)

The Memory menu item allows the pilot to save up to four unique display configurations and recall them for use at a later time. For example, the pilot may have a specific display setup for ILS approach, another for GPS approach, another for en route, etc.

The SAVE menu option allows for saving the current range, navigation source, display mode, bearing indicator source, and lightning overlay. To save the current configuration to a memory location, highlight the desired SAVE menu option (e.g., SAVE1, SAVE2) and then press and hold the MENU button for 2 seconds. Saved configurations are stored in memory to maintain the setups even when the EHSI is powered off.

*(Software Version –2 Only)* To activate a previously saved configuration, select the appropriate LOAD number that corresponds to the SAVE number used to store the setup (e.g., LOAD1, LOAD2, etc.). The ACTV menu option returns the display setup to the state it was in before entering the Memory menu item. The unit will change immediately to the desired configuration when a LOAD or ACTV menu item is selected.

*(Software Versions –3 and –4 Only)* To activate a previously saved configuration, select the appropriate LOAD number that corresponds to the SAVE number used to store the setup (e.g., LOAD1, LOAD2, etc.). To implement the changed configuration the pilot must take one of the following two actions:

- Press the MENU button to select the desired configuration and turn off the menu mode

Or

- Turn the left knob to select another menu item (other than MEMRY) from the list.

*Note: If one of the above actions is not taken, the display will return to the previously selected configuration state when the menu times out after 20 seconds.*

The ACTV menu option may be used to return the display setup to the state it was in before entering the Memory menu item.

## **2.13 GROUNDSPPEED OR TIME-TO-STATION (GSTTS)**

The groundspeed or time-to-station menu item allows the pilot to display the groundspeed or the time-to-station, if available. This menu item is disabled if the selected navigation source is not a GPS.

## **2.14 (SOFTWARE VERSIONS –3 AND -4 ONLY) OPTIONAL NAVIGATION SOURCE SELECT SWITCH**

A momentary push button switch may be installed in the aircraft's instrument panel to toggle the selected navigation source between GPS and NAV. If the KI 825 installation is interfaced with GPS 1, VOR 1, GPS 2 and VOR 2, pressing the switch only toggles between the sensors of the selected system. Therefore if GPS 1 is selected on the KI 825, pressing the push button toggles between GPS 1 and VOR 1. If GPS 2 is selected, pressing the push button toggles between GPS 2 and VOR 2.

## **2.15 (SOFTWARE VERSIONS –3 AND -4 ONLY) OPERATIONAL CHARACTERISTICS OF A SINGLE KI 825 WITH DUAL GARMIN GNS 430 (OR 530) INSTALLATION**

The following operational characteristics apply to an installation consisting of a single KI 825 EHSI, two Garmin GNS 430 (or 530) integrated Nav/Com/GPS units, and a single mechanical course deviation indicator (CDI). The mechanical CDI displays navigation information from the # 2 GNS 430 system only. The characteristics described below are applicable when the equipment is installed in accordance with the current revision of the Bendix/King KI 825 Installation Manual for this equipment.

1. GPS 1, VOR 1, GPS 2 and VOR 2 can be selected as the navigation source using the menu on the KI 825. All four selections are also available for the bearing pointer. The GPS/VLOC annunciation on the Garmin GNS 430 will change consistently with the selection made from the KI 825. For example, when GPS 1 is selected on the KI 825 the #1 GNS 430 system will annunciate "GPS". When VOR 2 is selected on the KI 825, the #2 GNS 430 will annunciate "VLOC".

2. Pressing the CDI button on the #1 GNS 430 will toggle the KI 825 between GPS 1 and VOR 1 if the #1 GNS 430 is presently being displayed on the KI 825. Likewise, pressing the CDI button on the # 2 GNS 430 will toggle the KI 825 between GPS 2 and VOR 2 if the # 2 GNS 430 is presently being displayed on the KI 825.
3. When doing an automatic GPS-to-ILS transition on the GNS 430 the navigation sensor will change from GPS to LOC on the KI 825 at the same time it changes from GPS to VLOC on the GNS 430.
4. When GPS 2 is selected as the navigation source on the KI 825 the mechanical CDI will be flagged (unusable). This is because there can only be one course for GPS 2 (i.e. there can't be one course from the KI 825 and another from the mechanical CDI). If GPS 2 is in OBS mode while it is selected on the KI 825, course selection is made from the KI 825.
5. If an optional navigation source select switch is mounted in the aircraft's instrument panel, pressing it will toggle between GPS and VOR only for the GNS 430 system (# 1 system or # 2 system) that is being displayed on the KI 825.

### **2.16 (SOFTWARE VERSIONS -3 AND -4 ONLY) OPERATIONAL CHARACTERISTICS OF A DUAL KI 825 WITH DUAL GARMIN GNS 430 (OR 530) INSTALLATION**

The following operational characteristics apply to an installation consisting of a pilot's KI 825, a copilot's KI 825, and two Garmin GNS 430 (or 530) integrated Nav/Com/GPS units. The characteristics described below are applicable when the equipment is installed in accordance with the current revision of the Bendix/King KI 825 Installation Manual for this equipment.

#### ***PILOT'S KI 825.***

1. GPS 1, VOR 1, GPS 2, and VOR 2 can selected as the navigation source. Making this selection never changes the sensor selected on the copilot's KI 825.
2. Course selection for GPS 1 (in OBS mode), VOR 1, and VOR 2 can be made with the course set knob. The VOR 1 and VOR 2 course selections are made independent of and are not affected by the course selected on the copilot's KI 825.
3. The course set knob is not operational (and its "CRS" annunciation is removed) when GPS 2 is selected as the navigation source.

4. When GPS 2 is the selected navigation source on the pilot's KI 825 and GPS 2 is in OBS mode, course changes can only be made by selecting GPS 2 on the copilot's KI 825 and using its course select knob. The pilot's KI 825 always has the same course as the copilot's KI 825 under these conditions.
5. When GPS 1 or VOR 1 is selected as the navigation source using the menu of the pilot's KI 825, the #1 GNS 430 annunciation is changed to the corresponding state (GPS or VLOC).
6. When GPS 2 or VOR 2 is selected as the navigation source using the menu of the pilot's KI 825, the #2 GNS 430 annunciation (GPS or VLOC) is unchanged.
7. When GPS 1 or VOR 1 is the selected navigation sensor on the pilot's KI 825, pressing the CDI button on the #1 GNS 430 toggles the pilot's KI 825 selected navigation sensor between GPS 1 and VOR 1 and at the same time changes the #1 GNS 430 to its corresponding annunciation (GPS or VLOC). Likewise, when the #1 GNS 430 does an automatic GPS-to-ILS sensor switch, the navigational source is appropriately changed on the pilot's KI 825.
8. When GPS 2 or VOR 2 is the selected navigation sensor on the pilot's KI 825, pressing the CDI button on the #2 GNS 430 toggles the GPS/VLOC annunciation on the #2 GNS 430 but does not change the selected sensor on the pilot's KI 825. When the #2 GNS 430 does an automatic GPS-to-ILS sensor switch, the navigation source is not changed on the pilot's KI 825.
9. GPS 1, GPS 2, VOR 1, or VOR 2 can be selected for the bearing pointer at any time without restriction (assuming no ILS frequencies are selected on VOR 1 or VOR 2).

### ***COPLOT'S KI 825***

Operation of the copilot's KI 825 is exactly the mirror image logic of the pilot's KI 825 described above.

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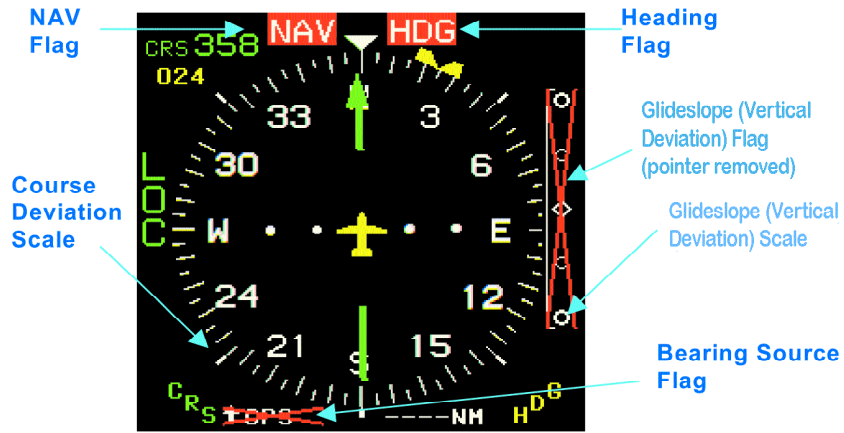


Figure 3-1 HSI Mode w/Error Flags

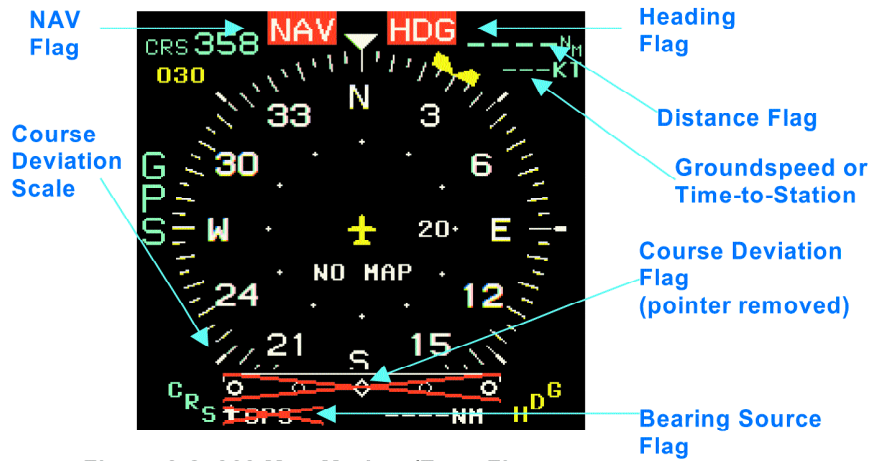


Figure 3-2 360 Map Mode w/Error Flags

### 3. ERROR FLAGS AND WARNINGS

The KI 825 alerts the pilot to abnormal conditions, such as failed navigational receivers, Goodrich WX-500 Stormscopes®, and remote compass systems. During these situations, the instrument either displays a warning flag and/or removes the unusable information. This section describes the flags and messages that are presented in the event of an abnormal operating condition. Figures 3-1 and 3-2 are on a foldout page for reference as the section is being reviewed.

<b>Flag or Message</b>	<b>Description</b>
<p>HDG (white letters on a red background).</p>	<p>In addition to the error flag, the following will happen:</p> <ul style="list-style-type: none"> <li>• The EHSI compass card will remain stationary in its last valid position.</li> <li>• The flag will become visible for any of the following reasons:                             <ul style="list-style-type: none"> <li>• Heading data not received.</li> <li>• Internal BIT error detected.</li> </ul> </li> </ul>
<p>NAV (white letters on a red background).</p>	<p>The NAV error flag becomes visible with any of the following:</p> <ul style="list-style-type: none"> <li>• Primary NAV data not received.</li> <li>• Internal BIT error detected.</li> </ul>
<p>A large red "X" through the CDI scale, and the course deviation bar will be removed.</p>	<p>Error detected in the course deviation indication data from the selected navigational system.</p>
<p>A red "X" displayed over the annunciation and the bearing pointer removed.</p>	<p>Data error detected in the bearing pointer from the selected bearing source.</p>



Flag or Message	Description
Four dashes replacing the numeric distance readout.	Data error detected in the distance to selected NAV source.
Four dashes replacing the numeric display.	Data error detected in the distance to selected bearing source.
TO/FROM symbol removed from the display. (HSI mode only)	Data error detected in the TO/FROM information from the currently selected navigational source.
TO/FROM indicator removed and the center indicator changed to a white open diamond. (360 Map & Arc Map)	TO/FROM signal not received from the selected navigational source.
<b>A red “X” over the glideslope (vertical deviation) scale.</b>	Data error detected in the vertical deviation information from the selected navigational source.
Yellow dashes and a colon replacing time-to-station.	Data error detected in the time-to-station information.
Dashes replacing the groundspeed numeric display.	Data error detected in the groundspeed information.
NO MAP annunciation and moving map symbology is removed.	Primary NAV sensor is a GPS and the distance-to-bearing information becomes invalid.
“No Lightning Display” annunciation.	Appears for 5 seconds after the EHSI is configured to display lightning and the range is less than 10 NM.

(Vertical VNAV deviation is only available with Software version 4)

<b>Flag or Message</b>	<b>Description</b>
NO LGHTN DATA is displayed and lightning annunciation test changes from white to yellow.	No data received from the Goodrich WX-500 Stormscope® for a period of 5 seconds or greater.
Red "X" over the lightning annunciation, the text changes from white to yellow, and all lightning data is removed.	A nonrecoverable communication error is received. Refer to your Goodrich WX-500 Stormscope® user's manual for corrective action and contact your authorized Goodrich WX-500 Stormscope® dealer as soon as possible.
The lightning annunciation changes from white to yellow.	A recoverable Goodrich WX-500 Stormscope® communication error is received. If the condition is not corrected automatically, contact your authorized Goodrich WX-500 Stormscope® dealer as soon as possible to correct the problem.
IO Card 1 Failure.	Unrecoverable error on IO board 1. The KI 825 is not operational. Contact your authorized Bendix/King dealer for corrective action.
IO Card 2 Failure.	Unrecoverable error on IO board 2. The KI 825 is not operational. Contact your authorized Bendix/King dealer for corrective action.

<b>Flag or Message</b>	<b>Description</b>
Configuration mismatch module used.	<p>System configuration data mismatch between the configuration setup data stored in memory and the configuration setup data stored in the KCM 100 configuration module (if installed).</p> <p>Due to this error, some systems may not interface properly with the KI 825 such as navigational systems, Goodrich WX-500 Stormscope®, etc.</p> <p>This message appears at power-up until corrected. Contact your authorized Bendix/King dealer for corrective action.</p>
Configuration HSI checksum failure.	<p>System configuration setup data stored in the memory and the configuration setup data stored in the KCM 100 configuration module is valid.</p> <p>Due to this error, some systems may not interface properly with the KI 825, such as navigational systems, Goodrich WX-500 Stormscope®, etc.</p> <p>This message will appear at power-up until corrected. Contact your authorized Bendix/King dealer for corrective action.</p>

<b>Flag or Message</b>	<b>Description</b>
<p>Configuration module checksum failure.</p>	<p>System configuration setup data stored in memory is valid and the configuration setup data stored in the optional KCM 100 remote configuration module is invalid.</p> <p>Due to this error, some systems may not interface properly with the KI 825, such as navigational systems, Goodrich WX-500 Stormscope® , etc.</p> <p>This message will appear upon start-up until corrected. Contact your authorized Bendix/King dealer for corrective action.</p>
<p>No valid configuration failure.</p>	<p>There is no valid system configuration setup data.</p> <p>Due to this error, some systems may not interface properly with the KI 825, such as navigational systems, Goodrich WX-500 Stormscope® , etc.</p> <p>This message will not clear until valid system configuration data is stored in the unit. Contact your authorized Bendix/King dealer for corrective action.</p>

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**APPENDIX A DEFINITIONS AND ABBREVIATIONS**

ACTV	Active
ADJST	Adjust
BIT	Built-In Test
BRITE	Menu button to adjust display brightness
BRG	Bearing
CDI	Course Deviation Indicator
CLR	Clear
CRS	Course
CW	Clockwise
DME	Distance-Measuring Equipment
DTK	Desired Track. The angle of the course line at the point nearest the present position. (GPS operating in LEG mode)
EHSI	Electronic Horizontal Situation Indicator
GPS	Global Positioning System
GS	Groundspeed
GSTTS	Groundspeed or Time-to-Station
HDG	Heading
HSI	Horizontal Situation Indicator
ILS	Instrument Landing System
IO	Referring to the Interface Circuit Card Assembly #1 or #2 in the unit
KT	Knot
LEG	The line connecting two waypoints in a flight plan. Also a GPS mode of operation in which automatic waypoint sequencing occurs.
LGHTN	Lightning
Lubber Line	A fixed line placed on an indicator to indicate the front-to-rear axis of the aircraft.
LOC	Localizer. The lateral guidance portion of an ILS system.
MEMRY	Memory
NAV	Navigational
NM	Nautical Mile
OBS	Omnidirectional Bearing Selector. Also a GPS mode of operation in which a course may be manually selected to or from the active waypoint. In this mode, automatic waypoint sequencing is disabled.
RNG	Range

STRK	Lightning Strike
TTS	Time-to-Station
VNAV	Vertical Navigation
VOR	Very high frequency omnidirectional radio range - a system that provides bearing information to an aircraft.

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