



**MK V
MK VI
MK VII
MK VIII
MK XXII**

Enhanced Ground Proximity Warning Systems

Line Maintenance Manual

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1 INTRODUCTION

1.1 SCOPE

This document provides information about the Enhanced Ground Proximity Warning System (EGPWS) with respect to Line Maintenance Operations. This includes Description and Operation, Troubleshooting, Removal and Installation, Adjustment and Test, and other related information. It is intended that the information in this document be combined with detailed aircraft installation documentation for operator specific line maintenance procedures.

1.2 APPLICABILITY

This manual is applicable to the MK V, MK VI, MK VII, MK VIII, and MK XXII EGPWS with the following part numbers and general description:

MK V EGPWC PART NUMBERS		MK VII EGPWC PART NUMBERS	
965-0976-003-XXX-XXX	115 VAC, -40° to +70°	965-1076-001-XXX-XXX	115 VAC, -40° to +70°
965-0976-020-XXX-XXX	115 VAC, Internal 8 channel GPS, -40° to +70°	965-1076-020-XXX-XXX	115 VAC, Internal 8 channel GPS, -40° to +70°
965-0976-040-XXX-XXX	28 VDC, -55° to +70°	965-1076-030-XXX-XXX	28 VDC, Internal 8 channel GPS, 55° to +70°
965-0976-060-XXX-XXX	115 VAC, Integral GNSSU, -40° to +70°	965-1076-040-XXX-XXX	28 VDC, -55° to +70°
965-1676-XXX (Airbus P/N)	115 VAC, -40° to +70°	965-1076-060-XXX-XXX	115 VAC, Integral GNSSU, -40° to +70°
965-1690-XXX (Boeing P/N)	115 VAC, -40° to +70°		

MK VI EGPWC PART NUMBERS		MK VIII EGPWC PART NUMBERS		MK XXII EGPWC PART NUMBERS	
965-1176-XXX	28 VDC, -55° to +70°	965-1206-XXX	28 VDC, -55° to +70°	965-1590-XXX	28 VDC, Internal 8 channel GPS, -55° to +70°
965-1186-XXX	28 VDC, Internal 8 channel GPS, -55° to +70°	965-1216-XXX	28 VDC, Internal 8 channel GPS, -55° to +70°	965-1595-XXX	28 VDC, Improved CPU, Internal 8 channel GPS, -55° to +70°
965-1180-XXX	28 VDC, Improved CPU, -55° to +70°	965-1210-XXX	28 VDC, Improved CPU, -55° to +70°		
965-1190-XXX	28 VDC, Improved CPU, Internal 8 channel GPS, -55° to +70°	965-1220-XXX	28 VDC, Improved CPU, Internal 8 channel GPS, -55° to +70°		

TABLE 1-1 EGPWC Part Numbers

NOTE: X's represent variable values defining a specific application and configuration software version (i.e., -230-230 for MK V/VII or -011 for MK VI/VIII/XXII original model or -026 for MK VI/VIII/XXII with improved CPU).



MK V & MK VII EGPWC (left) and MK VI, MK VIII, MK XXII EGPWC (right)

Figure 1-1 - Enhanced Ground Proximity Warning Computers

1.3 REFERENCE DOCUMENTS

The following documents are identified as additional EGPWS references:

MK V and MK VII:

- 965-0976-603Product Specification for the EGPWS (MK V and MK VII)
- 060-4404-000.....Product Description for Runway Awareness and Advisory System (RAAS) prior to -230-230
- 060-4564-000.....Product Description, Flight Safety Functions of the EGPWS
- 993-0976-401Interface Control Document for the Mark V EGPWS
- 993-1076-401Interface Control Document for the Mark VII EGPWS
- 060-4199-125Installation Design Guide for the MK V EGPWS
- 060-4199-225Installation Design Guide for the MK VII EGPWS
- 060-4241-000MK V and MK VII EGPWS Pilot Guide
- 060-4267-000EGPWS Terrain Database Airport Coverage List (MK V and MK VII)
- 060-4353-000EGPWS Terrain Database Obstacle Coverage Chart

MK VI, MK VIII, MK XXII:

- 965-1176-601Product Specification for the MK VI and MK VIII EGPWS (original model)
- 965-1180-601Product Specification for the MK VI and MK VIII EGPWS (with improved CPU)
- 965-1590-601Product Specification for the MK XXII EGPWS (original model)
- 965-1595-601Product Specification for the MK XXII EGPWS (with improved CPU)
- 993-1176-401Interface Control Document for the Mark VI/VIII/XXII EGPWS (original model)
- 993-1180-401Interface Control Document for the Mark VI/VIII/XXII EGPWS (with improved CPU)
- 060-4314-125Installation Design Guide for the MK VI/VIII EGPWS (original model)
- 060-4314-150.....Installation Design Guide for the MK VI/VIII EGPWS (with improved CPU)
- 060-4314-225Installation Design Guide for the MK XXII EGPWS (original model)
- 060-4314-250.....Installation Design Guide for the MK XXII EGPWS (with improved CPU)
- 060-4314-000MK VI and MK VIII EGPWS Pilot Guide
- 060-4314-200MK XXII EGPWS Pilot Guide
- 060-4326-000EGPWS Terrain Database Airport Coverage List (MK VI and MK VIII)

2 DESCRIPTION AND OPERATION

2.1 GENERAL SYSTEM DESCRIPTION

The purpose for the Enhanced Ground Proximity Warning System (EGPWS) is to help prevent accidents caused by Controlled Flight Into Terrain (CFIT), obstacles, or severe windshear. The Enhanced Ground Proximity Warning Computer (EGPWC) accepts a variety of aircraft sensors and system inputs and applies alerting algorithms to provide the flight crew with aural messages and visual annunciations when the boundaries of alerting envelopes are exceeded. A graphic depiction of terrain and obstacles within the range selected on an EFIS or Weather Radar display may be configured for enhanced situational awareness with respect to terrain and obstacles. Figure 2-1 provides an overall system block diagram.

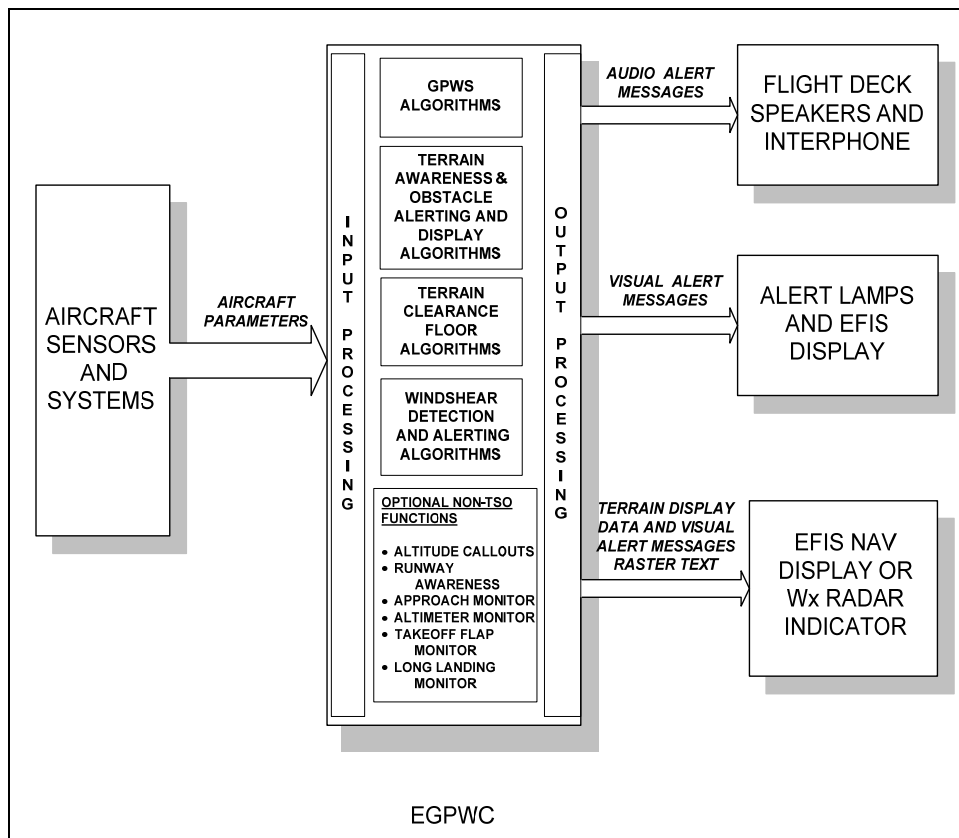


Figure 2-1: Enhanced Ground Proximity Warning System

The EGPWS is comprised of the following:

- Aircraft sensors and systems providing input signals
- The Enhanced Ground Proximity Warning Computer (EGPWC)
- Flight deck audio systems (speaker and interphone)
- Alert lamps and/or EFIS or EICAS displays (for alert and system status messages)
- EFIS Navigation Display (ND), Multi-Function Display (MFD), or Weather Radar Indicator for display of terrain
- Switching relay(s) when required for switching display inputs from weather display to terrain display
- GPS antenna for direct connection to EGPWC with internal GPS sensors

2.1.1 ENHANCED GROUND PROXIMITY WARNING COMPUTER (EGPWC)

All EGPWS functions are processed by a single Line Replaceable Unit (LRU) called the Enhanced Ground Proximity Warning Computer (EGPWC).

The MK V and MK VII EGPWC are digitally controlled computers housed in a 2 MCU ARINC 600-6 form factor chassis intended for Air Transport type aircraft. Installation configuration is defined by program pin strapping in the aircraft.

The MK VI and MK VIII EGPWC are digitally controlled computers housed in a non-ARINC form factor chassis intended for Business and General Aviation and Regional Turboprop type aircraft. These models have fewer interface and functional options. The installation configuration is defined in a programmed Configuration Module installed in the aircraft.

The MK XXII EGPWC is a digitally controlled computer housed in a non-ARINC form factor chassis intended for various rotorcraft. Similar to the MK VI and MK VIII EGPWC, this model has fewer interface and functional options. The installation configuration is defined in a programmed Configuration Module installed in the helicopter.

The EGPWC receives information in AC, DC, discrete, and synchro analog formats, and RS-232, RS-422, ARINC 429 or ARINC 575 digital formats. Discrete signals can be either ground or +28V discretes. The EGPWC provides discrete, audio and ARINC 429 outputs for alerts and system status, and video (ARINC 453/708) for terrain display. The EGPWC is rack mounted and does not require any forced air cooling when operated within the normal operating temperature range given in the Table 1-1.

2.2 OPERATION

2.2.1 MODE 1 – EXCESSIVE DESCENT RATE

Mode 1 provides audio and visual alerts for excessive descent rates into terrain. When the EGPWS caution alert envelope is penetrated, the message “SINKRATE” is enunciated and EGPWS alert lights illuminate. Continuing the excessive descent rate into the EGPWS warning alert envelope results in a “PULL-UP” enunciation and EGPWS alert lights illuminated. Mode 1 is desensitized to eliminate unwanted (nuisance) alerts when the EGPWS determines that the aircraft is above a Glideslope beam. In some fixed-wing applications, Mode 1 is also desensitized when Steep Approach or Flap Override is active. In helicopter applications, Mode 1 is disabled when autorotation is detected.

2.2.2 MODE 2A/2B - TERRAIN CLOSURE RATE

Mode 2 provides audio and visual alerts for dangerously high terrain closure rates. Two sub-modes, referred to as Mode 2A and 2B, are defined. Mode 2A is active when flaps are not in the landing position and the aircraft is not on an ILS approach within ± 2 dots of glideslope center. Mode 2B is active when the flaps are in the landing position or while on an ILS approach within ± 2 dots of glideslope deviation. When the caution alert envelope is penetrated, the message “TERRAIN, TERRAIN” is enunciated and EGPWS alert lights illuminate. Continuing the high terrain closure rate into the warning alert envelope results in a “PULL-UP” enunciation and EGPWS alert lights illuminated.

2.2.3 MODE 3 - DESCENT AFTER TAKEOFF

Mode 3 provides audio and visual alerts for excessive altitude loss after takeoff, or after a go-around from below 245 feet above ground level (AGL), when flaps and gear are not in the landing configuration. Penetrating the Mode 3 alert envelope causes the voice message “DON'T SINK, DON'T SINK” and illumination of EGPWS alert lights.

2.2.4 MODE 4A/4B/4C - UNSAFE TERRAIN CLEARANCE

Mode 4 provides audio and visual alerts for unsafe terrain clearance with respect to phase of flight, height above ground, and speed. Three sub-modes, referred to as Mode 4A, 4B, and 4C, are defined. Mode 4A is active during cruise and approach with landing gear up. Mode 4B is active during cruise and approach with landing gear down and flaps up. Mode 4C is active during takeoff when either gear or flaps are not in the landing configuration. The aural enunciations for Mode 4A are “TOO LOW TERRAIN” or “TOO LOW GEAR” depending on airspeed. Mode 4B

provides “TOO LOW TERRAIN” or “TOO LOW FLAPS” depending on airspeed. Mode 4C provides “TOO LOW TERRAIN”. EGPWS alert lights are illuminated during these alerts.

2.2.5 MODE 5 - DESCENT BELOW GLIDESLOPE

Mode 5 provides audio and visual alerts for excessive glideslope deviation when the aircraft descends below the glideslope beam on front-course ILS approaches. Two levels of alerting are provided. If the aircraft is below 1000 feet AGL and gets to or exceeds 1.3 dots glideslope deviation (fly-up), a ‘soft’ (reduced volume) “GLIDESLOPE” is enunciated. Exceeding 2 dots below 300 feet AGL provides a hard (full volume) “GLIDESLOPE” enunciation. EGPWS alert lights are illuminated during these alerts.

2.2.6 MODE 6 - ADVISORY CALLOUTS (OPTIONAL)

The EGPWC can be programmed to enunciate Mode 6 Advisory Callouts based on menu selectable options. Mode 6 includes Altitude Awareness, Minimums/Approaching Minimums, and Bank Angle type callouts as defined for each EGPWS model (refer to an applicable Interface Control Document or Installation Design Guide). The menu selected Advisory Callouts are defined and enabled in the installation configuration. If Altitude Callouts are not enabled, only (DH based) “MINIMUMS” callouts will be provided. The MK XXII offers a tail strike advisory for helicopters.

Only aural callouts are provided for Mode 6. EGPWS alert lights are NOT illuminated for Mode 6 callouts. The following table identifies all of the Mode 6 Callouts that are available and the applicability to each model.

TABLE 2-1: MODE 6 CALLOUTS

CALLOUT	DESCRIPTION	MODEL				
		V	VI	VII	VIII	XXII
“DECISION HEIGHT“	At descent below minimums setting (DH)	•	#	•	#	#
“CHECK HEIGHT“	At descent below minimums setting (DH)	#	#	#	#	•
“ALTITUDE-ALTITUDE“	At descent below minimums setting (DH) with gear up	#	#	#	#	•
“MINIMUMS“	At descent below minimums setting (DH)	•	#	•	#	#
“MINIMUM“	At descent below minimums setting (DH)	•	#	•	#	#
“MINIMUMS-MINIMUMS“	At descent below minimums setting (DH)	•	•	•	•	•
“DECIDE“	At descent below minimums setting (DH)	•	#	•	#	#
“APPROACHING DECISION HEIGHT“	At descent below minimums (DH altitude) setting plus 100 feet	•	#	•	#	#
“APPROACHING MINIMUMS“	At descent below minimums setting (DH altitude) plus 80 feet	•	#	•	#	#
“PLUS HUNDRED“	At descent below minimums setting (DH altitude) plus 100 feet	•	#	•	#	#
“FIFTY ABOVE“	At descent below minimums setting (DH altitude) plus 50 feet	•	#	•	#	#
“RADIO ALTIMETER“	At descent below 2500 feet	•	#	•	#	#
“TWENTY FIVE HUNDRED“	At descent below 2500 feet	•	#	•	#	#
“ONE THOUSAND“	At descent below 1000 feet	•	•	•	•	#
“FIVE HUNDRED“	At descent below 500 feet	•	•	•	•	#

CALLOUT	DESCRIPTION	MODEL				
		V	VI	VII	VIII	XXII
500 TONE	Provides 2 second 960 Hz tone at descent below 500 feet	•	#	•	#	#
SMART "FIVE HUNDRED"	At descent below 500 feet (only) during non-precision approach	•	•	•	•	•
"FIVE HUNDRED"	Above field callout within 5 nm of a runway in the database	#	•	#	•	#
"FIVE HUNDRED ABOVE"	Above field callout within 5 nm of a runway in the database	#	•	#	•	#
"FOUR HUNDRED"	At descent below 400 feet	•	•	•	•	#
"THREE HUNDRED"	At descent below 300 feet	•	•	•	•	#
"TWO HUNDRED"	At descent below 200 feet	•	•	•	•	•
"ONE HUNDRED SIXTY"	At descent below 160 feet	#	#	#	#	•
"ONE HUNDRED FIFTY"	At descent below 150 feet	#	#	#	#	•
"ONE HUNDRED FORTY"	At descent below 140 feet	#	#	#	#	•
"ONE HUNDRED THIRTY"	At descent below 130 feet	#	#	#	#	•
"ONE HUNDRED TWENTY"	At descent below 120 feet	#	#	#	#	•
"ONE HUNDRED TEN"	At descent below 110 feet	#	#	#	#	•
"ONE HUNDRED"	At descent below 100 feet	•	•	•	•	•
100 TONE	Provides 2 second 700 Hz tone at descent below 100 feet	•	#	•	#	#
"EIGHTY"	At descent below 80 feet	•	#	•	#	•
"SIXTY"	At descent below 60 feet	•	#	•	#	•
"FIFTY"	At descent below 50 feet	•	•	•	•	•
"FOURTY"	At descent below 40 feet	•	•	•	•	•
"THIRTY FIVE"	At descent below 35 feet	•	#	•	#	#
35 TONE	Provides 1 second 1400 Hz tone at descent below 35 feet	•	#	•	#	#
"THIRTY"	At descent below 30 feet	•	•	•	•	•
"TWENTY"	At descent below 20 feet	•	•	•	•	•
20 TONE	Provides 1/2 second 2800 Hz tone at descent below 20 feet	•	#	•	#	#
"FIFTEEN"	At descent below 15 feet	•	#	•	#	#
"TEN"	At descent below 10 feet	•	•	•	•	•
"FIVE"	At descent below 5 feet	•	#	•	#	#

Not currently identified in any menu option for the model indicated.

2.2.6.1 EXCESSIVE BANK ANGLE CALLOUT

The Bank Angle Callout feature provides callout enunciation for excessive bank angles based on altitude and bank angle limits defined by aircraft type. It is intended to enhance situational awareness during intentional or unintentional maneuvering, and for protection against wing or engine strikes when close to the runway.

When the bank angle limit is reached, the aural callout "BANK ANGLE, BANK ANGLE" is given. Follow-on aural messages are only provided when the aircraft roll angle increases an additional 20% from the previous callout. Bank Angle Callouts are enabled by the installation configuration.

2.2.6.2 TAIL STRIKE CALLOUT

A tail strike alert function is provided by the MK XXII for applicable rotary wing aircraft based upon Radio Altitude, Pitch Attitude, Pitch Rate and Barometric Altitude Rate. The voice message "Tail Too Low" is provided continuously while within the alert boundary. Unique alert boundaries are provided for applicable aircraft types.

2.2.7 MODE 7 - WINDSHEAR DETECTION (OPTIONAL FOR MK V/VII ONLY)

Mode 7 provides the flight crew with visual and aural alerts for windshear of sufficient magnitude to be potentially hazardous to the aircraft. The system is capable of detecting severe decreasing performance shears (i.e. increasing tailwind/decreasing headwind and/or downdraft) which present an immediate danger to the aircraft. The system is also capable of detecting severe increasing performance shears (increasing headwind/decreasing tailwind and/or up draft). While these shears may not present an immediate danger to the aircraft, these shears can indicate that the atmospheric instability is such that an encounter with a severe decreasing performance shear is likely.

A detected increasing performance shear will result in an aural "CAUTION WINDSHEAR" enunciation and cockpit light annunciation when enabled. A detected decreasing performance shear will result in an aural siren followed by "WINDSHEAR, WINDSHEAR, WINDSHEAR" with a corresponding cockpit warning light annunciation.

2.2.8 ENVELOPE MODULATION (NOT AVAILABLE IN MK VI/VIII -001)

Envelope Modulation provides improved alert protection and expanded alerting margins at identified key locations throughout the world. Due to terrain features at or near certain specific airports, normal operations have resulted in nuisance or missed alerts at these locations in the past. With the introduction of accurate position information and a terrain and airport database, it is now possible to identify these areas and adjust the normal alerting process to compensate for the condition.

Modes 4, 5, and 6 are expanded at certain locations to provide alerting protection consistent with normal approaches. Modes 1, 2, and 4 are desensitized at other locations to prevent nuisance alerts that result from unusual terrain or approach procedures. In all cases, very specific information is used to correlate the aircraft position and phase of flight prior to modulating the envelopes. This function is automatic and transparent to crew operation.

2.2.9 TERRAIN CLEARANCE FLOOR AND RUNWAY FIELD CLEARANCE FLOOR

The Terrain Clearance Floor (TCF) alerting function adds an additional element of protection to the standard Ground Proximity Warning System for fixed-wing aircraft. It creates an increasing terrain clearance envelope around the airport runway to provide CFIT protection against situations where Mode 4 provides limited or no protection. TCF alerts are based on current aircraft location, destination runway center point position, and Radio Altitude (altitude AGL). TCF is active during takeoff, cruise, and final approach. TCF complements the existing Mode 4 protection by providing an alert based on insufficient terrain clearance even when in landing configuration.

The TCF function is enhanced in all fixed-wing models (beginning with release -210-210 for the MK V/VII) with the addition of a Runway Field Clearance Floor (RFCF) alerting function. RFCF is based on current aircraft location, destination runway center point position, and Geometric Altitude or altitude Above Sea Level (ASL) relative to the destination runway. RFCF provides short landing protection for runways that are significantly higher than the surrounding terrain.

When an aircraft penetrates either the TCF or the RFCF alert envelope, the aural message "TOO LOW TERRAIN" will occur. This aural message will occur once when initial envelope penetration occurs, and one time thereafter for each 20% degradation in either Altitude (AGL) or Altitude (ASL) depending on which envelope was violated (TCF or RFCF respectively). EGPWS cockpit alert annunciations remain illuminated until the alert envelope is exited. The TCF and RFCF functions are not available in the MK XXII.

2.2.9.1 RUNWAY DATABASE

The EGPWS Runway Database consists of data records for all airport runways offered for the coverage provided by the Terrain Database. For the MK V and MK VII, all hard surface runways in the world 3500 feet or greater in length are supported. For the MK VI, all runways 2000 feet or greater in length within the database region installed are supported. The MK VIII has the ability to select >2000 foot or >3500 foot runway lengths. For the MK XXII, only runways 2000 feet or greater with a published approach procedure are included. The database provides the means of accessing the records of runways closest to the current aircraft position.

2.2.10 TERRAIN ALERTING AND DISPLAY (OPTIONAL)

The Terrain Alerting and Display (TAD) function monitors aircraft position with respect to local database-cataloged terrain to provide rapid audio and visual alerts when a terrain threat is detected. Terrain threats are recognized and annunciated when terrain violates specific computed envelope boundaries forward of the aircraft path. The terrain database also includes obstacles (when and where available) providing similar annunciations when cataloged obstacles violate the same envelope boundaries.

Terrain Alerting outputs (lights and audio) behaves in the same manner as the standard GPWS mode alerts. Either caution or warning alerts will initiate a specific audio alert phrase. The caution aural is "CAUTION TERRAIN" or "CAUTION OBSTACLE" and the warning aural is "TERRAIN, TERRAIN, PULL UP" or "OBSTACLE, OBSTACLE, PULL UP" (minor variations exist).

Complementing the terrain threat alerts, the EGPWS also maintains a synthetic image of local terrain forward of the aircraft for display on EFIS Navigation Displays (ND's), Multi-Functional Displays (MFD's), or Weather Radar Indicators. The EGPWS may be configured to automatically de-select the Weather Display and pop-up a display of the terrain threats when they occur. The logic used for these configurable controls also provides an external input for predictive windshear alerts that can override a Terrain Display and revert to the weather display with the corresponding windshear data.

The EGPWS provides up to two optional external displays outputs, each with independent range-scaling control in the same fashion as weather radar with more than one indicator. Changes of range scaling to one display do not affect the other display. Each of these two independent outputs may be used to drive more than one display.

2.2.10.1 TERRAIN AND OBSTACLE DATABASE

The EGPWS Terrain Database is the earth's surface divided into grid sets and cells referenced to the geographic (latitude/longitude) coordinate system of the World Geodetic System 1984 (WGS-84). Elements of the grid sets include the highest terrain altitude (above MSL) in each cells respective area. Grid sets vary in resolution depending on geographic location. Because the overwhelming majority of "Controlled Flight Into Terrain (CFIT)" accidents occur near an airport, and the fact that aircraft operate in closer proximity to terrain near an airport, higher resolution grids are used around airports. Lower resolution grids are used outside of airport areas where aircraft altitude enroute makes CFIT accidents unlikely and for which detailed terrain features are not important to the flight crew.

Digital Elevation Models (DEM's) are available for most of the airports around the world today. In cases where data is not currently available, DEM's are generated from available topographic maps, sectional charts, and airline approach plates. The process of acquiring, generating, assembling, and updating the database is governed by strict configuration controls to insure the highest level of data integrity for generation of the EGPWS Terrain Database.

The EGPWS Terrain Database is organized in a flexible and expandable manner. Using digital compression techniques, the complete database is stored in non-volatile memory within the LRU. Updates and additions are easily accomplished via a PCMCIA card interface.

The Obstacle Database (in MK V and MK VII -204-204 and later, and MK VI, MK VIII and MK XXII) is a separate file included within the terrain database. Both files are loaded into the EGPWS in the terrain database PCMCIA card. The obstacle database is accessed by the EGPWC application software only if obstacle alerting is enabled by installation configuration. The obstacle data is processed by the EGPWS in the same fashion as terrain, and is presented on the display as terrain (uses same coloring scheme).

MK V, MK VII, and MK VIII EGPWS utilize a worldwide Terrain Database. The MK VI EGPWS utilizes a regional Terrain Database consisting of one of the following regions:

- the Americas Region (designated “N”) for all of North, Central, and South America,
- the Atlantic Region (designated “A”) covering Greenland, Europe, Africa, and Asia,
- the Pacific Region (designated “P”) covering Europe, East Africa, Asia, Australia, the Pacific Ocean (to 120W longitude including most of the US west coast).

The MK XXII utilizes 11 regional databases. For either worldwide or regional Terrain Databases, the Obstacle Database currently covers cataloged obstacles (see Section 1.3) that are 100 feet high or higher. The MK XXII database of obstacles is unique in the inclusion of oil rigs.

2.2.11 PEAKS DISPLAY MODE (OPTIONAL)

As an enhancement to the “standard” EGPWS terrain display, the Peaks Mode (when enabled by the installation configuration) allows terrain below the aircraft to be viewed on the EGPWS terrain display during all phases of flight (for MK V and MK VII -206-206 and later, and MK VI, MK VIII, and MK XXII). At altitudes safely above terrain for the chosen display range, the terrain is displayed independent of aircraft altitude emphasizing the highest and lowest displayed elevations to provide enhanced situational awareness. This can be particularly valuable to the flight crew in case of an unplanned descent or off-route deviation and for previewing terrain prior to or during descent.

The EGPWS terrain display uses colors and shading patterns corresponding to the vertical displacement between terrain elevation and the current altitude of the aircraft. With the “standard” display, terrain more than 2000 feet below the aircraft is not displayed typically leaving the terrain display blank during the enroute portion of flight. The Peaks Mode Display adds additional density patterns and level thresholds based on terrain elevations relative to the range and distribution of terrain in the display area. The Peaks Mode is thus a “merged” display applicable to all phases of flight.

Within the Peaks Mode display, two elevation numbers indicate the highest and lowest terrain currently being displayed. The elevation numbers indicate terrain in hundreds of feet Above Sea Level (ASL). The terrain elevation numbers are displayed with the “highest” terrain number on top, and the “lowest” terrain number beneath it. The “highest” terrain number is shown in the same color as the highest terrain color pattern on the display, and the “lowest” terrain number is shown in the color of the lowest terrain color pattern shown on the display. A single elevation number is displayed when there is no appreciable difference in terrain elevations such as when flying over water (displayed blue on some display systems) or flat terrain. The elevation numbers on the display are also an indication that the terrain display is selected.

2.2.12 GEOMETRIC ALTITUDE (GPS REQUIRED)

Geometric Altitude (for MK V and MK VII -206-206 and later, and MK VI, MK VIII, and MK XXII) is a computed pseudo-Corrected Barometric Altitude (computed altitude “Above Sea Level” - ASL). This is designed to ensure optimal operation of the EGPWS enhanced functions through all phases of flight and atmospheric conditions. Geometric Altitude uses GPS Altitude, an improved pressure altitude calculation, Radio Altitude, and Terrain and Runway elevation data to reduce or eliminate errors potentially induced into Corrected Barometric Altitude by temperature extremes, non-standard altitude conditions, and altimeter miss-sets. Geometric Altitude also allows continuous EGPWS operations in QFE environments without custom inputs or special operational procedures.

2.2.13 WEATHER RADAR AUTOTILT (MK V AND MK VII ONLY)

MK V and MK VII EGPWS (-210-210 and later) provide an automatic Weather Radar tilt angle capability. The Auto-Tilt function uses aircraft altitude above the terrain and the terrain database to generate an optimum tilt angle for the Weather Radar. The Auto-Tilt angle results in minimum ground clutter on the display while maintaining the optimum weather detection capability. With manual tilt control, there can be over-scan where weather cells and terrain are

below the antenna beam scan resulting in a blank display. Alternately, under-scan, where the antennas scan is hitting the ground below the weather cells, results in ground clutter display. The calculated tilt angle is transmitted on the ARINC 429-output bus (labels 061, 062, 063, 064, and 065) for any compatible Weather Radar system. See the appropriate Part Number ICD for complete Label definitions.

2.2.14 SYSTEM DISPLAY AND ANNUNCIATION

In addition to the aural (voice) alerts provided over the cockpit speaker and interphone system, the EGPWS drives cockpit annunciators and/or Electronic Flight Instrument Systems (EFIS) with system status and alert annunciations. For some EFIS displays, the EGPWS is designed to interface and display the EGPWS terrain video as well as alert annunciations directly onto the EFIS without the use of external relays or annunciators. This is referred to as an "integrated" EFIS display. For other displays (some EFIS and all Radar Indicators), the terrain video is relay switched into the display system externally taking the place of weather radar video. In this case, external switching and annunciation is required. This is referred to as a "Bolt-On" display. The interface and display characteristics are defined for each display system and programmed into the EGPWC as part of the configuration software.

Cockpit annunciations can vary somewhat aircraft to aircraft or operator to operator. In addition, several system options are defined by the installation configuration. One of these is EGPWS lamp format. Two formats are provided; Lamp Format 1 and Lamp Format 2. They are described and illustrated in the next page.

2.2.15 RUNWAY AWARENESS AND ADVISORY SYSTEM (OPTION FOR MK V AND MK VII ONLY)

The Honeywell Runway Awareness and Advisory System (RAAS) offers significant safety enhancements for aircraft equipped with Honeywell's MK V or MK VII Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Runway Awareness and Advisory System is a software enhancement hosted in the EGPWS Unit. RAAS uses GPS position data and the Honeywell EGPWS Database to provide aural advisories and alerts that supplement flight crew awareness of position during ground operations and on approach to landing. EGPWS protection and operation is unaltered by the addition of RAAS. RAAS installation is accomplished via a configuration database upload. The installation does require that the EGPWS has a source of GPS data, software -218-218 (or -002 or -051) or later, Terrain Database version 435 or later (454 or later if using software -230-230 or later), and the RAAS Configuration Database (RCD) or Reloadable Customer Definitions (RCD) is loaded. When enabled, RAAS operates automatically, without any action required from the flight crew. RAAS availability can be verified by performing an EGPWS self test. **See Appendix C for RAAS Maintenance Messages.**

2.2.16 STABILIZED APPROACH MONITOR (OPTION FOR MK V AND MK VII ONLY)

The Stabilized Approach Monitor function offers significant safety enhancements for aircraft equipped with Honeywell's MK V or MK VII Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Stabilized Approach Monitor is a software enhancement hosted in the EGPWS Unit. Stabilized Approach Monitor uses GPS position data and the Honeywell EGPWS Database to provide aural advisories and alerts that supplement flight crew awareness of unstabilized approach to landing. EGPWS protection and operation is unaltered by the addition of Stabilized Approach Monitor. Stabilized Approach Monitor installation is accomplished via a configuration database upload. The installation does require that the EGPWS has a source of GPS data, software -230-230 or later, Terrain Database version 454 or later, and the Reloadable Customer Definitions (RCD) is loaded. When enabled, Stabilized Approach Monitor operates automatically, without any action required from the flight crew. Stabilized Approach Monitor availability can be verified by performing an EGPWS self test. **See Appendix D for Stabilized Approach Monitor Maintenance Messages.**

2.2.17 ALTIMETER MONITOR (OPTION FOR MK V AND MK VII ONLY)

The Altimeter Monitor function offers significant safety enhancements for aircraft equipped with Honeywell's MK V or MK VII Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Altimeter Monitor is a software enhancement hosted in the EGPWS Unit. Altimeter Monitor compares Corrected Altitude to the EGPWS blended Geometric Altitude solution to provide aural advisories that supplement flight crew awareness of incorrect altimeter setting or problems with the pressure altitude system. EGPWS protection and operation is unaltered by the addition of Altimeter Monitor. Altimeter Monitor installation is accomplished via a configuration database upload. The

installation does require that the EGPWS has a source of GPS data, software -230-230 or later, Terrain Database version 454 or later, and the Reloadable Customer Definitions (RCD) is loaded. When enabled, Altimeter Monitor operates automatically, without any action required from the flight crew. Altimeter Monitor availability can be verified by performing an EGPWS self test. **See Appendix E for Altimeter Monitor Maintenance Messages.**

2.2.18 TAKEOFF FLAP CONFIGURATION MONITOR (OPTION FOR MK V AND MK VII ONLY)

The Takeoff Flap Configuration Monitor function offers significant safety enhancements for aircraft equipped with Honeywell's MK V or MK VII Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Takeoff Flap Configuration Monitor is a software enhancement hosted in the EGPWS Unit. Takeoff Flap Configuration Monitor uses GPS position data, Flap angle inputs, and the Honeywell EGPWS Database to provide aural alerts that supplement flight crew awareness of improper flap setting when the aircraft is aligned on a runway prior to takeoff. EGPWS protection and operation is unaltered by the addition of Takeoff Flap Configuration Monitor. Takeoff Flap Configuration Monitor installation is accomplished via a configuration database upload. The installation does require that the EGPWS has a source of GPS data, flap angle input, software -230-230 or later, Terrain Database version 454 or later, and the Reloadable Customer Definitions (RCD) is loaded. When enabled, Takeoff Flap Configuration Monitor operates automatically, without any action required from the flight crew. Takeoff Flap Configuration Monitor availability can be verified by performing an EGPWS self test. **See Appendix F for Takeoff Flap Configuration Monitor Maintenance Messages.**

2.2.19 LONG LANDING MONITOR (OPTION FOR MK V AND MK VII ONLY)

The Long Landing Monitor function offers significant safety enhancements for aircraft equipped with Honeywell's MK V or MK VII Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Long Landing Monitor is a software enhancement hosted in the EGPWS Unit. Long Landing Monitor uses GPS position data and the Honeywell EGPWS Database to provide aural alerts that supplement flight crew awareness of their position during a landing when the aircraft has not touched down in a nominal amount of time and/or distance. EGPWS protection and operation is unaltered by the addition of Long Landing Monitor. Long Landing Monitor installation is accomplished via a configuration database upload. The installation does require that the EGPWS has a source of GPS data, software -230-230 or later, Terrain Database version 454 or later, and the Reloadable Customer Definitions (RCD) is loaded. When enabled, Long Landing Monitor operates automatically, without any action required from the flight crew. Long Landing Monitor availability can be verified by performing an EGPWS self test. **See Appendix G for Long Landing Monitor Maintenance Messages.**

2.2.20 LOW AIRSPEED MONITOR (MK V BOEING 737NG ONLY)

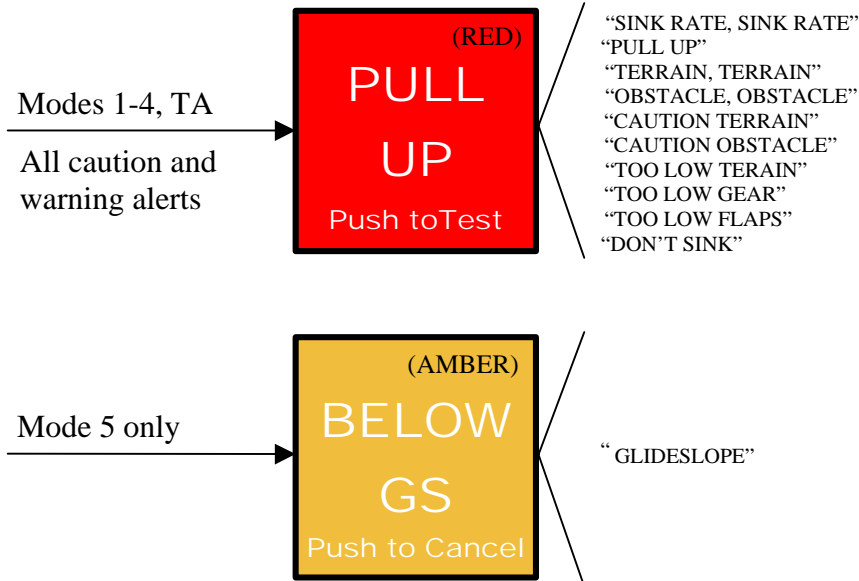
The Low Airspeed Monitor function offers significant safety enhancements for Boeing 737NG aircraft equipped with Honeywell's MK V Enhanced Ground Proximity Warning Systems (EGPWS). Honeywell's Low Airspeed Monitor is a software enhancement hosted in the EGPWS Unit. Low Airspeed Monitor uses Minimum Operating Speed and Stick Shaker Speed input from the Stall Management and Yaw Damper computers to provide an aural alert that supplements flight crew awareness that their airspeed had passes below 70% of the amber airspeed band. EGPWS protection and operation is unaltered by the addition of Low Airspeed Monitor. Low Airspeed Monitor installation is accomplished via an application software upload. The installation does require that the EGPWS has software -232-232 or later loaded. When installed, Low Airspeed Monitor operates automatically, without any action required from the flight crew. Low Airspeed Monitor availability can be verified by performing an EGPWS self test. **See Appendix H for Low Airspeed Monitor Maintenance Messages.**

2.2.21 LAMP FORMAT

The EGPWS contains two different caution/warning lamp illumination formats as described below.

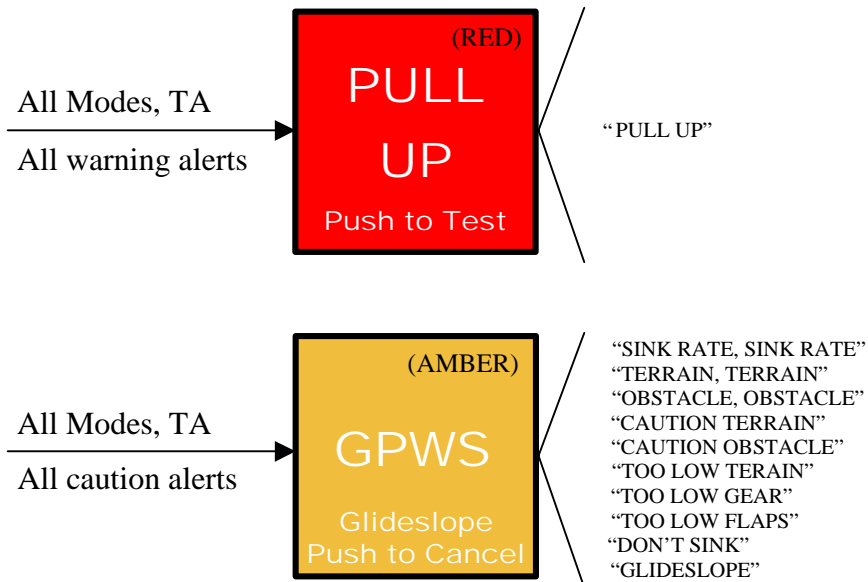
Lamp Format 1 provides EGPWS warning (red) and caution (amber) alert lamp drive logic such that:

- Only a Mode 5 “Glideslope” alert will activate the caution lamp output (amber).
- All other alerts (except “windshear” and Mode 6 callouts) will activate the warning lamp output (red).



Lamp Format 2 provides EGPWS warning (red) and caution (amber) alert lamp drive logic such that:

- Only the warning alerts containing the phrase “Pull Up” will activate the warning lamp output (red).
- All other alerts (except “windshear” and Mode 6 callouts) will activate the caution lamp output (amber).



Note: Actual legends may vary.

EGPWS caution or warning alerts lamp driver outputs are activated for all Mode 1-5 GPWS alerts and Terrain or Obstacle alerts when enabled. Windshear warning and caution alerts activate separate lamp outputs when enabled.

2.3 SYSTEM MAINTENANCE

2.3.1 MAINTENANCE PHILOSOPHY

The EGPWS is an "on-condition" only maintenance system. No scheduled maintenance is required. This is accomplished by both continuous Built-In-Test (BIT) and event initiated test functions. Event initiated test refers to both power-up tests and manually activated Self-Tests. Results of these functions are indicated by system status indicators and messages so that the systems functionality can be assessed.

Detected faults are indicated to the flight crew during normal flight operations by system status annunciators or flight display (EFIS) messages in the cockpit (i.e., GPWS INOP or FAIL, W/S INOP or FAIL, TERR INOP or NOT AVAILABLE). On the ground, system status indications are expanded to direct fault isolation to the fault source whether internal or external to the EGPWC. Several levels of reporting are provided by the EGPWS Self-Test, and multiple means are provided to access the information. The intent is to provide information that will encourage the line mechanic to correct the real problem through clear fault messages and minimal effort.

2.3.2 SYSTEM OPERATION DURING AN INOP CONDITION

EGPWS continued airworthiness is predicated on system status indications. An indication of TERR INOP (only) or NOT AVAILABLE (only) is likely to indicate a loss of necessary GPS data for performing Terrain Alerting and Display functions, but has no effect on basic GPWS (Modes 1-7) functions. Additionally, a GPWS INOP (only) indicates a loss of basic GPWS functions, but this could be limited to say Mode 4 only because of a loss of necessary data required for that mode alone. In any case, the EGPWS will provide alerting based on the current capability of the EGPWC and its inputs.

For the MK VI and MK XXII, consideration should be given to any operation that will cross the boundaries of the regional database. Although this has no affect on the basic GPWS functions, the enhanced (TAD/TCF) functions will become inoperative once the aircraft leaves the database region. This is indicated by the TERR INOP or NOT AVAILABLE status indicator and the loss of terrain display when enabled and active.

2.3.3 BIT DESCRIPTION

The EGPWC contains an extensive BIT capability. The BIT functions provide high confidence that the Warning Computer and interface signal sources are operating properly, and that the EGPWS will perform its intended function. Detected failures are indicated via GPWS INOP, Windshear INOP, and Terrain INOP/NA annunciations and on the ARINC 429 bus output. Failures detected during flight are saved in the flight history and are enunciated during Level 4 of the cockpit Self-Test. BIT status is also available through the RS-232 port by use of a PC or terminal.

If the EGPWC detects an internal Warning Computer fault, it will turn on all the INOP lights. If the EGPWC detects an external input fault, it may or may not turn on the INOP light(s) depending on the input fault, the type of installation, and whether the aircraft is airborne or on the ground.

The EGPWC BIT performs three types of functions: Operation Monitoring, Operation Tests, and Restricted Tests.

Operation Monitoring consists of software checks that are performed as part of the normal Warning Computer processing. Operation Monitoring includes checks of data values and program flow control variables used for the warning computations to ensure they are within expected ranges. The statuses of various EGPWC hardware sub-systems are continuously verified including core processor checks, voice generator circuitry checks, and ARINC 429 wrap-around tests. Operation Monitoring also includes extensive testing of the input signals to ensure the EGPWC is using proper data for its calculations.

Operation Tests run during normal operation without disrupting the EGPWC warning calculations or annunciations. Operations Tests include CPU instruction set tests, A/D tolerance tests, ROM check-sum verification tests, and non-destructive RAM tests. Operation Tests are scheduled by the operating system to be performed between the routines required for normal operation.

Restricted Tests destroy data or take an excessive amount of time to complete and cannot be run during normal system operation. These tests are usually run during system power up or during a cockpit initiated Self-Test.

These tests primarily consist of more thorough hardware checks that would disrupt normal operation if continuously run.

2.3.4 EGPWC FRONT PANEL

To aid in troubleshooting the EGPWS, the front panel of the Warning Computer provides indicators and user interfaces as follows.

2.3.4.1 EGPWS STATUS LED'S

Three LED's on the EGPWC front panel provide a high level indication of overall system status. These are:

- a yellow "External Fault" LED
- a green "Computer OK" LED
- a red "Computer Fail" LED

The yellow "External Fault" LED indicates that a fault external to the EGPWC exists. The green "Computer OK" LED indicates that the EGPWC is operating correctly with no internal faults. The red "Computer Fail" LED indicates that the EGPWC has an internal fault. Further explanation of internal and external faults is given in Section 3.4.1 and Section 3.4.2.

***Useful Tip #1** – The red Computer Fail LED illuminated does not guarantee the EGPWS is failed. It is possible for invalid strapping/wiring (MK V/VII only) to cause the LED to illuminate. Before returning a MK V/VII for repair, **bench test** the unit with power/ground applied, making sure to ground the parity pin. If the red Computer Fail LED does not illuminate during this bench test, the aircraft wiring is causing the Computer Fail condition.

2.3.4.2 FRONT PANEL SELF-TEST INTERFACE (MK V AND MK VII ONLY)

The EGPWC front panel provides a Self-Test switch for activating Self-Test features described in Section 2.3.5. This switch functions the same as cockpit Self-Test switches.

2.3.4.3 AUDIO JACK (MK V AND MK VII ONLY)

The EGPWC front panel provides a headphone jack for use during Self-Test. The audio jack is a standard 600Ω monophonic audio output compatible with a standard 2-connector ¼" audio plug headphones.

2.3.4.4 FRONT PANEL PCMCIA INTERFACE

For the MK V and MK VII, a PCMCIA card slot is provided in the front panel. For the MK VI, MK VIII, and MK XXII the PCMCIA interface utilizes an external PCMCIA interface called a "SmartCable" connected to the front panel Test Connector.

The PCMCIA interface provides a data downloading capability (either loading a new database from a PCMCIA Card or downloading history data from the EGPWC to a Fault History Card).

2.3.4.5 FRONT PANEL TEST CONNECTOR

The EGPWC front panel Test Connector provides communications support capabilities intended for maintenance and test functions. For the MK V and MK VII, this includes RS-232 and 422 communications. For the MK VI, MK VIII, and MK XXII this includes RS-232, power, and signals used for PCMCIA (SmartCable) operation. These serve as access to EGPWS signal monitoring, flight history, initiating BITE tests, updating databases, and other functions. The interface is full duplex and is intended for human interaction using custom interface programs such as the Honeywell WinVIEWS[®] utility (see Appendix A).

2.3.5 SELF-TEST FUNCTIONS

The EGPWC supports a manually operated Self-Test sequence for indicating the operational status of the system. The Self-Test aurally enunciates the EGPWS status and activates outputs (lights and displays) for visual verification. The EGPWC Self-Test includes detailed configuration and status information for the EGPWC and aircraft installation, maintenance information detailing the cause of detected faults, and historical information about faults and alerts that occurred during previous flights. The Self-Test Function can only be accessed while on the ground.

NOTE: Self-Test can be inhibited based on several configuration conditions (see Self-Test Preamble section 3.3.1).

EGPWS Self-Test is divided into six levels:

- **Level 1** — Identifies the status of each of the major functions of the EGPWS. This is the normal pre-flight test performed by the flight crew.
- **Level 2** — Identifies all failures currently within the system. Level 2 is accessed by maintenance personnel to help resolve INOP conditions.
- **Level 3** — Identifies the configuration status of the Warning Computer and the installation.
- **Level 4** — Identifies faults that have occurred during past flights. This information can be used to resolve system problems reported by the flight crews.
- **Level 5** — Identifies alerts that have occurred during past flights. This information can be used to resolve system problems reported by the flight crews.
- **Level 6** — Identifies state changes in the input discretes. This information can be used to verify the installation and proper function of all discrete inputs.

Self-Test aural is heard over the cockpit speaker, cockpit interphone system, or through the headphone jack on the EGPWC front panel (MK V and MK VII only). Details of these Self-Test levels are provided in Fault Isolation Section 3.

3 FAULT ISOLATION (TROUBLESHOOTING)

3.1 GENERAL

The troubleshooting methods provided in this section identify system and sensor or subsystem faults to the lowest level possible. Additional fault isolation in the installation or associated sensors or subsystem should be performed using the aircraft installation and wiring diagrams and other supporting documentation in accordance with established maintenance procedures.

Do not remove or replace the EGPWC until all associated sensors or subsystems and their interfaces have been verified per established maintenance procedures and the fault is isolated to the EGPWC. If the troubleshooting methods determine that the EGPWC is faulty, then the EGPWC should be replaced per Section 6. Route the faulty EGPWC to an authorized repair facility for repair.

3.2 TROUBLESHOOTING GUIDE

In general, if any EGPWS Inoperative status is indicated, the EGPWC front panel LED's should be checked. The following table shows the recommended maintenance action in response to the front panel LED's.

EXTERNAL FAULT	COMPUTER OK	COMPUTER FAIL	CORRECTIVE ACTION
OFF	GREEN	OFF	Normal operation.
YELLOW	GREEN	OFF	Troubleshoot external faults using the Level 2 Self-Test. DO NOT REMOVE OR REPLACE THE EGPWC
OFF	OFF	OFF	Ensure that the EGPWC is installed in the rack correctly and power to the EGPWC is turned on.
OFF	OFF	RED	Record the Level 2 Self-Test, if possible. Remove and replace the EGPWC if required.
OFF	GREEN	RED	Record the Level 2 Self-Test, if possible. Remove and replace the EGPWC if required.
YELLOW	OFF	OFF	Troubleshoot external faults using the Level 2 Self-Test. DO NOT REMOVE OR REPLACE THE EGPWC
YELLOW	OFF	RED	Troubleshoot external faults using the Level 2 Self-Test. Remove and replace the EGPWC if required.
YELLOW	GREEN	RED	Record the Level 2 Self-Test, if possible. Troubleshoot external faults using the Level 2 Self-Test. Remove and replace the EGPWC if required.

A Terrain INOP light rarely implies an external or internal failure of the EGPWC. The Terrain INOP light may turn on if the required accuracy of the position information is not being received from the GPS, IRS, or the FMC. Therefore, if the Terrain INOP light is reported to be on (or was on), perform a Level 2 Self-Test. If no faults are present, verify that position data from the GPS, IRS, or FMC is correct (note: this sentence does not apply to internal GPS engines).

NOTE: The Computer Fail Light will illuminate during some ground test procedures that use the WinVIEWS Software utility, even although no fault exists. The EGPWS Computer Fail Light will extinguish after testing has completed.

The following sections detail the operation of the EGPWS Self-Test and its use in troubleshooting EGPWS faults, when initiated by EGPWS Self-Test switches in the aircraft. Reference is made to a “**short cancel**” and a “**long cancel**”. A “short cancel” is defined as depressing the Self-Test switch (either in the cockpit or on the EGPWC front panel) for less than 2 seconds. A “long cancel” is defined as depressing the Self-Test switch (either in the cockpit or on the EGPWC front panel) for more than 2 seconds (but not longer than 59 seconds or a fault is indicated and Self-Test is exited). The affect of these is indicated in each section.

3.3 LEVEL 1 SELF-TEST - GO/NO GO TEST

Level 1 Self-Test provides an overview of the current operational capability of the EGPWS. It is divided into 3 functions - the Preamble, Short Level 1 Self-Test, and Long Level 1 Self-Test as described in the following sections.

During Level 1 Self-Test, a *Short Cancel* terminates the Self-Test level and “CURRENT FAULTS” is enunciated to indicate activation of Level 2 Self-Test. A *Long Cancel* terminates the entire Self-Test sequence exiting Self-Test.

3.3.1 SELF-TEST PREAMBLE

When Self-Test is initiated, the Preamble is performed. This first step in the Self-Test process checks for configuration errors before starting the Short or Long Level 1 Self-Test process. If any are detected, the condition is enunciated and the Self-Test process is automatically terminated (inhibited). These are listed below with the associated probable cause and action.

TABLE 3-1: POSSIBLE PREAMBLE RESULTS

POSSIBLE SELF-TEST PREAMBLE RESULTS	
Enunciation:	“PROGRAM PIN PARITY ERROR” (MK V or MK VII only)
Probable Cause:	Wiring error in the program pins.
Action:	Verify wiring to each program pin. Verify ODD parity selected.
Enunciation:	“AIRCRAFT TYPE INVALID” (MK V or MK VII only)
Probable Cause:	Wiring error to the Aircraft Type program pins.
Action:	Verify wiring to the Aircraft Type program pins.
Enunciation:	“CONFIGURATION TYPE INVALID” (MK VI, MK VIII, MK XXII only)
Probable Cause:	The programmed configuration type is not a valid configuration.
Action:	Correct and reprogram the Configuration Module (see Maintenance Practices section)
Enunciation:	“AIRCRAFT CONFIGURATION DATA BASE FAILED” (MK V or MK VII only)
Probable Cause:	EGPWC internal Configuration database error.
Action:	Pull power to the EGPWS for one minute and cycle power to clear all potential faults before removing or replacing the EGPWC for repair (see Removal/Installation section)
Enunciation:	“ APPLICATION DATA BASE FAILED” (MK VI, MK VIII, MK XXII only)
Probable Cause:	EGPWC internal Application database error.
Action:	Pull power to the EGPWS for one minute and cycle power to clear all potential faults before removing or replacing the EGPWC for repair (see Removal/Installation section)
Enunciation:	“AIRCRAFT CONFIGURATION DATA BASE CRC FAILED” (MK V or MK VII only)
Probable Cause:	EGPWC internal configuration database error.
Action:	Pull power to the EGPWS for one minute and cycle power to clear all potential faults before removing or replacing the EGPWC for repair (see Removal/Installation section)
Enunciation:	“ APPLICATION DATA BASE CRC FAILED” (MK VI, MK VIII, MK XXII only)
Probable Cause:	EGPWC internal Application database error.
Action:	Pull power to the EGPWS for one minute and cycle power to clear all potential faults before removing or replacing the EGPWC for repair (see Removal/Installation section)
Enunciation:	“CONFIGURATION MODULE READ ERROR” (MK VI, MK VIII, MK XXII only)
Probable Cause:	The Configuration Module is faulty.
Action:	Verify Configuration Module connections. Cycle power to the EGPWC. If the problem persists, reprogram the Configuration Module. IF the condition persist, replace the Configuration Module. See Removal/Installation section.

POSSIBLE SELF-TEST PREAMBLE RESULTS	
Enunciation:	“CONFIGURATION MODULE NOT PROGRAMMED” (MK VI, MK VIII, MK XXII only)
Probable Cause:	The Configuration Module is not programmed.
Action:	Program the Configuration Module. See Maintenance Practices section.
Enunciation:	“CONFIGURATION MODULE NOT COMPATIBLE” (MK VI, MK VIII, MK XXII only)
Probable Cause:	The Configuration Module is not compatible with the EGPWC h/w or s/w or it's faulty.
Action:	Verify Configuration Module connections. Cycle power to the EGPWC. If the problem persists, reprogram or replace the Configuration Module (see Removal/Installation section).
Enunciation:	“GPWS INHIBITED”, “TERRAIN INHIBITED”
Probable Cause:	The “Audio Inhibit” or both “GPWS Inhibit” and “Terrain Inhibit” discrete inputs are true.
Action:	Deselect or remove these inputs.
Enunciation:	“GPWS INHIBITED”
Probable Cause:	The “GPWS Inhibit” discrete input is true (selected) and “Terrain Inhibit” is not.
Action:	Deselect or remove this input.
Enunciation:	“SELF-TEST INHIBITED”
Probable Cause:	The “Steep Approach” input discrete(s) is enabled and active (selected).
Action:	Deselect or remove this input (cockpit switch).

3.3.2 SHORT LEVEL 1 SELF-TEST

The Short Level 1 Self-Test is intended to provide a Go/No Go confidence test to indicate EGPWS functionality. It indicates which Modes of the EGPWC are currently not available and activates system outputs. The short Level 1 Self-Test is a subset of the Long Level 1 Self-Test.

Upon successful completion of the preamble the short Self-Test is started. A Short Level 1 Self-Test sequence (following the Preamble) is as follows:

- GPWS INOP, Windshear INOP, Terrain INOP (or Terrain Not Available) lights turn on *
- Amber caution (GPWS or Below G/S) lights turn on
- Voice: “GLIDESLOPE”
- Amber caution (GPWS or Below G/S) lights turns off
- G/S Cancel light turns on (if installed)
- G/S Cancel light turns off (if installed)
- Red Warning (Pull Up or GPWS) lights turns on
- Voice: “PULL UP”
- Red Warning (Pull Up or GPWS) lights turns off
- Red Windshear Warning lights turns on
- Voice: “(SIREN) WINDSHEAR, WINDSHEAR, WINDSHEAR”
- Red Windshear Warning lights turns off
- Amber Windshear Caution lights turns on (if installed)
- Amber Windshear Caution lights turns off (if installed)
- Red Warning (Pull Up or GPWS) lights turns on
- Voice: “TERRAIN, TERRAIN, PULL UP” (or “WARNING TERRAIN” for MK XXII)
- Terrain test pattern is displayed
- If RAAS is enabled, a RAAS Maintenance Message from Table C1-1 will be enunciated.
- If Stabilized Approach Monitor is enabled but inoperative or inhibited, it will be enunciated.
- If Altimeter Monitor is enabled but inoperative, it will be enunciated.
- If Takeoff Flap Configuration Monitor is enabled but inoperative or inhibited, it will be enunciated.
- If Low Airspeed Monitor is enabled, a Maintenance Message from Table H1-1 will be enunciated.
- Red Warning (Pull Up or GPWS) lights turns off
- Terrain test pattern is turned off (after several sweeps)
- GPWS INOP, Windshear INOP, and Terrain INOP (or Terrain Not Available) lights turn off

Installations that do not have the windshear function or the function enabled will not enunciate the windshear message and illuminate windshear alert lights. Similarly, installations without the Terrain Alerting and Display (TAD) function enabled will not have terrain lights and display or "TERRAIN" aural enunciation.

- **NOTE: The general sequence of the LEVEL 1 SELF-TEST is the same for all installations. The actual aural message and nomenclature of the Alert/warning lamps will vary.**
- NOTE: Ensure that none of the RAAS maintenance messages or RAAS On-Ground (display) status messages listed in Appendix C of this document is enunciated during the Level 1 Self-Test or terrain display range changes (respectively) unless RAAS is activated for your aircraft. See the applicable aircraft AFMS and/or Instructions for Continued Airworthiness (ICAW) documentation to determine if RAAS is activated.
- NOTE: An enunciation of "GPS NOT NAVIGATING" during the Level 1 Self-Test indicates that the Internal P-xPress GPS engine has not acquired sufficient satellites to navigate. If this message is enunciated, ensure the aircraft is in full view of the constellation for at least 20 minutes. If this does not resolve the enunciation, verify all interfaces of the coax cable from the antenna to the EGPWC.

3.3.3 LONG LEVEL 1 SELF-TEST

The Long Level 1 Self-Test is initiated by pressing and holding Self-Test until Self-Test voices start. The Long Level 1 Self-Test enunciates all configured and activated alert voices, including warning voices, caution voices, and altitude callout voices immediately following the Short Level 1 Self-Test sequence above.

3.4 LEVEL 2 SELF-TEST - CURRENT FAULTS

Level 2 Self-Test provides enunciation of all faults existing at the time of the test request. Level 2 Self-Test is initiated by pressing Self-Test within 3 seconds of the end of Level 1 Self-Test or following a *short cancel* during Level 1 Self-Test.

If a fault is detected, it will be classified as either an internal or an external fault. Internal faults are defined as those faults that originate within the EGPWC. Internal faults will turn on the red "COMPUTER FAIL" LED on the EGPWC front panel. External faults are defined as those faults that originate from sources outside the EGPWC. External faults will turn on the amber "EXTERNAL FAULT" LED on the EGPWC front panel.

Note that for the EGPWS/GNSSU (-060 MK V/VII), both internal and external fault lights will be lit if there is a problem with the integral GNSSU subsystem.

If the EGPWC is connected to a GPS or GNSSU for position information (internal or external), various navigation data status messages may also be listed during Level 2 Self Test. These messages indicate that there is a problem with the position data, caused by antenna problems, satellite visibility or multi-path errors.

***Useful Tip #2** – Pressing the GPWS test switch for more than 2 seconds during Level 2 through 5 will bypass the test information and will immediately jump to the end of that level ("PRESS TO CONTINUE" voice). GPWS INOP, Windshear INOP, and Terrain INOP (or Terrain Not Available) lights are turned on (or remain on) for the duration of the Level 2 Self-Test.

3.4.1 CURRENT FAULTS - INTERNAL

An internal fault indicates a problem with the EGPWC. The following table lists the internal fault messages and the probable maintenance response.

Note: "NO FAULTS" is enunciated for Level 2 Self-Test if no faults are present.

TABLE 3-2: LEVEL 2 SELF-TEST - INTERNAL FAULTS

Enunciation:	ROM FAILED RAM FAILED NVM RAM FAILED NVM FAILED WATCHDOG TIMER TEST FAILED EXCESSIVE WATCHDOG TIMEOUTS FAILURE ANALOG CONVERTER FAILED* VOICE GENERATOR FAILED ARINC 429 TRANSMITTER FAILED ARINC 429 RECEIVER FAILED FLASH FILE SYSTEM WRITE FAILED (fixed by MK VI, VIII, XXII Hardware Mod 2) APPLICATION DATABASE FAILED (DSP or CRC) TERRAIN DATABASE FAILED (CRC or Runway or Mag. Var.)*** TERRAIN DATABASE NOT COMPATIBLE ENVELOPE MODULATION DATABASE FAILED CONFIGURATION DATABASE FAILED (MK V/VII) APPLICATION DATABASE FAILED (MK VI/VIII/XXII) CONFIGURATION DATABASE AAC DATA FAULT SYSTEM OR MODE TASK FAILED SUPPORT TASK FAILED INTERNAL GPS FAILED** APPLICATION SOFTWARE VERSION INVALID RCD FAILED (MK V/VII)
Probable Cause:	EGPWC failure
Action:	Remove and replace the EGPWC.

Notes: If external faults also exist, these should be eliminated, and the internal faults rechecked before the EGPWC is removed and replaced.

* Power unit on bench with parity pin strapped, and verify the failure is cleared.

** If the EGPWC incorporates the integral Mercury GNSSU (-060 hardware part numbers), both internal and external faults will be indicated. This fault can also be indicated if there is no antenna connection to the GNSSU. Before replacing the EGPWC/GNSSU, ensure that the antenna is connected and that no antenna wiring breaks exist.

*** Invalid Latitude/Longitude causes a Mag Var table fault which may be annunciated as "Terrain Database Failed" This can be caused by not connecting the GPS antenna.

3.4.2 CURRENT FAULTS - EXTERNAL

An external fault indicates a problem with an external sensor, system, or wiring. External faults are further broken down in to sub-categories; Discrete Faults, ARINC 429 Bus Activity Faults, Analog Input Wire Monitoring Faults, ARINC 429 Signal Faults, Analog Signal Faults, and Program Pin or Configuration Module Faults. The following table provides a few examples of these.

TABLE 3-3: CURRENT FAULTS - EXTERNAL (EXAMPLES)

FAULT	EXAMPLE	REASON
ARINC 429 Bus Fault	GPS BUS 1 INACTIVE	No expected input labels received for more than 4 seconds
ARINC 429 Signal Fault	ILS BUS 1 GLIDESLOPE FAULT FW	The SSM of the input data indicates Failure/Warning Note: Only the RS232 present Status will report the 'FW' part of the fault.
ARINC 429 Signal Fault	ILS BUS 1 GLIDESLOPE FAULT UPD	The input label is not meeting the required update rate. Note: Only the RS232 present Status will report the 'UPD' part of the fault.
Analog Signal Fault	RADIO ALTIMETER 1 WIRING FAULT	Open wire monitoring has detected no connection.
	AOA UNREASONABLE FAULT	AOA is not within 4 degrees of waterline during takeoff roll (60-90 knots). Incorrect Aircraft Configuration or AOA potentiometer is Worn.
Discrete Input Faults	FLAP SWITCH FAULT	Indicates Landing Flaps for > 60 seconds with an airspeed > 250 knots, or indicates Not Landing Flaps for more than 2 seconds with "Too Low Flaps" message below 100 feet.
	GEAR SWITCH FAULT	Indicates Landing Gear for > 60 seconds with an airspeed > 290 knots, or indicates Not Landing Gear for more than 2 seconds with "Too Low Gear" message below 100 feet.
	AUDIO CANCEL INVALID	Discrete selected for > 30 seconds.
	TERRAIN INHIBIT INVALID	Discrete selected for > 60 seconds.
	GPWS INHIBIT INVALID	Discrete selected for > 60 seconds.
	ALL MODES INHIBIT INVALID	Discrete configured to suppress both audio and visual outputs and selected for > 60 seconds. Or if aircraft type is configured for 'Audio Inhibit Monitoring' then activation for > 60 seconds to inhibit only audio will cause this fault.
	GLIDESLOPE CANCEL INVALID	Discrete selected for > 15 seconds.
	ILS SELECT INVALID	More than 1 discrete selected for > 5 seconds.
	FLAP ANGLE UNREASONABLE	Invalid combination selected for > 30 seconds.
	RANGE UNREASONABLE	No valid range provided for > 5 seconds.
	SELF-TEST INVALID	Discrete selected for > 60 seconds.
	AIR GROUND INVALID	Indicates On-Ground for > 60 seconds with an airspeed > 290 knots.
MOMENTARY TERRAIN SELECT 1 (or 2) INVALID	Selected for > 15 seconds.	

TABLE 3-4: LEVEL 2 SELF-TEST - EXTERNAL FAULTS

THE FOLLOWING EXTERNAL FAULTS ARE AVAILABLE IN LEVEL 2 SELF-TEST:	
Enunciation:	"<BUS> Inactive"
Example:	GPS BUS 1 Inactive
Probable Cause:	Input source not powered or a wiring problem exists between source LRU and the EGPWC.
Action:	Verify input source LRU is powered. Verify wiring from the source LRU. Verify program pin configuration.
Enunciation:	"<BUS><SIGNAL> FAULT"
Example:	ILS BUS 1 GLIDESLOPE FAULT
Probable Cause:	Input signal SSM = Fail Warning, or Input signal is not being transmitted (incorrect update rate).
Action:	Repair input signal.
Enunciation:	"<SIGNAL> FAULT ESE" (See Table 3-5 for other failure codes)
Probable Cause:	External signal is outside reasonable limits
Action:	Verify signal scaling
Enunciation:	"<BUS> WIRING FAULT"
Example:	RADIO ALTIMETER 1 WIRING FAULT
Probable Cause:	Open wire monitor has detected no connection from the source LRU.
Action:	Verify wiring from the source LRU.
Enunciation:	"FLAP SWITCH FAULT"
Probable Cause:	Electrical short at the flap discrete input.
Action:	Verify wiring from the flap override switch and/or flap input discretes.
Enunciation:	"GEAR SWITCH FAULT"
Probable Cause:	Electrical short at the gear discrete input.
Action:	Verify wiring from the gear override switch and/or gear input discrete.
Enunciation:	"AUDIO CANCEL INVALID"
Probable Cause:	Electrical short at the audio cancel input.
Action:	Verify wiring from the audio cancel switch.
Enunciation:	"ALL MODES INHIBIT INVALID"
Probable Cause:	Electrical short at the audio cancel input.
Action:	Verify wiring from the audio cancel input.
Enunciation:	"GLIDESLOPE CANCEL INVALID"
Probable Cause:	Electrical short at the glideslope cancel input.
Action:	Verify wiring from the glideslope cancel input.
Enunciation:	"ILS SELECT INVALID"
Probable Cause:	Electrical short at the ILS Select inputs.
Action:	Verify wiring from the ILS Select switches.
Enunciation:	"FLAP ANGLE UNREASONABLE"
Probable Cause:	Electrical short at the flap discrete input(s).
Action:	Verify wiring from the flap-input discrete(s).

THE FOLLOWING EXTERNAL FAULTS ARE AVAILABLE IN LEVEL 2 SELF-TEST:	
Description:	SELF-TEST INVALID (WinVIEWS ONLY)
Probable Cause:	Electrical short at the Self-Test input.
Action:	Verify wiring from the Self-Test discrete.
Enunciation:	“MOMENTARY TERRAIN SELECT 1 (or 2) INVALID”
Probable Cause:	Electrical short at the Terrain Select inputs.
Action:	Verify wiring from the terrain “ON” switches.
Enunciation:	“PROGRAM PIN READ ERROR”
Probable Cause:	Wiring error to the program pins.
Action:	Verify wiring to each program pin.
Enunciation:	“CALLOUTS OPTION INVALID”
Probable Cause:	Wiring error to the Callout Options program pins.
Action:	Verify wiring to the Callout Options program pins.
Enunciation:	“AUDIO MENU INVALID”
Probable Cause:	Wiring error to the Audio Menu program pins.
Action:	Verify wiring to the Audio Menu program pins.
Enunciation:	“PROGRAM PIN <XX> INVALID” (where XX is a number)
Probable Cause:	Invalid option selected.
Action:	Verify wiring to all program pins.
Description:	“CONFIGURATION MODULE READ ERROR” (WinVIEWS ONLY)
Probable Cause:	The Configuration Module is faulty.
Action:	Cycle power to EGPWC. If fault persists, reprogram or replace the Configuration Module.
Description:	“CONFIGURATION MODULE NOT PROGRAMMED” (WinVIEWS ONLY)
Probable Cause:	The Configuration Module is new, or never has been programmed.
Action:	Reprogram the Configuration Module. See Appendix C.
Description:	“CONFIGURATION MODULE NOT COMPATIBLE (WinVIEWS ONLY)
Probable Cause:	The Configuration Module is faulty.
Action:	Cycle power to the EGPWC. If the persist reprogram the Configuration Module. If the condition persist, replace the Program Module. See Appendix C.
Description:	“SUPPORT TASK FAILED”
Probable Cause:	Fault History Memory Full.
Action:	Erase Fault History.
Description:	“SYSTEM OR MODE TASKED FAILED”
Probable Cause:	Conflicting Configuration of the same channel.
Action:	Check configuration of channels.
Description:	“MOMENTARY FLAP OVERRIDE INVALID”
Probable Cause:	Electrical short at the Flap Override input.
Action:	Verify wiring from the Flap Override Switch.

Failure Identifier	Failure Meaning
F/W	The 429 SSM indicates Failure Warn (F/W) The presence of this message indicates that the data from the 429 signal is in the F/W state.
NCD	The 429 SSM indicates No Computed Data (NCD) The presence of this message indicates that the data from the 429 signal is in the NCD state. (Note: relatively few signals are faulted due to NCD – refer to the individual input processing requirements for each signal to see if NCD is to be considered as a fault for that signal).
UPD	Update Failure The presence of this message indicates that the signal has an update failure.
FLP	Flaps Undefined This message indicates the flaps are in an undefined position/setting.
UNR	Data Unreasonable The presence of this message indicates a data unreasonable condition.
ESE	AAC External Signal Error This message indicates that the data from the Analog Acquisition Card has an External Signal Error validity classification.
EVD	AAC External Validity Discrete Error This message indicates an EM7 analog input is faulted due to the External Validity indicating that this input is invalid.

TABLE 3-5: GENERAL FAILURE CODE IDENTIFIERS

Only one of the Failure Identifiers is recorded per faulted signal. If there are multiple conditions causing a faulted signal, the highest priority failure condition identifier is recorded. The failure condition priorities are as follows:

Failure Condition	Priority
Update Failure	Highest ↓ ↓ ↓ ↓ Lowest.
Failure Warning	
NCD	
Flaps Undefined	
Data Unreasonable	

For EM7 Analog Data Only:

Failure Condition	Priority
Update Failure	Highest ↓ ↓ ↓ ↓ ↓ Lowest
External Signal Error	
External Validity Discrete	
Failure Warning	
NCD	
Data Unreasonable	

For example, if the Computed Airspeed from Air Data Computer #1 is failed (i.e., SSM = Fail Warning), the following messages would be enunciated:

- “CURRENT FAULTS”
- “EGPWC OK”
- “EXTERNAL FAULTS”
- “AIR DATA BUS 1 COMPUTED AIRSPEED FAULT”
- “PRESS TO CONTINUE”

NOTE: Before attempting to correct an external fault, verify that the EGPWS installation configuration matches the aircraft configuration. If the installation configuration and aircraft configuration does not match, check the Program Pin or Configuration Module connections being sure to cycle power to the EGPWC in the process. If an incorrect aircraft configuration exists, the Program Pins must be changed or the Configuration Module may need to be reprogrammed (see Maintenance Practices) or replaced (see Removal/Installation section).

If the unit is a MK V or MK VII with integral GNSSU (-060 part number), and external faults are indicated on GPS signals (e.g., GPS BUS 1 LATITUDE FAULT), an internal fault may exist. In this case both fault lights will be on and the message INTERNAL GPS FAULT will also be indicated. This condition can also be caused by a disconnected or broken antenna wire. Ensure good antenna connection before replacing the EGPWS/GNSSU.

If no faults are detected, the following messages will be enunciated:

- “CURRENT FAULTS”
- “NO FAULTS”
- “PRESS TO CONTINUE”

If no faults are detected, but the GPS or GNSSU are not navigating properly, navigation status messages may be enunciated as follows:

- “CURRENT FAULTS”
- “NO FAULTS”
- Navigation Status Messages* “PRESS TO CONTINUE”

The list of possible navigation problems is listed in Table 3–6. In these instances, no fault lamps will be lit on the unit, however, TERRAIN INOP or TERRAIN UNAVAILABLE will be indicated on the Flight Deck.

TABLE 3-6: LEVEL 2 SELF-TEST – NAVIGATION STATUS MESSAGES

THE FOLLOWING GPS STATUS MESSAGES ARE AVAILABLE IN LEVEL 2 SELF-TEST:	
Enunciation:	“TERRAIN AWARENESS NO VALID LATITUDE”
Probable Cause:	GPS/GNSSU has not acquired a sufficient number of satellites.
Action:	Remove aircraft from hanger and wait 5 to 20 minutes for the GPS/GNSSU acquire a sufficient number of satellites. Verify cabling and antenna connection for the GPS/GNSSU.
Enunciation:	“TERRAIN AWARENESS NO VALID LONGITUDE”
Probable Cause:	GPS/GNSSU has not acquired a sufficient number of satellites.
Action:	Remove aircraft from hanger and wait 5 to 20 minutes for the GPS/GNSSU acquire a sufficient number of satellites. Verify cabling and antenna connection for the GPS/GNSSU.
Enunciation:	“TERRAIN INOP”
Probable Cause:	GPS/GNSSU has not acquired a sufficient number of satellites.
Action:	Remove aircraft from hanger and wait 5 to 20 minutes for the GPS/GNSSU to acquire sufficient number of satellites. Verify cabling and antenna connection for the GPS/GNSSU.
Description:	“TERRAIN AWARENESS-POSITION ERROR”
Probable Cause:	GPS/GNSSU has not acquired a sufficient number of satellites or ARINC [743A / 743] setting incorrect.
Action:	Remove aircraft from hanger and wait 5 to 20 minutes for the GPS/GNSSU to acquire sufficient number of satellites. Verify cabling and antenna connection for the GPS/GNSSU. Verify correct 743A / 743 configuration.
Enunciation:	“TERRAIN CLEARANCE FLOOR POSITION ERROR”
Probable Cause:	GPS/GNSSU has not acquired a sufficient number of satellites or ARINC [743A / 743] setting incorrect.
Action:	Remove aircraft from hanger and wait 5 to 20 minutes for the GPS/GNSSU to acquire sufficient number of satellites. Verify cabling and antenna connection for the GPS/GNSSU. Verify correct 743A / 743 configuration.

3.5 LEVEL 3 SELF-TEST - SYSTEM CONFIGURATION

A Level 3 Self-Test enunciates EGPWC configuration information. Level 3 is accessed while the aircraft is on the ground by pressing the EGPWS test switch within 3 seconds of the “PRESS TO CONTINUE” message at the end of the Level 2 test. The message “SYSTEM CONFIGURATION” will be enunciated when Level 3 starts.

During a Level 3 Self-Test, a short cancel bumps the enunciation to the next Level 3 item (e.g. from terrain database information to envelope modulation database information). A long cancel terminates the Self-Test level and “PRESS TO CONTINUE” is enunciated for proceeding to Level 4 Self-Test.

TABLE 3-7: LEVEL 3 SELF-TEST INFORMATION

THE FOLLOWING INFORMATION IS GIVEN IN THE LEVEL 3 SELF-TEST:	
1.	Part Number
2.	Mod Status
3.	Serial Number
4.	Application Software Version or (only for PNs 965-1676-XXX and 965-1690-XXX) Software Version
5.	Configuration Software Version (only for PNs 965-0976-XXX or 965-1076-XXX)
6.	Terrain Database Version
7.	Envelope Modulation Database Version
8.	Boot Code Version
9.	RAAS RCD Part Number (MK V/VII and RAAS enabled only)
10.	Aircraft Type
11.	Audio Menu
12.	Altitude Callout Menu
13.	All other selected options from installation configuration. Note that only those features that are enabled or disabled from the basic configuration are enunciated. The order of the enunciation will vary depending on Aircraft configuration.
	“SMART CALLOUT SELECTED”
	“AUDIO DECLUTER DISABLED”
	“ARINC 743 GPS SELECTED”
	“WINDSHEAR CAUTION WITH VOICE SELECTED”
	“TERRAIN CLEARANCE FLOOR DISABLED”
	“TERRAIN AWARENESS DISABLED”
	“BANK ANGLE SELECTED”
	“OBSTACLE AWARENESS SELECTED”
	“PEAKS ENABLED”
	“INTERNAL GPS SELECTED”
	“FLASH “L” “A” “M” “P” “S” SELECTED” -204-204 software versions and earlier
	“FLASHING LAMP SELECTED” -206-206 software versions and later
	“POP-UP DISABLED”
	“FLAP “R” “E” “V” SELECTED” -204-204 software versions and earlier
	“FLAP REVERSAL SELECTED” -206-206 software versions and later
	“FLAP “W” “O” “W” REVERSAL SELECTED” (MK XXII)
	“MODE SIX LOW VOLUME SELECTED” (discrete)/ “MODE 6 Low Volume Program Pin Selected “ (pp12)
	“AUDIO INHIBIT MONITOR SELECTED”
	“EGPWS INHIBITED”
	“GLIDESLOPE INHIBITED”

THE FOLLOWING INFORMATION IS GIVEN IN THE LEVEL 3 SELF-TEST:	
"IRS 1 ATTITUDE MODE SELECTED"	
"MODE 6 INOP-NO Decision Height" (approaching minimums in menu).	
"STEEP APPROACH ACTIVATED"	
"STEEP APPROACH ENABLED"	
"STEEP APPROACH SELECTED"	
"VISUAL SUPPRESS ENABLED"	
"ALTERNATE VOLUME 1 SELECTED"	
"QFE SELECTED"	
"ALTN G/S CANCEL "	
"OPTIONAL INPUTS SELECTED"	
"SINGLE GPS SELECTED"	
"DUAL GPS SELECTED"	
"SINGLE GPIRS SELECTED"	
"DUAL GPIRS SELECTED"	
"DUAL ILS SELECTED"	
"DUAL RA SELECTED"	
"TRIPLE RA SELECTED"	
"WINDSHEAR DISABLED"	
"WINDSHEAR INOP DISABLED"	
"SIM REPOSITION ENABLED"	
"BANK ANGLE DISABLED"	
"ALTERNATE RA 1 SELECTED "	
"ALTERNATE RA 2 SELECTED "	
"ALTN GPS BUS SPEED SELECTED "	
"PWS OPTION 1 SELECTED "	
"PWS OPTION 2 SELECTED"	
"ALTERNATE POP UP SELECTED "	
"BANK ANGLE OPTION 1 SELECTED"	
"BANK ANGLE OPTION 2 SELECTED"	
"CONFIGURATION OPTION 1 SELECTED"	
"CONFIGURATION OPTION 2 SELECTED"	
"ALTERNATE MODE 4B REV SELECTED"	
"LAMP FORMAT 2 SELECTED"	
"ALTERNATE DISPLAY 1 SELECTED"	
"ALTERNATE DISPLAY 2 SELECTED"	
"ALTERNATE DISPLAY 3 SELECTED"	
"ALTERNATE DISPLAY 4 SELECTED"	
"ALTERNATE DISPLAY 5 SELECTED"	
"ALTERNATE DISPLAY 6 SELECTED"	
"ALTERNATE DISPLAY 7 SELECTED"	
"ALTERNATE DISPLAY 8 SELECTED"	
"ALTERNATE DISPLAY 9 SELECTED"	
"ALTERNATE VOLUME 2 SELECTED"	
"ALTERNATE MODE 6 VOLUME" SELECTED"	

THE FOLLOWING INFORMATION IS GIVEN IN THE LEVEL 3 SELF-TEST:	
	<i>"GPS ALTITUDE REF WGS84 SELECTED"</i>
	<i>"AUTOROTATION CALLOUT X SELECTED" (MK XXII)</i>
	<i>"NORMAL POPUP RANGE X SELECTED" (MK XXII)</i>
	<i>"LOW ALTITUDE POPUP RANGE X SELECTED" (MK XXII)</i>
	<i>"MODE 6B ALWAYS ON SELECTED" (MK XXII)</i>
	<i>"NORMAL TERRAIN WITH AIRSPEED SELECTED" (MK XXII)</i>
	<i>"LOW ALTITUDE WITH AIRSPEED SELECTED" (MK XXII)</i>
	<i>"SAR LOW ALTITUDE SELECTED" (MK XXII)</i>
	<i>"AUDIO INHIBIT TIME X" (MK XXII)</i>
	<i>"INHIBIT ALL EXCEPT MINIMUMS TYPE CALLOUT AND 100 CALLOUT SELECTED" (MK XXII)</i>
	<i>"INHIBIT ALL EXCEPT MINIMUMS TYPE CALLOUT SELECTED" (MK XXII)</i>
	<i>"INHIBIT TOO LOW GEAR SELECTED" (MK XXII)</i>
	<i>"INHIBIT RUNWAY CALLOUTS 50 AND BELOW SELECTED" (MK XXII)</i>
	<i>"ALTERATE DECISION HEIGHT SELECTED" (MK XXII)</i>
*	<i>"RUNWAY AWARENESS ENABLE SET" OR "RUNWAY AWARENESS ENABLED"</i>
*	<i>"APPROACH MONITOR ENABLED"</i>
*	<i>"FLAPS MONITOR ENABLED"</i>
*	<i>"ALTIMETER MONITOR ENABLED"</i>
*	<i>"LONG LANDING ENABLED"</i>
*	<i>"AIRSPEED LOW INHIBITED"</i>

*Ensure that none of these maintenance messages above or listed in Appendix C through H of this document are enunciated during the Level 3 Self-Test or terrain display range changes (respectively) unless these optional functions are activated for your aircraft. See the applicable aircraft AFMS and/or Instructions for Continued Airworthiness (ICAW) documentation to determine if these functions are activated.

3.6 LEVEL 4 SELF-TEST - FAULT HISTORY

Level 4 Self-Test provides enunciation of the faults recorded over the last 10 flight legs. Level 4 Self-Test is initiated by pressing the cockpit Self-Test button within 3 seconds of the end of Level 3 Self-Test.

If any faults were recorded in the last ten flight legs then voice sequence as described in the following table will be enunciated. Otherwise, the message "NO FAULTS" will be enunciated.

During Level 4 Self-Test, a *Short Cancel* bumps the enunciation to the next flight leg with faults (if any).

During Level 4 Self-Test, a *Long Cancel* terminates the Self-Test level and "PRESS TO CONTINUE" is enunciated for proceeding to Level 5 Self-Test.

TABLE 3-8: LEVEL 4 SELF-TEST INFORMATION

THE FOLLOWING INFORMATION IS GIVEN IN THE LEVEL 4 SELF-TEST:	
1.	Enunciate the number of the most recent flight leg with faults as "FLIGHT X", where "X" is a number from 1 to 10 where 1 is the most recent flight leg
2.	Enunciate any internal faults stored for leg X
3.	Enunciate any external faults stored for leg X
4.	Increment to next oldest leg with faults (if any) and repeat the above sequence
5.	Test proceeds to the next flight leg that contains a fault.

For Example:

If a fault occurred within the previous 10 flight legs the aural messages enunciated will be the same as given in Level 2 with the added information of which flight leg the fault occurred. For example, if radio altimeter bus 1 failed 4 flights earlier the messages would be:

- "FLIGHT 4"
- "EGPWC OK"
- "EXTERNAL FAULTS"
- "RADIO ALTIMETER BUS 1 INACTIVE"
- "PRESS TO CONTINUE"

Note that flight 1 is the most recent flight.

3.7 LEVEL 5 SELF-TEST - ALERT HISTORY

Level 5 Self-Test provides enunciation of the alerts (cautions and warnings) recorded over the last 10 flight legs. Level 5 Self-Test is initiated by pressing the cockpit Self-Test button within 3 seconds of the end of Level 4 Self-Test.

If any alerts were recorded in the last ten flight legs then voice sequence as described in the following table will be enunciated. Otherwise, the message “NO WARNINGS” will be enunciated.

During Level 5 Self-Test, a *Short Cancel* bumps the enunciation to the next flight leg with faults (if any).

During Level 5 Self-Test, a *Long Cancel* terminates the Self-Test level and “PRESS TO CONTINUE” is enunciated for proceeding to Level 6 Self-Test.

TABLE 3-9: LEVEL 5 SELF-TEST INFORMATION

THE FOLLOWING INFORMATION IS GIVEN IN THE LEVEL 5 SELF-TEST:	
1.	Enunciate the number of the most recent flight leg with alerts as “FLIGHT X”, where “X” is a number from 1 to 10 where 1 is the most recent flight leg
2.	Enunciate any alerts stored for leg X
3.	Increment to next oldest leg with alerts (if any) and repeat the above sequence

For Example:

If a glideslope alert were given 7 flight legs earlier, the messages would be:

“WARNING HISTORY”
 “FLIGHT 7”
 “GLIDESLOPE”
 “PRESS TO CONTINUE”

3.8 LEVEL 6 SELF-TEST - DISCRETE INPUT TEST

Level 6 Self-Test provides enunciation of any changes in the status of discrete inputs for verification proper function and discrete input wiring. Level 6 Self-Test is initiated by pressing the cockpit Self-Test button within 3 seconds of the end of Level 5 Self-Test. The results are indicated in the following sections.

If a state change occurs on any discrete input (other than the Self-Test input as it is directly tested in its use to control the test sequences), the EGPWC will annunciate the functional name of the discrete followed by its new state. For example, if the Glideslope Cancel discrete input in the current configuration is defined as ground = cancel, and the discrete transitions from open to ground, Level 6 Self-Test will say: “GLIDESLOPE CANCELED”. If the input is only momentarily grounded Level 6 Self-Test will say: “GLIDESLOPE CANCELED - GLIDESLOPE ENABLED.”

NOTE: Not all discrettes are used in an installation; therefore, unused discrettes shall not apply. See aircraft wiring diagrams to determine applicable discrettes.

During Level 6 Self-Test the message “DISCRETE INPUT TEST - PRESS TO CANCEL” is enunciated every 60 seconds. This provides additional evidence; along with the continued illumination of the INOP lights/fail annunciations, that Self-Test is still in progress.

During Level 6 Self-Test, a *Short Cancel* or *Long Cancel* terminates Self-Test and “END OF SELF-TEST” is enunciated. As with all Self-Test levels, if the aircraft goes in air, then Self-Test is terminated.

3.8.1 ARINC 552 / ALT 55 RADIO ALTITUDE VALIDITY FLAG DISCRETES

Three Radio Altitude validity flags may be used by the EGPWS, one for each of the three possible ARINC 552 or ALT 55 Radio Altimeters inputs.

Type Validity from ARINC 552 or ALT 55 Radio Altimeter.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Radio Altitude Validity Discrete #1	Valid => "Radio Altimeter 1 Valid" Invalid => "Radio Altimeter 1 Invalid"
Radio Altitude Validity Discrete #2	Valid => "Radio Altimeter 2 Valid" Invalid => "Radio Altimeter 2 Invalid"
Radio Altitude Validity Discrete #3	Valid => "Radio Altimeter 3 Valid" Invalid => "Radio Altimeter 3 Invalid"

3.8.2 GND LANDING GEAR DISCRETE

Type Supplied by landing gear or landing gear selector handle position-sensitive switch. This input can be paralleled with, or used exclusively by a Gear Override Switch if an alternate source of Gear Position is used.

Signal Status: Landing Gear Down or Landing Gear Up

Fault monitoring: Indication of landing gear selected for more than 60 seconds at airspeeds above 290 knots will result in a gear switch fault which will cause a GPWS INOP indication.

Note: This can be caused either by a gear switch fault or by the Gear Override switch being left in the on position.

	Level 6 Audio readout
Landing Gear Discrete or Gear Override	Selected => "Landing Gear Down" Not Selected => "Landing Gear Up"

3.8.3 +28V LANDING GEAR DISCRETE

Type Supplied by landing gear or landing gear selector handle position-sensitive switch. This input can be paralleled with, or used exclusively by a Gear Override Switch if an alternate source of Gear Position is used.

Signal Status: Landing Gear Down or Landing Gear Up

Fault monitoring: Indication of landing gear selected for more than 60 seconds at airspeeds above 290 knots will result in a gear switch fault which will cause a GPWS INOP indication.

Note: This can be caused either by a gear switch fault or by the Gear Override switch being left in the on position.

	Level 6 Audio readout
+28 V Landing Gear Discrete or Gear Override	Selected => "28V Landing Gear Down" Not Selected => "28V Landing Gear Up"

3.8.4 GND LANDING FLAP DISCRETE OR FLAP OVERRIDE

Type: Supplied by Flap or Flap selector handle switch. This input can be paralleled with, or used exclusively by a Flap Override Switch if an alternate source of Flap Position is used.

Signal Status: Landing Flaps or Not Landing Flaps

Fault monitoring: Indication of landing flaps selected for more than 60 seconds at airspeeds above 250 knots will result in a flap switch fault which will cause a GPWS INOP indication.

Note: This can be caused either by a flap switch fault or by the Flap Override switch being left in the on position.

Level 6 Audio readout	
GND Landing Flaps Discrete or Flap Override	Selected => "Flaps Selected"
	Not Selected => "Flaps Not Selected"

Note: If Flap Reversal Program Pin is enabled for MK VII EGPWC, the Audio readout will be:

Level 6 Audio readout	
GND Landing Flaps Discrete or Flap Override	Selected => "Flaps Selected"
	Not Selected => "Flaps Not Selected"

3.8.5 +28V LANDING FLAP OR FLAP OVERRIDE DISCRETE

Type: Supplied by Flap or Flap selector handle switch. This input can be paralleled with, or used exclusively by a Flap Override Switch if an alternate source of Flap Position is used.

Signal Status: Landing Flaps or Not Landing Flaps

Fault monitoring: Indication of landing flaps selected for more than 60 seconds at airspeeds above 250 knots will result in a flap switch fault which will cause a GPWS INOP indication.

Note: This can be caused either by a flap switch fault or by the Flap Override switch being left in the on position.

Level 6 Audio readout	
+28 V Landing Flaps Discrete or Flap Override	Selected => "28V Flaps Selected"
	Not Selected => "28V Flaps Not Selected"

Note: If Flap Reversal Program Pin is enabled for MK VII EGPWC, the Audio readout will be:

Level 6 Audio readout	
GND Landing Flaps Discrete or Flap Override	Selected => "Flaps Selected"
	Not Selected => "Flaps Not Selected"

3.8.6 FLAP POSITION DISCRETES

Up to four flap position discretets are typically supplied from the flap selector handle switch.

Type: Supplied by Flap selector handle switch.

Signal Status: Flap position selected.

Fault monitoring: Depending on the installation, activation of more than one, or none of these discretets for more than 30 seconds will result in a Flap Unreasonable indication.

	Level 6 Audio readout
Flap Position Discrete #1	Selected => "Flap 1 True" Not Selected => "Flap 1 False"
Flap Position Discrete #2	Selected => "Flap 2 True" Not Selected => "Flap 2 False"
Flap Position Discrete #3	Selected => "Flap 3 True" Not Selected => "Flap 3 False"
Flap Position Discrete #4	Selected => "Flap 4 True" Not Selected => "Flap 4 False"

3.8.7 SELF-TEST DISCRETE

Type: Supplied by momentary actuated cockpit self-test switch

Signal Status: Self-Test or Normal

Fault monitoring: Activation of this input continuously for more than 60 seconds will result in the "Self-Test Invalid" fault which will cause a GPWS INOP indication.

Note: This input is used to start and stop the Level 6 Self-Test, there is no audio output for this discrete in Level 6.

3.8.8 STEEP APPROACH DISCRETES

To activate Steep Approach, both of the Steep Approach discretets must be selected. Discrete #1 should be enabled if Steep Approach is to be used, and can be permanently enabled. Discrete #2 should be selected in flight when starting a steep approach, it should not be permanently selected. On ground Self-Test is inhibited if Steep Approach is active.

3.8.8.1 STEEP APPROACH DISCRETE #1 (MK V AND MK VII ONLY)

Type: Steep Approach Enabled

Signal Status: Steep Approach Enabled or Disabled

	Level 6 Audio readout
Steep Approach Discrete #1	Enabled => "Steep Approach Enabled" Disabled => "Steep Approach Disabled"

3.8.8.2 STEEP APPROACH DISCRETE #2

Type: Steep Approach Selected
 Signal Status: Steep Approach Selected or Not Selected

Level 6 Audio readout	
Steep Approach Discrete #2	Selected => "Steep Approach Selected" Not Selected => "Steep Approach Not Selected"

3.8.9 GND ILS TUNED DISCRETE

Type: Supplied by ILS/VOR Mode Selector.
 Signal Status: ILS tuned or VOR tuned

Level 6 Audio readout	
GND ILS Tuned Discrete #1	ILS Tuned => "ILS 1 Tuned" ILS Not Tuned => "ILS 1 Not Tuned"
GND ILS Tuned Discrete #2	ILS Tuned => "ILS 2 Tuned" ILS Not Tuned => "ILS 2 Not Tuned"

3.8.10 +28V ILS TUNED DISCRETE

Type: Supplied by ILS/VOR Mode Selector.
 Signal Status: ILS tuned or VOR tuned

Level 6 Audio readout	
+28 V ILS Tuned Discrete #1	ILS Tuned => "28V ILS 1 Tuned" ILS Not Tuned => "28V ILS 1 Not Tuned"
+28 V ILS Tuned Discrete #2	ILS Tuned => "28V ILS 2 Tuned" ILS Not Tuned => "28V ILS 2 Not Tuned"

3.8.11 GLIDESLOPE VALIDITY DISCRETES

Two Glideslope Validity Discrettes may be used by EGPWS, one for each possible ARINC 547 Glideslope Receiver input.

Type: Validity from ARINC 547 Glideslope receiver.
 Signal Status: Valid or Invalid

Level 6 Audio readout	
Glideslope Validity Discrete #1	Valid => "Glideslope 1 Valid" Invalid => "Glideslope 1 Invalid"
Glideslope Validity Discrete #2	Valid => "Glideslope 2 Valid" Invalid => "Glideslope 2 Invalid"

3.8.12 GND GLIDESLOPE INHIBIT DISCRETE

Type: Switch for inhibit of Glideslope mode

Signal Status: Glideslope Inhibit or Not Inhibit

Fault monitoring: Mode 5 will be disabled and "Glideslope" will not be enunciated during cockpit Self-Test and the long vocabulary test if inhibited.

Level 6 Audio readout	
Glideslope Inhibit Discrete	Inhibit => "Glideslope Inhibit True"
	Not Inhibit => "Glideslope Inhibit False"

3.8.13 +28 V GLIDESLOPE INHIBIT DISCRETE

Type: Switch for inhibit of Glideslope mode

Signal Status: Glideslope Inhibit or Not Inhibit

Fault monitoring: Mode 5 will be disabled and "Glideslope" will not be enunciated during cockpit Self-Test and the long vocabulary test if inhibited.

Level 6 Audio readout	
+28V Glideslope Inhibit Discrete	Inhibit => "28V Glideslope Inhibit True"
	Not Inhibit => "28V Glideslope Inhibit False"

3.8.14 GND GLIDESLOPE CANCEL DISCRETE

Type: Supplied by momentarily actuated cockpit Glideslope mode manual inhibit switch.

Signal Status: Glideslope is canceled if glideslope function is active

Fault monitoring: Activation of this input for more than 15 seconds will result in the 'Glideslope Cancel Invalid' fault which will cause a GPWS INOP indication. Typically, the Glideslope cancel can only be selected below 2000 feet AGL. However, some configurations only allow it below 1000 feet AGL.

Level 6 Audio readout	
Glideslope Cancel Discrete	Cancel => "Glideslope Canceled"
	Normal => "Glideslope Enabled"

3.8.15 DECISION HEIGHT DISCRETE

Type: Decision Height Bug switch

Signal Status: Less than Decision Height or Greater than Decision Height

Level 6 Audio readout	
DH Discrete	Less Than DH => "Below DH"
	Greater Than DH => "Above DH"

3.8.16 MODE 6 VOLUME CONTROL DISCRETE

Type: Mode 6 low volume select switch

Signal Status: Low Volume Select or Normal Volume

“Low Volume” in this case refers to the -6db volume level used during Self-Test. “Normal Volume” refers to the level of the selected call-out menu.

Level 6 Audio readout	
Mode 6 Low Volume Discrete	Low Volume => “Mode 6 Low Volume”
	Normal => “Mode 6 Normal Volume”

3.8.17 CALLOUTS ENABLE DISCRETE (MK V AND MK VII ONLY)

Type: Mode 6 Altitude callouts enable switch

Signal Status: Callouts Enable or Callouts Disable with optional Minimums only

Level 6 Audio readout	
Altitude Callouts Enable Discrete	Voice Enabled => “Callouts Enabled”
	Voice Disabled => “Callouts Disabled”

3.8.18 GND AUDIO SUPPRESS(INHIBIT)/ALL MODES INHIBIT DISCRETE

The function of this discrete is controlled by program pin. This discrete always inhibits all audio except for the Windshear warning. If configured to suppress visual the input will also suppress all visuals except for the Windshear warning. If configured to also suppress visuals, activation of this input for more than 60 seconds will always result in the ‘All Modes Inhibit’ fault which will cause GPWS and Terrain INOP indications. As a function of selected aircraft type this discrete can also cause the All Modes Inhibit fault after 60 seconds even if it is only configured to suppress audio.

Type: Analog discrete input from a flight deck mounted switch

Signal Status: Audio Suppress enabled or disabled/All Modes Inhibit enable or disable

Level 6 Audio readout	
GND Audio Inhibit Discrete	GPWS Inhibit => “Audio Inhibit”
	Not Inhibit => “Audio Not Inhibit”

3.8.19 +28 V AUDIO SUPPRESS(INHIBIT)/ALL MODES INHIBIT DISCRETE

The function of this discrete is controlled by program pin. This discrete always inhibits all audio except for the Windshear warning. If configured to suppress visual the input will also suppress all visuals except for Windshear warning. If configured to also suppress visuals, activation of this input for more than 60 seconds will always result in the ‘All Modes Inhibit’ fault which will cause GPWS and Terrain INOP indications. As a function of selected aircraft type this discrete can also cause the All Modes Inhibit fault after 60 seconds even if it is only configured to suppress audio.

Type: Analog discrete input from a flight deck mounted switch

Signal Status: Audio Suppress enabled or disabled/All Modes Inhibit enable or disable

Level 6 Audio readout	
+28V Audio Inhibit Discrete	GPWS Inhibit => “28V Audio Inhibit”
	Not Inhibit => “28V Audio Not Inhibit”

3.8.20 AOA VALIDITY DISCRETES (MK V AND MK VII ONLY)

Two AOA validity discretets may be used by EGPWS, one for each source of AOA. Input will come from either an AOA Indication System or a Stall Warning Computer, depending on the type being used by the aircraft.

Type: Fail Flag from AOA Indication System or a Stall Warning Computer

Signal Status: Fail or Not Fail

	Level 6 Audio readout
AOA Validity Discrete #1	Valid => "AOA 1 Valid" Invalid => "AOA 1 Invalid"
AOA Validity Discrete #2	Valid => "AOA 2 Valid" Invalid => "AOA 2 Invalid"

3.8.21 DISPLAY SELECT DISCRETES

Type: Supplied by momentarily actuated cockpit manual switch. Two types are supported:

Type 1: momentary make/break switch

Type 2: toggle type switch

Signal Status: Terrain Awareness Display (TAD) activated if not active or TAD canceled if currently active.

	Level 6 Audio readout
Display Select Discrete #1	True => "Display Discrete 1 True" False => "Display Discrete 1 False"
Display Select Discrete #2	True => "Display Discrete 2 True" False => "Display Discrete 2 False"

3.8.22 TERRAIN AWARENESS & TCF INHIBIT

Type: Switch for inhibit of Terrain Awareness & TCF functions

Signal Status: Terrain Awareness & TCF Inhibit or Not Inhibit

"Terrain Inhibited" will be enunciated during cockpit Self-Test if inhibited.

Fault monitoring: For some installations, activation of this input for more than 5 seconds will activate the Terrain Monitor (refer to the Terrain Display Configuration Data table for each aircraft type).

	Level 6 Audio readout
Terrain Awareness & TCF Inhibit	Disabled => "Terrain Off" Normal => "Terrain On"

3.8.23 SIMULATOR REPOSITION (MK V AND MK VII ONLY)

Type: Switch for activating Simulator Reposition

Signal Status: Reposition or Normal

If the Simulator Reposition program pin option is activated, then this discrete can be used to 'preset' the EGPWS to match simulator initial conditions.

	Level 6 Audio readout
Simulator Reposition Discrete	Reposition => "Simulator Reposition On" Normal => "Simulator Reposition Off"

3.8.24 WEATHER RADAR ON/OFF

Type: WXR On/Off switch input

Signal Status: Radar turned on or off

	Level 6 Audio readout
WXR #1 On Discrete	On => "Weather On" Off => "Weather Off"
WXR #2 On Discrete	On => "Weather 2 On" Off => "Weather 2 Off"

3.8.25 LOCALIZER VALIDITY DISCRETES (MK V AND MK VII ONLY)

Two Localizer validity discrettes may be used by EGPWS, one for each possible ARINC 547 Localizer Receiver input.

Type: Validity from ARINC 547 Localizer receiver.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Localizer Validity Discrete #1	Valid => "Localizer 1 Valid" Invalid => "Localizer 1 Invalid"
Localizer Validity Discrete #2	Valid => "Localizer 2 Valid" Invalid => "Localizer 2 Invalid"

3.8.26 ATTITUDE VALIDITY DISCRETES

Two Attitude validity discrettes may be used by EGPWS, one for each possible Attitude sensor.

Type: Validity from Attitude sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Attitude Validity Discrete #1	Valid => "Attitude 1 Valid" Invalid => "Attitude 1 Invalid"
Attitude Validity Discrete #2	Valid => "Attitude 2 Valid" Invalid => "Attitude 2 Invalid"

3.8.27 AIRSPEED VALIDITY DISCRETE

Airspeed validity discrete may be used by EGPWS for the Airspeed sensor.

Type: Validity from Airspeed sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Airspeed Validity Discrete	Valid => "Airspeed Valid" Invalid => "Airspeed Invalid"

3.8.28 BAROMETRIC ALTITUDE RATE VALIDITY DISCRETES

Two Barometric Altitude Rate validity discrettes may be used by EGPWS, one for each possible barometric rate sensor.

Type: Validity from barometric rate sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Barometric Altitude Rate Validity Discrete #1	Valid => "Altitude Rate1 Valid" Invalid => "Altitude Rate1 Invalid"
Barometric Altitude Rate Validity Discrete #2	Valid => "Altitude Rate 2 Valid" Invalid => "Altitude Rate 2 Invalid"

3.8.29 ACCELERATION SELF-TEST IN PROGRESS DISCRETE

Indicates that Accelerometers are in Self-Test mode.

Type: Self-Test status from acceleration sensor.

Signal Status: Acceleration Self-Test Active or Inactive

	Level 6 Audio readout
Acceleration Self-Test In Progress	In Progress => Acceleration Self-Test Active Not in Progress => Acceleration Self-Test Inactive

3.8.30 LONGITUDINAL ACCELERATION VALIDITY DISCRETE

Longitudinal Acceleration validity discrete may be used by EGPWS for the Acceleration sensor.

Type: Validity from Acceleration sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Longitudinal Acceleration Validity Discrete	Valid => "Longitudinal Acceleration Valid" Invalid => "Longitudinal Acceleration Invalid"

3.8.31

3.8.32 NORMAL ACCELERATION VALIDITY DISCRETE

Normal Acceleration validity discrete may be used by EGPWS for the Acceleration sensor.

Type: Validity from Acceleration sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Normal Acceleration Validity Discrete	Valid => "Normal Acceleration Valid" Invalid => "Normal Acceleration Invalid"

3.8.33 MAGNETIC HEADING VALIDITY DISCRETE

A Magnetic Heading validity discrete may be used by EGPWS for the Magnetic Heading sensor.

Type: Validity from Magnetic Heading sensor.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Magnetic Heading Validity Discrete	Valid => "Magnetic Heading Valid" Invalid => "Magnetic Heading Invalid"

3.8.34 AOA VANE HEATER DISCRETE

An AOA Vane Heater Discrete may be used by EGPWS for indication of vane heat for flight history recording.

Type: Heater Flag from AOA vane.

Signal Status: Vane Heater On or Vane Heater off

	Level 6 Audio readout
AOA Vane Heater Discrete	True => "AOA Vane Heater On" False => "AOA Vane Heater Off"

3.8.35 PLI Deselect SWITCH DISCRETES (MK V AND MK VII ONLY)

PLI deselect switch discrettes may be used by EGPWS for de-activating the PLI select relays to remove EGPWS PLI indication from the ADI.

Type: momentary make/break switch

Signal Status: EGPWS PLI deselected

	Level 6 Audio readout
PLI Deselect Switch #1	Pressed => "PLI Deselect Switch 1 True" Not Pressed => "PLI Deselect Switch 1 False"
PLI Deselect Switch #2	Pressed => "PLI Deselect Switch 2 True" Not Pressed => "PLI Deselect Switch 2 False"

3.8.36 AUTOPILOT DISCONNECT DISCRETES

Autopilot Disconnect discrettes may be used by EGPWS for indication that the Autopilot has been disconnected.

Type: Autopilot Disconnected

Signal Status: Autopilot Connected or Not Connected

	Level 6 Audio readout
Autopilot Disconnect #1	Connected => "Autopilot 1 Selected" Not Connected => "Autopilot 1 Not Selected"
Autopilot Disconnect #2	Connected => "Autopilot 2 Selected" Not Connected => "Autopilot 2 Not Selected"

3.8.37 TACTICAL SELECT DISCRETE

Tactical Select discrete may be used by EGPWS for an indication that the Tactical Select switch has been pressed.

Type: momentary make/break switch

Signal Status: Tactical Select Selected or Not Selected

	Level 6 Audio readout
Tactical Select Discrete	Selected => "Tactical Selected" Not Selected => "Tactical Not Selected"

3.8.38 ALTITUDE ALERT DISCRETE

Altitude Alert discrete may be used by EGPWS for an indication that the Altitude Alert is selected.

Type: Discrete for activating the Altitude Alert tone.

Signal Status: Altitude Alert Selected or Deselected

	Level 6 Audio readout
Altitude Alert Discrete	True => "Altitude Alert Selected" False => "Altitude Alert Deselected"

3.8.39 CORRECTED BAROMETRIC ALTITUDE VALIDITY DISCRETE

Corrected Barometric Altitude Validity Discrete may be used by EGPWS to determine when the Corrected Altitude input is invalid.

Type: Validity from Corrected Barometric Altitude computer.

Signal Status: Valid or Invalid

	Level 6 Audio readout
Corrected Barometric Alt Valid	Valid => "Corrected Altitude Valid" Invalid => "Corrected Altitude Invalid"

3.8.40 MOMENTARY FLAP OVERRIDE DISCRETE

Flap Override Discrete may be used by EGPWS to determine when Flap Override has been selected.

Type: Momentary make/break switch.

Signal Status: Selected or Not Selected

	Level 6 Audio readout
Momentary Flap Override Discrete	Selected => "Flap Override" Not Selected => "Not Flap Override"

3.8.41 WEIGHT ON WHEELS DISCRETE

Weight On Wheels Discrete may be used by EGPWS to determine if the aircraft is on the ground.

Type: Weight On Wheels Status

Signal Status: On Ground or Not On Ground

	Level 6 Audio readout
Weight On Wheels Discrete	Selected => "On Ground"
	Not Selected => "Not On Ground"

3.8.42 GPWS INHIBIT DISCRETE

This discrete inhibits all audio and visual except for Windshear, Terrain Awareness and TCF.

Type: Analog discrete input from a flight deck mounted switch

Signal Status: GPWS enabled or disabled

Fault monitoring: Activation of this input for more than 5 seconds will result in the 'GPWS Inhibit' fault which will cause a GPW INOP indication.

	Level 6 Audio readout
GPWS Inhibit Discrete	GPWS Inhibit => "GPWS Inhibit"
	Not Inhibit => "GPWS Not Inhibit"

3.8.43 RAAS ENABLE DISCRETE (MK V AND MK VII ONLY)

Type: Discrete for enabling RAAS functionality

Signal Status: RAAS Enabled or Disabled

	Level 6 Audio readout
RAAS Enable Discrete	True => "Runway Awareness Enabled"
	False => "Runway Awareness Disabled"

3.8.44 RAAS INHIBIT DISCRETE (MK V AND MK VII ONLY)

Type: Discrete for inhibiting RAAS functionality, also inhibits Long Landing Monitor and Takeoff Flap Configuration Monitor

Signal Status: RAAS Inhibit or Not Inhibit

	Level 6 Audio readout
RAAS Inhibit Discrete	True => "Runway Awareness Inhibit"
	False => "Runway Awareness Not Inhibit"

3.8.45 STABILIZED APPROACH MONITOR ENABLE DISCRETE (MK V AND MK VII ONLY)

Type: Discrete for enabling Stabilized Approach Monitor functionality

Signal Status: Approach Monitor Enabled or Disabled

	Level 6 Audio readout
Stabilized Approach Monitor Enable Discrete	True => "Approach Monitor Enabled" False => "Approach Monitor Disabled"

3.8.46 STABILIZED APPROACH MONITOR INHIBIT DISCRETE (MK V AND MK VII ONLY)

Type: Discrete for inhibiting Stabilized Approach Monitor functionality

Signal Status: Approach Monitor Inhibit or Not Inhibit

	Level 6 Audio readout
Stabilized Approach Monitor Inhibit Discrete	True => "Approach Monitor Inhibit" False => "Approach Monitor Not Inhibit"

3.8.47 LOW AIRSPEED MONITOR INHIBIT DISCRETE (MK V – 737NG ONLY)

Type: Discrete for inhibiting Low Airspeed Monitor functionality

Signal Status: Low Airspeed Monitor Inhibit or Not Inhibit

	Level 6 Audio readout
Low Airspeed Monitor Inhibit Discrete	True => "Low Airspeed Inhibit True" False => "Low Airspeed Inhibit False"

4 MAINTENANCE PRACTICES

4.1 GENERAL

Normal maintenance activities performed on the EGPWS should follow standard industry maintenance practices. System maintenance practices may include; updating a database, downloading flight history data, and programming or reprogramming the MK VI, MK VIII or MK XXII Configuration Module. These are addressed in the following sections.

4.2 DATABASE UPDATE

The Enhanced Ground Proximity Warning System (EGPWS) uses Terrain, Obstacle, Runway, and Envelope Modulation databases to provide enhanced functions. These are periodically updated, as new data becomes available. The Terrain, Obstacle, and Runway databases are typically combined and loaded into the EGPWS as one database, however it is possible that individual database updates could be provided. The procedure for loading a database update is the same in all cases and this section will address them as a database update generically.

For each new (updated) database, Honeywell will provide notification of the new database via a Service Information Letter (SIL). The SIL will be sent to all registered EGPWS customers, or they will be available for Internet download from Honeywell Technical Publication website or the EGPWS website at www.egpws.com. The SIL will contain a description of the changes in the database, as compared to the previous database, so that each customer can determine the applicability of the database update to their operations. For example, a Terrain database update involving only terrain in South America will be of no value to a domestic U.S. airline. Thus, the domestic U.S. airline would not need the database update. The SIL will also contain instructions on how to obtain the new Terrain Database and any required modifications. Database updates are coordinated with the FAA prior to SIL release via a Honeywell "minor mod" notification process. Installation and verification of terrain databases is addressed in a generic Service Bulletin.

EGPWS databases are not identified on the EGPWC nameplate as a part of the unit part number. However, for the MK V and MK VII, there is a label on the inside of the front panel maintenance door that can be used for identifying the installed terrain database. For the MK VI, MK VIII, and MK XXII a separate label is placed on the unit front panel identifying the installed Terrain database version number and for the MK VI and MK XXII the database region (see section 2.2.10.1). Otherwise, the installed databases can be determined in the Level 3 Self-Test (see Section 3.5) which should always be used to confirm the current database version.

4.2.1 DATABASE UPDATE FREQUENCY

Honeywell is continually striving to improve the EGPWS databases. New terrain, obstacle, or runway data is obtained by many different means, evaluated and verified, before it is processed into an EGPWS database. When sufficient or significant new data is available, Honeywell will release a database update.

Honeywell is committed to investigating reported nuisance alerts. When nuisance alerts result from database problems (accuracy or resolution) Honeywell will make corrections to the database. Nuisance alerts can also result in changes to the Envelope Modulation database, although this tends to be less frequently updated.

It is up to the EGPWS customer to determine if a specific database update is applicable to their operation. Honeywell recommends always operating with the latest database.

NOTE: Some database updates may require a hardware or software mod. Any required modification information will be identified in the associated database SIL.

Operators can visit the EGPWS website Database page and enroll in a distribution list that sends e-mail notification when a new database is released. Also on this website page is a Future Content and Schedule document that gives details on the expected release dates for 3-4 future databases.

4.2.2 LOADING A DATABASE

A database is loaded into the EGPWC via the PCMCIA card slot in the front panel in the MK V and MK VII. In the MK VI, MK VIII, and MK XXII a "Smart Cable" data-loader is connected to the Test connector on the front panel.

The database may be loaded either while the EGPWC is on the aircraft or on a bench provided the appropriate power is applied.

Each Honeywell database Service Information Letter includes reference to the procedure for loading the database in the EGPWC. Refer to the SIL for this information.

4.3 FLIGHT HISTORY DOWNLOADING

In flight, the EGPWC records detected faults, and data prior to and following an alert. This flight history data can be downloaded from the EGPWC via the PCMCIA interface. With this data, Honeywell can analyze the flight history when necessary to help in the troubleshooting process, or analyzing special or unique events.

4.3.1 OBTAINING AN EGPWS FLIGHT HISTORY DOWNLOAD CARD

To obtain a Flight History Download (PCMCIA) Card necessary for this procedure, order the following part number:

For MK V and MK VII EGPWS (P/Ns 965-0976-xxx-xxx-xxx/965-1676-xxx/965-1690-xxx and 965-1076-xxx-xxx-xxx), order Flight History Download Card p/n 718-1592-001.

For MK VI, MK VIII, and MK XXII EGPWS (P/Ns 965-11xx-xxx, 965-12xx-xxx, and 965-159x-xxx), order Flight History Download Card p/n 718-1593-001.

NOTE: A Honeywell programmed and formatted PCMCIA Card is required to initiate the download sequence and record the data. The Download Cards (p/n 718-1592-001 and 718-1593-001) are not interchangeable. Also, database update cards can not be used for flight history downloading.

4.3.2 DOWNLOAD PROCEDURE

1. For the MK VI, MK VIII, and MK XXII access and connect Smart Cable p/n 951-0386-001 to Test Connector J3 on the EGPWC front panel.

For the MK V or MK VII, access and open the front panel door on the EGPWC.

2. Apply power to the EGPWC.
3. Verify that the COMPUTER OK LED is ON.

NOTE: If the COMPUTER FAIL LED is ON, the integrity of the Downloaded Data cannot be assured.

NOTE: If the EXTERNAL FAULT LED is ON, this will not interfere with the Download process.

4. On the EGPWC front panel or Smart Cable (see Figures x-x and x-x), verify the:

- IN PROG LED is extinguished.
- CARD CHNG LED is extinguished.
- XFER COMP LED is extinguished.
- XFER FAIL LED is extinguished.

5. Verify that the PCMCIA Card has its Write Protect Function Selector in the OFF (in-board) position.

NOTE: The PCMCIA Card Write Protect Selector is fragile and should be moved only with the minimum amount of force.

6. Insert PCMCIA Card into the PCMCIA Card slot.

For the MK V or MK VII, ensure the notch on the bottom of the PCMCIA Card is in the down position. Push the card in carefully until the PUSH TO EJECT button on the front Panel is fully extended. This will be when the face of the button is nearly level with the rear of the inserted PCMCIA Card.

For the MK VI, MK VIII, and MK XXII, the label on the card and on the Smart Cable should both be oriented in the same direction. The PCMCIA Card will only insert about half the card length.

CAUTION: Excessive force will damage the internal connector.

7. While loading is in progress, the IN PROG LED illuminates and the COMPUTER OK LED turns OFF.
8. When loading is complete, the IN PROG LED will turn OFF and the XFER COMP LED will turn ON.

NOTE: This operation should require no more than 10 minutes.

NOTE: If the XFER FAIL LED turns ON instead of the XFER COMP LED, then a different Flight History Download PCMCIA Card must be obtained from Honeywell for the Data Download.

9. Remove the PCMCIA Card,

For the MK V or MK VII, depress the PUSH TO EJECT button on the EGPWC front panel.

For the MK VI or MK VIII, and MK XXII, carefully grasp the card and pull from the Smart Cable.

NOTE: The EGPWS should automatically return to its normal operating mode upon removal of the card.

10. Verify that the COMPUTER OK LED illuminates (allow up to 3 minutes for the light to come on).

11. Procedure is complete. Close the EGPWC front panel door or disconnect the Smart Cable as appropriate.

NOTE: Flight History Download Cards can only be used once.

4.3.3 TRANSCRIPTION OF THE PCMCIA CARD

For transcription of a Flight History Download Card, contact Honeywell Technical Operations to arrange delivery of the data or the card

a) via email aerotechsupport@honeywell.com

b) via toll-free (US/Canada) telephone 800-601-3099 (select option 2):

c) via direct dial telephone 602-365-3099

4.4.1 CONFIGURATION MODULE REPROGRAMMING (MK VI, MK VIII, MK XXII ONLY)

Reprogramming the EGPWS Configuration Module is accomplished similar to the programming process above. Prior to reprogramming, the desired new configuration should be determined based on the MK VI, MK VIII, or MK XXII Interface Design Guide (IDG) document referenced in Section 1.3.

For reprogramming the Configuration Module, the following procedure is used:

1. Verify EGPWC interface to P2 connector (including Configuration Module) and RS-232 interface to PC.
2. Power EGPWC and PC and start WinVIEWS.
3. With WinVIEWS active in the Terminal Mode, start the Configuration sub-mode by typing "CFG" at the prompt. At this point, either all the ID's can be rewritten using the CUW command as before, or individual categories can be changed as follows:
4. At the CFG > prompt use the CAT command with the following structure:
 - CAT<space><category #><space><ID#><space><T or F>
 - <category #> is the ICD Category to change (example 7)
 - <ID#> is the new ID to change to (example 92)
 - <T or F> is True or False for rebooting the EGPWC. Use "T" if only one category is to be changed and the EGPWC will reboot following ENTER. Use "F" if another individual ID is to be changed by another CAT operation.

Example:

CFG >CAT 7 92 T

5. After inputting the desired change information, pressing ENTER will transmit the data to the EGPWC to write to the Configuration Module. If a reboot is commanded (T), then the EGPWC will reboot at the completion of the write process. If a reboot is not commanded (F), then the message "Writing to configuration module...Category 7 ID updated successfully." is given and the CFG > prompt is again displayed. At this point, the Configuration Module has been changed, but the change will not be effective until the EGPWC is rebooted. Additional changes can be made with the final change set to command the EGPWC reboot (or cycle EGPWC power to reboot).
6. Verification of the changes made is the same as before. As above, type "CFG" to restart the Configuration sub-mode. At the CFG > prompt, type "CMR" <ENTER>. Each Category and its associated ID is read from the Configuration Module and listed on the display. Alternately, when not in the Configuration sub-mode, the command "PS" (Present Status) will display EGPWC and configuration data.
7. Configuration Module reprogramming is complete.

An **example** CUW command/data string, its definition, and the corresponding CWR list is provided below.

CUW command/data string:

CFG > CUW 0/15 2 3 2 0 0 3 95 1 0 0 0 0 0 0 0/

Above Configuration defined:

Category 1 Aircraft/Mode Type:	2
Category 2 Air Data Source:	3
Category 3 Position Source:	2
Category 4 Altitude Callouts Menu:	0 (All callouts)
Category 5 Audio Menu:	0 (Basic menu)
Category 6 Display Configuration:	3
Category 7 Select Group #1 Options:	95
Steep Approach Enabled:	True
TA&D Alternate Pop-Up:	False (Pop-Up on Caution or Warning)
Peaks Mode Enable:	True
Obstacle Awareness Enabled:	True
Bank Angle Enable:	True
Flap Reversal:	True
GPS Altitude Reference:	MSL (required for internal GPS source, Cat 3 ID 2)
Category 8 Radio Altitude Input Select:	1
Category 9 Navigation Input Select:	0
Category 10 Attitude Input Select:	0
Category 11 Heading Input Select:	0
Category 12 Windshear Select type:	0
Category 13 Discrete I/O Type Select:	0
Category 14 Audio output Level Select:	0 (Equiv. to MK VI GPWS output level)
Category 15 Undefined	0

CWR list: (based on above configuration)

CFG > CMR

CONFIGURATION MODULE:

Format Version:0
Category 1 ID: 2
Category 2 ID: 3
Category 3 ID: 2
Category 4 ID: 0
Category 5 ID: 0
Category 6 ID: 3
Category 7 ID: 95
Category 8 ID: 1
Category 9 ID: 0
Category 10 ID: 0
Category 11 ID: 0
Category 12 ID: 0
Category 13 ID: 0
Category 14 ID: 0
Category 15 ID: 0
CRC: 1565805624

5 SERVICING

5.1 GENERAL

The EGPWS does not require any servicing.

6 REMOVAL/INSTALLATION

6.1 EGPWC

6.1.1 REMOVAL

1. Remove power to the EGPWC.
2. (MK VI, MK VIII, and MK XXII only) Disconnect aircraft connectors from the front of the unit.
3. Turn hold-down counterclockwise and unlatch from EGPWC.
4. Remove EGPWC from aircraft equipment rack.

6.1.2 INSTALLATION

1. Ensure power is off to the EGPWC rack.
2. Position EGPWC in mounting tray and secure with hold-down latch (rotate clockwise).
3. (MK VI, MK VIII, and MK XXII only) Connect aircraft connectors to the front of the unit ensuring that each is properly latched.
4. Provide power to EGPWC and all required sensors and subsystems.
5. Perform a Level 1 Self-Test per Section 3.3 to verify EGPWC operation.
6. If RAAS or any other optional function is installed, refer to Level 1 and Level 3 Self-Test messages in Appendix C through G to validate the RCD version installed.

6.2 CONFIGURATION MODULE (MK VI, MK VIII, AND MK XXII ONLY)

Refer to the appropriate Installation Design Guide referenced in Section 1.3 for Configuration Module illustrations.

6.2.1 REMOVAL

1. Remove power to the EGPWC.
2. Disconnect the P2 aircraft connector from the unit.
3. Remove two screws holding Configuration Module to P2 connector.
4. Separate Configuration Module from P2 connector and access wires.
5. De-pin six Configuration Module wires and detach ground wire to free Configuration Module from P2 connector.

6.2.2 INSTALLATION

1. Ensure that power is off to the EGPWC.
2. Pin six Configuration Module wires to P2 connector (see applicable aircraft wiring diagrams).
3. Connect the Configuration Module housing ground wire to a wire harness shield termination within the P2 connector harness.

4. Align the Configuration Module housing to the P2 connector ensuring that wires are properly contained within the connector assembly.
5. Install the two screws securing the Configuration Module to the P2 connector.
6. Connect the P2 connector assembly to the EGPWC.
7. Provide power to EGPWC and all required sensors and subsystems.
8. Program the Configuration Module per the instructions in Section 4.4 and any appropriate aircraft drawings that define the proper values to use.
9. Perform EGPWS Level 1, 2, and 3 Self-Test per Section 3.3 to 3.5 to verify system function and proper configuration per aircraft drawings.

6.3 DISPLAY SWITCHING RELAYS (IF INSTALLED)

Refer to appropriate EGPWS aircraft wiring and mechanical drawings.

6.3.1 REMOVAL

1. Remove power to the EGPWC.
2. Remove power to the Weather Radar system.
3. Remove power to the EGPWS/Weather Radar display switching relays.
4. Access and remove the display switching relay(s) using standard maintenance practices.

6.3.2 INSTALLATION

1. Ensure that EGPWC, Weather Radar, and display switching relay power is removed.
2. Mount relay(s) and secure.
3. Provide power to the EGPWC and all required sensors and subsystems.
4. Provide power to the Weather Radar system.
5. Provide power to the display switching relays.
6. Perform a Level 1 Self-Test per Section 3.3 to verify relay operation.

7 ADJUSTMENT/TEST

7.1 ADJUSTMENT

The EGPWS does not require any adjustments.

7.2 TEST

Line maintenance testing for the EGPWS consists of functional verification of the EGPWC and associated interfaces. For EGPWC functional verification, see the Fault Isolation Section 3. Associated interfaces are verified through EGPWS ground tests as described in the following section.

7.2.1 EGPWS GROUND TESTS

All EGPWS Ground Tests are developed by the installer to meet aircraft specific interfaces. Examples of Ground Test are available from Honeywell via the EGPWS website. To obtain a copy of a sample Ground Test Procedure, please visit www.egpws.com, select the Installation Information page, then select the Ground and Flight Test Procedures sub-page.

8 INSPECTION/CHECK

8.1 GENERAL

The EGPWS does not require any specific periodic inspection or checks. The system should be inspected for integrity and checked for wear/tear during the course of routine aircraft maintenance inspections.

9 CLEANING/PAINTING

9.1 GENERAL

The EGPWS does not contain any elements that required cleaning or painting on the aircraft. Any cleaning or painting of the EGPWC should be performed by an authorized EGPWS repair facility.

10 REPAIRS

10.1 GENERAL

No on-aircraft repairs are identified for the EGPWS. If a problem is found with a unit, remove and replace the unit per the removal and installation procedures and route the unit to an authorized repair facility for repair.

11 APPENDIX A: WINVIEWS

WinVIEWS (Windows Virtual Interface to the Enhanced Warning System) is a software tool developed by Honeywell to monitor or view values within the EGPWC, and perform certain test interface functions.

Overview: The WinVIEWS software provides a monitor function that does not alter the operation of the EGPWS. The monitoring of the values assists in the testing of the EGPWS by allowing the operator to quickly determine if the correct signal and scaling is being used by the EGPWS. Additionally, WinVIEWS provides a detailed status of the software configuration and input signals, which enables quick identification of system anomalies. WinVIEWS is also utilized for programming the Configuration Module in MK VI, MK VIII, and MKXXII applications.

To obtain a copy of the WinVIEWS software, please visit www.egpws.com, select the Installation Information page, then select the Diagrams, Drawings & Software sub-page. WinVIEWS is available as a self extracting .zip file. A User's Guide is available there as well.

In addition to the WinVIEWS software, a command file may be utilized. The command file is a simple text file that includes each Current Value Table (CVT) Item used in a test procedure. The file must be 'text only' such as those created in the Microsoft Windows NotePad program. It should have a filename extension of .wvc or .cmd. The webpage mentioned above also contains generic command files for use in ground and flight testing the various EGPWS models.

To use WinVIEWS a RS-232 cable (PN 704-2670-001 is required) to connect the PC 9-pin comm port to the EGPWC 15-pin test port.

Typical WinVIEWS operation with the EGPWC:

1. Connect the PC to the EGPWC via the RS-232 cable defined above.
2. On the PC, start the WinVIEWS program (requires Windows 95 or later).
3. WinVIEWS opens in the Terminal Mode. Various commands are available in this mode. Type "HELP" or "?" for command help. In particular, CVT Items may be added or deleted to/from the display to assist with system analysis.
4. Under the File Menu select the "Load Command File" option and load the appropriate Command File.
5. Use F6 to select the Display Mode: each CVT item listed in the Command File will be continuously updated at a rate of at least once per second. The value shown for each CVT Item listed is the current value used by the EGPWS. F6 toggles between the Display and Terminal Modes.

12 APPENDIX B: TROUBLESHOOTING DO'S AND DO NOT'S

DO use built-in self test levels to find the exact nature of the fault.

DO use our free WinVIEWS program to quickly access Self Test Level 1, 2, and 3 info

DO remember to look at the front panel LEDs

Green Computer OK LED means "don't remove"

Amber External Fault LED means "don't remove"

Red Computer means "possibly remove"

DO NOT use cockpit INOP lamps for troubleshooting

INOP indications are merely a pilot's indication of which EGPWS functions are inactive, they are not positive indication of internal EGPWS faults. Experience shows External (non-EGPWS) faults are responsible for INOPs illumination 99% of the time.

DO NOT remove unit if front panel green Computer OK LED is illuminated

13 APPENDIX C: RAAS MAINTENANCE MESSAGES (AURAL & DISPLAYED)

TABLE C1-1: RAAS MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
Self-Test Level 1 (Annunciated after Terrain Awareness part of Self-Test)	<p>Except where noted, all maintenance message voices are Male</p> <p><i>“Runway Awareness OK - Feet”</i></p> <p><i>“Runway Awareness OK - Metres”</i></p> <p>Note: Feet and Metres will be annunciated in the gender voice option (Male or Female) selected for RAAS.</p>	<p>All volume levels at same volume as existing EGPWS Self-Test messages</p> <p>RAAS enabled, functioning, has good position information, and is at a validated airport. Distances annunciated in Feet.</p> <p>RAAS enabled, functioning, has good position information, and is at a validated airport. Distances annunciated in Metres.</p>
Self-Test Level 1	<i>“Runway Awareness Not Available”</i>	RAAS enabled, but the system either has no position information, the accuracy of the position information is insufficient to allow RAAS to function, or the aircraft is at airport that has not been validated in the EGPWS Terrain Database
Self-Test Level 1	<i>“Runway Awareness Inhibited”</i>	RAAS enabled, but the advisories have been inhibited with the activation of an external input/switch.
Self-Test Level 1	<i>“Runway Awareness INOP”</i>	RAAS enabled but the function is inoperative
Self-Test Level 1	<i>“Runway Awareness R-T-O”</i>	RAAS enabled and functioning, but RAAS advisories (other than distance remaining) are temporarily inhibited because RAAS has detected a Rejected Take-Off condition. To clear this message and enable RAAS advisories, the aircraft must be taxied off the runway area.
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>“Runway Awareness Enable Set”</i>	RCD Enable Key is set. The RCD is not loaded.
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>“Runway Awareness Enabled”</i>	<p>RCD is loaded and RAAS Enable Key is set.</p> <p>Note: This message replaces the <i>“Runway Awareness Enable Set”</i> message.</p>
Self-Test Level 3	<p>Software -228-228 and earlier:</p> <p><i>“RAAS RCD Part Number XXX-XXXX-XXX “</i></p> <p>Software -230-230 and on:</p> <p><i>“RCD Part Number XXX-XXXX-XXX “</i></p> <p>where X is the 10-digit installation-specific RCD part number.</p>	Allows verification that the correct RCD is loaded into the EGPWS.

TABLE C1-2: RAAS DISPLAYED MAINTENANCE MESSAGES

MAINT. FUNCTION	DISPLAYED MESSAGE	NOTES:
Self-Test Level 1 (Displayed as part of the EGPWS Self-Test Pattern)	<p>RCDxyz12 (magenta)*</p> <p>* May be green depending on display</p> <p>¹SEE NOTE BELOW</p>	<p>Displayed immediately above or below the TDB Version display.</p> <p>RCD version "xyz12" is the last 5 digits of the 10-digit RCD software part number (labeled on PCMCIA card).</p>
On-Ground status	<p>RAAS-OK-FT (green)</p> <p>RAAS-OK-M (green)</p>	<p>RAAS enabled, functioning, has good position information, and is at a validated airport. Distances annunciated in Feet.</p> <p>RAAS enabled, functioning, has good position information, and is at a validated airport. Distances annunciated in Metres.</p>
	<p>RAAS-N/AVBL (amber)</p>	<p>RAAS enabled, but the system either has no position information, the accuracy of the position information is insufficient to allow RAAS to function, or the aircraft is at airport that has not been validated in the EGPWS Terrain Database (last item only applicable to -228-228 and earlier)</p>
	<p>RAAS-NA-xxxx (amber)</p>	<p>RAAS enabled, but the aircraft is at an airport (ICAO code "xxxx") that has not been validated in the EGPWS Terrain Database (applicable only to -230-230 and later)</p>
	<p>RAAS-RTO (green)</p>	<p>RAAS enabled but advisories are inhibited because a RAAS Rejected Take-Off was detected</p>
	<p>RAAS-INOP (amber)</p>	<p>RAAS enabled but function is Inoperative</p>

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved RCD configurations specific to their aircraft type/model having RAAS installed.

14 APPENDIX D: STABILIZED APPROACH MONITOR MAINTENANCE MESSAGES

TABLE D-1: STABILIZED APPROACH MONITOR MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
	Except where noted, all maintenance message voices are Male	All volume levels at same volume as existing EGPWS Self-Test messages
Self-Test Level 1	<i>“Approach Monitor Inhibited”</i>	Stabilized Approach Monitor enabled, but the advisories have been inhibited with the activation of an external input/switch
Self-Test Level 1	<i>“Approach Monitor INOP”</i>	Stabilized Approach Monitor enabled but the function is inoperative
Self-Test Level 2	<i>“Approach Monitor Approach Speed Undefined”</i>	Stabilized Approach Monitor “Too Fast” function is enabled but the aircraft does not provide a source of Approach Speed
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>“Approach Monitor Enabled”</i>	RCD Enable Key is set and loaded RCD activates Stabilized Approach Monitor function.
Self-Test Level 3	<i>“RCD Part Number XXX-XXXX-XXX “</i> where X is the 10-digit installation-specific RCD part number.	Allows verification that the correct RCD is loaded into the EGPWS.

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved RCD configurations specific to their aircraft type/model having Stabilized Approach Monitor installed.

15 APPENDIX E: ALTIMETER MONITOR MAINTENANCE MESSAGES

TABLE E-1: ALTIMETER MONITOR MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
	Except where noted, all maintenance message voices are Male	All volume levels at same volume as existing EGPWS Self-Test messages
Self-Test Level 1	<i>"Altimeter Monitor INOP"</i>	Altimeter Monitor enabled but the function is inoperative
Self-Test Level 2	<i>"Altimeter Monitor GPS Signal Undefined"</i>	Altimeter Monitor function is enabled but the aircraft does not provide a source of GPS
Self-Test Level 2	<i>"Altimeter Monitor Static Air Temperature Undefined"</i>	Altimeter Monitor function is enabled but the aircraft does not provide a source of SAT
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>"Altimeter Monitor Enabled"</i>	RCD Enable Key is set and loaded RCD activates Altimeter Monitor function.
Self-Test Level 3	<i>"RCD Part Number XXX-XXXX-XXX "</i> where X is the 10-digit installation-specific RCD part number.	Allows verification that the correct RCD is loaded into the EGPWS.

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved RCD configurations specific to their aircraft type/model having Altimeter Monitor installed.

16 APPENDIX F: TAKEOFF FLAP CONFIGURATION MONITOR MAINTENANCE MESSAGES

TABLE F-1: TAKEOFF FLAP CONFIGURATION MONITOR MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
Self-Test Level 1	Except where noted, all maintenance message voices are Male <i>"Flaps Monitor Inhibited"</i>	All volume levels at same volume as existing EGPWS Self-Test messages Takeoff Flap Configuration Monitor enabled, but the advisories have been inhibited with the activation of an external input/switch. NOTE – the EGPWS does not support a dedicated Takeoff Flap Configuration Monitor inhibit, but activation of a defined RAAS inhibit will also inhibit Takeoff Flap Configuration Monitor.
Self-Test Level 1	<i>"Flaps Monitor INOP"</i>	Takeoff Flap Configuration Monitor enabled but the function is inoperative
Self-Test Level 2	<i>"Flaps Monitor Flap Angle Undefined"</i>	Takeoff Flap Configuration Monitor function is enabled but the aircraft does not provide a source of Flap Position
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>"Flaps Monitor Enabled"</i>	RCD Enable Key is set and loaded RCD activates Takeoff Flap Configuration Monitor function.
Self-Test Level 3	<i>"RCD Part Number XXX-XXXX-XXX"</i> where X is the 10-digit installation-specific RCD part number.	Allows verification that the correct RCD is loaded into the EGPWS.

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved RCD configurations specific to their aircraft type/model having Takeoff Flap Configuration Monitor installed.

17 APPENDIX G: LONG LANDING MONITOR MAINTENANCE MESSAGES

TABLE G-1: LONG LANDING MONITOR MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
Self-Test Level 1	Except where noted, all maintenance message voices are Male <i>“Runway Awareness Inhibited” (only if RAAS enabled at same time as Long Landing Monitor)</i>	All volume levels at same volume as existing EGPWS Self-Test messages Long Landing Monitor enabled, but the advisories have been inhibited with the activation of an external input/switch. NOTE – the EGPWS does not support a dedicated Long Landing Monitor inhibit, but activation of a defined RAAS inhibit will also inhibit Long Landing Monitor.
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>“Long Landing Enabled”</i>	RCD Enable Key is set and loaded RCD activates Long Landing Monitor function.
Self-Test Level 3	<i>“RCD Part Number XXX-XXXX-XXX “</i> where X is the 10-digit installation-specific RCD part number.	Allows verification that the correct RCD is loaded into the EGPWS.

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved RCD configurations specific to their aircraft type/model having Long Landing Monitor installed.

18 APPENDIX H: LOW AIRSPEED MONITOR MAINTENANCE MESSAGES

TABLE H-1: LOW AIRSPEED MONITOR MAINTENANCE MESSAGES

MAINT. FUNCTION	MESSAGE	NOTES:
	Except where noted, all maintenance message voices are Male	All volume levels at same volume as existing EGPWS Self-Test messages
Self-Test Level 1	<i>"Airspeed Low"</i>	Low Airspeed Monitor enabled, functioning, has all required input information.
Self-Test Level 1	<i>"Airspeed Low Inhibited"</i>	Low Airspeed Monitor enabled, but the advisory have been inhibited via aircraft wiring.
Self-Test Level 1	<i>"Airspeed Low INOP"</i>	Low Airspeed Monitor enabled but the function is inoperative.
Self-Test Level 3 (Annunciated at end of Selected Options)	<i>"Airspeed Low Inhibited"</i>	Low Airspeed Monitor enabled, but the advisory have been inhibited via aircraft wiring.

NOTE: Operators/Installers must refer to their Instructions for Continued Airworthiness (ICA) documentation to identify the approved configurations specific to their aircraft type/model having Low Airspeed Monitor installed.