

## **MK VI EGPWS Changes from Software –001 to Software -011**

**965-1176/1186-001 to 965-1176/1186-003 – Service Bulletin 012-0709-103 (965-1176/1186/1206/1216-34-03)**

The Application Software and Configuration Database modifications include:

- Added Category 2 (Air Data Input) ID 10 – ARINC 429 with 500 ohm OAT probe (for Shadin ADC-2000)
- Revised Category 6 (Terrain Display) ID 0 (formerly Allied Signal Picture Bus, ASPB, renamed KCPB) to support key press and other optional data
- Revised Category 6 (Terrain Display) ID 3 (Collins ProLine 2 4x4) to support Peaks Mode display
- Revised Category 6 (Terrain Display) ID 5 (Collins ProLine 2 5x6) to support Peaks Mode display
- Revised Category 6 (Terrain Display) ID 6 (Collins ProLine 2 5x4, 5x5) to support Peaks Mode display
- Revised Category 6 (Terrain Display) ID 7 (Bendix 1N182A/812A) to support Peaks Mode display
- Revised Category 6 (Terrain Display) ID 8 (Bendix 1N842A/862A) to support Peaks Mode display
- Added Category 6 (Terrain Display) ID 9 – Bendix EFIS 40/50 Non-Integrated (bolt-on)
- Added Category 6 (Terrain Display) ID 10 – Bendix EFIS 40/50 Integrated (requires EFIS software mod)
- Added Category 8 (Radio Altitude) ID 4 – Bendix KRA-405 analog format input
- Added Category 9 (Navigation Input) ID 4 – Bendix KN-40 ARINC 429 Glideslope and Localizer
- Added Category 10 (Attitude Input) ID 2 – Analog Pitch & Roll (3 wire synchro) with +28 Vdc validity discrete
- Added Category 10 (Attitude Input) ID 4 – Analog Roll (3 wire synchro) with Ground validity discrete (Note – Ground validity discrete was changed to a +28 Vdc validity discrete in –006 software)
- Changed Category 12 from future to Windshear, added ID 0 (No Windshear) configuration
- Added Category 13 (Input/Output Discrettes) ID 1 to support Lamp Format 2 functionality
- Added GPWS Envelop Modulation database and logic. The Envelope Modulation function will use computed Geometric Altitude, when available, in lieu of corrected barometric altitude. Envelop Modulation will revert to corrected barometric altitude if geometric altitude becomes unavailable
- Updated Mode 4 logic to use airspeed validity and not inhibit Mode 4 alerts for zero airspeed. These changes were made within the guidelines of TSO-C92c.
- Updated the Mode 4 voice-ratchet logic to consistently give the initial Mode 4 alert upon entering the warning envelope. With –001 software, the EGPWS may not issue the initial Mode 4 alert on a subsequent approach, if the gear or flaps are deployed while a Mode 4 callout is in progress and a go around is then executed.
- Updated Honeywell Bank Angle logic to correctly ratchet the advisory at 120% and 140% of the bank angle threshold at altitudes below 130 feet. In EGPWS software version –001, the ratchet occurred at approximately 125% and 160% of the bank angle threshold.
- Updated the Terrain Clearance Floor (TCF) function to reduce the occurrence of nuisance warnings in geographical areas with complex runway geometry.
- Added latitude label 310 and longitude label 311 to the ARINC 429 output buses which reflect the current position being used by the EGPWS. This is intended for FDR usage and signal validity is not included with these outputs.
- Updated ARINC 429 output label 271 to set bits during Self Test Level 1

**965-1176/1186-003 to 965-1176/1186-004 – Service Bulletin 012-0709-105 (965-1176/1186/1206/1216-34-05)**

The Application Software and Configuration Database modifications include:

- Added Category 2 (Air Data Input) ID 11 analog uncorrected barometric altitude with 500 ohm OAT input for Honeywell AZ-XXX family of analog air data computers analog
- Added Fixed Gear support via addition of Category 5 (Audio Menu) ID 2 and 3. See Installation Design Guide 060-4314-125 for installation details.
- Added Category 6 (Terrain Display) ID 11 - Collins WXI-701-711 PPI Display with Auto-Range
- Added Category 6 (Terrain Display) ID 12 - Collins WXI-701-711 PPI Display without Auto-Range
- Added Category 6 (Terrain Display) ID 13 - Honeywell P880/660/440 Display

**965-1176/1186-004 to 965-1176/1186-005 – Service Bulletin 012-0709-107 (965-1176/1186/1206/1216-34-07)**

The Application Software and Configuration Database modifications include:

- Revise Category 6 (Terrain Display) ID 0 (KCPB) so when configured for KCPB display output and a synchro magnetic heading input is used, the terrain display shows terrain relative to magnetic heading.

**965-1176/1186-005 to 965-1176/1186-006 – Service Bulletin 012-0709-110 (965-1176/1186/1206/1216-34-10)**

The Application Software and Configuration Database modifications include:

- Added Category 2 (Air Data Input) ID 12 analog uncorrected barometric altitude without temperature input for Honeywell AZ-XXX family of analog air data computers (NOTE - this ID has important changes in the –011 software and should only be used by –011 or later PNs)
- Added Category 4 (Altitude Callouts) ID 8: Minimums-Minimums
- Revised Category 6 (Terrain Display) ID 0 (KCPB) to support padding requests from displays with an odd number of rows (i.e. Universal MFD-640)
- Added Category 6 (Terrain Display) ID 14 - Bendix PPI-4A/4B without Auto Range
- Added Category 6 (Terrain Display) ID 15 - Honeywell Integrated P880/660/440 with aircraft symbol via overlay
- Revised Category 10 (Attitude Input) ID 4 (Analog Roll 3-wire Synchro with validity) to change ground validity discrete to +28 Vdc validity discrete
- Added Category 10 (Attitude Input) ID 5 - Pitch and Roll via high speed ARINC 429
- Added Category 11 (Heading Input) ID 2 – Magnetic Heading via high speed ARINC 429
- Added Category 13 (Input/Output Discretes) ID 2 and 3 to support a GPWS Inhibit input
- Updated the Geometric Altitude function with filtering for GPS Vertical Figure of Merit (VFOM)

**965-1176/1186-006 to 965-1176/1186-008 – Service Bulletin 012-0709-112 (965-1176/1186/1206/1216-34-12)**  
**965-1176/1186-008 to 965-1176/1186-008 Mod 2 – Service Bulletin 012-0709-119 (965-1176/1186/1206/1216/1686-34-19)**

The Application Software and Configuration Database modifications include:

- Improved Category 2 (Air Data Input) ID 0, 3, 4, 11, and 12 derivation of Barometric Altitude Rate under turbulent conditions
- Corrected Category 2 (Air Data Input) ID 4 (CIC 02702) Barometric Altitude scaling
- Added GPS N/S and E/W velocity vector labels to Category 3 (Position Input Select) ID 0, 1, 2, 3, 4, and 5
- Added Dead Reckoning algorithm for use by Internal GPS (965-1216-XXX) during brief periods of satellite outage
- Added Category 4 (Altitude Callouts) ID 9: Minimums-Minimums, 500, 200, 100, 50, 40, 30, 20, 10
- Added Category 4 (Altitude Callouts) ID 10: Minimums-Minimums, 500, 200
- Added Category 4 (Altitude Callouts) ID 11: Minimums-Minimums, 500, 100, 50, 40, 30, 20, 10
- Added Category 4 (Altitude Callouts) ID 12: Minimums-Minimums, 500
- Added Category 4 (Altitude Callouts) ID 100: Above Field Callout “500”
- Added Category 4 (Altitude Callouts) ID 101: Above Field Callout “500 Above”
- Added Category 9 (Navigation Input) ID 5 (Analog Glideslope and Localizer with +28V validity flag)
- Added Category 13 (Input/Output Discrettes) ID 4 and 5 to allow flashing of GPWS caution/warning lamps
- Added Category 13 (Input/Output Discrettes) ID 6 and 7 to support a momentary Steep Approach input
- Improved fault handling of incorrect configurations on power up
- Mod 1 to Application/Configuration software database 008 was not applicable to MK VI
- Mod 2 to Application/Configuration software database 008 implemented the following changes:
  - 1) Flash Write Failure messages have been observed during self-test. The failure can occur intermittently after a power-up and results in the storage of a message flight history. The message remains latched until an operator manually clears the fault message using Fault History Erase (FHE). These failures are being set prematurely do to insufficient time to complete the flash write operation. The application code is being modified to increase the time out limit and thus prevent nuisance fault messages.
  - 2) The EGPWS can become inoperable during power up when configuring dual KCPB display inputs. Lengthy configuration files from the display on the ARINC 429 bus upon power up can cause the EGPWS input task time limit to be exceeded. This can prevent the EGPWS display output from becoming correctly configured for the display. The application code is being modified to increase the amount of time allowed to process the maximum allowable query/response

*NOTE: KC Picture Bus (KCPB) is a proprietary data format intended for the transmission of digital image pixel data and/or text data to display hardware. KCPB is also known as ASPB (AlliedSignal Picture Bus). The KCPB compatible display system will respond to the EGPWS with a stream of configuration information. This configuration information will be used by the EGPWS to configure the output image.*
  - 3) ARINC 743 VFOM and HFOM data received from some FMS systems can become high due to compensation for selective availability. The higher VFOM and HFOM values can limit the availability of the EGPWS functions. The application code is being revised to scale VDOP and HDOP values and derive more accurate VFOM and HFOM values. This change will return system availability to the level of other ARINC 743a GPS inputs.
  - 4) Artifacts can remain on the display after running a self-test or flying with 5NM range selected. This can occur intermittently after running the EGPWC self-test or while flying with 5NM range selected. The problem manifests itself as small dots resembling a starry night. This problem is most prevalent with GNS-XLS installations due to the use of KCPB, but is not limited to this display type. Rebooting the EGPWS or switching display modes can clear the problem. The application code is being modified to correctly initialize a variable in the Digital Signal Processor (DSP) software. This change will prevent this anomaly from occurring regardless of the selected display type.

**965-1176/1186-008 to 965-1176/1186-010 – Service Bulletin 012-0709-115 (965-1176/1186/1206/1216/1686-34-15)  
965-1176/1186-010 to 965-1176/1186-010 Mod 1 – Service Bulletin 012-0709-115 (965-1176/1186/1206/1216/1686-34-20)**

The Application Software and Configuration Database modifications include:

- Revised Category 6 (Terrain Display Select) ID 0 (KCPB) to display GSL in lieu of MSL
- Added Category 6 (Terrain Display Select) ID 18 (KCPB2) which disables display of geometric altitude
- Added ability to utilize derived true heading when using KCPB display interface
- Improved the response to range changes on KCPB displays that don't have aircraft on bottom center
- Repositioned Collins ProLine 2 Peaks Elevation numbers to improve visibility
- Label 273, Radar Vertical Profile Mode, is now an optional input for RDR-2000/2100 and RDS-81/82/84/86 displays
- Corrected terrain auto pop-up logic so that an intermittent latitude or longitude failure during an alert will result in displayed terrain when the failure has subsided, assuming the aircraft is still within the alert profile
- Changed Gear Down Reasonableness Check fault logic for GA SLOW aircraft from 250 knots to 200 knots
- Changed Flap Down Reasonableness Check fault logic for GA SLOW aircraft from 210 knots to 180 knots
- Mod 1 to Application/Configuration software database 010 implemented the following changes:
  - 1) Flash Write Failure messages have been observed during self-test. The failure can occur intermittently after a power-up and results in the storage of a message flight history. The message remains latched until an operator manually clears the fault message using Fault History Erase (FHE). These failures are being set prematurely do to insufficient time to complete the flash write operation. The application code is being modified to increase the time out limit and thus prevent nuisance fault messages.
  - 2) The EGPWS can become inoperable during power up when configuring dual KCPB display inputs. Lengthy configuration files from the display on the ARINC 429 bus upon power up can cause the EGPWS input task time limit to be exceeded. This can prevent the EGPWS display output from becoming correctly configured for the display. The application code is being modified to increase the amount of time allowed to process the maximum allowable query/response.

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  - 3) ARINC 743 VFOM and HFOM data received from some FMS systems can become high due to compensation for selective availability. The higher VFOM and HFOM values can limit the availability of the EGPWS functions. The application code is being revised to scale VDOP and HDOP values and derive more accurate VFOM and HFOM values. This change will return system availability to the level achieved with other ARINC 743a GPS inputs.
  - 4) Artifacts can remain on the display after running a self-test or flying with 5NM range selected. This can occur intermittently after running the EGPWS self-test or while flying with 5nm range selected. The problem manifests itself as small dots resembling a starry night. This problem is most prevalent with GNS-XLS installations due to the use of KCPB, but it is not limited this display type. Rebooting the EGPWS or switching display modes can clear the problem. The application code is being modified to correctly initialize a variable in the Digital Signal Processor (DSP) software. This change will prevent this anomaly from occurring regardless of the selected display type.

**965-1176/1186-010 to 965-1176/1186-011 – Service Bulletin 012-0709-117 (965-1176/1186/1206/1216/1686-34-17)**  
**965-1176/1186-011 to 965-1176/1186-011 Mod 1 – Service Bulletin 012-0709-115 (965-1176/1186/1206/1216/1686-34-21)**

The Application Software and Configuration Database modifications include:

- Revised Category 2 (Air Data Input) ID 12 implementation of Static Air Temperature to improve performance of Geometric Altitude algorithm when using this input. **Honeywell recommends current EGPWS installations using Air Data ID 12 upgrade to this part number to ensure best performance of the Geometric Altitude algorithm.**
- Added Category 4 (Altitude Callouts) ID 13: Minimums, 1000, 500, 400, 300, 200, 100, 50, 40, 30, 20, 10
- Mod 1 to Application/Configuration software database 011 implemented the following changes:
  - 1) Flash Write Failure messages have been observed during self-test. The failure can occur intermittently after a power-up and results in the storage of a message flight history. The message remains latched until an operator manually clears the fault message using Fault History Erase (FHE). These failures are being set prematurely do to insufficient time to complete the flash write operation. The application code is being modified to increase the time out limit and thus prevent nuisance fault messages.
  - 2) The EGPWS can become inoperable during power up when configuring dual KCPB display inputs. Lengthy configuration files from the display on the ARINC 429 bus upon power up can cause the EGPWS input task time limit to be exceeded. This can prevent the EGPWS display output from becoming correctly configured for the display. The application code is being modified to increase the amount of time allowed to process the maximum allowable query/response.

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