



AERONAUTICAL ACCESSORIES, INC.

P.O. BOX 3689 BRISTOL, TENNESSEE 37625-3689 USA
TELEPHONE: 423-538-5151 TOLL FREE: 800-251-7094
TELEFAX: 423-538-8469 E-MAIL: sales@aero-access.com

INSTALLATION INSTRUCTIONS

HONEYWELL MARK XXII ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)

4123401-00000

FOR

BELL HELICOPTER TEXTRON MODEL 412EP HELICOPTERS

Report Number 4123401-IM001

Revision E

September 17, 2010



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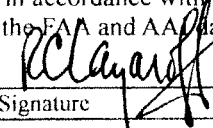
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LOG OF REVISIONS

Rev.	Date	Description	Pages	Prepared By
				Approved by
-	02/11/02	Original Release	All	N/A
A	10/10/05	Reformatted Document Page Numbering Addition of PRIMUS 440/660/880	All 2,3,4, 6,14	
B	12/04/06	Revising Honeywell EGPWS P/N	6,13, 22	
C	01/03/07	Revised Installation Manual P/N Revised Configuration ID Table Revised Step 4	7 23 24	
D	01/11/07	Revised Section 7 Revised Steps 49 thru 63 Added Steps 64 and 72 and Renumbered Subsequent Steps	7 14 15	
E	09/17/10	Revised Section 10 (changed # 2 AHRS to # 1 AHRS)	9	RC 

This change has been determined to be minor in accordance with the agreement between the FAA and AA dated September 3, 2009

 9-24-10

Signature _____ Date _____

LIST OF EFFECTIVE PAGES

All pages contained herein are at latest revision shown in Log of Revisions.

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Section 1.**Introduction**

The Honeywell Mark XXII Enhanced Ground Proximity Warning System is intended to help prevent accidents caused by Controlled Flight into Terrain or CFIT. The system enhances the flight crew's situation awareness by providing aural alerts, visual annunciations and display of the terrain in the vicinity of the helicopter. Installation must be performed by qualified personnel in accordance with these instructions and the referenced drawings, Honeywell Mark XXII EGPWS Installation Manual and FAA advisory Circular AC 43.13-1B/2A, as applicable.

Section 2.**System Description**

The Mk XXII EGPWS System as installed in the Bell 412EP consists of the following components, which will be installed as part of this modification:

- One (1) Enhanced Ground Proximity Warning Computer (EGPWC)
- One (1) equipment shelf at Sta. 194 RHS (right hand side) for EGPWC mounting
- One (1) GPS Antenna
- One (1) Annunciator Dimmer on the lower nose equipment shelf
- One (1) Relay Assembly on the lower nose equipment shelf
- Three (3) Terminal Block modules on the lower nose equipment shelf
- One (1) relay module on the lower nose equipment shelf (Primus 440/660/880 Only)
- Two (2) Circuit Breakers in the overhead circuit breaker panel
- Ten (10) Annunciators in the Instrument panel (five (5) on each side) (KMD 550/850 Only)
- Twelve (12) Annunciators in the Instrument panel (six (6) on each side) (Primus 440/660/880 Only)
- One (1) EGPWS test switch in the Pilot Instrument Panel

Section 3.**Approved EGPW Computer**

The following Honeywell EGPW Computer may be installed.

P/N 965-1595-024. Software version 024

Section 4.**System Requirements**

The following items and signal sources are required for this installation:

Radio Altitude BHT Kit No. 412-706-025-101

Airdata Source, P & G D60268, which is part of BHT FDR Kit No. 412-705-001-103, CIC 8800M or Shadin 2000.

Display KMD 550/850 with KAC 502 EGPWS module or Primus 440/660/800.

Section 5.**Special Tools**

In addition to common electrician and mechanic sheet metal and hand tools, the following items are required for system configuration and test:

A laptop computer with Windows[®] 3.1 or higher and terminal emulator software such as WinVIEWS[®].

Pitot Static test set

ILS ramp test set

Section 6.**Unpacking and Inspecting Equipment**

Carefully unpack the equipment and note any damage to the shipping containers. Visually inspect each component for evidence of damage. Report any evidence of damage to Aeronautical Accessories Inc. immediately. As equipment is unpacked, cross check each item with the kit packing list to ensure all equipment was received. Report any shortages to Aeronautical Accessories Inc. immediately.

Section 7.**General Notes and References**

Use standard torque values for all fasteners. Refer to AC43.13-1B or Bell Helicopter Standard Practices Manual for detailed information.

Bell Helicopter 412 Maintenance Manual BHT-412-MM

Honeywell Mark XXII EGPWS Installation Manual 060-4314-250

KMD 550/850 Multi-Function Display System Installation Manual 006-10608-0001 or Primus 440/660/880 Digital Weather Radar System Installation Manual A09-3944-001

Refer to Instructions for Continued Airworthiness for the Honeywell Mark XXII EGPWS, Document Number 4123401-RMM01 for information to maintain the system.

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Section 8. Pre-Installation Preparation

TASK	Mech	Insp
1. Open nose compartment, disconnect and remove battery.		
2. Remove pilot, copilot, cabin seats and carpet. Retain all attaching hardware for reinstallation		
3. Remove center wireway cover. Retain all attaching hardware for reinstallation		
4. Remove LH cabin floor to gain access to fore / aft wire runs. Retain all attaching hardware for reinstallation		
5. Remove RH chin window for ease of installation of the Annunciator Dimmer. Retain all attaching hardware for reinstallation		

Section 9. Mechanical Installation

TASK	Mech	Insp
1. Locate and install EGPW Computer on shelf and install per drawing 4123401-01000		
2. Locate and install the RH Aft Equipment Shelf per drawing 4123401-05000. Note: Shelf should be even with top of door track when installed.		
3. Locate and install GPS Antenna per drawing 4123401-04000.		
4. Locate and install Annunciators and EGPWS Press to Test Switch per drawing 4123401-02000		
5. Locate and install EGPWS Circuit Breaker per 4123401-02000		
6. Locate and install terminal block rail, Annunciator Dimmer and Relay Assembly per drawing 4123401-02000		
7. Locate and install ground block per drawing 4123401-02000		
8. Install the following placard adjacent to the terrain display.		
TERRAIN DISPLAY NOT TO BE USED FOR NAVIGATION		

Section 10. Electrical Installation

Note: Refer to drawing Wiring Diagram, Honeywell Mark XXII EGPWS Drawing Number 4123401E02000 for wiring information. Route wiring with exiting wire runs and secure per AC43.13-1B

TASK		Mech	Insp
1.	Pre-terminate EGPW Computer connectors P1 and P2. Refer to Honeywell MK XXII Installation Manual for Configuration Module installation details.		
2.	Pre-terminate Annunciator Dimmer connector P22-1		
3.	Pre-terminate Relay Assembly connector P22-2		
4.	Route appropriate wires to Radar Altimeter R/T and terminate as shown		
5.	Route appropriate wire to Radar Altimeter Indicator and terminate as shown.		
6.	Route appropriate wires to 8TB2 and terminate as shown.		
7.	Reroute existing wires E52C22W and E52C22B from 8TB3 to 8TB2 as shown. Relocate existing wires E56C22W and E56C22B as shown. Install jumper wires E52E22W, E52E22B, E56E22W and E56E22B as shown.		
8.	Route appropriate wires to Air Data Computer and terminate as shown.		
9.	Route appropriate wires to #1 Nav Receiver and terminate as shown.		
10.	Route appropriate wires to # 1 AHRS and terminate as shown.		
11.	Route appropriate wire to direct audio input of audio system and terminate.		
12.	Route appropriate wires to annunciators and switches and terminate as shown.		
13.	Route appropriate wire to TCAS system (if installed) and terminate.		
14.	Route appropriate wires to KMD 550/850 or Primus 440/660/880 and terminate as shown.		

TASK

15. Route power wires and ground wires and terminate as shown.
16. Route GPS Antenna co-ax and terminate as shown.

Mech	Insp

Section 11. Post Installation Configuration and Tests

TASK

1. Perform a full continuity check on all newly installed wiring using the applicable wiring diagram.
2. Connect ground power to the helicopter and apply power.
3. Verify that 28V dc is present on P1, Pin 40 and 60 of the EGPWS Computer, P22-1, Pin 3 of the Annunciator Dimmer Supply, and P22-2, Pin 3 of the Relay Assembly.
4. Pull the EGPWS 28V DC circuit breaker.
5. Verify that 28V DC is no longer present on P1, Pin 40 and 60, P22-1, Pin 3 and P22-2, Pin 3
6. Disconnect external power and connect all EGPWS components. Set the EGPWS and all associated avionics circuit breakers.
7. Connect the PC, with Honeywell WinVIEWS software installed, to the EGPWS front connector using an RS-232 cable.
8. Reapply external power, ensure that the EGPWS is on and start the WinVIEWS program.

Mech	Insp

SYSTEM CONFIGURATION

TASK

9. Configure the EGPWS system per Appendix A.
10. Prepare and load a command file per Appendix B.

Mech	Insp

COCKPIT AUDIO

TASK

- 11. Connect headsets at the pilot's and copilot's position.
- 12. Key the pilot's ICS and speak into the microphone while initiating the Self-Test function. EGPWS advisories should be clearly heard at both crew positions
- 13. Key the copilot's ICS and speak into the microphone while initiating the Self-Test function again. EGPWS advisories should be clearly heard at both crew positions

Mech	Insp

TERRAIN DISPLAY (PRIMUS 440/660/880)

TASK

- 14. Depress the pilot's TERR DISPLAY switch/annunciator and verify that the pilot's and copilot's ON segments illuminate. Depress the pilot's TERR DISPLAY switch again and verify that the ON segments go out
- 15. Depress the copilot's TERR DISPLAY switch/annunciator and verify that the pilot's and copilot's ON segments illuminate. Depress the copilot's TERR DISPLAY switch again and verify that the ON segments go out

Mech	Insp

LOW ALTITUDE and TERRAIN INHIBIT DISCRETES

TASK

- 16. Depress the pilot's LOW ALT switch/annunciator and verify that the pilot's and copilot's ON segments illuminate. Depress the pilot's LOW ALT switch again and verify that the ON segments go out
- 17. Depress the copilot's LOW ALT switch/annunciator and verify that the pilot's and copilot's ON segments illuminates. Depress the copilot's LOW ALT switch again and verify that the ON segments go out.
- 18. Depress the pilot's TERR INHIB switch/annunciator and verify that the pilot's and copilot's ON segments illuminate. Depress the pilot's TERR INHIB switch again and verify that both ON segments go out.
- 19. Depress the copilot's TERR INHIB switch/annunciator and verify that the pilot's and copilot's ON segments illuminate. Depress the copilot's TERR INHIB switch again and verify that both ON segments go out.

Mech	Insp

SELF TEST LEVEL 2 CURRENT FAULTS

TASK

- 35. Initiate Self-Test level 1 by pressing the EGPWS PTT button for less than 2 seconds
- 36. Once the Self-Test Level 1 audio starts press the EGPWS PTT button again, for less than 2 seconds
- 37. Verify that the following voices messages are heard in both headsets: "CURRENT FAULTS", "NO FAULTS", "PRESS TO CONTINUE".

Mech	Insp

NOTE

If faults exist, they will be annunciated as EGPWS Internal Faults or as External Faults. The aural message will provide a description of the fault. If a fault is annunciated, it should be corrected prior to proceeding with the remainder of this ground test procedure

SELF TEST LEVEL 3 EGPWS CONFIGURATION

TASK

- 38. Initiate Self-Test Level 1 by pressing the EGPWS PTT button for less than 2 seconds.
- 39. Once the Self-Test Level 1 audio starts press the EGPWS PTT button again, for less than 2 seconds. This initiates Level 2
- 40. Immediately after the Self-Test Level 2 "PRESS TO CONTINUE" message is heard, depress the EGPWS PTT switch. (This will initiate Level 3.)
- 41. Verify that the following messages are heard in both headsets. Record all unspecified details.

Mech	Insp

NOTE

"X's" listed below represent numbers, letters, the word "point" or no annunciation. Any of these annunciations are acceptable where "X" is listed below. (e.g. the serial number could be annunciated as "SERIAL NUMBER 316").

- 42. SYSTEM CONFIGURATION
PART NUMBER 965-1595-0XX _____
- 43. MOD STATUS X _____
- 44. SERIAL NUMBER XXXX _____

TASK

- 75. Set the Decision Height Bug to 75 feet. Activate the Radio Altimeter Self-test function. Verify that the CVT Item DHDsc Observed Value is 0.
- 76. While still maintaining Self-test increase the Decision Height Bug to 125 feet. Verify that the CVT Item DHDsc Observed Value is 1.

Mech	Insp
Mech	Insp

TASK

- 77. Verify that the CVT Item ARA1Val Observed Value is 1.
- 78. Pull the Radio Altimeter circuit breaker. Verify that the CVT Item ARA1Val Observed Value is 0.

AIR DATA COMPUTER

Wiring for the Air Data Computer interface is checked by varying the inputs to the Air Data Computer via the test set for the Air Data System

CAUTION

Be very careful when using the Air Data Test Set. Flight instruments and other expensive equipment can easily be damaged by improper adjustment of the tester.

TASK

- 79. Set the pilot's altimeter to a pressure setting of 29.92 in-Hg. Observe the altitude reading on the pilot's barometric altimeter. Verify that the CVT Item RawBAIt1 Observed Value is within +/-300 feet of the pilot's indication. Record the RawBAIt1 value.

Mech	Insp
Mech	Insp

TASK

- 80. Adjust the Air Data Test Set for a 1000-FPM rate of climb. Verify that the Baro Altitude Rate, CVT Item RawBaroRt1, Observed Value is 1000 +/-200-FPM.
- 81. Verify the Computed Airspeed by setting the Air Data Test Set to 120 +/-5 knots. The CVT Item RawCAS1 Observed Value should be 120 +/-5 knots.
- 82. Verify that the Static Air Temperature (SAT) CVT Item RawSAT1 Observed Value is with +/-5°C of the outside air temperature.

NAVIGATION (ILS)

This test verifies the Instrument Landing System connections to the EGPWS input.

TASK

- 83. Activate the NAV 1 Navigation unit. Select an ILS frequency. Verify that the CVT Item ILSTuned1 Observed Value is 1.
- 84. Tune the navigation unit to a VOR frequency. Verify that the CVT Item ILSTuned1 Observed Value is 0.
- 85. Provide a Glideslope "1 dot down" signal from the Ramp Test Set. Verify that the CVT Item RawGS1 Observed Value is between +0.057 and +0.117.

Mech	Insp
Mech	Insp

TASK

- 86. Change the Glideslope signal to "2 dots up". Verify that the CVT Item RawGS1 Observed Value is between - 0.145 and -0.205.

POSITION SOURCE

Verifying the following data check of the GPS input (wiring/signal) to the EGPWS.

NOTE

Position indications are provided in the form of W x° y.x' or N x° y.z'. The EGPWS stores position as +/- x.xxx°. For reference, in the EGPWS CVT Item, West and South = "-" and North and East = "+". To convert the X° y.z' to x.xxx° divide the y.z' by 60 and add it to the leading x. For example, Mt. Pleasant (N40° 06.47'; W79° 32.93') is equivalent to the EGPWS value N40.108°; W79.55°.

TASK

- 87. Verify that the CVT Item GPSLatitude1 Observed Value is within +/- 0.008° of the present position latitude.
- 88. Verify that the CVT Item GPSLongitude1 Observed Value is within +/- 0.008° of the present position longitude.

Mech	Insp
Mech	Insp

TASK

- 89. Set the pilot's barometric altimeter to the local barometric pressure. Verify that the CVT Item RawGAlt1 Observed Value is within +/-500 feet of the altitude read on the pilot's altimeter.
- 90. Verify that the CVT Item RawHFOM1 is less than 0.3nm.
- 91. Verify that the CVT Item RawVFOM1 is less than 150 feet.

ATTITUDE

Wiring for the Attitude system interface is checked by varying the inputs of the Attitude system and comparing the CVT Item readout to the ADI.

NOTE

When reading CVT Item Observed Values positive roll values correspond to a bank right condition and positive pitch values correspond to a nose-up condition.

TASK

- 92. Remove the copilot's AHRS from its mounting rack and level the AHRS to 0°. The roll attitude, as read on the Copilot's attitude indicator display, should read 0°.
- 93. Verify that the CVT Item RawRoll1 Observed Value is within 1° of zero.
- 94. Tilt the AHRS to simulate a 15° Right Bank. Verify that the CVT Item RawRoll1 Observed Value is between +14° and +16°.
- 95. Tilt the AHRS to simulate a 10°-Left Bank. Verify that the CVT Item RawRoll1 Observed Value is between -9° and -11°.
- 96. Level the AHRS to 0°. Verify that the CVT Item RawPitch1 Observed Value is within +/- 1° of zero.
- 97. Tilt the AHRS to simulate a 15° Nose Up attitude. Verify that the CVT Item RawPitch1 Observed Value is between +14° and +16°.
- 98. Tilt the AHRS to simulate a 10° Nose Down attitude. Verify that the CVT Item RawPitch1 Observed Value is between -9° and -11°.

Mech	Insp

MAGNETIC HEADING

Comparing the CVT Item readout to the magnetic heading on the HSI checks wiring to the Magnetic Heading system.

NOTE

In the following tests the CVT Item for Magnetic Heading is displayed as +/- 180°. If the aircraft heading is 350°, the CVT Item will read -10°. If the aircraft heading is 240°, the CVT Item will read -120°. If the aircraft heading is 155 ° the CVT Item will read 155°.

TASK

- 99. Activate the compass system and ensure that the valid flag is out of view. Observe the copilot's heading as displayed HSI. Verify that the CVT Item RawIMHD1 is within +/- 3° of the heading on the EFIS display.

Mech	Insp

GLIDESLOPE CANCEL

The momentary Glideslope Cancel Discrete Input (J1-15) is checked by changing the state of the Glideslope select switch(es) and verifying that the CVT Item Observed Value matches the Expected Value.

TASK

- 100. Press and hold the pilot's GLIDE SLOPE switch. Verify that the CVT Item GSCan Observed Value is 1.
- 101. Release the pilot's GLIDE SLOPE switch. Verify that the CVT Item GSCan Observed Value is 0.
- 102. Press and hold the copilot's GLIDE SLOPE switch. Verify that the CVT Item GSCan Observed Value is 1.
- 103. Release the copilot's GLIDE SLOPE switch. Verify that the CVT Item GSCan Observed Value is 0.

Mech	Insp

LOW ALTITUDE MODE

Pressing the LOW ALT Switch can activate this discrete input. Discrete Input (J1-14 = Gnd) is checked by changing the state of the discrete and verifying that the CVT Item Observed Value matches the Expected Value.

TASK

- 104. Press the pilot's LOW ALT switch. Verify that the CVT Item TacticalSel Observed Value is 1.
- 105. Press the copilot's LOW ALT switch. Verify that the CVT Item TacticalSel Observed Value is 0.

Mech	Insp

TERRAIN INHIBIT MODE

This discrete input can be activated by pressing the TERR INHIBIT Switch. Discrete Input (J1-12 = Gnd) is checked by changing the state of the discrete and verifying that the CVT Item Observed Value matches the Expected Value.

TASK

- 106. Press the pilot's TERR INHIB switch. Verify that the CVT Item TerrDis Observed Value is True.
- 107. Press the copilot's TERR INHIB switch. Verify that the CVT Item TerrDis Observed Value is False.
- 108. Press the pilot's TERR INHIB switch again. Verify that the CVT Item TerrDis Observed Value is True.
- 109. Press the copilot's TERR INHIB switch. Verify that the CVT Item TerrDis Observed Value is False.

Mech	Insp

DISPLAY RANGE SELECTION

Proper Terrain Display range selection is checked by selecting Terrain on the display (KMD 550/850 only), cycling through all possible range settings, and verifying the range displayed on the display matches the CVT Item on the PC. Verify each of the following Range selections.

		TASK	Mech	Insp
110.	Display Range 2.5nm	CVT Item DispRngOut1 Value 2.5		
111.	Display Range 5nm	CVT Item DispRngOut1 Value 5		
112.	Display Range 10nm	CVT Item DispRngOut1 Value 10		
113.	Display Range 20nm	CVT Item DispRngOut1 Value 20		
114.	Display Range 40nm	CVT Item DispRngOut1 Value 40		
115.	Display Range 80nm	CVT Item DispRngOut1 Value 80		
116.	Display Range 160nm	CVT Item DispRngOut1 Value 160		
117.	Display Range 320nm	CVT Item DispRngOut1 Value 320		

ENGINE TORQUE

CAUTION

Engine Torque is measured with the engines running and thus the rotor head turning. Position the aircraft in a safe area and remove all other test equipment other than the WinVIEWS terminal or laptop computer. It is recommended that these be placed inside the passenger compartment.

		TASK	Mech	Insp
118.	Verify that the CVT Item RawTorque1 Observed Value is within +/- 5% of the #1 engine torque displayed on the torque indicator.			
119.	Verify that the CVT Item RawTorque2 Observed Value is within +/- 5% of the #2 engine torque displayed on the torque indicator.			

COCKPIT AUDIO – AURAL WARNINGS

TASK

- 120. Increase the rotor rpm to 90%. Decrease the rotor rpm until the RPM warning tone is heard by the pilot and copilot. This tone will be used as a qualitative reference when monitoring the EGPWS aural advisory signals in the next step
- 121. Initiate the EGPWS Self-Test Level 1 by depressing the EGPWS PTT button, for less than 2 seconds. EGPWS aural caution/warning advisories should be heard at both crew positions. The tones should be approximately 6db lower than the tones heard in previous step.

Mech	Insp

EMI / RFI CHECKS

NOTE

The following test shall be conducted with all electrical and avionics systems fully operational and with the engines running

TASK

- 122. Activate all of the avionics systems including the Compass and Attitude Gyros. Tune each system to an appropriate frequency to pickup signals from a local navigation station or ramp test set. Ensure that acceptable signals are received and displayed.
- 123. Turn the Flight Director (if installed) On and set it to a mode suitable to display commands and pull flags out of view.
- 124. Monitor the ICS and all radios from both crew positions and set-up acceptable audio levels for each. Note any interference or background noise

Mech	Insp

TASK

- 125. Perform an EGPWS Self-Test and verify that there is no significant increase in audio background noise or interference.
- 126. Repeat the EGPWS Self-Test while monitoring all navigation and engine displays. Verify that there are no significant changes in display indications or changes in operational modes.
- 127. Pull the EGPWS circuit Breaker. Verify that there is no significant difference in background noise or interference and no significant change in indications or operational modes of the avionics and electrical systems.

Mech	Insp

Section 12. Weight and Balance

The installation of this kit has the following affect on the aircraft's weight and balance. Adjust ballast as necessary to return the aircraft's empty weight center of gravity to within allowable limits. Refer to the aircraft manufacture's technical publications for aircraft limitations.

* Lateral Arm (+) is to the right and (-) is to the left

Kit Name	Part Number	Weight (lbs)	Longitudinal		Lateral *	
			Arm (in)	Moment (in/lbs)	Arm (in)	Moment (in/lbs)
Equipment Shelf	4123401-5000-1	5.9	194.5	1147.55	+29.0	171.1
EGPWS Computer	965-1595-024	3.9	187.5	187.5	+28.5	111.15
GPS Antenna	071-01553.0200	0.27	43.3	45.59	-3.5	-0.94
Dimmer Assembly	017-22000-01	0.25	7.8	1.95	+17.5	4.375
Annunciators (10)	Various	0.56	25.0	14	0	0
Total:		10.88	128.4		0.4	

The above weight and balance data does not include electrical cabling.

Appendix A.**EGPWS System Configuration**

System ID Configuration

Each category provides information relative to aircraft interfaces or EGPWS functional options required or used for EGPWS operation

This programming is accomplished using a programming software tool available from Honeywell (WinVIEWS) or generating a data text string and transferring this data (in either case) via the EGPW Computer (EGPWC) RS-232C interface to the configuration module. Once programmed, the configuration is available and read by any installed EGPWC on power up.

The following table lists the configuration ID numbers used in the EGPWS installation in the 412EP.

TABLE 1 – EGPWS CONFIGURATION ID NUMBERS

Category	Description	ID Number	ID Description
1	Aircraft / Mode Type Select	130	Fixed Gear, Tail Strike Type I
2	Air Data Input Select	1	ARINC 429 Digital without Corrected Altitude Label 204
3	Position Input Select	2	GPS, Internal
4	Altitude Callouts	0	MINIMUMS-MINIMUMS, 200, 100, 50, 40, 30, 20, 10 "Smart 500"
5	Audio Menu Select	128	Basic Helicopter Menu
6	Terrain Display Select ¹	0	KC Picture Bus (KCPB)
		13	Honeywell Primus 880/660/440 (Integrated) WXPDP w/ SCI Range
7	Options 1 Select	29	False/False/True/True/True/False/MSL
8	Radio Altitude Input Select	3	Analog Radio Altitude (RT-200/300)
9	Navigation Input Select	4	Digital KN40 Glideslope and Localizer (ARINC 429)
10	Attitude Input Select	128	Digital Pitch, Roll, Pitch Rate, and Roll Rate (High Speed ARINC 429)
11	Heading Input Select	2	High Speed ARINC 429
12	Windshear Input Select	0	No Windshear
13	I / O Discrete Select	129	Helicopter Input / Output Discrete Definitions (Lamp Format 2)
14	Audio Output Level ²	0	Nominal
		1	- 6 dB
		2	-12 dB
		3	-18 dB
		4	-24 dB
15	Autorotation Threshold	12	6.0%
16	Torque Input Select	12	Analog, DC 0.044VDC/%
17	Options 2 Select	0	5/2.5/1

Note 1: Use ID Number 0 if aircraft is equipped with a KMD 550/850.

Use ID Number 13 if aircraft is equipped with a Primus 880/660/440.

Note 2: Audio Output Level ID Number 0 (Nominal) is recommended, however, the audio output level can be adjusted by using the values shown in Table 1.

The EGPWC reads the aircraft configuration from the Configuration Module, which is installed in the EGPWC connector. The Configuration Module must have the aircraft specific configuration ID string written to it before the EGPWS is operational.

For programming 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, configuration sub-mode commands are available for programming purpose. Type “**CFG**” at the Terminal Mode prompt (>). At this point, the CFG> prompt is displayed and the program and EGPWC are ready for entering the program command and data string. Type “**HELP**” or “?” to display a list of the Terminal Mode commands and their description. “**CUW**” is the preface command for entering the ID string.
4. Using the Category ID’s listed in Table 1, create a command string with one of the following structures:

CUW 0/17 130 1 2 0 128 0 31 3 4 128 2 0 129 0 12 12 0/ (Aircraft w/ KMD 550/850)

CUW 0/17 130 1 2 0 128 13 31 3 4 128 2 0 129 0 12 12 0/ (Aircraft w/ Primus 880/660/440)

CUW<space>0 is the command and version number. CUW writes the category ID’s defined by version 0 definition (0 is the only version currently available) to the Configuration Module via the EGPWC without a CRC (checksum) value attached (this is generated by the EGPWC when the data is transmitted).

- /17 indicates the beginning of the data string (/) with 17 being the number of categories to follow.

- <space><Cat 1 ID#><space><Cat 2 ID #>...<Cat 17 ID#>/ each Cat ID#. The ending slash (/) indicates the end of the data string.

Note: If 17 ID’s do not follow “/17”, the error message “*Invalid Parameter. Not enough ID’s. Configuration update failed, please try again.*” will be given. The value entered for each category must be an available ID for the associated category or a similar error message will be given. If the number of categories provided is less than 17 (e.g., “/8 # ... #/” with eight ID’s defined), then the remaining categories (9 through 17) will be set to 0.

After completing the data string as defined above, pressing ENTER the cursor will flash waiting for an answer “Y” or “N”. Pressing the Y (or y) key confirms the data and sends the data to the EGPWC to write to the Configuration Module.

Note: Using Kermit or a similar terminal emulator pressing ENTER results in a question: “**Confirm this data reflects configuration to be programmed (Y/N)**”. Pressing the Y (or y) key confirms the data and sends the data to the EGPWC to write to the Configuration Module.

Following the writing to the Configuration Module the EGPWC is automatically rebooted in order for the new configuration to take affect.

Note: If when the ENTER key is pressed the question response is not given (cursor just moves to the next line), pressing any character key should provide the proper response.

Pressing the N key results in the message "**Command aborted – No configuration module change has been made**". If necessary, revise the data to correct or change as necessary and continue as above. The backspace key can be used to make corrections.

5. Following the successful writing to the Configuration Module (no error messages) and EGPWC reboot, pressing **Control Z (Ctrl-Z)** restarts the WinVIEWS Terminal Mode communication.

6. There are a couple ways to now confirm the Configuration Module programming with the following being the preferred. 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 PC screen. Alternately, when not in the Configuration sub-mode, the command "**PS<Enter>**" (Present Status) will display EGPWC and configuration data.

7. Configuration Module programming is complete. If the "CFG >" prompt is still present type "**Exit<Enter>**" to exit the Configuration sub-mode.

Additional information on WinVIEWS and system configuration may be found in the Honeywell MK XXII installation manual.

Appendix B.**Command File**

The command file is a simple text file that should include each CVT Item used in this test procedure. The command file that includes the CTV items for this test procedure is found on the following page. The file must be a 'Text Only' type of file, such as those created in the Microsoft Windows Note Pad program. It should have a filename extension of .CMD. Once this file is loaded, WinVIEWS can automatically display the current value of each parameter listed in the file.

1. Connect the PC to the EGPWS via the RS-232 cable as defined in Appendix A.
2. On the PC, start Windows 3.1, or higher.
3. Start the WinVIEWS program.
4. Under the File Menu select the "Load Command File" option and load the appropriate
Command File.
5. Command File.
6. Use F6 to select Data Display Mode. Each CVT Item listed in the Command File will be continuously updated at a rate of greater than once per second. The values shown for the CVT Items listed will be the test values.

The format for the WinVIEWS command file is:

1. ASCII Text Only; no spaces
2. A CVT Item as specified in the test procedure
3. Each CVT Item Name is followed by a <return> or <enter>

V returns value item (each CVT item must include a V)

F returns flag item (F is optional and may be included for troubleshooting)

Do not enter the CVT description in the command file

Command File text		CVT Description
RawRA1	VF	Value of Raw Radio Altitude
ARA1Val	V	Value of Radio Altitude Valid
DHDsc	V	Value of Decision Height input
RawBAIt1	VF	Value of Barometric Altitude
RawBaroRt1	VF	Value of Barometric Rate (vertical speed)
RawCAS1	VF	Value of Calibrated Airspeed
RawSAT1	VF	Value of Static Air Temperature
ILSTuned1	V	Value of Tuned to Loc input
RawGS1	V	Value of Glideslope deviation
GPSLatitude1	VF	Value of GPS Latitude
GPSLongitude1	VF	Value of GPS Longitude
RawGAlt1	VF	Value of GPS Altitude
RawVFOM1	VF	Value of GPS vertical figure of merit
RawHFOM1	VF	Value of GPS horizontal figure of merit
RawRoll1	VF	Value of Roll Attitude input
RawPitch1	VF	Value of Pitch Attitude input
RawIMHD1	VF	Value of Magnetic Heading input
GSCan	V	Value of Glideslope Cancel discrete input
TacticalSel	V	Value of Low Altitude discrete input
TerrDis	V	Value of Terrain Inhibit discrete input
DispRngOut1	v	Value of selected range on display
RawTorque1	VF	Value of raw torque input for engine #1
RawTorque2	VF	Value of raw torque input for engine #2

United States of America
Department of Transportation -- Federal Aviation Administration
Supplemental Type Certificate

Number SR01474NY

This certificate issued to

Bell Helicopter Textron, Inc.
441 Industrial Park Road
Piney Flats, TN 37686

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 29 of the Federal Aviation Regulations.

Original Product -- Type Certificate Number: H4SW

Make: Bell Helicopter Textron

Model: 412EP

Description of Type Design Change:

Installation of the Honeywell Mark XXII for the Bell Model 412EP Helicopter, in accordance with Aeronautical Accessories, Inc. Drawing List Report 4123401-MDL01, Revision F, dated 01-03-07, or later FAA approved revision. Rotorcraft Flight Manual Supplement dated 01-09-2007 or later FAA approved revision is required. Instructions for Continued Airworthiness Report Number 4123401-RMM01 dated 01-03-2007 or later revision is required.

Limitations and Conditions:

The installer must determine whether this design change is compatible with previously approved modifications. If the holder agrees to permit another person to use this certificate to alter a product, the holder must give the other person written evidence of that permission.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: October 01, 2001

Date reissued: February 9, 2011;
February 10, 2003

Date of issuance: March 12, 2002

Date amended: January 09, 2007



By direction of the Administrator

Richard C. Spitzer
(Signature)

for James A. Richmond, Acting Manager
Rotorcraft Certification Office,
Southwest Region

(Title)

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of the Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of Supplemental Type Certificate Number _____

to (Name of transferee) _____

(Address of transferee) _____

(Number and street)

(City, State, and ZIP code)

from (Name of grantor) (Print or type) _____

(Address of grantor) _____

(Number & street)

(City, State, and ZIP code)

Extent of Authority (if licensing agreement): _____

Date of Transfer: _____

Signature of grantor (In ink): _____



European Aviation Safety Agency

SUPPLEMENTAL TYPE CERTIFICATE

EASA.IM.R.S.01311

This certificate, established in accordance with Regulations (EC) No 1592/2002 and (EC) No 1702/2003 and issued to:

Aeronautical Accessories, Inc.

P.O. Box 3689

Bristol

Tennessee 37625-3689

USA

certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable type certification basis and environmental protection requirements when operated within the conditions and limitations specified below:

Original Product Type Certificate number: *FAA TCDSH4SW*

Manufacturer: *Bell Helicopter*

Model: *Bell 412 EP*

Original STC Number: *FAA STC SR01474NY*

Description of Design Change:

Installation of Honeywell Mark XXII EGPWS for Bell Helicopter Textron 412EP helicopters.
Validation of FAA STC SR01474NY dated January 9, 2007.



European Aviation Safety Agency

Associated Technical Documentation:

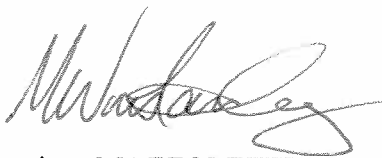
- AAI drawing list report 4123401-MDL01, revision F, dated 01-03-07 or later approved revision.
- AAI Rotorcraft Flight Manual Supplement document 4123401-FMS01, Rev C dated 06 June 2007, or later approved revisions.
- Instruction for continued airworthiness report 4123401-RMM01 dated 01-03-2007 or later approved revisions.

Limitations and Conditions:

Prior to installation of this modification the installer must determine that the interrelationship between this modification and any other previously installed modification will introduce no adverse effect upon the airworthiness of the product. The installation of this modification by third persons is subject to written permission of the approval holder.

This certificate shall remain valid unless otherwise surrendered or revoked.

For the European Aviation Safety Agency,
Date of Issue: 20 June 2007


Massimo MAZZOLETTI
Certification Manager
Rotorcraft, Balloons, Airships