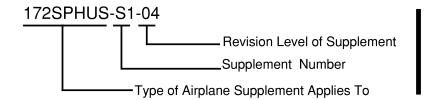
SUPPLEMENTS

INTRODUCTION

The supplements in this section contain expanded operational procedures for both standard and optional equipment installed in the airplane. Operators should refer to each supplement to ensure that all limitations and procedures appropriate for their airplane are observed.

A Log Of Approved Supplements is provided, for convenience only, beginning on page Log 1 and is a numerical list of all supplements applicable to this airplane by name, number and revision level. This log should be used as a checklist to ensure all applicable supplements have been placed in the Pilot's Operating Handbook (POH). Supplements may be removed from the POH provided the equipment is not installed on the airplane. If equipment is installed on the airplane, however, the supplement(s) must be retained and updated as revisions to each supplement are issued.

Each individual supplement contains its own Log of Effective Pages. This log lists the page number and effective date of every page in the supplement. The log also lists the dates on which revisions to the supplement occurred. Additionally, the part number of the supplement provides information on the revision level. Refer to the following example:



LOG OF APPROVED SUPPLEMENTS

NOTE

IT IS THE AIRPLANE OWNER'S RESPONSIBILITY TO MAKE SURE THAT HE OR SHE HAS THE LATEST REVISION TO EACH SUPPLEMENT OF A PILOT'S OPERATING HANDBOOK AND THE LATEST ISSUED "LOG OF APPROVED SUPPLEMENTS." THIS "LOG OF APPROVED SUPPLEMENTS" WAS THE LATEST REVISION AS OF THE DATE IT WAS SHIPPED BY CESSNA; HOWEVER, SOME CHANGES MAY HAVE OCCURRED AND THE OWNER SHOULD VERIFY THIS IS THE LATEST, MOST UP-TO-DATE VERSION BY CONTACTING CESSNA CUSTOMER SUPPORT AT (316) 517-5800.

SUPP. NO.	SUPPLEMENT NAME	REVISION LEVEL	EQUIPMENT INSTALLED
1	Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head	0	
2	Bendix/King KT 76C Transponder with Blind Encoder	0	
3	Bendix/King KMA 26 Audio Selector Panel	1	
4	Pointer Model 3000-11 or Model 4000-11 Emergency Locator Transmitter (ELT)	2	
5	Bendix/King KLN 89B Global Positioning System (GPS)	2	
6	Bendix/King KR 87 Automatic Direction Finder (ADF)	1	
7	Bendix/King Kap 140 Single Axis Autopilot	2	
8	Winterization Kit	0	
9	Davtron Model 803 Clock/OAT	0	
10	Bendix/King KLN 89 Global Positioning System (GPS)	1	
11	Reserved		

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LOG OF APPROVED SUPPLEMENTS

SUPP. No.	SUPPLEMENT NAME	REVISION LEVEL	EQUIPMENT INSTALLED
12	Canadian Supplement	0	
13	Bendix/King KCS-55A Slaved Compass System with KI-525A Horizontal Situation Indicator (HSI)	1	
14	Reserved		
15	Bendix/King KAP 140 2 Axis Autopilot	5	
16	Bendix/King KT 73 Mode S Transponder	0	
17	Reserved		
18	Reserved		
19	Bendix/King KLN 94 Global Positioning System	4	
20	Bendix/King KMA 28 Audio Selector Panel	0	
21	Bendix/King KMD 550 Multi-Function Display	0	
22	12 Volt Cabin Power System	0	
24	Astrotech Model TC-2 Clock/OAT/Volt Indicator	0	
25	Bendix/King KX 165A VHF NAV/COM	0	
26	Bendix/King KDR 510 Flight Information Services (FIS)	0	



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON

SUPPLEMENT 1

BENDIX/KING KX 155A VHF NAV/COMM with KI 208 or KI 209A INDICATOR HEAD

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
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Date: July 10, 1998

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S1-1

SUPPLEMENT 1

BENDIX/KING KX 155A VHF NAV/COMM with KI 208 or KI 209A INDICATOR HEAD

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S1-1) S1-2 S1-3 S1-4 S1-5 S1-6 S1-7	July 8/98 July 8/98 July 8/98 July 8/98 July 8/98 July 8/98 July 8/98	S1-9 S1-10 S1-11 S1-12 S1-13 S1-14 S1-15	July 8/98 July 8/98 July 8/98 July 8/98 July 8/98 July 8/98 July 8/98
S1-8	July 8/98	S1-16 Blank	July 8/98

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	<u>In Airplane</u>

S1-2 July 8/98

SUPPLEMENT

BENDIX/KING KX 155A VHF NAV/COMM with KI 208 or KI 209A INDICATOR HEAD

SECTION 1 GENERAL

The Bendix/King KX 155A VHF Nav/Comm, shown in Figure 1, consists of a panel-mounted receiver-transmitter and a KI 208 or KI 209A Indicator.

The set includes a 760-channel VHF communications receiver-transmitter and a 200-channel VHF navigation receiver. A 40-channel glide- slope receiver is also included if the KI 209A indicator is used. The communications receiver-transmitter receives and transmits signals between 118.00 and 136.975 MHz with 25-kHz spacing. Optional 8.33 kHz (2280 channel) Comm is available. The navigation receiver receives VOR and localizer signals between 108.00 and 117.95 MHz in 50-kHz steps. The glide slope receiver is automatically tuned when a localizer frequency is selected. The circuits required to interpret the VOR and localizer signals are also an integral part of the Nav receiver.

Large self-dimming gas discharge readouts display both the communications and navigation operating frequencies. The KX-155A's "flip-flop" preselect feature enables you to store one frequency in the standby display while operating on another and then interchange them instantly with the touch of a button. Both the active (COMM) and the standby (STBY) frequencies may be displayed at all times and are stored in nonvolatile memory without drain on the aircraft battery. KX 155A has 32 programmable comm channels, a stuck microphone alert and transmitter shutdown, Bearing To/From radial mode, course deviation indicator mode and an elapsed timer mode.

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The Comm portion incorporates an automatic squelch. To override the automatic squelch, the Comm volume control knob is pulled out. Push the knob back in to reactivate the automatic squelch. A "T" will be displayed during transmit and "R" during valid signal reception.

The Nav portion uses the pull out feature of the Nav volume control to receive the Nav signal Ident. Pull the volume control knob out to hear the Ident signal plus voice. Push the knob in to attenuate the Ident signal and still hear Nav voice.

All controls for the Nav/Comm, except those for navigation course selection, are mounted on the front panel of the receiver-transmitter. Control lighting is provided by NAV/COMM interior lighting and the instrument panel flood lighting system. Operation and description of the audio selector panel used in conjunction with this radio is shown and described in Supplement 3 in this section.

NOTE

The unit has a stuck microphone alert feature. If the microphone is keyed continuously for greater than 33 seconds, the transmitter stops transmitting and the active Comm frequency flashes to alert the pilot of the stuck mic condition.

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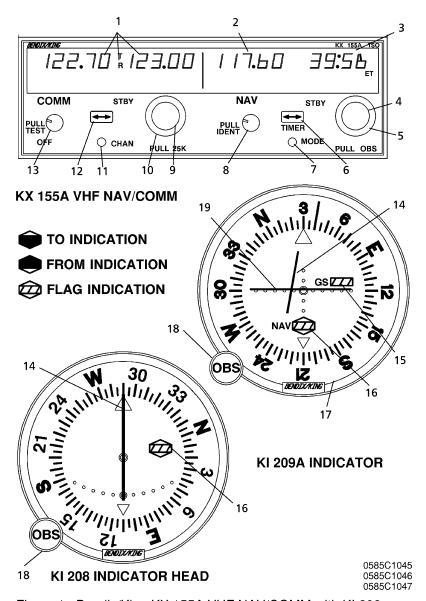


Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 1 of 7)

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NAV FUNCTION DISPLAYS

	109.60 g 030 -+
	VOR MODE: ACTIVE/BEARING, CDI FORMAT
	109.60 % 030 FLAG
	VOR MODE: ACTIVE/BEARING, FLAG DISPLAY
	109.60 030 [™]
	VOR MODE: ACTIVE "BEARING TO" FUNCTION DISPLAY
$\Big($	109.60 ^{to})
	VOR MODE: ACTIVE/BEARING, FLAG DISPLAY

LOCALIZER MODE: FREQUENCY/CDI FORMAT

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 2 of 7)

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- 1. OPERATING COMM FREQUENCY DISPLAY -- Displays COMM ACTIVE and COMM STANDBY frequencies with a "T" between them to indicate TRANSMIT and an "R" to indicate RECEIVE modes of operation.
- 2. OPERATING NAV FREQUENCY DISPLAY -- The right portion of the display is allocated to NAV receiver ACTIVE and STANDBY information. The frequency channeling is similar to the COMM when operating in the frequency mode. The NAV ACTIVE and STANDBY frequencies are stored in the memory on power down and return on power up.
- 3. NAV STANDBY/OBS/Bearing/Radial/Timer Display -- The right side of the NAV display is controlled by the MODE SELECTOR BUTTON (see #7 below). With an active VOR frequency, this portion of the display shows the STANDBY frequency, OBS setting for the internal CDI, the bearing to the VOR station, radial from the VOR station, or a count-up/count-down timer. With an active localizer frequency, this portion of the display shows the standby frequency, the letters "LOC", or count-up/count-down timer.
- 4. NAV FREQUENCY SELECTOR KNOB (SMALL) -- Operates in 50 kHz steps. The NAV receiver's lower and upper frequency limits are 108.00 MHz and 117.95 MHz. Exceeding the upper limit of frequency band will automatically return to the lower limit and vice versa. A clockwise rotation will increase (inc) the previous frequency while a counterclockwise rotation will decrease (dec) the previous frequency.
- 5. NAV FREQUENCY SELECTOR KNOB (LARGE) -- Operates in 1 MHz steps. The frequency inc/dec operates the STANDBY frequency display. A clockwise rotation will increase the previous frequency while a counterclockwise rotation will decrease the previous frequency. Exceeding the upper limit of the frequency band will automatically return to the lower limit and vice versa.

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 3 of 7)

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- 6. NAV/FREQUENCY TRANSFER BUTTON (←→) -- Interchanges the NAV Active and STANDBY frequencies. Depressing the NAV frequency transfer button for 2 seconds or more will cause the display to go into the ACTIVE ENTRY mode. Only the ACTIVE frequency will be displayed and it can be directly changed by using the NAV inc/dec knobs. The display will return to the ACTIVE/STANDBY mode when the NAV frequency transfer button is pushed.
- 7. MODE SELECTOR BUTTON -- Depressing the mode button will cause the NAV display to go from the ACTIVE/STANDBY format to the ACTIVE/CDI (Course Deviation Indicator) format. In the CDI mode, the frequency inc/dec knob (pushed in) channels the ACTIVE frequency. When the ACTIVE window is tuned to a VOR frequency, the standby frequency area is replaced by a three digit OBS (Omni Bearing Selector) display. The desired OBS course can be selected by pulling out the inner NAV frequency knob and turning it. This OBS display is independent of any OBS course selected on an external CDI. An "OBS" in the middle of the NAV display will flash while the inner NAV frequency knob is pulled out. The CDI is displayed on the line below the frequency/OBS. When the ACTIVE window is tuned to a localizer frequency, the standby frequency area is replaced by "LOC". When the received signal is too weak to ensure accuracy the display will "FLAG".

Depressing the mode button again will cause the NAV display to go from the ACTIVE/CDI format to the ACTIVE/BEARING format. In the BEARING mode, the frequency inc/dec knob channels the ACTIVE frequency window. Depressing the frequency transfer button will cause the ACTIVE frequency to be placed in blind storage and the STANDBY frequency (in blind storage) to be displayed in the ACTIVE window display. In bearing mode, the right hand window of the NAV display shows the bearing TO the station. When a too weak or invalid VOR signal is received the display flags (dashes).

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 4 of 7)

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Another push of the mode button will cause the NAV display to go from the ACTIVE/BEARING format to the ACTIVE/RADIAL format. In the RADIAL mode, the frequency inc/dec knobs channel the ACTIVE frequency window and depressing the frequency transfer button will cause the ACTIVE frequency to be placed in blind storage and the STANDBY frequency (in blind storage) to be displayed in the ACTIVE window display. In radial mode of operation, the right hand window of NAV display shows the radial FROM the station. When a too weak or invalid VOR signal is received the display flags (dashes).

Another push of the mode button will cause the unit to go into the TIMER mode. When the unit is turned on, the elapsed timer (ET) begins counting upwards from zero. The timer can be stopped and reset to zero by pushing the NAV frequency transfer button for 2 seconds or more causing the ET on the display to flash. In this state, the timer can be set as a countdown timer or the elapsed timer can be restarted. The countdown timer is set by using the NAV frequency inc/dec knobs to set the desired time and then pushing the NAV frequency transfer button to start the timer. The large knob selects minutes, the small knob in the "in" position selects 10 second intervals, and the small knob in the "out" position selects individual seconds. After the countdown timer reaches zero, the counter will begin to count upwards indefinitely while flashing for the first 15 seconds. When the elapsed timer is reset to zero it may be restarted again by momentarily pushing the NAV frequency transfer button.

8. NAV/VOLUME CONTROL (PULL IDENT) -- Adjusts volume of navigation receiver audio. When the knob is pulled out, the Ident signal plus voice may be heard. The volume of voice/ident can be adjusted by turning this knob.

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 5 of 7)

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- 9. COMM FREQUENCY SELECTOR KNOB (INNER) -- This smaller knob is designed to change the indicated frequency in steps of 50-kHz when it is pushed in, and in 25-kHz steps when it is pulled out. For 8.33 kHz versions, channels are incremented in 25 kHz steps with the knob pushed in and 8.33 kHz with the knob pulled out.
- 10. COMM FREQUENCY SELECTOR KNOB (OUTER) -- The outer, larger selector knob is used to change the MHz portion of the frequency display. At either band-edge of the 118-136 MHz frequency spectrum, an offscale rotation will wrap the display around to the other frequency band-edge (i.e., 136 MHz advances to 118 MHz).
- 11. CHANNEL BUTTON -- Pressing the CHAN button for 2 or more seconds will cause the unit to enter the channel program (PG) mode. Upon entering the channel program mode, the channel number will flash indicating that it can programmed. The desired channel can be selected by turning the comm kHz knob. The channel frequency can be entered by pushing the comm transfer button which will cause the standby frequency to flash. The comm frequency knobs are then used to enter the desired frequency. If dashes (located between 136 MHz and 118 MHz) are entered instead of a frequency, the corresponding channel is skipped in channel selection mode. Additional channels may be programmed by pressing the COMM transfer button and using the same procedure. The channel information is saved by pushing the CHAN button which will also cause the unit to return to the previous frequency entry mode.

The channel selection mode (CH) can then be entered by momentarily pushing the CHAN button. The comm frequency knobs can be used to select the desired channel. The unit will automatically default to the previous mode if no channel is selected within 2 seconds after entering the channel selection mode. The unit is placed in the transmit mode by depressing a mic button.

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 6 of 7)

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12. COMM FREQUENCY TRANSFER BUTTON () -- Interchanges the frequencies in the USE and STANDBY displays. To tune the radio to the desired operating frequency, the desired frequency must be entered into the standby display and then the transfer button must be pushed. This will trade the contents of the active and standby displays. The operating frequency can also be entered by accessing the ACTIVE ENTRY (direct tune) mode which is done by pushing the COMM TRANSFER button for 2 or more seconds. In the direct tune mode, only the active part of the display is visible. The desired frequency can be directly entered into the display. Push the COMM TRANSFER button again to return to the active/standby display.

The transceiver is always tuned to the frequency appearing in the ACTIVE display. It is, therefore, possible to have two different frequencies stored in the ACTIVE and STANDBY displays and to change back and forth between them at the simple push of the transfer button.

- 13. COMM VOLUME CONTROL (OFF/PULL/TEST) -- Rotate the VOL knob clockwise from the OFF position. Pull the VOL knob out and adjust for desired listening level. Push the VOL knob back in to actuate the automatic squelch. The VOL knob may also be pulled out to hear particularly weak signals.
- 14. VOB/Localizer Needle or CDI needle.
- Glideslope Flag
- 16. TO-FROM-NAV FLAG
- 17. Azimuth Card
- 18. OBS Knob
- 19. Glideslope Needle

Figure 1. Bendix/King KX 155A VHF NAV/COMM with KI 208 or KI 209A Indicator Head (Sheet 7 of 7)

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SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed. However, if the frequency readouts fail, the radio will remain operational on the last frequency selected. If either frequency transfer button is pressed and held while power is applied to the unit, the unit wakes up with 120.00 MHz in the COMM use frequency and 110.00 MHz in the NAV active frequency, with both COMM and NAV in the active entry mode. This will aid the pilot in blind tuning the radio.

SECTION 4 NORMAL PROCEDURES

COMMUNICATION RECEIVER-TRANSMITTER OPERATION:

- OFF/PULL/TEST Volume Control -- Turn clockwise; pull out and adjust to desired audio level; push control back in to activate the automatic squelch.
- MIC Selector Switch (on audio control panel) -- SET to COMM
- SPEAKER Selector (on audio control panel) -- SET to desired mode
- 4. COMM Frequency Selector Knobs -- Select desired operating frequency.
- 5. COMM Transfer Button -- PRESS to transfer desired frequency from the STBY display into the COMM display.

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6. Mic Button:

a. To transmit -- Press button and speak in microphone.

NOTE

During COMM transmission, a lighted "T" will appear between the "COMM" and "STBY" displays to indicate that the transceiver is operating in the transmit mode.

b. To Receive -- RELEASE mike button.

NAVIGATION RECEIVER OPERATION:

- 1. NAV Frequency Selector Knobs -- SELECT desired operating frequency in "STBY" display.
- 2. NAV TRANSFER BUTTÓN -- PRESS to transfer desired frequency from the "STBY" display into the "NAV" display.
- 3. Speaker Selector (on audio control panel) -- SET to desired mode..
- 4. NAV Volume Control -
 - a. ADJUST to desired audio level.
 - b. PULL out to identify station.

VOR OPERATION:

Channel the NAV Receiver to the desired VOR and monitor the audio to positively identify the station. To select an OBS course, turn the OBS knob to set the desired course under the lubber line. When a signal is received, the NAV flag will pull out of view and show a "TO" or "FROM" flag as appropriate for the selected course.

LOC OPERATION

Localizer circuitry is energized when the NAV Receiver is channeled to an ILS frequency. Monitor the LOC audio and positively identify the station. The NAV flag will be out of view when the signal is of sufficient strength to be usable.

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GLIDESLOPE OPERATION

The glideslope receiver is automatically channeled when a localizer frequency is selected. A separate warning flag is provided to indicate usable signal conditions.

PILOT CONFIGURATION

This mode can be accessed by pressing and holding the NAV Mode Button for more than 2 seconds and then pressing the Nav Frequency Transfer Button for an additional 2 seconds, while continuing to hold the NAV Mode Button. When the Pilot Config Mode is entered the unit will show the "SWRV" mnemonic which is the unit software revision level. Adjustment pages can be accessed by MODE button presses.

The pilot may adjust two parameters in the pilot configuration, the display minimum brightness and sidetone volume level. Minimum Brightness (BRIM) will have a range of 0-255. The dimmest is 0 and the brightest is 255. Sidetone volume level is adjusted when SIDE is displayed. Values from 0-255 may be selected with 0 being least volume, 255 being the greatest.

Adjustment	Mnemonic	Min Level	Max Level
Software Revision Number	SWRV		
Minimum Display Brightness	BRIM	0	255
Sidetone Level	SIDE	0	255

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Subsequent presses of the MODE button sequences through SWRV, BRIM, SIDE, and then back to SWRV.

Pressing the NAV Transfer Button momentarily exits Pilot configuration mode. The NAV returns to its pre-Pilot Config state with the new brightness and sidetone levels stored in nonvolatile memory.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna, or several related antennas, may result in a minor reduction in cruise performance.



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 2

BENDIX/KING KT 76C TRANSPONDER WITH BLIND ENCODER

SERIAL NO	_
REGISTRATION NO	_

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVAL

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The Cessna Aircraft Co
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Walker Date: July 10, 1998

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SUPPLEMENT 2

BENDIX/KING KT 76C TRANSPONDER with BLIND ENCODER

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998

LOG OF EFFECTIVITY PAGES

PAGE DATE PAGE DATE S2-6 Title (S2-1) July 8/98 July 8/98 S2-7 S2-2 July 8/98 July 8/98 S2-3 July 8/98 S2-8 July 8/98 S2-4 July 8/98 S2-9 July 8/98 S2-5 July 8/98 S2-10 Blank July 8/98

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	<u>In Airplane</u>

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SUPPLEMENT

BENDIX/KING KT 76C TRANPONDER with BLIND ENCODER

SECTION 1

GENERAL

The Bendix/King Transponder (Type KT 76C), shown in Figure 1, is the airborne component of an Air Traffic Control Radar Beacon System (ATCRBS). The transponder enables the ATC ground controller to "see" and identify more readily the aircraft on the radarscope. The blind encoder (SSD120-20) (also shown in Figure 1) enables the transponder to automatically report aircraft altitude to ATC.

The Bendix/King Transponder system consists of a panel-mounted unit and an externally-mounted antenna. The transponder receives interrogating pulse signals on 1030 MHz and transmits coded pulse-train reply signals on 1090 MHz. It is capable of replying to Mode A (aircraft identification) and also to Mode C (altitude reporting) interrogations on a selective reply basis on any of 4096 information code selections. When a panel-mounted SSD120-20 Blind Encoder (not part of KT 76C Transponder system) is included in the avionic configuration, the transponder can provide altitude reporting in 100-foot increments between -1000 and +20,000 feet.

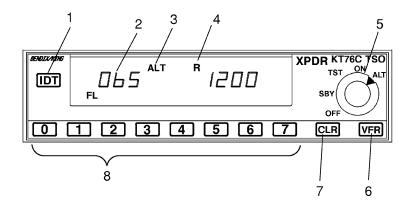
The KT 76C features microprocessor and LSI (Large Scale Integrated) control. Mode and code selection are performed using the rotary knob and numeric buttons and all functions including the flight level altitude are presented on a gas discharge display. All display segments are automatically dimmed by a photocell type sensor.

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A VFR programming sequence, described in Section 4, allows the pilot to preprogram any single code such as "1200" into the KT 76C. Pressing the VFR button instantly returns the KT 76C to the preprogrammed code without having to manually enter "1200".

All Bendix/King Transponder operating controls are located on the front panel of the unit. Functions of the operating controls are described in Figure 1.

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- IDENT BUTTON (IDT) When depressed, selects special identifier pulse to be transmitted with transponder reply to effect immediate identification of the airplane on the ground controller's display. ("R" will illuminate steadily for approximately 18 seconds. Button illumination is controlled by the avionic light dimming rheostat.
- 2. ALTITUDE DISPLAY Displays the pressure altitude on the left side of the display. The display is in hundreds of feet. "FL" is annunciated to indicate Flight Level altitude. Flight Level is a term to indicate that the altitude is not true altitude, but barometric altitude which is not corrected for local pressure. For Example, "FL-040" corresponds to an altitude of 4000 feet, meaning sea level pressure of 29.92 inches of mercury.

The Flight Level altitude is only displayed when the altitude reporting is enabled, i.e. in Altitude mode. If an invalid code from the altimeter is detected dashes will appear in the altitude window. Altitude reporting is disabled if the altitude window is blank or has dashes.

Figure 1. Bendix/King KT 76C Transponder with Blind Encoder (Sheet 1 of 2)

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- 3. MODE ANNUNCIATORS Displays the operating mode of the transponder.
- 4. REPLY INDICATOR (R) "R" is illuminated momentarily when the transponder is replying to a valid interrogation and during the 18 ±2 seconds following the initiation of an Ident.
- 5. MODE SELECTOR KNOB Controls application of power and selects transponder operating mode as follows:
 - OFF Turns set off.
 - SBY Turns set on for standby power and code selection. "SBY" is annunciated.
 - TST Self-test function. The transmitter is disabled. All display segments will illuminate.
 - ON Turns set on and enables transponder to transmit Mode A (aircraft identification) reply pulses. ON is annunciated.
 - ALT Turns set on and enables transponder to transmit either Mode A (aircraft identification) reply pulses and Mode C (altitude reporting) pulses selected automatically by the interrogating signal. ALT is annunciated.
- 6. VFR CODE BUTTON (VFR) Pressing the VFR Button will cause a pre-programmed Mode A reply code to supersede whatever Mode A reply code was previously in use. Button illumination is controlled by the RADIO LT dimming rheostat
- 7. CLEAR BUTTON (CLR) -- Pressing the CLR button will delete the last Mode A code digit entered.
- 8. NUMERIC KEYS 0-7 Selects assigned Mode A reply code. The new code will be transmitted after a 5-second delay.

Figure 1. Bendix/King KT 76C Transponder with Blind Encoder (Sheet 2 of 2)

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SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed.

SECTION 3 EMERGENCY PROCEDURES

TO TRANSMIT AN EMERGENCY SIGNAL:

- 1. Mode Selector Knob -- ALT.
- 2. Numeric Keys 0-7 -- SELECT 7700 operating code.

TO TRANSMIT A SIGNAL REPRESENTING LOSS OF ALL COMMUNICATIONS (WHEN IN A CONTROLLED ENVIRONMENT):

- 1. Mode Selector Knob -- ALT.
- 2. Numeric Keys 0-7 -- SELECT 7600 operating code.

SECTION 4 NORMAL PROCEDURES

BEFORE TAKEOFF:

Mode Selector Knob -- SBY.

TO TRANSMIT MODE A (AIRCRAFT IDENTIFICATION) CODES IN FLIGHT:

1. Numeric Keys 0-7 -- SELECT assigned code..

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2. Mode Selector Knob -- ON.

NOTES

- During normal operation with Mode Selector Knob in ON position, reply indicator flashes, indicating transponder replies to interrogations.
- Mode A reply codes are transmitted in ALT also; however, Mode C codes are suppressed when the Mode Selector Knob is positioned to ON.
- 3. IDT Button -- DEPRESS momentarily when instructed by ground controller to "squawk IDENT" ("R" will illuminate steadily indicating IDENT operation).

TO TRANSMIT MODE C (ALTITUDE REPORTING) CODES IN FLIGHT:

- 1. Transponder Code Selector Knob -- SELECT assigned code.
- 2. Mode Selector Knob -- ALT.

NOTES

- When directed by ground controller to "stop altitude squawk", turn Mode Selector Knob to ON for Mode A operation only.
- Altitude transmitted by the transponder for altitude squawk and displayed on the KT 76C panel is pressure altitude (referenced to 29.92") and conversion to indicated altitude is done in the ATC computers.

TO SELF-TEST TRANSPONDER OPERATION:

- 1. Mode Selector Knob -- TST Check all displays.
- 2. Mode Selector Knob -- SELECT desired function.

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TO PROGRAM VFR CODE:

- 1. Mode Selector Knob -- SBY.
- 2. Numeric Keys 0-7 -- SELECT desired VFR code.
- 3. IDT Button -- PRESS AND HOLD.
 - a. VFR Code Button -- PRESS (while still holding IDT button) to place new VFR code in nonvolatile memory for subsequent call up.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally-mounted antenna, or related external antennas, may result in a minor reduction in cruise performance.



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 3

BENDIX/KING KMA 26 AUDIO SELECTOR PANEL

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVAL		
FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co Delegation Option Manufacturer CE-1 Within A Thinking Executive Engineer		
/		
Date: 27June 2000		

Member of GAMA 8 July 1998

Revision 1 - 30 May 2000

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172SPHUS-S3-01

S3-1

SUPPLEMENT 3

BENDIX/KING KMA 26 AUDIO SELECTOR PANEL

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998
1	May 30, 2000

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S3-1)	May 30/00	S3-6	July 8/98
S3-2	May 30/00	S3-7	July 8/98
S3-3	July 8/98	S3-8	May 30/00
S3-4	July 8/98	S3-9	July 8/98
S3-5	July 8/98	S3-10 blank	July 8/98

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
Number	<u>Title</u>	Effectivity	Incorporation	In Airplane

S3-2 May 30/00

SUPPLEMENT

BENDIX/KING KMA 26 AUDIO SELECTOR PANEL

SECTION 1 GENERAL

The Bendix/King KMA 26 Audio Selector Panel is a combination audio amplifier, an audio distribution panel intercom, and a marker beacon receiver. The audio amplifier is for amplification of the audio signals for the speaker system. All receiver audio distribution functions are controlled by two rows of pushbuttons. A rotary selector switch on the right side of the console connects the microphone to either EMG, Com 1, Com 2, Com 3 or PA (Unused position). All operating controls are shown and described in Figure 1.

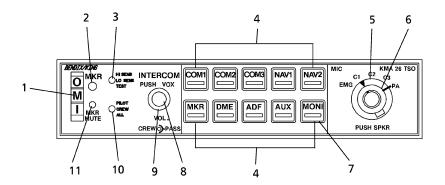
A crystal-controlled superheterodyne marker beacon receiver with 3-light presentation is incorporated within the unit. Dimming circuitry for the marker lamps automatically adjusts brightness appropriate to the cockpit ambient light level. Hi and Lo sensitivity and lamp test functions are also provided.

Light dimming for the audio control panel is manually controlled by the RADIO light rheostat knob.

MARKER FACILITIES

MARKER	IDENTIFYING TONE	LIGHT*
Inner, Airway & Fan	Continuous 6 dots/sec (3000 Hz)	White
Middle	Alternate dots and dashes (1300 Hz)	Amber
Outer	2 dashes/sec (400 Hz)	Blue
	*When the identifying tone is keyed, the respective indicating light will blink accordingly.	

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 MARKER BEACON ANNUNCIATOR LIGHTS -- The three-light marker beacon receiver built into the KMA 26 gives a visual and aural signal when the ship's antenna passes over a 75 MHz beacon. The blue, amber, and white lights on the faceplate, as well as the audio tones, identify the beacon type.

INNER, AIRWAY and FAN -- Light illuminates white to indicate passage of ILS inner, airway or fan marker beacons.

OUTER -- Light illuminates blue to indicate passage of outer marker beacon.

MIDDLE -- Light illuminates amber to indicate passage of middle marker beacon.

2. PHOTOCELL FOR AUTOMATIC DIMMING OF MARKER BEACON LIGHTS AND SELECT BUTTON -- The photocell in the faceplate automatically dims the marker lights as well as the green annunciators in the Speaker Audio Select Buttons for night operation.

Figure 1. Bendix/King KMA 26 Audio Selector Panel (Sheet 1 of 4)

S3-4 July 8/98

- 3. MARKER BEACON SENSITIVITY LAMP AND TEST SWITCH --The "MKR" Audio Select button must be pushed so that the green annunciator is illuminated for the marker beacon to receive to provide an audio signal at beacon passage. When this switch is on "HI SENS" (upper) position, the high sensitivity is selected which permits you to hear the outer marker tone about a mile out. At this point you may select the the "LO SENS" (middle) position to temporarily silence the tone. It will start to sound again when you are closer to the marker, giving you a more precise indication of its location.
- 4. AUDIO SELECT BUTTONS -- Push button audio selection is available for three Communications receivers ("COM 1", "COM 2", and "COM 3"), two Navigation receivers ("NAV 1" and "NAV 2"), the internal Marker Beacon receiver ("MKR"), one DME, one ADF, and one additional auxiliary receiver ("AUX"). The "AUX" position could be used, for example, for a second DME or ADF. When a receiver's audio is selected, the green annunciator illuminates at the bottom of the button. Push the button again to deselect the receiver's audio.
- 5. MICROPHONE SELECTOR SWITCH (MIC) -- Used to select the desired transmitter for the cockpit microphones. The "C1", "C2", and "C3" positions are for transmitting on the Com 1, Com 2, and Com 3 communications transceivers, respectively. The "EMG" (emergency) position is used to bypass the KMA 26's audio amplifier and directly connects Com 1 to the pilot's microphone and headphones. This provides a fail-safe method of communication should the unit fail. The "PA" position may be selected when the aircraft is configured with a passenger address capability. The "Auto Com" feature always provides automatic headphone audio selection to match the Com transmitter in use. To add speaker audio, simply push the Speaker Select Switch (inner right knob) to the "in" position. Pulling the switch to the "out" position removes speaker audio.

Figure 1. Bendix/King KMA 26 Audio Selector Panel (Sheet 2 of 4)

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- SPEAKER SELECT (PUSH SPKR) SWITCH -- With the Speaker Select Switch pushed in, both headphone and cabin speaker audio will be heard. Headphone audio is active fulltime. Headphone audio cannot be deselected.
- 7. MONITOR SELECT (MONI) BUTTON -- When activated, if Com 1 is selected on the Microphone Selector Switch then Com 2 audio is automatically routed to the speaker. Or if Com 2 is selected on the Microphone Selector Switch, then Com 1 is routed to the speaker. Pressing the "MONI" button again will disable the feature. Initially when "MONI" is selected the green annunciators in the button flash for approximately 5 seconds, then remains steady while the Comannunciation returns to its previous state.
- 8. CREW INTERCOM VOLUME (VOL CREW) KNOB and INTERCOM VOX SENSITIVITY SET (INTERCOM PUSH VOX) SWITCH -- Inside knob adjusts Pilot and Copilot intercom volume. Intercom operation is voice activated (VOX), where intercom becomes active automatically when a crew member or passenger begins to speak. Set the intercom VOX squelch by momentarily pressing and releasing the left inner knob when no one is speaking.
- PASSENGER INTERCOM VOLUME (VOL PASS) KNOB --Adjusts passenger intercom volume.

Figure 1. Bendix/King KMA 26 Audio Selector Panel (Sheet 3 of 4)

S3-6 July 8/98

10. INTERCOM MODE SELECT SWITCH -- Has three modes "ALL", "CREW", AND "PILOT" which are selected with the toggle switch on the lower left side on the faceplate. In the "ALL" position the pilot, copilot, and passengers are all on the same intercom "loop" and everyone hears the radios. In the "CREW" position the pilot and copilot are on one intercom loop and can hear the radios while the passengers have their own dedicated intercom and do not hear the radios. In the "PILOT" mode the pilot hears the radios but is isolated from the intercom while the copilot and passengers are on the same intercom loop and do not hear the radios.

When either the "ALL" or "CREW" intercom modes are selected, the pilot's and copilot's intercom volume is controlled by rotating the Crew Intercom Volume Knob (left inner knob) while the passenger's volume is controlled by rotating the Passenger Intercom Volume Knob (left outer knob). When the "PILOT" intercom mode is selected, the copilot's and passenger's volume is controlled with the Passenger Intercom Volume Knob. Remember, the volume knobs on the KMA 26 control intercom volume only, not the receiver's volume.

11. MARKER MUTE BUTTON -- Mutes currently active marker beacon audio.

Figure 1. Bendix/King KMA 26 Audio Selector Panel (Sheet 4 of 4)

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SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed.

SECTION 3 EMERGENCY PROCEDURES

- In the event of a failure of the audio amplifier in the KMA 26, as evidenced by the inability to transmit in COM 1, 2 or 3.
 - MIC Selector Switch -- EMG.

NOTE

This action bypasses the KMA 26 audio amplifier and connects the pilot's mic/head set directly to COM 1.

SECTION 4 NORMAL PROCEDURES

AUDIO CONTROL SYSTEM OPERATION:

- 1. MIC Selector Switch -- Turn to desired transmitter.
- SPEAKER and Audio Select Button(s) -- SELECT desired receiver(s).

NOTES

Rotation of the MIC selector switch selects the Com audio automatically.

S3-8 May 30/00

MARKER BEACON RECEIVER OPERATION:

- 1. TEST Position -- HOLD toggle down momentarily to verify all lights are operational.
- 2. SENS Selections -- Select HI sensitivity for airway flying or LO for ILS/LOC approaches.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or related external antennas, may result in a minor reduction in cruise performance.



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON

SUPPLEMENT 4

POINTER MODEL 3000-11 OR MODEL 4000-11 EMERGENCY LOCATOR TRANSMITTER

SERIAL NO	
REGISTRATION NO	-

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Pointer Model 3000-11 or Model 4000-11 Emergency Locator Transmitter is installed. The Pointer Model 4000-11 Emergency Locator Transmitter is approved for use only in the USA, Canada and Japan.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1

Viscout Walter Executive Engineer
Date: 27 June 2000

Member of GAMA 8 July 1998

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Revision 2 - 7 July 2003

172SPHUS-S4-02 S4-1

POINTER MODEL 3000-11 OR MODEL 4000-11 EMERGENCY LOCATOR TRANSMITTER (ELT)

Use the Log of Effective Pages to determine the current status of this supplement. Pages affected by the current revision are indicated by an asterisk (*) preceeding the page number.

Supplement Status

Date

Original Issue Revision 1 Revision 2 8 July 1998 30 May 2000 7 July 2003

APPROVED BY

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessne Aircraft Co.
Delegation Option Authorization DOA-100129-CE
White Wildlift Executive Enginee

07-07:-63 MANA

DATE OF APPROVAL

LOG OF EFFECTIVE PAGES

	Page	Page Status	Revision Number
*	S4-1 thru S4-3	Revision	2
	S4-4 thru S4-9/S4-10	Revision	1

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airpiane		
		Serial	Revision	Incorporated
<u>Number</u>	<u>Title</u>	<u>Effectivity</u>	<u>Incorporation</u>	<u>In Airplane</u>

S4-2 Revision 2

POINTER MODEL 3000-11 OR MODEL 4000-11 EMERGENCY LOCATOR TRANSMITTER (ELT)

SECTION 1

GENERAL

This supplement provides information which must be observed when operating the Pointer Model 3000-11 or Model 4000-11 Emergency Locator Transmitter. The Pointer Model 4000-11 Emergency Locator Transmitter is approved for use only in the USA, Canada and Japan.

Both the Pointer Model 3000-11 ELT (which incorporates the english placard) and Model 4000-11 ELT (which incorporates the bilingual placard) consist of a self-contained dual-frequency solid-state transmitter powered by a battery pack consisting of five alkaline "C" cell batteries and is automatically activated by a deceleration sensing inertia "G" switch, which is designed to activate when the unit senses longitudinal inertia forces as required in TSO-C91A. Also, a remote switch/annunciator is installed on the top right hand side of the copilot's instrument panel for control of the ELT from the flight crew station. The annunciator, which is in the center of the rocker switch, illuminates when the ELT transmitter is transmitting. The ELT emits an omni-directional signal on the international distress frequencies of 121.5 MHz and 243.0 MHz. General aviation and commercial aircraft, the FAA and CAP monitor 121.5 MHz, and 243.0 MHz is monitored by the military.

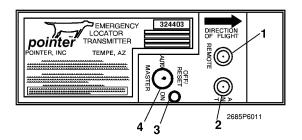
The ELT is contained in a high impact, fire retardant, glass filled Lexan case with carrying handle and is mounted behind the aft cabin partition wall on the right side of the tailcone. To gain access to the unit, unfasten the turn fasteners on the aft cabin partition. The ELT is operated by a control panel at the forward facing end of the unit or by the remote switch/annunciator located on the top right hand portion of the copilot's instrument panel (see Figure 1).

Power for the transmitter is provided by an alkaline battery pack inside the transmitter case.

Revision 2 S4-3

In accordance with FAA regulations, the ELT's battery pack must be replaced after 2 years shelf or service life or for any of the following reasons:

- a. After the transmitter has been used in an emergency situation (including any inadvertent activation of unknown duration).
- b. After the transmitter has been operated for more than one cumulative hour (e.g. time accumulated in several tests and inadvertent activation of known duration).
- c. On or before battery replacement date. Battery replacement date is marked on the battery pack and the label on the transmitter.



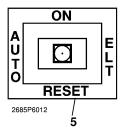


Figure 1. Pointer Model 3000-11 Emergency Locator Transmitter



- 1. REMOTE CABLE JACK -- Connects to ELT remote switch/annunciator located on the copilot's instrument panel.
- 2. ANTENNA RECEPTACLE -- Connects to antenna mounted on top of tailcone.
- 3. TRANSMITTER ANNUNCIATOR LIGHT -- Illuminates red to indicate the transmitter is transmitting a distress signal.
- 4. MASTER FUNCTION SELECTOR SWITCH (3-position toggle switch):
 - AUTO -- Arms transmitter for automatic activation if "G" switch senses a predetermined deceleration level.
 - ON -- Activates transmitter instantly. Used for test purposes and if "G" switch is inoperative. The ON position bypasses the automatic activation switch. (The red annunciator in the center of the remote switch/annunciator should illuminate).

S4-4 Revision 1

- OFF/RESET -- Deactivates transmitter during handling, following rescue and to reset the automatic activation function. (The red annunciator in the center of the remote switch/annunciator should extinguish).
- 5. REMOTE SWITCH/ANNUNCIATOR (3-position rocker switch):
 ON -- Remotely activates the transmitter for test or
 emergency situations. Red annunciator in
 center of rocker switch illuminates to indicate
 that the transmitter is transmitting a distress
 signal.
 - AUTO -- Arms transmitter for automatic activation if "G" switch senses a predetermined deceleration level.
 - RESET -- Deactivates and rearms transmitter after automatic activation by the "G" switch. Red annunciator in center of rocker switch should extinguish.

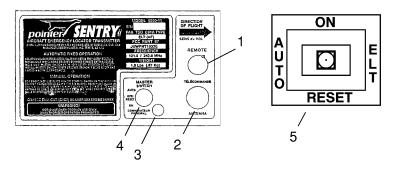


Figure 2. Pointer Model 4000-11 Emergency Locator Transmitter (ELT).

- 1.REMOTE CABLE JACK -- Connects to ELT remote switch/annunciator located on the copilot's instrument panel.
- ANTENNA RECEPTACLE -- Connects to antenna mounted on top of tailcone.
- 3. TRANSMITTER ANNUNCIATOR LIGHT -- Illuminates red to indicate the transmitter is transmitting a distress signal.

Revision 1 S4-5

MASTER FUNCTION SELECTOR SWITCH (3-position toggle switch):

ON -- Activates transmitter instantly. Used for test purposes and if "G" switch is inoperative. The ON position bypasses the automatic activation switch. (The red annunciator in the center of the remote switch/annunciator should illuminate).

AUTO -- Arms transmitter for automatic activation if "G" switch senses a predetermined deceleration level.

OFF/RESET -- Deactivates transmitter during handling, following rescue and to reset the automatic activation function. (The red annunciator in the center of the remote switch/annunciator should extinguish).

5. REMOTE SWITCH/ANNUNCIATOR (3-position rocker switch):
ON -- Remotely activates the transmitter for test or
emergency situations. Red annunciator in
center of rocker switch illuminates to indicate
that the transmitter is transmitting a distress
signal.

AUTO -- Arms transmitter for automatic activation if "G" switch senses a predetermined deceleration level.

RESET -- Deactivates and rearms transmitter after automatic activation by the "G" switch. Red annunciator in center of rocker switch should extinguish.

SECTION 2 LIMITATIONS

Refer to Section 2 of the Pilot's Operating Handbook (POH).

S4-6 Revision 1

SECTION 3 EMERGENCY PROCEDURES

Before performing a forced landing, especially in remote and mountainous areas, activate the ELT transmitter by positioning the remote switch/annunciator to the ON position. The annunciator in center of the rocker switch should be illuminated.

Immediately after a forced landing where emergency assistance is required, the ELT should be utilized as follows:

NOTE

The ELT remote switch/annunciator system could be inoperative if damaged during a forced landing. If inoperative, the inertia "G" switch will activate automatically. However, to turn the ELT OFF and ON again requires manual switching of the master function selector switch which is located on the ELT unit.

1. ENSURE ELT ACTIVATION:

- a. Position remote switch/annunciator to the ON position even if annunciator light is already on.
- b. If airplane radio is operable and can be safely used (no threat of fire or explosion), turn ON and select 121.5 MHz. If the ELT can be heard transmitting, it is working properly.
- c. Ensure that antenna is clear of obstructions.

NOTE

When the ELT is activated, a decreasing tone will be heard before the typical warbling tone begins.

- 2. PRIOR TO SIGHTING RESCUE AIRCRAFT -- Conserve airplane battery. Do not activate radio transceiver.
- 3. AFTER SIGHTING RESCUE AIRCRAFT -- Position remote switch/annunciator to the RESET position and release to the AUTO position to prevent radio interference. Attempt contact with rescue aircraft with the radio transceiver set to a frequency of 121.5 MHz. If no contact is established, return the remote switch/annunciator to the ON position immediately.
- 4. FOLLOWING RESCUE -- Position remote switch/annunciator to the AUTO position, terminating emergency transmissions.

Revision 1 S4-7

SECTION 4 NORMAL PROCEDURES

As long as the remote switch/annunciator is in the AUTO position and the ELT master function selector switch remains in the AUTO position, the ELT automatically activates when the unit senses longitudinal inertia forces as required in TSO-C91A.

Following a lightning strike, or an exceptionally hard landing, the ELT may activate although no emergency exists. If the remote switch/annunciator illuminates, the ELT has inadvertently activated itself. Another way to check is to select 121.5 MHz on the radio transceiver and listen for an emergency tone transmission. If the remote switch/annunciator is illuminated or an emergency tone is heard, position the remote switch/annunciator in the RESET position and release to the AUTO position.

The ELT must be serviced in accordance with FAR Part 91.207.

INSPECTION/TEST

1. The emergency locator transmitter should be tested every 100 hours.

NOTE

Test should only be conducted within the first 5 minutes of each hour.

- 2. Disconnect antenna cable from ELT.
- 3. Turn airplane battery switch and avionics power switches ON.
- 4. Turn airplane transceiver ON and set frequency to 121.5 MHz.
- 5. Place remote switch/annunciator in the ON position. The annunciator should illuminate. Permit <u>only three</u> emergency tone transmissions, then immediately reposition the remote switch/annunciator to the RESET position and release to the AUTO position.
- 6. Place the ELT master function selector switch in the ON position. Verify that the transmitter annunciator light on the ELT and the remote switch/annunciator on the instrument panel are illuminated.

S4-8 Revision 1

- 7. Place the ELT master function selector switch in the OFF/RESET position.
- 8. Reposition ELT master function selector switch to AUTO.9. Reconnect antenna cable to ELT.

⚠ WARNING

A TEST WITH THE ANTENNA CONNECTED SHOULD BE APPROVED AND CONFIRMED BY THE NEAREST CONTROL TOWER.

NOTE

Without its antenna connected, the ELT will produce sufficient signal to reach the airplane transceiver, yet it will not disturb other communications or damage output circuitry.

After accumulated test or operation time equals 1 hour, battery pack replacement is required.

IN-FLIGHT MONITORING AND REPORTING

Pilot's are encouraged to monitor 121.5 MHz and/or 243.0 MHz while in flight to assist in identifying possible emergency ELT transmissions. On receiving a signal, report the following information to the nearest air traffic control facility:

- 1. Your position at the time the signal was first heard.
- 2. Your position at the time the signal was last heard.
- 3. Your position at maximum signal strength.
- 4. Your flight altitude and frequency on which the emergency signal was heard -- 121.5 MHz or 243.0 MHz. If possible, positions should be given relative to a navigation aid. If the aircraft has homing equipment, provide the bearing to the emergency signal with each reported position.

SECTION 5 PERFORMANCE

There is no change in airplane performance when the ELT is installed.



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 5

BENDIX/KING KLN 89B GLOBAL POSITIONING SYSTEM (IFR)

SERIAL NO.	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Global Positioning System is installed.

FAA APPROVAL
FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co
Delegation Option Manufacturer CE-1
White A William Executive Engineer
Date: 27 June 2000

Member of GAMA 8 July 1998

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Revision 2 - 30 May 2000

S5-1

BENDIX/KING KLN 89B GLOBAL POSITIONING SYSTEM (IFR)

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998 May 21, 1999
2	May 30, 2000

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S5-1) S5-2 S5-3 S5-4 S5-5 S5-6 S5-7 S5-8	May 30/00 May 30/00 May 21/99 May 21/99 May 21/99 May 21/99 May 21/99	S5-11 S5-12 S5-13 S5-14 S5-15 S5-16 S5-17 S5-18	May 21/99 May 21/99 May 21/99 May 21/99 May 21/99 May 21/99 May 21/99
S5-9	May 21/99	S5-19	May 21/99
S5-10	May 21/99	S5-20 blank	May 21/99

S5-2 May 30/00

BENDIX/KING KLN 89B GLOBAL POSITIONING SYSTEM (IFR)

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

Number Title Airplane Unit Effectivity Revision Incorporated In Airplane

BENDIX/KING KLN 89B GPS NAVIGATION SYSTEM (IFR)

SECTION 1 GENERAL

A WARNING

THE KLN 89B IS NOT AUTHORIZED FOR INSTRUMENT APPROACHES UNLESS THE OPERATIONAL REVISION STATUS IS UPGRADED TO "ORS 02" OR LATER, AS READ ON THE POWER-ON PAGE, AND THE HOST SOFTWARE IS UPGRADED TO "HOST 00880-0004" OR LATER, AS READ ON THE KLN 89B OTH 6 PAGE.

The KLN 89B GPS (Global Positioning System) is a three-dimensional precision navigation system based on 24 earth orbiting satellites. Receiver Autonomous Integrity Monitoring (RAIM) is a function that every IFR-certified GPS receiver must continuously perform to assure position accuracy. RAIM is available when 5 or more of these satellites are in view, or 4 satellites are in view and a barometrically corrected altitude input from the airplane's altimeter is made. Annunciation is provided if there are not enough satellites in view to assure position integrity.

Operational guidance for the KLN 89B GPS Navigation System is provided with the Bendix/King KLN 89B Pilot's Guide (supplied with the airplane). This Pilot's Guide should be thoroughly studied and VFR operations conducted so that you are totally familiar with the GPS system of navigation before actually using this equipment in IFR conditions.

S5-4 May 21/99

The database card is an electronic memory containing information on airports, navaids, intersections, SID's, STAR's, instrument approaches, special use airspace, and other items of interest to the pilot.

Every 28 days, Bendix/King receives new database information from Jeppesen Sanderson for the North American database region. This information is processed and downloaded onto the database cards. Bendix/King makes these database card updates available to KLN 89B GPS users.

A CAUTION

THE DATABASE MUST BE UPDATED ONLY WHILE THE AIRCRAFT IS ON THE GROUND. THE KLN 89B DOES NOT PERFORM ANY NAVIGATION FUNCTION WHILE THE DATABASE IS BEING UPDATED.

NOTE

A current database is required by regulation in order to use the KLN 89B GPS system for nonprecision approaches.

Provided the KLN 89B navigation system is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications of: VFR/IFR en route oceanic and remote, en route domestic, terminal, and instrument approach (GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation within the U.S. National Airspace System, North Atlantic Minimum Navigation Performance Specifications (MNPS) Airspace and latitudes bounded by 74° North and 60° South using the WGS-84 (or NAD 83) coordinate reference datum in accordance with the criteria of AC 20-138, AC 91-49, and AC 120-33. Navigation data is based upon use of only the global positioning system (GPS) operated by the United States.

NOTE

Aircraft using GPS for oceanic IFR operations may use the KLN 89B to replace one of the other approved means of long range navigation. A single KLN 89B GPS installation may also be used on short oceanic routes which require only one means of long-range navigation.

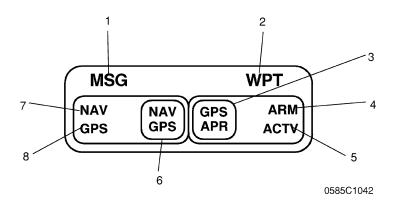
NOTE

FAA approval of the KLN 89B does not necessarily constitute approval for use in foreign airspace.

NOTE

When the KLN 89B contains receiver software RCVR 01621-0001 (or higher dash number), as verified on the **OTH 6** page, the unit is qualified for BRNAV (Basic Area Navigation) operation in the European region in accordance with the criteria of AC 90-96. (Reference ICAO Doc 7030 Regional Supplementary Procedures, JAA Technical Guidance Leaflet AMJ20X2 and Eurocontrol RNAV Standard Doc 003-93 Area Navigation Equipment Operational Requirements and Functional Requirements (RNAV).)

S5-6 May 21/99



- 1. GPS MESSAGE (MSG) ANNUNCIATOR LIGHT -- MSG will begin flashing whenever the message prompt (a large "M" on the left side of the screen) on the KLN 89B GPS unit begins flashing to alert the pilot that a message is waiting. Press the Message (MSG) key on the GPS to display the message. If a message condition exists which requires a specific action by the pilot, the message annunciator will remain on but will not flash.
- 2. GPS WAYPOINT (WPT) ANNUNCIATOR LIGHT -- GPS WAYPOINT annunciator will begin to flash approximately 36 seconds prior to reaching a Direct-To waypoint. Also, when turn anticipation is enabled in the KLN 89B GPS unit, the annunciator will begin to flash 20 seconds prior to the beginning of turn anticipation, then illuminate steady at the very beginning of turn anticipation.

Figure 1. GPS Annunciator/Switch (Sheet 1 of 3)

A WARNING

TURN ANTICIPATION IS AUTOMATICALLY DISABLED FOR FAF WAYPOINTS AND THOSE USED EXCLUSIVELY IN SID/STARS WHERE OVERFLIGHT IS REQUIRED. FOR WAYPOINTS SHARED BETWEEN SID/STARS AND PUBLISHED EN ROUTE SEGMENTS (REQUIRING OVERFLIGHT IN THE SID/STARS), PROPER SELECTION ON THE PRESENTED WAYPOINT PAGE IS NECESSARY TO PROVIDE ADEQUATE ROUTE PROTECTION ON THE SID/STARS.

- 3. GPS APPROACH (GPS, APR) SWITCH -- Pressing the GPS APPROACH switch manually selects or disarms the approach ARM mode and also cancels the approach ACTV mode after being automatically engaged by the KLN 89B GPS system. The white background color of the GPS APPROACH annunciator makes it visible in daylight.
- 4. ARM ANNUNCIATOR LIGHT -- ARM annunciator will illuminate when the KLN 89B GPS system automatically selects the approach ARM mode or when the approach ARM mode is manually selected. The approach ARM mode will be automatically selected when the airplane is within 30 NM of an airport, and an approach is loaded in the flight plan for that airport. The approach ARM mode can manually be selected at a greater distance than 30 NM from the airport by pressing the GPS APPROACH switch; however, this will not change the CDI scale until the airplane reaches the 30 NM point. The approach ARM mode can also be disarmed by pressing the GPS APPROACH switch.
- 5. ACTIVE (ACTV) ANNUNCIATOR LIGHT -- ACTV annunciator will illuminate when the KLN 89B GPS system automatically engages the approach ACTV mode (the ACTV mode can only be engaged by the KLN 89B GPS system which is automatic.) To cancel the approach ACTV mode, press the GPS APPROACH switch; this will change the mode to the approach ARM mode and illuminate the ARM annunciator.

Figure 1. GPS Annunciator/Switch (Sheet 2 of 3)

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6. NAV/GPS SWITCH -- Toggles from Nav 1 to GPS and vice versa to control the type of navigation data to be displayed on the CDI (Course Deviation Indicator). The No. 1 CDI Omni Bearing Selector (OBS) provides analog course input to the OBS mode when NAV/GPS KLN 89B in the switch/annunciator is in GPS. When the NAV/GPS switch annunciation is in NAV, GPS course selection in OBS mode is digital through the use of the controls and display at the KLN 89B.

NOTE

Manual CDI course centering in **OBS** mode using the control knob can be difficult, especially at long distances. Centering the Course Deviation Indicator (CDI) needle can best be accomplished by pressing the Direct-To button and then manually setting the No. 1 CDI course to the course value prescribed in the KLN 89B displayed message.

NOTE

The Directional Gyro heading (HDG) bug must also be set to provide proper course datum to the autopilot if coupled to the KLN 89B in **LEG** or **OBS**. (When the optional HSI is installed, the HSI course pointer provides course datum to the autopilot.)

- 7. NAVIGATION SOURCE (NAV) ANNUNCIATOR -- The NAV annunciator will illuminate steady to inform the pilot that NAV 1 information is being displayed on the NAV 1 CDI.
- 8. NAVIGATION SOURCE (**GPS**) ANNUNCIATOR -- The **GPS** annunciator will illuminate steady to inform the pilot that GPS information is being displayed on the NAV 1 CDI.

Figure 1. GPS Annunciator/Switch (Sheet 3 of 3)

SECTION 2 LIMITATIONS

- 1. The KLN 89B GPS Pilot's Guide, P/N 006-08786-0000, dated May, 1995 (or later applicable revision) must be available to the flight crew whenever IFR GPS navigation is used. The Operational Revision Status (ORS) of the Pilot's Guide must match the ORS level annunciated on the Self Test page.
- 2. IFR Navigation is restricted as follows:
 - a. The system must utilize ORS level 01 or later FAA approved revision.
 - b. The data on the self test page must be verified prior to use.
 - c. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.
 - d. The system must utilize ORS Level 02 or later FAA approved revision to conduct nonprecision instrument approaches. In addition, the software level status found on page OTH 6 must be "HOST 00880-0004" or later. Instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the KLN 89B database. The KLN 89B database must incorporate the current update cycle.
 - The KLN 89B Quick Reference, P/N 006-08787-0000, dated 5/95 (or later applicable to revision) must be available to the flight crew during instrument approach operations.
 - Instrument approaches must be conducted in the approach mode and RAIM must be available at the Final Approach Fix.

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- 3) APR ACTV mode must be annunciated at the Final Approach Fix.
- 4) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, and MLS approaches are not authorized.
- 5) When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS or Loran-C navigation.
- 6) The KLN 89B can only be used for approach guidance if the reference coordinate datum system for the instrument approach is WGS-84 or NAD-83. (All approaches in the KLN 89B database use the WGS-84 or the NAD-83 geodetic datum).
- e. For BRNAV operations in the European region:
 - 1) With 23 (24 if the altitude input to the KLN 89B is not available) or more satellites projected to be operational for the flight, the aircraft can depart without further action.
 - 2) With 22 (23 if the altitude input to the KLN 89B is not available) or fewer satellites projected to be operational for the flight, the availability of the GPS integrity (RAIM) should be confirmed for the intended flight (route and time). This should be obtained from a prediction program run outside of the aircraft. The prediction program must comply with the criteria of Appendix 1 of AC90-96. In the event of a predicted continuous loss of RAIM of more than 5 minutes for any part of the intended flight, the flight should be delayed, cancelled, or rerouted on a track where RAIM requirements can be met.

NOTE

AlliedSignal's Preflight, Version 2.0 or later computer based prediction program may be used for the RAIM prediction. Alternate methods should be submitted for approval in accordance with Advisory Circular AC90-96.

f. The aircraft must have other approved navigation equipment appropriate to the route of flight installed and operational.

SECTION 3 EMERGENCY PROCEDURES

There are no changes to the basic airplane emergency procedures when the KLN 89B GPS is installed.

- 1. If the KLN 89B GPS information is not available or invalid, utilize remaining operational navigation equipment as required.
- 2. If a "RAIM NOT AVAILABLE" message is displayed while conducting an instrument approach, terminate the approach. Execute a missed approach if required.
- 3. If a "RAIM NOT AVAILABLE" message is displayed in the en route or terminal phase of flight, continue to navigate using the KLN 89B or revert to an alternate means of navigation appropriate to the route and phase of flight. When continuing to use the KLN 89B for navigation, position must be verified every 15 minutes using another IFR approved navigation system.
- 4. Refer to the KLN 89B Pilot's Guide, Appendices B and C, for appropriate pilot actions to be accomplished in response to annunciated messages.

SECTION 4 NORMAL PROCEDURES

OPERATION

Normal operating procedures are outlined in the KLN 89B GPS Pilot's Guide, P/N 006-08786-0000, dated May, 1995, (or later applicable revision). A KLN 89B Quick Reference, P/N 006-08787-0000, dated May, 1995 (or later applicable revision) containing an approach sequence, operating tips and approach related messages is intended as well for cockpit use by the pilot familiar with KLN 89B operations when conducting instrument approaches.

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WARNING

TO PREVENT THE POSSIBILITY OF TURN ANTICIPATION CAUSING POTENTIALLY MISLEADING NAVIGATION WHEN THE AIRCRAFT IS NOT ON COURSE, VERIFY THE CDI COURSE AND CDI NEEDLE PRESENTATION IS PROPER PRIOR TO TAKEOFF AND DO NOT SWITCH FROM OBS TO LEG WITH GREATER THAN 1 NM CROSS TRACK ERROR (XTK).

IF MISLEADING DATA IS SUSPECTED, A DIRECT-TO OPERATION TO YOUR DESIRED WAYPOINT WILL CLEAR ANY PREVIOUS OBS COURSE, AND CANCEL TURN ANTICIPATION.

NOTE

After the above Direct-To operation, further reorientation to the nearest leg of the active flight plan may be accomplished by pressing the Direct-To button followed by pressing the Clear button and finally the Enter Button.

Refer to the Pilot's Guide section 4.2.2 for an explanation of turn anticipation, and Appendix A - Navigation Terms for the definition of cross track error (XTK).

AUTOPILOT COUPLED OPERATION

The KLN 89B may be coupled to the KAP 140 autopilot by first selecting **GPS** on the NAV/GPS switch. Manual selection of the desired track on the pilot's DG heading bug is required to provide course datum to the KAP 140 autopilot. (Frequent course datum changes may be necessary, such as in the case of flying a DME arc.) The autopilot approach mode (APR) should be used when conducting a coupled GPS approach.

NOTE

Select HDG mode for DME arc intercepts. NAV or APR coupled DME arc intercepts can result in excessive overshoots (aggravated by high ground speeds and/or intercepts from inside the arc).

APPROACH MODE SEQUENCING AND RAIM PREDICTION

A WARNING

FAMILIARITY WITH THE EN ROUTE OPERATION OF THE KLN 89B WILL NOT CONSTITUTE PROFICIENCY IN APPROACH OPERATIONS. APPROACH OPERATIONS SHOULD NOT BE ATTEMPTED IN IMC (INSTRUMENT METEOROLOGICAL CONDITIONS) PRIOR TO ATTAINING PROFICIENCY IN VMC (VISUAL METEOROLOGICAL CONDITIONS).

NOTE

The special use airspace alert will automatically be disabled prior to flying an instrument approach to reduce the potential for message congestion.

Prior to arrival, select a STAR if appropriate from the APT 7
page. Select an approach and an initial approach fix (IAF)
from the APT 8 page.

NOTE

Using the outer knob, select the **ACT** (Active Flight Plan Waypoints) pages. Pull the inner knob out and scroll to the destination airport, then push the inner knob in and select the **ACT 7** or **ACT 8** page.

To delete or replace a SID, STAR or approach, select **FPL 0** page. Place the cursor over the name of the procedure, press **ENT** to change it, or **CLR** then **ENT** to delete it.

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2. En route, check for RAIM availability at the destination airport ETA on the **OTH 3** page.

NOTE

RAIM must be available at the FAF in order to fly an instrument approach. Be prepared to terminate the approach upon loss of RAIM.

- 3. At or within 30 nm from the airport:
 - a. Verify automatic annunciation of APRARM.
 - b. Note automatic CDI needle scaling change from ±5.0 nm to ±1.0 nm over the next 30 seconds.
 - c. Update the KLN 89B altimeter baro setting as required.
 - d. Internally the KLN 89B will transition from en route to terminal integrity monitoring.
- 4. Select **NAV 4** page to fly the approach procedure.
 - a. If receiving radar vectors, or need to fly a procedure turn or holding pattern, fly in OBS until inbound to the FAF.

NOTE

OBS navigation is TO-FROM (like a VOR) without waypoint sequencing.

▲ WARNING

TO PREVENT THE POSSIBILITY OF TURN ANTICIPATION CAUSING POTENTIALLY MISLEADING NAVIGATION WHEN THE AIRCRAFT IS NOT ON COURSE, DO NOT SWITCH FROM OBS TO LEG WITH GREATER THAN 1 NM CROSS TRACK ERROR (XTK).

b. **NoPT** routes including DME arc's are flown in **LEG**. <u>LEG</u> is mandatory from the FAF to the MAP.

NOTE

<u>Select HDG mode for DME arc intercepts.</u> NAV or APR coupled DME arc intercepts can result in excessive overshoots (aggravated by high ground speeds and/or intercepts from <u>inside</u> the arc).

A WARNING

FLYING FINAL OUTBOUND FROM AN OFF-AIRPORT VORTAC ON AN OVERLAY APPROACH; BEWARE OF THE DME DISTANCE INCREASING ON FINAL APPROACH, AND THE GPS DISTANCE-TO-WAYPOINT DECREASING, AND NOT MATCHING THE NUMBERS ON THE APPROACH PLATE.

- 5. At or before 2 nm from the FAF inbound:
 - a. <u>Select the FAF as the active waypoint</u>, if not accomplished already.
 - b. Select LEG operation.
- 6. Approaching the FAF inbound (within 2 nm):
 - a. Verify APR ACTV.
 - b. Note automatic CDI needle scaling change from ±1.0 nm to ±0.3 nm over the 2 nm inbound to the FAF.
 - c. Internally the KLN 89B will transition from terminal to approach integrity monitoring.
- 7. Crossing the FAF and APR ACTV is not annunciated:
 - a. Do not descend.
 - b. Execute the missed approach.

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8. Missed Approach:

- a. Climb.
- b. Navigate to the MAP (in APRARM if APR ACTV is not available).

NOTE

There is no automatic LEG sequencing at the MAP.

c. After climbing in accordance with the published missed approach procedure, press the Direct To button, verify or change the desired holding fix and press **ENT**.

GENERAL NOTES

- The database must be up to date for instrument approach operation.
- Only one approach can be in the flight plan at a time.
- Checking RAIM prediction for your approach while en route using the OTH 3 page is recommended. A self check occurs automatically within 2 nm of the FAF. APR ACTV is inhibited without RAIM.
- Data cannot be altered, added to or deleted from the approach procedures contained in the database. (DME arc intercepts may be relocated along the arc through the NAV 4 or the FPL 0 pages).
- Some approach waypoints do not appear on the approach plates (including in some instances the FAF).

- Waypoint suffixes in the flight plan:
 - i-- IAF
 - f-- FAF
 - m -- MAP
 - h -- missed approach holding fix.
- •The DME arc IAF (arc intercept waypoint) will be on your present position radial off the arc VOR when you load the IAF into the flight plan, or the beginning of the arc if currently on a radial beyond the arc limit. To adjust the arc intercept to be compatible with a current radar vector, bring up the arc IAF waypoint in the NAV 4 page scanning field or under the cursor on the FPL 0 page, press CLR, then ENT. Fly the arc in LEG. Adjust the heading bug (if autopilot coupled) and CDI course with reference to the desired track value on the NAV 4 page (it will flash to remind you). Left/right CDI needle information is relative to the arc. Displayed distance is not along the arc but direct to the active waypoint. (The DME arc radial is also displayed in the lower right corner of the NAV 4 page.)
- The DME arc IAF identifier may be unfamiliar. Example: D098G where 098 stands for the 098° radial off the referenced VOR, and G is the seventh letter in the alphabet indicating a 7 DME arc.
- APRARM to APR ACTV is automatic provided that:
 - a. You are in APRARM (normally automatic).
 - b. You are in LEG mode.
 - c. The **FAF** is the active waypoint.
 - d. Within 2 nm of the FAF.
 - e. Outside of the FAF.
 - f. Inbound to the FAF.
 - g. RAIM is available.
 - Direct-To operation between the FAF and MAP cancels APR ACTV. Fly the missed approach in APRARM.
 - Flagged navigation inside the FAF may usually be restored (not guaranteed) by pressing the GPS APR button changing from **ACTV** to **ARM**. Fly the missed approach.

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- The instrument approach using the KLN 89B may be essentially automatically started 30 nm out (with a manual baro setting update) or it may require judicious selection of the OBS and LEG modes.
 - APRARM may be canceled at any time by pressing the GPS APR button. (A subsequent press will reselect it.)

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionics equipment is installed. However, installation of an externally-mounted antenna or related external antennas, may result in a minor reduction in cruise performance.



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 6

BENDIX/KING KR87 AUTOMATIC DIRECTION FINDER (ADF)

SERIAL NO.	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Automatic Direction Finder is installed.

FAA APPROVAL
FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co Delegation Option Manufacturer CE-1 White A White Executive Engineer
Date: 27 June 2000

Member of GAMA 8 July 1998

Revision 1 - 30 May 2000

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172SPHUS-S6-01 S6-1

BENDIX/KING KR 87 AUTOMATIC DIRECTION FINDER (ADF)

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue		
0 (Original)	July 8, 1998		
1	May 30, 2000		

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S6-1)	May 30/00	\$6-7	July 8/98
S6-2	May 30/00	\$6-8	July 8/98
S6-3	May 30/00	\$6-9	July 8/98
S6-4	July 8/98	\$6-10	July 8/98
S6-5	July 8/98	\$6-11	July 8/98
S6-6	May 30/00	\$6-12	July 8/98

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	In Airplane

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BENDIX/KING KR 87 AUTOMATIC DIRECTION FINDER (ADF)

SECTION 1 GENERAL

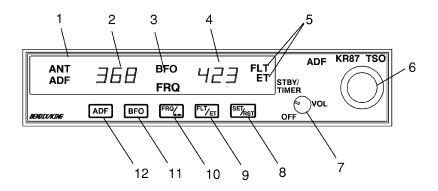
The Bendix/King Digital ADF is a panel-mounted, digitally tuned automatic direction finder. It is designed to provide continuous 1-kHz digital tuning in the frequency range of 200-kHz to 1799-kHz and eliminates the need for mechanical band switching. The system is comprised of a receiver, a built-in electronics timer, a bearing indicator, and a KA-44B combined loop and sense antenna. Operating controls and displays for the Bendix/King Digital ADF are shown and described in Figure 1. The audio system used in conjunction with this radio for speaker-phone selection is shown and described in Supplement 3 of this handbook.

The Bendix/King Digital ADF can be used for position plotting and homing procedures, and for aural reception of amplitude-modulated (AM) signals.

The "flip-flop" frequency display allows switching between preselected "STANDBY" and "ACTIVE" frequencies by pressing the frequency transfer button. Both pre-selected frequencies are stored in a non-volatile memory circuit (no battery power required) and displayed in large, easy-to-read, self-dimming gas discharge numerics. The active frequency is continuously displayed in the left window, while the right window will display either the standby frequency or the selected readout from the built-in electronic timer.

The built-in electronic timer has two separate and independent timing functions. An automatic flight timer that starts whenever the unit is turned on. This timer functions up to 59 hours and 59 minutes. An elapsed timer which will count up or down for up to 59 minutes and 59 seconds. When a preset time interval has been programmed and the countdown reaches :00, the display will flash for 15 seconds. Since both the flight timer and elapsed timer operate independently, it is possible to monitor either one without disrupting the other. The pushbutton controls and the bearing indicators are internally lighted. Intensity is controlled by the RADIO light dimming rheostat.

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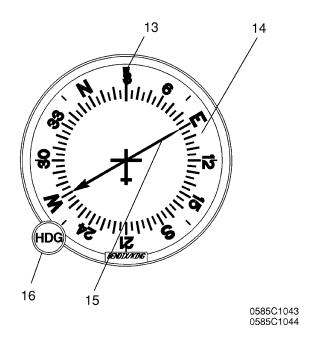


Figure 1. KR 87 Automatic Direction Finder (ADF) (Sheet 1 of 4)

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- 1. ANT/ADF MODE ANNUNCIATOR -- Antenna (ANT) is selected by the "out" position of the ADF button. This mode improves the audio reception and is usually used for station identification. The bearing pointer is deactivated and will park in the 90° relative position. Automatic Direction Finder (ADF) mode is selected by the depressed position of the ADF button. This mode activates the bearing pointer. The bearing pointer will point in the direction of the station relative to the aircraft heading.
- IN-USE FREQUENCY DISPLAY -- The frequency to which the ADF is tuned is displayed here. The active ADF frequency can be changed directly when either of the timer functions is selected.
- 3. BFO (Beat Frequency Oscillator) ANNUNCIATOR -- The BFO mode, activated and annunciated when the "BFO" button is depressed, permits the carrier wave and associated morse code identifier broadcast on the carrier wave to be heard.

NOTE

CW signals (Morse Code) are unmodulated and no audio will be heard without use of BFO. This type of signal is not used in the United States air navigation. It is used in some foreign countries and marine beacons.

4. STANDBY FREQUENCY/FLIGHT TIME OR ELAPSED TIME ANNUNCIATION -- When FRQ is displayed the STANDBY frequency is displayed in the right hand display. The STANDBY frequency is selected using the frequency select knobs. The selected STANDBY frequency is put into the ACTIVE frequency windows by pressing the frequency transfer button. Either the standby frequency, the flight timer, or the elapsed time is displayed in this position. The flight timer and elapsed timer are displayed replacing the standby frequency which goes into "blind" memory to be called back at any time by depressing the FRQ button. Flight time or elapsed time are displayed and annunciated alternatively by depressing the FLT/ET button.

Figure 1. KR 87 Automatic Direction Finder (ADF) (Sheet 2 of 4)

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- 5. FLIGHT TIMER AND ELAPSED TIMER MODE ANNUNCIATION -- Either the elapsed time (ET) or flight time (FLT) mode is annunciated here.
- 6. FREQUENCY SELECT KNOBS -- Selects the standby frequency when FRQ is displayed and directly selects the active frequency whenever either of the time functions is selected. The frequency selector knobs may be rotated either clockwise or counterclockwise. The small knob is pulled out to tune the 1's. The small knob is pushed in to tune the 10's. The outer knob tunes the 100's with rollover into the 1000's up to 1799. These knobs are also used to set the desired time when the elapsed timer is used in the countdown mode.
- 7. ON/OFF/VOLUME CONTROL SWITCH (ON/OFF/VOL) -- Controls primary power and audio output level. Clockwise rotation from OFF position applies primary power to the receiver; further clockwise rotation increases audio level. Audio muting causes the audio output to be muted unless the receiver is locked on a valid station.
- 8. SET/RESET ELAPSED TIMER BUTTON (SET/RST) -- The set/reset button when pressed resets the elapsed timer whether it is being displayed or not.
- FLIGHT TIMER/ELAPSED TIMER MODE SELECTOR BUTTON (FLT/ET) -- The Flight Timer/Elapsed Time mode selector button when pressed alternatively selects either Flight Timer mode or Elapsed Timer mode.

Figure 1. KR 87 Automatic Direction Finder (ADF) (Sheet 3 of 4)

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- 10. FREQUENCY TRANSFER BUTTON (FRQ) -- The FRQ transfer button when pressed exchanges the active and standby frequencies. The new frequency becomes active and the former active frequency goes into standby.
- 11. BFO (Beat Frequency Oscillator) BUTTON -- The BFO button selects the BFO mode when in the depressed position. (See note under item 3).
- 12. ADF BUTTON -- The ADF button selects either the ANT mode or the ADF mode. The ANT mode is selected with the ADF button in the out position. The ADF mode is selected with the ADF button in the depressed position.
- 13. LUBBER LINE -- Indicates relative or magnetic heading of the aircraft. The heading must be manually input by the pilot with the heading (HDG) knob.
- 14. COMPASS CARD -- Manually rotatable card that indicates relative or magnetic heading of aircraft, as selected by HDG knob.
- 15. BEARING POINTER -- Indicates relative or magnetic bearing to station as selected by HDG knob. If the relative heading of North (N) is manually selected under the lubber line by the pilot, then the bearing pointer indicates the relative bearing to the station. If the aircraft's magnetic heading is selected under the lubber line by the pilot, then the bearing pointer indicates the magnetic bearing to the station.
- 16. HEADING KNOB (HDG) -- Rotates card to set in relative or magnetic heading of aircraft.

Figure 1. KR 87 Automatic Direction Finder (ADF) (Sheet 4 of 4)

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SECTION 2 LIMITATIONS

There is no change to airplane limitations when the KR 87 ADF is installed.

SECTION 3 EMERGENCY PROCEDURES

There are no changes to the basic airplane emergency procedures when the KR 87 ADF is installed.

SECTION 4 NORMAL PROCEDURES

TO OPERATE AS AN AUTOMATIC DIRECTION FINDER:

- 1. OFF/VOL Control -- ON.
- 2. Frequency Selector Knobs -- SELECT desired frequency in the standby frequency display.
- 3. FRQ Button -- PRESS to move the desired frequency from the standby to the active position.
- ADF Selector Switch (on audio control panel) -- SELECT as desired.
- 5. OFF/VOL Control -- SET to desired volume level and identify that desired station is being received.
- ADF Button -- SELECT ADF mode and note relative bearing on indicator.

ADF TEST (PRE-FLIGHT or IN-FLIGHT):

- 1. ADF Button -- SELECT ANT mode and note pointer moves to 90° position.
- ADF Button -- SELECT ADF mode and note the pointer moves without hesitation to the station bearing. Excessive pointer sluggishness, wavering or reversals indicate a signal that is too weak or a system malfunction.

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TO OPERATE BFO:

- 1. OFF/VOL Control -- ON.
- 2. BFO Button -- PRESS on.
- 3. ADF Selector Buttons (on audio control panel) -- SET to desired mode.
- 4. VOL Control -- ADJUST to desired listening level.

NOTE

A 1000-Hz tone and Morse Code identifier is heard in the audio output when a CW signal is received.

TO OPERATE FLIGHT TIMER:

- 1. OFF/VOL Control -- ON.
- 2. FLT/ET Mode Button -- PRESS (once or twice) until FLT is annunciated. Timer will already be counting since it is activated by turning the unit on.
- 3. OFF/VOL Control -- OFF and then ON if it is desired to reset the flight timer.

TO OPERATE AS A COMMUNICATIONS RECEIVER ONLY:

- 1. OFF/VOL Control -- ON.
- ADF Button -- SELECT ANT mode.
- 3. Frequency Selector Knobs -- SELECT desired frequency in the standby frequency display.
- 4. FRQ Button -- PRESS to move the desired frequency from the standby to the active position.
- 5. ADF Selector Buttons (on audio control panel) -- SET to desired mode.
- 6. VOL Control -- ADJUST to desired listening level.

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TO OPERATE ELAPSED TIME TIMER-COUNT UP MODE:

- 1. OFF/VOL Control -- ON.
- 2. FLT/ET Mode Button -- PRESS (once or twice) until ET is annunciated.
- SET/RST Button -- PRESS momentarily to reset elapsed timer to zero.

NOTE

The Standby Frequency which is in memory while Flight Time or Elapsed Time modes are being displayed may be called back by pressing the FRQ button, then transferred to active use by pressing the FRQ button again.

TO OPERATE ELAPSED TIME TIMER-COUNT DOWN MODE:

- 1. OFF/VOL Control -- ON.
- 2. FLT/ET Mode Button -- PRESS (once or twice) until ET is annunciated.
- SET/RST Button -- PRESS until the ET annunciation begins to flash.
- 4. FREQUENCY SELECTOR KNOBS -- SET desired time in the elapsed time display. The small knob is pulled out to tune the 1's. The small knob is pushed in to tune the 10's. The outer knob tunes minutes up to 59 minutes.

NOTE

Selector knobs remain in the time set mode for 15 seconds after the last entry or until the SET/RST, FLT/ET or FRQ button is pressed.

 SET/RST Button -- PRESS to start countdown. When the timer reaches 0, it will start to count up as display flashes for 15 seconds.

NOTE

While FLT or ET are displayed, the active frequency on the left side of the window may be changed, by using the frequency selector knobs, without any effect on the stored standby frequency or the other modes.

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ADF OPERATION NOTES:

ERRONEOUS ADF BEARING DUE TO RADIO FREQUENCY PHENOMENA:

In the U.S., the FCC, which assigns AM radio frequencies, occasionally will assign the same frequency to more than one station in an area. Certain conditions, such as Night Effect, may cause signals from such stations to overlap. This should be taken into consideration when using AM broadcast station for navigation.

Sunspots and atmospheric phenomena may occasionally distort reception so that signals from two stations on the same frequency will overlap. For this reason, it is always wise to make positive identification of the station being tuned, by switching the function selector to ANT and listening for station call letters.

ELECTRICAL STORMS:

In the vicinity of electrical storms, an ADF indicator pointer tends to swing from the station tuned toward the center of the storm.

NIGHT EFFECT:

This is a disturbance particularly strong just after sunset and just after dawn. An ADF indicator pointer may swing erratically at these times. If possible, tune to the most powerful station at the lowest frequency. If this is not possible, take the average of pointer oscillations to determine relative station bearing.

MOUNTAIN EFFECT:

Radio waves reflecting from the surface of mountains may cause the pointer to fluctuate or show an erroneous bearing. This should be taken into account when taking bearings over mountainous terrain.

COASTAL REFRACTION:

Radio waves may be refracted when passing from land to sea or when moving parallel to the coastline. This also should be taken into account.

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SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or related external antennas, may result in a minor reduction in cruise performance.

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Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON

SUPPLEMENT 7

BENDIX/KING KAP 140 SINGLE AXIS AUTOPILOT

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the KAP 140 Single Axis Autopilot is installed.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1

When W Executive Engineer
Date: 27 June 2000

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8 July 1998

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Revision 2 - 31 October 2002

S7-1

BENDIX/KING KAP 140 SINGLE AXIS AUTOPILOT

Use the Log of Effective Pages to determine the current status of this supplement. Pages affected by the current revision are indicated by an asterisk (*) preceeding the page number.

Supplement Status	Date
Original Issue	8 July 1998
Revision 1	30 May 2000
Revision 2	31 October 2002

LOG OF EFFECTIVE PAGES

Page	Page Status	Revision Number
* Title (S7-1)	Revised	2
* S7-1 thru Ś7-5	Revised	2
S7-6 thru S7-7	Revised	1
* S7-8 thru S7-19	Revised	2
* S7-20	Added	2

APPROVED BY

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessne Aircraft Co.
Delegation Option Authorization DOA-100129-CE
Visited No. 100149
Executive Engineer

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DATE OF APPROVAL 10-31-02

S7-2 Revision 2

BENDIX/KING KAP 140 SINGLE AXIS AUTOPILOT

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

<u>Number</u>	<u>Title</u>	<u>Airplane</u> <u>Serial</u> <u>Effectivity</u>	Revision Incorporation	Incorporated In Airplane
KC-140-M1 (Honeywell Service Bulletin)	KAP 140 AP		Revision 2	

BENDIX/KING KAP 140 SINGLE AXIS AUTOPILOT

SECTION 1

GENERAL

The Bendix/King KAP 140 is an all-electric, single-axis (aileron control) autopilot system that provides lateral and directional control. Components are a computer, a turn coordinator, an aileron actuator, a course deviation indicator, and a directional indicator or HSI (if installed).

Roll and yaw motions of the airplane are sensed by the turn coordinator gyro. The computer computes the necessary correction and signals the actuator to move the ailerons to maintain the airplane in the commanded lateral attitude.

The KAP 140 will provide wing leveler, heading hold, NAV track, and approach and backcourse lateral modes.

A lockout device prevents autopilot engagement until the system has been successfully preflight tested. Automatic preflight self-test begins with initial power application to the autopilot.

The following conditions will cause the autopilot to disengage:

- A. Electric power failure.
- B. Internal autopilot system failure.
- C. Turn coordinator failure (flagged gyro).
- D. Computer autopilot monitor that detects the R (ROLL) axis annunciator.

The AVIONICS MASTER switch supplies power to the avionics bus bar at the radio circuit breakers and the autopilot circuit breaker. The AVIONICS MASTER switch also services as an emergency autopilot (AP) shutoff.

The following circuit breakers are used to protect the listed elements of the KAP 140 single axis autopilot:

<u>LABEL</u>	<u>FUNCTI</u>	<u>ONS</u>		
AUTO PILOT	Supplies power to the KC 140 Computer and the autopilot.			
WARN	Supplies power disconnect tone.	to	the	autopilot

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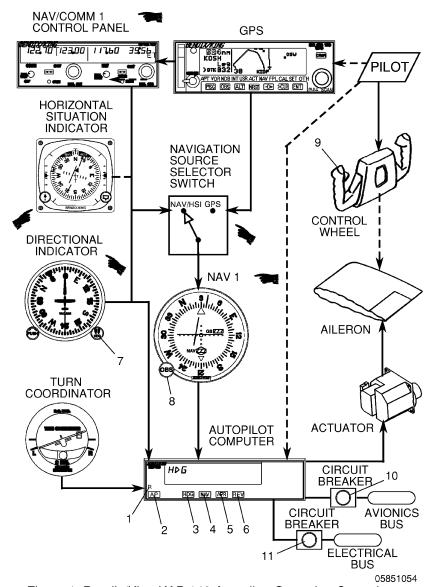
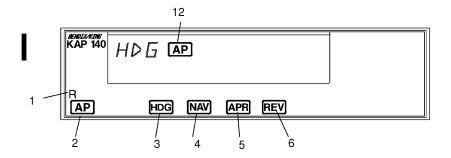


Figure 1. Bendix/King KAP 140 Autopilot, Operating Controls and Indicators (Sheet 1 of 3)



- ROLL (R) AXIS ANNUNCIATOR -- When illuminated, indicates a failure in the roll axis and prevents engagement or disengages the autopilot.
- 2. AUTOPILOT ENGAGE/DISENGAGE (AP) BUTTON -- When pushed* or pressed and held (approx 0.25 seconds)**, engages autopilot if all preflight self test conditions are met. The autopilot will engage in the basic ROL mode which functions as a wings leveler. The AP button can also be used to disengage the autopilot.
- 3. HEADING (HDG) MODE SELECTOR BUTTON -- When pushed, will select the Heading mode, which commands the airplane to turn to and maintain the heading selected by the heading bug on the Directional Gyro or HSI (if installed). A new heading may be selected at any time and will result in the airplane turning to the new heading. The button can also be used to toggle between HDG and ROL modes. This button can also be used to engage the autopilot in HDG mode. For airplane serials 172S8001 thru 172S9128 not incorporating Honeywell Service Bulletin KC140-M1, this button will also engage the autopilot in HDG mode.
- * Airplane serials 172S8001 thru 172S9128 not incorporating Honeywell Service Bulletin KC140-M1.
- ** Airplane serials 172S8001 thru 172S9128 incorporating Honeywell Service Bulletin KC140-M1, and airplane serials 172S9129 and on.

Figure 1. Bendix/King KAP 140 Autopilot, Operating Controls and Indicators (Sheet 2 of 3)

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- NAVIGATION (NAV) MODE SELECTOR BUTTON -- When pushed, will select the Navigation mode. This mode provides automatic beam capture and tracking of VOR, LOC, or GPS signals as selected for presentation on the NAV#1 CDI or HSI (if installed).
- 5. APPROACH (APR) MODE SELECTOR BUTTON -- When pushed, will select the Approach mode. This mode provides automatic beam capture and tracking of VOR, LOC, or GPS signals as selected for presentation on the NAV #1 CDI or HSI (if installed). The greater tracking sensitivity of the APR mode is recommended for instrument approaches.
- 6. BACK COURSE APPROACH (REV) MODE SELECTOR BUTTON -- This button is active only when the coupled navigation receiver is tuned to a LOC/ILS frequency. When pushed, it will select the Back Course (BC) approach mode. This mode functions indentically to the approach mode except that the autopilot response to LOC signals is reversed.
- 7. HEADING SELECT KNOB (HDG) -- Positions the heading pointer ("bug") on the compass card. Note that the position of the heading bug also provides course datum to the autopilot when tracking in NAV, APR, or REV (BC) modes. This is in addition to its more intuitive use in the HDG mode.
- 8. OMNI BEARING SELECT KNOB (OBS) -- Selects the desired course radial to be tracked by the autopilot. (Note that the HDG bug must also be positioned to the proper course to capture and track the selected radial).
- 9. AUTOPILOT DISCONNECT (A/P DISC) SWITCH -- When depressed will disengage the autopilot. The autopilot disconnect will be annunciated by a continuous two-second tone accompanied by a flashing "AP" displayed on the autopilot computer.
- 10. AUTOPILOT CIRCUIT BREAKER -- A 5-amp circuit breaker supplying 28 VDC to the KAP 140 system.

Figure 1. Bendix/King KAP 140 Autopilot, Operating Controls and Indicators (Sheet 3 of 3)

- 11. WARN C/B -- Power to the autopilot disconnect horn.
- 12. AUTOPILOT ENGAGE AP Annunciation** -- Illuminates whenever the autopilot is engaged. Flashes during pilot initiated or automatic disengagement.
- * Airplane serials 172S8001 thru 172S9128 not incorporating Honeywell Service Bulletin KC140-M1.
- ** Airplane serials 172S8001 thru 172S9128 incorporating Honeywell Service Bulletin KC140-M1, and airplane serials 172S9129 and on.

SECTION 2 LIMITATIONS

The following autopilot limitations must be adhered to:

- 1. The autopilot must be OFF during takeoff and landing.
- During autopilot operation, the pilot, with seat belt fastened, must be seated in the left front seat.
- Continued autopilot system use is prohibited following abnormal or malfunctioning operation, and prior to corrective maintenance.
- 4. The entire PREFLIGHT procedure, outlined under Section 4, including steps 1 through 6, must be successfully completed prior to each flight. Use of the autopilot is prohibited prior to completion of these tests.
- 5. KMA 28 audio amplifier PUSH OFF/EMG operation is prohibited during normal operations.

NOTE

During emergency operation of the audio amplifier, the PUSH OFF/EMG state of the KMA 28 will prevent flight control system alerts from being heard.

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SECTION 3 EMERGENCY PROCEDURES

The two step procedure listed under paragraph 1 should be among the basic airplane emergency procedures that are committed to memory. It is important that the pilot be proficient in accomplishing both steps without reference to this manual.

- 1. In case of Autopilot malfunction (accomplish Items a. and b. simultaneously):
 - a. Airplane Control Wheel -- GRASP FIRMLY and regain aircraft control.
 - b. A/P DISC Switch -- PRESS and HOLD throughout recovery.

NOTE

The AVIONICS MASTER switch may be used as an alternate means of removing power from the autopilot. In addition to the above, power may be removed with the Engage/Disengage button or the airplane MASTER switch. If necessary perform steps a. and b. above, then turn off the AVIONICS MASTER switch. Primary attitude, airspeed, directional and altitude control instruments will remain operational with either master switch OFF.

A WARNING

- DO NOT ATTEMPT TO RE-ENGAGE THE AUTOPILOT FOLLOWING AN AUTOPILOT MALFUNCTION.
- THE PILOT IN COMMAND MUST CONTINUOUSLY MONITOR THE AUTOPILOT WHEN IT IS ENGAGED, AND BE PREPARED TO DISCONNECT THE AUTOPILOT AND TAKE IMMEDIATE CORRECTIVE ACTION INCLUDING MANUAL CONTROL OF THE AIRPLANE AND/OR PERFORMANCE OF EMERGENCY PROCEDURES IF AUTOPILOT OPERATION IS NOT AS EXPECTED OR IF AIRPLANE CONTROL IS NOT MAINTAINED.

AMPLIFIED EMERGENCY PROCEDURES

The following paragraphs are presented to supply additional information for the purpose of providing the pilot with a more complete understanding of the recommended course of action for an emergency situation.

A WARNING

DO NOT ATTEMPT TO RE-ENGAGE THE AUTOPILOT FOLLOWING AN AUTOPILOT MALFUNCTION UNTIL CORRECTIVE SERVICE ACTION HAS BEEN PERFORMED ON THE SYSTEM.

An autopilot malfunction occurs when there is an uncommanded deviation in the airplane flight path or when there is abnormal control wheel movement. The main concern in reacting to an autopilot malfunction, or to an automatic disconnect of the autopilot, is in maintaining control of the airplane. Immediately grasp the control wheel and press and hold down the A/P DISC switch throughout the recovery. Manipulate the controls as required to safely maintain operation of the airplane within all of its operating limitations. The AVIONICS MASTER switch may be used as required to remove all power from the Autopilot. With the AVIONICS MASTER switch off, all flight instruments will remain operational; however, communications, navigation, and identification equipment will be inoperative.

Note that the emergency procedure for any malfunction is essentially the same: immediately grasp the control wheel and regain airplane control while pressing and the holding the A/P DISC switch down.

It is important that all portions of the autopilot system are preflight tested prior to each flight in accordance with the procedures published herein in order to assure their integrity and continued safe operation during flight.

A flashing mode annunciation on the face of the autopilot is normally an indication of mode loss.

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NOTE

An exception to this is HDG annunciation which will flash for 5 seconds along with steady NAVARM, APRARM, or REVARM annunciation to remind the pilot to set the HDG bug for course datum use.

- 1. Flashing HDG -- Indicates a failed heading. PRESS HDG button to terminate flashing. ROL will be displayed.
- 2. Flashing NAV, APR or REV -- Indicates a flagged navigation source. If no NAV source is flagged, a failed heading mode can be the cause. PRESS NAV, APR or REV button to terminate flashing. ROL will be displayed.

NOTE

At the onset of mode annunciator flashing, the autopilot has already reverted to a default mode of operation, (i.e., ROL mode). An immediate attempt to reengage the lost mode may be made if the offending navigation flag has cleared.

Effects of instrument losses upon autopilot operation:

- 1. Loss of the artificial horizon -- no effect on the autopilot.
- 2. Loss of the turn coordinator -- autopilot inoperative.
- 3. Loss of the Directional Gyro (DG) -- The directional gyro does not provide any system valid flag. If the DG fails to function properly the autopilot heading and navigation mode will not function correctly. Under these conditions, the only useable lateral mode is ROL.
- 4. Loss of Horizontal Situation Indicator (HSI) (if installed) -- If the HSI fails to function properly the autopilot heading and navigation mode will not function correctly. Under these conditions, the only usable lateral mode is ROL.

SECTION 4 NORMAL PROCEDURES

PREFLIGHT (PERFORM PRIOR TO EACH FLIGHT):

- GYROS -- Allow time for the turn coordinator to come up to speed, as evidenced by the turn coordinator flag being pulled from view.
- 2. AVIONICS MASTER -- ON.
- 3. POWER APPLICATION AND SELF TEST

A self test is performed upon power application to the computer. This test is a sequence of internal checks that validate proper system operation prior to allowing normal system operation. The sequence is indicated by "PFT" (preflight test) with an increasing number for the sequence steps. Successful completion of self test is identified by all display segments being illuminated (Display Test) and the disconnect tone sounding.

- 4. AUTOPILOT -- ENGAGE by pressing AP button.
- 5. FLIGHT CONTROLS -- MOVE left and right to verify that the autopilot can be overpowered.

NOTE

Normal use will not require the autopilot to be overpowered.

6. A/P DISC Switch -- PRESS. Verify that the autopilot disconnects and tone sounds.

BEFORE TAKEOFF:

1. Autopilot -- OFF.

AUTOPILOT ENGAGEMENT:

 AP Button -- PRESS. Note ROL annunciator on. If no other modes are selected the autopilot will operate in the ROL mode.

NOTE

Aircraft heading may change in ROL mode due to turbulence.

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AUTOPILOT ENGAGEMENT:

 AP Button -- PRESS. Note ROL annunciator on. If no other modes are selected the autopilot will operate in the ROL mode.

NOTE

Aircraft heading may change in ROL mode due to turbulence.

HEADING HOLD

- 1. Heading Selector Knob -- SET bug to desired heading.
- 2. HDG Mode Selector Button -- PRESS. Note HDG mode annunciator ON. Autopilot will automatically turn the aircraft to the selected heading.

COMMAND TURNS (HEADING HOLD MODE ENGAGED)

1. Heading Selector Knob -- MOVE bug to the desired heading. Autopilot will automatically turn the aircraft to the new selected heading.

NAV COUPLING

- 1. When equipped with DG:
 - a. NAV#1 OBS Knob -- SELECT desired course.
 - b. NAV Mode Selector Button -- PRESS. Note NAVARM annunciated.
 - c. Heading Selector Knob -- ROTATE BUG to agree with OBS course.

NOTE

When NAV is selected, the autopilot will flash HDG for 5 seconds to remind the pilot to reset the HDG bug to the OBS course. If HDG mode was in use at the time of NAV button selection, a 45° intercept angle will then be automatically established based on the position of the bug.

NOTE

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode <u>PRIOR</u> to pressing the NAV button. The HDG bug must still be positioned to agree with the OBS course to provide course datum to the autopilot when using a DG (Directional Gyro).

- 1) If the CDI needle is greater than 2 to 3 dots from center, the autopilot will annunciate NAV_{ARM}. When the computed capture point is reached, the ARM annunciator will go out and the selected course will be automatically captured and tracked.
- 2) If the CDI needle is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting NAV mode. The NAV annunciator will then illuminate and the capture/track sequence will automatically begin.
- 2. When equipped with HSI:
 - a. Course Bearing Pointer SET to desired course.
 - b. Heading Selector Knob -- **SET BUG** to provide desired intercept angle and engage HDG mode.
 - c. NAV Mode Selector Button -- PRESS.
- If the Course Deviation Bar (D-Bar) is greater than 2 to 3 dots from center, the autopilot will annunciate NAV_{ARM}. When the computed capture point is reached the ARM annunciator will go out and the selected course will be automatically captured and tracked.
- 2) If the D-Bar is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting NAV mode; the NAV annunciator will illuminate and the capture/track sequence will automatically begin.

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APPROACH (APR) COUPLING: (To enable glideslope coupling on an ILS and more precise tracking on instrument approaches).

- 1. When equipped with DG:
 - a. **NAV #1 OBS** Knob -- **SELECT** desired approach course. (For a localizer, set it to serve as a memory aid.)
 - b. **APR** Mode Selector Button -- **PRESS**. Note **APR**_{ARM} annunciated.
 - c. Heading Selector Knob -- **ROTATE BUG** to agree with desired approach.

NOTE

When APR is selected, the autopilot will flash HDG for 5 seconds to remind the pilot to reset the HDG bug to the approach course. If HDG mode was in use at the time of APR button selection a 45° intercept angle will then be automatically established based on the positon of the bug.

NOTE

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode <u>PRIOR</u> to pressing the APR button. The HDG bug must still be positioned to agree with the desired approach course to provide course datum to the autopilot when using a DG.

If the CDI needle is greater than 2 to 3 dots from center,
 the autopilot will annunciate APR_{ARM}; when the computed capture point is reached the ARM annunciator will go out and the selected course will be automatically captured and tracked.

- 2) If the CDI needle is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting APR mode; the APR annunciator will illuminate and the capture/track sequence will automatically begin.
 - 2. When equipped with HSI:
 - a. Course Bearing Pointer -- **SET** to desired course.
 - b. Heading Selector Knob -- SET BUG to provide desired intercept angle.
 - c. APR Mode Selector Button -- PRESS.
- If the D-Bar is greater than 2 to 3 dots from center, the autopilot will annunciate APR_{ARM}; when the computed capture point is reached the ARM annunciator will go out and the selected course will be automatically captured and tracked.
- 2) If the D-Bar is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting APR mode; the APR annunciator will illuminate and the capture/track sequence will automatically begin.
 - d. Airspeed -- **MAINTAIN** 90 KIAS during autopilot approaches (recommended).

BACK COURSE (REV) APPROACH COUPLING (i.e., reverse localizer):

- 1. When equipped with DG:
 - a. **NAV #1 OBS** Knob -- **SELECT** the localizer course to the front course inbound (as a memory aid).
 - b. REV Mode Selector Button -- PRESS.
 - c. Heading Selector Knob -- **ROTATE BUG** to the heading corresponding to the localizer <u>front course bound</u>.

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NOTE

- When REV is selected, the autopilot will flash HDG for 5 seconds to remind the pilot to reset the HDG bug to the localizer <u>FRONT COURSE INBOUND</u> heading. If heading mode was in use at the time of REV button selection, a 45° intercept angle will then be automatically established based on the position of the bug.
- All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode <u>PRIOR</u> to pressing the REV button. The HDG bug must still be positioned to the localizer <u>FRONT</u> <u>COURSE INBOUND</u> heading to provide course datum to the autopilot when using a DG.
- If the CDI needle is greater than 2 to 3 dots from center,
 the autopilot will annunciate REV_{ARM}; when the computed capture point is reached the ARM annunciator will go out and the selected back course will be automatically captured and tracked.
- 2) If the CDI needle is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting REV mode; the REV annunciator will illuminiate and the capture/track sequence will automatically begin.

2. When equipped with HSI:

- a. Course Bearing Pointer -- **SET** to the ILS <u>front course inbound</u> heading.
- b. Heading Selector Knob -- **SET BUG** to provide desired intercept angle and engage HDG mode.
- c. REV Mode Selector Button -- PRESS.
 - If the D-Bar is greater than 2 to 3 dots from center, the autopilot will annunciate REV_{ARM}; when the computed capture point is reached the ARM annunciator will go out and the selected back course will be automatically captured and tracked.

- 2) If the D-Bar is less than 2 to 3 dots from center, the HDG mode will disengage upon selecting REV mode; the REV annunciator will illuminate and the capture/track sequence will automatically begin.
 - d. Airspeed -- **MAINTAIN** 90 KIAS during autopilot approaches (recommended).

MISSED APPROACH

- 1. A/P DISC -- PRESS to disengage AP.
- 2. MISSED APPROACH -- EXECUTE.
- 3. AP Button -- PRESS (if AP operation is desired). Note ROL annunciator ON. Select optional lateral modes as desired.

BEFORE LANDING

1. A/P DISC Switch -- PRESS to disengage AP.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the KAP140 Autopilot is installed.

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Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 8

WINTERIZATION KIT

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Winterization Kit is installed.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1

Walker Date: July 10, 1998

Member of GAMA
8 July 1998

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WINTERIZATION KIT

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue		
0 (Original)	July 8, 1998		

LOG OF EFFECTIVITY PAGES

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SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	<u>In Airplane</u>

S8-2 July 8/98

WINTERIZATION KIT

SECTION 1 GENERAL

The winterization kit consists of two cover plates (with placards) which attach to the air intakes in the cowling nose cap, a placard silk screened on the instrument panel, and insulation for the crankcase breather line. This equipment should be installed for operations in temperatures consistently below 20°F (-7°C). Once installed, the crankcase breather insulation is approved for permanent use, regardless of temperature.

SECTION 2 LIMITATIONS

The following information must be presented in the form of placards when the airplane is equipped with a winterization kit.

1. On each nose cap cover plate:

REMOVE WHEN O.A.T. EXCEEDS +20°F.

2. On the instrument panel near the EGT gauge:

WINTERIZATION KIT MUST BE REMOVED WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 20°F.

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SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the winterization kit is installed.

SECTION 4 NORMAL PROCEDURES

There is no change to the airplane normal procedures when the winterization kit is installed.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the winterization kit is installed.

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Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 9

DAVTRON MODEL 803 CLOCK/O.A.T.

SERIAL NO	_
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Davtron Clock/O.A.T. is installed.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1

When W Executive Engineer
Date: July 10, 1998

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DAVTRON MODEL 803 CLOCK/O.A.T.

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue	
0 (Original)	July 8, 1998	

LOG OF EFFECTIVITY PAGES

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SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	<u>Incorporation</u>	In Airplane

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DIGITAL CLOCK/O.A.T.

SECTION 1 GENERAL

The Davtron Model 803 digital clock combines the features of a clock, outside air temperature gauge (O.A.T.) and voltmeter in a single unit. The unit is designed for ease of operation with the use of three buttons. The upper button is used to control sequencing between temperature and voltage. The lower two buttons control reading and timing functions related to the digital clock. Temperature and voltage functions are displayed in the upper portion of the unit's LCD window, and clock/timing functions are displayed in the lower portion of the unit's LCD window.

The digital display features an internal light (back light) to ensure good visibility under low cabin lighting conditions and at night. The intensity of the back light is controlled by the PANEL LT rheostat. In addition, the display incorporates a test function which allows checking that all elements of the display are operating.

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when the digital clock/O.A.T. is installed.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the digital clock/O.A.T. is installed.

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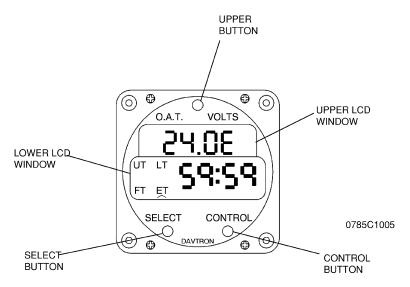


Figure 1. Clock/OAT Gauge

SECTION 4 NORMAL PROCEDURES

TEST MODE

The unit may be tested by holding the SELECT button down for three seconds. Proper operation is indicated by the display 88:88 and activation of all four annunciators.

O.A.T. / VOLTMETER OPERATION

The upper portion of the LCD window is dedicated to O.A.T. and voltmeter operations. The voltmeter reading is preselected upon startup and is indicated by an "E" following the display reading. Pushing the upper control button will sequence the window from voltage to fahrenheit ("F") to centigrade ("C"), and back again to voltage.

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CLOCK OPERATIONS

The lower portion of the LCD window is dedicated to clock and timing operations. Pushing the SELECT button will sequence the window from universal time (UT) to local time (LT) to flight time (FT) to elapsed time (ET), and back again to universal time. Pushing the CONTROL button allows for timing functions within the four SELECT menus. Setting procedures are as follows:

SETTING UNIVERSAL TIME

Use the SELECT button to select universal time (UT). Simultaneously press both the SELECT and the CONTROL buttons to enter the set mode. The tens of hours digit will start flashing. The CONTROL button has full control of the flashing digit, and each button push increments the digit. Once the tens of hours is set the SELECT button selects the next digit to be set. After the last digit has been selected and set with the CONTROL button, a final push of the SELECT button exits the set mode. The lighted annunciator will resume its normal flashing, indicating the clock is running in universal time mode.

SETTING LOCAL TIME

Use the SELECT button to select local time (LT). Simultaneously press both the SELECT and the CONTROL buttons to enter the set mode. The tens of hours digit will start flashing. The set operation is the same as for UT, except that minutes are already synchronized with the UT clock and cannot be set in local time.

FLIGHT TIME RESET

Use the SELECT button to select flight time (FT). Hold the CONTROL button down for 3 seconds, or until 99:59 appears on the display. Flight time will be zeroed upon release of the CONTROL button.

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SETTING FLIGHT TIME FLASHING ALARM

Use the SELECT button to select flight time (FT). Simultaneously press both the SELECT and the CONTROL buttons to enter the set mode. The tens of hours digit will start flashing. The set operation is the same as for UT. When actual flight time equals the alarm time, the display will flash. Pressing either the SELECT or CONTROL button will turn the flashing off and zero the alarm time. Flight time is unchanged and continues counting.

SETTING ELAPSED TIME COUNT UP

Use the SELECT button to select elapsed time (ET). Press the CONTROL button and elapsed time will start counting. Elapsed time counts up to 59 minutes, 59 seconds, and then switches to hours and minutes. It continues counting up to 99 hours and 59 minutes. Pressing the CONTROL button again resets elapsed time to zero.

SETTING ELAPSED TIME COUNT DOWN

Use the SELECT button to select Elapsed Time (ET). Simultaneously press both the SELECT and the CONTROL buttons to enter the set mode. The tens of hours digit will start flashing. The set operation is the same as for UT, and a count down time can be set from a maximum of 59 minutes and 59 seconds. Once the last digit is set, pressing the SELECT button exits the set mode and the clock is ready to start the countdown. Pressing the CONTROL button now will start the countdown. When countdown reaches zero, the display will flash. Pressing either the SELECT or CONTROL button will reset the alarm. After reaching zero, the elapsed time counter will count up.

Button Select Disable

When there is no airplane power applied to the unit, the CONTROL and SELECT buttons are disabled.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this equipment is installed. However, installation of this O.A.T. probe may result in a minor reduction in cruise performance.

S9-6 July 8/98



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON

SUPPLEMENT 10

BENDIX/KING KLN 89 VFR GLOBAL POSITIONING SYSTEM (GPS)

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Global Positioning System is installed.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1

While W Hill Executive Engineer
Date: 27 June 2000

Member of GAMA 8 July 1998

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Revision 1 - 30 May 2000

S10-1

BENDIX/KING KLN 89 VFR GLOBAL POSITIONING SYSTEM (GPS)

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998
1	May 30/00

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S10-1) S10-2 S10-3 S10-4	May 30/00 May 30/00 May 30/00 July 8/98		

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	<u>In Airplane</u>

S10-2 May 30/00

BENDIX/KING KLN 89 VFR GLOBAL POSITIONING SYSTEM (GPS)

SECTION 1 GENERAL

The Bendix/King KLN 89 is a navigation system based on the Global Positioning Satellite network. It contains a database cartridge which may be updated by subscription. Complete descriptive material on the KLN 89 may be found in the Bendix/King KLN 89 Pilot's Guide supplied with the unit. This pilot guide must be available during operation of the KLN 89 unit.

SECTION 2 LIMITATIONS

Use of the KLN 89 is limited to VFR operations only. The following information must be presented in the form of placards when the airplane is equipped with a KLN 89 unit:

1. On the instrument panel near the KLN 89 unit:

GPS NOT APPROVED FOR IFR NAVIGATION

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the KLN 89 GPS is installed.

May 30/00 S10-3

SECTION 4 NORMAL PROCEDURES

There is no change to basic airplane normal operating procedures with the KLN 89 GPS installed.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the KLN 89 GPS is installed. However, installation of an externally-mounted antenna or related external antennas may result in a minor reduction in cruise performance.

S10-4 July 8/98



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 172S8001 AND ON SUPPLEMENT 12

CANADIAN SUPPLEMENT

SERIAL NO.	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when used for Canadian Operation.

FAA APPROVAL	
FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co Delegation Option Manufacturer CE-1 Washard Manufacturer Engineer	
Executive Engineer	
Date: July 10, 1998	

Member of GAMA
8 July 1998

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S12-1

CANADIAN SUPPLEMENT

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	July 8, 1998

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S12-1)	July 8/98	S12-3	July 8/98
S12-2	July 8/98	S12-4	July 8/98

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unİt	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	<u>In Airplane</u>

S12-2 July 8/98

CANADIAN SUPPLEMENT

SECTION 1 GENERAL

This supplement is required for Canadian operation of Cessna Model 172S.

SECTION 2 LIMITATIONS

The following placard must be installed.

1. Near the fuel tank filler cap:

FUEL

100LL/ 100 MIN. GRADE AVIATION GASOLINE
CAP. 26.5 U.S. GAL. (100 LITRES) USABLE
CAP 17.5 U.S. GAL. (66 LITRES) USABLE
TO BOTTOM OF FILLER INDICATOR TAB

July 8/98 S12-3

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when used for Canadian operation.

SECTION 4 NORMAL PROCEDURES

There is no change to basic airplane normal operating procedures when used for Canadian operation.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when used for Canadian operation.

S12-4 July 8/98



Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

CESSNA MODEL 172S AIRPLANES 17208113 AND ON

SUPPLEMENT 13

BENDIX/KING KCS-55A SLAVED COMPASS SYSTEM WITH KI-525A HORIZONTAL SITUATION INDICATOR (HSI)

SERIAL NO	
REGISTRATION NO	

This supplement must be inserted into Section 9 of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when Horizontal Situation Indicator is installed.

FAA APPROVAL		
FAA APPROVED UNDER FAR 21 SUBPART J		
The Cessna Aircraft Co		
Delegation Option Manufacturer CE-1		
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* ******* * ****** Executive Engineer		
/		
Date: 27 June 2000		
Date: 27 Jūne 2000		

Member of GAMA
15 January 1999

Revision 1 - 30 May 2000

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172SPHUS-S13-01

S13-1

BENDIX/KING KCS-55A SLAVED COMPASS SYSTEM WITH KI-525A HORIZONTAL SITUATION INDICATOR (HSI)

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the Supplement. Pages which are affected by the current revision will carry the date of that revision

Revision Level	Date of Issue
0 (Original)	Jan. 15, 1999
1	May 30, 2000

LOG OF EFFECTIVITY PAGES

PAGE	DATE	PAGE	DATE
Title (S13-1)	May 30/00	S13-5	Jan. 15/99
S13-2	May 30/00	S13-6	Jan. 15/99
S13-3	May 30/00	S13-7	Jan. 15/99
S13-4	Jan. 15/99	S13-8	Jan. 15/99

SERVICE BULLETIN CONFIGURATION LIST

The following is a list of Service Bulletins that are applicable to the operation of the airplane, and have been incorporated into this supplement. This list contains only those Service Bulletins that are currently active.

		Airplane		
		Unit	Revision	Incorporated
<u>Number</u>	<u>Title</u>	Effectivity	Incorporation	In Airplane

S13-2 May 30/00

BENDIX/KING KCS-55A SLAVED COMPASS SYSTEM WITH KI-525A HORIZONTAL SITUATION INDICATOR (HSI)

SECTION 1 GENERAL

The Bendix/King KCS-55A Slaved Compass System with KI-525A HSI Indicator is an additional navigation indicator option. The KCS-55A compass system includes a slaving control and compensator unit, magnetic slaving transmitter and a remote directional gyro. The information obtained from the KCS-55A compass system is displayed on the KI-525A Indicator.

The panel-mounted KI-525A indicator combines the display functions of both the standard Directional Gyro (Heading Indicator) and the Course Deviation Indicator's VOR/LOC/Glideslope information to provide the pilot with a single visual presentation of the complete horizontal navigation situation.

This system also incorporates a slaving accessory and compensator unit. This unit indicates any difference between the displayed heading and the magnetic heading. Up deflection indicates a clockwise error of the compass card. Down deflection indicates a counterclockwise error of the compass card. Whenever the aircraft is in a turn and the compass card rotates, it is normal for this meter to show a full deflection to one side or the other.

May 30/00 S13-3

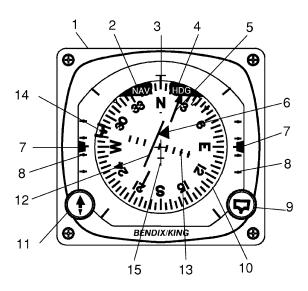


Figure 1. Horizontal Situation Indicator System (Sheet 1 of 2)

- HORIZONTAL SITUATION INDICATOR (HSI) -- Provides a pictorial presentation of aircraft deviation relative to VOR/GPS radials and localizer beams. It also displays glide slope deviations and gives heading reference with respect to magnetic north. The gyro is remote-mounted and electricdriven
- NAV FLAG -- Flag is in view when the NAV receiver signal is inadequate.
- 3. HEADING REFERENCE (LUBBER LINE) -- Magnetic heading appears under this line when the compass card is slaved or slewed to the aircraft's magnetic heading.
- 4. HEADING WARNING FLAG (HDG) -- When flag is in view, the heading display is invalid.
- COURSE SELECT POINTER -- Indicates VOR/Localizer or GPS course on the compass card. The selected VOR radial or localizer heading remains set on the compass card when the compass card rotates.

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- TO/FROM INDICATOR -- Indicates direction of VOR station relative to the selected course. Displays TO when a LOC frequency is selected.
- 7. DUAL GLIDE SLOPE POINTERS -- Displays deviation of airplane from an ILS glideslope. Full scale deflection of the glideslope pointers represents ±0.7 degrees. Pointers will be out of view if an invalid glideslope signal is received.
- 8. GLIDE SLOPE SCALES -- Indicates displacement from glide slope beam center. A glide slope deviation bar displacement of 2 dots represents full-scale (0.7°) deviation above or below glide slope beam centerline.
- 9. HEADING SELECTOR KNOB ()-- Positions the heading bug on compass card by rotating the heading selector knob. The bug rotates with the compass card.
- 10. COMPASS CARD -- Rotates to display heading of airplane with reference to lubber line on HSI.
- 11. COURSE SELECTOR KNOB ()-- Positions the course bearing pointer on the compass card by rotating the course selector knob.
- 12. COURSE DEVIATION BAR (D-BAR) The center portion of the omni bearing pointer moves laterally to pictorially indicate the relationship of airplane to the selected course. It indicates degrees of angular displacement from VOR radials and localizer beams, or displacement in nautical miles from GPS desired course.
- 13. COURSE DEVIATION SCALE -- A course deviation bar displacement of 5 dots represents full scale (VOR = ±10°, LOC = ±2-1/2°, GPS = 5nm enroute, GPS APR = .3nm) deviation from beam centerline.
- 14. HEADING BUG -- Moved by () knob to select desired heading.
- SYMBOLIC AIRCRAFT -- Provides pictorial presentation of the airplane position and intercept angle relative to selected VOR Radial or localizer course.

Figure 1. Horizontal Situation Indicator System (Sheet 2 of 2)

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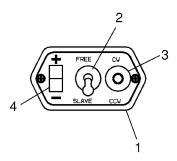


Figure 2. KA-51B Slaving Accessory and Compensator Unit

- 1. KA-51B SLAVING ACCESSORY AND COMPENSATOR UNIT -- Controls the KCS-55A Compass System.
- 2. MANUAL/AUTOMATIC (FREE/SLAVE) COMPASS SLAVE SWITCH -- Selects either the manual or automatic slaving mode for the Compass System.
- 3. CW/CCW COMPASS MANUAL SLAVE SWITCH -- With the manual/automatic compass slave switch in the FREE position, allows manual compass card slaving in either the clockwise or counterclockwise direction. The switch is spring loaded to the center position.
- 4. SLAVING METER -- Indicates the difference between the displayed heading and the magnetic heading. Up deflection indicates a clockwise error of the compass card. Down deflection indicates a counterclockwise error of the compass card.

S13-6 Jan 15/99

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this instrument is installed.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this instrument is installed.

SECTION 4 NORMAL PROCEDURES

A CAUTION

ELECTRICAL POWER MUST BE SUPPLIED TO THIS INSTRUMENT FOR PROPER FUNCTIONING. ABSENCE OF WHICH WILL RESULT IN UNRELIABLE HEADING INFORMATION.

Normal procedures for operation of this system differ little from those required for the more conventional Course Deviation Indicators. However, several small differences are worth noting.

The rectilinear movement of the course deviation bar in combination with the rotation of the compass card in response to heading changes, provides an intuitive picture of the navigation situation at a glance when tuned to an omni station. When tuned to a localizer frequency, the course select pointer <u>must</u> be set to the inbound front course for <u>both</u> front and back-course approaches to retain this pictorial presentation.

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For normal procedures with autopilots, refer to the Autopilot Supplements in the Supplement section of this handbook. A description of course datum and autopilot procedures for course datum are incorporated in the appropriate autopilot supplements.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this instrument is installed.

S13-8 Jan 15/99