

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<sub>ARM</sub>** 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 position of the bug.

**NOTE**

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode PRIOR 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.

- 1) If the CDI needle is greater than 2 to 3 dots from center, the autopilot will annunciate **APR<sub>ARM</sub>**; 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**.

1) If the D-Bar is greater than 2 to 3 dots from center, the autopilot will annunciate **APR<sub>ARM</sub>**; 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 front course bound.

### 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 FRONT COURSE INBOUND 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 PRIOR to pressing the REV button. The HDG bug must still be positioned to the localizer FRONT COURSE INBOUND heading to provide course datum to the autopilot when using a DG. ■
- 1) If the CDI needle is greater than 2 to 3 dots from center, the autopilot will annunciate **REV<sub>ARM</sub>**; 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 illuminate and the capture/track sequence will automatically begin. ■
2. When equipped with HSI:
- a. Course Bearing Pointer -- **SET** to the ILS front course inbound heading.
  - b. Heading Selector Knob -- **SET BUG** to provide desired intercept angle and engage HDG mode.
  - c. **REV** Mode Selector Button -- **PRESS**.
    - 1) If the D-Bar is greater than 2 to 3 dots from center, the autopilot will annunciate **REV<sub>ARM</sub>**; 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.



**Pilot's Operating Handbook and  
FAA Approved Airplane Flight Manual**

**CESSNA MODEL 182S**

**AIRPLANES 80001 AND ON**

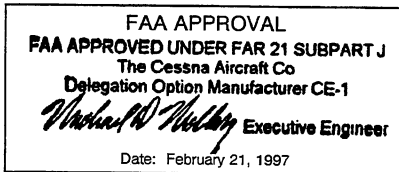
**SUPPLEMENT 8**

**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.



 Member of GAMA

**3 February 1997**

COPYRIGHT © 1997  
CESSNA AIRCRAFT COMPANY  
WICHITA, KANSAS, USA

182SPHUS-S8-00

S8-1

# SUPPLEMENT 8

## 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

<u>Revision Level</u>	<u>Date of Issue</u>
0 (Original)	Feb 3, 1997

## LOG OF EFFECTIVITY

---

<u>PAGE</u>	<u>DATE</u>	<u>PAGE</u>	<u>DATE</u>
Title (S8-1)	Feb 3/97		
S8-2	Feb 3/97		
S8-3	Feb 3/97		
S8-4	Feb 3/97		

## 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 Unit Effectivity</u>	<u>Revision Incorporation</u>	<u>Incorporated In Airplane</u>
---------------	--------------	--	-----------------------------------	-------------------------------------

# **SUPPLEMENT**

## **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 in both hot and cold weather.

### **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:

**THIS PLATE NOT TO BE USED WHEN TEMPERATURE  
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.**

### **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.





**Pilot's Operating Handbook and  
FAA Approved Airplane Flight Manual**

**CESSNA MODEL 182S  
AIRPLANES 80001 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 Clock/O.A.T. gauge is installed.



Member of GAMA

**3 February 1997**

COPYRIGHT © 1997  
CESSNA AIRCRAFT COMPANY  
WICHITA, KANSAS, USA

182SPHUS-S9-00

S9-1

## SUPPLEMENT 9

### 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

<u>Revision Level</u>	<u>Date of Issue</u>
0 (Original)	Feb 3, 1997

#### LOG OF EFFECTIVITY

---

PAGE	DATE	PAGE	DATE
Title (S9-1)	Feb 3/97	S9-5	Feb 3/97
S9-2	Feb 3/97	S9-6	Feb 3/97
S9-3	Feb 3/97		
S9-4	Feb 3/97		

#### 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 Unit Effectivity</u>	<u>Revision Incorporation</u>	<u>Incorporated In Airplane</u>
---------------	--------------	--	-----------------------------------	-------------------------------------

# **SUPPLEMENT**

## **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 a three button control system. 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.

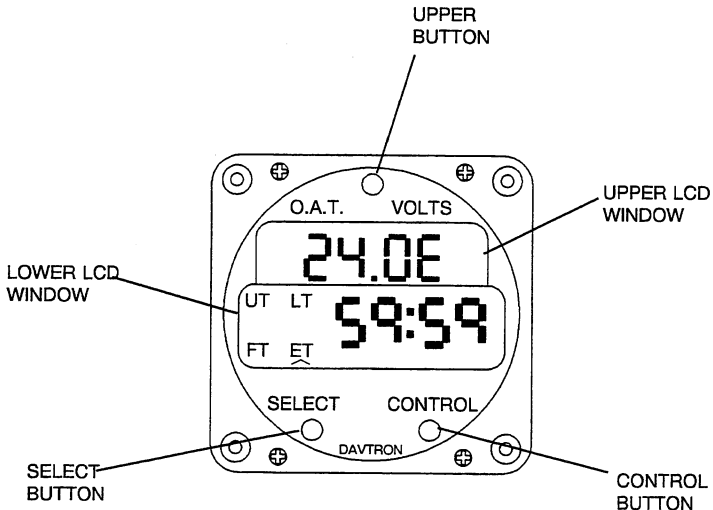


Figure 1. Davtron Model 803 Digital Clock

## 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 button will sequence the window from voltage to fahrenheit ("F") to centigrade ("C"), and back again to voltage.

## **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.

### **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 OAT probe will result in a minor reduction in cruise performance.



---

**Pilot's Operating Handbook and  
FAA Approved Airplane Flight Manual**

**CESSNA MODEL 182S  
AIRPLANES 80001 AND ON**

**SUPPLEMENT 10**

**BENDIX/KING KLN 89 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 KLN 89 Global Positioning System is installed.

FAA APPROVAL
<b>FAA APPROVED UNDER FAR 21 SUBPART J</b>
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1
<i>Richard D. Hedley</i> Executive Engineer
Date: February 21, 1997

COPYRIGHT © 1997  
CESSNA AIRCRAFT COMPANY  
WICHITA, KANSAS, USA

182SPHUS-S10-00

 Member of GAMA  
**3 February 1997**

S10-1

## SUPPLEMENT 10

### BENDIX/KING KLN 89 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

<u>Revision Level</u>	<u>Date of Issue</u>
0 (Original)	Feb 3, 1997

#### LOG OF EFFECTIVITY

---

PAGE	DATE	PAGE	DATE
Title (S10-1)	Feb 3/97		
S10-2	Feb 3/97		
S10-3	Feb 3/97		
S10-4	Feb 3/97		

#### 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 Unit Effectivity</u>	<u>Revision Incorporation</u>	<u>Incorporated In Airplane</u>
---------------	--------------	--	-----------------------------------	-------------------------------------



# **SUPPLEMENT**

## **Bendix/King KLN 89 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:

<p><b>GPS NOT APPROVED FOR IFR NAVIGATION</b></p>
---

### **SECTION 3 EMERGENCY PROCEDURES**

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

## **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 will result in a minor reduction in cruise performance.



**Pilot's Operating Handbook and  
FAA Approved Airplane Flight Manual**

**CESSNA MODEL 182S**

**AIRPLANE SERIALS  
18280001 THRU 18280164**

**SUPPLEMENT 11**

**BENDIX/KING KAP 140  
2 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 2 Axis Autopilot System is installed.

<p>FAA APPROVAL FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co Delegation Option Manufacturer CE-1 <i>Richard W. Hedberg</i> Executive Engineer Date: April 6, 1998</p>
---

 Member of GAMA

**3 February 1997**

Revision 2 - 1 December 1997

COPYRIGHT © 1997  
CESSNA AIRCRAFT COMPANY  
WICHITA, KANSAS, USA

182SPHUS-S11-02

S11-1

# SUPPLEMENT 11

## BENDIX/KING KAP 140 2 AXIS AUTOPILOT

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

<u>Revision Level</u>	<u>Date of Issue</u>
0 (Original)	Feb. 3, 1997
1	July 18, 1997
2	Dec. 1, 1997

### LOG OF EFFECTIVITY

---

Title (S11-1)	Dec 1/97	S11-15	July 18/97
S11-2	Dec 1/97	S11-16	July 18/97
S11-3	Feb 3/97	S11-17	July 18/97
S11-4 (blank)	Feb 3/97	S11-18	July 18/97
S11-5	Dec 1/97	S11-19	Feb 3/97
S11-6	Feb 3/97	S11-20	Feb 3/97
S11-7	Dec 1/97	S11-21	Feb 3/97
S11-8	Dec 1/97	S11-22	Feb 3/97
S11-9	Feb 3/97	S11-23	Feb 3/97
S11-10	Feb 3/97	S11-24	Feb 3/97
S11-11	Feb 3/97	S11-25	Feb 3/97
S11-12	Feb 3/97	S11-26	Feb 3/97
S11-13	Dec 1/97	S11-27	Feb 3/97
S11-14	July 18/97	S11-28	Feb 3/97

# **SUPPLEMENT**

## **BENDIX/KING KAP 140 2 AXIS AUTOPILOT**

### **SECTION 1 GENERAL**

The KAP 140 2 Axis Autopilot provides the pilot with the following features: Vertical Speed mode (VS); Altitude hold (ALT); Wing Level (ROL); Heading select (HDG); Approach (APR); ILS coupling to Localizer (LOC) and Glideslope (GS); and backcourse (REV) modes of operation.

The KAP 140 2 Axis Autopilot has an electric trim system which provides autotrim during autopilot operation and manual electric trim (MET) for the pilot when the autopilot is not engaged. The electric trim system is designed to fail safe for any single inflight trim malfunction. Trim faults are visually and aurally annunciated.

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

The following conditions will cause the Autopilot to automatically disengage:

- A. Power failure.
- B. Internal Flight Control System failure.

C. Pitch accelerations in excess of + 1.4g or less than 0.6g will cause the autopilot to disengage.

D. Flagged turn and bank gyro.

E. Computer autopilot monitor that detects either the R (ROLL) or P (PITCH) axis annunciator.

Activation of AP DISC/TRIM INT control wheel switch will also disconnect the autopilot.

The AVIONICS MASTER switch supplies power to the avionics bus bar of the radio circuit breakers and the autopilot circuit breaker. The AVIONICS MASTER switch also serves as an emergency AP/MET shutoff.

The airplane MASTER switch function is unchanged and can be used in an emergency to shut off electrical power to all flight control systems while the problem is isolated.

The following circuit breakers are used to protect the KAP 140 2-Axis Autopilot:

**LABEL**

**FUNCTIONS**

AUTO  
PILOT

Supplies power to the KC 140 Computer and the autopilot pitch, roll and pitch trim servos.

WARN

Supplies separate power for autopilot alerting on the ship's annunciator panel.

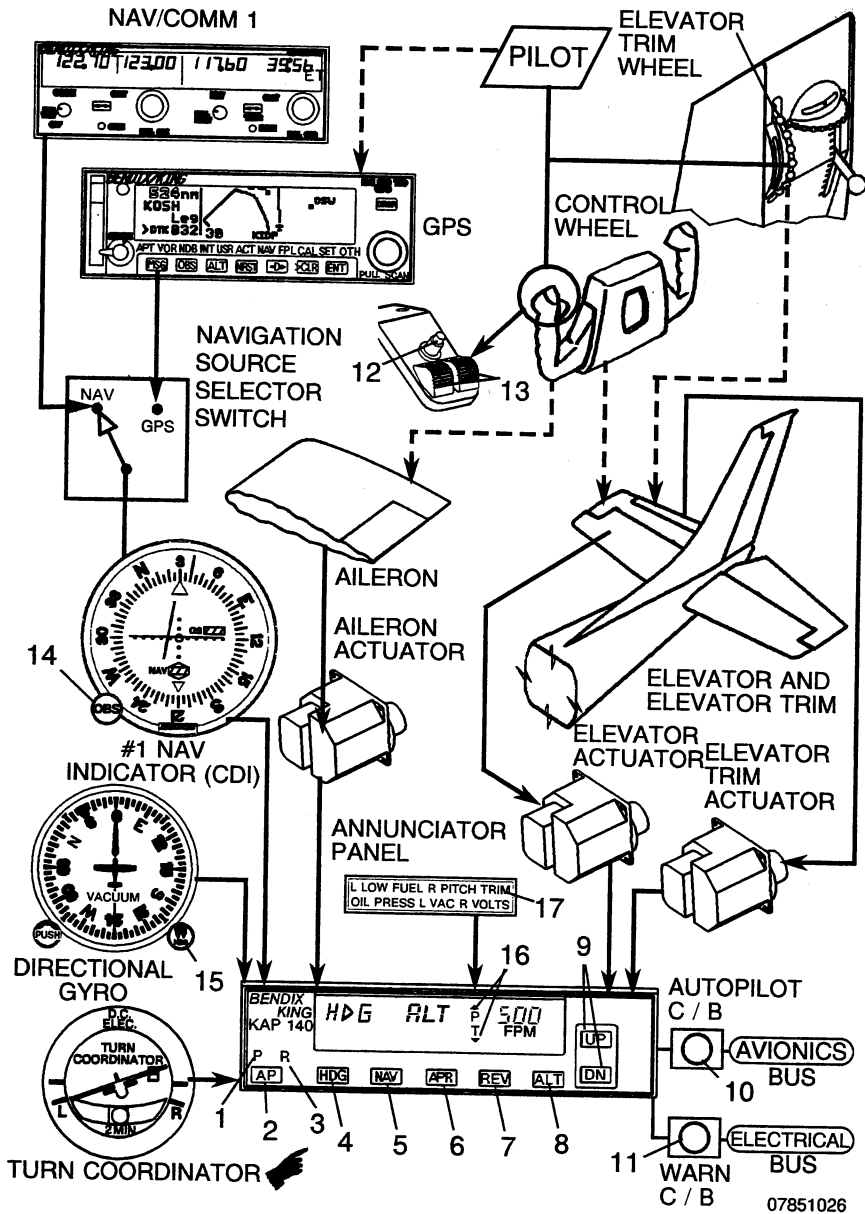
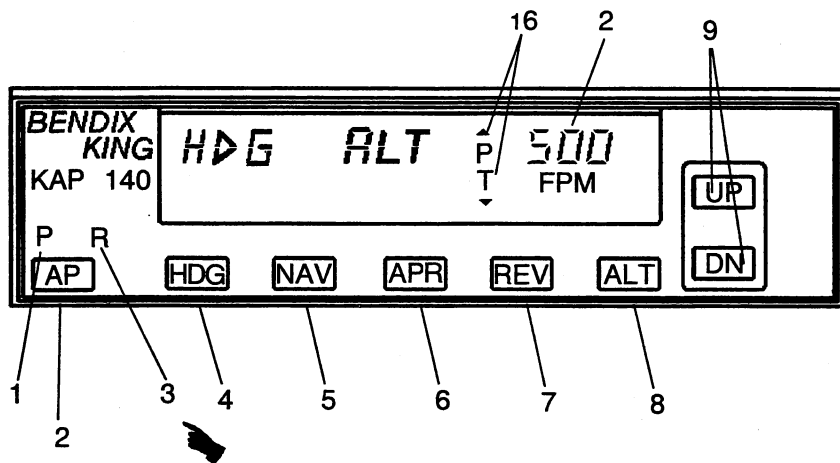


Figure 1. Bendix/King 2-Axis KAP 140 Autopilot Schematic  
(Sheet 1 of 5)



1. PITCH AXIS (P) ANNUNCIATOR -- When illuminated, indicates failure of pitch axis and will either disengage the autopilot or not allow engagement of the pitch axis.
2. AUTOPILOT ENGAGE/DISENGAGE (AP) BUTTON -- When pushed, engages autopilot if all logic conditions are met. The autopilot will engage in the basic roll (ROL) mode which functions as a wing leveler and the pitch axis mode of vertical speed (VS) mode. The commanded vertical speed will be displayed in the upper right corner of autopilot display area. The captured VS will be vertical speed present at the moment of AP button press. The button may be used to disengage the autopilot.
3. ROLL AXIS (R) ANNUNCIATOR -- When illuminated, indicates failure of the roll axis and disengage the autopilot.
4. 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. A new heading may be selected at any time and will result in the airplane turning to the new heading. Button can also be used to toggle between HDG and ROL modes. This button may be used to engage the autopilot

Figure 1. Bendix/King 2-Axis KAP 140 Autopilot, Operating Controls and Indicators (Sheet 2 of 5)



## PLACARDS

The following information must be displayed in the form of composite or individual placards.

1. Near the throttle:

**CAUTION:**  
  
POWER CHANGES IN EXCESS  
OF 3 In HG MAN PRESS/SEC  
IN TURBULENCE WITH  
AUTOPILOT ENGAGED CAN  
CAUSE AUTOPILOT UPSET.

### NOTE

Autopilot upset can result in a rapid pitch up or pitch down of the airplane. If this condition occurs while making power change in turbulence, firmly grasp the control wheel and maintain airplane control. Press and hold A/P DISC switch throughout recovery. Once the airplane is stabilized, the autopilot may be re-engaged as described in Section 4, Normal Procedures.

2. Above the flap control handle/indicator:

**FLAPS MUST BE UP WITH THE AUTOPILOT ENGAGED**

## SECTION 3 EMERGENCY PROCEDURES

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

1. In case of Autopilot, Autopilot Trim, or Manual Electric Trim malfunction (accomplish Items A and B simultaneously):
  - A. Airplane Control Wheel -- GRASP FIRMLY and regain aircraft control.
  - B. **A/P DISC/TRIM INT** Switch -- PRESS and HOLD throughout recovery.
  - C. AIRCRAFT -- **RETRIM** Manually as Needed.
  - D. **AUTOPILOT** Circuit Breaker -- PULL.

**NOTE**

The **Avionics Master** Switch may be used as an alternate means of removing all power from the autopilot and electric trim systems. If necessary perform steps 1A through 1C above, then turn the **Avionics Master** Switch OFF before locating and pulling the **Autopilot** Circuit Breaker. Turn the **Avionics Master** Switch on as soon as possible to restore power to all other avionics equipment. Primary attitude, airspeed, directional compass, and altitude instruments will remain operational at all times.

 **WARNING**

**DO NOT ATTEMPT TO RE-ENGAGE THE AUTOPILOT FOLLOWING AN AUTOPILOT, AUTOTRIM, OR MANUAL ELECTRIC TRIM MALFUNCTION UNTIL THE CAUSE FOR THE MALFUNCTION HAS BEEN CORRECTED.**

Maximum Altitude losses due to autopilot malfunction:

CONFIGURATION	ALT. LOSS
Cruise, Climb, Descent	250 ft.
Maneuvering	100 ft.
APPR	50 ft.

**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.

1. An autopilot or autotrim malfunction occurs when there is an uncommanded deviation in the airplane flight path or when there is abnormal control wheel or trim wheel motion. In some cases, and especially for autopilot trim, there may be little to no airplane motion, yet the red **PITCH TRIM** annunciator may illuminate and an alert tone may sound.

The primary concern in reacting to an autopilot or autopilot trim 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/TRIM INT switch throughout the recovery. Manipulate the controls as required to safely maintain operation of the airplane within all of its operating limitations. Elevator trim should be used manually as needed to relieve control forces. **Locate and pull the AUTOPILOT circuit breaker** on the right hand circuit breaker panel to completely disable the autopilot system.

2. A manual electric trim malfunction may be recognized by the illumination of a red **PITCH TRIM** annunciator accompanied by an alert tone, or by unusual trim wheel motions with the autopilot mode OFF without pilot actuation of the manual electric trim switches. As with an autopilot malfunction, the first concern following a manual electric trim malfunction is regaining control of the airplane. Grasp the control wheel firmly and press and hold down the A/P DISC/TRIM INT switch. Locate and pull the AUTOPILOT circuit breaker on the right hand breaker panel.
3. Note that the emergency procedure for any malfunction is essentially the same: immediately grasp the control wheel and regain airplane control while pressing and holding the A/P DISC/TRIM INT switch down, and retrim the airplane as needed. After these steps have been accomplished secure the autopilot electric trim system by pulling the autopilot circuit breaker. As with any other airplane emergency procedure, it is important that the 4 steps of the Autopilot/Electric Trim Emergency Procedures located on Page 13 of this supplement are committed to memory.

4. The AVIONICS MASTER switch may be used as required to remove all power from the Autopilot and Electric Trim systems while the circuit breaker is located and pulled. Return the AVIONICS MASTER switch to the ON position as soon as possible. With the AVIONICS MASTER switch off, all flight instruments will remain operational; however, communications, navigation, and identification equipment will be inoperable.
5. It is important that all portions of the autopilot and electric trim 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.

 **WARNING**

**DO NOT RESET AUTOPILOT CIRCUIT BREAKER FOLLOWING AN AUTOPILOT/AUTOTRIM OR MANUAL ELECTRIC TRIM MALFUNCTION UNTIL THE CAUSE FOR THE MALFUNCTION HAS BEEN CORRECTED.**

A flashing  $\frac{P}{T}$  annunciator with an up or down arrow head on the face of the autopilot computer.

A flashing  $\frac{P}{T}$  auto trim annunciation on the face of the autopilot indicates a failure of the auto trim function to relieve pitch servo loading in a timely manner. This condition should be temporary.

1. FLASHING  $\frac{P}{T}$  ANNUNCIATION -- **OBSERVE** aircraft pitch behavior. If pitch behavior is satisfactory, wait 5-10 seconds for the annunciation to stop.
2. If annunciation continues, Airplane Control Wheel -- **GRASP FIRMLY**, disengage the autopilot and check for an out of pitch trim condition manually retrim as required.
3. **AUTOPILOT OPERATION** -- **CONTINUE** if satisfied that the out of trim indication was temporary. **DISCONTINUE** if evidence indicates a failure of the auto trim function.

A red **P** or **R** on the face of the autopilot computer.

1. A red **P** is an indication that the pitch axis of the autopilot has been disabled and cannot be engaged. **DO NOT ENGAGE INTO A ROLL AXIS ONLY SYSTEM.**

### NOTE

If the red **P** lamp was the result of some abnormal accelerations on the airplane, the annunciation should be extinguished within approximately one minute and normal use of the autopilot will be reestablished.

2. A red **R** is an indication that the roll axis of the autopilot has been disabled and cannot be engaged. The autopilot cannot be reengaged.

Flashing mode annunciation in the display of the autopilot computer.

1. Flashing **HDG** -- Indicates a failed heading. **PRESS HDG** button to terminate flashing. **ROL** will be displayed.
2. Flashing **NAV**, **APR** or **REV** -- Usually an indication of a flagged navigation source. **PRESS** the **NAV**, **APR** or **REV** button to terminate flashing. **ROL** will be displayed. (Select a valid navigation source.)

### NOTE

A flashing **NAV**, **APR** or **REV** annunciation can also be caused by a failed heading valid input.

3. Flashing **GS** -- Indication of a flagged glideslope. (**GS** will rearm automatically if a valid **GS** signal is received.)

### NOTE

To continue tracking the localizer, observe the appropriate minimums for a nonprecision approach. (Press **ALT** twice in rapid succession to terminate the flashing. Control the pitch axis in the default **VS** mode.)

### NOTE

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

### EXCEPTION

The **HDG** annunciation will flash for 5 seconds upon selection of **NAV**, **APR**, or **REV** modes to remind the pilot to set the **HDG** bug for use as course datum.

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 DG (Directional Gyro)-- 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.

## **SECTION 4 NORMAL PROCEDURES**

### **A. PREFLIGHT (PERFORM PRIOR TO EACH FLIGHT):**

1. **AVIONICS MASTER -- ON.**
2. **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" with an increasing number for the sequence steps. Successful completion of self test is identified by all display segments being illuminated (Display Test), external "Pitch Trim" (A/C System Annunciator Panel) being illuminated, and the disconnect tone sounding.

### **NOTE**

Upon applying power to the autopilot, the red P warning on the face of the autopilot may illuminate indicating that the pitch axis cannot be engaged. This condition should be temporary, lasting approximately 30 seconds. The P will extinguish and normal operation will be available.

 **WARNING**

**IF PITCH TRIM LIGHT STAYS ON, THEN THE AUTOTRIM DID NOT PASS PREFLIGHT TEST. THE AUTOPILOT CIRCUIT BREAKER MUST BE PULLED. MANUAL ELECTRIC TRIM AND AUTOPILOT ARE INOPERATIVE.**

3. **MANUAL ELECTRIC TRIM -- TEST** as follows: Press both halves of the split Manual Electric Trim (MET) switches to the nose down position, verify that the trim wheel and the trim tab position indicator are moving in the down direction. Repeat test for the nose up direction.

Press MET for nose up trim, press and hold the AP DISC/TRIM INT switch, verify that both the trim wheel and indicator are not moving, release the AP DISC / TRIM INT switch while still holding MET trim up, the trim wheel and indicator should continue to move in the nose up direction.

4. **AUTOPILOT -- ENGAGE** by pressing AP button.
5. **FLIGHT CONTROLS -- MOVE** fore, aft, left and right to verify the autopilot can be overpowered.
6. **A/P DISC/TRIM INT Switch -- PRESS.** Verify that the autopilot disconnects.
7. **TRIM -- SET** to take off position manually.

 **WARNING**

**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.**

 **WARNING**

**DURING ALL AUTOPILOT COUPLED OPERATIONS, THE PILOT IN COMMAND MUST USE PROPER AUTOPILOT COMMANDS AND USE THE PROPER ENGINE POWER TO ENSURE THAT THE AIRPLANE IS MAINTAINED BETWEEN 80 AND 160 KIAS, AND DOES NOT EXCEED OTHER BASIC AIRPLANE OPERATING LIMITATIONS.**

**NOTE**

Autopilot tracking performance will be degraded in turbulence.

**NOTE**

Avoid abrupt power changes at low indicated airspeeds with the autopilot engaged.

**1. BEFORE TAKEOFF:**

- a.. **A/P DISC/TRIM INT** Switch -- **PRESS.**



2. AFTER TAKEOFF:

- a. Elevator Trim -- **VERIFY** or **SET** to place the airplane in a trimmed condition prior to Autopilot engagement.

**NOTE**

Engaging the autopilot into a mistrim condition may cause unwanted attitude changes and a "TRIM FAIL" annunciation.

- b. **AP** Button -- **PRESS**. Note **ROL** and **VS** annunciator on. If no other modes are selected the autopilot will operate in the ROL and vertical speed modes.

 **WARNING**

**WHEN OPERATING AT OR NEAR THE BEST RATE OF CLIMB AIRSPEED, AT CLIMB POWER SETTINGS, AND USING VERTICAL SPEED MODE, IT IS EASY TO DECELERATE TO AN AIRSPEED WHERE CONTINUED DECREASES IN AIRSPEED WILL RESULT IN A REDUCED RATE OF CLIMB. CONTINUED OPERATION IN VERTICAL SPEED MODE COULD RESULT IN A STALL.**

**WHEN OPERATING AT OR NEAR THE MAXIMUM AUTOPILOT SPEED, IT WILL BE NECESSARY TO REDUCE POWER IN ORDER TO MAINTAIN THE DESIRED RATE OF DESCENT AND NOT EXCEED THE MAXIMUM AUTOPILOT SPEED.**

 **WARNING**

**DO NOT HELP THE AUTOPILOT OR HAND-FLY THE AIRPLANE WITH THE AUTOPILOT ENGAGED AS THE AUTOPILOT WILL RUN THE PITCH TRIM TO OPPOSE CONTROL WHEEL MOVEMENT. A MISTRIM OF THE AIRPLANE, WITH ACCOMPANYING LARGE ELEVATOR CONTROL FORCES, MAY RESULT IF THE PILOT MANIPULATES THE CONTROL WHEEL MANUALLY WHILE THE AUTOPILOT IS ENGAGED.**

**3. CLIMB OR DESCENT:**

**a. Using Vertical Trim:**

- 1) VERTICAL SPEED Control -- PRESS** either the **UP** or **DN** button to select aircraft vertical speed within the limits of  $\pm 2000$  ft./min.
- 2) VERTICAL SPEED Control -- RELEASE** when desired vertical speed is displayed. The autopilot will maintain the displayed vertical speed.

**4. ALTITUDE (ALT) HOLD:**

- a. ALT Hold Selector Button -- PRESS.** Note **ALT** hold annunciator **ON**. Autopilot will maintain the selected altitude.

**NOTE**

It is recommended by the FAA (AC00-24B) to use basic "PITCH ATTITUDE HOLD" mode during operation in severe turbulence. However, since this autopilot does not use the attitude gyro as a pitch reference, it is recommended that the autopilot be disconnected and that the airplane be flown by hand in severe turbulence.

b. Change altitudes:

- 1) Using Vertical Speed (Recommended for altitude changes less than 100 ft.)
  - a) **VERTICAL SPEED** Control -- **PRESS** and **HOLD** either the **UP** or **DN** button. Vertical Speed will seek a rate of change of about 500 fpm.
  - b) **VERTICAL SPEED** Control -- **RELEASE** when desired altitude is reached. The autopilot will maintain the desired altitude.

**NOTE**

As an alternative, press either the UP or DN button with a succession of quick momentary presses programming either an increase or decrease in the altitude preference at the rate of 20 feet each time the button is depressed.

5. HEADING HOLD:

- a. Heading Selector Knob -- **SET BUG** to desired heading.
- b. **HDG** Mode Selector Button -- **PRESS**. Note **HDG** mode annunciator **ON**. Autopilot will automatically turn the aircraft to the selected heading.

**NOTE**

Aircraft heading may change in ROL mode due to turbulence.

- c. Heading Selector Knob -- **MOVE BUG** to the desired heading. Autopilot will automatically turn the aircraft to the new selected heading.

6. NAV COUPLING:

- a. **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 PRIOR 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 D-Bar is greater than 2 to 3 dots: the autopilot will annunciate **NAVARM**; 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: the HDG mode will disengage upon selecting NAV mode; the **NAV** annunciator will illuminate and the capture/track sequence will automatically begin.

7. APPROACH (APR) COUPLING: (To enable glideslope coupling on an ILS and more precise tracking on instrument approaches).
- a. **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 position of the bug.

**NOTE**

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode PRIOR 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.

- 1) If the D-Bar is greater than 2 to 3 dots: the autopilot will annunciate **APRARM**; 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: the HDG mode will disengage upon selecting APR mode; the **APR** annunciator will illuminate and the capture/track sequence will automatically begin.

8. BACK COURSE (REV) APPROACH COUPLING (i.e., reverse localizer):
- a. **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 front course inbound.

**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 FRONT COURSE INBOUND 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.

**NOTE**

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode PRIOR to pressing the REV button. The HDG bug must still be positioned to the localizer FRONT COURSE INBOUND heading to provide course datum to the autopilot when using a DG.

- 1) If the D-Bar is greater than 2 to 3 dots: the autopilot will annunciate **REARM**; 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: the HDG mode will disengage upon selecting **REV** mode; the **REV** annunciator will illuminate and the capture/track sequence will automatically begin.

9. GLIDESLOPE COUPLING

- a. **APR** Mode -- **ENGAGED**, Note **GS ARM** annunciated.

**NOTE**

Glideslope coupling is inhibited when operating in NAV or REV modes. With NAV 1 selected to a valid ILS, glideslope ARM and coupling occurs automatically in the APR mode when tracking a localizer.

- b. At Glideslope centering -- note **ARM** annunciator goes out.

**NOTE**

Autopilot can capture glideslope from above or below the beam.

10. MISSED APPROACH

- a. **A/P DISC/TRIM INTER** Switch - **PRESS** to disengage **AP**.
- b. **MISSED APPROACH - EXECUTE**.
- c. **AP** Button -- After aircraft is in trim, **PRESS** for autopilot operation if desired.

**NOTE**

If tracking the ILS course outbound as part of the missed approach procedure is desired, use the NAV mode to prevent inadvertent GS coupling.

11. BEFORE LANDING

- a. **A/P DISC/TRIM INT** Switch -- **PRESS** to disengage AP.

**SECTION 5  
PERFORMANCE**

There is no change to the airplane performance when the KAP140 2-Axis Autopilot is installed.





**Pilot's Operating Handbook and  
FAA Approved Airplane Flight Manual**

**CESSNA MODEL 182S  
AIRPLANES 18280165 AND ON OR  
AS MODIFIED BY MK182-22-01**

**SUPPLEMENT 15**

**BENDIX/KING KAP 140  
2 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 2 Axis Autopilot System is installed.

FAA APPROVAL FAA APPROVED UNDER FAR 21 SUBPART J The Cessna Aircraft Co Delegation Option Manufacturer CE-1 <i>Richard D. Halley</i> Executive Engineer Date: March 27, 1998
---

 Member of GAMA

**1 December 1997**

COPYRIGHT © 1997  
CESSNA AIRCRAFT COMPANY  
WICHITA, KANSAS, USA

182SPHUS-S15-00

S15-1

## SUPPLEMENT 15

### BENDIX/KING KAP 140 2 AXIS AUTOPILOT

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

<u>Revision Level</u>	<u>Date of Issue</u>
0 (Original)	Dec. 1, 1997

### LOG OF EFFECTIVITY

---

Title (S15-1)	Dec 1/97	S15-15	Dec 1/97
S15-2	Dec 1/97	S15-16	Dec 1/97
S15-3	Dec 1/97	S15-17	Dec 1/97
S15-4 (blank)	Dec 1/97	S15-18	Dec 1/97
S15-5	Dec 1/97	S15-19	Dec 1/97
S15-6	Dec 1/97	S15-20	Dec 1/97
S15-7	Dec 1/97	S15-21	Dec 1/97
S15-8	Dec 1/97	S15-22	Dec 1/97
S15-9	Dec 1/97	S15-23	Dec 1/97
S15-10	Dec 1/97	S15-24	Dec 1/97
S15-11	Dec 1/97	S15-25	Dec 1/97
S15-12	Dec 1/97	S15-26	Dec 1/97
S15-13	Dec 1/97	S15-27	Dec 1/97
S15-14	Dec 1/97	S15-28	Dec 1/97

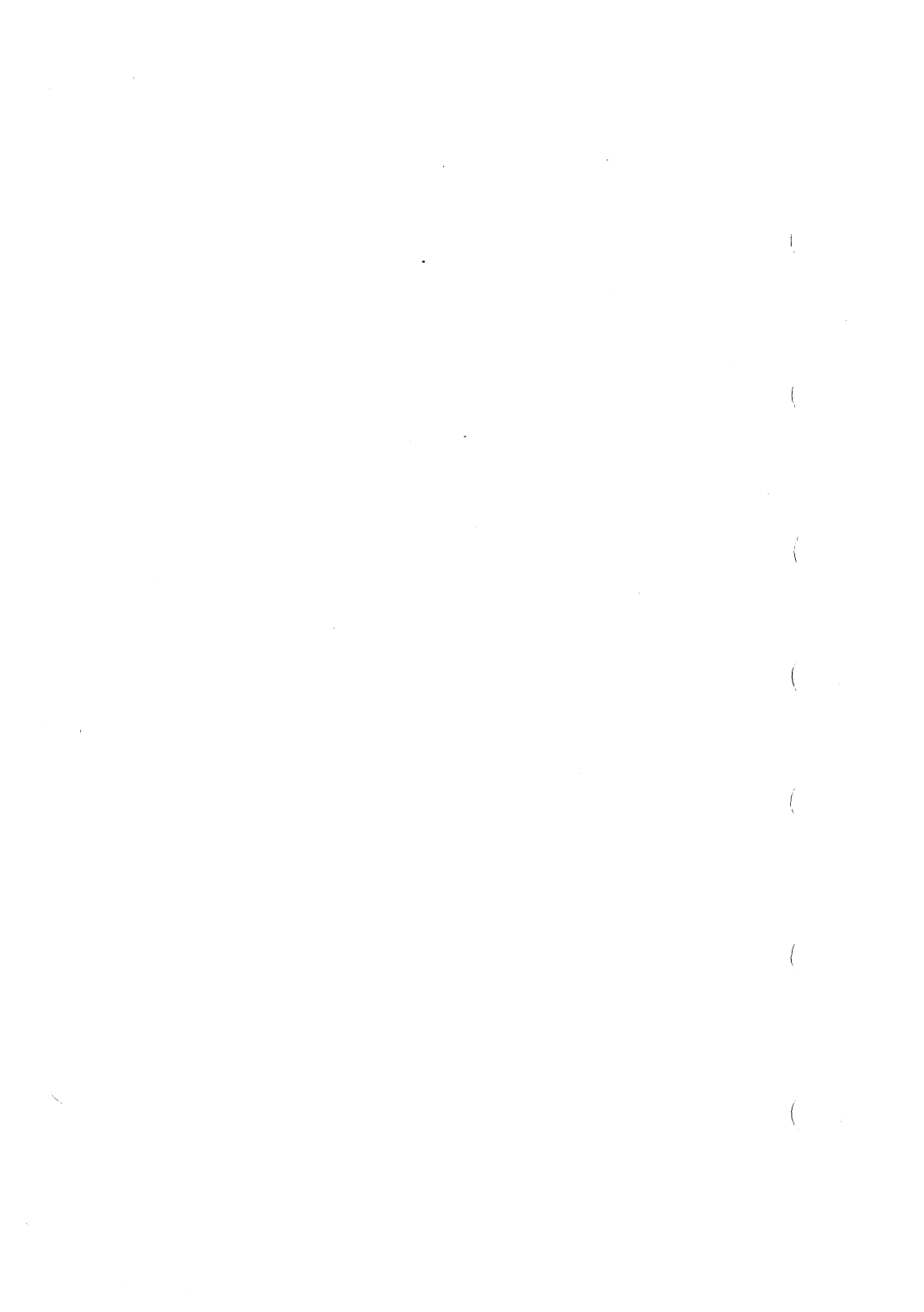
## SUPPLEMENT 15

### BENDIX/KING KAP 140 2 AXIS AUTOPILOT EXCLUDING FLAP LIMITATIONS

#### 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 Unit Effectivity</u>	<u>Revision Incorporation</u>	<u>Incorporated In Airplane</u>
---------------	--------------	--------------------------------------	-----------------------------------	-------------------------------------



# **SUPPLEMENT**

## **BENDIX/KING KAP 140 2 AXIS AUTOPILOT**

### **SECTION 1 GENERAL**

The KAP 140 2 Axis Autopilot provides the pilot with the following features: Vertical Speed mode (VS); Altitude hold (ALT); Wing Level (ROL); Heading select (HDG); Approach (APR); ILS coupling to Localizer (LOC) and Glideslope (GS); and backcourse (REV) modes of operation.

The KAP 140 2 Axis Autopilot has an electric trim system which provides autotrim during autopilot operation and manual electric trim (MET) for the pilot when the autopilot is not engaged. The electric trim system is designed to be fail safe for any single inflight trim malfunction. Trim faults are visually and aurally annunciated.

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

The following conditions will cause the Autopilot to disengage:

- A. Power failure.
- B. Internal Autopilot System failure.

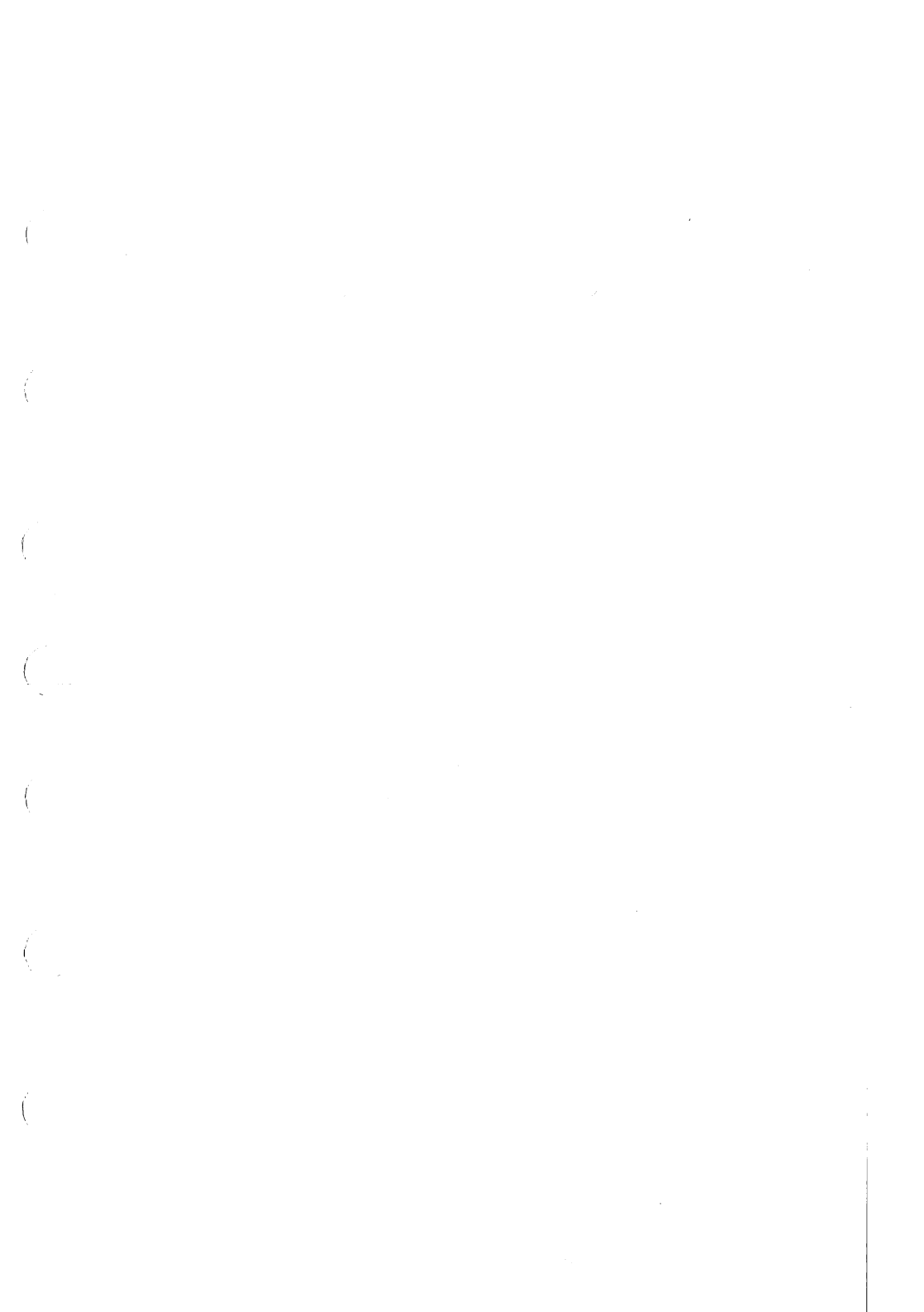
- C. Pitch accelerations in excess of + 1.4g or less than + 0.6g.
- D. Turn coordinator failure (flagged gyro).
- E. Computer autopilot monitor that detects either the R (ROLL) or P (PITCH) axis annunciator.

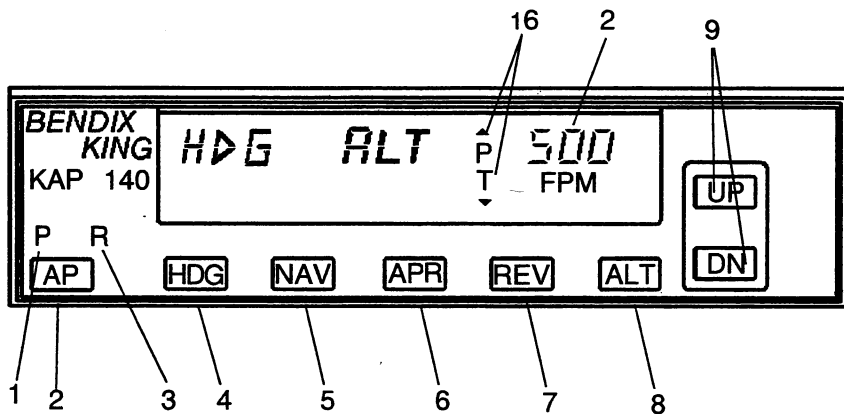
Activation of A/P DISC/TRIM INT control wheel switch will also disconnect the autopilot.

The AVIONICS MASTER switch supplies power to the avionics bus bar of the radio circuit breakers and the autopilot circuit breaker. The AVIONICS MASTER switch also serves as an emergency AP/MET shutoff.

The following circuit breakers are used to protect the KAP 140 2-Axis Autopilot:

<u>LABEL</u>	<u>FUNCTIONS</u>
AUTO PILOT	Pull-off circuit breaker supplies power to the KC 140 Computer and the autopilot pitch, roll and pitch trim servos.
WARN	Supplies separate power for autopilot alerting (PITCH TRIM) on the ship's annunciator panel.





1. PITCH AXIS (P) ANNUNCIATOR -- When illuminated, indicates failure of pitch axis and will either disengage the autopilot or not allow engagement of the pitch axis. In turbulent air, will illuminate during abnormal vertical/accelerations.
2. AUTOPILOT ENGAGE/DISENGAGE (AP) BUTTON -- When pushed, engages autopilot if all preflight self-test conditions are met. The autopilot will engage in the basic roll (ROL) mode which functions as a wing leveler and the pitch axis vertical speed (VS) mode. The commanded vertical speed will be displayed in the upper right corner of autopilot display area. The captured VS will be the vertical speed present at the moment the AP button is pressed. The button may also be used to disengage the autopilot.
3. ROLL AXIS (R) ANNUNCIATOR -- When illuminated, indicates failure of the roll axis and disengages the autopilot.

Figure 1. Bendix/King 2-Axis KAP 140 Autopilot, Operating Controls and Indicators (Sheet 2 of 5)



4. **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. 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.
5. **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 #1 CDI. NAV mode is recommended for enroute navigation tracking.
6. **APPROACH (APR) MODE SELECTOR BUTTON** -- When pushed, will select the Approach mode. This mode provides automatic beam capture and tracking of VOR, GPS, LOC and Glideslope (GS) on an ILS, as selected for presentation on #1 CDI. APR mode tracking sensitivity is recommended for instrument approaches.
7. **BACK COURSE APPROACH (REV) MODE BUTTON** -- This button is active only when the coupled navigation receiver is tuned to a LOC/ILS frequency. When pushed will select the Back Course approach mode. This mode functions identically to the approach mode except that the autopilot response to LOC signals is reversed. Glideslope is locked out with REV mode.
8. **ALTITUDE HOLD (ALT) MODE SELECT BUTTON** -- When pushed, will select the altitude hold mode. This mode provides capture and tracking of the selected altitude. The selected altitude is the airplane altitude at the moment the ALT button is pressed. If the ALT button is pressed with an established VS rate present, there will be about a 10% (of VS rate) overshoot. The airplane will return positively to the selected altitude. This button may be used to engage the autopilot in the ALT mode.

Figure 1. Bendix/King 2-Axis KAP 140 Autopilot, Operating Controls and Indicators (Sheet 3 of 5)

9. VERTICAL SPEED (UP/DN) MODE BUTTONS -- The action of these buttons depends on the vertical mode present when pressed. If VS mode is active (AP plus any lateral mode) and the UP button is pressed, the autopilot will modify the displayed VS command (FPM) in the up direction. Single momentary cycles on either the UP or DN button will increment the VS command by 100 FPM per cycle. When either button is continuously held in, it will modify the vertical speed command by 300 fpm per second.

If ALT mode is active, pressing the UP/DN buttons will modify the captured altitude by 20 feet per cycle, or if held continuously will command the airplane up or down at the rate of 500 FPM, synchronizing the ALT reference to the actual airplane altitude upon button release.

10. AUTO PILOT CIRCUIT BREAKER -- A 5-amp pull-off circuit breaker supplying 28 VDC to the KAP 140 system.

11. WARN C/B -- Power to the autopilot disconnect horn and the ship's annunciator panel (PITCH TRIM).

12. AUTOPILOT DISCONNECT (A/P DISC/TRIM INT) SWITCH -- When depressed will disengage the autopilot and interrupt manual electric trim (MET) power. An autopilot disconnect will be annunciated by a continuous 2 second tone accompanied by a flashing "AP" displayed on the autopilot computer.

13. MANUAL ELECTRIC TRIM (MET) SWITCHES -- When both switches are pressed in the same direction, will activate pitch trim in the selected direction. If only one switch is moved, the trim system will not operate. If only the right half of the MET switch assembly is held, simulating a stuck switch, for 3 seconds, the trim monitoring system will detect a switch failure resulting in a  $\frac{P}{T}$  annunciation on the autopilot display and the disabling of the electric trim system. If the stuck switch is corrected, the fault will clear. Use of manual electric trim during autopilot operation will disengage the autopilot.

Figure 1. Bendix/King 2-Axis KAP 140 Autopilot, Operating Controls and Indicators (Sheet 4 of 5)

14. OMNI BEARING SELECT (OBS) KNOB -- Selects the desired course to be tracked by the autopilot. (Note: The HDG bug must also be positioned to the proper course to capture and track the selected radial or desired track).
15. HEADING SELECT KNOB (HDG) -- Positions the heading 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.
16. PITCH TRIM (PT) Annunciator -- Indicates the direction of required pitch trim. The annunciation will flash if auto trim has not satisfied the request for trim for a period of 10 seconds. A solid  $\begin{matrix} P \\ \uparrow \\ T \end{matrix}$  without an arrowhead is an indication of a pitch trim fault. Refer to the EMERGENCY PROCEDURES for proper response to a pitch trim fault.
17. PITCH TRIM Annunciation -- Illuminates whenever the automated preflight self test detects a pitch trim fault or the continuous monitoring system detects a pitch trim fault in flight. Refer to the EMERGENCY PROCEDURES for proper response to a pitch trim fault.

Figure 1. Bendix/King 2-Axis KAP 140 Autopilot, Operating Controls and Indicators (Sheet 5 of 5)

## SECTION 2 LIMITATIONS

The following autopilot limitations must be adhered to:

1. The entire preflight test procedure outlined under Section 4, paragraph A of this supplement, including steps 1 through 7, must be successfully completed prior to each flight. Use of the autopilot or manual electric trim system is prohibited prior to completion of these tests.
2. During autopilot operation, a pilot with seat belt fastened must be seated at the left pilot position.
3. The autopilot must be OFF during takeoff and landing.
4. The system is approved for Category I operation only (Approach mode selected).
5. Autopilot maximum airspeed limitation -- 160 KIAS.  
Autopilot minimum airspeed limitation -- 80 KIAS.
6. Maximum flap extension -- 10°.
7. Maximum fuel imbalance with autopilot engaged -- 90 lbs.
8. The autopilot must be disengaged below 200 feet AGL during approach operations and below 800 feet AGL for all other phases of flight.
9. Overriding the autopilot to change pitch or roll attitude is prohibited. (Disengage with A/P DISC/TRIM INT or AP select button.)
10. The AUTO PILOT circuit breaker must be pulled following any inflight illumination of the red "PITCH TRIM" warning light, but only after first completing the Emergency Procedures (Section 3, paragraph 1.). The manual electric trim and autopilot autotrim systems will be disabled with the AUTO PILOT circuit breaker pulled.

## SECTION 3 EMERGENCY PROCEDURES

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

1. In case of Autopilot, Autopilot Trim, or Manual Electric Trim malfunction (accomplish Items A and B simultaneously):
  - A. Airplane Control Wheel -- GRASP FIRMLY and regain aircraft control.
  - B. **A/P DISC/TRIM INT** Switch -- PRESS and HOLD throughout recovery.
  - C. AIRCRAFT -- **RE-TRIM** Manually as Needed.
  - D. **AUTO PILOT** Circuit Breaker -- PULL.

### NOTE

The **Avionics Master** Switch may be used as an alternate means of removing all electric power from the autopilot and electric trim systems. If necessary perform steps 1A through 1C above, then turn the **Avionics Master** Switch OFF before locating and pulling the **Autopilot** Circuit Breaker. Turn the **Avionics Master** Switch on as soon as possible to restore power to all other avionics equipment. Primary attitude, airspeed, directional compass, and altitude instruments will remain operational at all times.

### WARNING

**DO NOT ATTEMPT TO RE-ENGAGE THE AUTOPILOT FOLLOWING AN AUTOPILOT, AUTOTRIM, OR MANUAL ELECTRIC TRIM MALFUNCTION UNTIL THE CAUSE FOR THE MALFUNCTION HAS BEEN CORRECTED.**

Maximum Altitude losses due to autopilot malfunction:

CONFIGURATION	ALT. LOSS
Cruise, Climb, Descent	250 ft.
Maneuvering	100 ft.
Approach	50 ft.

### 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.

1. An autopilot or autotrim malfunction occurs when there is an uncommanded deviation in the airplane flight path or when there is abnormal control wheel or trim wheel motion. In some cases, and especially for autopilot trim, there may be little to no airplane motion, yet the red **PITCH TRIM** annunciator (ship's annunciator panel) may illuminate and an alert tone may sound.

The primary concern in reacting to an autopilot or autopilot trim 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/TRIM INT switch throughout the recovery. Manipulate the controls as required to safely maintain operation of the airplane within all of its operating limitations. Elevator trim should be used manually as needed to relieve control forces. **Locate and pull the AUTO PILOT circuit breaker** on the right hand circuit breaker panel to completely disable the autopilot system.

2. A manual electric trim malfunction may be recognized by illumination of the red **PITCH TRIM** annunciator, accompanied by an alert tone, or by unusual trim wheel motions with the autopilot OFF, without pilot actuation of the manual electric trim switches. As with an autopilot malfunction, the first concern following a manual electric trim malfunction is maintaining control of the airplane. Grasp the control wheel firmly and press and hold down the A/P DISC/TRIM INT switch. **Locate and pull the AUTO PILOT circuit breaker** on the right hand breaker panel.

3. Note that the emergency procedure for any malfunction is essentially the same: immediately grasp the control wheel and regain airplane control while pressing and holding the A/P DISC/TRIM INT switch down, and retrim the airplane as needed. After these steps have been accomplished secure the autopilot electric trim system by pulling the autopilot (AUTO PILOT) circuit breaker. As with any other airplane emergency procedure, it is important that the 4 steps of the emergency procedure located on Page 13 be committed to memory.
4. The AVIONICS MASTER switch may be used to remove all electric power from the Autopilot and Electric Trim systems while the circuit breaker is located and pulled. Return the AVIONICS MASTER switch to the ON position as soon as possible. With the AVIONICS MASTER switch off, all avionics and autopilot equipment will be inoperable.
5. It is important that all portions of the autopilot and electric trim 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.

 **WARNING**

**DO NOT RESET AUTOPILOT CIRCUIT BREAKER FOLLOWING AN AUTOPILOT/AUTOTRIM OR MANUAL ELECTRIC TRIM MALFUNCTION UNTIL THE CAUSE FOR THE MALFUNCTION HAS BEEN CORRECTED.**

A flashing  $\frac{P}{T}$  auto trim annunciation on the face of the autopilot indicates a failure of the auto trim function to relieve pitch servo loading in a timely manner. This condition should be temporary.

1. FLASHING  $\frac{P}{T}$  ANNUNCIATION -- **OBSERVE** aircraft pitch behavior. If pitch behavior is satisfactory, wait 5-10 seconds for the annunciation to stop.

2. If annunciation continues, Airplane Control Wheel -- **GRASP FIRMLY**, disengage the autopilot and check for an out of pitch trim condition. Manually retrim as required.
3. **AUTOPILOT OPERATION -- CONTINUE** if satisfied that the out of trim indication was temporary. **DISCONTINUE** if evidence indicates a failure of the auto trim function.

A red **P** or **R** on the face of the autopilot computer.

1. A red **P** is an indication that the pitch axis of the autopilot has been disabled and cannot be engaged. **DO NOT ENGAGE INTO A ROLL AXIS ONLY SYSTEM.**

#### **NOTE**

If the red **P** lamp was the result of some abnormal accelerations on the airplane, the annunciation should be extinguished within approximately one minute and normal use of the autopilot will be reestablished.

2. A red **R** is an indication that the roll axis of the autopilot has been disabled and cannot be engaged. The autopilot cannot be reengaged.

Flashing mode annunciation in the display of the autopilot computer.

1. Flashing **HDG** -- Indicates a failed heading. **PRESS HDG** button to terminate flashing. ROL will be displayed.
2. Flashing **NAV, APR** or **REV** -- Usually an indication of a flagged navigation source. **PRESS** the **NAV, APR** or **REV** button to terminate flashing. ROL will be displayed. (Select a valid navigation source.)

#### **NOTE**

A flashing **NAV, APR** or **REV** annunciation can also be caused by a failed heading valid input.



3. Flashing **GS** -- Indication of a flagged glideslope. (GS will rearm automatically if a valid GS signal is received.)

**NOTE**

To continue tracking the localizer, observe the appropriate minimums for a nonprecision approach. (Press ALT twice in rapid succession to terminate the flashing. Control the pitch axis in the default VS mode.)

**NOTE**

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

**EXCEPTION**

The HDG annunciation will flash for 5 seconds upon selection of NAV, APR, or REV modes to remind the pilot to set the HDG bug for use as course datum.

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 DG (Directional Gyro)-- 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.

## SECTION 4 NORMAL PROCEDURES

### A. PREFLIGHT (PERFORM PRIOR TO EACH FLIGHT):

#### 1. AVIONICS MASTER -- ON.

2. **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" with an increasing number for the sequence steps. Successful completion of self test is identified by all display segments being illuminated (Display Test), external "Pitch Trim" (A/C System Annunciator Panel) being illuminated, and the disconnect tone sounding.

#### NOTE

Upon applying power to the autopilot, the red P warning on the face of the autopilot may illuminate indicating that the pitch axis cannot be engaged. This condition should be temporary, lasting approximately 30 seconds. The P will extinguish and normal operation will be available.

#### WARNING

**IF PITCH TRIM LIGHT STAYS ON, THEN THE AUTOTRIM DID NOT PASS PREFLIGHT TEST. THE AUTOPILOT CIRCUIT BREAKER MUST BE PULLED. MANUAL ELECTRIC TRIM AND AUTOPILOT ARE INOPERATIVE.**

3. **MANUAL ELECTRIC TRIM -- TEST** as follows: Press both halves of the split Manual Electric Trim (MET) switches to the nose down position, verify that the trim wheel and the trim tab position indicator are moving in the down direction. Repeat test for the nose up direction.

Press MET for nose up trim, press and hold the AP DISC/TRIM INT switch, verify that both the trim wheel and indicator are not moving, release the A/P DISC / TRIM INT switch while still holding MET trim up, the trim wheel and indicator should continue to move in the nose up direction.

4. **AUTOPILOT -- ENGAGE** by pressing AP button.
5. **FLIGHT CONTROLS -- MOVE** fore, aft, left and right to verify the autopilot can be overpowered.
6. **A/P DISC/TRIM INT Switch -- PRESS.** Verify that the autopilot disconnects.
7. **TRIM -- SET** to take off position manually.

 **WARNING**

**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.**

 **WARNING**

**DURING ALL AUTOPILOT COUPLED OPERATIONS, THE PILOT IN COMMAND MUST USE PROPER AUTOPILOT COMMANDS AND USE THE PROPER ENGINE POWER TO ENSURE THAT THE AIRPLANE IS MAINTAINED BETWEEN 80 AND 160 KIAS, AND DOES NOT EXCEED OTHER BASIC AIRPLANE OPERATING LIMITATIONS.**

**NOTE**

Autopilot tracking performance will be degraded in turbulence.

1. BEFORE TAKEOFF:

- a. **A/P DISC/TRIM INT** Switch -- **PRESS**.

2. AFTER TAKEOFF:

- a. Elevator Trim -- **VERIFY** or **SET** to place the airplane in a trimmed condition prior to Autopilot engagement.

**NOTE**

Engaging the autopilot into a mistrim condition may cause unwanted attitude changes and a "TRIM FAIL" annunciation.

- b. Airspeed and Rate of Climb -- **STABILIZED**.

**NOTE**

Avoid autopilot engagement into a climb condition that either cannot be maintained, or is on the performance limits of the airplane for its power and weight configuration.

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

 **WARNING**

**WHEN OPERATING AT OR NEAR THE BEST RATE OF CLIMB AIRSPEED, AT CLIMB POWER SETTINGS, AND USING VERTICAL SPEED (VS) MODE, CONTINUED OPERATION IN VERTICAL SPEED MODE CAN RESULT IN AN AIRPLANE STALL. IF NECESSARY, DISCONNECT THE AUTO PILOT AND RETURN THE AIRPLANE TO A STABILIZED CLIMB PRIOR TO RE-ENGAGEMENT.**

 **WARNING**

**WHEN OPERATING AT OR NEAR THE MAXIMUM AUTOPILOT SPEED, IT WILL BE NECESSARY TO REDUCE POWER IN ORDER TO MAINTAIN THE DESIRED RATE OF DESCENT AND NOT EXCEED THE MAXIMUM AUTOPILOT SPEED.**

 **WARNING**

**DO NOT HELP THE AUTOPILOT OR HAND-FLY THE AIRPLANE WITH THE AUTOPILOT ENGAGED AS THE AUTOPILOT WILL RUN THE PITCH TRIM TO OPPOSE CONTROL WHEEL MOVEMENT. A MISTRIM OF THE AIRPLANE, WITH ACCOMPANYING LARGE ELEVATOR CONTROL FORCES, MAY RESULT IF THE PILOT MANIPULATES THE CONTROL WHEEL MANUALLY WHILE THE AUTOPILOT IS ENGAGED.**

3. CLIMB OR DESCENT:

a. Using Vertical Trim:

- 1) **VERTICAL SPEED** Control -- **PRESS** either the **UP** or **DN** button to select aircraft vertical speed within the command limits of  $\pm 2000$  ft./min.
- 2) **VERTICAL SPEED** Control -- **RELEASE** when desired vertical speed is displayed. The autopilot will maintain the displayed vertical speed.

**NOTE**

Avoid selecting a climb rate that either cannot be maintained or is on the performance limit of the airplane for its power and weight configuration.

4. ALTITUDE (**ALT**) HOLD:

- a. **ALT** Hold Selector Button -- **PRESS**. Note **ALT** hold annunciator **ON**. Autopilot will maintain the selected altitude.

**NOTE**

It is recommended by the FAA (AC00-24B) to use basic "PITCH ATTITUDE HOLD" mode during operation in severe turbulence. However, since this autopilot does **not** use the attitude gyro as a pitch reference, it is recommended that the autopilot be disconnected and that the airplane be flown by hand in severe turbulence.

b. Changing altitudes:

1) Using Vertical Speed (Recommended for altitude changes less than 100 ft.)

a) **VERTICAL SPEED** Control -- **PRESS** and **HOLD** either the **UP** or **DN** button. Vertical Speed will seek a rate of change of about 500 fpm.

b) **VERTICAL SPEED** Control -- **RELEASE** when desired altitude is reached. The autopilot will maintain the desired altitude.

**NOTE**

As an alternative, press either the UP or DN button with a succession of quick momentary presses programming either an increase or decrease in the altitude preference at the rate of 20 feet each time the button is depressed.

5. HEADING HOLD:

a. Heading Selector Knob -- **SET BUG** to desired heading.

b. **HDG** Mode Selector Button -- **PRESS**. Note **HDG** mode annunciator **ON**. Autopilot will automatically turn the aircraft to the selected heading.

**NOTE**

Aircraft heading may change in ROL mode due to turbulence.

c. Heading Selector Knob -- **MOVE BUG** to the desired heading. Autopilot will automatically turn the aircraft to the new selected heading.

6. NAV COUPLING:

- a. **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 PRIOR 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 D-Bar is greater than 2 to 3 dots, the autopilot will annunciate **NAVARM**. 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, the HDG mode will disengage upon selecting NAV mode. The **NAV** annunciator will then illuminate and the capture/track sequence will automatically begin.



7. APPROACH (APR) COUPLING: (To enable glideslope coupling on an ILS and more precise tracking on instrument approaches).
- a. **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<sub>ARM</sub>** 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 position of the bug.

**NOTE**

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode PRIOR 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.

- 1) If the D-Bar is greater than 2 to 3 dots: the autopilot will annunciate **APR<sub>ARM</sub>**; 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: 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** 100 KIAS minimum during coupled autopilot approaches (recommended).

8. BACK COURSE (REV) APPROACH COUPLING (i.e., reverse localizer):
- a. **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 front course inbound.

**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 FRONT COURSE INBOUND 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.

**NOTE**

All angle intercepts compatible with radar vectors may be accomplished by selecting ROL mode PRIOR to pressing the REV button. The HDG bug must still be positioned to the localizer FRONT COURSE INBOUND heading to provide course datum to the autopilot when using a DG.

- 1) If the D-Bar is greater than 2 to 3 dots: the autopilot will annunciate **REARM**; 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: 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** 100 KIAS minimum during autopilot coupled approaches (recommended).

## 9. GLIDESLOPE COUPLING

- a. **APR** Mode -- **ENGAGED**, Note **GS<sub>ARM</sub>** annunciated.

### NOTE

Glideslope coupling is inhibited when operating in NAV or REV modes. With NAV 1 selected to a valid ILS, glideslope armed and coupling occurs automatically in the APR mode when tracking a localizer.

- b. At Glideslope centering -- note **ARM** annunciator goes out.

### NOTE

Autopilot can capture glideslope from above or below the beam.

- c. Airspeed -- **MAINTAIN** 100 KIAS minimum during autopilot coupled approaches (recommended).

## 10. MISSED APPROACH

- a. **A/P DISC/TRIM INTER** Switch - **PRESS** to disengage **AP**.

- b. **MISSED APPROACH - EXECUTE**.

- c. If autopilot is desired:

- 1) Elevator Trim -- **VERIFY** or **SET**.
- 2) Airspeed and Rate of Climb -- **STABILIZED**.

### NOTE

Avoid autopilot engagement into a climb condition that either cannot be maintained, or is on the performance limits of the airplane for its power and weight configuration.

- 3) **AP** Button -- **PRESS**. Note **ROL** and **VS** annunciators on. If no other modes are selected the autopilot will operate in the **ROL** and **VS** modes. Verify that the aircraft Vertical Speed Indicator (**VSI**) and the Autopilot **VS** agree.

**NOTE**

If tracking the ILS course outbound as part of the missed approach procedure is desired, use the NAV mode to prevent inadvertent GS coupling.

**11. BEFORE LANDING**

- a. **A/P DISC/TRIM INT** Switch -- **PRESS** to disengage AP.

**SECTION 5  
PERFORMANCE**

There is no change to the airplane performance when the KAP 140 2 Axis Autopilot is installed.