

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

S-Tec System 55X Autopilot w/ Altitude Selector/Alerter

When the S-Tec System Fifty Five X (55X) Autopilot with Altitude Selector / Alerter is installed in the Cirrus Design SR22, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Cirrus Design SR22 Pilot's Operating Handbook. This document must be carried in the airplane at all times. Information in this supplement adds to, supersedes, or deletes information in the basic SR22 Pilot's Operating Handbook.

• Note •

This POH Supplement Revision dated Revision 5: 08-15-07, supersedes and replaces Revision 4 of this supplement dated 07-18-05.

FAA Approved



Date

Aug 15 2007

for Royace H. Prather, Manager
Chicago Aircraft Certification Office, ACE-115C
Federal Aviation Administration

Section 1 - General

This airplane is equipped with an S-TEC System 55X Autopilot. The System 55X autopilot is a two-axis autopilot system. The system consists of a flight guidance programmer/computer, altitude encoder, altitude selector / alerter, turn coordinator, and HSI. Mode selection and vertical speed selection is made on the programmer/computer panel. A button on each control yoke handle may be used to disengage the autopilot. The autopilot makes roll changes through the aileron trim motor and spring cartridge and makes pitch changes for altitude hold through the elevator trim motor. The SR22 installation of the S-Tec System 55X Autopilot features:

- Heading Hold and Command;
- NAV/LOC/GPS/GS tracking, high and low sensitivity, and automatic 45° course intercept;
- GPS Steering (GPSS);
- Altitude Pre-select, Hold and Command, Altitude display, and baro correction;
- Altitude and Decision Height (DH) alert; and
- Vertical Speed Hold and Command.

Refer to S-Tec System Fifty-Five X Autopilot Pilot's Operating Handbook (POH) Serials 0002 thru 0434; P/N 87109 dated 8 November 2000 or later OR Serials 0435 and subsequent; P/N 87247 original release or later, for full operational procedures and description of implemented modes. The System 55X POH also contains detailed procedures for accomplishing GPS & VOR course tracking, front course and back course localizer approaches, and glideslope tracking.

Refer to S-Tec Altitude Selector / Alerter Pilot's Operating Handbook (POH) P/N 8716 or P/N 87110 (original issue or later) for full operational procedures and detailed description of operational modes of the Altitude Selector / Alerter.

• Note •

The SR22 implementation of the System 55X Autopilot does not utilize the optional remote annunciator, roll servo, and optional trim servo. Therefore, all references to these items in the S-Tec System 55X POH shall be disregarded. Additionally,

this installation does not utilize a CWS (Control Wheel Steering) switch or an AUTOPILOT MASTER switch.

• Note •

This installation utilizes the airplane's roll trim actuator to affect steering changes. Therefore, the automatic trim function of the System 55X is not implemented. Disregard all references in the S-Tec System 55X POH to this feature.

Roll information is displayed on the HSI. Autopilot Flight Director is not implemented in this installation.

Section 2 - Limitations

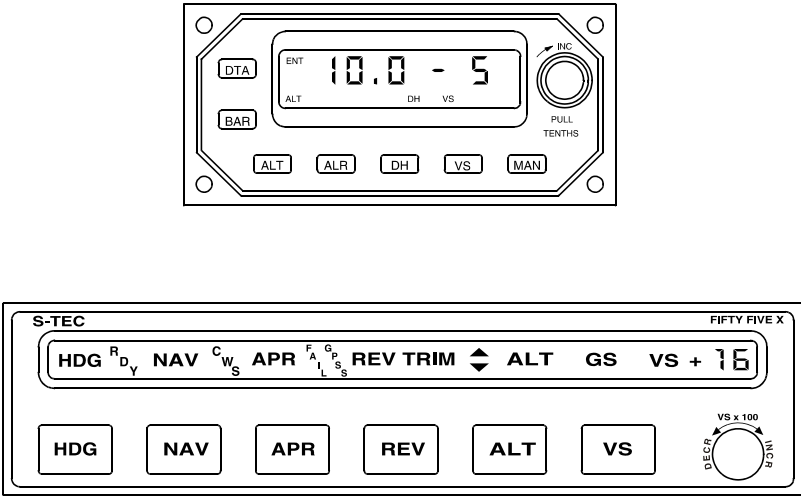
1. Autopilot operation is prohibited above 185 KIAS.
2. The autopilot must not be engaged for takeoff or landing.
3. The autopilot must be disengaged for missed approach, go-around, and bailed landing.
4. Flaps must be set to 50% for autopilot operation in Altitude Hold at airspeeds below 95 KIAS.
5. Flap deflection is limited to 50% during autopilot operations.
6. The autopilot must be disconnected in moderate or severe turbulence.
7. Minimum engage height for the autopilot is 400 ft AGL.

• **WARNING** •

Autopilot may not be able to maintain all selectable vertical speeds. Selecting a vertical speed that exceeds the aircraft's available performance may cause the aircraft to stall.

8. Minimum speed with the autopilot engaged is $1.2V_s$ for the given configuration.
9. For VOR/GPS and ILS glideslope and localizer intercept, capture, and tracking, the following limitations apply:
 - a. The autopilot must be disengaged no later than 100 feet below the Minimum Descent Altitude.

- b. The autopilot must be disconnect during approach if course deviation exceeds 50%. The approach should only be continued by “hand-flying” the airplane.
 - c. The autopilot must be disengaged at the Decision Height.
 - d. 12 knot maximum crosswind component between the missed approach point and outer marker.
 - e. The intercept of the localizer shall occur at least 5 miles outside of the outer marker.
 - f. If the crosswind component is greater than 12 knots and less than 17 knots, the intercept shall occur at least 10 miles outside of the outer marker.
 - g. The intercept angle shall be no greater than a 45-degree intercept.
 - h. The ILS is flown at normal approach speeds, and within any STC or TC speed constraints and as defined in this flight manual.
 - i. The flaps should be extended in the approach configuration prior to the Outer Marker. No further changes in the flap configuration should be made throughout the autopilot-coupled approach.
 - j. The glideslope is approached in such a manner to allow automatic arming of the glideslope, or if the glideslope is manually armed no more than 15% above the glideslope.
10. The S-TEC System Fifty Five X Pilot's Operating Handbook, *Serials 0002 thru 0434*; P/N 87109 dated 8 November 2000 or later OR *Serials 0435 and subsequent*; P/N 87247 original release or later, must be carried in the airplane and available to the pilot while in flight.



SR22_FM09_1502A

Figure - 1
System 55X Altitude Selector/Alerter & Autopilot Computer
P/N 13772-108
Revision 5: 08-15-07

Section 3 - Emergency Procedures

Autopilot Malfunction

Refer to *Electric Trim/Autopilot Failure* procedure in the SR22 POH. Do not reengage the autopilot until the malfunction has been identified and corrected. The autopilot may be disconnected by:

1. Pressing the A/P DISC/Trim switch on the control yoke handle.
2. Pulling the AUTOPILOT circuit breaker on Essential Bus.

Altitude lost during a roll or pitch axis autopilot malfunction and recovery:

Flight Phase	Bank Angle	Altitude Loss
Climb	40°	200 ft
Cruise	45°	300 ft
Descent	40°	350 ft
Maneuvering	10°	60 ft
Approach	10°	80 ft

System Failure and Caution Annunciations

If any of the following failure annunciations occur at low altitude or during an actual instrument approach, disengage the autopilot, execute a go-around or missed approach as appropriate. Inform ATC of problem. Do not try to troubleshoot until a safe altitude and maneuvering area are reached or a safe landing is completed.

Annunciation	Condition	Action
Flashing RDY for 5 seconds with audible tone.	Autopilot disconnect. All annunciations except RDY are cleared.	None.
Flashing RDY with audible tone then goes out.	Turn coordinator gyro speed low. Autopilot disengages and cannot be re-engaged.	Check power to turn coordinator.
Flashing NAV, REV, or APR.	Off navigation course by 50% needle deviation or more.	Use HDG mode until problem is identified. Crosscheck raw NAV data, compass heading, and radio operation.
Flashing NAV, REV, or APR with steady FAIL	Invalid radio navigation signal.	Check Nav radio for proper reception. Use HDG mode until problem is corrected.
Flashing VS	Excessive vertical speed error over selected vertical speed. Usually occurs in climb.	Reduce VS command and/or adjust power as appropriate.
Flashing GS	Off glideslope centerline by 50% needle deviation or more.	Check attitude and power. Adjust power as appropriate.
Flashing GS with steady FAIL	Invalid glideslope radio navigation signal.	Disconnect autopilot and initiate go-around or missed approach procedure. Inform ATC.
Flashing GS plus ALT.	Manual glideslope disabled.	Re-enable by pressing NAV mode button.

Section 4 - Normal Procedures

Refer to Section 7 – Systems Description for a description of the autopilot and altitude selector and their respective modes.

The Autopilot is integrated with the Altitude Selector/Alerter and can be operated with or without data inputs from the Altitude Selector/Alerter. The autopilot ALT and VS modes are coupled to the Altitude Selector/Alerter ALT and VS outputs by pressing and holding the Autopilot Programmer/Computer VS button and then pressing the ALT button. Altitude Selector Vertical Speed output can be individually coupled to the autopilot through the autopilot VS mode by pressing the autopilot VS button.

• WARNING •

The pilot must properly monitor and control the engine power to avoid stalling the airplane in autopilot altitude hold or vertical speed modes.

• Note •

Any coupled Altitude Selector / Alerter mode can be disabled by disconnecting the autopilot.

Autopilot and Altitude Selector Pre-Flight Tests

1. Battery Master Switch ON
2. Transponder ON
3. Avionics Power Switch ON

Note that all autopilot annunciators, except CWS, and TRIM illuminate. After about 5 seconds, all lights will go out. When the turn coordinator gyro has reached operational RPM, the RDY annunciator will come on.

4. Altitude Selector Tests:
 - a. Altimeter Set Field Elevation.
 - b. Self-Test – On power up, all annunciators come on for approximately 5 seconds and then sounds an audio tone. After the self-test is complete, press the DTA and then BAR buttons on the altitude selector.

- c. Rotate altitude selector input knob to set BARO to the nearest 0.1 inch Hg.
- d. Push ALT button to display ALT SEL. With a flashing SEL annunciator, rotate the selector knob to input an altitude 300 to 400 feet lower or higher than the indicated altitude.
- e. Push the VS button. Rotate the selector input knob to input the desired climb (+) or descent (-) vertical speed.
- f. Push ALT button, ALT SEL annunciator will illuminate.
- g. Engage autopilot HDG mode.
- h. Press and hold the VS button and then press the ALT button. Autopilot VS and ALT annunciators will illuminate.
- i. Rotate altitude selector knob to change selected altitude to match field elevation. VS annunciator on autopilot programmer should go out when the ALT SEL setting on the altitude selector is within 100 feet of indicated altitude on altimeter. Autopilot ALT mode should remain illuminated, indicating autopilot altitude hold is engaged. If ALT engagement does not occur within 100 feet of indicated altitude, readjust BARO setting on altitude selector.

5. Autopilot Tests

- a. Heading Mode TEST
 - 1.) Center the HDG bug under the lubber line on the HSI.
 - 2.) Momentarily press HDG button on autopilot Mode Selector. Note that HDG light illuminates.
 - 3.) Then rotate HDG knob on the HSI to the left then right. Note that control yokes follow movement of knob. Then return HDG bug to lubber line.
- b. Vertical Speed TEST
 - 1.) Press VS button on autopilot programmer/computer. Note that VS light illuminates VS+0.
 - 2.) Rotate the VS control knob to 500 FPM up (+5). After a short delay, the control yoke will move aft.
 - 3.) Rotate the VS control knob to 500 FPM down (-5). After a short delay, the control yoke will move forward.

- c. Altitude HoldTEST
 - 1.) Depress ALT button on autopilot programmer/computer. Note that ALT annunciator comes on, VS annunciator goes out, and yoke does not move.
- d. Overpower Test:
 - 1.) Grasp control yoke and input left aileron, right aileron, nose up, and nose down to overpower autopilot. Overpower action should be smooth in each direction with no noise or jerky feel.
- e. Radio Check:
 - 1.) Turn on NAV1 radio, with a valid NAV signal, and select VLOC for display on the HSI.
 - 2.) Use autopilot programmer/computer to engage NAV mode and move OBS so that VOR deviation needle moves left or right. Note that control yokes follow direction of needle movement.
- f. Autopilot Disconnect Tests:
 - 1.) Press Pilot A/P DISC/Trim Switch (control yoke). Note that the autopilot disengages. Move control yoke to confirm that pitch and roll control is free with no control restriction or binding.
 - 2.) Repeat step using Copilot A/P DISC/Trim Switch.

In-Flight Procedures

- 1. Autopilot RDY LightCHECK ON
- 2. Trim airplane for existing flight conditions.
- 3. Engage desired mode by pressing mode selector button on autopilot programmer/computer.

Heading Mode

- 1. Begin by selecting a heading on HSI within 10° of the current airplane heading.
- 2. Press HDG button on autopilot programmer/computer. The HDG annunciator will illuminate and the airplane will turn to the selected heading.

3. Use HSI HDG bug to make heading changes as desired.

Autopilot Altitude Hold Mode

1. Manually fly the airplane to the desired altitude and level off.

• Note •

For smoothest transition to altitude hold, the airplane rate of climb or descent should be less than 100 FPM when Altitude Hold is selected.

2. Press HDG or NAV to engage a roll mode. The associated annunciator will illuminate.

• Note •

A roll mode must be engaged prior to engaging a pitch mode.

3. Press the ALT button on the autopilot programmer/computer. The ALT annunciator will illuminate indicating that the mode is engaged and the autopilot will hold the present altitude.

• Note •

Manually flying the airplane off the selected altitude will not disengage altitude hold and the autopilot will command a pitch change to recapture the altitude when the control input is released.

4. Altitude can be synchronized to another altitude by rotating the VS knob on the programmer/computer. Clockwise rotation will increase and counterclockwise rotation will decrease altitude 20 feet for each 'click.' The maximum adjustment is ± 360 feet. Adjustments greater than 360 feet can be made by selecting VS mode and flying the airplane to the new altitude and then re-engaging ALT mode.

Autopilot Vertical Speed Mode

1. Begin by manually establishing the desired vertical speed.
2. Press HDG or NAV to engage a roll mode. The associated annunciator will illuminate.

• Note •

A roll mode must be engaged prior to engaging a pitch mode.

3. Press the VS button on the autopilot programmer/computer to engage the vertical speed mode. When the mode is engaged, the autopilot will synchronize to and hold the vertical speed at the time the mode was engaged.

• Note •

The vertical speed is displayed in 100-foot increments at the far right of the programmer/computer window next to the VS annunciation. A plus (+) value indicates climb and a negative or minus (-) value indicates descent.

4. Vertical speed can be adjusted by rotating the VS knob on the programmer/computer. Clockwise rotation increases and counterclockwise rotation decreases rate of climb (or descent) 100 FPM for each 'click.' The maximum adjustment is ± 1600 FPM.

• Note •

A flashing VS mode annunciator indicates excessive error between actual vertical speed and the selected vertical speed (usually in climb). The pilot should adjust power or reduce the commanded vertical speed as appropriate to remove the error.

Altitude Pre-Select

The altitude selector may be used to set up an altitude and vertical speed for intercept and capture. The altitude can be above or below the current altitude and the vertical speed chosen should be appropriate (climb or descent) for the altitude. Once selected, the altitude and vertical speed can be coupled to the autopilot by pressing and holding the VS button and then pressing the ALT button.

1. Press altitude selector DTA button to enter the data entry (ENT) mode.
2. Press altitude selector BARO button and adjust baro setting as necessary.
3. Press the ALT button to enter altitude select mode. The SEL annunciator will flash. Use the altitude selector knob to input the desired altitude in thousands of feet; for example, 5500 feet is entered as 5.5 and 10,500 is entered as 10.5.

4. Press DTA again to accept altitude entry, the ENT annunciator will go out and the SEL annunciator will stop flashing and illuminate steady indicating that the system is in the 'operate' mode.

• Note •

When the system is in the 'operate' mode, pressing the ALT button will cause the system to extinguish the SEL annunciator and display the baro corrected encoded altitude. Pressing the ALT button again will return the display to the selected altitude and the SEL annunciator will come on again.

5. Press altitude selector VS button and use altitude selector knob to input the desired vertical speed in 100 FPM increments. Turn the knob clockwise to increase vertical speed and CCW to decrease vertical speed. Positive (+) vertical speed indicates climb and negative (-) vertical speeds indicates descent. Any vertical speed from ± 1 (100 FPM) to ± 16 (1600 FPM) is selectable.

• Note •

If an altitude is selected that requires an opposite vertical speed from that selected, the system will automatically select the correct sign ('+' for climb, '-' for descent) and a vertical speed of 500 FPM.

6. After takeoff, press the VS button and then press and hold the ALT button to engage the autopilot VS mode and arm the autopilot altitude hold mode to capture and hold the selected altitude. If the ALR button is pressed, the system will provide alarms at 1000 feet and 300 feet from the selected altitude. As the airplane's altitude nears the selected altitude, the system automatically reduces vertical speed command in 100 FPM increments to provide a 300 FPM vertical speed at altitude capture. The system will make a smooth transition to the selected altitude and hold the selected altitude.

BARO Selection

Upon initial start-up, the altitude selector enters BARO select immediately after the self-test if it is receiving a valid altitude signal. The setting can easily be entered at this time. At other times, it is necessary to select the DTA entry and BARO modes in order to adjust the BARO setting. After initial start-up, the Baro setting can be changed at any time using the following procedure:

1. Press DTA button on altitude selector to enter the data entry mode. ENT will be annunciated.
2. Press BAR button to display the BARO setting. Repeated presses of the BAR button will toggle the display between millibars and inches Hg.

• Note •

The BARO setting can also be displayed by pressing the ALT button while in the 'operate mode' (i.e. SEL annunciator illuminated).

3. Rotate the selector knob (CW to increase setting or CCW to decrease setting). Only three digits are displayed for millibars: for a BARO setting of 952.8 mb, the display will indicate 952; and for a BARO setting of 1003.8 mb, the display will read 003. For inches Hg, the 1/100 decimal position will not be selectable or displayed; for example, a 29.92 inch Hg setting is input and displayed as 29.9.
4. Press DTA again to accept the entry.

Set Decision Height (DH)

1. Press altitude selector DTA button to enter the data entry (ENT) mode.
2. Press DH button to enter decision height with the display reading 0.0. Use the altitude selector knob to set the desired decision height to the nearest 100 ft above the desired decision height. For example, for a DH of 1160 feet, set 1200 feet.
3. Press altitude DTA button again to enter the selected DH. The display will show the selected decision height for approximately 5 seconds and then revert to ALT mode and display the altitude. The DH annunciator will remain illuminated indicating a decision height

is set. As the airplane approaches within approximately 50 feet of the decision height, the alert will sound and the DH light will flash. As the airplane passes through approximately 50 feet beyond the decision height, the alert will sound and the light will flash again.

• Note •

Pressing the DH button again will disable the DH function causing the DH annunciation to go out. Repeated activation of the DH button alternately activates and deactivates the DH mode.

Set Altitude Alert (ALR)

1. Press altitude selector ALR button to arm alert mode. The ALR annunciator will come on. Upon entering within 1000 feet of the altitude selected in ALT SEL, the altitude alert chime will sound in the cabin speaker and headphones and the ALR annunciator will flash. The chime will sound and the ALR annunciator will flash again as the airplane approaches within 300 feet of the selected altitude. If the airplane's altitude deviates ± 300 feet from the selected altitude, the chime will sound and the ALR annunciator will flash to indicate the condition.
2. To disable ALR, press the altitude selector ALR button again. The ALR annunciator will go out.

GPS Tracking and GPS Approach

1. Begin with a reliable GPS signal selected on the NAV receiver.
2. Select desired course on HSI and establish a desired intercept heading.
3. Press the NAV button on the autopilot programmer/computer twice. The NAV and GPSS mode annunciators will illuminate.

• Note •

If the course needle is at full-scale deviation, the autopilot will establish the airplane on a heading for a 45° intercept with the selected course. As the airplane approaches the course, the autopilot will smoothly shallow the intercept angle. The pilot may select an intercept angle less than the standard 45° by setting the desired intercept heading with the HSI HDG bug, pressing and holding HDG, and then pressing NAV once to

intercept course in NAV mode or twice to intercept course in GPSS mode on the autopilot programmer/computer. When the on-course intercept turn begins the HDG mode will disengage and the annunciator will go out.

During the intercept sequence, the autopilot operates at maximum gain and sensitivity (90% of standard rate turn). When the selected course is intercepted, course deviation needle centered, the course-tracking program is activated. The system will remain at maximum sensitivity for approximately 15 seconds while the wind correction angle is established. The maximum turn rate is then reduced to 45% standard rate. Approximately 60 seconds later, the maximum turn rate is reduced to 15% standard rate.

4. For increased sensitivity during GPS approach or if desired for enroute tracking, press the APR button on the autopilot programmer/computer. The NAV, GPSS, and APR annunciators will be illuminated. Use HDG to accomplish a procedure turn. Engage GPSS again to complete the approach.

VOR Tracking and VOR-LOC Approach

1. Begin with a reliable VOR or VOR-LOC signal selected on the NAV receiver.
2. Select desired course on HSI and establish a desired intercept heading.
3. Press the NAV button on the autopilot programmer/computer. The NAV mode will illuminate. Course interception and tracking will be as described under GPS Tracking and GPS Approach above.
4. For station passage, set HDG bug to within 5° of selected course.

• Note •

If the HDG bug is within 5° of center and the course deviation is less than 10%, the autopilot will immediately establish the lowest level of sensitivity and limit the turn rate to a maximum of 15% of a standard rate turn.

5. For increased sensitivity during approach or if desired for enroute tracking, press the APR button on the autopilot programmer/computer. Both NAV and APR annunciators will be illuminated.

Glideslope Intercept and Tracking

1. Begin with a reliable ILS signal selected on the NAV receiver.
2. Select autopilot NAV and APR. Airplane must be within 50% needle deviation of localizer centerline.
3. Select ALT mode. Airplane must be 60% or more below the glideslope centerline during the approach to the intercept point. If the above conditions have existed for 10 seconds, GS mode will arm, the GS annunciator will come on and the ALT annunciator will remain illuminated. When glideslope intercept occurs, the ALT annunciator will go out and the system will track the glideslope.

• Note •

If approach vectoring locates the airplane too near the glideslope at the intercept point (usually the outer marker), the GS mode can be manually armed by pressing the ALT button once. Once capture is achieved, GS annunciator will come on and ALT annunciator will go out.

Section 5 - Performance

There is no change to the airplane performance when the S-Tec System 55X autopilot is installed.

Section 6 - Weight & Balance

There is no change to the airplane weight & balance when the S-Tec System 55X autopilot is installed.

Section 7 - Systems Description

Autopilot

The airplane is equipped with an S-Tec System 55X two-axis Automatic Flight Control System (Autopilot). The autopilot programmer/computer is installed in the center console radio stack.

The autopilot roll axis uses an inclined gyro in the turn coordinator case as the primary turn and roll rate sensor. In addition to the turn coordinator instrument, the roll axis computer receives signals from the HSI and the #1 NAV/GPS radio. The roll computer computes roll steering commands for turns, radio intercepts, and tracking. Roll axis

steering is accomplished by autopilot steering commands to the aileron trim motor and spring cartridge.

The pitch computer receives altitude data from the altitude encoder pressure transducer plumbed into the static system, an accelerometer, and glideslope information from the HSI and #1 NAV radio. Pitch axis command for altitude hold, vertical speed hold, and glideslope tracking is accomplished by pitch computer commands to the autopilot pitch servo.

The altitude selector provides altitude and vertical speed pre-select capability for the autopilot. A pre-programmed altitude and vertical speed can be input into the altitude selector/alerter and then coupled to the autopilot. The autopilot will then follow the selected vertical speed until the selected altitude is reached. Then the altitude selector will signal the autopilot to hold the selected altitude. The altitude selector/alerter receives uncorrected altitude data from the same altitude encoder used by the transponder. In addition to the preselect functions, the altitude selector provides altitude alert, decision height, and altitude readout.

28 VDC for autopilot and altitude selector/alerter is supplied through the 5-amp AUTOPILOT circuit breaker on the Essential Bus.

All Autopilot mode selection is performed by using the mode select buttons and VS knob on the autopilot programmer/computer in the center console. Annunciators in the programmer/computer display window annunciate modes. *Refer to Figure 1* for an illustration of the programmer/computer.

RDY (Ready)– Illuminates when autopilot is ready for engagement. When the airplane's Battery Master switch is turned on and the rate gyro RPM is correct, the RDY annunciator will come on indicating the autopilot is ready for the functional check and operation. The autopilot cannot be engaged unless the RDY light is illuminated.

HDG (Heading) Mode – When HDG is selected, the autopilot will engage the HDG mode, fly the airplane to, and hold the heading set on the HSI. Subsequent heading changes are made using the HDG knob on the HSI. For smoothest transition to HDG mode, it is recommended that the airplane be aligned to within 10° of the selected heading before engaging HDG. The HDG mode is also used in combination with the NAV mode to set up a pilot selected intercept angle to a course.

GPSS (GPS Steering) – Pressing NAV twice will cause the autopilot to go to GPSS for smoother tracking and transitions. When GPSS is selected, the autopilot can be switched between heading and GPSS modes of operation. In the heading mode, the converter receives a heading error signal from the heading bug on the Horizontal Situation Indicator. GPSS converts this information and sends this heading error directly to the autopilot.

In the GPSS mode, the converter receives ground speed and bank angle digital signals that are calculated and converted to a commanded turn rate. The turn rate is then scaled and converted to a DC heading error signal that is compatible with the autopilot. The end result is an autopilot that can be directly coupled to the roll steering commands produced by the GPS Navigator, eliminating the need for the pilot to make any further adjustments to the HSI course arrow.

REV (Reverse Course) – When REV is selected, the autopilot will automatically execute high sensitivity gain for an approach where tracking the front course outbound or tracking the back course inbound is required. The APR and REV annunciators will illuminate when REV is selected.

APR (Approach) – When APR is selected, the autopilot provides increased sensitivity for VOR or GPS approaches. APR may also be used to provide increased sensitivity for enroute course tracking.

GS (Glideslope) – The autopilot GS function will capture and track an ILS glideslope. To arm the GS function, the following conditions must be met: (1) the NAV receiver must be tuned to the appropriate ILS frequency; (2) The glideslope signal must be valid – no flag; (3) the autopilot must be in NAV/APR/ALT modes; and (4) the airplane must be 60% or more below the glideslope centerline during the approach to the intercept point, and within 50% needle deviation of the localizer centerline at the point of intercept – usually the outer marker. When the above conditions have existed for 10 seconds, the GS annunciator will illuminate indicating GS arming has occurred (ALT annunciator will remain on). When the glideslope is intercepted and captured, the ALT annunciator will go out.

ALT (Altitude Hold), Mode – When ALT is selected, the autopilot will hold the altitude at the time the mode was selected. Altitude hold will not engage if an autopilot roll mode is not engaged. Altitude correction for enroute barometric pressure changes may be made by rotation of the VS knob on the autopilot programmer/computer. Clockwise rotation will increase and counterclockwise rotation will decrease altitude 20 feet for each 'click.' The maximum adjustment is ± 360 feet. Adjustments greater than 360 feet can be made by selecting VS mode and flying the airplane to the new altitude and then re-engaging ALT mode.

VS (Vertical Speed) Mode – When VS is selected, the autopilot will synchronize to and hold the vertical speed at the time the mode was selected. Altitude hold will not engage if an autopilot roll mode is not engaged. The vertical speed is displayed in 100-foot increments at the far right of the programmer/computer window next to the VS annunciation. A plus (+) value indicates climb and a negative or minus (-) value indicates descent. Vertical speed can be adjusted by rotating the VS knob on the programmer/computer. Clockwise rotation increases and counterclockwise rotation decreases rate of climb (or descent) 100 FPM for each 'click.' The maximum adjustment is ± 1600 FPM.

Altitude Selector / Alerter

The altitude selector / alerter provides the autopilot with an altitude preselect function, a programmable vertical speed function, as well as provides altitude alert, decision height alert, and baro corrected altitude display. The altitude selector reads and decodes altitude information from the same altitude encoder that provides altitude information to the transponder. The decoded altitude is baro corrected and then compared to the selected altitude setting. When the decoded and baro corrected altitude matches the selected altitude, the altitude selector signals the autopilot to engage the ALT hold mode. The altitude select (ALT SEL) function is operable only when the transponder and encoder are operating and then both the autopilot ALT and VS modes are selected.

The altitude selector also provides a vertical speed signal to the autopilot pitch computer that is proportional to the amplitude and direction of the selected or computed vertical speed. This signal is not used by the autopilot until the autopilot VS mode is engaged. When VS is engaged, the autopilot compares the selected vertical speed signal with the existing vertical speed derived from the autopilot's altitude transducer and maneuvers the airplane to attain the selected vertical speed. The Vertical Speed (VS) select portion of the altitude selector / alerter is showing a selected vertical speed (VS annunciator on) and the autopilot Vertical speed (VS) mode is engaged.

The altitude selector / alerter also provides Decision Height (DH) and Altitude Alert (ALR) selection. All selector function selection is made through the altitude selector/alerter. Available functions are as follows:

DTA (Data) – The data entry button is used to select data entry mode. The first time the DTA button is pressed the selector will enter the data entry mode, the ENT annunciator will come on, and the SEL annunciator will flash to indicate the system is ready to accept an altitude entry. To change baro (BAR) correction, Decision Height (DH), or Vertical Speed (VS), press the appropriate button on the selector and rotate the input knob at the right of the display CW to increase the displayed numbers and CCW to decrease the displayed numbers. Pull the knob out and rotate as required to change the decimal numbers.

When the system is in the ENT mode, it is not coupled to the autopilot. In this mode, the autopilot will hold the last vertical speed selected.

• Note •

It is not necessary to enter the DTA mode to change the vertical speed, if vertical speed is coupled to the autopilot. If this is the case, vertical speed changes can be made by rotating the input knob as required to obtain the new vertical speed.

While in this mode, pressing DTA a second time will toggle the system to 'operate' mode. Repeatedly pressing the DTA button will toggle the system between ENT and 'operate' mode.

BAR (baro) – In this mode, the baro setting used by the altitude selector may be changed. When the Altitude Selector / Alerter is initially powered, the BARO mode is displayed automatically at the completion of the self-test. At other times, it is necessary to enter the data entry mode by pressing the DTA button and then inputting a new baro correction. Pressing the DTA button a second time will return the system to the 'operate' mode.

ALT (Altitude) – The ALT button has two functions: Altitude Pre-select and Altitude readout.

Pre-select - When the ALT button is pressed while the system is in the Data Entry (DTA) mode the SEL annunciator will flash and a new altitude can be selected by rotating the input knob CW to increase altitude and CCW to decrease altitude in thousands of feet. Pull the knob to input altitude in hundreds of feet. For example: 5500 feet is input as 5.5. Pressing DTA again will return the system to 'operate' mode and the SEL annunciator will stop flashing with the ALT annunciator remaining on. When a preselect altitude is coupled to the autopilot by pressing and holding the VS button and then pressing the ALT button, the airplane will fly at the selected vertical speed until the selected altitude is intercepted. At that time the altitude selector will command the autopilot to engage altitude hold.

Readout – When the ALT button is pressed in the 'operate' mode, the SEL annunciator will go out and the display will show the baro corrected encoder altitude. Repeated pushes of the ALT button will alternately display baro corrected encoder altitude and pre-selected altitude.

ALR (Alert Mode) – The ALR button enables the altitude alert system in conjunction with the ALT SEL mode. Pressing the ALR switch illuminates the ALR annunciator indicating arming of the alert mode. Upon entering within 1000 feet of the altitude selected in ALT SEL, the altitude alert chime will sound in the cabin speaker and headphones and the ALR annunciator will flash. The chime will sound and the ALR annunciator will flash again as the airplane approaches within 300 feet of the selected altitude. If the airplane's altitude deviates ± 300 feet from the selected altitude, the chime will sound and the ALR annunciator will flash to indicate the condition. The ALR function can be alternately enabled and disabled by repeatedly pressing the ALR button.

DH (Decision Height) – The DH button allows entry and arming of altitude alerting at a set decision height. To set a DH, first enter the data (DTA) entry (ENT) mode, press the DH button, and rotate the selector knob to input the desired decision height to the nearest 100 feet above the specified decision height. For example, for a DH of 1160 feet set 1.2 (1200 feet). After setting the desired decision height, press the DTA button again to accept the entered DH. The display will show the selected DH for approximately 5 seconds and then revert to Alt mode until the selected DH is reached during descent. The DH annunciator will remain illuminated indicating a decision height is set. As the airplane approaches within approximately 50 feet of the decision height, the alert will sound and the DH light will flash. As the airplane passes through approximately 50 feet beyond the decision height, the alert will sound and the light will flash again. Pressing the DH button again will disable the DH function causing the DH annunciation to go out. Repeated activation of the DH button alternately activates and deactivates the DH mode.

VS (Vertical Speed) – At initial start up, after self-test, pressing the Altitude Selector / Alerter VS button enables vertical speed selector mode. The initial vertical speed will be set at + 2 indicating a climb at 200 feet per minute. Rotating the selector input knob will change the selected vertical speed in 100 FPM increments. Rotate CW to increase vertical speed or CCW to Decrease vertical speed. The maximum vertical speed is ± 1600 FPM (± 16). Zero vertical speed is not selectable.

The vertical speed display is the only Altitude Selector / Alerter function available in the 'operate' mode. Therefore, vertical speed changes can be commanded by rotating the selector input knob. Vertical speeds can also be entered in the data (DTA) entry (ENT) mode by pressing the VS button and using the selector input knob to enter a new vertical speed. The DTA button must be pressed again to accept the new vertical speed and enter the 'operate' mode.

The Altitude Selector / Alerter VS mode can be disabled by pressing the Altitude Selector / Alerter MAN button.

MAN (Manual) – Vertical Speed selection can be completely decoupled from the autopilot system by depressing the Altitude Selector / Alerter MAN button.