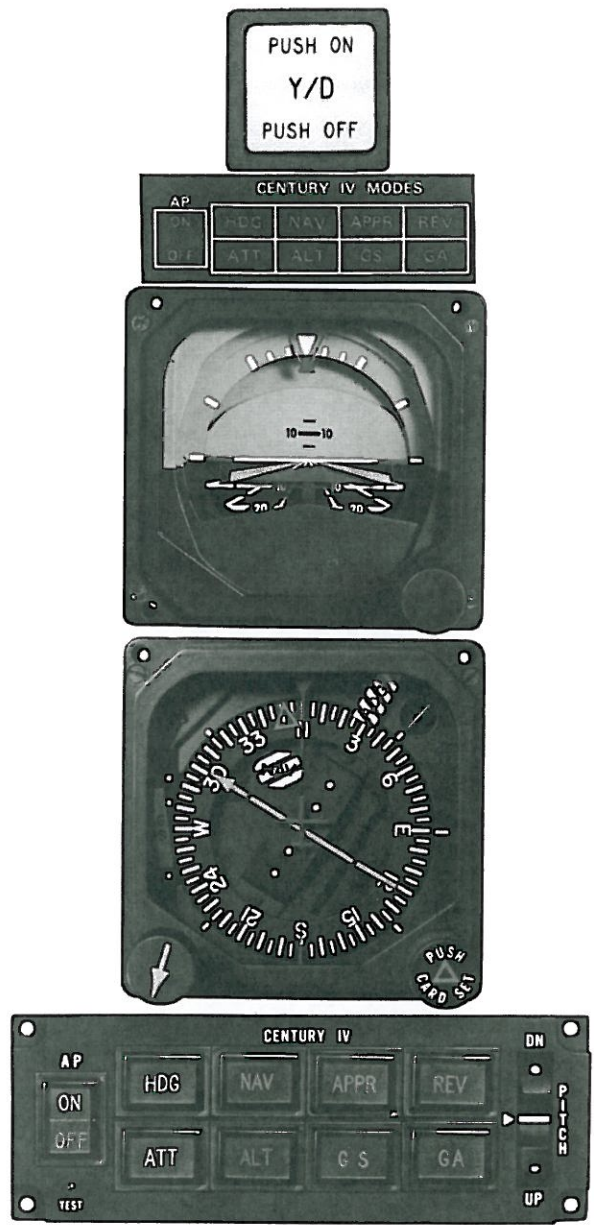




CENTURY IV

AUTOPILOT FLIGHT SYSTEM

PILOT'S OPERATING HANDBOOK



MARCH 1981
68S82

NOTICE

This Handbook presents general operating techniques for the Century IV Autopilot and Flight Director/Autopilot.

Each aircraft installation has either an Airplane Flight Manual Supplement or an Autopilot Flight Manual that contains FAA approved flight procedures for the autopilot in that particular model aircraft.

We recommend that in addition to reviewing this Handbook, the pilot study the appropriate Airplane Flight Manual Supplement or the Autopilot Flight Manual prior to attempting to use the system in flight.

The appropriate AFM Supplement or Autopilot Flight Manual is considered to be one of the documents that **must** be aboard any U.S. registered aircraft with Century IV installed for the aircraft to be legally airworthy.

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LOG OF REVISIONS

05-01-76	Added information on DG/NSD-360A System
05-01-76	Added information on cross pointer Steering Horizon
11-01-77	Added information on Double Cue (4-Inch) Steering Horizon

FOREWORD

The Century Flight Systems, Inc. Century IV Autopilot and Flight Director/Autopilot systems represent the very latest in "State of the Art" designs for Automatic Flight Control Systems (AFCS).

In this handbook, we have detailed the broad range of features, functions and benefits of the Century IV family of systems.

CENTURY IV AUTOPILOT

The Century IV is available in an autopilot only version that uses a standard type artificial horizon and the DG-360 (described on pages 20-23). It may optionally use the NSD-360 or other pictorial navigation system.

CENTURY IV FLIGHT DIRECTOR/AUTOPILOT

The Century IV/FD is an integrated Flight Director / Autopilot that uses a Steering Horizon and the NSD-360 (described on pages 24-28) . The Century IV/FD may optionally use the Slaved NSD-360 or other pictorial navigation system.

Both the Century IV and Century IV/FD may incorporate additional options such as:

- Remote Annunciator
- Yam Damper
- Remote Go-Around

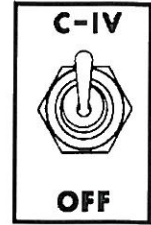
We suggest that you do two things:

1. Read this handbook and your airplane Flight Manual Supplement.
2. Spend some VFR flight time with the equipment to learn how to work with the autopilot so that you may enjoy its capabilities to the fullest.

CENTURY IV OPERATING CONTROLS

Century IV ON - OFF Switch-

The switch is usually on the instrument panel. Moving this switch to the "ON" position applies aircraft power to the AFCS system. Since no warm-up is required, the system is ready for immediate operation, provided the horizon has stabilized and the D.G. or Compass system is in operation.

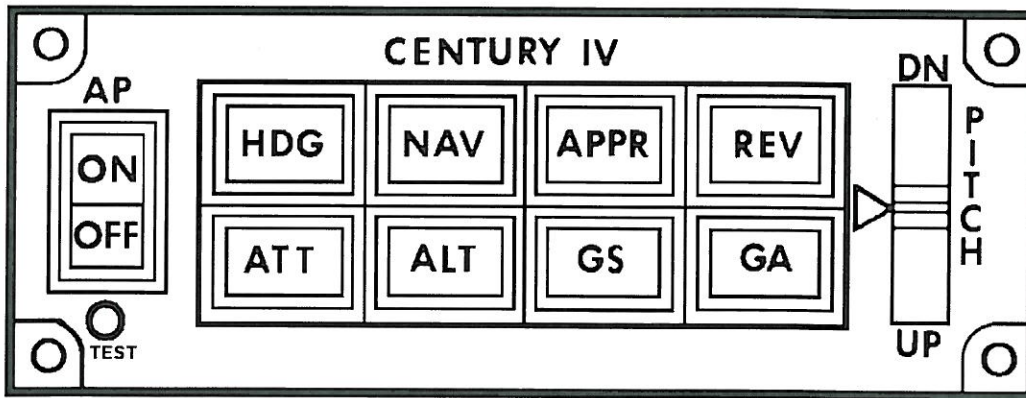


Autopilot Programmer-The Autopilot Programmer pictured below is the Pilot Command Station for the system.

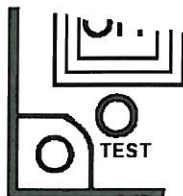
The programmer also serves as a Master Annunciator to indicate system engagement and active modes. In normal operation active modes are brightly illuminated and inactive modes are dimly illuminated.

Exception: A/P "ON-OFF" one or the other is brightly illuminated (depending on autopilot status).

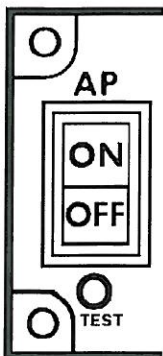
Overall lighting intensity of the annunciator is electronically controlled by sensing the voltage being applied to other aircraft lights in the same area as the programmer and electronically matching the level for night operations.



MODE AND SWITCH FUNCTIONS



Test Switch - Located in the lower left corner of the programmer. Pressing this switch tests all mode switch lamps at full brightness except AP "ON-OFF". In addition, it tests an attitude warning circuit normally active **only** when the G/S mode is engaged. While the test switch is depressed, the pitch command disc should be rotated to positions. "UP" and "DOWN" from the level flight index. When the pitch command disc is set for "UP" the ATT lamp will be extinguished. When the Pitch Command disc is "DOWN" the ATT lamp will flash on an off.



Autopilot ON/OFF Switch - is used to engage or disengage the autopilot.

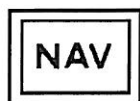
Because of internal programming, the response to pressing the switch differs between the Century IV and Century IV/FD. The table below indicated the differences.

ACTION	Century IV Autopilot Response	Century IV/FD Flight Director/ Autopilot Response
Turn "ON" System	AP HDG OFF ATT	AP HDG OFF ATT
Turn AP "On"	AP Lateral mode remains as programmed. Pitch mode recycles to ATT pitch command synchronizes servos engage after approx. 2 sec. delay.	AP Lateral mode remains as Programmed. ON Pitch mode remains as programmed.
Turn AP "OFF"	AP Recycles to OFF HDG ATT servos disengage	AP Lateral and pitch modes OFF remained as programmed. Servos disengaged

LATERAL MODES



The **Heading** mode is the basic lateral mode of the autopilot. It is automatically activated when the system is turned "ON". While this mode is active, the autopilot will turn the shortest direction and fly the selected heading on the compass system. Banks in the **HDG** mode are a maximum of 20°.



The **NAVigation** mode is normally used for cross-country navigation. When the **NAV** mode is active, the system combines basic course direction data from the Course Selector and left-right needle information to intercept and track selected VOR radials. After interception, automatic cross wind compensation and bank limiting circuits are activated for tracking accuracy and passenger comfort.



The **APPRoach** mode is used for VOR and Localizer approaches. When the **APPR** mode is active, the system combines basic Course Direction data from the Course Selector and left-right needle information to intercept and track selected VOR and Localizer courses. The **APPR** mode is similar to the **NAV** mode except its dynamics are such that extremely tight tracking results. The **APPR** mode may be used cross country but its more rapid responsiveness to needle movement may be less desirable. Internal compensation for differences between the dynamics of the VOR and Localizer is automatically accomplished by NAV receiver frequency selection.



The **REVerse** mode is used for inbound localizer back courses and outbound legs of VOR and localizer back courses. When the **REV** mode is active, the system will automatically fly the "Tail" of the A/P radio course arrow and automatically (internally compensate for reverse needle sensing.

NOTE

When in the **REV** mode, left-right needle displays to the pilot are **NOT ELECTRICALLY REVERSED** in conventional VOR/LOC displays. If a compass system with integral course and left-right needle display(NSD-360, PN-101, KPI-550, etc.) is being used, the action of flying the "Tail" of the A/P radio course arrow will cause mechanical inversion of the display and normal visual sensing of "turn toward the needle" for "On course" is provided. A good rule of thumb to remember is that in the **REVerse** mode, the system will fly what ever radio situation is selected, **backwards**. This feature greatly simplifies approach work by requiring that only the inbound localizer front course or the inbound (Final) VOR course be selected on the D.G. or compass system. With this accomplished, the actual direction to be flown during each phase of the approach is directed simply by pressing either the **APPRoach** or **REVerse** mode button on the programmer.

SELECTED ANGLE INTERCEPT

The Century IV incorporates a selected angle intercept feature that enables the pilot to enjoy unlimited freedom in choosing an intercept angle to a particular course. This feature is extremely useful when being vectored to a final approach course.



The selected angle intercept may be used whenever the left-right deviation needle exceeds one-half scale. The feature is activated by simultaneously pressing the **HDG** and **APPR** button on the programmer--both buttons will light brightly to signify that the feature is active. The system will remain in the **HDG** mode and headings are selected with the heading bug.

The approach course is selected using the Course Selector (and OBS, if separate). As the selected course is neared, the system will recognize that the deviation indicator (CDI) has reached one-half scale and will automatically switch into the **APPRoach** mode (as indicated by extinguishing the **HDG** mode) and complete the desired maneuver. The feature may be used also for intercept of any course of radial (except **REVerse**) and after interception, **NAV** may be selected for cross-country use.

NOTE

See the Operations Section for actual operating techniques.

PITCH MODES



The **ATTitude** mode is used when the Pitch Attitude of the aircraft is to be controlled by the pitch command knob located on the extreme right in the programmer. Pressing the **ATT** button will disengage other pitch modes and permit selector of the aircraft pitch **ATTitude** by rotating the pitch command knob until the desired pitch attitude is obtained. Automatic Pitch Synchronization to aircraft attitude will occur when **ATT** is selected. The pitch knob is a **command** device. Its position in relation to the center index mark is directly related to an aircraft pitch attitude relative to level flight.

In addition to manual **ATT** selection by the pilot, the system will automatically recycle to the **ATTitude** mode under any of the following circumstances:

1. Turn System "ON"
2. Press Pitch Sync button on wheel
3. Engage Autopilot with A/P On-Off Switch. In Century IV AP only version. (See page 4)

Manual selection of the **ATTitude** mode from other pitch modes will cause momentary autopilot disengagement while automatic pitch synchronization occurs.

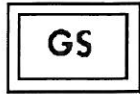
The **ATT** button has special circuitry to cause it to flash on and off under certain conditions when the "TEST" button is pressed, and when the glideslope (G/S) is coupled. (SEE page 4).



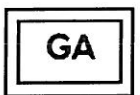
The **ALTitude** mode button is used to activate the Altitude Hold feature. Pressing this button will cause the system to maintain the pressure altitude existing at the time of engagement. While there are no restrictions on when the **ALT** button may be pressed to hold altitude, it is suggested that for passenger comfort, the rate of climb or descent be reduced to less than 500 feet per minute prior to engagement.

The system is capable of maintaining altitude through a broad range of power, speed and configuration changes. However, when operating in **ALT** mode at reduced power and speed, it is suggested that the pilot carefully monitor the barometric Altimeter.

The Century IV has been designed to make smooth transitions and gently return to the chosen altitude in turbulence, however, gusts exceeding 300 feet vertical displacement may cause shifting of altitude reference and the autopilot may not fully return to the selected altitude.



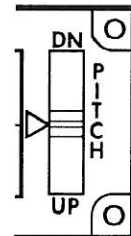
The **Glideslope** button serves as an annunciator for the glideslope coupler and is a means for the pilot to manually "ARM" the glideslope coupler under certain circumstances. Glideslope coupling is accomplished automatically in the system if certain logic elements occur in the proper sequence. If they are not correct, arming and subsequent coupling will not occur. Please refer to the operation section for operating details.



The **Go-Around** mode is used to provide a preselected (during installation) climb command to the autopilot. Pressing the **GA** button causes the aircraft to assume a preset climb angle. In multi-engine aircraft the climb angle selected is the angle which gives single engine best rate of climb with one engine at zero thrust. This may result in somewhat shallow deck angles and high climb airspeeds with both engines operating. In single engine aircraft, go-around angles are set to provide comfortable climbs without excessive steepness. Should conditions exist that make steeper climbs desirable, the **ATT** button, or **Pitch Sync** button, may be pressed and desired climb angle selected. The **GA** mode may also be used for cruise-climbs, if desired.

PITCH COMMAND KNOB

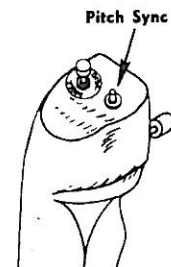
The pitch command knob is located at the extreme right end of the programmer. The knob may be moved manually in the **ATT** mode to provide command attitudes. In addition it is motor driven to provide **Pitch Synchronization** when required.



WHEEL MOUNTED CONTROLS

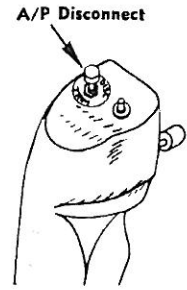
Pitch Sync Button -The Century IV features automatic pitch synchronization to synchronize the autopilot with the pitch attitude of the aircraft. If the Century IV is on and the autopilot servos engaged, pressing the **Pitch Sync** button on the wheel will cause:

1. Both the pitch and roll servos to disengage.
2. The pitch mode on the programmer to re-cycle to **ATT**.
3. The pitch command knob to automatically rotate to match or follow changes in pitch attitude.



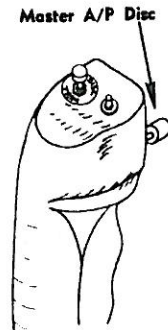
The lateral mode will not recycle but will continue as programmed. This feature is of great convenience when the pilot desires to briefly resume manual control of the pitch axis without totally re-programming the autopilot. When the **Pitch Sync** button is released, the roll and pitch servos will re-engage and the pitch attitude existing at the time the button is released will be maintained. Should another pitch mode (such as **ALT**) be desired, the appropriate button on the programmer must be pressed.

A/P Disconnect-- All Century IV autopilots use a quick disconnect on the pilot's control wheel. Pressing this **A/P Disconnect** Button usually consists of a multi-function arrangement whereby pressing the **A/P Disconnect** button also activates the electric trim system included with the Century IV Autopilot.



MASTER AUTOPILOT DISCONNECT TRIM INTERRUPT

Many Century IV's incorporate an additional switch on the control wheel (usually a large red button). Pressing this button will disconnect the Century IV, the Yaw Damper (if installed) and will interrupt the operation of the Electric Trim System. Release of the button will restore power to the Trim System but A.F.C.S. re-engagement is necessary to resume automatic flight.



TRIM SYSTEMS

There are two basic types of trim systems used with the Century IV.

1. Push button automatic trim.
2. Command automatic trim.

The Type trim used in a particular model of aircraft is determined during STC approval by the characteristics of the aircraft.

Push Button Automatic Trim-- This system is easily identified by the fact that there is a push button on the left horn of the pilot's control wheel labeled A/P DISC-TRIM. Pressing this button will.

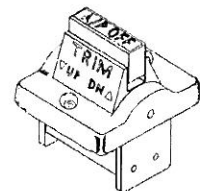
1. Disconnect the autopilot servos.
2. Arm the trim system.

Incorporated within the trim system is a sensor that will sense control wheel forces and automatically trim them off. The system is not responsive to control wheel movement as such and therefore, time must be allowed by the pilot for airspeed changes to occur, wheel force to develop and be trimmed off. This is particularly true in the higher speed regions of flight where aircraft inertia prevents rapid speed changes.

Command/Automatic Trim -- This system is easily identified by the switch installed in the left of the pilots control wheel.

The switch has three distinct actions

1. An **A/P Disconnect** bar (in the top of the switch) - Press down to disconnect the autopilot & arm the trim.
2. "**DOWN**" trim - Press forward while holding the **A/P Disconnect** bar down.
3. "**UP**" trim - Pull aft while holding the **A/P Disconnect** bar down.



This mode is called command trim because the pilot commands trim in the direction desired.

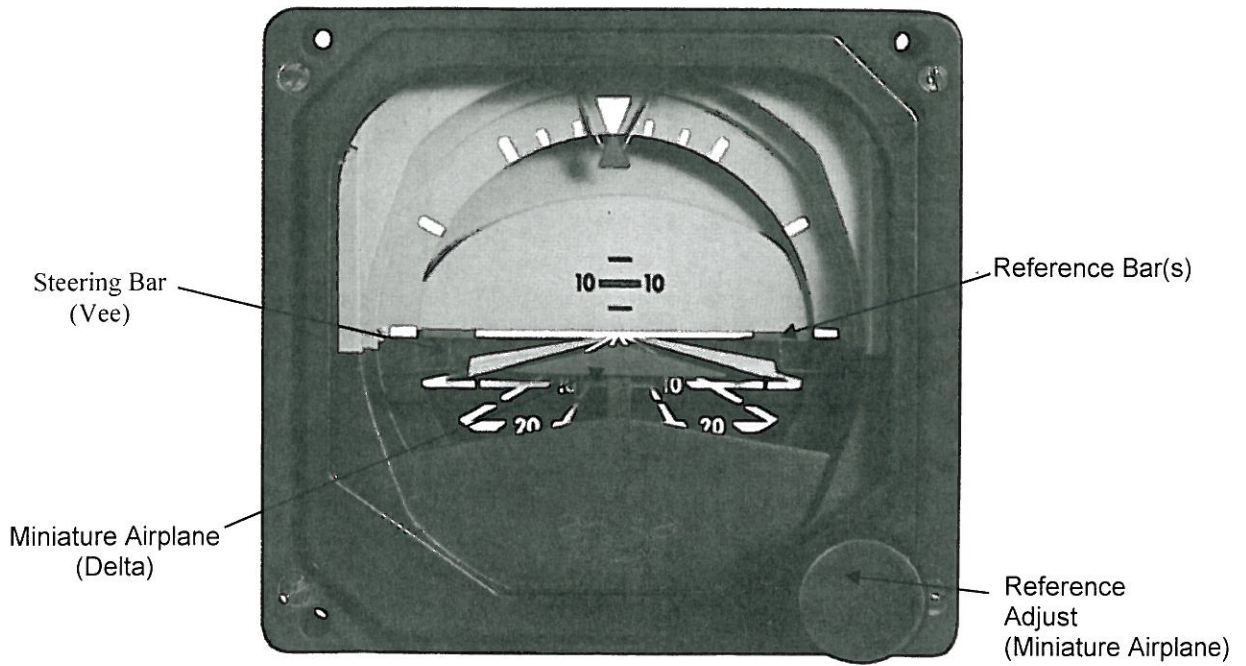
Autotrim operation is identical "on Autopilot" for both the **Push Button Automatic Trim** and the **Command/Automatic Trim** systems. Both systems act to trim off control system forces for the Autopilot.

ELECTRONIC TRIM SYSTEM

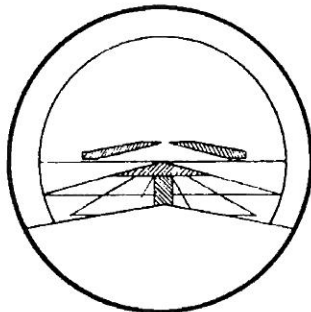
Many Century IV Autopilot models incorporate a totally electronic Autotrim system that electronically senses trim requirements "on Autopilot" and adjust the trim as required. This system offers reduced maintenance and reduced installation complexity. However the system requires greater time to totally resolve minor trim forces. Occasionally, when disengaging the autopilot a slight "bump" may be felt in the controls if insufficient time has elapsed for total resolution.

NOTE

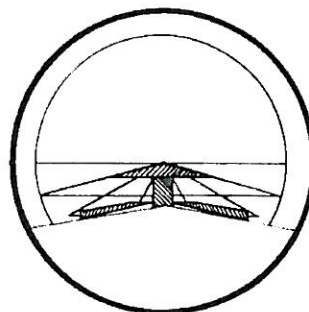
Many trim systems require preflight checks for safety. These checks carry the same importance to safety of flight as checking magnetos or fastening seat and shoulder belts. Please do not overlook these checks as outlined in the A.F.M.



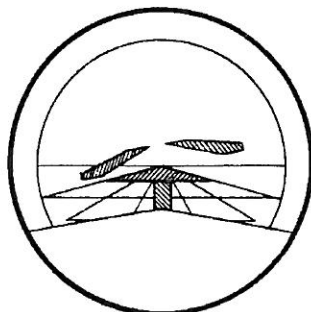
Single Cue
STEERING HORIZON
(Command Satisfied)



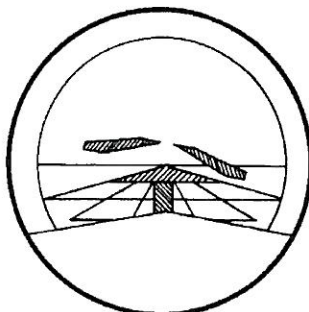
Fly Up



Fly Down



Fly Left
(Fly Up)



Fly Right
(Fly Up)

**CENTURY IV FLIGHT DIRECTOR
STEERING HORIZON
SINGLE CUE
(Optional)**

Addition of the Flight Director option to the Century IV is accomplished by substituting the Steering Horizon (pictured at left) for the Standard Artificial Horizon.

With the Steering Horizon installed, the pilot may choose to program a particular flight sequence and monitor autopilot maneuvering by observing the steering bar or he may turn the autopilot OFF and place himself in the control system loop by following commands of the steering bar. The great advantage of the Flight Director is that the computer observes many inputs, compares these inputs to the sequence programmed by the pilot and resolves differences into combinations of four commands: Fly Up, Fly Down, Fly Left, and Fly Right. To accomplish the programmed maneuver, the pilot needs only to "fly the miniature airplane (delta) into the 'vee' of the steering bar." Pictured at the left is the steering horizon with significant parts labeled and illustrating Fly Up, Fly Down, Fly Left and Fly Right.

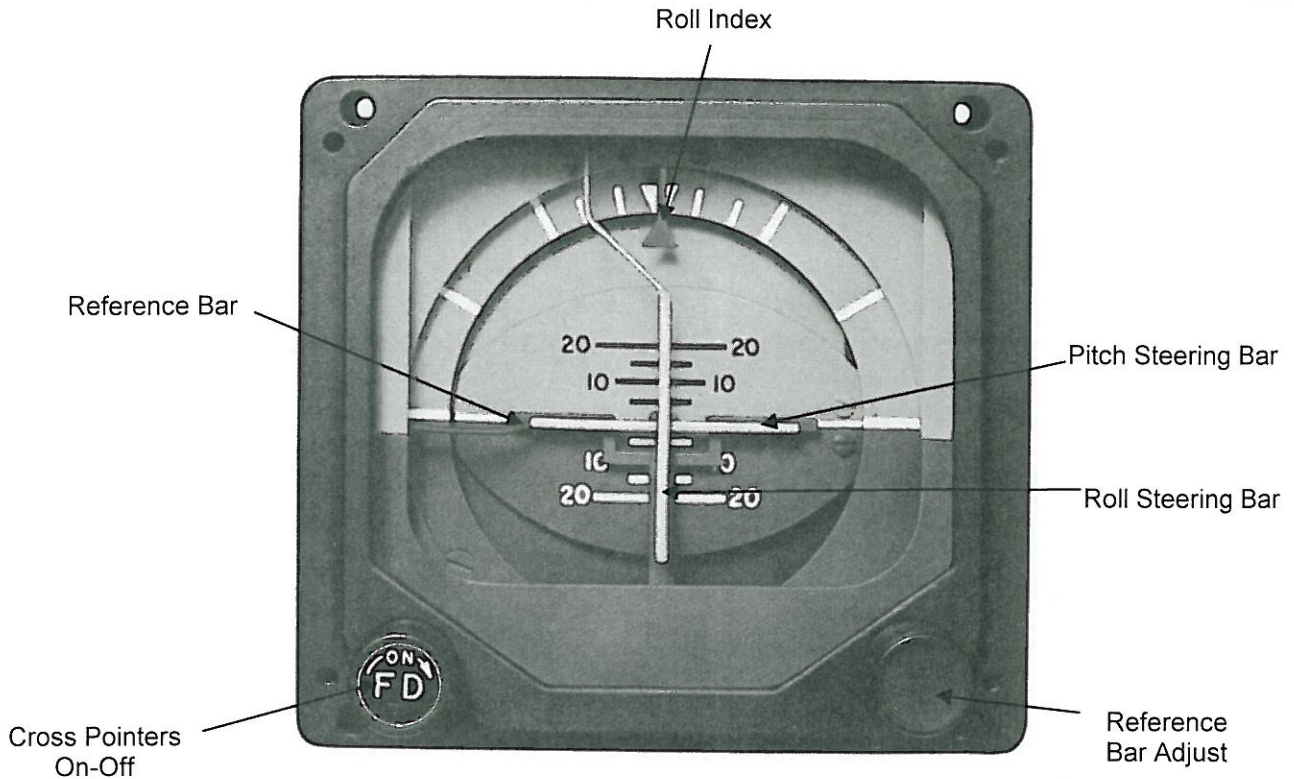
NOTE

The pilot should always keep in mind that the Steering Horizon displays **COMPUTED DATA** and will give a "command satisfied" indication if the pitch attitude and intercept heading are satisfactory for normal conditions.

The system **cannot** compensate for inadequate power or airspeed to accomplish the desired maneuver, therefore, a **raw data** display is mandatory with the Flight Director display so that the pilot is constantly presented with concise data on his heading and actual position on the Localizer, Glideslope and VOR Radial. For this reason, whenever the Steering Horizon is installed, the NSD-360 (described later) or similar horizontal situation indicator must also be installed.

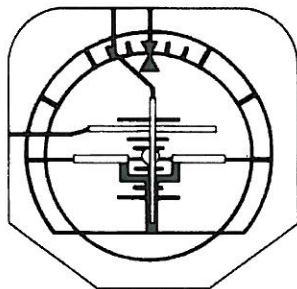
CAUTION

Steering information is **NOT** disabled if **NAV** Flags appear. The pilot should monitor the **HSI** to assure reliable **NAV** information is present.

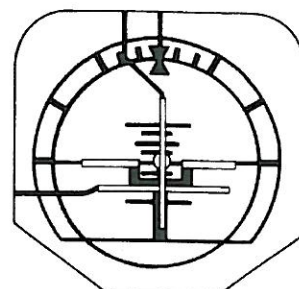


**Double Cue
STEERING HORIZON**

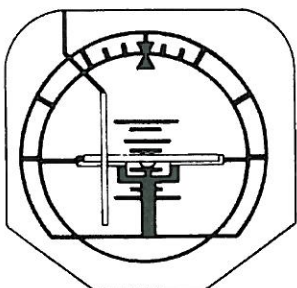
(Fly Up – Fly Right)



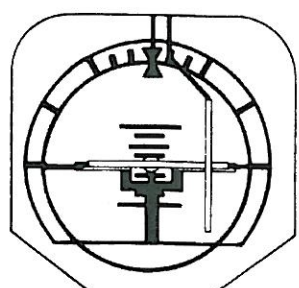
Fly Up



Fly Down



Fly Left



Fly Right

**CENTURY IV FLIGHT DIRECTOR
STEERING HORIZON
Double Cue
(Optional)**

An optional two cue steering horizon may also be used with the Century IV. With the double cue steering horizon (pictured at left) installed and turned "ON", the pilot may program a particular flight sequence and monitor autopilot maneuvers observing the pitch and roll steering bars. A command satisfied situation is indicated by a centering of the steering bars over the dot on the reference bar.

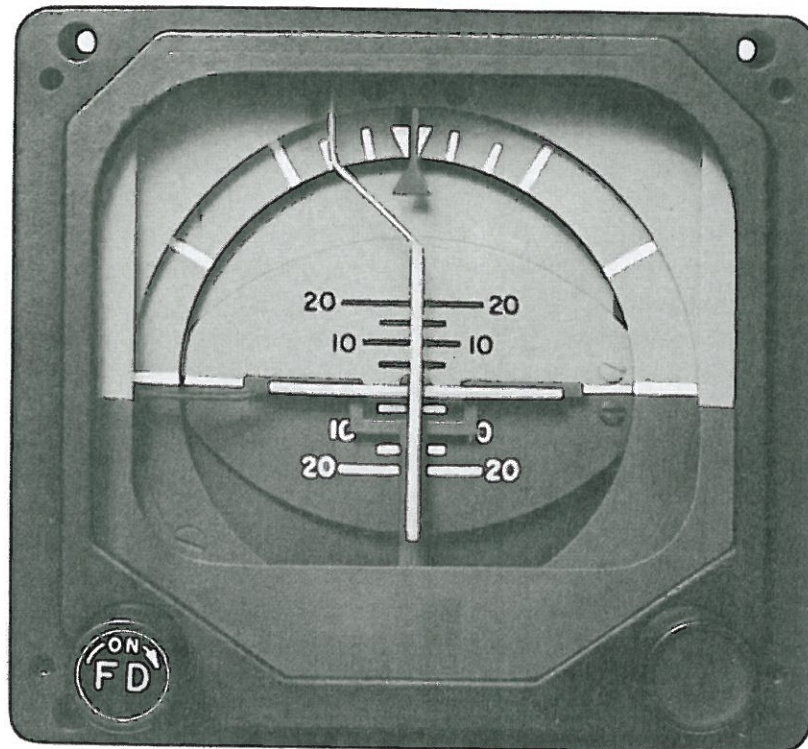
In addition, the pilot may manually execute the programmed flight sequence by turning the autopilot "OFF". By observing the commands of the steering bars and moving the controls to keep the bars centered, the programmed flight sequence will be executed.

NOTE

The two cue steering horizon is equipped with an "ON-OFF" switch to control the steering bar display. This FD ON-OFF control does not affect any other function.

CAUTION

Steering information is **NOT** disabled if **NAV** flags appear. The pilot should monitor the **HSI** to assure reliable **NAV** information is present.



**CENTURY IV FLIGHT DIRECTOR
STEERING HORIZON
DOUBLE CUE (4-INCH)
(Optional)**

The optional double cue steering horizon (pictured at left) is used with the Century IV Flight Director. This steering horizon incorporates all of the features and functions of the double cue steering horizon shown and described on pages 14 and 15.

In addition, this steering horizon provides a dual glideslope display; a 25 percent expanded localizer display ($5/8^\circ$ for full scale); a "slip /skip" inclinometer; and two decision height annunciators. The glideslope and expanded localizer indicators repeat the raw data indications located in the H.S.I. instrument and thus the pilot may observe both computed steering and raw data indications within a single instrument. The expanded localizer scale provides increased localizer sensitivity for extremely accurate localizer tracking information.

When the glideslope or localizer signals are not reliable the processed raw data display pointers in the steering horizon will be removed from view and the G/S or NAV flag will appear on the H.S.I. instrument. The computed steering information is **not** disabled when the NAV or G/S signal is unreliable, therefore the pilot should monitor the raw data display to assure that the navigation information is reliable. During an instrument approach, if a significant disagreement is observed between the navigation position information and the computed steering display, a missed approach should be initiated immediately and the reason for the disagreement identified prior to completing the approach.

OPTIONAL REMOTE GO AROUND (GA)

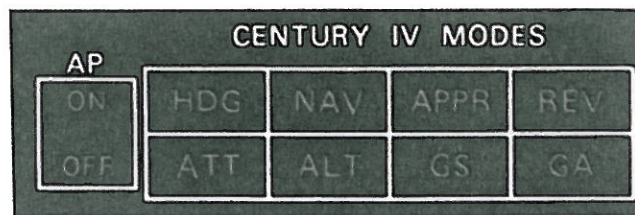
Some installations (where space permits) may incorporate a remote **G/A button**, mounted on the wheel or throttle. Pressing this button has the same effect as pressing the **G/A** button on the programmer.

REMOTE ANNUNCIATOR (Optional)

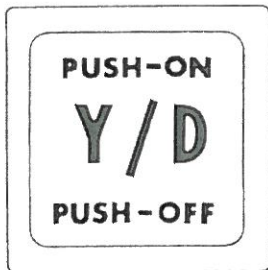
Many Century IV installations incorporate a miniature remote annunciator.

The Remote Annunciator is particularly useful in those installations where the Programmer is not within the normal panel scan of the pilot. Normally, the miniature remote annunciator is mounted in the instrument panel above or adjacent to the horizon. By repeating the programmer annunciator, the remote annunciator assists the pilot in monitoring the numerous automatic switching functions of the Century IV.

Lighting intensity of the remote annunciator is controlled by the main Century IV programmer.



YAW DAMPER SYSTEM (Optional)



The Century Flight Systems, Inc. Yaw Damper System is a frequently installed option with the Century IV. The system has only one control -- the ON-OFF Push Button. The system is an independent subsystem that may be used with or without the Century IV.

For pilot assistance and passenger comfort, its function is to add additional stability to the yaw axis of the aircraft and minimize any tendency to hunt or dutch roll in the aircraft. In addition, the Yaw Damper incorporates an "electronic ball" to assist in coordinating turns and under conditions of asymmetric power.

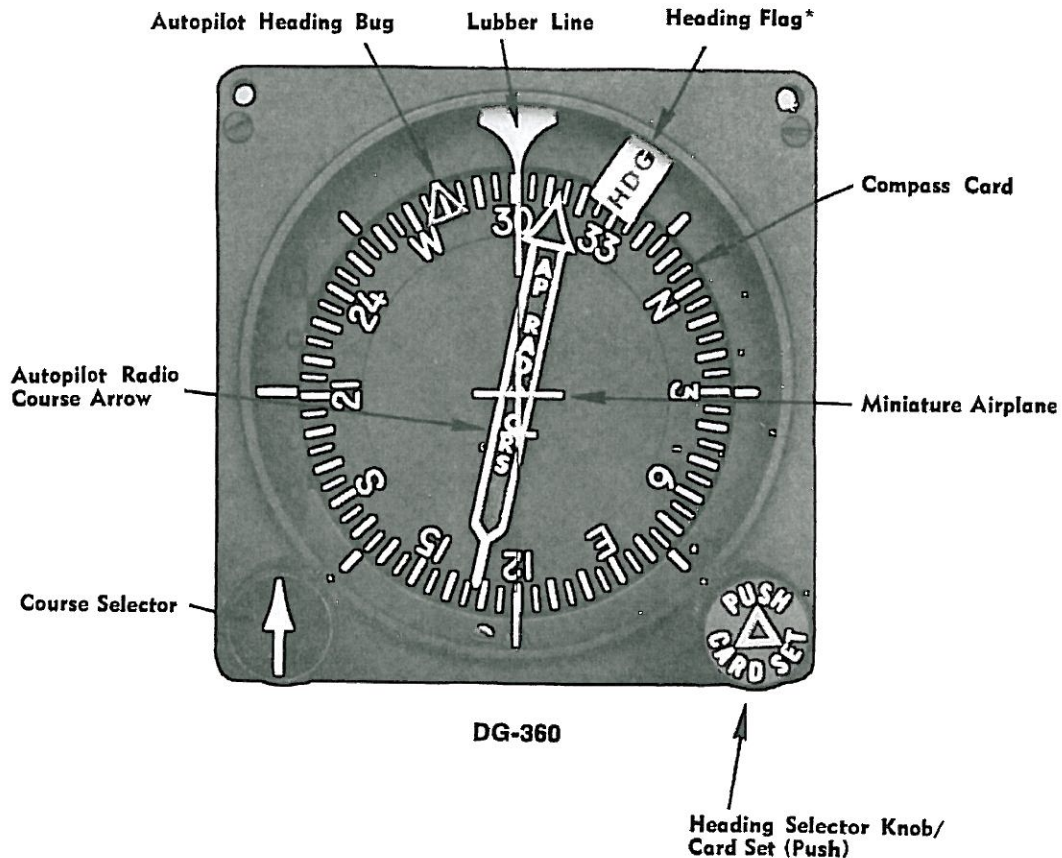
The Yaw Damper does not ordinarily compensate for rudder trim variations with speed changes and therefore may "bump" the rudder controls slightly when engaged or disengaged at speeds other than that for which it is adjusted.

The Yaw Damper is engaged by pressing the ON-OFF Push Button. It is disengaged by pressing the On-OFF Push Button or by pressing the Master Autopilot Disconnect--Trim Interrupt Button.

The Yaw Damper switch is a lighted annunciator type switch which is connected to the panel lamp rheostat controlling the light intensity in the area of installation. On some installations, the light intensity for day operations is low under some ambient light conditions. For this reason, the knob edge is engraved with a black index line that is in view when the system is "OFF" and hidden when the system is "ON".

ELECTRONIC RUDDER TRIM (Optional)

An optional automatic Rudder Trim System is available for some aircraft models for use with the Yaw Damper System. The function of the Rudder Trim System is to adjust the rudder trim tab to relieve rudder forces. The System is interlocked with the main Autopilot and the Yaw Damper so that both must be **on** for the rudder trim to be operational.



*Red and White Striped in DG-360A

PANEL MOUNTED CONTROLS

Directional Gyro and Compass Systems:

The basic directional input for the Century IV is the Edo-Aire Mitchell DG-360 (the most basic member of the NSD-360 family of instruments.)

The DG-360 contains an air driven non-slaved gyro with an electrically driven servo'd heading card. Both air and electric power are required of proper operation. Interruption of either air or electric air power will cause the red* HDG flag to be visible.

Upon start up and occasionally during flight, it will be necessary to set the heading card to match the magnetic compass. This is accomplished by pressing "in" on the knob in the lower right corner of the instrument and rotating it until the heading card reading agrees with the magnetic compass. Release the knob. CAUTION: Do not set if magnetic compass is erratic or inaccurate as during turns, climbs, descents, or turbulence.

NOTE

The DG-360 pictured at left is not authorized for use in Flight Director Versions of the Century IV. The NSD-360 or other Integrated Display is required in the Century IV/FD when the steering horizon is part of the system.

*Red and White Striped in NSD-360A

A/P HEADING “BUG”

The autopilot heading bug is a small triangle on the outer rim of the heading card. Its position is controlled by the autopilot Heading Selector knob at the lower right corner of the instrument. Rotating this selector knob without pressing in will move the bug in relation to the heading card.

When in the HDG mode, the autopilot will seek to turn the aircraft to place the heading bug under the lubber line. Bank angles in the heading mode are approximately 20° maximum.

NOTE

The autopilot does not attempt to maintain standard rate turns, the rate of turn is a function of both airspeed and angle of bank. 20° of bank will give a standard rate turn at 150 knots. Speeds higher than 150 knots, result in turn rates less than standard. Speeds lower than 150 knots result in turn rate higher than standard rate. Standard rate=3°/second or 180°/minute.

NOTE

If the heading bug is set more than 150° from the lubber line, momentary banks of less than 20° may result. If the heading bug is set more than 180° from the lubber line, bank reversal (e.g. left to right) will result as the autopilot seeks the shortest direction to the desired heading.

A/P RADIO COURSE ARROW:

The DG-360 incorporates a separate autopilot course selector so that Century IV users may enjoy the benefits of independent course and heading selection. The course selector is used with the NAV, APPR and REV lateral modes of the autopilot. If one considers the A/P Radio Course Selector as simply a means to tell the autopilot the basic direction of flight when in the radio coupled modes, then its use becomes easier to understand.

For Radio Coupled VOR flight, the head of the autopilot radio course arrow is placed on the heading corresponding to the course selected by the OBS. Pressing the NAV or APPR button will cause the autopilot to intercept the radial and track it in the basic direction indicated by the head of the autopilot radio course arrow.

If the REV button is pressed, the autopilot will intercept and track in the reverse direction (this is most useful during the outbound phase of VOR approaches.)

NOTE

The DG-360 and Century IV will operate correctly for **Outbound** legs of VOR approaches if the **Inbound** course is selected on the DG-360 and the **Inbound** course is selected on the VOR indicator. The direction of flight is controlled by using the REV button on the programmer.

LOCALIZER

For localizer work, head of the A/P course arrow is always placed on the **Inbound front course heading**. Selection of the direction to be flown is then accomplished by pressing either the APPR button for:

1. Front course inbound or
 2. Back course outbound
- or the REV button for:
1. Back course inbound
 2. Front course outbound

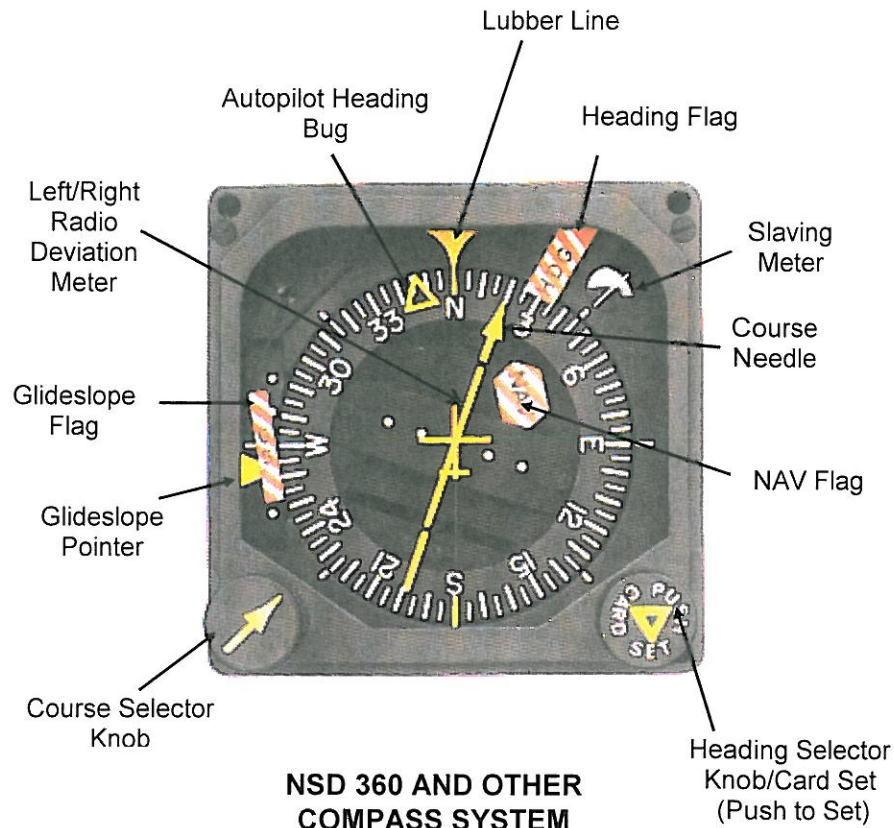
When the NAV, APPR, or REV modes are active, the A/P radio course arrow is in the autopilot circuit. The heading bug may be moved at will without consequence. This permits pre-selection of desired headings and activation when they are needed by merely pressing the HDG button. When the HDG mode is active, the A/P radio course arrow may be moved to pre-select the radio course to be flown. Activation is accomplished by pressing the NAV, APPR, or REV button.

NOTE

When the DG-360 is used, radio information to the autopilot is obtained from a **separate VOR/Localizer indicator** which is **not** automatically set by moving the **A/P radio course arrow**. The pilot must be certain that the **A/P radio course arrow** and the **OBS** are properly set for the basic direction of radio coupled flight or improper interception and tracking will result.

NOTE

If a NAV1 - NAV2 selector switch is installed the pilot must be certain that the correct VOR/localizer indicator is selected.



The Century IV autopilot may be optionally used with the Century Flight System, Inc. NSD-360 or ARINC compass systems of other manufacturers (such as the Collins PN101, the King KPI-550 (A), Wilcox 1041A or Sperry RD-444 Series.) The explanation which follows will be based on the NSD-360 however, the principles will apply equally to the compass systems of other manufacturers provided the differences in design, features and concepts are ascertained and allowed for, such as slaving, knob location, size, etc.

Special notes on features of various compass systems relating to their operation with the Century IV will be discussed at the end of this section.

The NSD-360 (Navigation Situation Display) is an integrated HSI instrument combining an air driven gyro and an electrically servo heading card with VOR/Localizer and Glideslope information. The NSD-360 has an optional slaving feature that requires initial heading setting on start-up. Subsequent resetting of the heading card, required manually on non-slaved versions, is automatically accomplished.

The NSD-360 has incorporated a heading warning flag to warn of loss of either air or electric power. Appearance of the flag during flight should be sufficient grounds to question the validity of displayed heading. In slaved versions, the slaving meter should oscillate about a 45° point to show that the slaving circuits are accomplishing their function. Should the needle remain motionless or either vertical or horizontal for an extended period (two minutes) in level flight, the heading should be manually set using the magnetic compass and the performance of the heading card observed. If slaving difficulties are encountered, set the slaving mode switch to SL#2 or free gyro. In free gyro mode, the instrument must be periodically reset to manually counteract the effects of gyro precession.

NOTE

Do not set heading card when turning as the magnetic compass and magnetic flux detectors in slaved systems are not reliable references when the aircraft is banked.

NSD-360 CONTROLS

The heading selector / card set is used to move the heading bug relative to the heading card. It is also used to set the heading card to the aircraft heading by pushing in and rotating card. When setting has been accomplished the knob is released. The heading selector should not be pushed in when setting the heading bug.

The course selector knob is used to adjust the autopilot course selector arrow to the desired course. Selection of the autopilot course automatically sets the internal VOR resolver to the identical VOR radial. Readout of VOR left-right information is made by observing the center segment of the course arrow.

DISPLAYS

NSD-360 **VOR / Localizer left-right deviation** is displayed by the center segment of the autopilot course radio arrow. Note that the tiny airplane in the center of the instrument display gives a pictorial representation of the Navigation Situation. In the illustration, the aircraft is approaching the desired radial at about 20° intercept. When operating in the VOR mode, the display always gives the correct display if the heading card is matched to the magnetic heading. When operating in the localizer mode, the course arrow should be placed on the **INBOUND** front course heading. The display will then be correct for either front course or back course.

During Back Course Approaches, the display will be inverted and the tail of the course arrow will indicate the back course heading. The Left-Right needle sensing will require turns **toward** the needle for course centerline.

“TO” FLAG - “FROM” FLAG

The **to** and **from** flags point in the direction of the VOR Station. To or from is pictorially represented,. In the localizer mode, the “To” flag is used to indicate good navigation signal strength. The “To” flag will be exposed if the signal is good for either a front or back course.

NAV WARNING FLAG

The red* **NAV** warning flag will appear if the signal being received is not suitable for **NAVigation**.

NOTE (NSD-360)

The NAV warning flag, and to-from flags are driven by one meter movement. Appearance of one flag causes disappearance of the other.

NOTE (NSD-360A)

In the NSD-360A series, separate “NAV” (RED and White) and “TO-FROM” meter movements are used. Good navigation data will be indicated in both VOR and Localizer mode by absence of the NAV Flag. In the localizer mode the “TO-FROM” arrows may remain out of view (depending on NAV converter design).

GLIDESLOPE (Optional)

The **Glideslope** meter on the left side of the instrument displays conventional glideslope information - location of glideslope centerline is pictorially represented.



“On Glideslope”



Below Glideslope
(Fly Up)



Above Glideslope
(Fly Down)

The red **Glideslope Flag** is on the left side of the instrument. It is arranged so that it will obstruct view of the glideslope meter if a glideslope signal is not available or is unsuitable for guidance.

***Red and White Striped in NSD-360A.**

IMPORTANT NOTICE

Because the NSD-360 incorporates an integrated course / left -right display and OBS resolver, the use of a NAV-1/NAV-2 switch is **not recommended** with the NSD-360 for left-right radio information.

The Century IV requires left-right data and course error data that is related to the actual heading of the aircraft. The use of a NAV-1/NAV-2 selector switch would involve complex operational techniques that would add confusion in moments of stress and its installation is therefore not encouraged.

NOTES ON OTHER COMPASS SYSTEMS

Collins PN-101 - See manufacturer's operator's manual.

King KP-550 - See manufacturer's operator's manual.

NOTE

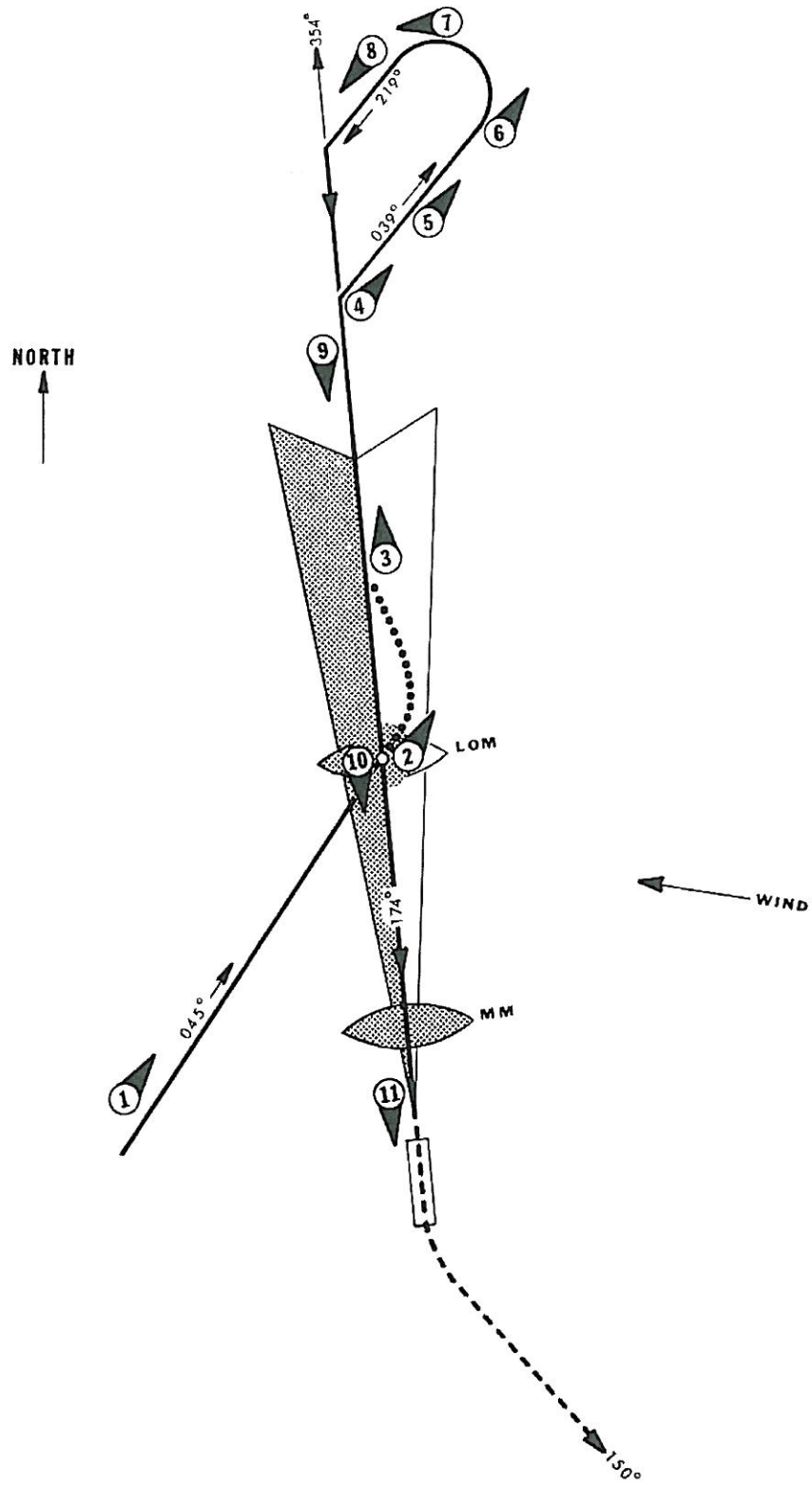
If RMI feature is active on the KPI-550 (Series) interlocking is normally used to cause programmer to revert to and remain in the **HDG** mode. Course and L-R needle information when in the RMI mode is not suitable for autopilot use.

CENTURY IV
OPERATING TECHNIQUES

In the pages that follow, we have included techniques for:







Localizer Approaches	}	ILS
Glideslope Arming & Coupling		
Localizer Back Course		
VOR Approaches		
VOR Navigation		

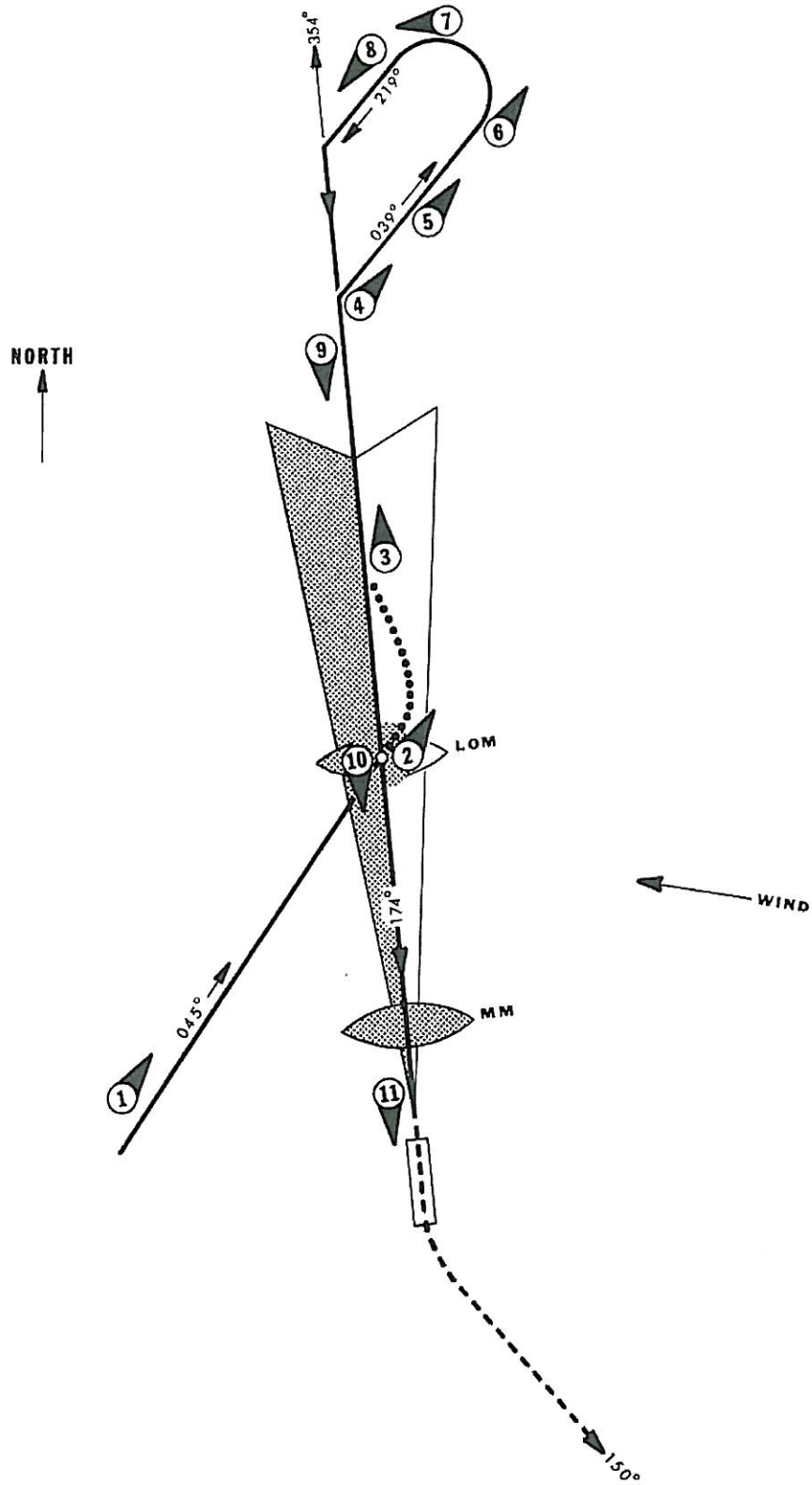
The photographs depict the Navigation Situation at the indicated position as seen on the NSD-360. The techniques are equally applicable to other Integrated Compass Systems (PN101, KPI-550, Etc.) The techniques are also applicable to the DG-360, provided it is understood that the Radio Course Arrow and OBS must be set separately to achieve the desired results



LOCALIZER (LOC) APPROACH




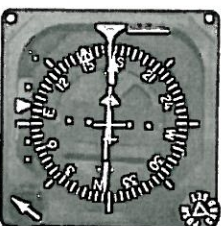

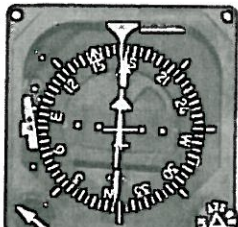
Localizer (LOC) Approach
SEE ALSO GLIDESLOPE (GS) SECTION

PSN	NSD-360	PROGRAMMER	REMARKS
1		AP ON HDG ALT OR ATT (as appropriate)	The localizer or ILS approach begins with a transition from the enroute structure to the outer compass locator (LOM) . The HDG mode and HDG Bug is used by the pilot to select the desired heading. Aircraft altitude or rate of descent is controlled using ALT, ATT, the Pitch Command Knob or Pitch Sync. The Inbound Front Course direction is selected with the course arrow.
2		AP ON REV ALT OR ATT	Upon reaching the (LOM) , press the REV Button. System will intercept and track Outbound . Note: This is a good time to begin reducing speed for the approach.
3		AP ON REV ALT OR ATT	Altitude appropriate to this phase of the approach should be controlled using ALT and /or ATT as necessary. The Procedure Turn outbound heading may be pre-selected using the heading bug
4		AP ON HDG ALT OR ATT	Press the HDG Button to begin Procedure Turn.
5		AP ON HDG ALT OR ATT	Proceed outbound in procedure turn until sufficient time has elapsed to assure proper re-interception.
6		AP ON HDG ALT OR ATT	Lead aircraft through procedure turn by moving the heading bug initially about three-fourths of the way around the card in the desired direction of the turn

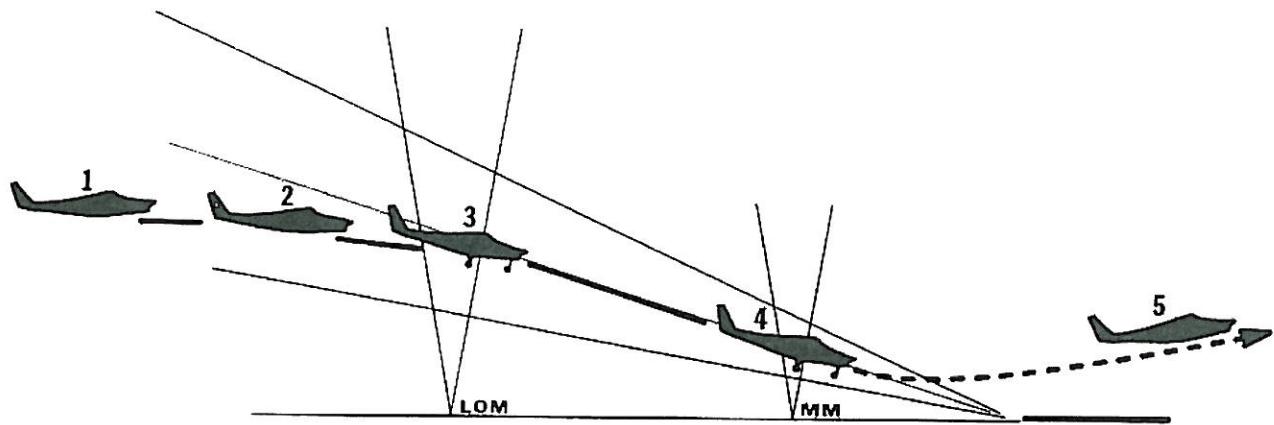


LOCALIZER (LOC) APPROACH

Localizer (LOC) Approach Con't

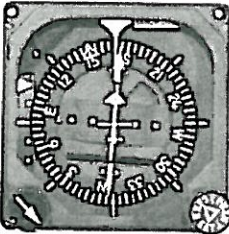


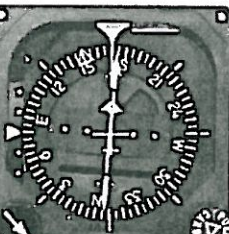

PSN	NSD-360	PROGRAMMER	REMARKS
7		AP ON HDG ALT OR ATT	As the aircraft turns, move the heading bug to the desired intercept heading. In this case the pilot has selected 199° for a selected angle intercept.
8		AP ON APPR ALT OR ATT	If a 45° intercept is desired press APPR Button ... system will automatically execute 45° (approximate) intercept.
8A		AP ON HDG APPR ALT OR ATT	Alternate - If intercept angle other than 45° is desired, set heading bug to desired intercept heading. Press both HDG and APPR simultaneously. System will remain in HDG until needle reaches one-half scale and then automatically switch to APPR as indicated by extinguishing the HDG Annunciator. Note: The selected angle intercept is particularly useful if being vectored to the final approach course.
9		AP ON APPR ALT GS	After intercept, system will correct for cross wind, adjust its internal radio authority (20 seconds), and limit bank angles (90 seconds). Aircraft altitude should be controlled as necessary for the approach using ALT and ATT. Glideslope arming and intercept may be automatic or manual. Please see Glideslope section. Missed approach heading may now be programmed.
10		AP ON APPR GS	If typical ILS, GS (glideslope) coupling occurs as the glideslope is intercepted from below. Coupling is indicated by extinguishing ALT or ATT with only GS remaining. Flashing ATT indicates "down" command on Pitch Command Knob. Flashing ATT may be stopped by adjusting pitch command to level or "up".
11		AP ON HDG GA	If missed approach is required, the following sequence is typical, see AFM supplement for details in specific model aircraft. <ol style="list-style-type: none"> 1. Press GA. 2. Add power. 3. Check for positive rate of climb. 4. Retract gear and flaps. 5. Press HDG to turn to required heading. 6. Adjust climb as desired.

NOTE: When GA is pressed, lateral modes remain as programmed and autopilot remains engaged.

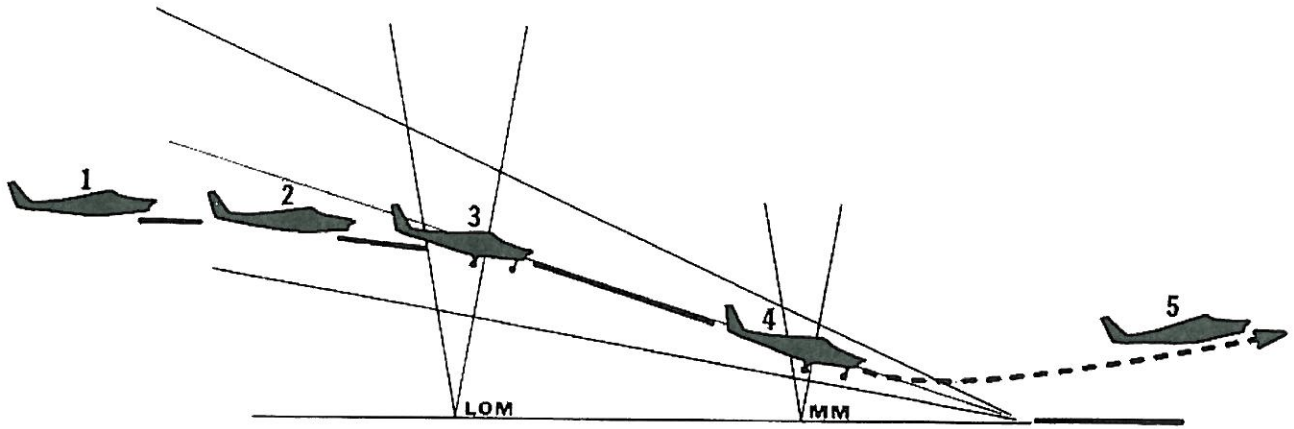


GLIDESLOPE (GS) AUTOMATIC ARM AND COUPLE

Glideslope (GS) Automatic Arm & Couple

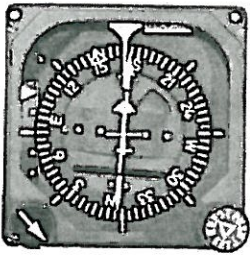
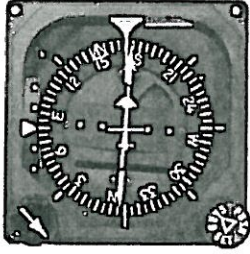

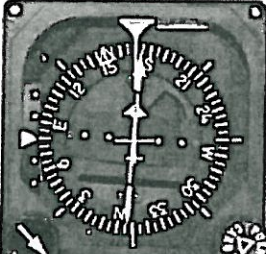

PSN	NSD-360	PROGRAMMER	REMARKS
1		AP APPR ON ALT	The typical glideslope portion of an ILS begins with the aircraft maintaining ALT for some distance prior to reaching glideslope interception.
2		AP APPR ON ALT GS	The Century IV recognizes the following elements: 1. A localizer frequency is tuned. 2. The system is in APPR and ALT. 3. The glideslope needle is "UP". With these conditions met for ten to thirty seconds, the glideslope coupler arms automatically as indicated by illumination of GS annunciator in addition to ALT.
3		AP APPR ON GS	When interception occurs, the Glideslope Coupler will couple as indicated by extinguishing the ALT light. Lower gear and flaps as indicated in A.F.M. (Airplane Flight Manual) supplement. Adjust power to maintain glideslope. Avoid large power changes. Note: Monitor steering horizon or artificial horizon and course guidance information through out approach. If raw data presentation and autopilot or flight director actions do not agree execute an immediate pull up and go around.
4		AP APPR ON GA	Upon reaching D.H., complete approach or conduct normal GA sequence. (See page 33, position 11)
5		AP HDG ON GA	As safe altitude is reached, press HDG Button for missed approach heading. Note: Pressing GA Button disconnects GS Coupler but does not reprogram lateral modes or disconnect autopilot.

NOTE: If it is desired to prevent Automatic Glideslope Arm and Coupling (e.g. when holding on the localizer) use the **NAV** mode instead of APPR.

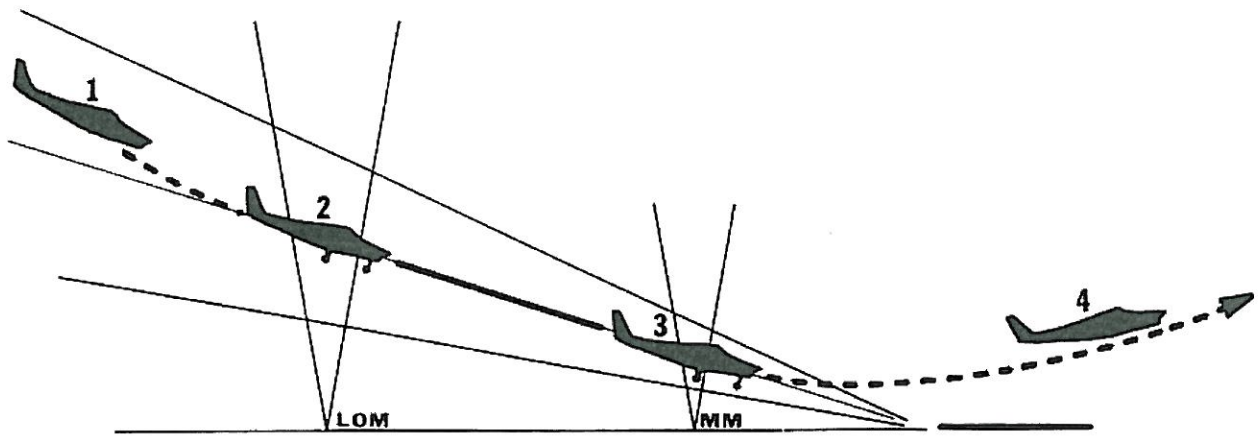


GLIDESLOPE (GS) AUTOMATIC ARM AND COUPLE

Manual Glideslope (GS) Arm/Automatic Couple

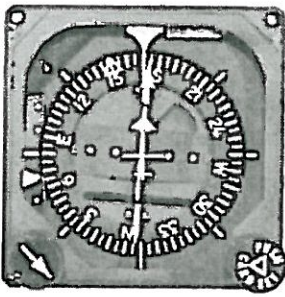
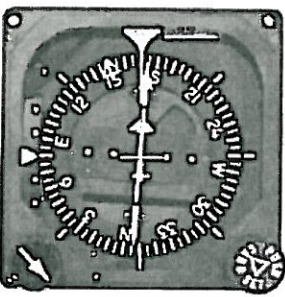

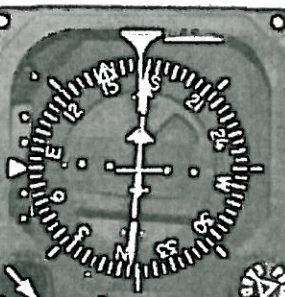
PSN	NSD-360	Programmer	Remarks
1		AP ON APPR ATT	Occasionally, it is desirable to approach the outer marker in ATT mode rather than ALT.
2		AP ON APPR ATT GS	In this case, the glideslope coupler is manually armed by momentarily pressing the GS Button. If the following conditions are present, it will arm: <ol style="list-style-type: none"> 1. Localizer frequency tuned. 2. In APPR mode. 3. GS needle "UP". Arming is indicated by GS being lighted in addition to ATT. Note: Use of pitch sync or any button after arming will cause dis-arming. Press GS Button to re-arm.
3		AP ON APPR GS	When interception occurs, the Glideslope Coupler will couple as indicated by extinguishing the ATT light. Lower gear and flaps as indicated in A.F.M. supplement adjust power to maintain glideslope.
4		AP ON APPR GA	Upon reaching D.H., complete approach or conduct normal GA sequence. (See page 33, position 11)
5		AP ON HDG GA	As safe altitude is reached, press HDG Button for missed approach heading. Note: Pressing GA Button disconnects GS Coupler but does not re-program lateral modes or disconnect autopilot.

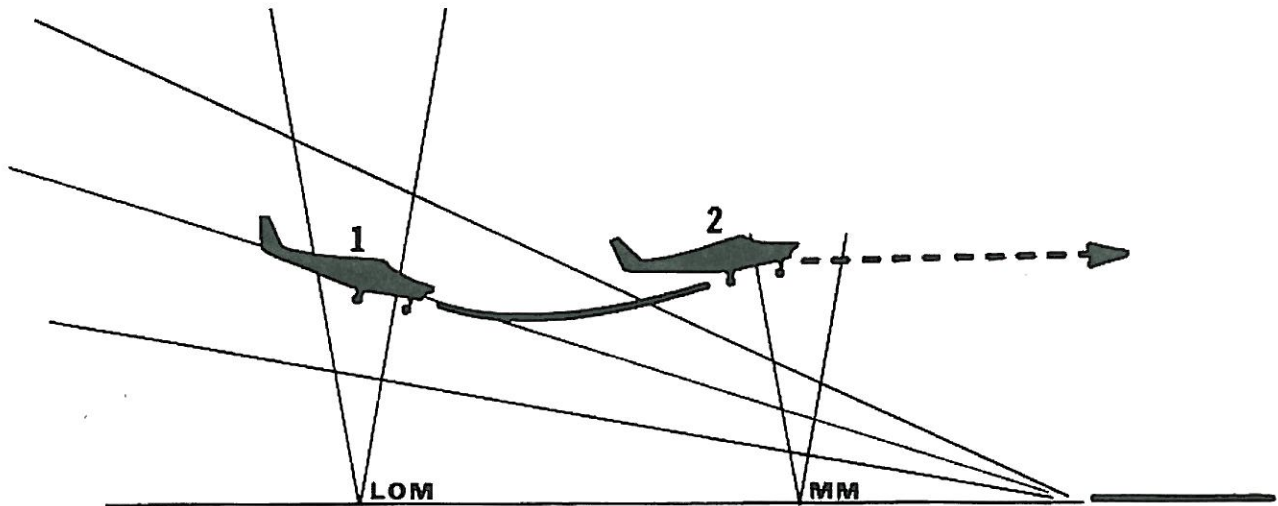
Note: Manual arming may also be used in ALT mode when insufficient time is available for automatic arming to occur.



MANUAL GLIDESLOPE (GS) COUPLING

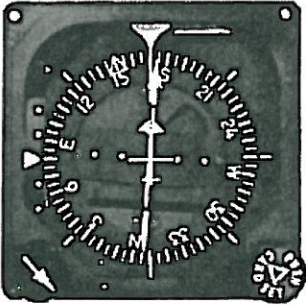
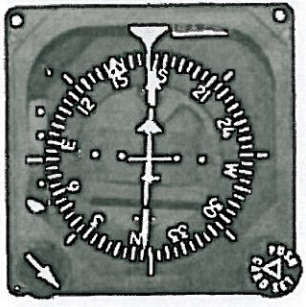
Manual Glideslope (GS) Coupling

PSN	NSD-360	PROGRAMMER	REMARKS
1		<p>AP ON</p> <p>APPR ATT OR ALT</p>	<p>Occasionally it is desirable to couple onto the glideslope from above. This is easily accomplished in the Century IV if the following conditions are present:</p> <ol style="list-style-type: none"> 1. Localizer frequency tuned. 2. In APPR mode. 3. In ATT or ALT. 4. Glideslope needle from zero to 80% "Down" (not over 80% "Down").
2		<p>AP ON</p> <p>APPR GS</p>	<p>Press Glideslope Button. System will couple onto glideslope and capture from above. Note: If Glideslope needle is more than 80% "Down" system will reject command and remain in ATT or ALT.</p>
3		<p>AP ON</p> <p>APPR GA</p>	<p>Upon reaching D.H., complete approach or conduct normal GA sequence. (See page 33, position 11)</p>
4		<p>AP ON</p> <p>HDG GA</p>	<p>As safe altitude is reached, press HDG Button for missed approach heading. Note: Pressing GA Button disconnects GS Coupler but does not re-program lateral modes or disconnect autopilot.</p>

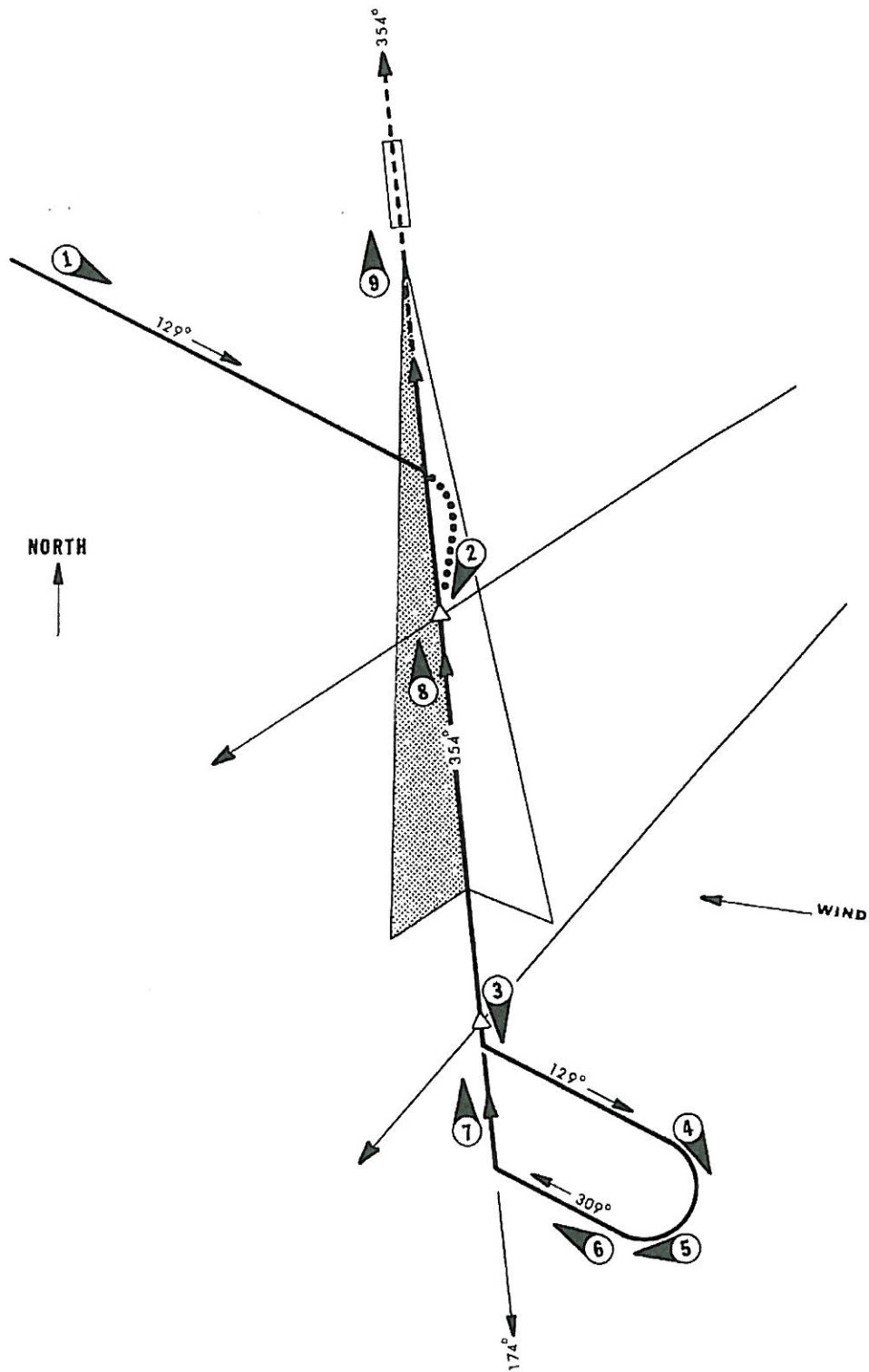


AUTOMATIC GLIDESLOPE (GS) DECOUPLE

Automatic Glideslope (GS) Decouple


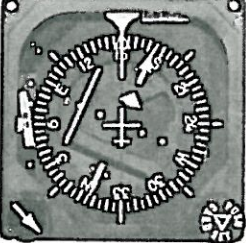
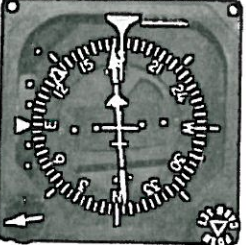
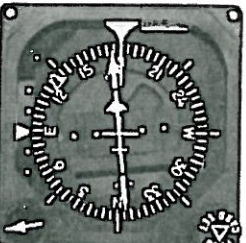

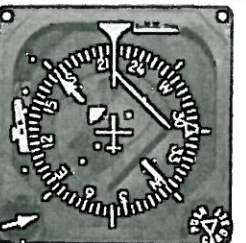
PSN	NSD-360	PROGRAMMER	REMARKS
1		AP APPR	The Century IV incorporates a safety feature for automatic glideslope decoupling.
2		AP ON APPR ALT	If, after glideslope coupling, the glideslope needle should exceed 80% down, the glideslope light will go out, ALT will light and the system will maintain the altitude existing when the needle excursion occurred. The pilot may elect to miss the approach or if the excursion is not great, may use ATT to fly the aircraft to a position with glideslope needle deflection less than 80% down and re-couple by pressing the GS button.

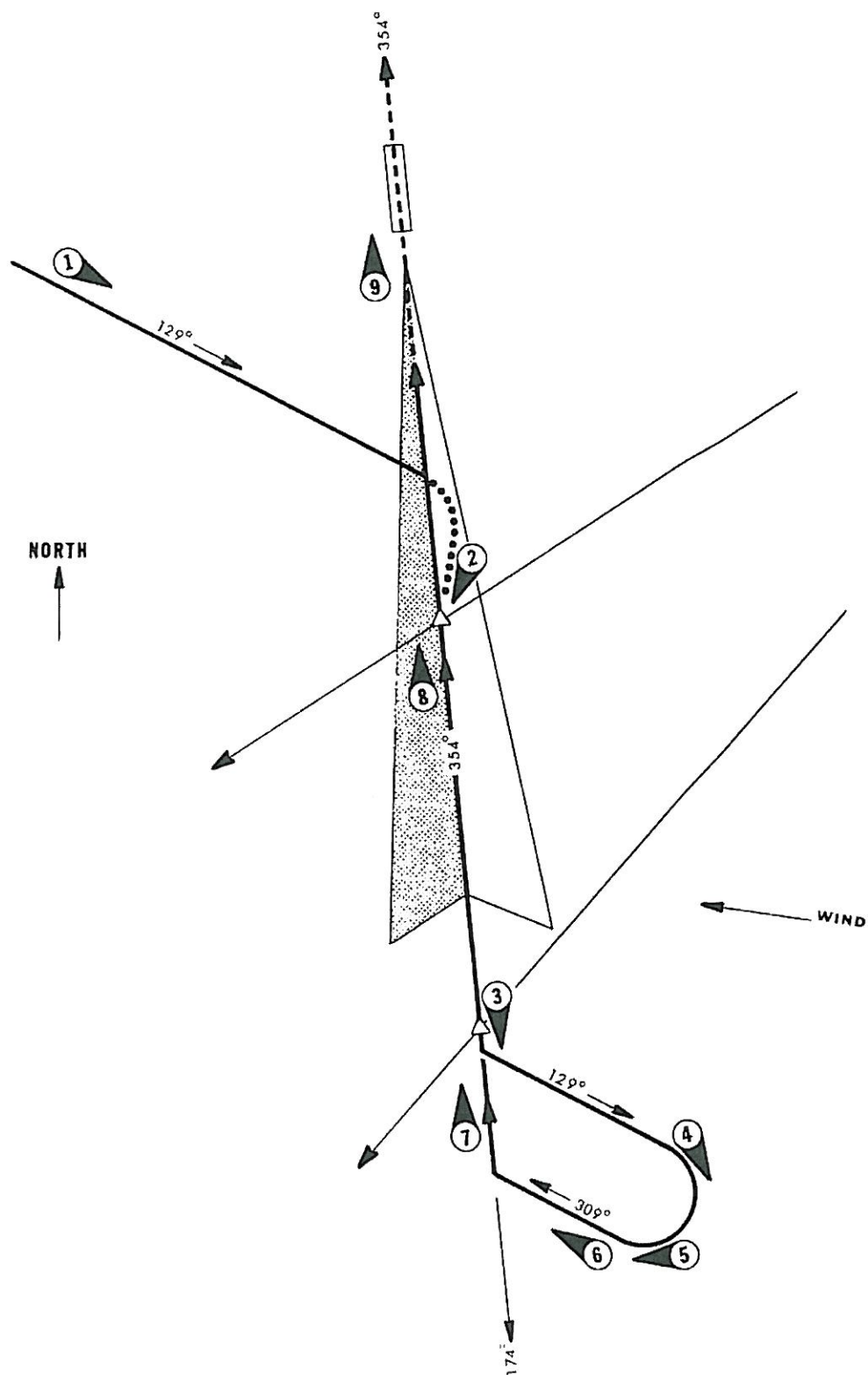
The system will not automatically decouple for deviation below the Glideslope.



LOCALIZER BACK COURSE (LOC BC)


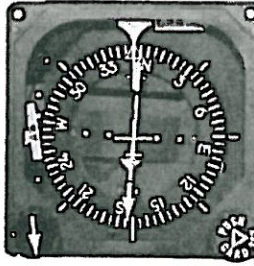

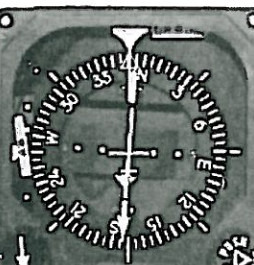
Localizer Back Course (LOC BC)

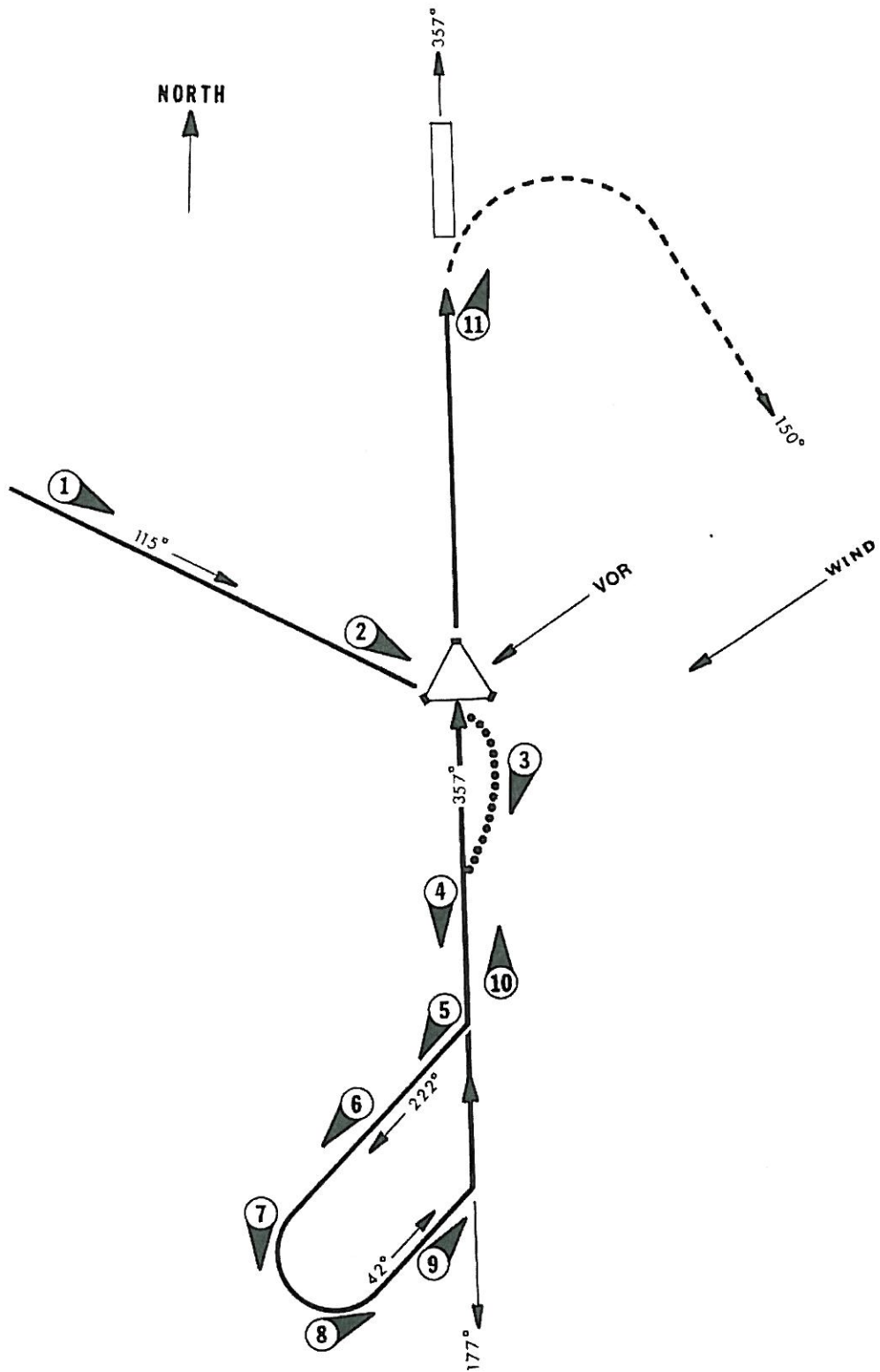
PSN	NSD-360	PROGRAMMER	REMARKS
1		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>The LOC (BC) back course approach begins with a transition from enroute structure to an intercept with the back course Outbound. The Inbound Front Course is set on the course arrow, and a 45° intercept to the course is achieved by pressing the APPR Button to fly the back course Outbound. Note: The set up for this example is the same as flying the front course across the airport and continuing outbound.</p>
1A		<p>AP ON</p> <p>HDG-APPR ALT OR ATT</p>	<p>Alternate--If an intercept angle other than 45° is desired, press HDG and APPR simultaneously--the system will follow heading bug until needle reaches one-half scale, automatically switch to APPR and extinguish HDG Annunciator.</p>
2		<p>AP ON</p> <p>APPR ALT OR ATT</p>	<p>As bound tracking begins, select outbound procedure turn heading with heading bug. Altitude should be controlled using ALT or ATT as appropriate for this phase of the approach.</p>
3		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>When outbound procedure turn heading is desired, press HDG Button, fly outbound for sufficient time to permit proper re-interception.</p>
4		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>Lead aircraft through procedure turn initially by turning heading bug approximately three-fourths distance around the card in the desired direction of turn.</p>
5		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>As aircraft turns, set heading bug to inbound procedure turn heading.</p>




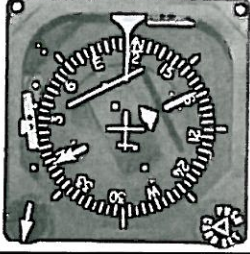
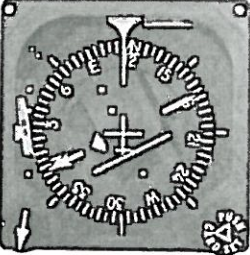
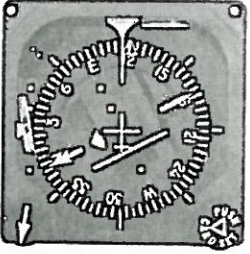
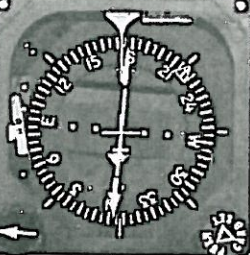
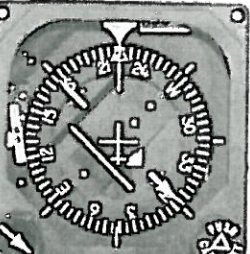
LOCALIZER BACK COURSE (LOC BC)

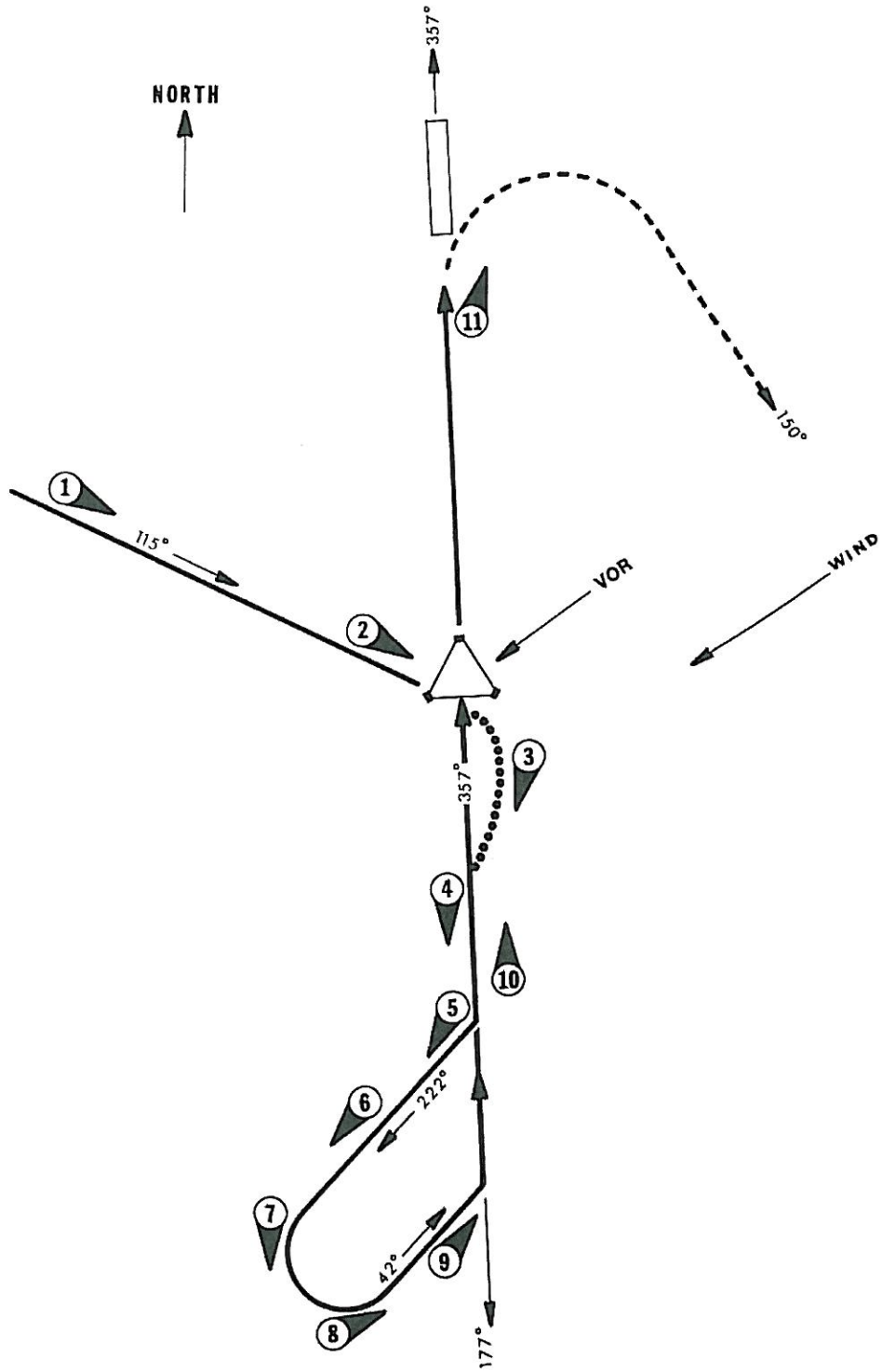
Localizer Back Course (LOC BC) Con't

PSN	NSD-360	PROGRAMMER	REMARKS
6		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>As aircraft nears inbound procedure turn heading, press REV Button for 45° intercept. Note: Selected angle intercept feature does not operate with REV mode.</p>
7		<p>AP ON</p> <p>REV ALT OR ATT</p>	<p>After intercept, system will correct for cross-wind, adjust its internal radio authority (20 seconds), and limit bank angles (90 seconds). Heading bug may be aligned with lubber line or set to miss approach heading. When final approach or step down fix is reached, control rate of descent with ATT, Pitch Command Knob and/or Pitch Sync.</p>
8		<p>AP ON</p> <p>REV ATT</p>	<p>Control altitude and rate of descent with ALT, ATT, Pitch Command Knob and/or Pitch Sync.</p>
9		<p>AP ON</p> <p>REV GA</p>	<p>For missed approach, conduct normal GA Sequence. (See page 33, position 11)</p>









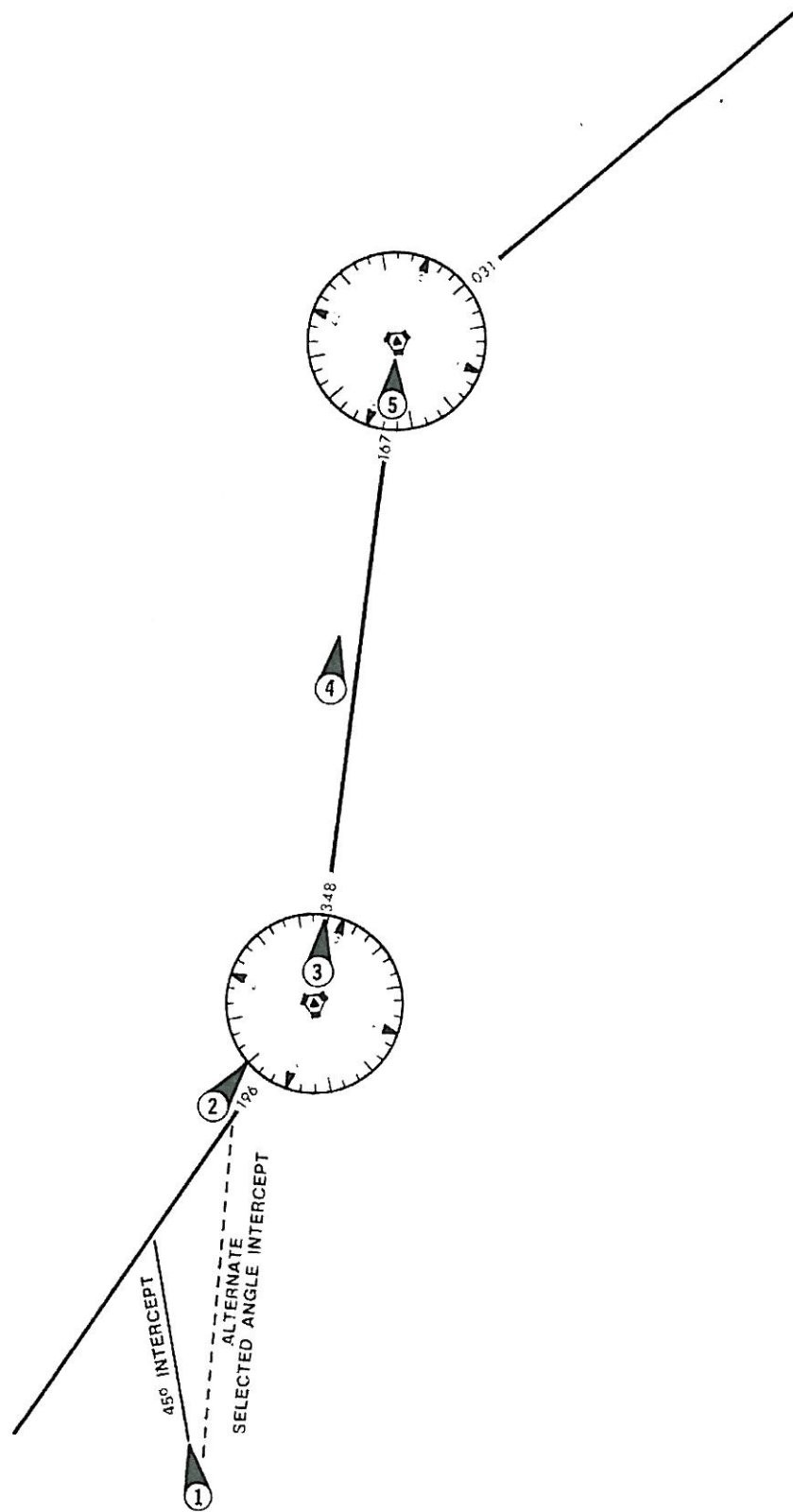
VOR APPROACH

PSN	NSD-360	PROGRAMMER	REMARKS
1		<p>AP ON</p> <p>NAV ALT OR ATT</p>	<p>The VOR Approach usually begins from an enroute situation. If ATC required a descent during this phase, ATT would be used instead of ALT.</p>
2		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>As the VOR is neared, match the heading bug to either the course or the lubber line and press HDG Button. Course arrow may now be set for inbound intermediate course segment.</p>
3		<p>AP ON</p> <p>REV ALT OR ATT</p>	<p>As the VOR is crossed, press the REV Button to fly the selected course outbound. Should a lower altitude be desired, ATT should be pressed and the aircraft flown to the desired altitude.</p>
4		<p>AP ON</p> <p>REV ALT OR ATT</p>	<p>When the desired altitude is reached, press ALT; the procedure turn outbound HDG is pre-selected with the heading bug.</p>
5		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>Pressing the HDG Button will cause the aircraft to turn to the selected outbound procedure turn heading.</p>
6		<p>AP ON</p> <p>HDG ALT OR ATT</p>	<p>Proceed outbound until sufficient time has elapsed to assure proper re-interception.</p>

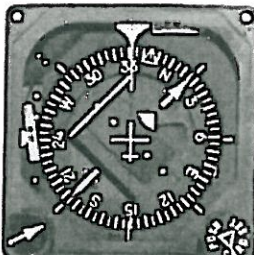
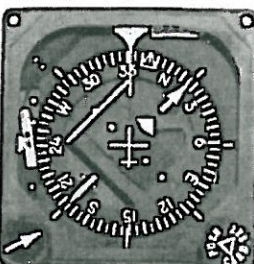






VOR APPROACH

PSN	NSD-360	PROGRAMMER	REMARKS
7		AP ON HDG ALT OR ATT	Lead aircraft through procedure turn by moving the heading bug initially about three-fourths of the way around the card in the desired direction of the turn.
8		AP ON HDG ALT OR ATT	As the aircraft turns, move the heading bug to the desired intercept heading.
9		AP ON APPR ALT OR ATT	Press APPR Button; system will automatically execute 45° (approximate) intercept.
9A		AP ON HDG APPR ALT	Alternate-If intercept angle other than 45° is desired, set heading bug to desired intercept heading. Press both HDG and APPR simultaneously. System will remain in HDG until needle reaches one-half scale and then automatically switch to APPR as indicated by extinguishing the HDG annunciator.
10		AP ON APPR ATT	After intercept, system will correct for crosswind, adjust its internal radio authority (20 seconds) and limit bank angles (90 seconds). Aircraft altitude should be controlled as appropriate for the approach by the use of ALT, ATT and Pitch Command or Pitch Sync. Should a course change be required for the final approach segment, simply move the course selector to the new course at the VOR. Missed approach heading may be preprogrammed with the HDG bug.
11		AP ON HDG GA	For missed approach, conduct normal GA Sequence. (See page 33, position 11)



VOR NAVIGATION

PSN	NSD-360	PROGRAMMER	REMARKS
1		<p>AP ON</p> <p>NAV ALT</p>	<p>Forty-Five degree intercept to a selected radial is automatically accomplished by setting the course arrow/OBS to the desired VOR course and pressing the NAV button on the Programmer.</p>
1A		<p>AP ON</p> <p>HDG APPR ALT</p>	<p>Alternate--If an intercept angle of other than 45° is desired, select the desired course with the course arrow/OBS and the desired intercept heading with the Heading Bug. Press HDG and APPR simultaneously. The system will remain in HDG mode until VOR needle reaches one-half scale and then switch automatically to APPR. After intercept, press NAV button.</p>
2		<p>AP ON</p> <p>NAV ALT</p>	<p>After intercept, system will correct for crosswind, adjust its internal radio authority (20 seconds), and limit bank angles (90 seconds).</p>
3		<p>AP ON</p> <p>NAV ALT</p>	<p>If a course change is required at the VOR, simply reposition the course arrow/OBS to the NAV course. If change is small, system will remain in bank limiting. If change is large, system will re-cycle as in 2.</p>
4		<p>AP ON</p> <p>NAV ALT</p>	<p>Station Switching is accomplished by re-channeling the NAV receiver to the station ahead and repositioning the course arrow/OBS to the new course. Note: If desired station change may be made by setting Heading Bug, press HDG and then pressing NAV after setting course arrow/OBS, system recycles as in 2 if system is re-programmed.</p>
5		<p>AP ON</p> <p>HDG APPR ALT</p>	<p>The selected angle intercept feature may be used for course changes at VOR's if desired. When near the VOR (5 nm, max), match the heading bug to the lubber line and press HDG button. Set new course with the course arrow/OBS. Press HDG and APPR simultaneously. When VOR is crossed, system will automatically switch to APPR and acquire the new course. Press NAV when convenient.</p>

MAINTENANCE

The Century IV has been designed and manufactured to render reliable service; however, some of the system components will require a regular inspection and service. It is important that agencies selected for service are properly qualified and equipped to render service on the Century IV's.

We have listed several items below to assist you in monitoring your system maintenance.

1. **Gyro Filters**—The gyros used with the Century IV are precision devices whose performance and service life are in part dependent upon the quality of the air supply. Poor air quality can significantly reduce gyro life (to hours) and performance by contaminating bearings. Regular filter maintenance is a good investment.
2. **Aircraft Static Systems**—Air leaks and water entrapment can significantly affect altitude hold performance. Static System maintenance and checks help not only the AFCS, but assure proper function of static instruments. Altitude Hold units used by Century Flight Systems, Inc. should NOT be disconnected during static system checks as they are designed to withstand such tests without damage.
3. Periodic inspection and maintenance is recommended for those items of the autopilot which attach to the aircraft control systems. During normal inspection is a good time to make these simple checks on the autopilot.
 - A. Inspect the bridle cable on the Pitch, Roll and Yaw Servos for:
 1. Condition.
 2. Tension - feels equally tight as main cable.
 3. Freedom - move controls through travel.
 - B. Inspect bridle cable clamps for:
 1. Obstruction.
 2. Bolt Torques - 55+/- 5 inch pounds of torque. Note: This higher than normal torque is FAA approved and required.
 3. Gap between clamp halves - .005' minimum, assures that cables are under clamping pressure.
 - C. Inspect Trim Capstans for:
 1. Evidence of wear.
 2. The clutch should slip instead of cable on capstan if overpowered.
 - D. Inspect Trim Cables for:
 1. Fraying.
 2. Proper tension (high end of spec is usually best).
 3. Freedom of travel.
 - E. Inspect Trim Sensor contacts for:
 1. Condition.
 2. Cleanliness.

NSD-360 and NSD-360A EMERGENCY OPERATION

Appearance of HDG Flag:

1. Check air supply gauge (vac or pressure) for adequate air supply (4 in. Hg min.).
2. Check NSD-360 (DG-360) circuit breaker.
3. Observe display for proper operation,

To disable heading card-- pull circuit breaker and use magnetic compass for directional data. Note: If heading card is not operational, autopilot should not be used.

NSD-360

With card disabled--VOR and Glideslope displays are still functional; use card set to rotate card to aircraft heading for correct picture.

Localizer--left-right information still usable, Flag information is disabled -- compare needle with #2 indicator for valid left-right needle operation.

NSD-360A

With card disabled -- VOR, Localizer, and Glideslope displays are still functional; use card set to rotate card to aircraft heading for correct picture.

Slaving Failure - (i.e. failure to self-correct for gyro drift):

1. Check slave switch (if installed) for SL-#1 PSN.
2. Check for HDG Flag.
3. Check NSD circuit breaker.
4. Reset heading card while observing slaving meter.
5. Select slaving amplifier #2 (SL-#2) if available.
6. Reset heading card while checking slaving meter.
7. Switch to free gyro and periodically set card as unslaved gyro.

NOTE

If the optional RMI feature is installed, it is inoperative in the SL#2 position.

MAINTENANCE

The NSD-360 family of instruments have been designed and manufactured to render reliable service. If service is required, it is important that agencies selected for service are properly qualified and equipped.

Gyro Filters -- The gyros used in the DG, NSD-360 family are precise devices whose performance and service life are in part dependent upon the quality of the air supply. Poor air quality can significantly reduce gyro life by contaminating bearings. Regular filter maintenance is a good investment.

PRODUCT IMPROVEMENTS

Century Flight Systems, Inc. maintains a policy of constant product improvement. Many times these product improvements are made available on a retrofit basis to owners of earlier systems. In most cases, retrofit and up-grading is available at moderate cost through your Century Flight Systems, Inc. Distributor. We must, because of practical considerations, state that we reserve the right to make changes in product specifications and prices without incurring obligations.

We suggest that you ask your installer to enter this significant data in your Operator's Manual for easy reference:

AK NO. _____ System S/N _____ Date Installed _____

Installed
By _____

Major component part numbers and serial numbers

Computer Amplifier, P/N _____ S/N _____

Programmer,
P/N _____ S/N _____

System Coupler, P/N _____

S/N _____

Trim Amplifier, P/N _____ S/N _____

Compass System, P/N _____ S/N _____

Remarks (Special
Features) _____

Registration of your system for warranty purposes will provide us with basic data on your system which we will use to make you aware of product improvements.

Should you sell your aircraft, may we ask you to advise the new owner of our continuing interest and ask him to drop us a note containing the above data so we may up-date our records.

Effective: July 4, 1975

LIMITED WARRANTY CENTURY FLIGHT SYSTEMS AUTOPILOT

Each new Century Flight Systems Inc. Autopilot is warranted by the manufacturer to be free from defects in material and workmanship under normal use, subject to the following conditions:

1. Century Flight Systems Inc. will through its designated service facilities at its option either repair or replace new components which, shall within (12 months after date of installation, be found, to Century Flight Systems Inc. satisfaction, to have been defective in material or workmanship under normal use.
2. The warranty registration must be signed and returned to Century Flight Systems Inc. within ten days of equipment installation date. In the event that the registration card is not returned within this time, the date of shipment from the factory will be deemed to be the installation date.
3. This warranty will not apply to any product which has been installed, repaired or altered in any way whatsoever in Century Flight Systems Inc. opinion to adversely affect its performance or reliability, or which has been subject to misuse, contamination, negligence, or accident.
4. Cost of transportation, removal, or reinstallation is at the option of Century Flight Systems Inc.
5. This is Century Flight Systems Inc. sole express warranty with respect to the goods supplied herein. CENTURY FLIGHT SYSTEMS INC. MAKES NO OTHER EXPRESS WARRANTY OF ANY KIND WHATSOEVER. CENTURY FLIGHT SYSTEMS INC. EMPLOYEES MAY HAVE MADE ORAL STATEMENTS ABOUT THE PRODUCTS DESCRIBED IN THIS CONTRACT. SUCH STATEMENTS DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY THE CUSTOMER, AND ARE NOT PART OF THE SALE CONTRACT.
6. THE DURATION OF ANY IMPLIED WARRANTY, AND OF ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL BE LIMITED TO (12) MONTHS COMMENCING AT DATE OF INSTALLATION TO THE FULL EXTENT PERMITTED BY APPLICABLE LAW, CONSEQUENTIAL DAMAGE OR BREACH OF ANY WARRANTY ARE HEREBY DISCLAIMED AND EXCLUDED BY CENTURY FLIGHT SYSTEMS, INC. .

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76068
January 1982

