SCHWEIZER AIRCRAFT CORP.

Supplement to the Approved
Rotorcraft Flight Manual

For

Schweizer 330 Model 269D Helicopters &
Schweizer 333 Model 269D Config. "A" Helicopters

OPTIONAL INSTRUMENT/AVIONICS INSTALLATIONS

Date of Original Approval: 7/28/93

Date of Rev. #7 Approval: JUN 11 2001

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1	11 Jun 2001	17.4	11 Dec 2000
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8	16 Sep 1998	18.6	11 Dec 2000
9	15 Nov 1994	18.7	11 Jun 2001
10	16 Sep 1998	18.8	11 Jun 2001
10.1	11 Jun 2001	18.9	11 Jun 2001
10.2	11 Jun 2001	18.10	11 Jun 2001
10.3	11 Jun 2001	18.11	11 Jun 2001
10.4	11 Jun 2001	18.12	11 Jun 2001
11	15 Nov 1994	19	15 Nov 1994
12	15 Nov 1994	20	15 Nov 1994
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15	15 Nov 1994	23	15 Nov 1994
16	11 Jun 2001	24	15 Nov 1994
16.1	11 Jun 2001	25	16 Sep 1998
16.2	11 Jun 2001	26	16 Sep 1998
17	15 Nov 1994	27	11 Jun 2001
17.1	11 Dec 2000	28	16 Sep 1998
17.2	11 Dec 2000		
17.3	11 Dec 2000		

NOTES

The change bar (▌) defines the latest FAA Approved changes. The (*) indicates not officially approved.

REVISION TABLE

Number	Date	Description
Rev. #1	15 Nov 1994	Updated to delete KI 202 and weight and balance table and to add KI 203, KCS 55A, GPS 150, KI 229, KN 62A KR 87, KR 21 and Nav Switching Options.
Rev. #2	30 Mar 1995	Updated to add KLX 135 GPS/COMM
Rev. #3	16 Sep 1998	Updated to add KLX 135A GPS/COMM, and miscellaneous other changes.
Rev. #4	20 Jul 1999	Updated to add GPS 150/150XL Navigation System
Rev. #5	22 Sep 2000	Updated to add GNC 250XL COMM/GPS
Rev. #6	11 Dec 2000	Updated to add KT76C Transponder , GNS 430 COMM/NAV/GPS and AA 97-424 Audio Control Panel.
Rev. #7	11 Jun 2001	Updated to add AA 85-001 InterVOX II Intercom, GTX 320/320A Transponder, GTX 327 Transponder, and GNS 530 COMM/NAV/GPS

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SECTION I

Introduction and General

This supplement contains basic operation instructions for optional avionics and instrumentation which may be installed on the aircraft. As installed optional equipment varies with each aircraft, it is the pilot's responsibility to become familiar with the operation and function of all installed equipment.

This supplement must be carried in the applicable basic FAA approved 330 Model 269D Rotorcraft Flight Manual when the rotorcraft is equipped with any of the optional instruments or avionics whose operation is contained herein.

Except as modified by this flight manual supplement, operation in compliance with the basic approved Rotorcraft Flight Manual is mandatory.

SECTION II

Limitations

The installation of optional equipment listed in this supplement is for VFR aircraft, only, and does not make the aircraft eligible for flight into IFR or IMC conditions.

If this aircraft has an installed GPS Navigation System, a placard (GARMIN P/N 161-00024-00, S.A.C. P/N 269A4646-265, or equivalent) stating "GPS limited to VFR use only" must remain installed on the instrument panel, in plain view of the pilot.

If this aircraft has an installed GPS Navigation System, the GPS manufacturer's operation manual must be immediately available to the flight crew.

SECTION III

Emergency and Malfunction Procedures

3.1 In case of electrical system failure, all unnecessary electrical equipment should be turned "OFF" to conserve battery power.

Specific emergency procedures for optional avionics are provided in the individual operational instructions where applicable.

4.1 KMA 24H AUDIO CONTROL PANEL

The PA position on the KMA 24H permits the flight crew to address cabin occupants over the cabin speaker (if installed). To do this, select "PA" with the microphone switch. When the mike is keyed, the receiver audio is muted and you may talk normally into the microphone to broadcast over the speaker.

The KMA 24H has "AUTO COMM" capability and always provides automatic headphone audio selection to match the transceiver in use. The selection of speaker audio can be made manually with the row of speaker audio select push buttons.

The KMA 24H has an "EMG" position on the microphone selector. This feature bypasses the KMA 24H's audio amplifier and directly connects COMM 1 to the pilot's microphone and headphones. This provides a fail-safe method of communication should the unit fail.

The KMA 24H also has an "EXT" position on the microphone selector switch which connects the microphone to an external ramp hailer speaker, if installed.

KMA 24H INTERCOM

The KMA 24H has a built-in five-station intercom with two dedicated amplifiers. Intercom operation may be "hot mike," in which the intercom is active all the time; voice activated (VOX), in which the intercom becomes active automatically when a crew member begins to speak; or keyed activation, in which a separate microphone switch must be keyed to activate the intercom. Selection of the desired method of microphone activation is accomplished with the intercom VOX sensitivity control (outer concentric knob on left side of unit).

Turn it to the fully clockwise detent position for hot mike operation. Turn the knob all the way counter-clockwise past the detent for keyed microphone operation. (Note: a separate intercom key switch must be included in the installation in order to use keyed intercom operation.) In the middle range, the switch selects VOX, and the rotation of this knob also adjusts the sensitivity of the voice activated switch.

In order to set the proper VOX sensitivity, first turn the VOX sensitivity control clockwise until a hissing sound is heard in the headphones. Next turn the control counterclockwise until the hissing sound stops. The VOX is now properly set for the present noise environment. It is normal to have to reset the VOX sensitivity level whenever the noise in the cockpit/cabin changes, such as when making large power setting changes.

The inner concentric knob is the intercom volume control. This adjusts the intercom volume without affecting the volume of the selected receiver audio inputs.

When either the pilot or copilot keys the microphone to transmit, all other intercom microphone inputs are muted, which ensures that the keyed microphone is the single source of transmitted audio. All receiver inputs are also muted during transmissions.

RECEIVER SELECTION

The top row of push buttons on the console controls the audio selection for the speaker, and the bottom row selects audio for headphones. The selections are independent, and any audio input can be selected for speaker or headphones or both. These push buttons allow audio selection independent of the AUTO feature described earlier.

The KMA 24H can control as many as six receivers. The KMA 24H has two unswitched inputs for uses such as the radar altimeter audio alert or the ring signal from a radiotelephone. To listen to a specific receiver, simply press the corresponding headphone or speaker button "in." To disconnect that receiver, press the button again. It will return to the "out" position.

For the KMA 24H, volume of audio input from transceivers and receivers is set with the volume controls of each individual radio.

TRANSMITTER SELECTION

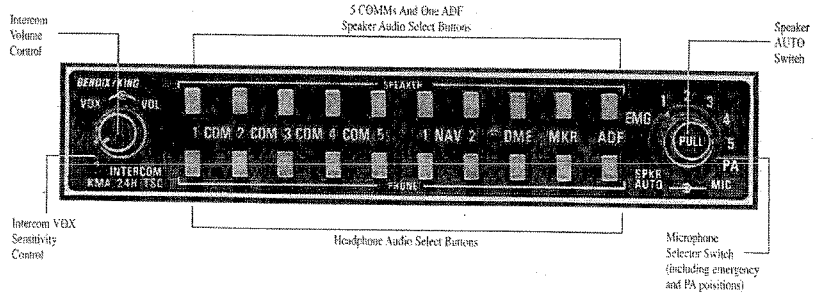
The rotary switch on the right side of the KMA 24H console selects the desired transmitter for the cockpit microphones. The COMM 1 thru 5 positions are for transmitting on the frequencies set up on those respective communication transceivers.

The "PA", "EXT", and "EMG" positions are discussed above.

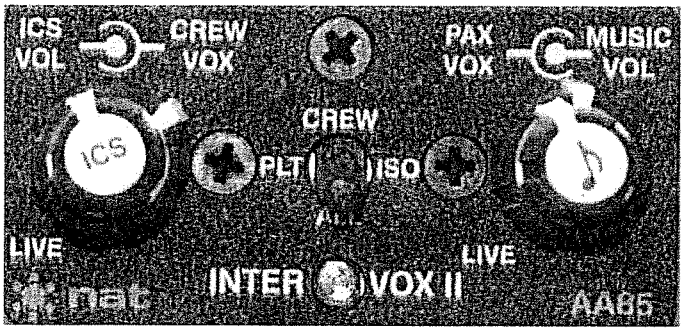
OPTIONAL INTERCOM MODES

The optional installation of a remote, two or three-position switch for intercom operations with the KMA 24H provides three modes: Isolate, Normal (NORM) and Private. In Isolate, the pilot takes himself out of the intercom loop while the other four intercom positions are tied together. In Normal, all five intercom positions are tied together. In Private, the pilot and copilot positions are linked together for two-station hot mike operation. At the same time, the other three intercom positions have independent three-station intercom operation.

Amplified operating instructions are provided in Bendix/King Publication No. 006-08316-007.



4.1A AA 85-001 InterVOX II Intercom



This box operates like two voice activated intercom systems: a primary one for the PILOT and a second one for the PASSENGERS. The center mounted toggle switch controls who is connected to which intercom. Switch **down** to "**ALL**" connects everybody to the PILOT's intercom. Switch in the **center** position to "**PLT ISO**" isolates the pilot to radios, only (without music), and connects everybody else to the PASSENGER's intercom. Switch position **up** to "**CREW**" connects the copilot to the PILOT's intercom and leaves the passengers connected to their own PASSENGER's intercom.

The light below the toggle switch lights up amber, when the intercom is keyed, and green, when the transmitter is keyed.

The left hand "**ICS**" intercom volume control **knob** adjusts all intercom volume. If the optional music input jack is connected to an external music source, the right hand **MUSIC** volume control **knob** adjusts the volume of all added music.

The left hand "**CREW VOX**" intercom noise squelch control **ring** adjusts the trigger level at which pilot or copilot voice will automatically key the PILOT's intercom. Turning this ring fully counterclockwise to "**LIVE**" keeps this intercom always keyed. Turning this **ring** fully clockwise keeps this intercom quiet (except for music) until it is manually keyed.

The aircraft's radios are connected to the PILOT's intercom, so the passengers only hear them in "**ALL**" mode. Any optionally supplied music is muted by intercom voice or a received radio signal, and keying a transmitter will mute intercom audio.

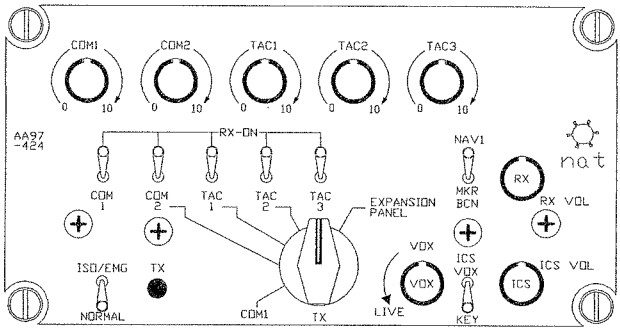
The right hand "**PAX VOX**" intercom noise squelch control **ring** adjusts the trigger level at which passenger voice will automatically key the intercom. Turning this **ring** fully counterclockwise to "**LIVE**" keeps their intercom always keyed. Turning this ring fully clockwise keeps their microphones quiet (except for music) until manually keyed.

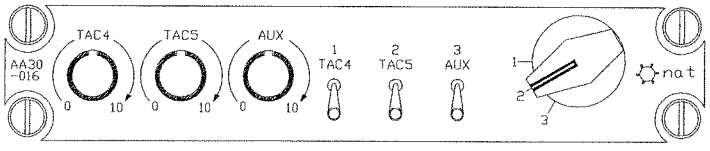
When the pilot keys, he takes transmitter authority away from the copilot.

If the pilot's mic key fails, he can switch to "**PLT ISO**" and then key his mic (and not the copilot mic) by having someone press the copilot mic key.

If an AA85 internal amplifier fails but does not trip the "**AUDIO AMP**" circuit breaker, the pilot may pull this circuit breaker, to get automatic **EMERGENCY** switching of the pilot's headset to direct radio connection.

4.1B AA 97-424 Audio Control Panel





The **transmit selector control** is a six position rotary switch that selects a transmitter and it's corresponding receiver audio. The fully clockwise "EXPANSION PANEL" switch position allows transfer of transmitter/receiver control to an auxiliary panel, such as an AA 30-016 with two or three more tactical radios. When a transmitter is keyed, audio selected by the controller that is transmitting is muted, except for the sidetone of the transceiver in use. Receive audio is automatically selected as a function of the rotary selector switch. No additional switching is needed, to establish external communication. During transmit, the appropriate TX annunciator (green) will light on the panel. When not transmitting, any of the row of five audio switches may be lifted, to add their audio to the audio of the selected transmitter. The rotary knobs above those five switches control their respective audio volume. There is also a (blue, center OFF) toggle switch that may be lifted, to add audio from NAV 1, or lowered for Marker Beacon receiver audio.

Intercom system (ICS) audio is controlled by a group of two knobs and a switch. It may be operated in three modes; LIVE (on constantly), VOX (voice activated), or KEYED (active only when keyed by the ICS switch). The center toggle switch is lifted, for VOX or LIVE, and lowered, for mic button keyed operation. The **Mode Control Switch** is a locking toggle switch (pull to switch) that is lifted for ISO/EMER OPER, and lowered for NORM. It is identified with a **red cap**. When switched to the ISO/EMER OPER position, the panel's audio is removed from the ICS bus and connected directly to the switch selected transmitter. This mode should be selected in the event of a audio selector panel fault or power failure. The Emergency function should be tested prior to flight, to assure proper operation and allow the radio levels to be set adequately for emergency operation. If an audio panel or airframe fault prevents the TX annunciator from lighting during transmit (indicating a failure in the mic keying circuit), then a different mic may have to be used. A power fault of any kind will prevent the TX annunciator from lighting, giving an immediate indication of failure. If ICS audio is still available, then the power to the control panel has not failed, and loss of the TX light indicates TX switch failure. Level will be lower than NORM operation because the signals are obtained directly from the radios, bypassing the electronics in the control panel. This is provided for failure situations which make operation impossible in the NORM mode (i.e., loss of power or amplifier failure, etc.)

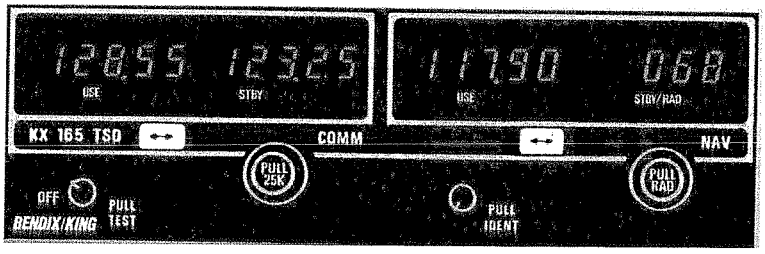
When the mode switch selects ISO/EMER OPER function, this prevents the pilot from receiving ICS audio. This is useful when passengers are interfering with critical flight operations (landing, etc.).

4.2 KX155/KX165 NAV/COMM

The KX155/KX165 is turned on by rotating the ON-OFF VOLUME control knob, on the left side of the unit, clockwise and adjusting COMM audio volume. The NAV audio volume is located on the right (NAV) side of the unit. The left side of the unit is dedicated to COMM frequency management and the right side of the unit is dedicated to NAV frequency management. Rotating the frequency control knobs will increment or decrement the frequency in the STAND-BY window (left frequency knobs control COMM frequencies; right frequency knobs control NAV frequencies. Depressing the white transfer button will exchange the USE and STAND-BY frequencies. When the transmit keyline is activated, a T will appear between the USE and STAND-BY windows, on the COMM side, to indicate transmission.

Navigational bearing information from the KX155/KX165 may be displayed on a Course Deviation Indicator (CDI), Pictorial Navigation Indicator (PNI) or on the green VOR needle of Radio Magnetic Indicator (RMI).

Amplified operation instructions are provided in Bendix-King Publication No. 006-8329-03.

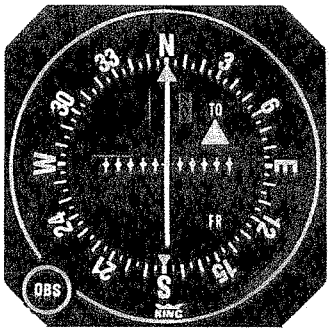


KX 165 NAV/COMM Transceiver (TSO'd)

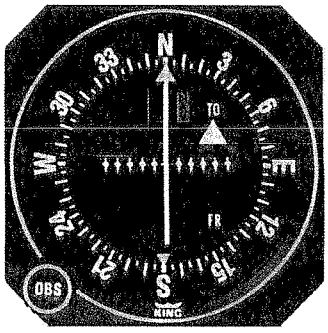
4.3 NAVIGATION INDICATORS

NAV Indicators for use with KX 155:

KI 203 VOR/LOC Indicator.



KI 204 and KI 206 VOR/LOC/Glideslope Indicators. The KI 204 indicator interfaces with the KX 155 with glideslope or other NAV/GS systems which do not contain their own VOR/LOC converters. The KI 204 provides rectilinear display of VOR/LOC and glideslope deviation, internal blue-white lighting, and an anti-reflective coated glass lens.

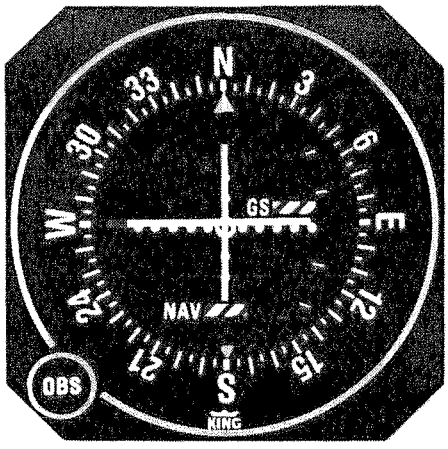


KI 204/206 VOR/LOC/Glideslope Indicator

NOTE: The KI 206 indicator is identical in appearance with the KI 204 and is used in place of the KI 204 when a VOR converter is provided elsewhere, such as with the KNS 80, KNS 81 and KX 165.

KI 208 VOR/LOC Indicator. Left/right course deviation is displayed. OFF flag disappears when valid NAV signal is received and TO/FROM is displayed. Internal blue-white lighting.

KI 209 VOR/LOC/Glideslope Indicator. Has built-in VOR/LOC converter for used with the KX 155 with glideslope receiver. OFF flag disappears when valid NAV signal is received, and TO/FROM is displayed. Independent GS flag. Internal blue-white lighting.



KI 209 VOR/LOC/Glideslope Indicator

KCS 55A PNI SYSTEM OPERATION INSTRUCTIONS

When power is applied to the KCS 55A System the HDG flag will remain in view until the following conditions are satisfied: The gyro spin motor is at least 50% of normal speed, the fast slave mode has been executed and normal system power is present. Slave rate is 180 degree/minute. The slow slave rate is 3 degree/minute. The slaving meter indicates relative deviation from this alignment.

CAUTION

MOVEMENT OF THE AIRCRAFT WHEN THE GYRO'S ARE NOT UP TO FULL SPEED OR WHEN POWER TO THE GYRO'S HAS BEEN SHUT OFF AND GYROS HAVE NOT FULLY SPUN DOWN MAY CAUSE GYRO DAMAGE. ALLOW SUFFICIENT SPIN DOWN TIME PRIOR TO ANY AIRCRAFT MOVEMENT.

Set the navigation receiver to the desired VOR/LOC station and rotate the course select knob to adjust the selected course pointer to the desired course radial. When a usable navigation signal is received by the KI 525A the NAV warning flag will disappear from view.

The KI 525A lateral deviation bar represents the selected VOR/LOC course. The relationship of the deviation bar to the symbol aircraft presents the relationship of the selected course to the aircraft

For an ILS approach, tune the navigation receiver to the desired frequency. For LOC and ILS front course operation the selected course pointer should be set to the inbound localizer course. The glideslope pointer will deflect into view after a 2 to 12 second delay if a usable glideslope signal is received. The glideslope pointer indicates the relative position of the glideslope path with respect to the aircraft. The heading bug (shown in the lower right hand corner) provides no function on this aircraft.

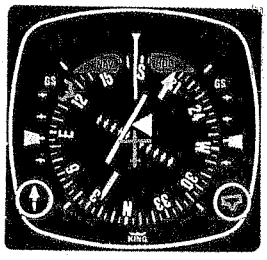
The position of the deviation bar with respect to the symbolic aircraft indicates the relative position of the selected course. For backcourse operation set the course pointer to the inbound localizer course. The deviation bar position relative to the symbolic aircraft then represents the position of the backcourse with respect to the aircraft.

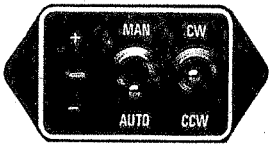
If the KI 525A HDG flag appears in view after the system has been operating or will not go out of view after initial power up, the compass information will not be reliable.

A continuous large deflection of the slaving meter or large discrepancies between the magnetic compass and the compass card may indicate a failure in the slaving system and may not necessarily be annunciated by the HDG flag. If a slaving failure should occur the SLAVE IN button/switch on the KA 51/51A/51B should be returned to its outer position. The system will now be in the free gyro mode. By depressing the clockwise or counterclockwise button on the KA 51/51A (toggle switch on the KA 51B) the compass dial can be repositioned to the correct heading. The compass system will continue to function normally except there will be no magnetic correction.

If the KI 525A NAV flag appears the navigation equipment is off, improperly tuned, or malfunctioning. The compass card will continue to display the aircraft heading.

If the glideslope pointer remains out of view during ILS operation the glideslope transmitter or the aircraft glideslope receiver is malfunctioning. The localizer and heading displays will continue to function normally.





KA 51B Slaving Accessory and Compensator Unit

4.4 NAV SWITCHING OPTIONS

When two or more navigational receivers share the same display (CDI, HSI or RMI), lighted indicator switches (with a push to switch feature) are installed to "Annunciate" which NAV receiver is the source of the displayed navigational information. The following NAV switching lighted indicator switch options may be installed:

HSI	
NAV	GPS

RMI	
NAV	GPS

CDI	
NAV	GPS

HIS	
N_1	N_2

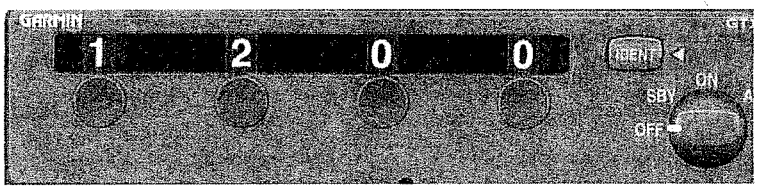
RMI	
N_1	N_2

The HSI select switch function is for the green single bar pointer only. The yellow double bar pointer is dedicated to the ADF.

The upper legend (CDI, HIS, RMI) is visible at all times and is backlighted whenever the instrument panel lights are turned on. Only one of the two lower legends (NAV, GPS, N1, N2) will be lighted at a given time. If "NAV" or "GPS" is illuminated, the display information will be from the source annunciated ("NAV" or "GPS").

The CDI, HSI or RMI will not display GPS information until the GPS has been activated to fly to waypoint.

4.4A GTX 320/320A TRANSPONDER OPERATING INSTRUCTIONS



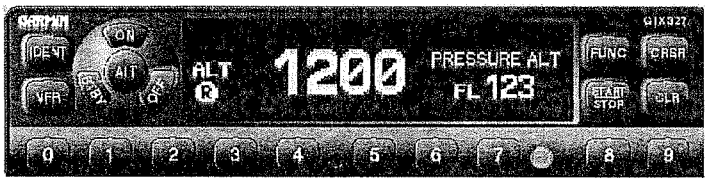
Detailed operating instructions can be found in the (GARMIN P/N 190-00133-09) GTX 320/320A Pilot's Guide. Some highlights of that pilot's guide are printed here.

Operation of this transponder will be very familiar to most pilots. Many pilots will only need to know that the **reply light** is the little caret **beside** the **IDENT** button, and that the **TST** function only tests the reply light. Pressing the **IDENT** button causes the special identification pulse to be added to any normal Mode A or Mode C replies, and it lights the reply light, for 20 seconds. **ON** provides only Mode A replies. **ALT** provides

both Mode A and Mode C (altitude) replies, and is the normal operating mode.

When changing codes in **ON** or **ALT**, do not pass through codes 0000 (government), 7500, (hijack), 7600-7677 (COMMunication failure), or 7700-7777 (EMERGENCY), or it may trigger an automatic alarm, at Air Traffic Control.

4.4B GTX 327 TRANSPONDER OPERATING INSTRUCTIONS



Detailed operating instructions can be found in the (GARMIN P/N 190-00187-00) GTX 327 Pilot's Guide. Some highlights of that Pilot's Guide (and the Installation Manual) are printed here.

Many pilots will only need to know that the (Mode A) reply code is usually displayed, and that pressing a number button starts over writing in a new reply code (left to right). During new code entry, the **CLR** button works as a backspace, and the **CRSR** button cancels a partial (less than four number button presses) entry. As expected, **SBY** switches the radio ON but allows no replies, **ON** starts only Mode A replies, **ALT** starts both Mode A and C replies, and **OFF** switches the transponder OFF (if held in for at least two seconds). If the helicopter has an optional Avionics Master Switch, the GTX 327 will remember which mode was selected before the Avionics Master was switched OFF. There is no TEST mode to test the reply light because there is no separate reply light; there is, instead, a circled "R" that shows up on the lower left corner of the display, for a reply indicator. The **IDENT** button activates 18 seconds of IDENT and adds the word "IDENT" to the upper left corner of the display. The **VFR** button toggles to and from a VFR code (usually 1200) from the entered Mode A reply code that is remembered (even during shut down) until a new code is four button entered. (The VFR code may be pilot selected, in the Configuration mode.)

Pressing the **FUNC** button advances the PRESSURE ALT part of the display through three different six digit stopwatch type timers: a FLIGHT TIME duration timer, a similar COUNT UP timer, and a reverse operating COUNT DOWN timer (that may all be operated simultaneously), and then back to (encoder) altitude. Use the **CRSR** button and six presses of the ten number buttons, to select the starting time for the count down timer. The **START/STOP** button starts or stops (and the **CLR** button resets) whichever timer is presently in view. When the COUNT DOWN timer passes zero, it flashes and continues as a count up timer, and "COUNT

DOWN" is replaced by "EXPIRED." When the PRESSURE ALT (altitude encoder output) function is displayed, an up or down arrow will appear, to the right side of "PRESSURE ALT," when the helicopter rate of climb exceeds the number of feet per minute selected in the Configuration mode. This altitude display can be pilot configured to read flight level, feet or meters.

When changing codes in **ON** or **ALT**, do not pass through codes 0000 (government), 7500, (hijack), 7600-7677 (COMMunication failure), or 7700-7777 (EMERGENCY), or it may trigger an automatic alarm, at Air Traffic Control.

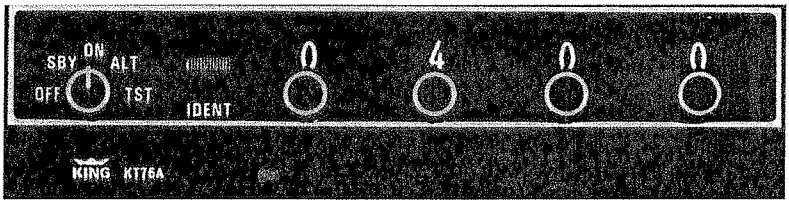
4.5 KY196A COMM

The KY196A COMM is turned on by rotating the ON-OFF-VOLUME control knob clockwise and adjusting the volume to a comfortable level. Two frequencies will be displayed, one in the USE window and one in the STAND-BY window. Rotating the frequency control knobs will increment or decrement the frequency in the STAND-BY window. Depressing the white push button will exchange the frequencies in the USE and STAND-BY windows. When the transmit keyline is activated, a T will appear between the USE and STAND-BY windows to indicate transmission.

Amplified operating instructions are provided in Bendix-King Publication No. 006-8438-00 (KY196A).

4.6 KT76A TRANSPONDER

Turn on the KT76A transponder by rotating the function selector knob to standby (SBY) for approximately 45 seconds, then to ON or ALT. Rotating the function selector to test (TST) position will cause the reply light to illuminate if test is successful. The transponder code is entered by rotating the code control knobs. During some operations, ATC may request the pilot to IDENT which will require a momentary depressing of the IDENT push button on the KT76A transponder. If aircraft is equipped with an altitude encoder, the transponder function selector knob must be turned to the ALT position in order to provide altitude reporting to ATC.



Amplified operating instructions are provided in Bendix-King Publication No. 006-8244-08.

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4.6A KT76C TRANSPONDER OPERATING INSTRUCTIONS

MODE SELECT KNOB POSITIONS:

OFF - The unit is not energized.

Standby - The unit is energized, but is inhibited from replying to any interrogation. "**SBY**" is annunciated on the display, in this mode. The altitude display is blank.

TEST - The unit will illuminate all segments and characters, in "TST." No transponder replies are transmitted in "TST," but display lighting level may be adjusted.

On - The unit replies Mode A, only. The altitude display is blank. "ON" is annunciated on the display. This mode is usually used to salvage position reporting, when an altitude reporting malfunction or condition threatens to preclude acceptable transponder use.

Altitude - This is the normal use mode. The unit sends a Mode A four digit (one of 4096) "squawk" ID (identification) code and a Mode C encoded altitude, in response to valid interrogations. The altitude information will be shown as a FL, on the left half of the display. The four digit "squawk" code will be displayed on the right half of the display. "**ALT**" and "**FL**" are annunciated on the display, in this mode.

PUSH BUTTONS:

IDENT - Depressing the "**IDT**" push button causes the special position identification pulse (SPI) to be appended to Mode A replies, for a period of 18 ± 2 seconds. During this period the KT 76C will annunciate the "**R**".

Buttons 0 through **7** are used to write (left to right) the four digit Mode A "squawk" code, displayed in the right hand ident window of the display. The **CLR** clear key works like a typewriter backspace key and erases displayed identification code digits, from right to left. The Mode A code may be selected in the Standby, On, and Altitude modes.

4.6A KT76C TRANSPONDER OPERATING INSTRUCTIONS (cont)

Three to four seconds after this code has been entered, or immediately after the "**IDT**" pushbutton has been pressed, the new code is transmitted. This code is written into non-volatile memory, so the code will be saved, when the power is switched "OFF."

VFR - Momentarily depressing the "**VFR**" pushbutton causes the preprogrammed VFR "squawk" code (usually 1200) to replace whatever code was previously entered. The new "squawk" code will be immediately displayed, and transmitted 4 to 6 seconds later. This "squawk" code will be stored as the last active code, just as if it were entered from the front panel pushbuttons.

The VFR code is programmed by the following sequence:

(1) Place the unit in Standby

(2) Enter in the desired VFR code, with the code pushbuttons.

(3) Depress the "**VFR**" pushbutton **while holding** the "**IDT**" pushbutton in its depressed position. This will both use and store this code.

NOTE

Pressing and **holding** the **"VFR"** Pushbutton for **two seconds** will switch back to the last non-VFR **"squawk"** code. Therefore, the VFR button can be used to switch back and forth between two "squawk" codes, and they are both remembered, even when the equipment is switched "OFF."

DISPLAY:

REPLY - The display indicator **"R"**, is illuminated for 750 msec ±100 msec when the transponder is replying to a valid interrogation, and during the 18 ±2 seconds SPI transmission, following pressing the **IDT** ident button.

ALTITUDE DISPLAY:

The KT 76C displays the Flight Level altitude on the left side of the display. The display is in hundreds of feet. "FL" is annunciated to indicate Flight Level altitude. Flight Level is a term to indicate that the altitude is not true altitude, but barometric altitude, which is

not corrected for local pressure. For Example, "Fl - 040" corresponds to an altitude of 4000 feet, if mean sea level pressure is 29.92 inches of mercury. The Flight Level altitude is only displayed when the altitude reporting is enabled, i.e. in Altitude mode. If an invalid code from the encoder is detected, dashes will appear in the altitude window. Altitude reporting is disabled, if the altitude window is blank or has dashes.

DISPLAY BRIGHTNESS ADJUSTMENT:

The upper left corner of the display has a photo sensor that continuously adjusts the display brightness according to the present cockpit light level. There is also a general lighting level adjustment, to compensate the brightness for pilot preference or aging of the display. This general brightness level is adjusted in the test (**TST**) mode. To adjust the display general brightness, perform the following steps:

a. Turn the mode select knob to **"TST"**.

b. Press the **"0"** pushbutton to decrease brightness by 10%

c. Press the **"7"** pushbutton to increase brightness by 10%.

d. Press the **"4"** pushbutton to set brightness to the 50% default setting.

e. Remove the mode select knob from the **"TST"** mode, to set display general brightness programming.

NOTE

In the test mode, four carets will show up below the four Mode A code digits. The next activation of a 0, 4, or 7 button will switch these carets to showing the display's programmed general lighting level.

One caret = 10, 20, or 30%.

Two carets = 40, 50, or 60%.

Three carets = 70, 80, or 90%.

Four carets = 100% (maximum) general lighting level.

4-7. GPS

GARMIN GPS 100 AVD GPS NAVIGATION SYSTEM

For detailed operating instructions refer to the Garmin GPS 100 AVD Owner's Manual Part No. 190-00012-00 Rev. B or subsequent.

CAUTION

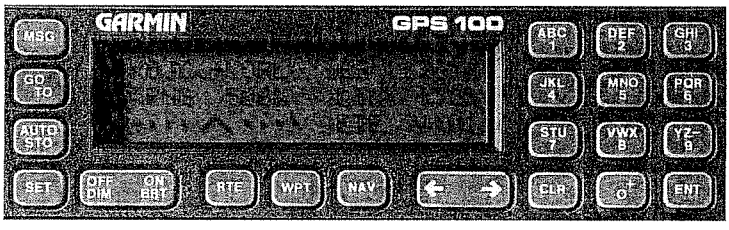
The aircraft must be placarded as follows: "GPS APPROVED FOR VFR USE ONLY"

GPS MESSAGE ANNUNCIATION

The manufacturer has installed a supplemental "GPS MESSAGE" annunciator light. This light incorporates a press-to-test lamp function. Whenever the GPS unit signals a "message", the "GPS message" annunciator will illuminate and an audio tone will be heard in the aircraft headsets.

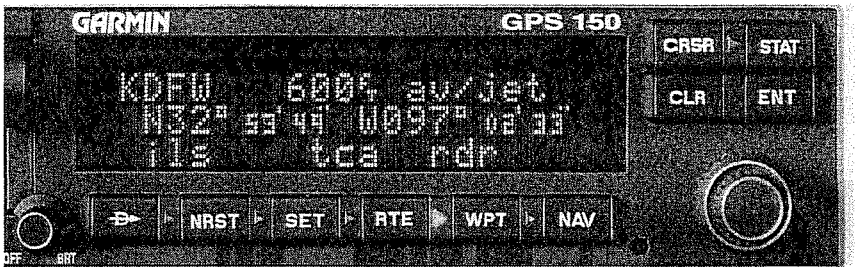
GPS NAVIGATIONAL INFORMATION DISPLAY

GPS navigational information may be displayed on the aircraft HSI, RMI or CDI. If an optional HSI, RMI or CDI has been installed, the display will give left/right deviation, to/from flag and NAV flag indications similar to a normal VOR/LOC display. If GPS and another navigational source can be displayed in an HSI, RMI or CDI, a separate lighted switch, with a push-to-switch function, will "Toggle" the navigational information from the GPS or the other navigational source, into the HSI, RMI or CDI. The lighted switch will illuminate the legend "GPS" whenever the HSI, RMI or CDI is displaying navigational information from the GPS.



FAA Approved: 28 Jul 1993
Revised: 20 Jul 1999

GARMIN GPS 150 NAVIGATION SYSTEM



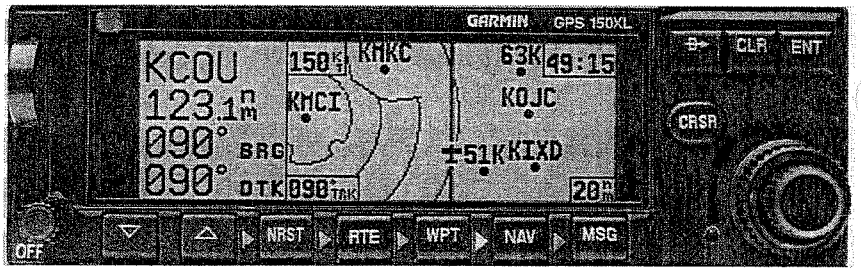
Notice the placard stating "**GPS limited to VFR use only**".

Detailed operating instructions can be found in the (GARMIN P/N 190-00048-00) GPS 150 Pilot's Guide that must be immediately available to the flight crew. Some highlights of that pilot's guide are printed here.

After equipment turn on and its self test, it is necessary to press the **ENT**er key to answer "yes, I approve that," any time the GPS 150 display includes the flashing question "**OK?**"...the operator may wish to first use the **CRSR** (cursor) key and twist the concentric knob and ring, to change something. The GPS 150 receiver has a message annunciator that lights up beside the **STAT**us key, that controls it. Waypoint arrival, change of receiver status, and other important GPS messages light this light. There is also mounted on the instrument panel a remote "**GPS MESSAGE**" indicator, with push to test (its own lamp) function. IF there is a flashing light beside the **STAT** key, repeated by the instrument panel mounted "GPS MESSAGE " light, press the GPS 150 **STAT** (status message) key once, to read the message, and again, to return to the previous display. Press the **D** arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start **USA all letter** airport identifiers with "K"); then, press **ENT** twice, to navigate directly there. Use **WPT** (waypoint), **CRSR** (to select a displayed word), and concentric ring and knob to make choices or enter location of user defined destination waypoints. Or, press **NRST** (nearest) key and twist ring and knob to get quick waypoints. **D** arrow and **ENT** will take you to a **CRSR** highlighted waypoint.

A 3/32" Allen wrench and power supply have been provided for pilot removal of the GPS 150 receiver, for user waypoint programming or operator familiarization. This GPS receiver weighs 2.1 pounds at 43" aft (for a small instrument panel, or 47.2" for a large instrument panel).

GARMIN GPS 150XL NAVIGATION SYSTEM



Notice the placard stating "**GPS limited to VFR use only**".

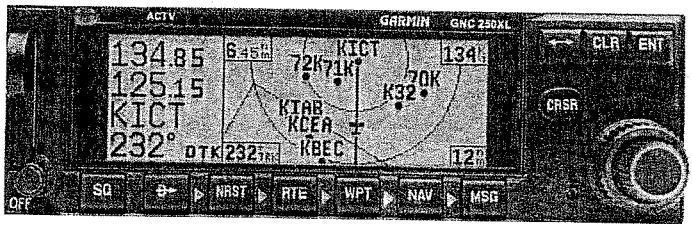
Detailed operating instructions can be found in the (GARMIN P/N 190-00067-80) GPS 150XL Pilot's Guide and Reference that must be immediately available to the flight crew. Some highlights of that pilot's guide are printed here.

After equipment turn on and its self test, it is necessary to press the **ENT**er key to answer "yes, I approve that," any time the GPS 150XL display includes the flashing question "**OK?**"...the operator may wish to first use the **CRSR** (cursor) key and twist the concentric knob and ring, to change something. The GPS 150XL receiver has a message annunciator that lights up beside the **MSG** (message) key, that controls it. Waypoint arrival, change of receiver status, and other important GPS messages light this light. There is also mounted on the instrument panel a remote "**GPS MESSAGE**" indicator, with push to test (its own lamp) function. IF there is a flashing light beside the **MSG** key, repeated by the instrument panel mounted "GPS MESSAGE " light, press the GPS 150XL **MSG** key once, to read the message, and again, to return to the previous display. Press the **D** arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start **USA all letter** airport identifiers with "K"); then, press **ENT** twice, to navigate directly there. Use **WPT** (waypoint), **CRSR** (to select a displayed word), and concentric ring and knob to make choices or enter location of user defined destination waypoints. Or, press **NRST** (nearest) key and twist ring and knob to get quick waypoints. **D** arrow and **ENT** will take you to a **CRSR** highlighted waypoint. Up and down arrow keys beside "OFF " knob change the map scale, when **NAV** key is pressed to moving map.

A 3/32" Allen wrench and power supply have been provided for pilot removal of the GPS 150XL receiver, for user waypoint programming or operator familiarization. This GPS receiver weighs 1.7 pounds at 43" aft (for a small instrument panel, or 47.2" for a large instrument panel).

Issued: 28 Jul 1993
Revised: 20 Jul 1999

4.7A GNC 250XL COMM/GPS



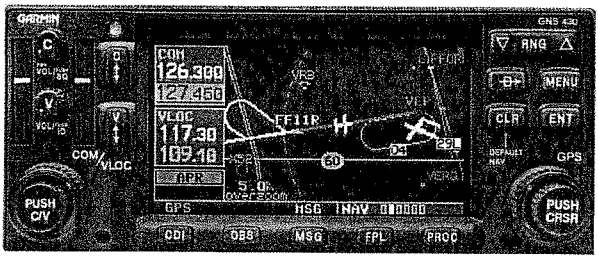
Detailed operation is described in the GARMIN GNC-250XL Pilot's Guide (Garmin P/N 190-00067-60, Rev. A or later), which must be immediately available to the flight crew. The GNC 250XL display top line is the **ACTV** (active) and **STBY** (standby) COMM frequencies, and the lower three lines are the GPS display, except in NAV MAP mode. This GPS is for VFR use only.

This COMM works as soon as the OFF/ON/Volume control knob is turned ON; right beside this knob is the **SQ**uelch control key...you can press it for MAXIMUM receiver sensitivity. The double ended ⇔ arrow key (above the **CRSR** cursor key) is used to trade the **ACTV** (active) and **STBY** (standby) frequencies. Only the **STBY** frequency may be changed, by the knobs beside the **CRSR** key, and only when the CRSR key has been pressed the correct number of times to highlight the **STBY** frequency. Pressing the **double arrow key for more than two seconds** will **always** tune the **active** frequency to **121.50** MHz (**emergency**). A "TX" will show up to the right of the active frequency, during transmit. The GNC 250XL will not transmit continuously for longer than 35 seconds, even with a stuck mic key.

If there is flashing light beside the **MSG** key, and/or the instrument panel mounted "GPS MESSAGE" light is on, press the GNC 250XL **MSG** (message) key once, to read the message, and again, to return to the previous display. **ENT**er = "yes" to "**OK?**" Press the **D** arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start USA **all letter** airport identifiers with "K"); then, press **ENT** twice, to navigate directly there. Use **CRSR** and ring knob to highlight what you want to change. **ENT** will transfer a **highlighted frequency** to **STBY**. Press **NRST** (nearest airport, etc.) key and twist knobs to get quick selections. **D** arrow and **ENT** takes you there. See GNC 250XL Pilot's Guide for more instructions.

A 3/32" Allen wrench and power supply have been provided for pilot removal of the GNC 250XL receiver, for user waypoint programming or operator familiarization. See Section VI for weight and balance information.

4.7B GNS 430 COMM//NAV/GPS



Detailed operation is described in the GARMIN GNS 430 Pilot's Guide and Reference (Garmin P/N 190-00140-00, Rev. A or later), which must be immediately available to the flight crew. A 16 page abbreviated GNS 430 Quick Reference reminder (Garmin P/N 190-00140-01, Rev. B or later) is also available. The following cursory instructions are for **VFR USE, ONLY**.

The COMM works as soon as the **C**(omm) PWR/VOL volume control knob is turned ON. After turn ON, the pilot will only be able to see and adjust which frequencies are presently selected, by pressing the GPS **ENT**er key(twice), to approve the GPS Aviation Database effectivity page, displayed after the turn ON self test display page. The "**C**" knob is also the squelch control key...you can press it for unsquelched MAXIMUM receiver sensitivity. The first 2.3" of the **left** hand side of this radio functions as a conventional VHF "**NAV/COMM**," and the rest of the radio (center and right hand side) functions only as a GPS navigation receiver, with moving map display. The double ended arrow ↔ key marked "**C**" is used to trade the **COMM** active and standby frequencies. **Pressing this key for more than two seconds** will **always** automatically **tune** the **COMM** transceiver **ACTIVE** frequency to the **121.500 emergency** frequency. Only the standby frequencies may be changed by the COM/VLOC **knob** and **ring**. An "RX" will show up beside the letters "COM" above the active frequency, while receiving a transmission. A "TX" will show up above the active frequency, during transmit. The GNS 430 will not transmit continuously for longer than 35 seconds, even with a stuck mic key.

Please call the large knob at the lower left corner of the GNS 430 the "COM **ring**," and please call the small knob in its center (PUSH C/V) the "COM **knob**."

Also, please call the large knob at the lower right corner of the GNS 430 the "GPS **ring**," and please call the small knob in its center (PUSH CRSR) the "GPS **knob**." The COM **knob** and **ring** tune the highlighted COMM standby frequency, on the second line down, below the letters "COM." Pushing in on the COM **knob** shifts the frequency highlight below "VLOC" (VOR/LOC/ILS), and the **knob** and **ring** then tune the VLOC standby frequency. Pushing the COM **knob** (PUSH C/V) toggles the tuning control (and cursor highlight) between COM and VLOC frequencies. However, this control always defaults back to COM, after the COM **knob** or **ring** has not been turned for the past 30 seconds.
The double ended arrow ↔ key marked "**V**" is used to trade the VOR or ILS active and standby frequencies. The **little knob** marked "**V**" is for VOR or Localizer or ATIS volume; push this knob to hear the VOR or LOC Morse code identifiers and see "ID," by the "VLOC" frequencies.

There are only two functional connections between the COMM/NAV and the GPS sides of the GNS 430. One function is through the **CDI** button, at the lower left edge of the GNS 430. The GNS 430 is normally connected to an HSI or other remote navigation **C**ourse **D**eviation **I**ndicator, and the "**CDI**" button selects whether this indicator will be supplied with "**VLOC**" (VOR or LOC) deviation from the **left** side of the GNS 430, or "**GPS**" deviation from the **right** side of the GNS 430. This choice is indicated, just above the **CDI** button.

The other connection is that if a COMM or NAV frequency on a GPS page is cursor highlighted (push the **GPS** "PUSH CRSR" **knob**), and the **ENT** button is pressed, this frequency is then transferred to the standby register of the COM or VLOC frequency display. VOR/LOC left/right is never displayed on the GNS 430.

IF there is a yellow flashing "MSG," above the **MSG** key, press the **MSG** (message) key once, to read the message, and again, to return to the previous display. After first turn "ON" and **ENT** approval of the Aviation Database effectivity pages, the next GPS page to appear will be the satellite STATUS page, while the receiver is looking for satellites (NAV page number 5). As soon as the GPS is ready to navigate, the display switches to the moving map (NAV page

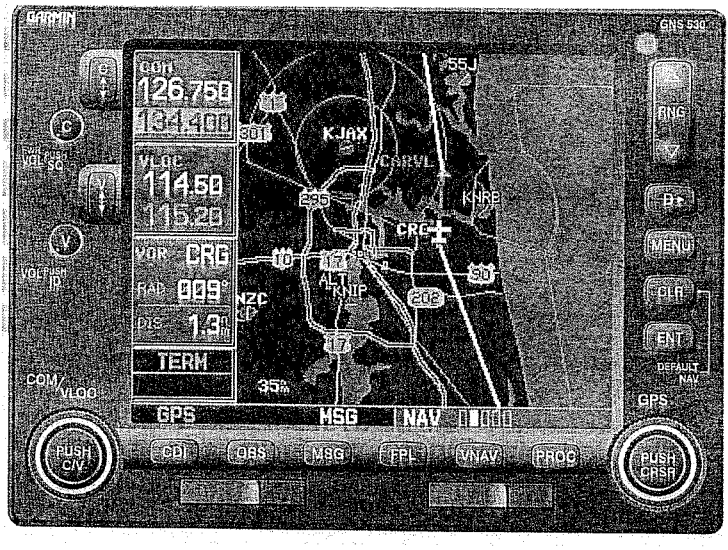
number 2). **NAV** is the first of four groups of pages that may be displayed after turning the GPS **ring** fully counter clockwise (**NAVIGATION, WAYPOINT, AUXILLARY** or **NEAREST**). Which group of pages is displayed just above the **FPL** button, and the little boxes to the right fill in to show which page of that group is being displayed. The GPS **knob** selects which page in that group will be displayed.

Turn the GPS **ring** to select which type of pages. Then, turn the GPS **knob**, to select your desired page. Then, push **PUSH CRSR** (the GPS **knob**), to use the ring for scrolling up or down that page. To get emergency **NEAREST AIRPORT**, turn the GPS **ring** fully clockwise (three or more detent clicks) and then turn the GPS **knob** (many detent clicks) fully counterclockwise, if necessary, to see the nearest airports (NRST page number one). Then, push the GPS (PUSH CRSR) **knob**, to get a cursor. Use the GPS **ring** to scroll the cursor through the nearest airports and their tower (or common traffic advisory) frequencies. First use the **ENT** key to transfer your chosen **twr** (or **uni** or **mul**) frequency to the COMM. Then, use the **ring** to scroll to the airport identifier and use the **D** arrow key and **ENT** key (twice) to navigate directly there.

At any time, press the **D** arrow "direct to" key and use the GPS **knob** and **ring** to spell out a chosen way point (remember that ICAO says to start USA **all letter** airport identifiers with "K"); then, press **ENT** twice, to navigate directly there. Pressing the **OBS** button allows the pilot to navigate along any chosen bearing to (or radial from) the waypoint, like using the omni bearing selector for a VOR. Press the **CLR** button for more than two seconds to default to NAV page one. NAV page one has **(only) a GPS course deviation indicator** that can be repeated on a remote CDI or HSI, by pressing the **CDI** button. The NAV 2 page is a moving map. The left and right ends of the top GPS (**RNG**) button select the moving map's range, between 500' and 2000 miles. The **CLR** button removes up to three levels of additional map details. Use the **MENU** button (and **ENT** key) to choose to display a larger map, or a small map with waypoint bearing and distance and ground speed data along one side.

Issued: 28 Jul 1993
Revised: 11 Dec 2000

4.7C GNS 530 COMM//NAV/GPS



Detailed operation is described in the GARMIN GNS 530 Pilot's Guide and Reference (Garmin P/N 190-00181-00, Rev. A or later), which must be immediately available to the flight crew. A 16 page abbreviated GNS 530 Quick Reference reminder (Garmin P/N 190-00181-01, Rev. B or later) is also available. The following cursory instructions are for **VFR USE, ONLY**.

The COMM works as soon as the **C**(omm) PWR/VOL volume control knob is turned ON. After turn ON, the pilot will only be able to see and adjust which frequencies are presently selected, by pressing the GPS **ENT**er key (twice), to approve the GPS Aviation Database effectivity page, displayed between the turn ON self test display pages. The "**C**" knob is also the squelch control key...you can press it for unsquelched MAXIMUM receiver sensitivity. The first 2" of the **left** hand side of this radio functions as a conventional VHF "**NAV/COMM**," and the rest of the radio (center and right hand side) functions only as a GPS navigation receiver, with moving map display. The double ended arrow ↔ key marked "**C**" is used to trade the **COMM** active and standby frequencies. **Pressing this key for more than two seconds** will **always** automatically **tune** the **COMM** transceiver **ACTIVE** frequency to the **121.500 emergency** frequency. Only the standby frequencies may be changed by the

COM/VLOC **knob** and **ring**. An "RX" will show up beside the letters "COM" above the active frequency, while receiving a transmission. A "TX" will show up above the active frequency, during transmit. The GNS 530 will not transmit continuously for longer than 35 seconds, even with a stuck mic key.

Please call the large knob at the lower left corner of the GNS 530 the "COM **ring**," and please call the small knob in its center (PUSH C/V) the "COM **knob**." Also, please call the large knob at the lower right corner of the GNS 530 the "GPS **ring**," and please call the small knob in its center (PUSH CRSR) the "GPS **knob**." The COM **knob** and **ring** tune the highlighted COMM standby frequency, on the second line down, below the letters "COM." Pushing in on the COM **knob** shifts the frequency highlight to below "VLOC" (VOR/LOC/ILS), and the **knob** and **ring** then tune the VLOC standby frequency. Pushing the COM **knob** (PUSH C/V) toggles the tuning control (and cursor highlight) between COM and VLOC frequencies. However, this control always defaults back to COM, after the COM **knob** or **ring** have not been turned for the past 30 seconds.

The double ended arrow ↔ key marked "**V**" is used to trade the VOR or ILS active and standby frequencies. The **little knob** marked "**V**" is for VOR or Localizer or ATIS volume; push this knob to hear the VOR or LOC Morse code identifiers and see "ID," by the "VLOC" frequencies.

There are only two functional connections between the COMM/NAV and the GPS sides of the GNS 530. One function is through the **CDI** button, at the lower left edge of the GNS 530. The GNS 530 is normally connected to an HSI or other remote navigation Course Deviation Indicator, and the "**CDI**" button selects whether this indicator will be supplied with "**VLOC**" (VOR or LOC) deviation from the **left** side of the GNS 530, or "**GPS**" deviation from the **right** side of the GNS 530. This choice is indicated, just above the **CDI** button.

The other connection is that if a COMM or NAV frequency on a GPS page is cursor highlighted (push the **GPS** "PUSH CRSR" **knob**), and the **ENT** button is pressed, this frequency is then transferred to the standby register of the COM or VLOC frequency display. VOR/LOC left/right is never displayed on the GNS 530.

IF there is a yellow flashing "MSG," above the **MSG** key, press the **MSG** (message) key once, to read the message, and again, to return to the previous display. After first turn "ON" and **ENT** approval of the Aviation Database effectivity and indicator self test pages, the next GPS page to appear will be the satellite STATUS page, while the receiver is looking for satellites (last NAV page). As soon as the GPS is ready to navigate, the display switches to the **moving map (NAV page number 2)**. **NAV** is the first of four groups of pages that may be displayed after turning the GPS **ring** fully counter-clockwise (**NAVIGATION, WAYPOINT, AUXILIARY** or **NEAREST**). Which group of pages is displayed just above the **FPL** button, and the little boxes to the right fill in to show which page of that group is being displayed. The GPS **knob** selects which page in that group will be displayed. Holding in the **CLR** key for **longer than two seconds** switches from any page to **NAV page one**, which looks similar to an **HSI, laid over a moving GPS map**.

Turn the GPS **ring** to select which type of pages. Then, turn the GPS **knob**, to select your desired page. Then, push **PUSH CRSR** (the GPS **knob**), to use the ring for scrolling up or down that page. To get **emergency NEAREST AIRPORT**, turn the GPS **ring** fully clockwise (four or more detent clicks) and then turn the GPS **knob** (many detent clicks) fully counterclockwise, if necessary, to see the nearest airports (NRST page number one). Then, push the GPS (PUSH CRSR) **knob**, to get a cursor. Use the GPS **ring** to scroll the cursor through the nearest airports and their tower (or common traffic advisory) frequencies. First use the **ENT** key to transfer your chosen **twr** (or **uni** or **mul**) frequency to the COMM. Then, use the **ring** to scroll to the airport identifier and use the **D→** key and **ENT** key (twice) to navigate directly there.

At any time, press the **D→** "direct to" key, to get to the "SELECT D→ WAYPOINT" page. Then, use the GPS **knob** and **ring** to spell out a chosen way point (remember that ICAO says to start USA **all letter airport identifiers** with "K"); then, press **ENT** twice, to navigate directly there. Or, turn the GPS **ring** to scroll the cursor down to the "SELECT D→ WAYPOINT" page third line; you can then use the GPS **knob** and **ring** to spell out the name of a city and get its airport, without knowing its identifier.

From the NAV two (moving map, north always up) page, press **PUSH/CRSR** and then use the **knob** and **ring** to **move the arrow to your chosen waypoint**. (Keep the **RNG** range select switch set at

50 miles or less, to make airports show up.) Then, press the **D→** "direct to" key and press **ENT** twice, to navigate directly there.

Pressing the **OBS** button allows the pilot to (press on, or press off) navigate along any chosen bearing to (or radial from) the waypoint, like using the omni bearing selector for a VOR, instead of navigating DIRECT TO the waypoint. (Using the OBS mode will inhibit automatic redirecting to the next waypoint of a selected FLIGHT PLAN route.)

The **FPL** button allows programming a pre selected FLIGHT PLAN route, like flying long distances by navigating from VOR to VOR to VOR, except that now any kind of waypoints may be used.

At any time, press the **CLR** button for more than two seconds to default to NAV page one. NAV page one looks similar to an HSI, but it shows aircraft ground track, moving up (not which way the nose is pointing). And it has **(only) a GPS course deviation indicator** that can be repeated on a remote CDI or HSI, by pressing the **CDI** button. The NAV two page is only a moving map, with NORTH up. The top and bottom ends of the GPS (**RNG**) rocker button select the moving map's range, between 500' and 2000 miles. The **CLR** button removes up to three levels of additional map details (or gives them back). Use the **MENU** button (and **ENT** key) to choose to display a larger map, or a small map with five fields of data (like waypoint and bearing), along the right side of that map.

The VERTICAL NAVIGATION setup page is quickly accessed by pressing the **VNAV** key. When navigating to a waypoint, press the **VNAV** key, to get the "VERTICAL NAVIGTION" page. Use **PUSH/CRSR** and **knob** and **ring** to select a target arrival altitude and distance from that waypoint, and the GPS will then fill in every vertical speed required (VSR) window instructing how to get there. Then, press the VNAV key again, to switch back to your previous page. When it is time to start down, at your chosen rate of descent, the GPS will flash a message light advising that it is time. If you do not see a VSR field on your NAV one or NAV two page, use the MENU key and **knob** and **ring** to **ENT** choose a convenient VSR field.

There is also very flexible ¾ inch square window under the VLOC frequency window. The factory VOR/LOC Data "Defaults" provide THE DECODED IDENTIFIER, on the top line and also VOR radial and distance or LOCALIZER location, below the decoded identifier.

Issued: 28 Jul 1993
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Or, the operator can use AUX page three, **PUSH/CRSR**, turn **KNOB** or **RING**, press **ENT**, turn **KNOB** twice, to get "Configurable Data Fields," turn **RING** to move the cursor to the window top line, and then use the **KNOB** to select one of all the possible GPS field choices and press **ENT**. To change back to the factory default DECODED IDENTIFIER choice, use the same AUX page three Data Field Configuration route and then the **MENU** button to get the choice "Restore Defaults?" and press **ENT**. Directly below this ¾ inch square window is a window that says "ENR," when proceeding to a waypoint 30 or more miles away and switches to "TERM," when less that 30 miles away. During an instrument approach, this window would switch from "TERM" to "APR," at 2 miles range.

The next (bottom) window down says "INTEG," any time Receiver Autonomous Integrity Monitoring (RAIM) is not of satisfactory accuracy for a GPS instrument approach.

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Issued: 28 Jul 1993
Revised: 11 Jun 2001

4.8 KI 229 RMI OPERATION INSTRUCTIONS

The KI 229 Radio Magnetic Indicator (RMI) display is discussed below.

A. Compass Card/Lubber Line

This rotating card repeats gyro stabilized magnetic compass information. Aircraft heading is read from the compass card under the orange lubber line.

B. ADF Pointer

The arrow of the double yellow pointer indicates magnetic heading to the ADF station.

C. VOR Pointer

The arrow of the single green pointer indicates the magnetic heading to a VOR station or Area Navigation Waypoint. This pointer can also be made to read magnetic heading to another ADF station by an external switch.

The KI 229 RMI repeats magnetic heading information from the KI 525A Navigation Indicator or other slaved directional gyro system. Aircraft heading is read under the lubber line of the KI 229. (Refer to KCS 55A PNI system operation for KI 525A operation).

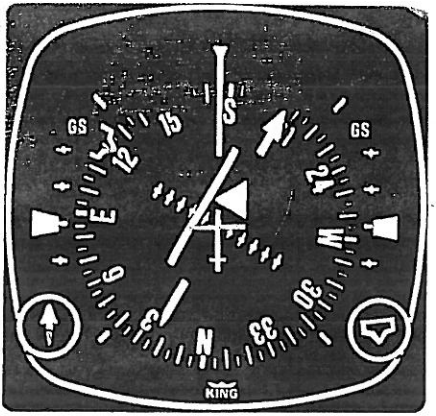
When the ADF receiver is tuned to a station, the yellow ADF pointer indicates the magnetic heading to the station. Thus, if the pilot desires to fly toward the station, he merely turns his aircraft to the magnetic heading indicated by the ADF pointer.

When the VOR receiver is tuned to a VOR station, the green VOR pointer indicates the magnetic heading to the station. If the KI 229 is used in an Area Navigation System, the VOR pointer indicates the magnetic heading to the waypoint. The green pointer can also be made to give magnetic heading for a second ADF receiver by the addition of an external switch and installation of a second ADF receiver.

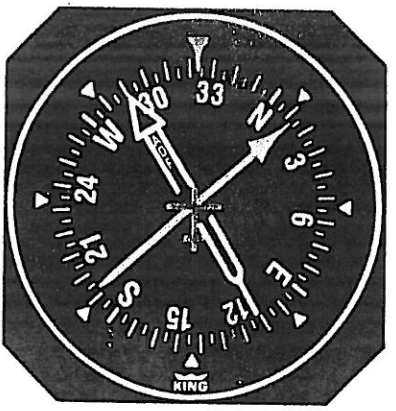
Should a localizer frequency be selected, or the VOR receiver indicate a flagged condition, the VOR (green) pointer is parked 90° to the right of the lubber line.

RMI OPERATION

The KI 229 Radio Magnetic Indicator provides bearing information to both ADF and VOR stations by means of two pointers, each of which is read against the compass card. The compass card displays heading information. The double pointer is dedicated solely to ADF and is marked "ADF". The single pointer is assigned to VOR information. (Note: The single pointer can be switched between VOR and ADF by means of an external switch as explained in the installation manual of the KI 229).



KI 525A Horizontal Situation Indicator (TSO'd)



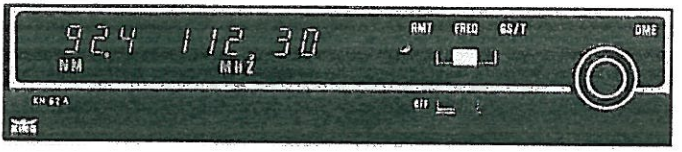
KI 229 RMI Indicator (TSO'd)

4.9 KN 62A DME OPERATION INSTRUCTIONS

The KN 62A front panel controls consist of an ON-OFF switch, a function switch, and frequency selection knobs. The function switch determines both the information displayed and the channeling source for the DME. In Remote (RMT) mode, the DME is channeled from an external control head, and the display shows range, speed, and time-to-station. In Frequency (FREQ) mode, the DME is channeled from its own frequency selection knobs, and the display shows range and frequency. In Ground Speed/Time-to-Station (GS/T) mode the DME holds the last internally selected frequency and displays range, speed, and time-to-station.

The frequency hold feature in GS/T mode is necessary to prevent accidental rechanneling of the DME when frequency is not being displayed. To prevent the unit from displaying false information, the DME will display dashes and stay in "search" whenever power is turned on or momentarily interrupted in GS/T mode. Normal operation is re-established by switching to FREQ or RMT mode.

When the DME is in search mode, dashes are displayed instead of range, speed, and time-to-station. An automatic dimming circuit adjusts the brightness of the display to compensate for changes in ambient light level.



KN 62A Complete panel-mounted digital DME (TSO'd)

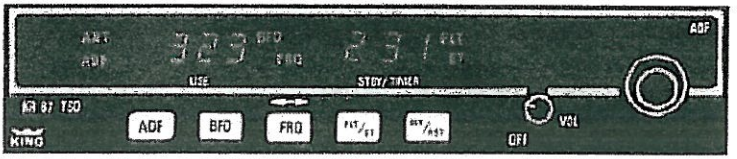
The audio output is used to identify the DME ground station being received.

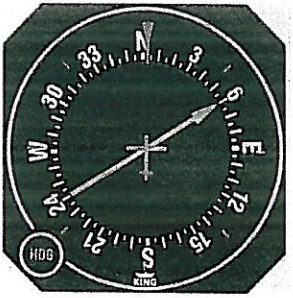
The effective range of the DME depends on many factors, most important being the altitude of the aircraft. When the aircraft is on the ground, the KN 62A usually will not receive DME stations due to line-of-sight signal limitations. The distance measured by the DME is slant-range distance (measured on a slant from aircraft to ground station) and should not be confused with actual ground distance. The difference between ground distance and slat-range distance is smallest at low altitude and long range. In order to obtain accurate ground speed and time-to-station, the aircraft must be tracking directly to or from the station.

If more than one VOR/DME is installed in the aircraft, a DME source selector switch is installed to allow channeling from either NAV #1 or NAV #2. This switch is labeled DME selector, NAV #1, NAV #2 and is installed adjacent to the DME.

4.10 KR 87 ADF

Rotate on-off-volume control knob to ON and adjust for proper volume. Depress FRQ button. Two (2) frequencies are displayed, one is in the USE or active window, the other is in the STAND-BY window. Rotating the frequency control knobs will change the frequency in the STAND-BY window. When the desired frequency is tuned in the STAND-BY window, depressing the FRQ button will exchange the USE and STAND-BY frequencies.





KI 227-00 ADF Indicator, for use with the KR 87 ADF (TSO'd)

ADF bearing information is displayed on the ADF indicator or the RMI. The RMI is gyro stabilized to the aircraft slaved compass system. The ADF indicator needle will point to the magnetic heading of the ADF station when the aircraft heading is located under the lubber line on the indicator.

When the ADF is not in use or if a weak ADF signal is received, the ADF (yellow) pointer will park at 90° to the right of the lubber line.

The antenna mode (ADF button not depressed) is normally used for station identifying. Depressing the ADF button IN will cause the pointer of the ADF indicator to point in the direction of the station tuned in the USE window (if sufficient signal strength is present). Pushing the BFO (Beat Frequency Oscillator) button will cause a 1000 Hz tone to be heard whenever there is a radio carrier signal present at the selected frequency. The BFO light will also be illuminated on the display. BFO operation is primarily used in various parts of the world where L/MF stations use an interrupted carrier for identification purposes.

Depressing the FLT/ET button will display the elapsed time (ET) or flight time (FLT) in the stand-by window (the stand-by frequency will be stored in memory). Depressing the FLT/ET will cycle the display between FLT timer and ET timer. The flight timer automatically resets to 0:00 when the unit is first turned on. The only way to reset the flight timer is to turn the unit OFF then ON.

The elapsed timer will either count up or count down. When power is first applied, it is automatically in the count up mode. The ET timer can be reset 0:00 by depressing the SET/RST (set/reset) button. The ET can be put in countdown mode by depressing and holding the RST Button in, for approximately 2 second, until ET message begins to flash. With ET flashing, the frequency control knobs can be rotated to enter any time desired up to 59 minutes, 59 seconds. The ET timer will not start counting down until RST button is depressed (Depressing the RST button will cause the ET to start counting down regardless of current display in STAND-BY/TIMER window). When timer reaches 0 it reverts back to count up mode.

When either FLT/ET timer modes are displayed in the STAND-BY/TIMER window, rotating the frequency control knobs will directly tune the USE frequency (instead of the stand-by frequency in memory).

4.11 MARKER BEACON

KR 21 Marker Beacon Operating Instructions

Marker beacon receivers are used to provide accurate fixes by informing the pilot of his passage over beacon stations located on airways and ILS approach courses. Three types of beacons are used. They are the inner marker, the outer marker and the middle marker. (See paragraph 4.1 of this supplement on how to select Marker Beacon Audio.)

KR 21 Marker Beacon Receiver and lights

When passing the outer marker the blue light will flash "on/off" at a two per second rate and the pilot will hear a series of low tone dashes.

When the aircraft passes the middle marker the pilot hears a medium pitched tone in a series of dots and dashes and the amber light flashes synchronously with the tones.

The inner marker is located close to the end of the runway. When the aircraft passes the inner marker the pilot will hear a 3000Hz tone in headphone or speaker and the white lamp will be alluminated while over the station. The inner marker is used to indicate a point approximately 1500 ft. from the runway and if on proper glide path the altitude above the runway should be approximately 100 feet.

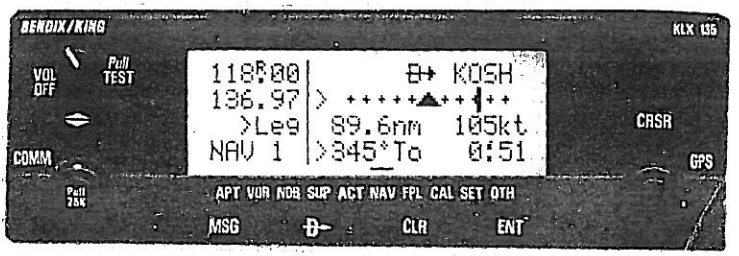
The HiLo Switch provides sensitivity switching control. An aircraft flying at high altitude or slightly off course may fail to receive the signal when in the low sensitivity position. It is suggested that the marker sensitivity switch first be placed in high sensitivity position until aural and/or lamp indication is received. The control switch may be turned to low sensitivity to reduce the duration of the indication and to obtain a more accurate reading of passage since the signal appears to build and fade faster on low sensitivity.

The high sensitivity position may be used to effectively give the pilot an advance indication that he is approaching the outer marker. In order to expedite the ILS approach the pilot may wish to retain higher speed until he is nearby the outer marker inbound. With the KR21 marker in high sensitivity position the aural tone will begin about one mile from the outer marker. At this time, the pilot may switch the marker to low sensitivity and slow to final approach speed.

4.12 KLX 135/135A COMM/GPS

Detailed operation is described in the BENDIX/KING KLX 135 Pilot's Guide (AlliedSignal P/N 006-08751-0000) or KLX 135A Pilot's Guide (AlliedSignal P/N 006-08789-0000), which must be immediately available to the flight crew. Upon KLX 135/135A turn ON, at the top of the third screen, look for a word like ORS 01. Make sure this Operational Revision Status number is the same as the one on the front cover of the KLX 135/135A Pilot's Guide you are using. Update the internal data base through the headphone type GPS "DATABASE" connector located under the instrument panel.

Note that you will have to press the **ENT**er button three or more times after KLX 135/135A turn ON, to see COMM active and standby frequencies (two lines in upper left corner). If the display fails, see **BLIND TUNING FEATURE**, in the KLX 135/135A Pilot's Guide. The knobs and transfer button on the left end of the KLX 135/135A control the VHF COMM. The knobs tune the standby (lower) frequency; then press the transfer button to move it to the (top) active frequency display. A "T" over the active frequency decimal point means you are transmitting, and an "R" over that point means you are receiving a transmission. Pull out the OFF/ON knob for maximum COMM receiver gain/squelch over ride and turn it to get a comfortable COMM audio volume.



KLX 135/135A GPS/COMM

All other knobs and buttons, control the GPS. When there is a flashing "**M**" under the COMM frequency display and/or the instrument panel mounted "GPS MESSAGE" light is on, press the KLX 135/135A **MSG** (message) button once to read the message and again to return to the previous display. Press the **D** arrow "direct to" button and use the two right side knobs to spell out a chosen way point (ICAO) identifier (remember that USA all letter airport identifiers start with "K"). Then press ENTer twice, to navigate directly there. See the KLX 135/135A Pilot's Guide for further instructions.

SECTION V

Performance Data
Not Affected

SECTION VI

Weight and Balance

At the time of delivery, Schweizer Aircraft Corporation provides each rotorcraft with an original weight and balance report and the equipment list, (equipment both required and optional) installed on the helicopter at the time of licensing. The removal or addition of any equipment can affect the basic empty weight and center of gravity. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in the weight and balance record.

6.1 GNC 250XL, GPS 150, GPS 150XL, GNS 430, GNS 530

The removable panel unit for GNC 250XL weighs 2.6 lbs. and is located at longitudinal arm 43.15" in the standard instrument panel.

The removable panel unit for GPS 150 receiver weighs 2.1 lbs. and is located at longitudinal arm 41.8" in the standard instrument panel.

The removable panel unit for GPS 150XL receiver weighs 1.7 lbs. and is located at longitudinal arm 43" in the standard instrument panel.

The removable panel unit for GNS 430 transceiver weighs 5.1 lbs. and is located at longitudinal arm 40.1" in the standard instrument panel.

The removable panel unit for GNS 530 transceiver weighs 6.8 lbs. and is located at longitudinal arm 41.1" in the standard instrument panel.

SECTION VII

Aircraft Handling, Servicing and Maintenance
Not Affected

SECTION VIII

Additional Operations and Performance Data
Not Affected

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