

IMPORTANT

The purpose of these notes is to provide basic information to student and private pilots who plan to fly Piper Warrior G-CBKR, fitted with the Garmin GNS430 equipment. The notes should be read in conjunction with the official Garmin Pilot's Guide a copy of which is held in the DSFT Pilot Self-briefing Section. The information on the following pages has been prepared to cover the 'need to know' basics for student and private pilots intending to fly on VFR flights. For information on the more advanced features of the equipment pilots must refer to the Garmin Pilot's Guide mentioned above.

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Introduction

The Garmin GNS430 is a very comprehensive piece of equipment with a wide range of applications as shown below. However, the average General Aviation pilot will normally only require the basic functions as described in these notes. Nevertheless, all pilots are strongly recommended to read the Garmin manuals located in the School's Self-briefing Section.

Pilots wishing to learn more of the background to GPS (Global Positioning System) and hence the advantages and potential disadvantages of this satellite system are advised to read the CAA General Aviation Safety Sense Leaflet No. 25 'Use of GPS' obtainable in the latest issue of CAA LASORS, or from the Web www.caa.co.uk via 'General Aviation Information', or from the copy in the School Pilot's Lounge.

The installation in 'Warrior' G-CBKR comprises a Garmin Audio Control Panel - similar to that used in other School aircraft mounted above two identical Garmin GNS430 sets forming a very compact avionics box. The avionics facility can be operated using a single GNS430 but it makes sense to use both sets and, of course, some procedures, described overleaf for switching ON and testing will have to be carried out on both sets if both are to be used in flight. Basically, the left-hand switches control the Nav/Com facility and the right-hand concern the GPS facility.

The Garmin 430 sets have many functions that may appeal to pilots flying in instrument conditions. However, pilots are warned that there are many potential pitfalls, or worse, and such pilots should seek competent instruction and practice before attempting to use GPS in such conditions. In any event the use of GPS data should be treated as 'back-up' and not as the primary navigation aid.

Controls

Left Hand Keys and Knobs



The Com/On-Off knob controls power and Com. volume. Can be pressed momentarily to disable the automatic squelch.



The VLOC knob controls the volume for the selected VOR/LOC frequency. Can be pressed momentarily to select/deselect the ident.



The large outer knob is used to select the MHz value (big numbers) of the standby frequency for the Com or VLOC receiver whichever is currently selected by the tuning cursor.

The smaller inner knob of this two-part switch is used to select the KHz value (the small numbers) of the standby frequency for the Com or VLOC receiver whichever is currently selected.

This inner knob can be pressed momentarily to toggle the tuning cursor between Com and VLOC frequency fields



This Com flip-flop key is used to swap the active and standby frequencies.



The VLOC flip-flop key is used to swap the active and standby.
VLOC frequencies i.e. to make the selected standby frequency active.

IMPORTANT: Press and hold the Com flip-flop key to select the Distress channel.

Right Hand Keys and Knobs



It is unlikely that the average School pilot will need to use many of these controls. There is, however, one exception and that is the ENT(Enter) Key, which will be required for most of the programming operations. Information on the right-hand controls now follows.



The RNG key allows the desired map scale to be selected. Pressing the up-arrow side allows the user to zoom into a larger area and the down-arrow side into a smaller area.



The Direct-to Key provides access to the Direct-to function allowing a destination waypoint to be entered and establish a direct track to the selected destination. This is done in conjunction with the large two-part switch at the bottom right-hand corner of the set.



This key displays a list of functions, which will allow the user to access additional features or to make changes to the currently displayed page. Further options on the chosen

feature can be made by using the large two-part switch at the bottom right-hand corner of the set.

CLR

This Clear key is used to erase or cancel an entry. If pressed and held the Default Navigation Page will be shown regardless of which page is currently displayed.

ENT

This Enter key is used to approve a particular operation sequence or complete a data entry. It is always used for confirming information during the switching 'on' phase. See page 9. In addition, it has a role to play if the GPS feature is to be used.



The large knob of the two-part switch CRSR at the bottom right-hand corner of the set is used to select between the various page groups:
NAV (GPS Navigation), WPT (Waypoint data/base information),
AUX (Flight Planning and Unit Settings) or NRST (Nearest Airports and associated frequencies). With the on-screen cursor activated the large right-hand knob allows the user to move the cursor about the page.



The small knob of the two-part switch is used to select between the various pages within one of the groups listed above. To display the on-screen cursor the user should momentarily press the knob this then allows the data to be entered or a selection made from a list of options.

Bottom Row Keys



As for the right-hand knobs and keys above, it is unlikely that the average School pilot will need to use these particular keys with the possible exception of the first listed: the CDI key.

CDI

The CDI key is used to toggle/select which navigation source will provide data to an external HSI or CDI i.e. GPS or VLOC.

OBS

The OBS key is used to select manual or automatic sequencing of waypoints. Pressing the OBS key selects OBS mode, which will retain the current 'active to' waypoint as the navigation reference even after passing the waypoint (i.e. prevents sequencing to the next waypoint). Pressing the OBS key again will return to normal operation, with automatic sequencing of waypoints. Whenever the OBS mode is selected the user can set the desired track to/from a waypoint using the OBS page or an external selector on the HSI or CDI.

MSG

The message key is used to display system messages and to alert the pilot to important warnings and requirements. More information is contained in the *Garmin Pilot's Guide and Reference Manual*, Sections 9 and 10

FPL

This flight plan key allows the user to create, edit, activate and invert flight plans as well as to access approach, departure and arrival information. A 'closest point to flight plan' feature is also available using this key. More information on this feature is contained in the *Garmin Pilot's Guide*, Sections 9 and 10.

PROC

This procedure's key allows the pilot to select and remove approaches, departures, and arrivals from a flight plan. When using a flight plan, available procedures for airport departure and/or arrival are offered automatically. Alternatively, the pilot may select the desired airport, then the desired procedure.

Switching On The Garmin GNS430 (Circuit and Local Area Flying)

- 1) Switch 'On' the aircraft master switch
- 2) Switch 'On' the radio master switch. The Avionics Standby Switch should be left OFF unless there has been a main power failure.
- 3) After switching 'On' using the knob on the left hand side, make the required selections on the Garmin audio panel. If both sets are to be used then both will need to be switched 'On' and tested.
- 4) Turn 'On' the Com. using the On/Off knob 'C'. To achieve the required volume it will be found advisable to rotate the knob at least two thirds of a turn. An alternative way of ensuring adequate volume is to use the squelch control. Ask your instructor to show you how.
- 5) This will illuminate the screen; display a brief Welcome page, followed by Land Data page as the unit conducts a self-test to ensure correct operation. Once completed the Data Base information appears at the bottom of the screen and 'OK?' appears at the bottom right hand corner. The pilot must check the dates.

Note: The Jeppesen database is normally up-dated every 28 days. However, for School VFR flights an out-of-date data base is acceptable because in any event the School curriculum requires that all flights are to be preceded by self-briefing and flight planning which will provide such data.

- 6) Assume that the data base indications are acceptable press ENT(Enter) to proceed. The Instrument Panel Self-test page will appear. This doesn't concern this particular pilot so again press ENT(Enter). This allows the Com. (and Nav) frequencies to be displayed. The Com frequencies should be checked by the pilot and re-set as required.

Refer to the top coloured display on the left-hand side of the set i.e. the Com. frequencies and confirm that they are acceptable. The dark blue background (with figures in white) confirms the active frequency and the light blue background confirms the standby frequency. Assuming that the frequencies are satisfactory and the standby mode(s) are correctly set - on both sets if both are to be used-then the Com./radio is ready for use.

Using The Com/Radio

- 1) The volume can be controlled as required by using the on/off knob 'C'. If both sets have been switched 'ON' but only one set is to be used then the volume on the other set should be turned down so as to be in standby mode ready for use. The automatic squelch can be overridden by pressing the ON/OFF knob 'C'. It can be brought back into use again by pressing the knob.
- 2) In flight, a standby frequency can be brought on line using the key 'C' with the arrows to 'flip-flop' the frequency.
- 3) If on an extended flight it is desired to set a new Com. frequency the standby frequency can be changed to the new frequency using the large 2-part knob at the bottom left-hand corner of the set: the larger outer knob to change the MHz(large) numbers and the smaller inner knob to change the KHz (small) numbers. The tuning cursor will normally be in the Com. window because if a prior VLOC window selection has been made the tuning cursor will automatically return to the Com. window after 30 seconds of inactivity.
CAUTION: Accidentally pressing the small knob can toggle the cursor between COM. and VLOC and so provide an unwanted selection.
- 4) The new frequency can then be activated using the Com 'flip-flop' key C with the arrows when required.
- 5) The use of two Garmin GNS430 sets affords the pilot with a great deal of flexibility, as is the case with two conventional Com. sets.

IMPORTANT:

In the unlikely event of an emergency the Distress frequency 121.5 MHz can be activated in a matter of seconds by pressing the Com. flip-flop key (key C with the arrows) and holding for 2 seconds.

Switching On The Garmin GNS430 (For Flight Requiring R.Navigation)

General

Whilst the foregoing information will be sufficient for the student pilot or private pilot operating in the circuit at Dunkeswell and in the local flying area, pilots flying further afield may need advice on how to use the Garmin 430 in conjunction with the aircraft VOR and ADF equipment. Pilots are strongly advised not to use the GPS facility for en route navigation unless they hold an IMC Rating and have successfully passed a formal course of training on the equipment both on the ground and in the air. However, these notes do provide information on how to find the nearest airfield together with relevant airfield data and the course to steer.

Switching On

The procedure is as described on Page 9 but with the addition of checking at the Instrument Panel Self-test page, checking the GPS Map for integrity, and checking the associated aircraft radio navigation equipment. The procedure for checking the ADF equipment is also given. For ease of reading, the procedures are detailed in full.

- 1) Switch 'On' the aircraft master switch
- 2) Switch 'On' the radio master switch. The Avionics Standby Switch should be left OFF unless there has been a main power failure.
- 3) Make the required selections on the Garmin audio panel including turning 'On' the switch at the left hand side. If both sets are to be used then both will need to be switched 'On' and tested.
- 4) Turn 'On' the Com. using the On/Off knob 'C'. To achieve the required volume it will be found advisable to rotate the knob at least two thirds of a turn. An alternative way of ensuring adequate volume is to use the squelch control. Ask your instructor to show you how.
- 5) This will illuminate the screen; display a brief Welcome page, followed by Land Data page as the unit conducts a self-test to ensure correct operation. Once completed the Data Base

information appears at the bottom of the screen and 'OK?' appears at the bottom right hand corner. The pilot must check the dates. Note: The Jeppesen database is normally up-dated every 28 days. However, for School VFR flights an out-of-date data base is acceptable because in any event the School curriculum requires that all flights are to be preceded by self-briefing and flight planning which will provide such data.

- 6) Assume that the data base indications are acceptable press ENT (Enter) to proceed. The Instrument Panel Self-test page will appear. To ensure that the set(s) and any connected instruments are indicating correctly check for the following indications on the respective indicators. The letters GPS will be illuminated on the indicators showing the mode in use.

LCDI (Course Deviation)	Half left
LFLG (Localiser Flag)	Out of view
VCDI (Vertical Deviation)	Half up
VFLG (Vertical flag)	Out of view

At the bottom of the Instrument Self-test display will be found further small displays e.g. TO/FROM etc. These must also be checked against the aircraft instrument(s). As a further check the OBS knob on the VOR indicator(s) can be displaced and the figures checked on the Garmin display to confirm the new setting. The RMI panel is not required since 'KR' does not have this facility. Similarly, the 'fuel state' panel should be ignored since the figures cannot be set in 'KR'. If the test proves satisfactory, press ENT (Enter). If there are discrepancies the matter should be reported.

- 7) The Basic Satellite Page will begin to appear thus providing an opportunity for the pilot to check and re-select as required both the Com. and VLOC frequencies. Change the standby Com frequency by pressing the small knob of the left-hand 2-part switch if it is necessary to move the tuning cursor to the Com window then rotate the large knob to select the MHz numbers and the small knob to select the KHz numbers of the new frequency. Flip-flop as required using key 'C' with the arrows.

To change the standby VLOC frequency again press the small knob of the left-hand 2-part switch to activate the tuning

cursor in the VLOC window then rotate the large knob to select the MHz numbers and the small knob to select the KHz numbers. Again, flip-flop using key 'C' with the arrows.

- 8) Check the integrity of the GPS map. Adjustments should not normally be required but can be made if necessary. e.g. RNG key. The map will display the position of the aircraft using an aircraft symbol relative to nearby airport(s) e.g. Exeter, (if at Dunkeswell), beacons, airspace boundaries etc. Clearly, if on the ground at Dunkeswell the aircraft position should be approximately 10 nm's from Exeter Airport on the appropriate bearing. The figures at the bottom left hand corner of the screen indicate the scale of the map in that particular display. Again if the map is not indicating correctly this should be investigated and reported as necessary.

It is strongly recommended that DSFT pilots intending to use radio navigation facilities in flight should NOT use the GPS mode but to use the aircraft radio navigation equipment as they have been taught. In which case the pilot should press the CDI key (bottom row) to disengage the GPS and revert to the aircraft basic instrumentation. The letters 'VLOC' will appear above the CDI key to confirm. Pre-flight checks can then be completed in the normal way i.e. the Garmin 430 reverts to a Nav. Com. set. To ident the facilities the appropriate selection(s) should be made on the audio panel and the volume of the signal controlled by the small V knob (VLOC volume) located immediately under the C On/Off knob. Press the knob momentarily as required to activate or de-activate the signal. When actioned the letters 'ID' appear alongside the VLOC frequency box.

Automatic Direction Finder (ADF)

In Warrior G-CBKR the ADF is also a Garmin set. When switched 'On' using the 'PWR' button the set immediately goes into a self-test mode and then displays the frequency of the beacon that has been set. The frequency can be changed as required using the buttons provided. The three modes 'ANT', 'BFO', and 'ADF' can be selected using the Mode button at the top right hand corner of the set. A volume control is provided at the top left hand corner of the set. Pre-flight checks can be

made in the normal manner using the audio panel to check the ident plus visual checking of the indicator needle to ensure a sensible reading. For example if 337 KHz is set the ident should be 'EX' and the QDM (at DSFT) approximately 205 deg. Magnetic.

Action if Lost

If a pilot is uncertain of the aircraft's position and cannot obtain help from other sources e.g. 121.5 MHz and circumstances demand an early decision then the Garmin GPS can provide detailed information for the 9 nearest airports within 200 miles of the aircraft. To obtain information on all 9 calls for action which the average School pilot might find difficult in pressing circumstances. However, obtaining the necessary information on the 3 nearest airports is fairly straightforward as follows:

- 1) Press and hold the CLR key to display the default/basic Navigation page. This action may not be necessary if you are already displaying any of the main pages. Nevertheless it is good insurance and may save time.
- 2) Rotate the large knob of the right-hand 2-part switch fully to the right (3 clicks) to select the NRST page. 'NRST' will appear in the lower right-hand corner of the screen.
- 3) The 'NRST' display will show the 3 nearest airports giving the ICAO location indicator, the bearing and distance to the airport, plus the R/T frequency, and the best available approach system e.g. VFR or ILS etc. Knowing the bearing and distance the pilot is able to set up a new heading and communicate with the chosen airport.

Note: By scrolling, much more information is available but the procedures are outside the scope of these Notes. If further information is required reference should be made to the GNS430 Pilot's Guide and Reference manual.

Switching Off

Switching 'Off' is quite straightforward. Simply turn knob 'C' anti-clockwise to the 'Off' position - on both sets if both have been used. Then turn 'Off' the radio master switch. In the event of a transit stop it is permissible to leave the Garmin GNS430 and other avionics switched 'On' and just turn 'Off' the radio master switch - provided the aircraft master switch is also turned 'Off'.

The Garmin ADF can be turned 'Off' by re-pressing the PWR button