

Garmin GNC 255 Pilot's Guide - revision 3

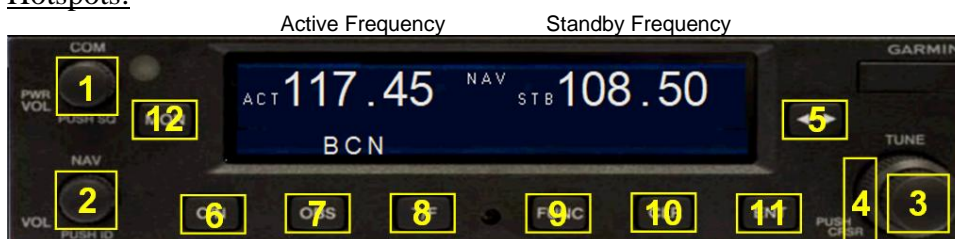
COM/NAV Radio

GNC 255 COM/NAV1, filename: **GarminComNav!GNC255_JD_1**

GNC 255 COM/NAV2, filename: **GarminComNav!GNC255_JD_2**



Hotspots:



1. ON/OFF **PWR** switch, **COM** Volume **VOL** and **PUSH SQ** squelch switch.
2. **NAV** Volume **VOL** and **PUSH ID** switch.
3. kHz **TUNE**, set timer seconds, scroll menu, and push for OBS course set.
4. MHz **TUNE**, and set timer minutes.
5. Frequency Transfer (Flip-Flop) ↔ button.
6. COM/NAV **C/N** Radio Mode Changeover button.
7. **OBS** button.
8. To/From **T/F** button.
9. Menu function **FUNC** button.
10. Clear **CLR** button.
11. Enter **ENT** button.
12. Standby Monitor **MON** button.

A comprehensive simulation of the real Garmin GNC 255 COM/NAV radio.

(Applicable to the Garmin GNC 255A and GNC 255B radios.)

This simulation is fully functional as a COM/NAV radio for FS2004 and FSX, and has many of the complex features of the real GNC 255 radio, including automatic COM ident (ICAO) and NAV ident displays, save and recall of 15 COM frequencies and 15 NAV frequencies, two independent timers, a fully independent OBS/CDI, etc.

The real GNC 255 has a number of other “bells and whistles” that are not simulated in this version.

I have decided to offer this version 1 of this simulation “as is” to the flight simulator community.

I may later issue a version 2 with some of these more advanced functions, although some may not be possible due to limitations of flight simulator and this programmer – we will have to wait and see!

The real GNC 255 has a comprehensive menu system. For this version a simplified sub-set of the real GNC255 menu system is provided.

The Garmin GNC 255 Pilot's Guide is available: http://static.garmin.com/pumac/190-01182-01_c.pdf

Operation of this radio has been made as close as possible to the real-life counterpart.

To this end the simulation uses right and left mouse clicks for knobs (right-click for increment, left-click for decrement). This is considered superior to the standard Flight Simulator method of left clicks only, and more closely simulates real-life operation. Alternatively, the mouse wheel can also be used on all knobs to increment or decrement values. Knobs that can be pushed in use middle mouse clicks. All standard Flight Simulator shortcut key assignments operate normally. If a previously saved “Flight” is loaded, all relevant frequencies and operating modes are correctly selected.

This radio defaults to the On state, as the majority of aircraft are fitted with an Avionics Master switch, in which case all individual radios are (and should be) normally left On for convenience and consistency.

COM Volume and ON/OFF switch

Left-click to switch the unit OFF. A click will be heard and the unit will be “dead”. Right-click to turn the unit back on. A non-volatile memory stores the Active and Standby frequencies on power down. When the unit is turned on again they will be restored to the display.

(Note: for sounds to be heard, the gauge `dsd_fsx_xml_sound.gau` must be installed – see Note 1.)



Automatic ID Display

The GNC255 has an automatic COM ID (ICAO) display.

I found this rather difficult to implement, and it's not perfect! I had to learn how to access the Flight Simulator (GPS) database, many thanks to Robert McElrath for his GPS Guidebook.

The software finds the 20 nearest COM frequencies and matches them to the COM active frequency selected.

For example while near Kemble in the UK, if 128.700 MHz is the active frequency, the unit will display the ICAO COM ident: EGBP, and will display the ident type: twr for tower.

Note that other frequencies of the same airport will not be displayed, and that some of the frequencies in the Flight Simulator's database are not correct. For example Kemble's frequency has (until very recently) been 118.9 MHz. To view the 20 nearest airports and their frequencies download my NearestAirports.zip, or use the GPS (9 nearest airports only). Automatic ID can be disabled, see the Monitor Button. Also see Note 3.



PUSH SQ squelch switch

To test the COM radio, middle-click the COM Volume knob to simulate pushing it in. An SQ indicator is displayed, and a loud static hiss is heard (as long as the relevant COM radio is selected in the Audio Selector unit). (In the real radio PUSH SQ turns the squelch off, and the static hiss (if there is no other radio transmission) indicates that the COM radio is working, and allows a comfortable volume level to be set).



Set COM Frequency

Select the desired Standby Frequency by clicking the MHz Tune and kHz Tune hotspots. Use right-click to increment, left-click to decrement (or use the mouse wheel).

Turning the MHz Tune knob beyond a band edge (118 or 136 MHz) will cause the tuning to wrap around to the opposite band edge.

The unit can be tuned in steps of 25 kHz or 50 kHz. Push the kHz Tune knob to toggle between 25 kHz (default) and 50 kHz. A quiet click is heard.



To exchange frequencies, making the Standby Frequency the Active Frequency and vice-versa, left-click the Frequency Transfer (Flip-Flop) ↔ button.

The transceiver is always tuned to the frequency appearing in the Active Frequency display. It is therefore possible to have two different frequencies stored in the Active and Standby displays and to change back and forth between them with a single push of the Transfer button.

COM Frequency Recall Mode

15 COM Frequencies and 15 NAV Frequencies can be saved and recalled as in the real GNC255 radio.

However in this version the method of storing and recalling is not like the real radio.

I may later issue an updated version of this radio which more closely emulates the real radio.

(Note, for Frequency Save/Recall, an application called **Logger** must be installed – see Note 2.)

The non-volatile channels are saved in a file, and are restored next time Flight Simulator is run.

Click the FUNC button to display the main menu (see below). Turn the kHz knob to scroll the highlighted menu item up and down using left and right clicks, or by using the mouse wheel.



To recall a COM frequency, highlight **COM Frequency**, and press the ENT button. The COM sub-menu appears:



With **Recall COM** highlighted, press the ENT button again. The **CH** indicator and a channel number are displayed.



Turn the kHz Tune button to select the required channel. The Channel Number is shown in the display, and a pre-programmed Channel Frequency will appear for each channel selected.

If there is no activity for 5 seconds the radio will exit Frequency Recall mode with the Standby Frequency now changed to the Channel Frequency.

Alternatively click the Frequency Transfer (Flip-Flop) button to exchange frequencies (making the Channel Frequency the Active Frequency).

Or click the CLR button within the 5 second period to exit the Frequency Recall Mode, keeping the previous Standby frequency.

Note that if a channel has been saved with dashes (see below), then this channel will be skipped while in Frequency Recall Mode. If no channels have been programmed, dashes (---) appear in the display.

COM Frequency Save Mode

With **Save COM** highlighted, press the ENT button.



PG (for program) and a channel number are displayed. The Channel Number will flash indicating that it can be changed by turning the kHz Tune knob to select the required channel..



To enter the required frequency click the Frequency Transfer (Flip-Flop) button. The Standby Frequency flashes to indicate that now it can be changed, and the Channel Number stops flashing. Click the MHz Tune and kHz Tune knobs to select the required frequency in the normal way. If the Frequency Transfer (Flip-Flop) button is pressed again the Channel Number flashes to indicate that the channel can now be changed again. In this way the user can program a number of channels by clicking the Frequency Transfer (Flip-Flop) button and using the same procedure. Click the ENT button to exit the Frequency Save Mode and save the channel information. If while saving the Frequency a frequency greater than 135.975 MHz or less than 118.000 MHz is set, dashes (- - -) appear in the display. This will cause this channel to be skipped when in Frequency Recall Mode.



The COM frequencies are saved in the following files in the flight simulator root directory. (The files are created automatically as soon as a channel is programmed.)

```
..\DataJD\GNC255_1_chans.ini
..\DataJD\GNC255_2_chans.ini
```

(Note: these files are text files, and can be opened using Notepad. Frequencies can be modified directly in these files if you don't want to go through the rigmarole of programming channels like in the real radio!)

Monitor Button

If the MON button is pressed the STB (standby) display changes to MN (monitor) but it doesn't actually monitor the standby frequency, as this functionality is not possible in Flight Simulator.

Note that in this version, it also disables the Automatic ID function. See Note 3.



COM/NAV Switching between COM and NAV Radio Mode

To toggle between COM and NAV radio functions press the C/N button.

The GNC255 defaults to the COM radio. Press C/N to change to the NAV radio.



Automatic ID Display

The GNC255 has an automatic NAV ID display. For example if 128.700 MHz is the active NAV frequency it displays BCN, the Brecon VOR. (This was easy to implement!)

NAV Volume and PUSH ID switch

To listen to the NAV Ident tone, the relevant NAV radio in the Audio Selector unit must be selected, and the NAV Volume knob must be pushed in by middle-clicking the knob. An ID indicator is displayed.

This is required if my KMA26, KMA 28 or GMA340 audio selector gauge is installed, and is how the real radio functions. However, if the flight simulator default audio selector is installed, pushing this knob does nothing, and the NAV ident tone will be heard regardless.



Set NAV Frequency

Select the desired Standby Frequency by clicking the MHz Tune and kHz Tune hotspots. Use right-click to increment, left-click to decrement (or use the mouse wheel). The NAV kHz Tune knob changes the Standby Frequency in steps of 50 kHz. Turning the MHz Tune knob beyond a band edge (108 or 118 MHz) will cause the tuning to wrap around to the opposite band edge.

To exchange frequencies, making the Standby Frequency the Active Frequency and vice-versa, click the Frequency Transfer (Flip-Flop) button.



NAV Frequency Recall Mode

15 COM Frequencies and 15 NAV Frequencies can be saved and recalled as in the real GNC255 radio. However in this version the method of storing and recalling is not like the real radio.

I may later issue an updated version of this radio which more closely emulates the real radio.

(Note, for Frequency Save/Recall, an application called **Logger** must be installed – see Note 2.)

The non-volatile channels are saved in a file, and are restored next time Flight Simulator is run.

Click the FUNC button to display the main menu (see below). Turn the kHz knob to scroll the highlighted menu item up and down using left and right clicks, or by using the mouse wheel.



To recall a NAV frequency, highlight **NAV Frequency**, and press the ENT button. The NAV sub-menu appears:



With **Recall NAV** highlighted, press the ENT button again. The **CH** indicator and a channel number are displayed.



Turn the kHz Tune button to select the required channel. The Channel Number is shown in the display, and a pre-programmed Channel Frequency will appear for each channel selected.

If there is no activity for 5 seconds the radio will exit Frequency Recall mode with the Standby Frequency now changed to the Channel Frequency.

Alternatively click the Frequency Transfer (Flip-Flop) button to exchange frequencies (making the Channel Frequency the Active Frequency).

Or click the CLR button within the 5 second period to exit NAV Frequency Recall Mode, keeping the previous Standby frequency.

Note that if a NAV channel has not been programmed with a frequency, a default frequency of 108.00 MHz will be set.

NAV Frequency Save Mode

With **Save NAV** highlighted, press the ENT button.



PG (for program) and a channel number are displayed. The Channel Number will flash indicating that it can be changed by turning the kHz Tune knob to select the required channel..



To enter the required frequency click the Frequency Transfer (Flip-Flop) button. The Standby Frequency flashes to indicate that now it can be changed, and the Channel Number stops flashing. Click the MHz Tune and kHz Tune knobs to select the required frequency in the normal way. If the Frequency Transfer (Flip-Flop) button is pressed again the Channel Number flashes to indicate that the channel can now be changed again. In this way the user can program a number of channels by clicking the Frequency Transfer (Flip-Flop) button and using the same procedure. Click the ENT button to exit the Channel Program Mode and save the channel information.

The NAV frequencies are saved in the following files in the flight simulator root directory. (The files are created automatically as soon as a channel is programmed.)

```
..\DataJD\GNC255_1_NAVchans.ini
..\DataJD\GNC255_2_NAVchans.ini
```

(Note: these files are text files, and can be opened using Notepad. Frequencies can be modified directly in these files if you don't want to go through the rigmarole of programming channels like in the real radio!)

NAV Modes

Four NAV modes are provided, just like on the real radio:

1. *Normal (Set NAV Frequency)*
2. *OBS/CDI (Omni Bearing Selector/Course Deviation Indicator)*
3. *Bearing TO*
4. *Radial FROM*

1. Normal Mode

The Normal mode is the default mode (see Set NAV Frequency above).

2. CDI Mode

To switch from the Normal mode to the CDI mode click the OBS button.

An **OBS** indicator is displayed, an OBS Bearing is displayed and a Course Deviation Indicator (CDI) is displayed (10 dashes, a vertical needle and a TO/FROM indicator).

The NAV kHz Tune knob can be pushed in using a middle mouse-click. A quiet click is heard. The **OBS** indicator flashes and the selected OBS course can be incremented or decremented by clicking the kHz Tune Knob. To centre the CDI needle automatically, click and hold the OBS button for 2 seconds.



The CDI vertical needle moves from side to side similar to a mechanical CDI in an Omni-Bearing Indicator (OBI) or Horizontal Situation Indicator (HSI).

When tuned to a VOR beacon the CDI is calibrated to indicate ± 10 degrees full-scale deflection, and each of the dashes represents 2 degrees. The **TO/FROM** indicator arrowhead is displayed in the centre of the CDI.



Note that the CDI on this radio is completely independent from any Flight Simulator CDI on a HSI or OBI. (Turning the OBS knob on the radio does NOT turn the OBS or CRS knob on the HSI or OBI, and vice versa.) This is a very useful feature. For example, a HSI (or OBI1) could indicate a course as set on the GPS, while the NAV1 radio could show a bearing TO or radial FROM a VOR beacon. The NAV2 radio could show a bearing TO or radial FROM a different VOR beacon with a CDI completely independent from the OBI2 CDI.

If the radio is tuned to an ILS frequency while in CDI mode, the OBS display changes to **LOC**.



When tuned to an ILS the CDI is calibrated to indicate $\pm 2\frac{1}{2}$ degrees, and each of the dashes represents $\frac{1}{2}$ degree.

If no signal is being received from the station tuned while in CDI mode, the CDI display changes to **FLAGGED**, and dashes are shown.



3. Bearing TO Mode

To switch to the Bearing TO mode click the T/F button. The Bearing To the NAV station tuned is displayed.



4. Radial FROM Mode

To switch to the Radial FROM mode click the T/F button again. The Radial From the NAV station tuned is displayed.



If no signal is being received from the station tuned while in Bearing TO or Radial FROM mode, the display changes to show dashes.



Timer Modes

Two independent Timers are provided – an Up Timer, and a Down Timer.

Up Timer

To select the Up Timer, click the FUNC button to display the main menu (see below). Turn the kHz knob to scroll the highlighted menu item up and down using left and right clicks, or by using the mouse wheel.



Highlight **Count Up**, and press the ENT button.



The Count Up Timer appears:



Press the ENT button, and the timer will start counting up.



Press ENT again and the timer will pause, with **TIMER STOPPED** displayed.



Press ENT and the timer will start counting again.

Press the CLR button to reset the timer to zero.

To hide the timer, right-click the ENT button, or press the FUNC button twice. The timer will continue to count in the background.

Down Timer

Highlight **Count Down**, and press the ENT button.



The Count Down Timer appears, with a default starting count-down time of 1:00.



To change the count-down time, turn the MHz Tune knob to set minutes, and the kHz Tune knob to set seconds. The seconds can be set in steps of 10 seconds (default) or 1 second. Push the kHz Tune knob to toggle between 1 second and 10 second steps (a quiet click is heard). Press the ENT button, and the timer will start counting down towards zero. Once the count reaches zero the display will briefly flash, an audible alarm will sound, and the counter will then begin to count up.



Press ENT again and the timer will pause.



Press ENT and the timer will start counting again.
Press the CLR button to reset the timer to the starting value.

To hide the timer, right-click the ENT button, or press the FUNC button twice.
The timer will continue to count in the background.

Note 1. Sounds

For custom sounds to be heard, the gauge `dsd_fsx_xml_sound.gau` must be installed.
This is a freeware gauge from Doug Dawson. See Credit for Sound Gauge below.

Installation

Download the file: `dsd_fsx_xml_sound.zip` available from FlightSim.com.
Unzip the zip file.

Step 1.

Install the file: `dsd_fsx_xml_sound.gau` into the flight simulator **Gauges** sub-folder.
(Normally ...\\fsx\\Gauges or ...\\Flight Simulator 9\\Gauges)

Step 2.

Install the file: `SoundJD.ini` into the flight simulator **Gauges** sub-folder.
(The file `SoundJD.ini`, and the folder: **SoundJD** are included in the my radio or autopilot package.)

Step 3.

Install the folder **SoundJD** into the flight simulator **Sound** sub-folder.
(Normally ...\\fsx\\Sound or ...\\Flight Simulator 9\\Sound)

Step 4.

Copy and paste the line:
`gaugenn=dsd_fsx_xml_sound!Sound, 2,2,2,2, ./gauges/SoundJD.ini` into the
[Window00] section in the `Panel.cfg` file for every aircraft that has my radio or autopilot installed.
(Where nn is the next available gauge number). Note the dot before `/gauges` !

Credit for Sound Gauge

Many thanks to Doug Dawson, for his excellent freeware sound gauge.
It is available from various flightsim websites (e.g. Flightsim.Com and Avsim.)
This is a very sophisticated and versatile application - the above installation only used a fraction of the capability available.

Note 2. Logger

In order to save and recall channel files, an application called Logger must be installed.
Logger is a FS9 and FSX module that provides file read and write capability for XML gauges.

Installation

Download the file: `Logger Modules v1.1.zip` available from: <https://robbiemcelrath.com/fs/logger/about>
This is a freeware application from Robbie McElrath. See Credit for Logger below.
Unzip the zip file.

Step 1:

For FS9 copy the file `Logger9.dll` into the flight simulator **Modules** sub-folder.
For FSX copy the file `LoggerX.dll` into the flight simulator **Modules** sub-folder and
follow the instructions provided on the above website in the Help section.

Step 2:

Create a folder in the flight simulator root folder called **DataJD**, or copy the folder **DataJD** supplied in this package into your Flight Simulator root directory. This folder has a number of frequencies pre-programmed. (The flight simulator root folder is normally ...\\fsx or ...\\Flight Simulator 9)

Credit for Logger

Many thanks to Robbie McElrath, for his excellent freeware `logger9.dll` and `loggerX.dll` modules. This is an incredibly useful application – it can do much more than just save and recall files.
Please read the documentation provided on the website.
Logger is available from Robbie McElrath at <https://robbiemcelrath.com/fs/logger/about> .

Note 3. Disabling the COM ID Function

The COM ID code works by accessing the Flight Simulator database (“GPS database”) very frequently to match up the active frequency in the radio, to a nearby COM station in the database.

(If anyone knows a better way of doing this, please let me know.)

After installing some third party airport scenery, I consistently get a Crash to Desktop (CTD) near this airport using an aircraft with my GNC255 installed.

If I removed my GNC255, I still got an occasional CTD if I played around with the default GPS.

When I removed the third party airport scenery I never got a CTD with my GNC255 installed.

So the question is: can accessing the Flight Simulator database cause a CTD to occur with some third party scenery?

If this causes a problem, the COM ID function can be disabled by simply clicking the Monitor Button:

If MN (monitor) is displayed, the COM ID function is disabled.

If STB (standby) is displayed, the COM ID function is enabled.