Coyote Avionics
Garmin Avionics
User's Guide

Coyote Avionics Design™
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Standard Disclaimer

This software is designed **for entertainment only**. Although it has been designed to resemble and function as much like the actual avionics as possible, it is not designed as a training device. Only a subset of the functions have been implemented.

NOT CERTIFIED FOR USE IN REAL FLIGHT OR FLIGHT TRAINING.

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Introduction

The goal of Coyote Avionics Design is to provide modern, high quality avionics for the use of the flightsim community.

The purpose of this document is to provide a reference for the Garmin Avionics set released by Coyote Avionics for FS2002. An updated version of this document will be included with each new release.

Garmin Avionics Set

The Garmin Avionics set consists of six pieces of rack mounted avionics equipment and a full function VOR/LOC/GS CDI for NAV2. Any piece can be used alone or in any combination with the other units. The only exception is that only one Nav1/Com1 set may be used. This means that either gns4301 or gns5301 can be used for COM1/NAV1, but not both.

The units are :

gma340   Audio panel
gns4301   COM1/NAV1/GPS
gns4302   COM2/NAV2/GPS
gtx327   Transponder

gns5301   COM1/NAV1/GPS with moving map display

gps500   standalone moving map display

GarminVor2 full function CDI for NAV2


GMA340

GNS430

GTX327

GNS530

GPS500

Garmin VOR2 CDI

GMA340 Audio Panel
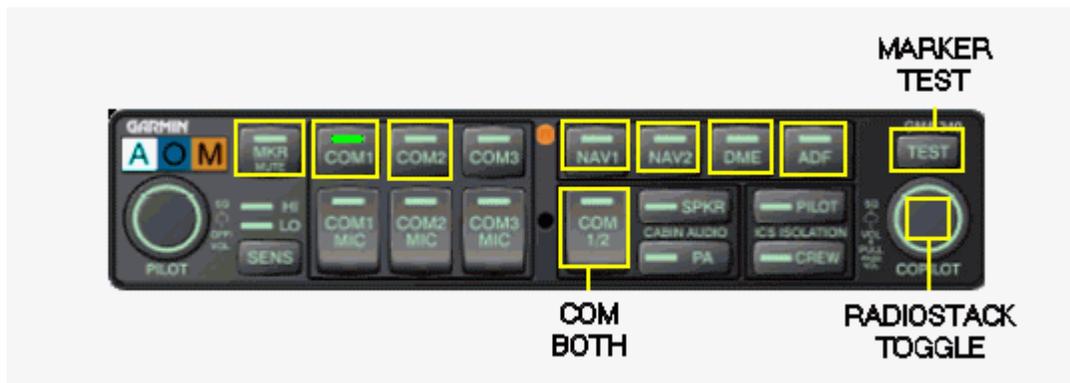
GMA340 hotspots

The audio panel provides full FS2002 audio panel functionality.

    Marker Beacon Lights   -- indicates which beacon is being received.
    [MRKR] button   -- Selects Marker Beacon audio output.
    [COM1] button   -- Selects COM1 audio output.
    [COM2] button   -- Selects COM2 audio output.
    [COM 1/2] button   -- Selects both COM1 and COM2 audio output.
    [NAV1] button   -- Selects NAV1 cw id audio output.
    [NAV2] button   -- Selects NAV2 cw id audio output.
    [DME] button   -- Selects DME cw id audio output.
    [ADF] button   -- Selects ADF cw id audio output.

    [TEST] button   -- Cycles thru the Marker Beacon lights (A-O-M) and back to off.

    [COPILOT] button -- Toggles radio stack window on and off.

Gauge Size	:	500x105
Minimum Recommended width	:	240
Gauge name	:	cad_garminavionics!gma340

GNS4301 COM1/NAV1/GPS

GNS4301 hotspots

The GNS4301 provides full COM1, NAV1 and GPS functions. The GPS portion is a readout of the default FS2002 GPS data.

Only the standby frequencies may be changed, then they are made active by selecting the appropriate active/standby frequency toggle. The frequency is tuned by placing the mouse pointer over the mhz or khz portion of the stdby frequency and either left clicking to decrease the frequency or right clicking to increase the frequency.

   COM1   Both active and standby frequencies are provided.
   C<->   active/standby frequency toggle.

   NAV1   Both active and standby frequencies are provided.
   V<->   active/standby frequency toggle.
   DIS Displays DME distance in NM

   GPS   Default navigation page is provided. Contains the following information :

      CDI   -- Displays +/- 5 NM course deviation.
      wptid -- Displays next waypoint id.
      DIS   -- Displays distance to next waypoint in NM.
      DTK   -- Displays desired track to next waypoint.
      BRG   -- Displays bearing to next waypoint.
      GS   -- Displays ground speed.
      TRK   -- Display current track.
      ETE   -- Displays estimated time to next waypoint.

  [CDI] button   Toggles GPS/NAV autopilot NAV source. (same function as default gps/nav switch)

[PUSH CRSR] knob   Toggles GPS display on/off.

Gauge Size	:	500x209
Minimum Recommended width	:	240
Gauge name	:	cad_garminavionics!gns4301

GNS4302 COM2/NAV2/GPS

GNS4302 hotspots

The GNS4302 provides full COM2, NAV2 and GPS functions. The GPS portion is a readout of the default FS2002 GPS data. The operation of GNS4302 is identical to GNS4301 except that the frequencies are for COM2 and NAV2.

Gauge Size	:	500x209
Minimum Recommended width	:	240
Gauge name	:	cad_garminavionics!gns4302

GNS530 COM1/NAV1/GPS

GNS530 hotspots

The GNS530 provides full COM1, NAV1 and GPS functions. The GPS portion is a readout of the default FS2002 GPS data.

Only the standby frequencies may be changed, then they are made active by selecting the appropriate active/standby frequency toggle. The frequency is tuned by placing the mouse pointer over the mhz or khz portion of the stdby frequency and either left clicking to decrease the frequency or right clicking to increase the frequency.

COM1   Both active and standby frequencies are provided.
C<->   active/standby frequency toggle.

NAV1   Both active and standby frequencies are provided.
V<->   active/standby frequency toggle.

VOR   Displays VOR id.
RAD   Displays VOR radial
DIS   Displays DME distance in NM.

GPS   Default navigation page is provided. Contains the following information :

CDI   -- Displays +/- 5 NM coarse deviation.
wptid -- Displays next waypoint id.
DIS   -- Displays distance to next waypoint in NM.
DTK   -- Displays desired track to next waypoint.
GS   -- Displays ground speed.
TRK   -- Display current track.

ETE   --   Displays estimated time to next waypoint.

compass rose   --   Indicates current heading
DTK pointer   --   Marks desired track
Wpt bearing needle   --   Points to bearing of next waypoint

[CDI] button   Toggles GPS/NAV autopilot NAV source. (same function as default
                    gps/nav switch)

[PUSH CRSR] knob   Toggles GPS display on/off. (same function as default GPS
                    button)

Gauge Size   :   500x364
Minimum Recommended width   :   240   //   300 with gps overlay
Gauge name   :   cad_garminavionics!gns5301

NOTE :   The GPS overlay is a temporary measure until I can build a moving map
display into the GNS530. If the GNS530 is part of a radiostack, the moving map will be
difficult to read at normal radiostack sizes. It is probably a better approach to use an
external popup GPS instead of the gps overlay.

GNSGPS gps overlay
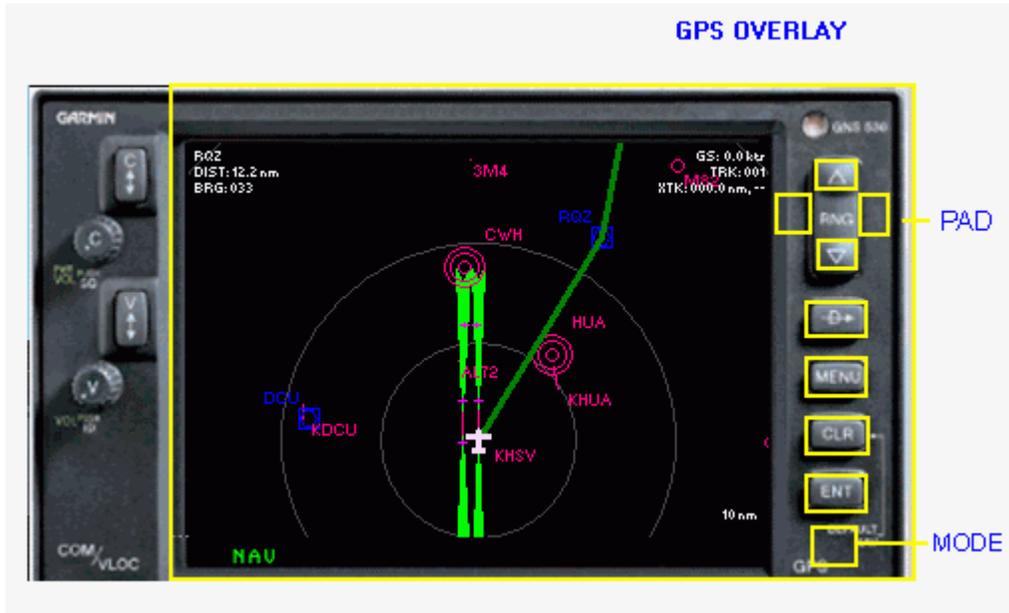
GPS overlay for GNS530

Optional GPS map overlay which overlays the nav screen of the GNS530 with the default GPS moving map display. The GPS map overlay is a repackaged version of the default FS2002 GPS. It is only used for this application since it does not have a complete frame.

   Hot spots overlaying RNG buttons -- Arrows pad used to navigate menus and pages.
   [-D->] button   -- Cycles between Direct To page/Emergency page/Normal page on
                     gps screen.
   [MENU] button -- Toggles gps Menu page on/off.
   [CLR] button   -- Same function as gps CANCEL button.
   [ENT] button   -- Same function as gps ENTER button.
   hot spot below ENT button   -- Cycles display Mode between moving map display,
                waypoint information display and route information display.

Gauge name :   gnsgps!gps

NOTE : Since FS2002 only supports one GPS nav source, toggling NAV source on either NAV1 radio or NAV2 radio has the same effect. In either case the FS2002 GPS becomes the NAV source.

GTX327 TRANSPONDER

GTX327 hotspots

The GTX327 Transponder provides modern transponder functions.

[**VFR**] button   -- Toggles between previous code and VFR code (1200).

[**FUNC**] button -- Toggles between Pressure Altitude display and Flight Time display
(flight time display not implemented)

[**CLR**] button   -- Deletes digit which was just entered (works like a backspace)

Pressure Altitude is indicated in Flight Level (FL), i.e. altitude = displayed number x100 ft.

SQUAWK CODE -- Squawk Code is entered by clicking each code digit in sequence. The CLR button works like a backspace so the last digit may be corrected by clicking CLR button and then clicking desired digit. The code change does not take effect until all four code digits are entered. For example :

to enter code 3400 you must click 3 4 0 0 in sequence

Gauge Size	:	500x126
Minimum Recommended width	:	240
Gauge name	:	cad_garminavionics!gtx327

GPS500 Moving Map Display

GPS500 hotspots

This gauge is a replacement for the default gps moving map display. This unit would typically be used with the gns4301/gns4302 combination. This is a repackaged version of the default FS2002 gps.

    Hot spots overlaying RNG buttons -- Arrows pad used to navigate menus and pages.
    [-D->] button   -- Cycles between Direct To page/Emergency page/Normal page on
                         gps screen.
    [MENU] button -- Toggles gps Menu page on/off.
    [CLR] button   -- Same function as gps CANCEL button.
    [ENT] button   -- Same function as gps ENTER button.
    [PUSH CRSR] knob   -- Cycles display Mode between moving map display, waypoint
                         information display and route information display.

Gauge Size   :   450x329
Minimum Recommended width   :   300
Gauge name   :   cad_gps500!gps

Garmin VOR2 CDI
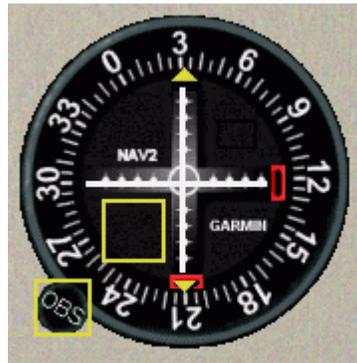
garminVOR2 hotspots

The garminVOR2 CDI is a full function CDI for NAV2. It provides both VOR/LOC course deviation information and glide slope information.

The OBI is adjusted by placing the mouse pointer on the OBS knob and right clicking to increase and left clicking to decrease.

Clicking inside the lower left quarter of the gauge will toggle digital readout of the course on/off.

Gauge Size	:	256x256
Minimum Recommended width	:	90
Gauge name	:	cad_GarminVor2!gi106b

Repackaged Garmin GPS Displays

There are several repackaged Garmin GPS displays in my collection. They are all the default FS2002 GPS with the front panel graphics bitmap changed and the buttons remapped to match the selected GPS. They all have the same functions as the default GPS.

The following repackaged Garmin GPS are currently available :

       Garmin GPS 500 GPS display
       Garmin GPSMAP 195 GPS display
       Garmin GPSMAP 295 GPS display
       Garmin GPS Pilot III GPS display
       Garmin Vista GPS display

Most of them were done on request and I am sure the list will continue to grow. They consist of both handheld units and panel mounted units.


Garmin Vista

GPSMAP 195

GPSMAP 295
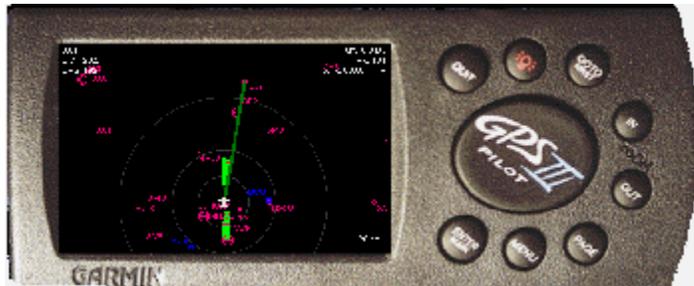
GPS Pilot III

In order for the GPS map to be legible, the GPS must be larger than lifesize when compared to the gauges on the panel. This problem is worse with a horizonally oriented map display such as the GPSMAP 295 and GPS Pilot III because the default GPS is optimized for vertical map display orientation.

Operation of the repackaged GPS is the same as the standard GPS, the only difference is the location and labeling of the buttons.

The following is a typical button mapping :

GPSMAP195   FS2002GPS

QUIT   CANCEL
EDIT/ENTER   ENTER
PAGE   MODE
MENU   MENU

GOTO
 or
WPT   -D->
 or
NRST

ARROW PAD   ARROW PAD

DESIGN STATEMENT :

All of these gauges are original implementations by Coyote Avionics Design$_{TM}$ except for the repackaged GPS and the garminVOR2 CDI. The graphics used are either modified versions of vendor product information graphics available on the Internet, scanned images, digital pictures provided by other flightsimmers or graphics developed especially for Coyote Avionics Design projects.

The garminVOR2 CDI was implemented by modifying the source code provided by Dai Griffith as part of his FS2000/CFS SDK Gauge Creation tutorial .

The repackaged GPS displays were implemented using information provided by Chuck Dome.

NOTES :

Coyote Avionics are constantly being updated and I will release updates as required. If you have a project which uses my gauges send me an email and I will send you the latest version. Please send me an email if anything doesn't work as expected or if there are any questions.

I am always open for suggestions. If you have any ideas on improvements that can be made feel free to send them to me.

INSTALLATION HINTS

<u>ASPECT RATIO</u>

Because of the details implemented in these gauges and the fact that most of the text displays are as close to scale as possible for maximum reality, the aspect ratio of the gauges should be maintained as close as possible.

This means that if a gauge is 500x100 pixels and you need a 240 pixel wide gauge, the size of the gauge in the panel should be 240x48. Since you usually know the width desired, the height of the gauge can be determined using the following approach.

Gauge size is 500x100 (WxH)

ratio is equal to H/W

therefore ratio = 100/500 = .20

required_height is equal to ratio x required_width

therefore required_height = 0.20 * 240 = 48

If the value is a decimal value such as 48.3 it is usually better to round up instead of down. For example use 49 if your calculation results are 48.3, etc.

The gauge size of all Coyote Avionics gauges are provided in the description.

<u>GAUGE SIZE</u>

For most gauges there is a minimum recommended size. The best way to determine the minimum size for a gauge is try it. The minimum size recommended in the description is only a guideline and they are based on a 1024x768 panel size.

If you follow these guidelines your panels will be a lot more realistic and a lot more readible.

Known Problems :

None

REFERENCES :

Garmin GMA 340 Audio Panel Pilot's Guide
Garmin GNS 430 Pilot's Guide and Reference
Garmin GNS 530 Pilot's Guide and Reference
Garmin GPS 500 Pilot's Guide and Reference
Garmin GTX 327 Mode A/C Transponder Pilot's Guide

How To Understand The Inner Workings Of The GPS by Stephen R. Goldsmith is a well written article that has good information on the default gps which also applies to my repackaged gps. It is a Flightsim.com Howto article which can be found at the following location : http://www.flightsim.com/cgi/kds?$=main/howto/gps-sg.htm

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