

# Coyote Avionics Bendix-King 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 simulated.

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 Bendix-King Avionics gauges which are released by Coyote avionics for use in FS2002. An updated version of this document will be included with each new release.

Complex avionics sets such as the EFS 40 EFIS Set are documented in their own User's Guide.

## **Bendix-King Avionics**

The Bendix-King Avionics currently available consists of six pieces of equipment.

The units are :

- KMA 28 Audio Panel/Marker Beacon Receiver
- KX 165 VHF COM/NAV Transceivers
- KX 165A VHF COM/NAV Transceivers
- KR 87 ADF Receiver
- KT 76C Transponder
- KLN 90B GPS Receiver

## KMA 28 Audio Panel



### KMA 28 hotspots

The KMA 28 audio panel provides full FS2002 audio panel functionality.

- |                      |  |
|----------------------|--|
| Marker Beacon Lights | -- indicates which beacon is being received. |
| [MKR] button         | -- Selects Marker Beacon audio output.       |
| [COM1] button        | -- Selects COM1 audio output.                |
| [COM2] button        | -- Selects COM2 audio output.                |
| [ICS] button         | -- Selects COM Both.                         |
| [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.           |

Gauge Size	:	500x100
Minimum Recommended width	:	220
Gauge name	:	cad_bkavionics!kma28

## KX 165 COM/NAV VHF TRANSCEIVER



KX 165 hotspots

The KX165 transceivers provide full COM and NAV functions.

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 stbby frequency and either left clicking to decrease the frequency or right clicking to increase the frequency.

COMM Both active and standby frequency display is provided.

NAV Both active and standby frequency display is provided.

left <-> btn active/standby COM frequency toggle.

right <-> btn active/standby NAV frequency toggle.

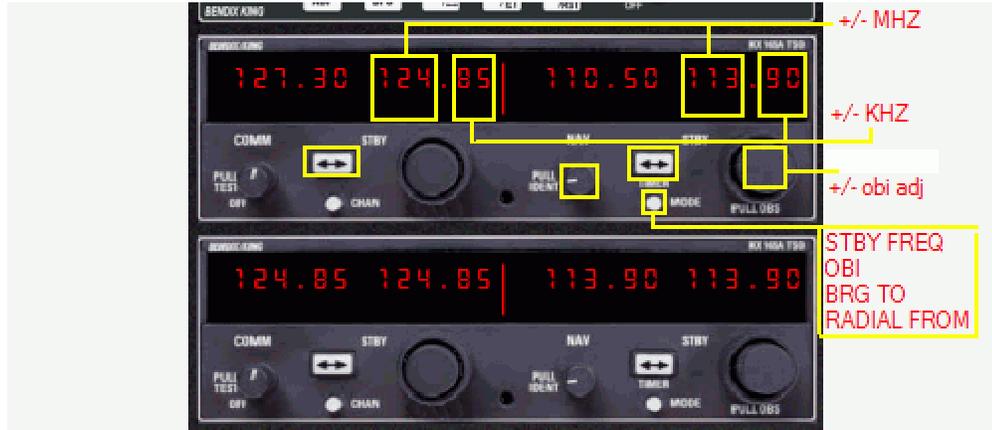
PULL IDENT toggles NAV cw id on/off

RAD knob toggles between radial display and stby nav freq display

Two KX165 transceivers are provided. KX1651 for COM1/NAV1 and KX1652 for COM2/NAV2.

Gauge Size	:	500x153
Minimum Recommended width	:	220
Gauge name (COM1/NAV1)	:	cad_bkavionics!kx1651
Gauge name (COM2/NAV2)	:	cad_bkavionics!kx1652

# KX 165A COM/NAV VHF TRANSCEIVER



## KX 165A hotspots

The KX165A transceivers provide full COM and NAV functions.

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.

- COMM Both active and standby frequency display is provided.
- NAV Both active and standby frequency display is provided.

left <-> btn active/standby COM frequency toggle.

right <-> btn active/standby NAV frequency toggle.

- PULL IDENT toggles NAV cw id on/off
- MODE btn selects NAV stby display modes. Modes supported are STBY FREQ, OBI, BRG TO, and RADIAL FROM.
- OBI knob used to select OBI setting. Left click to decrease and right click to increase.

Two KX165A transceivers are provided. KX165A1 for COM1/NAV1 and KX165A2 for COM2/NAV2.

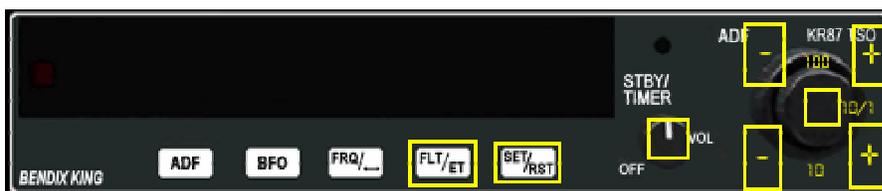
- Gauge Size : 500x155
- Minimum Recommended width : 220
- Gauge name (COM1/NAV1) : cad\_bkavionics!kx165a1
- Gauge name (COM2/NAV2) : cad\_bkavionics!kx165a2

## KR87 Digital ADF Receiver



KR87 ADF Receiver

The KR87 ADF receiver is a modern ADF receiver with a built-in timer. Both the Flight Time mode and the Elapsed Time mode of the timer are implemented.



KR87 hotspots

The receiver is tuned to the desired frequency using the tuning knobs. The frequency is displayed in KHZ on the left side of the display.

Tune in 100 KHZ steps by selecting the upper hotspots to the left and right of the knobs.

Tune in 10 KHZ or 1KHZ steps by selecting the lower hotspots to the left and right of the knobs.

Clicking the center of the tuning knob will toggle the lower tuning steps between 10 KHZ per step and 1 KHZ per step.

### TIMERS

There are two timers. The Flight Time timer and the Elapsed Time timer. The desired timer mode is selected by toggling the FLT/ET button.

#### FLT Timer Mode

The FLT Timer mode is the default timer mode. The flight time is displayed in HH:MM format on the right side of the display. The FLT annunciator will be displayed if in the FLT mode.

The timer starts when FS2002 is started. To reset the FLT Timer to 00:00 click the ON/OFF knob just to the right of the display. The timer cannot be stopped, it can only be reset to 0. It will continue to count up as long as FS2002 is running.

## ET Timer Mode

The Elapsed Timer counts in one second increments. The elapsed time is displayed in MM:SS format on the right side of the display. It may be reset to 00:00 by clicking the SET/RST button. It will continue to count until it reaches 59:59 then only the seconds display will continue to increment until it is reset. The ET annunciator will be displayed if in the ET mode.

NOTE : Since the Bendix-King KR87 ADF Receiver is one of the few ADF receivers available for new aircraft, it is available both as a single gauge or as part of the cad\_bkavionics gauge set. This is so it can be used with either a Garmin Avionics set or a Bendix-King Avionics set.

Gauge Size	:	500x103
Minimum Recommended width	:	220
Gauge name	:	cad_kr87adf!adfrcvr
Gauge name	:	cad_bkavionics!kr87adf

## KT 76C TRANSPONDER



The KT 76C Transponder provides modern transponder functions.

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

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

Pressure Altitude is indicated on the left side of the display 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	:	220
Gauge name	:	cad_bkavionics!kt76

## KLN 90B GPS RECEIVER



This gauge is a readout for the FS2000/FS2002 GPS. It displays the current navigation data from the default FS2000 GPS and provides GPS map display switching and GPS/NAV switching. The data formats displayed are based on the ones provided by the Bendix/King KLN 90B GPS. This gauge does not simulate a GPS, it only provides display and switching functions.

This gauge displays the data needed to navigate and fly using the built-in GPS in a realistic display without having to use the built-in GPS display except when changing GPS modes.

The display contains four lines of data.

The upper line displaying two XTK modes or an extended CDI scale when in the CDI mode. Lines 2 and 3 are divided into two data fields labeled 2L, 2R, 3L, and 3R. Line 4 is divided into three data fields labeled 4L, 4C and 4R.

<u>Line</u>	<u>Description</u>	<u>Example</u>
Line 1	Expanded CDI display using all of line 1 in CDI mode left digit specifies scale factor CDI pointer indicates Cross Track error.	5 (5 NM or 1 NM are available)
Line 2L	Bearing to Waypoint	-- BRG 025 (degrees)
Line 3L	Ground Speed	-- GS 129 KT (knots)
Line 4L	Waypoint ID	-- -> RQZ (next waypoint)

Line 1R XTK information displayed in one of two modes.

<u>Mode</u>	<u>Information Displayed</u>
XTK --	XTK -1.7 NM distance off track in NM (- means track is to left of aircraft)
FLY TO	-- FLY L 1.2 NM ( L = left / R = right )

Line 2R	Distance to Waypoint	-- DIS 13.1 NM (nautical miles)
Line 3R	Estimated Time to Wpt	-- ETE 00:06:02 (hh:mm:ss)
Line 4C	Desired Track to Wpt	-- DTK 032 (degrees)
Line 4R	Autopilot NAV/GPS source	-- GPS or NAV

## CDI mode symbology

	--	desired track
^	--	aircraft track ( always in center )
+	--	each mark is 1 NM or 0.2 NM

## Controls

In this version there are four active controls.

-D-> button	--	toggles GPS display on and off
ENT button	--	toggles autopilot NAV source between GPS and NAV
CDI/XTK/FLY knob	--	selects XTK display modes
right CRSR button	--	toggles CDI mode sensitivity between 1.0 NM per mark and 0.2 NM per mark. (full scale deviation of +/- 5 NM and +/- 1 NM)

## Assumptions

GPS window is defined for panel that gauge will be used with.

In panel.cfg the gps window uses standard ident of ident=GPS\_PANEL.

NOTE : Since the actual control is performed by the built-in GPS, this gauge may be installed on a secondary window and the window may be closed except when checking the readings, although for realism it will be better to have this gauge installed on the main panel.

## Installation

The master gauge is named cad\_kln90bro or cad\_kln90brored and it contains two gauges. The gps readout gauge (gpsro), and a small gauge which is an add-on for the Bendix/King KAP140 autopilot which implements the up/down buttons for additional realism (apupdn).

The GPS gauge is addressed in panel.cfg as cad\_kln90bro!gpsro and the updown add-on as cad\_kln90bro!apupdn.

It is not necessary to use the updown add-on, it was included since FS2000/FS2002 gauges are multiple gauges by design and having the updown buttons on the KAP140 autopilot is a nice feature.

## NAVIGATIONAL TERMS from Bendix/King KLN 90B manual

BRG - Bearing to waypoint (degrees)  
DIS - Distance to waypoint (nm)  
DTK - Desired Track (degrees)  
GS - Groundspeed (nm/hr)  
TK - Actual Track (degrees)  
WPT - Waypoint  
XTK - Cross Track Error Correction (nm) displayed as  
"FLY L 2.3 nm" or "XTK -2.3 NM"  
ETE - Estimated Time Enroute (hrs:min)  
CDI - Coarse Deviation Indicator

// green letter version

Gauge Size : 497x161  
Minimum Recommended width : > 250  
Gauge name : cad\_kln90bro!gpsro

// red letter version

Gauge Size : 497x161  
Minimum Recommended width : > 250  
Gauge name : cad\_kln90brored!gpsro

// KAP140 up/dn button

Gauge Size : 40x66  
Recommended width : adjust to fit default KAP140 up/dn buttons  
Gauge name : cad\_kln90bro!apupdn

## **DESIGN STATEMENT :**

All of these gauges are original implementations by Coyote Avionics Design™. The graphics used are either modified versions of vendor product information graphics available on the Internet, scanned images or digital pictures provided by other flightsimmers or graphics developed especially for Coyote Avionics Design projects.

## **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.

## INSTALLATION HINTS

### ASPECT RATIO

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.

### GAUGE SIZE

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 readable.**

**Known Problems :**

None

## REFERENCES :

Bendix/King KR87 Digital ADF Brochure  
Bendix/King Silver Crown Plus Avionics Systems Pilot's Guide

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