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General

iEFIS consists of one or more panels, one or two iBOX units as well as sensors and control interfaces as required.

As of writing of this document the following MGL devices are compatible with the iEFIS system:

Up to 8 panels may be connected in a single system

iEFIS Discovery: 7" screen size panel

iEFIS Explorer: 8.5" screen size panel

iEFIS Challenger: 10.4" screen size panel

iBOX V1: Full feature, central interface for an iEFIS system (up to 2 units)

SP-6 CAN: Compass/Magnetometer (up to 2 units)

SP-7 CAN: AHRS (up to 4 units)

SP-8 CAN: SP-6 and SP-7 in one housing (up to 4 units)

SP-9 CAN: High grade AHRS (up to 4 units)

SP-10 CAN: Flap, trim and gear controller (up to 6 units, up to 2 functions/unit, 6 functions max)

RDAC XF: Engine monitoring interface (up to 4 units/engines)

RDAC CAN: ECU interface (up to 2 units/engines)

MGL V6: COM radio (including full remote control)

MGL V10: COM radio (including full remote control)

MGL ECB system (up to 4 units, 48 breakers)

MGL iEFIS wireless node (one per system)

MGL iEFIS wired node (up to 8 – including iEFIS panels)

MGL Autopilot servos (Bank, Pitch, Yaw)

MGL/Garrecht mode-s transponder

MGL Voice command system

The following third party products are compatible with the iEFIS system:

Garmin SL40 COM radio

Garmin SL30 NAV/COM radio

Garmin G430W and newer GPS/NAV/COM systems

Sandia aerospace STX-165R mode-c transponder

Vertical power VPX

NexNAV FAA certified GPS receiver

Traffic systems compatible with ARINC 735 (TIS, TCAS, ADSB with TIS output)

Traffic systems: NAVWorx ADSB, FLARM, XRX PCAS

Transponders requiring greycode (gillman code) altitude encoder can be connected, using the iBOX altimeter as alticoder source.

Older navigation systems (VOR/ILS) using +/-150mV differential outputs to drive indicators can be connected as navigation source.

External autopilots can be connected to NMEA (RS232 port 6 on the iBOX) or connected to

ARINC steering signals.

IEFIS capabilities

Based on a powerful platform, iEFIS introduces a modular, yet low cost approach to the aircraft avionics panel. The principle guidance during the iEFIS development was “complete, one stop, any function, any aircraft”. From ultralights to space craft, this system covers all.

IEFIS of varying sizes can be combined in the cockpit as required. A compact unit called the 'iBOX' contains all of the EFIS interfaces to many possible devices in the cockpit as well as pressure sensors for altimeter, airspeed and angle of attack. Airspeed can be measured to several Mach numbers at altitude if the high speed option is fitted while the pressure based altimeter reaches to over 40,000 ft with a resolution of just 1 ft. The iBOX also contains one of the highest performance GPS receivers available today, able to track GPS satellites of several countries as well as providing WAAS and RAIM capability.

Up to two iBOX units may be used in a system forming a complete master and “hot standby” system for redundancy where required.

IEFIS may be used to comprehensively monitor up to 4 engines, 8 physical fuel tank levels and 4 virtual tanks (based on fuel flow measurements).

Up to 4 AHRS units may be fitted for high redundancy systems as well as multiple magnetometers.

A multitude of interfaces allows the iEFIS system to control or monitor any conceivable aircraft system.

A comprehensive built in autopilot requires just the addition of servos to complete.

Any conceivable navigation source from GPS based to traditional navigation radios may be connected in a variety of ways. All typical interfaces are provided as standard: RS232, ARINC 429, analog +/-150mV.

EFIS controlled COM radios, NAV radios and transponders, both mode-c and mode-s may be fitted for a complete, cost effective solution.

Each iEFIS panel may be connected to video sources such as taxi or night vision cameras as standard.

The modular concept of iEFIS allows not just a tailormade solution, if desired each panel can be customised by the owner using a freely available “screen design” tool. This provides similar capability to previous MGL systems but adapted to the iEFIS environment. However, despite this the iEFIS contains many built in screen layouts and options that can be simply selected during installation. This allows turn key solutions for most typical applications.

Installation of an iEFIS system poses greatly reduced effort compared to traditional systems. The iBOX(s) may be mounted in a location where they are easy accessible. This greatly simplifies and optimizes aircraft wiring. The panels themselves require only minimal installation effort – power and the iEFIS LAN connection is all that is required.

All panels and iBOX systems provide for dual redundant power supplies in a variety of different configurations as may be dictated by the aircraft systems.

IEFIS documentation

Due to the nature of the iEFIS system, documentation is split into several independent documents.

Please refer to the following:

iEFIS User manual (this document)

MGL EFIS files. Explains installation and function of the various database and map files.

MGL Autopilot manual.

iEFIS Installation manual

iEFIS Alteration guide (needed if custom screen designs are to be attempted)

In addition please refer to the manuals related to individual devices and interfaces.

Manuals are available on the MGL Avionics home website: www.MGLAvionics.co.za

The iEFIS panel in detail

This image shows the Explorer panel. The Challenger panel has identical controls but a slightly different screen layout.

The Discovery panel does not have the button array and has four instead of five rotary controls. Remaining functionality is similar.



Touch screen

The touch screen of the iEFIS panels is a pressure sensitive device calibrated for use in an aircraft. The touch screen is designed to activate on a positive pressure input and will filter short or unclear inputs. This makes it possible to steady your finger on the desired location without activating the touch screen. Desired contact pressure can be selected in the touch screen calibration function. Tip: Hold the top right rotary control down while applying power to the panel to activate the touch screen calibration function.

The touch screen may be used in all ambient pressure conditions including vacuum and is tolerant to rapid decompression.

The touch screen may be operated while wearing suitable gloves that allow a defined pressure point, i.e. pressure should not be spread over a large area as this makes precise location of the touch point difficult.

Rotary controls

The 5 rotary controls have strong indents during rotation to allow positive selection of a desired value. Many rotary functions have a dual level. The second level can be obtained by pressing the rotary control towards the panel while turning. For example, this is used when selecting a COM frequency: First select the MHZ, then press and turn to select the KHZ.

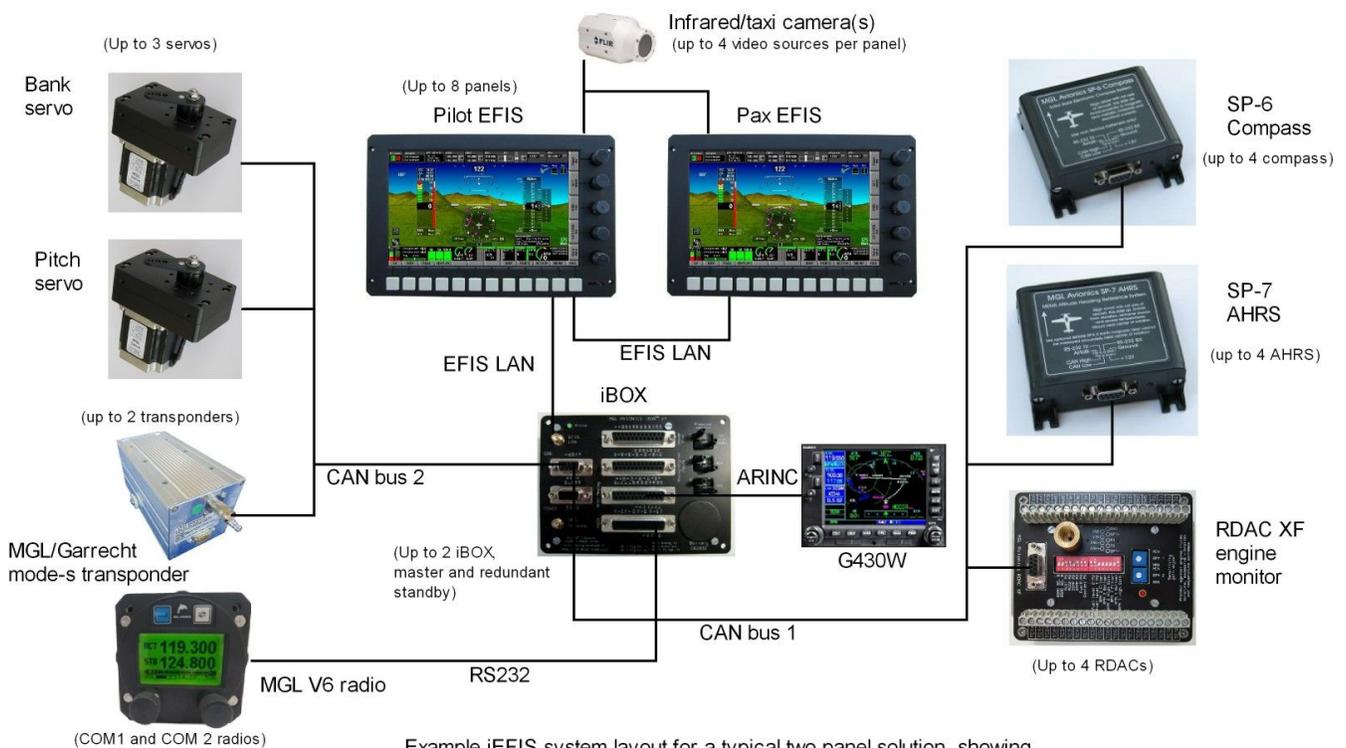
Soft keys

The soft keys below the display allow quick access to often used functions. These keys are assigned different functions depending on the currently active device context. Often they serve as a backup to the touch screen.

Micro SD card slot

The micro SD card slot can accept SD micro cards as well as SDHC micro cards. These cards are used mainly to transfer files to and from the panel such as maps. A permanently inserted card can also be used to record black box style flight data during flight.

Example system design



Example iEFIS system layout for a typical two panel solution, showing main communications bus connections.

The above image shows a typical small dual panel system with a single iBOX. Please refer to the iEFIS installation manual for details.

IEFIS default screens

Default screens refer to screen layouts that are “built-in” to a panel. Various types of default screens and parts of default screens can be chosen in the system setup. Layouts refer to the general organization of a screen while details refer to parts of a screen. A detail may relate to the monitoring for a particular engine type or a fuel system setup.

If none of the built in layouts and/or details are suitable, a custom layout may be performed using the screen designer tool. This may base a modified screen on an existing screen or it may be completely new screen that has been created from scratch.

This document refers to the built in screens. While custom screens may be similar, please refer to the company or person that designed your screens for details should this be needed.



Typical screen scene taken from the Simulator/Screen designer application. This is page 1. The screen layout is “Dedicated radio panel on top” while “2 tanks FF FP” have been selected for the fuel related section. Engine has been selected as “2-6 cyl, OT, OP, MAP” with number of EGT and CHT channels selected to six each. Basic units have here been selected as metric so you will find degrees Celsius, liters and bar used.

A “pop up” G meter is shown here – this activates automatically should you exceed or equal 1.5G positive or go below 0.5G or negative.

This screen is highly interactive and is discussed in more detail in sections:



Reveal hidden icons

Some of the interaction with the touch screen is via hidden icons. Some icons that are not used often are hidden. Tapping the hidden icons field will reveal these icons and they will then remain visible for a number of seconds. During this time you can activate the functions related to these

icons. Typical icons that fall into this category are:



These icons lead you to the “nearest airfields” page from which you can select to view various airport information. From here you can also activate GPS based approaches (GLS) to runways if the database for your chosen airport has the relevant information

available.

“GPS Goto”, is the “direct to” function for any type of waypoint in the database, including airports, nav aids, fixes etc.

“GPS VOR” is your selection for GPS based VOR navigation should you not have a NAV radio fitted. GPS based VOR navigation provides an accurate emulation of VOR navigation including DME.



Your HSI will be hidden if there is currently no active navigation solution. Tap on this icon to bring up a choice of navigation sources to activate the HSI display. You also at any time tap on the HSI itself to choose a navigation source. You can also use the NAV softkey for this.

The HSI



Navigation sources available for selection in your system are selected in the HSI/GSI indicator setup menu (System setup).

Be sure to allow your chosen navigation sources to be available for selection.

- You can tap on the active HSI indicator at any time to select a new navigation source or cancel the current source which will hide the HSI indicator.

HSI = Horizontal Situation Indicator

Note: The internal autopilot follows the HSI, canceling the HSI will disengage the autopilot as it no longer has a navigation source to follow.





This field shows UTC time from GPS, your local time (kept in the iBOX), flight time if a flight is active and also a stop watch. Tap in this field to bring up:

Tap here when done



This pop up allows you to start, stop and reset the stopwatch.

Further to this you have a count down timer. You can set this timer to a starting value and it will count down, proceeding to go negative if it goes below zero. The count down timer only shows when it is running:



Count down timer shows when running

Stop watch and count down timer resolutions are to 0.1 second.

These timers are located in the iBOX and apply system wide. You can start/stop timers from any panel.

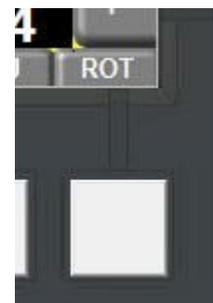
Adjusting local pressure (QNH or baro pressure)

The iEFIS panel offers two methods of adjusting local pressure:

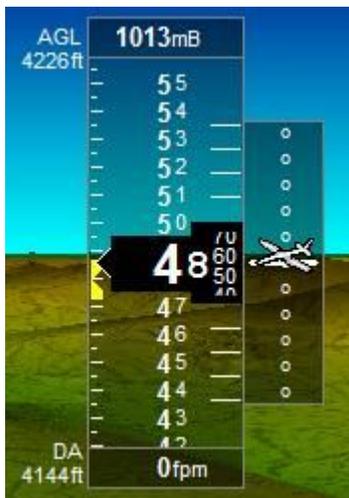
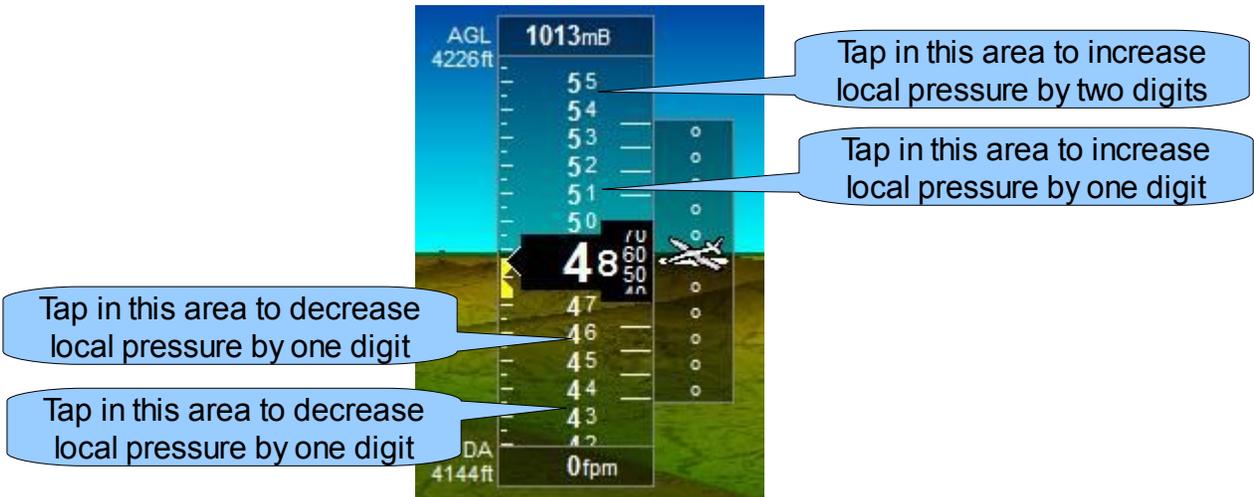
a) adjust local pressure using the rotary control:



If you do not see the baro pressure tab next to the rotary control, press the "ROT" softkey to select a rotary control page that does have this control present.



b) Adjust the local pressure by tapping on the altimeter tape:



The altimeter is setup to show a tape, digital readout, local pressure (shown here in millibar), elevation above ground level (AGL), density altitude (DA) and vertical speed (VSI).

DA requires the ambient temperature probe to be operational and correctly calibrated.

AGL requires a valid 3D GPS fix and correctly installed terrain database.

The yellow altitude bug is set either by the pilot using the altitude bug rotary control, it can be set by the autopilot on engaging "straight and level" or it can be set by a flight plan containing altitude cues.

To the right of the altimeter tape is the vertical guidance display. In this image it shows that we are very slightly above the target altitude. The vertical guidance display is also used during ILS and GLS approaches if a glide slope is present.



The digital VSI readout at the bottom of the altimeter tape is paired with a graphical readout.

The range of the graphical readout can be set in the Instruments setup menu to suit your aircraft. For this example, the range has been set to +/- 1500 ft/min.

Vertical speed readout is based on changes of static pressure (static port) and is very sensitive. Please select your static port location carefully to avoid unintended pressure changes for example if pitch attitude changes. Slower aircraft can often use cabin pressure as static pressure and do not require a static port.

Two heading displays are available, the top, larger heading display is derived from GPS

GPS track (magnetic)

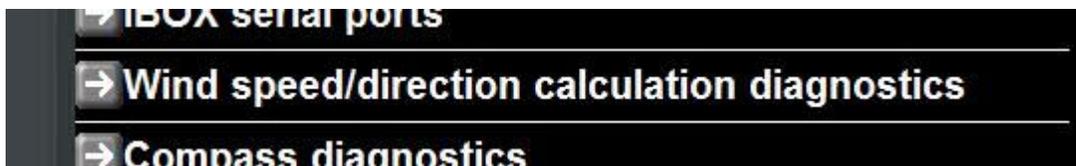
ground track, corrected for local magnetic variation.

The smaller readout below is derived from the magnetic compass sensor (if available in your installation). In still air (no wind) and with the aircraft not slipping, the two numbers should be very similar. Differences between the heading numbers usually indicate incorrect installation or calibration of the magnetic compass (please refer to the separate compass calibration manual if required).

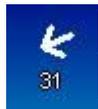


Heading from compass

Note: It is vital that the heading from the magnetic compass is as accurate as possible. This input is used for wind direction and strength calculations. If there is a difference between GPS ground track (corrected for variation) and magnetic heading the calculation will assume that the aircraft is crabbing (wind is from the side). This can result in greatly inaccurate wind speed and direction calculation results. Please also refer to the “Wind speed/calculation diagnostics” in the Diagnostics menu if there are any issues with this.



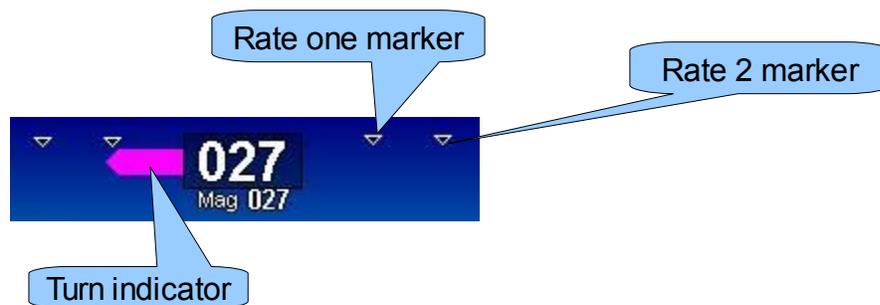
Note: Please ensure that your date/year is set correctly in the system. The magnetic variation calculations require a correct date as the magnetic field of the Earth changes slowly over time.



Wind speed and direction indication is based on GPS ground track, magnetic heading, true airspeed and GPS ground speed.

Wind direction may be shown relative to North or relative to the aircraft heading – you can choose this in the “Operations setup menu”.

Note: The calculations are based on straight line flight, wings level – aircraft is not slipping into wind. Wind calculations do not give a correct result while the aircraft is in a turn.



This image shows the rate-of-turn bargraph. It is showing that the aircraft is in a rate one turn to the left. A rate one turn completes a full 360 degree turn in two minutes. A rate two turns completes the same 360 degree turn in one minute.

Additional touch functions



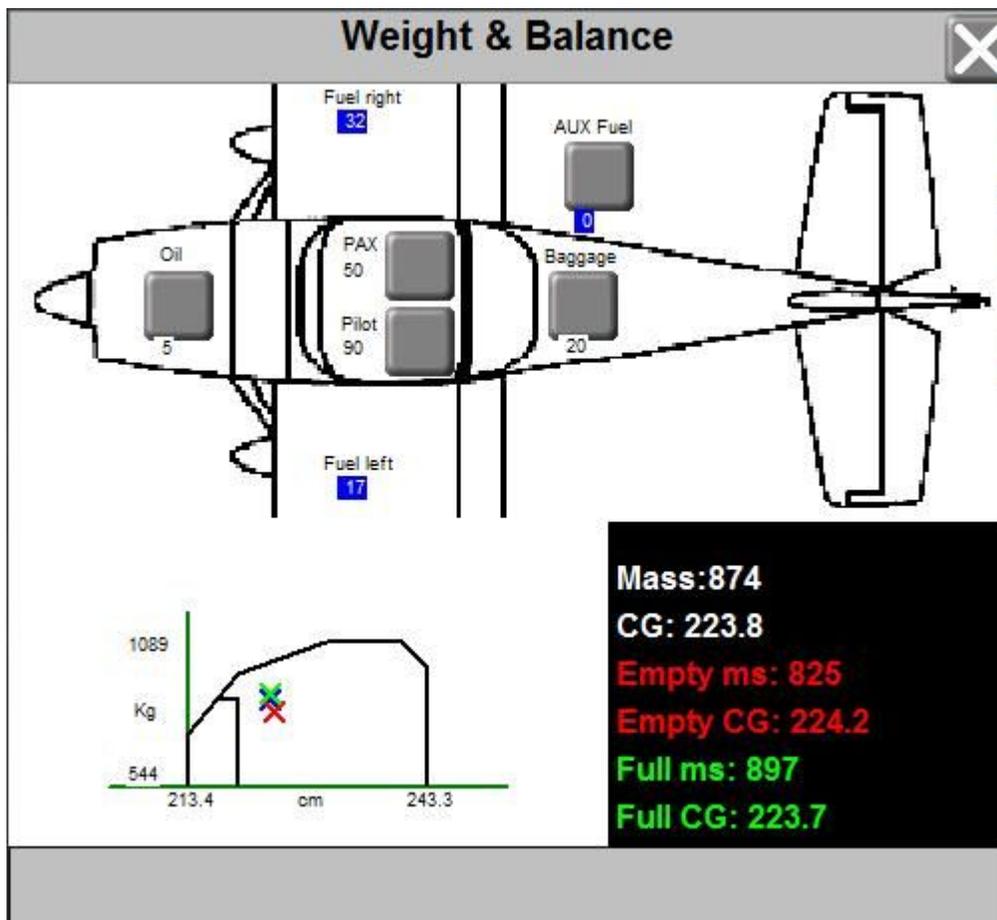
These two icons provide access to the Weight and balance calculation system as well as the electronic circuit breaker system (ECB).

The ECB icon will only show if a ECB system is available in your installation and has been configured. Two ECB systems are supported: Vertical Power VPX and MGL Avionics.

The Weight and balance icon will only show if the required configuration files are present in your panel. There are two files: WB.DAT and WB.MIF. The WB.DAT file contains details about your weight stations and the WB.MIF contains an image of your aircraft (usually top down view). The WB.DAT file is created by the Weight and Balance editor in the iEFIS Simulator and Screen Designer application. The image file is typically created using a standard image editor on a PC and converted to MIF format using the MGL Avionics MIF converter application.

Note: The aircraft image must be created in the following image size: 500 pixels wide by 300 pixels height. Image format for conversion to MIF must be standard Windows BMP.

The MIF converter is available as free download from the MGL Avionics website (EFIS tools page).

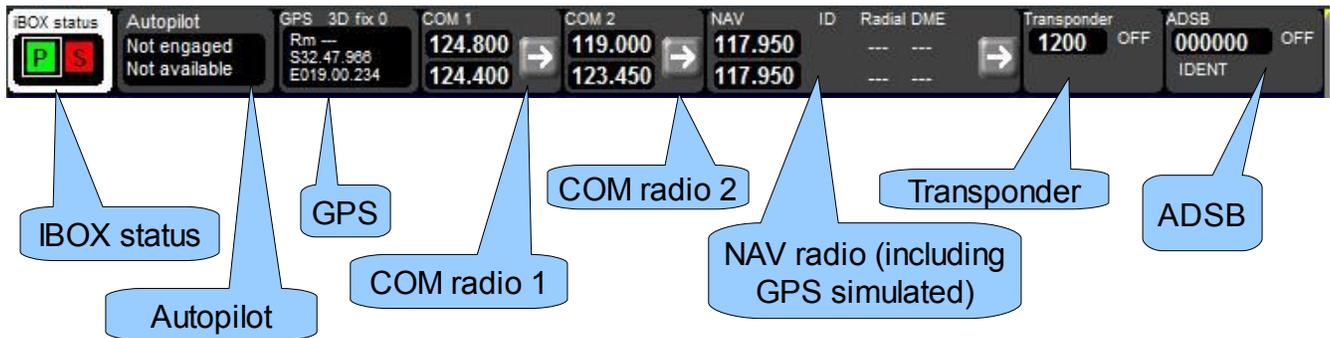


Typical Weight and Balance calculator image. Stations and their functions are selected in the Weight and Balance editor included in the iEFIS Simulator and Screen designer application available from the MGL Avionics website.

Radio and Status panel

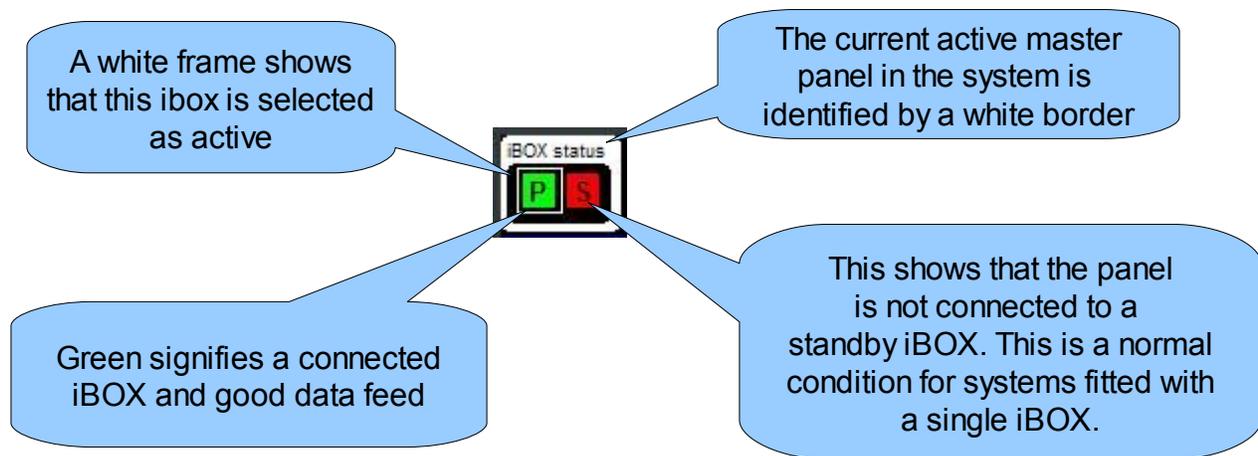
Some screen layouts may provide a partial or full Radio panel. The example screen layout provides a full panel on top of the screen.

All panel items are touch sensitive and provide localized functionality or open larger “pop up” devices as described here.



IBOX status

This display provides instant verification of your panels connection to one or two iBOX devices. It provides several indications:



The “P” and “S” fields may flash. They will flash if the following conditions are detected:

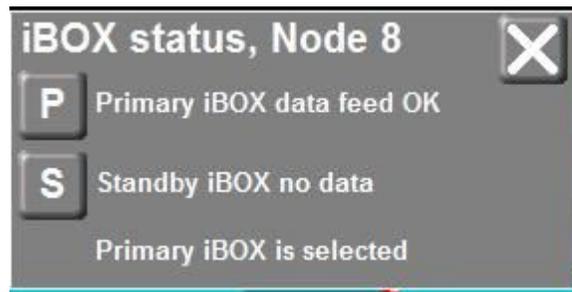
- A “standby iBOX” has been connected to the panels primary LAN connector. This is a serious installation fault and must be rectified.
- A “main iBOX” has been connected to the panels secondary LAN connector. This is a serious installation fault and must be rectified.
- In a dual iBOX installation that is correctly wired, the standby iBOX has been selected as active. In this case both fields will flash. This is a legal condition and performed either as

forced changeover due to a system fault or maintenance or setup is performed on the standby iBOX (in this case it must become the active iBOX so it becomes possible to perform certain operations).

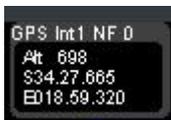
iBOX status pop up

Tapping the iBOX status will open the iBOX status dialog. This dialog gives more detailed information and allows you to select master or standby iBOX for setup or maintenance work to be performed.

This dialog also shows the node address of this panel. In this case we have node address 8 which is normally reserved for a wireless or wired connection into a PC or tablet computer.



GPS status



The GPS status shows the fix quality and number of satellites tracked. It shows the current geographic position, GPS derived altitude (if 3D fix is available) and the GPS RAIM status. (the last two indications alternate). GPS RAIM status shows if satellites have been excluded from processing due to integrity concerns.

The GPS status line:

GPS source:

- Int1 - GPS in the primary iBOX
- Int2 - GPS in the secondary iBOX
- NMEA - External NMEA GPS
- ARINC - External ARINC GPS

GPS Fix quality

- NF - No fix
- DR - Dead recon
- 2D - 2D Fix

3D - 3D fix

This is followed by the number of satellites tracked

RAIM information

If RAIM is enabled, the ALT field will alternate between:

ALT GPS altitude if 3D fix

and

Rm RAIM status

RAIM status gives you the current RAIM error limit estimate as follows:

Rm OFF - The RAIM system is not operating. This is usually due to insufficient satellites in view. RAIM requires a minimum of 5 tracked satellites.

Rm H12/V15 - The current RAIM error estimate. It is given in meters. In this example we have a horizontal error estimate of 12 meters and a vertical error estimate of 15 meters. RAIM error estimates tend to be very conservative, the real error is usually much less.

RAIM Alert

Should RAIM error limits be exceeded, the entire black inside rectangle of the GPS status display will flash yellow. The limits are setup in the GPS/NMEA setup menu (see installation manual) and also set from any active navigation database SID or STAR procedure.

GPS status dialog



Tapping the GPS status opens the full GPS detail screen. This screen shows a Skyview of the current satellite positions, received satellite signal strengths and several performance and status indicators. You can also access nearest airports, GPS direct to, and GPS based VOR navigation from this dialog (this is a duplicate of the same icons available on the main screen (hidden icons) or functions available from the NAV softkey menu.

HACC and VACC refer to accuracy estimates of the current GPS fix (horizontal and vertical accuracy). Accuracy is based on the number of satellites in view, their relative positions, atmospheric conditions and dynamics affecting the GPS receiver.

Results of RAIM processing (Receiver Autonomous Integrity Monitoring) are taken into account to derive the highest possible accuracy of the GPS fix.

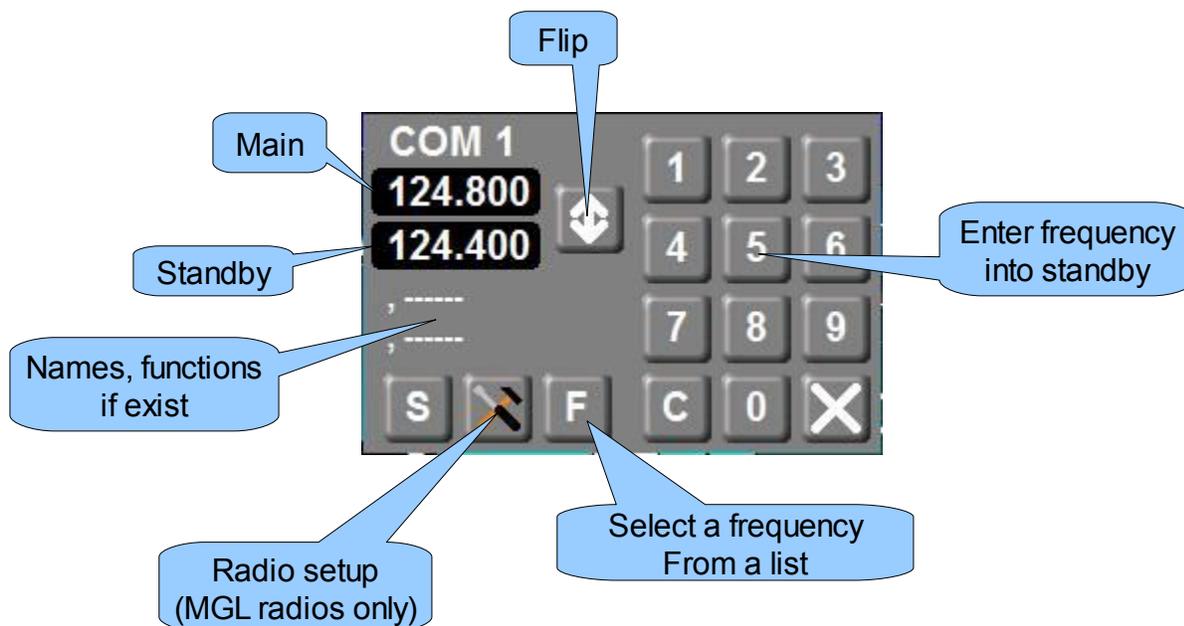
Sunrise and Sunset times can be obtained for any region based on UTC and offset in hours. Enter the UTC offset of your area to obtain local time of sunrise and sunset.

COM radios

The COM radio status display shows main and standby frequencies. Tapping on the frequencies exchanges them (this uses a short animation to reinforce the process visually).



COM radio dialog



Tapping the frequencies will flip main and standby frequency. Entering frequencies using the numeric keypad requires entering of 6 digits, for example, 123450 will set frequency 123.450 MHZ.

Selecting a frequency from a list: Prepare a list of frequencies in a standard text file format. For example you could use Notepad in Windows. Please create a standard ASCII text file. Native output of word processors cannot be used.

Here is a sample text file:

;Example frequency list for Radio function

;First entry is frequency in the following formats

;123

;123.0

;123.5

;123.45

;123.425

;This can be followed by a space and then text up to 30 characters for a descriptor

;Lines starting with a ";" are comments (like this line)

124.8 VFR below 1500 AGL

124.4 General flying area

123.45 Chat frequency

120.01 test 1
121.02 test 2
121.03 test 3
121.04 test 4
121.05 test 5
121.06 test 6
121.07 test 7
121.08 test 8
121.09 test 9

;---end of file (this text is not required to be in the file ----

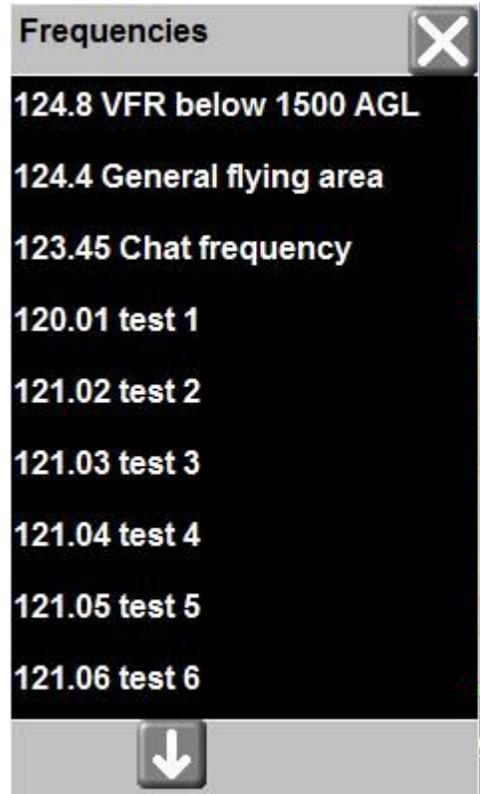
Copy this text file into your panels “Other” folder using the file manager (in the menu) from your SD card..

Tapping the “F” button will then bring up the following dialog:

Select and tap the desired frequency. It will be placed in the standby field.

Note: Frequencies associated with airports or airspaces can be selected directly from the relevant view displays, for example the “nearest airports” display.

The frequency list shown here is mainly intended for often used area or unpublished frequencies. Place frequencies into your Radio.txt file that you use often. In some ways this is equivalent to the channel memory of a radio – just nicer to use.

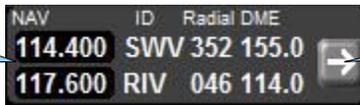


NAV radio

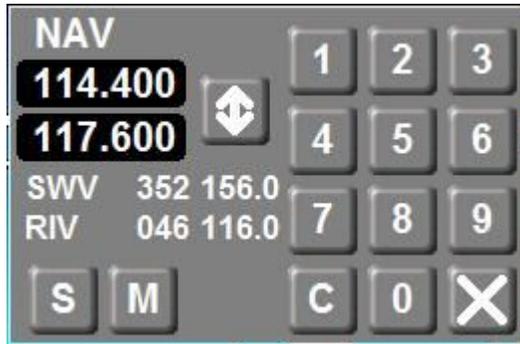
The NAV radio is based on the capabilities of the connected navigation system. For example, if you have a Garmin SL30 NAV/COM connected your will be able to use dual VOR navigation or ILS/Glideslope.

Even if you have no NAV radio connected, the NAV radio is still functional. Using the navigation database and the GPS it can emulate a real VOR navigation system. Simply choose the VOR station by tapping the  icon or selecting the equivalent function from the NAV menu soft key. You can select a VOR station in either the main or standby frequency slot. DME is calculated automatically.

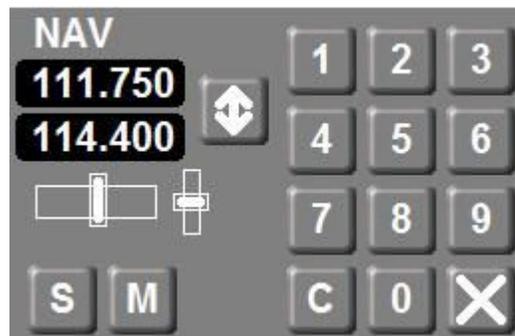
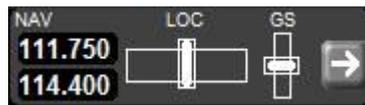
Tap here to flip main and standby frequency



Tap here to open the full NAV radio dialog



NAV radio in ILS mode. The display switches to ILS mode either by selection of a ILS frequency or by demand from the external NAV radio. It does not switch to ILS mode if a GLS approach is activated as there is little point in that. You can continue VOR navigation even with GLS active.

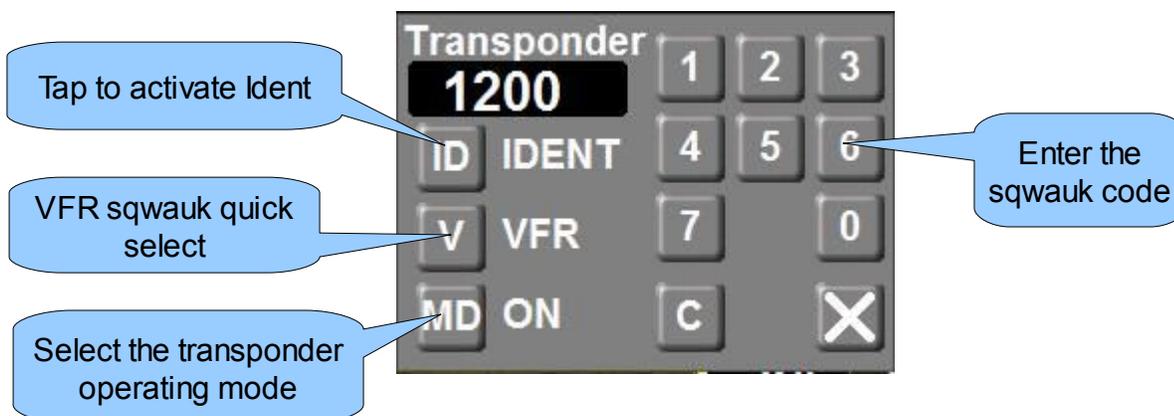


Note: If a NAV radio is connected and navigation is flagged valid, emulated GPS based VOR navigation is automatically suppressed.

Transponder



If you have a remote controlled transponder connected to the system, you can tap on the transponder display to open the transponder dialog:

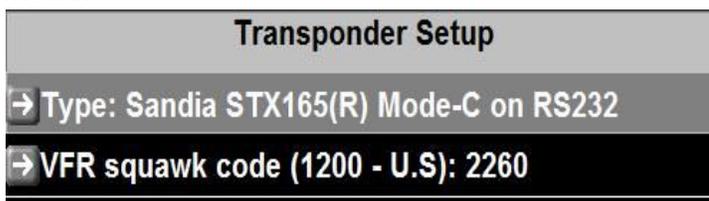


The iEFIS supports the Sandia Aerospace STX165R remote control mode-c transponder connected via a serial RS232 port (assign the port in the serial port setup and routing menu).

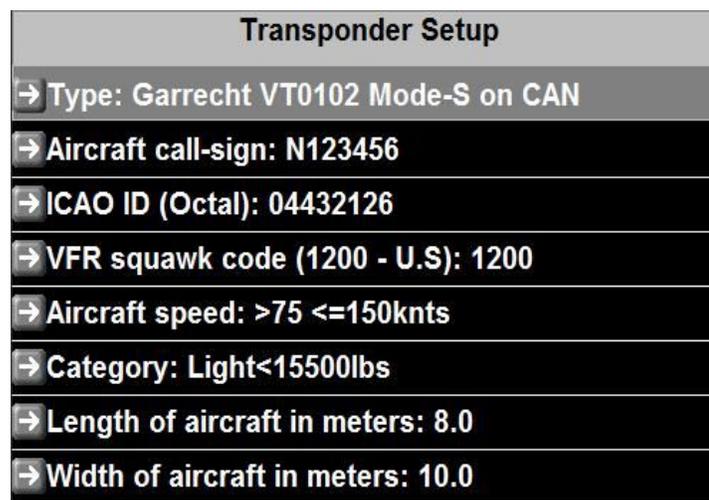
Also supported is the MGL/Garreht remote control mode-s transponder via CAN bus interface. No further interface setup is needed.

Please consult the transponder setup menu:

Setup for mode-c transponder



Setup for mode-s transponder



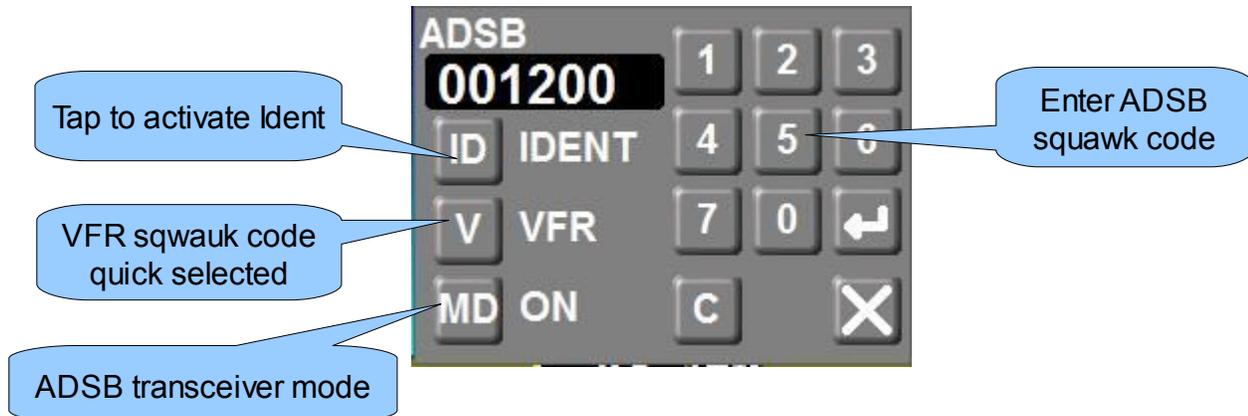
ADSB

The iEFIS system supports ADSB receivers as well as ADSB transceivers. Currently ADSB systems from NacWorx are supported.

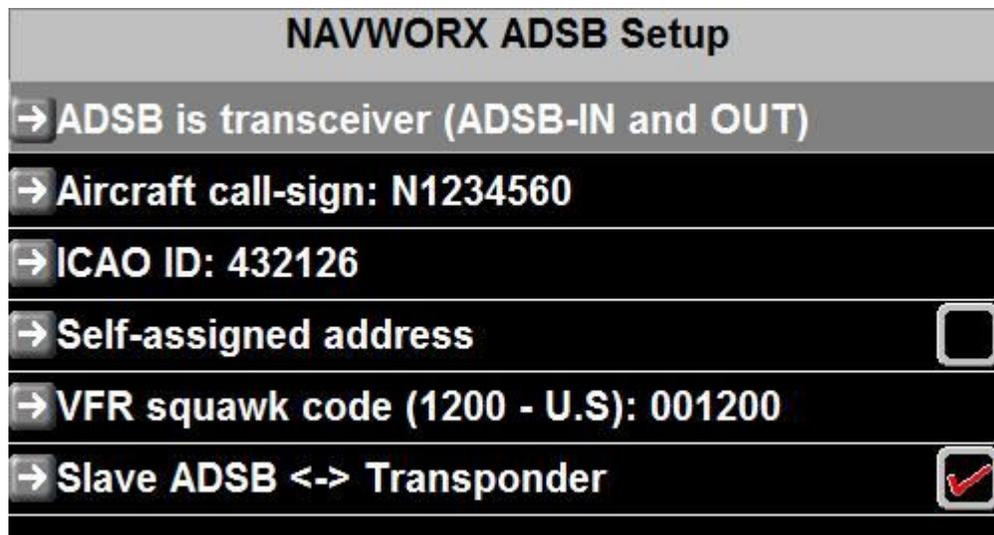
The ADSB status display and dialog is only relevant for ADSB transceivers (“ADSB out”).



Tap on the ADSB status display to open the ADSB dialog.



The ADSB transceiver needs to be setup:



Please note the last item in the ADSB setup menu. This allows you to synchronize the ADSB transceiver with your transponder if you have a remote control transponder connected to your iEFIS system.

If synchronization is activated, transponder and ADSB will transmit the same squawk codes. Ident is also synchronized. You can enter your squawk code in either transponder or ADSB

and the other will follow. Note: ADSB has 6 digits. Only 4 are in common use currently.

Waypoint information

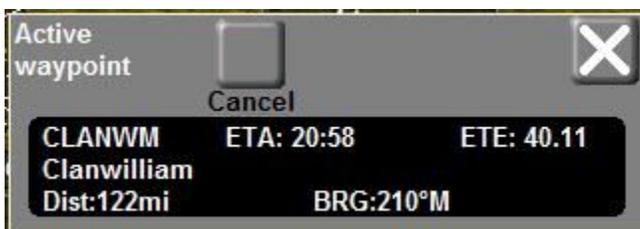
If a GPS waypoint is active, the waypoint information box is visible:



Information available in this display is:

Short and long waypoint names, Estimated time of arrival assuming a great circle line flight to the destination at current ground speed, estimated time en-route. Distance to go and magnetic bearing to destination complete the information.

Tap on the waypoint information display to gain further controls:



This is effectively a larger version of the waypoint status display. You gain a tap function allowing you to cancel the waypoint.

Note that you also have a waypoint cancel function available in the Action softkey menu.

GPS mark position



You can mark the current position at any time. Tap the GPS mark position and you will be presented with a waypoint editor:

A screenshot of a "Waypoint editor" dialog box. The dialog has a dark red background and a grey header with the title "Waypoint editor" and a close button (X). The content is as follows:

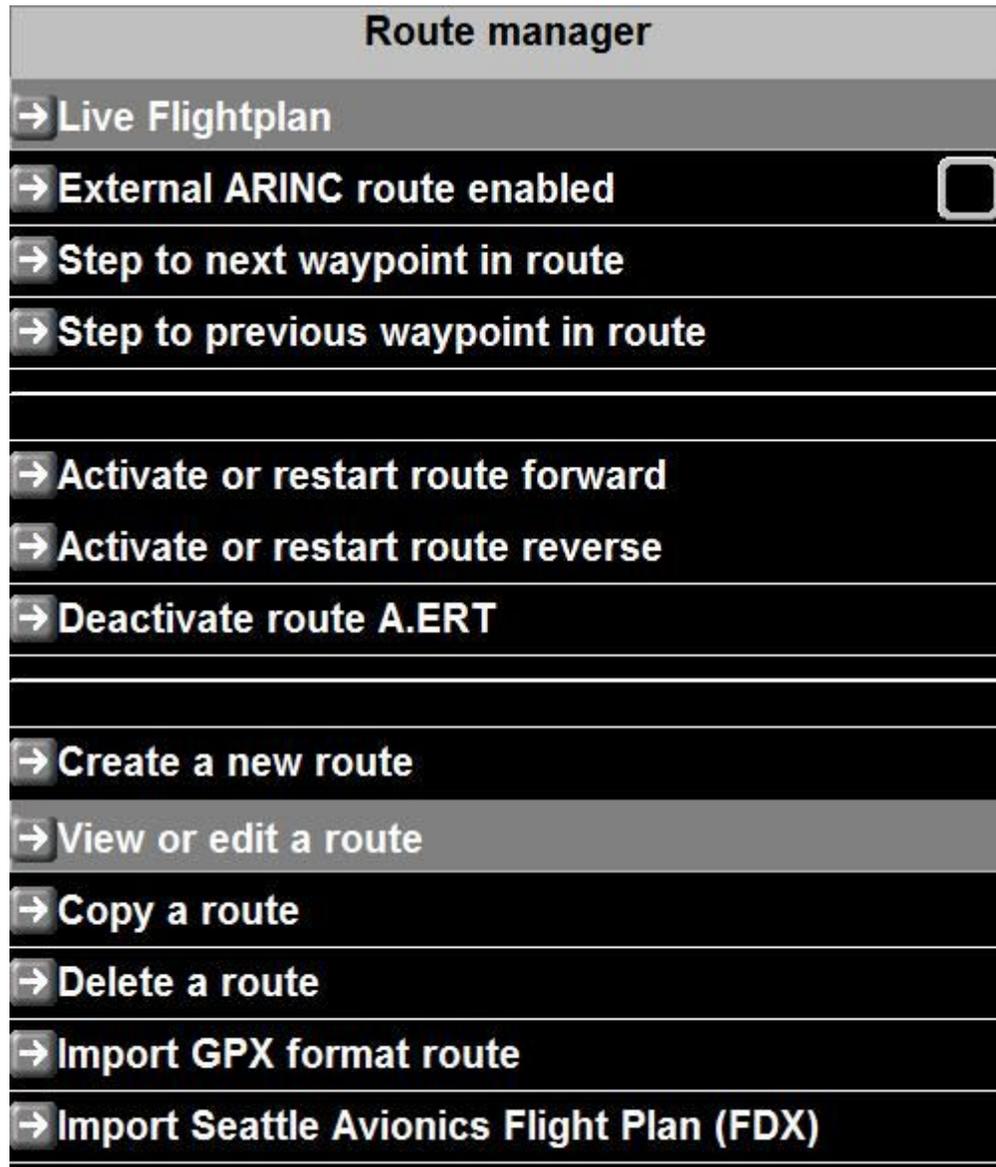
→	Waypoint type:	WAYPOINT
→	Short name:	WPT
→	Long name:	Waypoint
→	Latitude:	S29.59.633
→	Longitude:	E019.03.601
→	Altitude:	4855
→	Save to:	Markers.ERT route
→	Accept this waypoint	
→	Cancel	

Here you may edit the newly created waypoint. You may want to give it a name. Finally select where you would like to save the waypoint to. You may choose the “markers” route file or you can save your waypoint to the supplementary waypoint database.

Starting with an empty “markers” route file you can easily create a route “on the fly”.

Waypoints stored in routes may be reused in new routes.

The route manager



Live Flightplan

If a flight plan (route) is active – the live flight plan provides information on distances, estimated flight times and fuel burn figures. You can also work with wind speed and direction to see how your various flight plan legs would be affected.

This menu entry is only visible if a flight plan is active.

External ARINC route enabled

If you have a Garmin 430W or compatible system connected you can import the currently active Garmin route and treat it as if it were a local route on your system, including use of the life flight plan. Check the box to allow Garmin routes to be used. Unchecking the box re-enables local routes even if a Garmin route is active.

Step to Next/Previous waypoint in route

This is a duplication of the tap functions provided on the main screen and waypoint status dialog.

Activate or restart route forward / reverse

This allows you to select a route either stored on your local system or on an inserted SD card. If you select a route stored on a SD card it is automatically copied to your system for future use.

You may start a route from the first waypoint in the file or you may start it from the last waypoint in the file in which case the route is flown in reverse.

Deactivate route

If a route is active you can deactivate it here.

You can also deactivate a route from the waypoint status menu.

Create a new route / View or edit a route / Delete a route

Routes are edited using the interactive flightplan tool.

Import routes

Various third part route formats may be imported. The list of supported formats may grow with future releases.

Route controls

You may step backwards and forwards through a route using the provided screen and menu functions:



Note on the waypoint status dialog if a route is active:

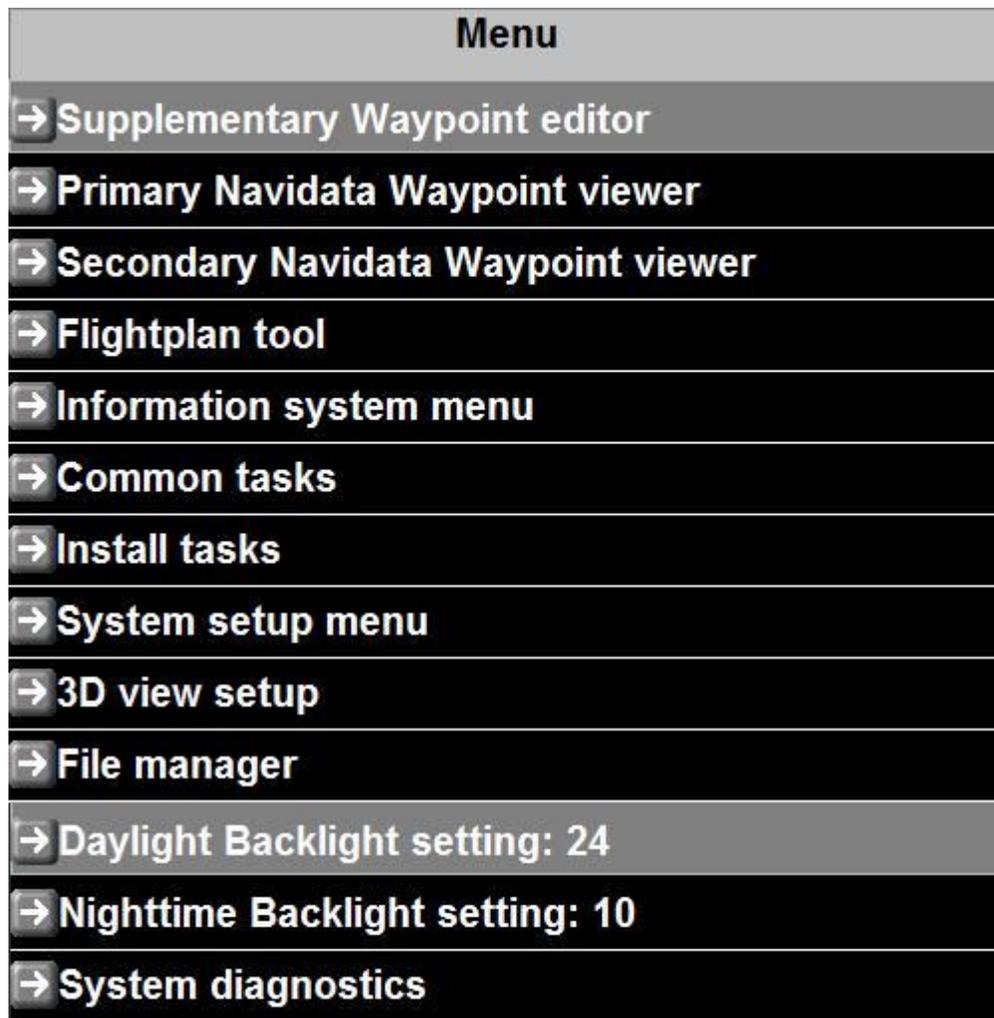
Selecting “Cancel” with an active route will cancel the route but leave the current waypoint active. This waypoint would be the next waypoint in the route. Should you wish to cancel this waypoint as well, simply tap the “cancel” button again.

The menu system

Press the “Menu” softkey button to activate the menu system.

The menu itself occupies most of the screen to allow sure use of the touch screen to select items. A smaller part of the screen is dedicated to a screen design showing essential flight instruments. This screen design can be customized similar to any other screen. Please consult the iEFIS alteration guide.

It is also possible to navigate the menu system using the soft keys. Move the highlighted bar as needed to the desired menu items and press the “Select” soft key.



Supplementary Waypoint editor

Please consult the MGL EFIS files document for detailed information on the various files and their uses in the iEFIS system.

The supplementary waypoint file is used to hold user created waypoints. Here you can create

waypoints that the system can use in addition to those provided in the navidata file(s).

Primary Navidata waypoint viewer

The primary navidata file contains navigation data provided either by a third party such as Jeppesen or you can also create and maintain your own navidata file using the MGL Central application.

The system permits up to 26 primary navidata files. One is active at any one time. You select the currently active navidata file using the NAV soft key. Navidata files are identified by the last character of the file name. This may be a character from a-z. The last navidata file would have the full filename of navidatz.ewd

Waypoints in the navidata file can be viewed but not edited.

Secondary Navidata waypoint viewer

The secondary navidata file contains navigation created using the MGL Central application.

This allows you to use a subscription product such as Jeppesen while still allowing use of a custom database that you can create yourself. One reason you may want to do this is to add airports with runway information that are not included in your subscription product.

The filenames used are Snavi.ewd or SnaviA to SnaviZ.ewd

The system permits up to 26 secondary navidata files. One is active at any one time. You select the currently active navidata file using the NAV soft key. Navidata files are identified by the last character of the file name. This may be a character from a-z. The last navidata file would have the full filename of SNaviz.ewd

Waypoints in the navidata file can be viewed but not edited.

Secondary navidata files are exactly the same format as primary navidata files. Only the filename changes.

Note: Subscription products cannot be secondary navidata files, they can only be used as primary navidata files.

Flightplan tool

The flight plan tool provides a comprehensive system for creating and editing flight plans (routes) on the EFIS. This is described in detail in a separate section of this manual.

Information system menu

Obtain information such as serial numbers or view the system log.

Common Tasks

A collection of a few tasks such as exporting the flight log

Install Tasks

This is a collection of automated installation functions you can choose to copy data files to the system such as map and terrain files.

System setup menu

This is the entry point to a comprehensive system setup menu.

This is described in detail in the iEFIS installation documentation.

3D View setup

A collection of setups affecting the synthetic vision. Here you can select texturing, colors and other options.

File manager

The file manager gives access on the file and folder level to internal files. You can copy files between internal disk and SD card or delete files.

Please ensure that you are familiar with the function and location of all files before using this function. This is powerful in the hands of the experienced user but you may also destroy your system by performing file operations that will cause a system malfunction.

Daylight backlight setting

Select the desired level of the back light for daylight operation. This is most likely the maximum setting of 31. Select a lower number if your system operates from battery and you need to conserve power. A setting of 24 reduces the systems power consumption by about 1/3.

Note: You switch between day and night light settings using the “Action” soft key.

Nighttime backlight setting

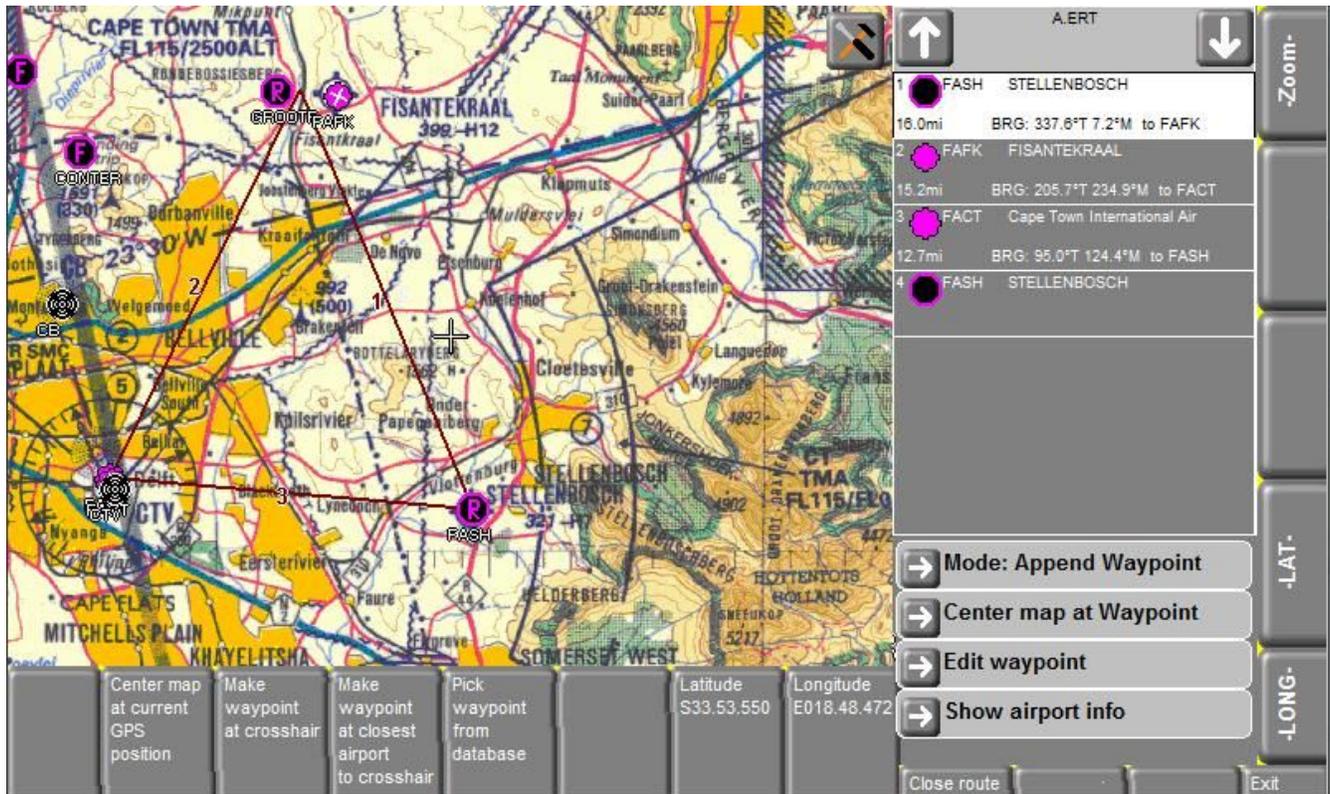
Select the desired backlight setting for night time operation. Most likely you will choose a very low number.

Note: You switch between day and night light settings using the “Action” soft key.

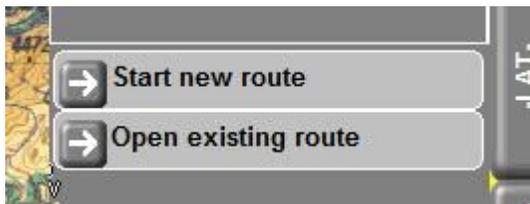
System Diagnostics

This provides access to low level data from iBOX devices and RDAC units. Several other useful diagnostic functions are also provided.

The Flightplan Tool



The Flight plan tool starts with the option of creating a new route or editing an exiting route:



Routes are stored in your internal drive in the folder "Fplan". Route files can be copied using the file manager. You can also use the "route manager" and seldom will seldom need to access these files directly.

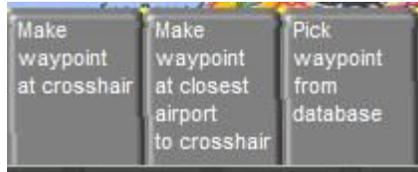
Once a route is open the right hand pane shows the route details. You can navigate the details using the touch screen.

Change the "mode" to append or insert new waypoints, change waypoint order or delete waypoints.

You can edit waypoint details such as the waypoint type.

For airports your can request airport details such as runways and frequencies from the current navidata database.





Using the softkeys you can pick waypoints from the map or from the database.

Picking waypoints from the map is simple:

Touch the map at any location – that location will become the center of the map. This is where the cross hair will be. By tapping the map the map can be rapidly moved. Utilizing the zoom levels the map can be moved by large distances with just a few taps.

The tapping method permits moving the map accurately even when flying in turbulence and is faster than dragging the map as you may do on a tablet.

Using the soft keys you can create a waypoint from the current map location or pick the waypoint that is closest to the cross hair so accurate positioning is not required.

Note that the rotary controls can also be used to move the map.

Any route changes are applied immediately even if the route being edited is currently active.



Tapping the “tools” icon reveals map options for a few seconds. These allow you to select raster or vector map or other map configuration tools.

When you are finished editing your route, you can “close” the route which allows you to create or edit another route or you can simply exit the flight plan tool. There is no need to save your work, it is saved as you edit.



Working with maps



Typical map view – here we have a “track up” display using a vector map with terrain data forming the backdrop.

Tap on the map and you get:



The “tools” icon gives access to map choices and setups. Note that you can also access “plates” from here. Plates are treated like a form of map as they can be geo referenced.

The PAN icon. Tap here to place the map in “PAN” mode. Panning allows you to move the map view to any location regardless of your current position.

Zoom the map by tapping on the zoom icons.

Tapping the map again while you have the map icons showing brings up a new display.



The last tap location shows the distance and time to the location you just tapped.

A simple method to find out “how long will it take to get to...”

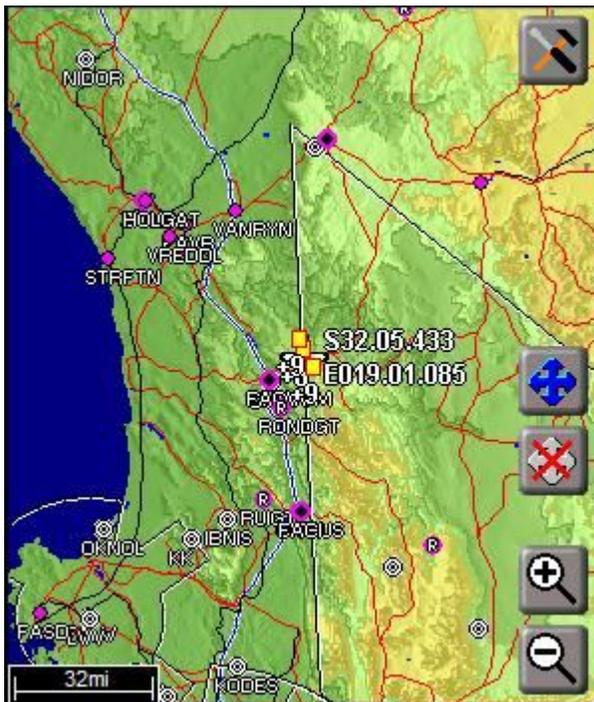
You also get the option of setting that location as a “direct to” for GPS navigation. Tap on the “Set as Goto” and you are set. If you have your autopilot engaged on GPS navigation, the autopilot will follow the new track instantly.

Touch screen navigation made simple...

Using map “panning” you can move the map view to any conceivable location. Tap the map to reveal the map icons, then tap on the “PAN icon:



Map in “PAN mode”



The tools icon is available as before

Freeze the PAN at current view. You would want that if you would like to “goto” a location in the current view or obtain distances/times.

End the “PAN” mode and return to normal mode

Map zoom icons

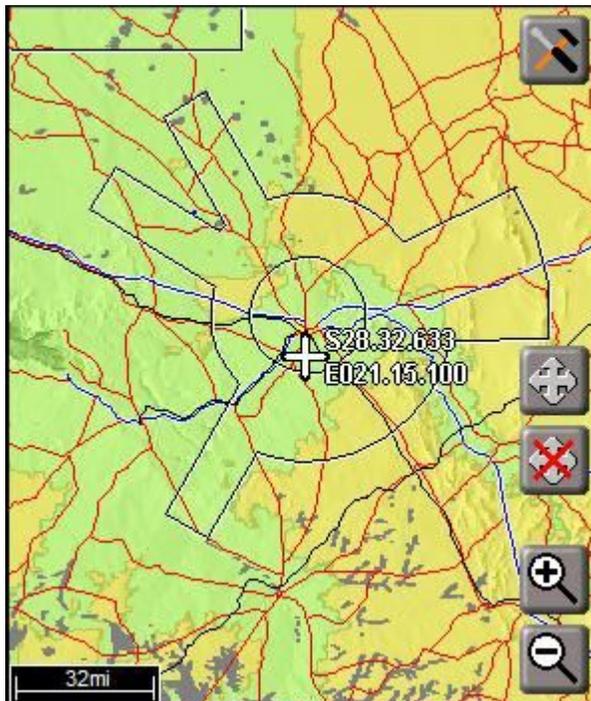
If you are in "PAN" mode, moving the map is simple: Tap on the map anywhere and that location will become the new map center. You can move the map rapidly this way, also use the zoom icons if you want to move real great distances.



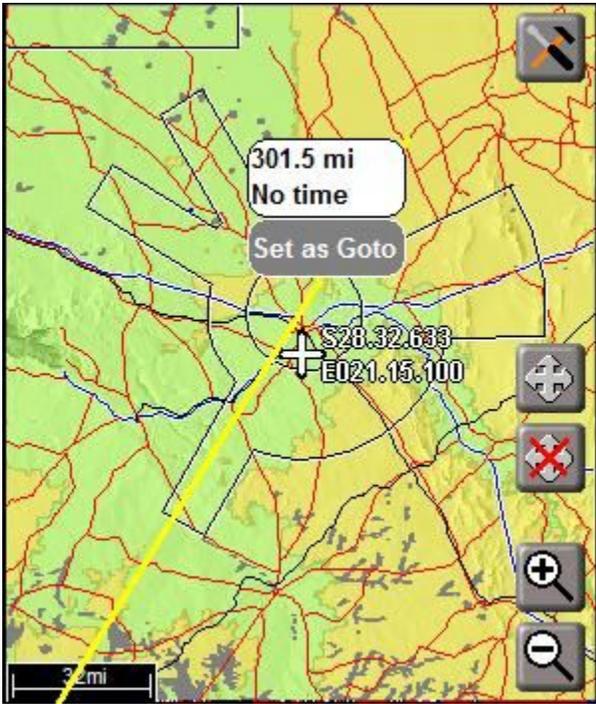
Here we have moved using the "PAN".
The map center is the last tap location. A white cross marks the location and the exact geographic position is shown.

PAN freeze icon

PAN end icon



PAN freeze has been tapped. Note the color of the icon has changed to grey. You can change it back to blue by tapping it again.



While the map PAN is frozen, tapping on the map shows distance, time and an option to “goto” this location as before with the normal map view:

Flying a divert

Sometimes you may be flying along a GPS track to a waypoint but need to divert via a new, intermediate point. Using the touch screen this is easily done.

First we have a map showing our destination:



Here we have a waypoint active. We decide that we would like to fly via the MLED beacon to the left of our track.

We tap the map.



Note we have a new icon. This is the "divert" icon.

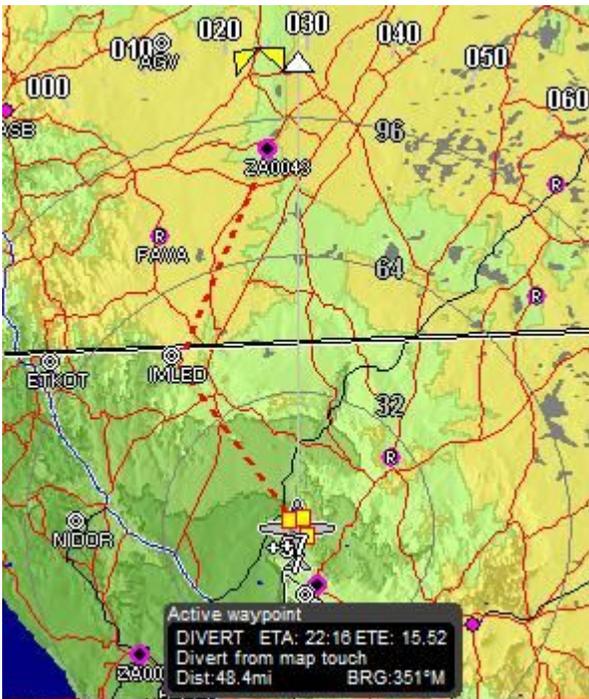
We tap the divert icon.



We are now in “divert mode”. We can tap anywhere on the map and that point will be our new divert waypoint.

We can end the divert mode at any time by tapping on the divert icon again (in that case no divert will be activated).

We tap on the MLED beacon to the left of the track.



The divert has been activated. When we reach the divert waypoint we will once again be heading on track to our original destination.



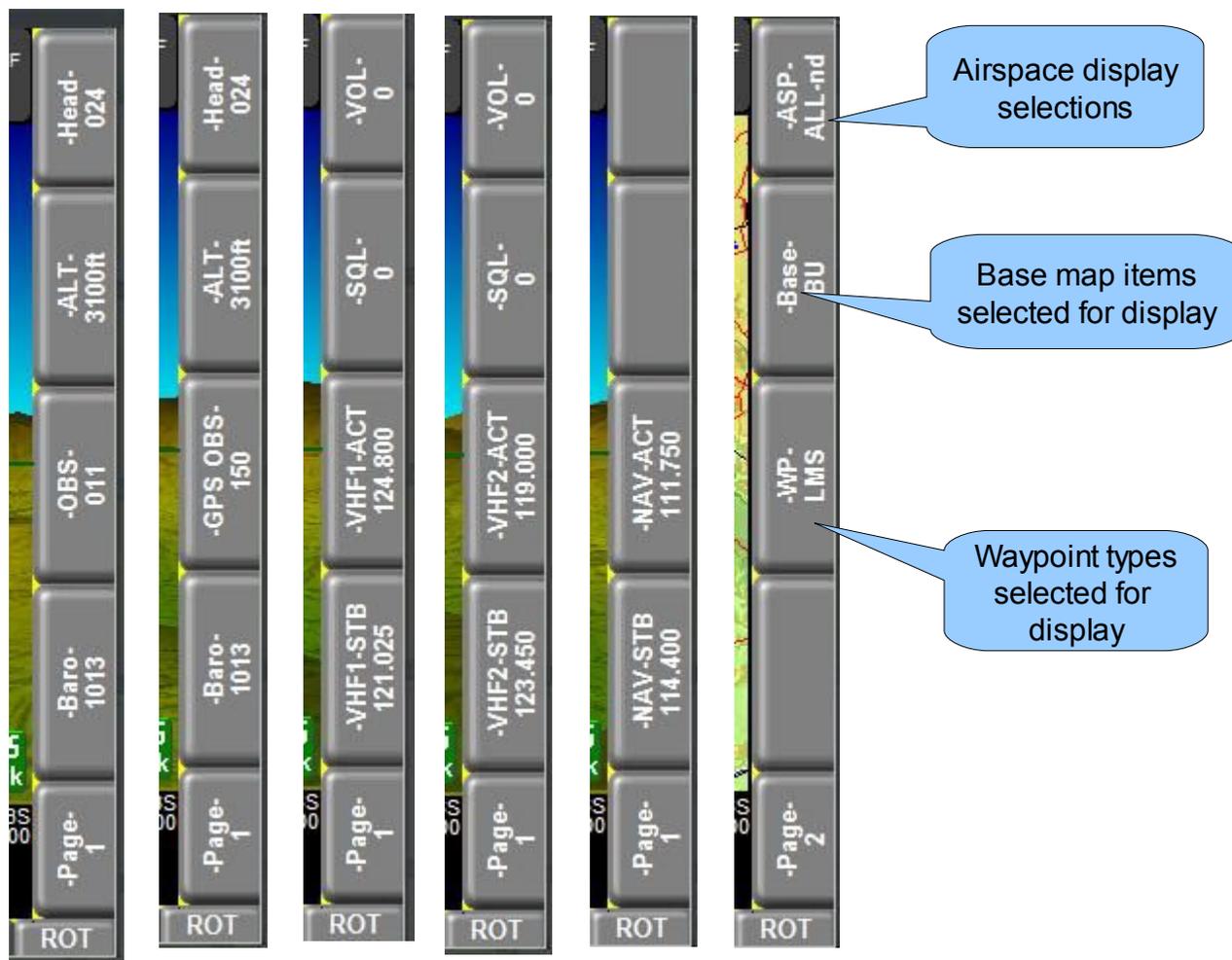
While the divert is active, tapping on the map shows the divert icon with a red cross over it.

Tapping the divert icon in this mode will remove the divert and a new track from current aircraft position to the original waypoint is activated.

Diverts work with any current waypoint, including the next waypoint if you are flying a flight plan (i.e. active route).

The rotary controls

Rotary controls work in pages. Simply flip through the available pages using the “ROT” softkey below the rotary control column.

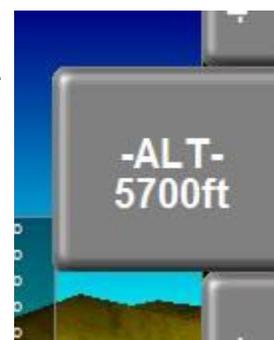


Certain of the rotary control pages are automatically selected if you open specific devices. For example, if you open a COM radio, the corresponding radio controls are selected.

The rotary column selection shown on the right can be used to quickly select from pre-made type selections applicable for the map display. These selections are separate for every zoom level (this means you can optimize every zoom level as needed). Base map items are applicable for the vector map only.

Note that you have fine control over individual items by using the “Map” soft key. This also gives you more map related options.

If you turn a rotary control you activate a flyout which shows a large version of the current value being adjusted:



Waypoint selection system

The EFIS contains a common structure to view or select waypoints. Depending on the context, the function operates in slightly differing ways.

Here we start with the most common – using the “Direct goto” function to select a waypoint.

There are several ways to activate this function:



This icon is available after tapping the reveal icon on the standard EFIS screens.



You can also reach this icon via the GPS status display. You can also select:

→ GPS: Goto waypoint and set HSI

from the NAV soft key menu.

All waypoints - SELECT mode		
N FACI,	Citrusdal Airport, SF	19.5mi ↑
N CITRUS,	Citrusdal	19.7mi ↑
N RUIGTE,	Ruigtevlei	23.9mi ↑
N FAKA,	Kagga Kamma	33.2mi →
N FACE,	Ceres	37.7mi ↘
N FALS,	Sommersveld Mil	38.3mi ↙
N FAMY,	Malmesbury	42.7mi ↘
N RONDGT,	Rondegat	44.1mi ↑
N FALW,	Langebaan Mil	48.9mi ←
N FACW,	Clanwilliam Airport, SF	50.5mi ↑

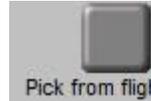
Waypoints appear in order of distance from your current location.

The system maintains the nearest 20,000 waypoints from your database in memory and this is periodically refreshed as you change position. Waypoints that are very far away are not considered. Regardless if the memory list includes a waypoint or not, if it is contained in the

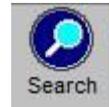
database you can search for this.



Note the “Types” button. Tap this to bring up a popup where you can select which types of waypoints to include in the list. Waypoint types are “Airports”, “Nav aids”, “intersections”, etc.



You may select a waypoint that is included on any flight plans you have stored on your system. You will select the flight plan file name and then can pick the desired waypoint from that flight plan.



Tap the “Search” icon to activate the search function.



You can search short or long waypoint names. You can also select the search method. Either the waypoint name must start with the letters given in your search or you may choose “Contains”. In this case the name will match if any part of it contains your search criteria.

When you have finished your search you can tap the enter key on the keyboard. The search criteria will remain active until you either select a waypoint or tap the up/down icons which will allow you to resume normal selection.

Touch screen calibration

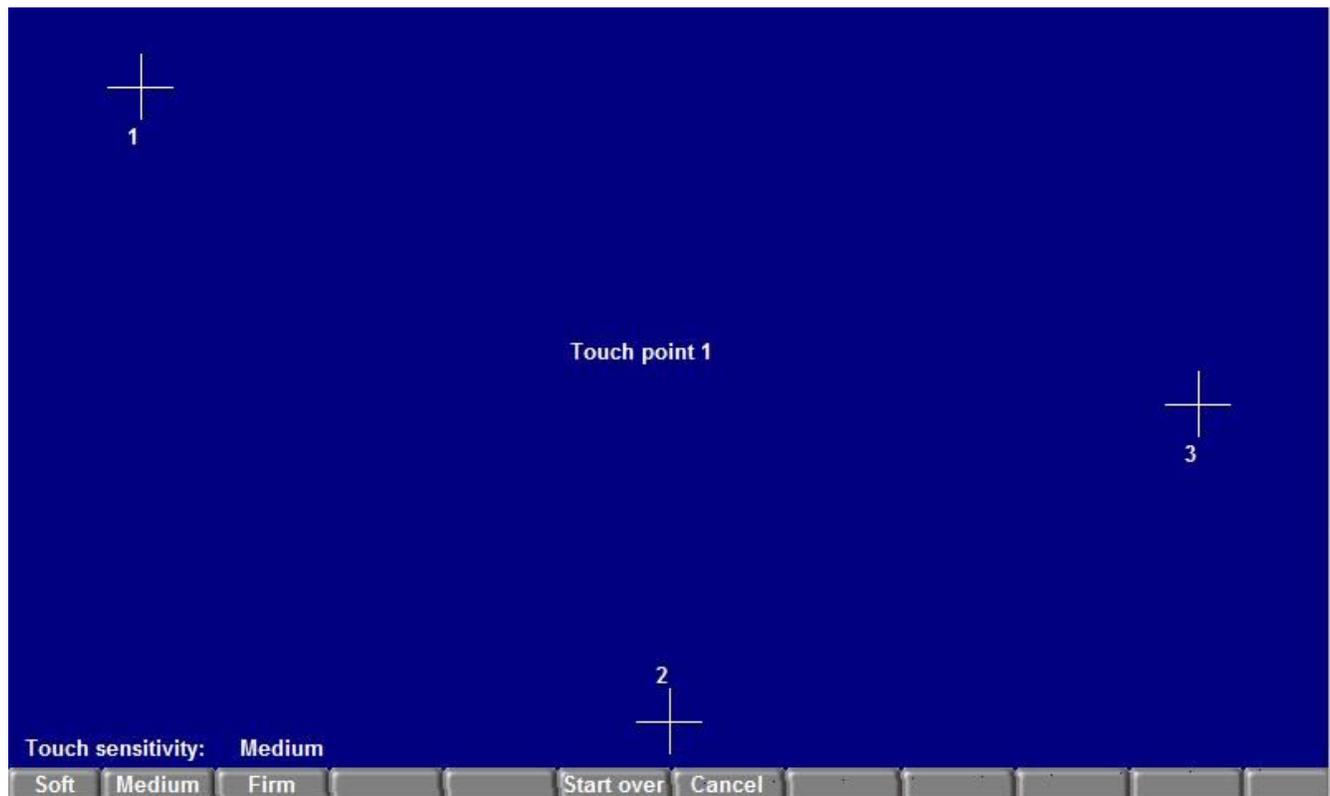
Touch screens require calibration. The iEFIS comes with a pre-calibrated screen. You should perform the calibration so the screen behaves the way you want.

Every person is different and so are fingers. The iEFIS touch screen is pressure sensitive and locates the center of pressure when you press with your finger. The center varies a little with your anatomy and also how you press the screen, applying perhaps a bit of sideways or up/down force as you press.

Regardless of this, you may want to operate the touch screen in a way where the touch point detected is very slightly above your finger rather than underneath. This is a personal preference but you can calibrate the screen any way you like.

You will find the touch screen calibration function towards the end of the System Setup menu.

You can also activate the touch screen calibration function by holding down the top right rotary control (press towards the panel, past the “click” point), hold it while applying power to the panel. The panel will start straight into touch screen calibration mode.



Follow the on screen instruction in the center – press all three points in sequence. After this you can test the screen. You can also select the force needed to activate the touch in three steps.

Recommendation: Smaller aircraft tend to need firmer force to assist with operation during turbulence.