MGL EFIS to IEFIS panel upgrade

This document details the differences between a traditional MGL EFIS system and the iEFIS system.

This document is aimed at the installer and screen designer

Installation

The iEFIS is a modular system. The actual panel is separated from the EFIS related real world interfaces. Electrical interfaces such as communications ports and pressure sensors are located in the iBOX.

Either one or two iBOX systems can be installed in a single system. One of the iBOX units is the "master". A second iBOX is a "hot standby". All external devices are wired to both iBOX units. The "Hot standby" is passive, not taking part in any control or outputs to external devices. On pilot demand or by automatic switchover, the "hot standby" can take full control from the "master" iBOX. In this case the master iBOX will disconnect its outputs.

A second mode of active backup system is also possible. This is called the "Super redundant backup mode". Here each group or panels has its own "Master iBOX". Most external devices are also duplicated but some (like engine monitoring) may still be shared.

Each groups iBOX is wired to the backup LAN of the other group. This way, in case of any iBOX failure the failed group can switch over to the iBOX of the other group. This is the highest form of redundancy possible but does complicate external device wiring. Duplication of external devices may be needed as well as interlocking of controls to avoid duplicate control of the same item.

The iBOX provides:

2 power supply inputs and switched supply output (for supply of AHRS etc)
6 RS232 serial ports (Port 6 is a dedicated GPS NMEA port)
3 ARINC 429 receivers (low or high speed)
1 ARINC 429 transmitter (low or high speed)
4 balanced analog +/-150mV navigation signal inputs
8 analog and digital inputs for general monitoring (such as gear position/flaps etc)
4 digital outputs (open switches to ground)
1 alarm output (open switch to ground if active)
Full altitude encoder output (parallel code)
2 CAN bus interfaces (Public domain MGL CAN bus protocol)
27knots to 220Knots airspeed sensor (standard)
27knots to 520Knots airspeed sensor (optional, dual airspeed sensing)

AOA sensor for single ended or differential angle of attack sensing
50 channel WAAS/RAIM GPS
Real time clock keeps system time for EFIS panels

The iBOX maintains transient information such as virtual fuel levels for system use. The iBOX runs system times including count up and count down timers so they apply system wide.

The iBOX can be mounted in a convenient location providing easy access to wiring in the aircraft. Up to 8 panels can be connected to the iBOX (including a wireless Wifi node).

Main and standby LANs are based on RG174 cable and SMA connectors allowing simple and fast wiring up of a system. The two LANs are completely separate for maximum redundancy.

IEFIS

The iEFIS is based on the MGL G2 system used in the Odyssey and Voyager panels.

Some differences exist:

1) Large selection of built in screen layouts and screen sections allowing easy "plug and play" for most applications.

2) Custom screens can be designed as in the past – custom screens now have a common file extention: "sdf"

3) A new screen section has been introduced: "Fuel". We now have 4 sections: Flight, Engine, Fuel and Info

4) The menu has its own screen design. The menu screen file "number" is "M", for example: "FlightM.sdf".

5) The screen designer has been reworked. Items are now grouped in categories for selection and can be inserted at any point in the drawing list. Selected items in the drawing list are shown with a flashing border on the screen. You can select items on the screen by clicking on an item – keep clicking on the same location to select/unselect items relevant to that location (if more than one) until you have the desired selection.

6) "Built-in" screen designs can be extracted as bases for a custom design. Simply choose the desired screen layout and selection in the simulator, then choose to export this to the screens folder of the current project (File menu).

7) Custom screens now have to be enabled before they will override the built in screens. You can do this on a per section bases for an entire project or on a per page, per section base. For example you could replace all the "Engine" files with one selection or just change one "Flight" section on one page.

8) There is no longer a "Splash" screen as the startup is so fast.

9) There is no longer a "RAM" disk.

10) Flightplans are now stored in the "FPlan" folder on the SSD

11) Checklists are now stored in the "Checks" folder on the SSD

12) Flight data recording is in a new format. The old "Black box viewer" does not work with

this data. A new Black Box data viewer is in preparation.

13) There are three methods of data recording:

a) To SD card in a fixed size recording file as before

b) To a permanent, built in data recorder. There is a function available to extract this data to a file on the SD card. This data recorder records approximately the last hour of flight and is referred to as the "crash log".

c) To an external "Black Box" flight recorder system using the public domain MGL data feed specification.

14) If more than one panel is connected to an iBOX (or two), the panels need to have a "node number" assigned. This is done after removed a small panel at the rear of the EFIS and assigning a node number. Each panel must have a unique number.

15) The "main" panel, usually the panel in front of the pilot gets node number 1.

16) The currently active panel is the panel that has the IBOX status in the top left corner of the built in screens with a white background. The active panel has privileges with respect to many setups and functions which other panels do not have.

17) The panel with the lowest node number on the iBOX LAN is the active panel. If the currently active panel stops working or is switched off, the next lowest node panel takes over as "active" panel.

18) The "active" panel is in control of such things as the autopilot. Panels that are not active can send requests to the "active" panel such as changing a radio frequency etc.

19) Node 8 is reserved for the Wireless/Wired node. If may be assigned to a normal panel if such a node is not planned in the system.

Screen designer compatibility with Odyssey/Voyager

Screen files made for the previous generation of EFIS systems are largely compatible after renaming the file extention to "sdf". One area where differences exist are with the "Special Text" item. The indexing system has changed resulting in most items displaying the wrong text. This can be fixed up in the screen designer.

Minor areas of incompatibility exist but they are minor and usually fixed quickly using the screen designer.