

G4 iEFIS in-system screen designer



General

The G4 iEFIS expands on the screen designs that can be performed traditionally on a PC running the iEFIS simulator which includes a screen design facility to allow modification of the built in screens as well as creation of new screen displays.

The G4 iEFIS adds to this by allowing in addition a full feature screen design on the EFIS itself.

The main goal of this was to allow built in screens to be much more simple as it is now easy to add specific items as needed for an aircraft application.

Two different methods are available to add or modify screens or screen items.

Screen design basics

Each screens visible contents is made up from screen items like text or graphical components. These items are added to a file in your system in the "SCREENS" folder of your internal disk.

Each screen is made up from one or more screen files. The files are called "FLIGHT", "ENGINE", "FUEL" and "INFO". There can be more than one "INFO" file per screen that you can page. These are the "built-in" screens and they are normally not included in the "SCREENS" folder but you can extract the currently selected files into the "SCREENS" folder for editing.

There is also the possibility to add another file called "USER" this is normally used to add one or more items to an existing built-in screen design but cal also be used to add items to an already extracted and edited design in the SCREENS folder.

User screen file

Each page may have one USER screen file. This is normally used to add one or more items to a built in screen design. G4 built-in screen designs are typically very basic containing only essential items. This leaves useful screen space for you to add custom items as you may require for your application.

Extracted screen files

It is possible to edit the built-in screens by first selecting the displays you want (Engine type, fuel system) and then extracting this to the SCREENS folder. Once extracted you can then edit these files and before any possible modification. You can completely delete all items and start from a blank screen, modify existing items or add items.

Since these are ordinary files they can be copied and reused in other EFIS panels.

The user screen file

Traditionally each page of the EFIS is made up of one or more modules – each module contains one or more items. Each item is a visible item on the screen or one of a few non-visible items intended for special purposes such as skipping items on certain conditions.

These modules are called “Flight”, “Engine”, “Fuel” and “Info”. Regardless of the names used each module can contain any item type. The names being chosen so it is simple to categorize items in a group. For example you would like to put all engine monitoring items in the “Engine” group.

Each of these names is followed by a number between 1 and 9 – this number denotes the page this module is to be used for.

The Info module is special in that you can have more than one info module per page. In addition to the page number the name is followed by a letter “A”, “B”, “C”,... using a non-visual “touch” item placed on the info page you can now page between the various info modules for the current page. A typical use for this might be a selection of check lists or aerobatic routine diagrams.

The G4 adds one more module: The “User” module. The user module is drawn as last module after the above modules have finished drawing. Normally the user can place additional items he would like to see in this module. However it is quite possible that a page has only a user module and it is even possible to extract default screens directly into the user module for alterations.

The user module is stored in a file. The file name is “UserVN.sdf” or “UserHN.sdf” where “N” stands for the page number 1 to 9. “V” and “H” denote screen in Vertical (Portrait) mode or screen in Horizontal (Landscape) mode.

User screen files can be copied between pages and there is a backup and restore facility.

User screen files are located in the “SCREENS” folder of the internal disk.

What you can do with the user file screen designer

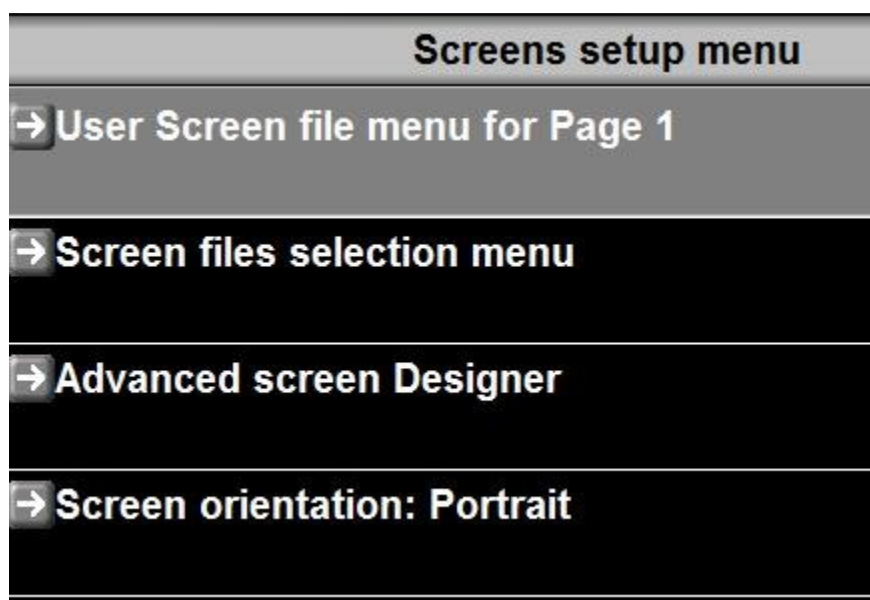
- 1) Add items to the built in screens or custom screen files located in your SCREENS folder – this is the primary purpose to allow items to be added as needed as part of initial installation.
- 2) Create new screens from scratch – start with an empty (black) screen and design a display using all available items as needed.
- 3) Create a new user screen containing all items of the currently displayed page. Effectively this combines all items in the Flight, Engine, Fuel and current Info module into one user file that can now be modified as needed. Once done the original display must be switched off so only the user file is shown – this is done in the Screen files selection Menu – set everything for this page to “Custom” and ensure that the SCREENS folder for this page does not have any content.
- 4) Create Info modules – pageable sections of the display.

Starting the screen design

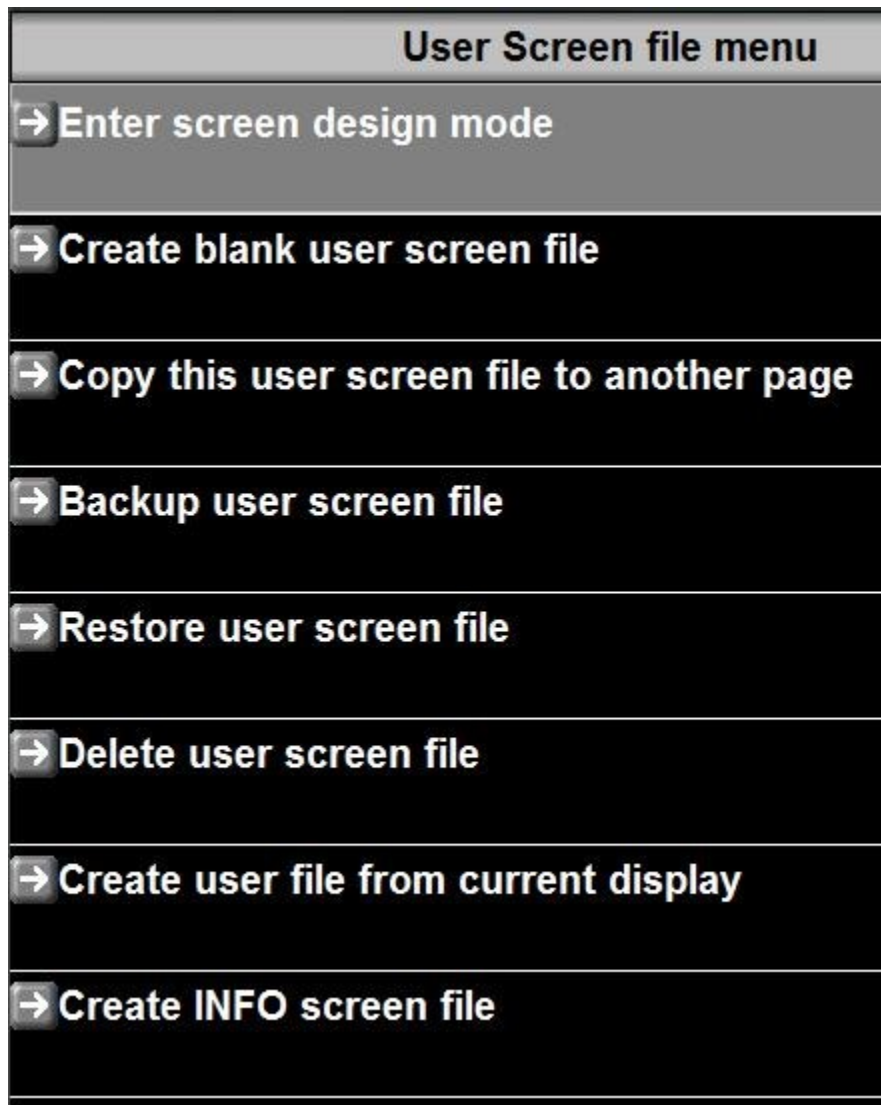
The first step in starting a new user screen module or modifying an existing one is to select the current page as you normally would – any work on a user file is related to the currently selected page on the EFIS. So if you are looking at page 3 – starting the screen designer will create a new, empty user screen for page 3 or if one already exists you can edit it, copy to another page, delete it or make and restore a backup of that user screen file.

If you would like to edit an existing user screen file – it is recommended to make a backup of that user screen file first. The backup would be saved to the SCREENS folder with the same file name but a file extension of “.bak”. Restoring from that backup is just as easy.

Enter the Menu and navigate to System Setup. Find the menu entry called “Screens setup Menu”. Enter this and now select “User screen file Menu for page N” where “N” is the number of your current page (Automatically set so you can be sure you are editing the correct page).



Now enter the User Screen file Menu:



Choose "Enter screen design mode". This gets you back to the normal EFIS display but it will now have different softkey button functions and also the rotary controls are now used to move items on the screen. Note that all of the items contained in the Flight, Engine, Fuel and Info modules that you cannot directly edit are dimmed – they are still displayed so you can use them as reference to place new items.

Once you select "Enter screen design mode" the User Screen file menu will appear as first item whenever you select "Menu" so you can get back here fast. This will last until the next power cycle.

The screen designer



The above image is what you will see (here in landscape mode) if you enter the screen design mode. Here we see the built in screens (as selected in the screen setup menu). All items are shown in a dimmed color. There are no items shown in a bright color meaning the current user file for this screen is empty.

Looking at the soft keys at the right: “Add new” allows you to add an item for display. “Drawing order allows you to change the order items are drawn – drawing order is important in some cases as it used to create special effects for example making sure a background to an item is drawn first.

“List” shows you the list of items in the current user file in the order they are drawn. This is also needed if you need to select an item that has no visual screen representation so you can edit or delete it.

“End design” terminates the screen design mode and the EFIS resumes normal operation.

You do not specifically have to save a user screen file – that is done automatically.

The two top rotary controls are used to move items on the screen. You would select an item by touching it first.

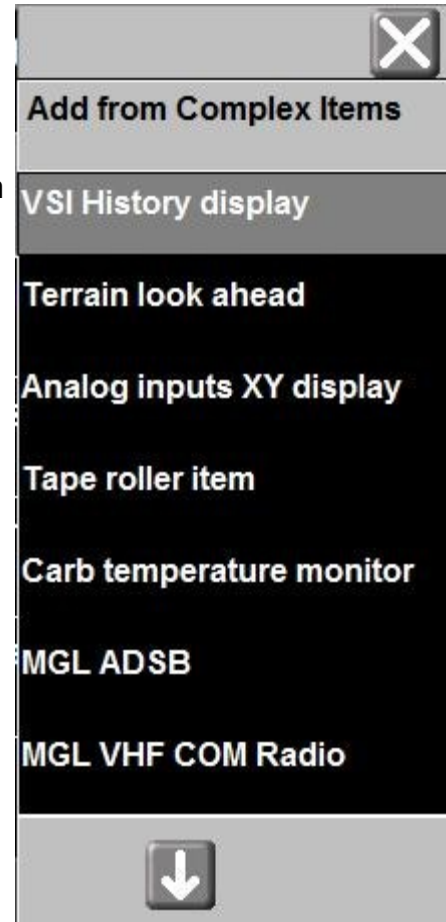
In the next step we will add an item. We will add a radio interface to this screen.

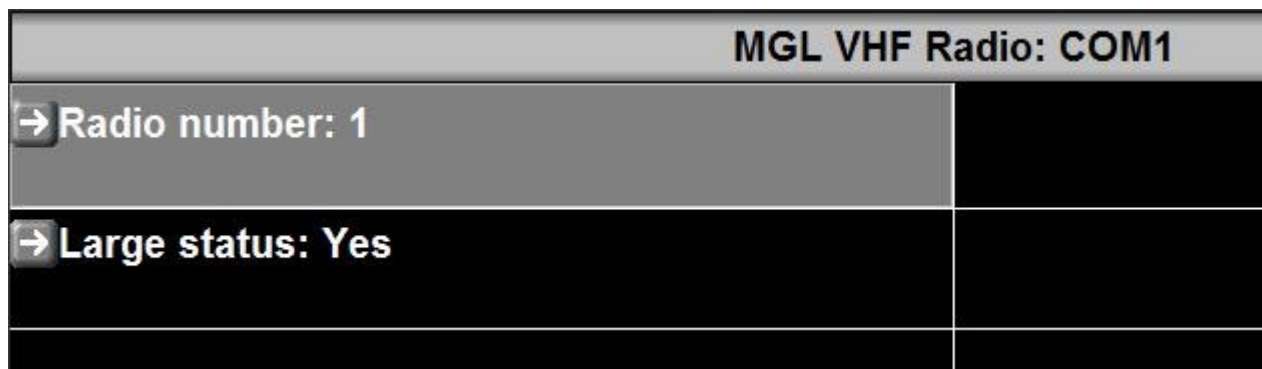
Add a screen item from category	
→ Text Items	
→ Complex Items	
→ Instruments	
→ Status/Control	
→ General Items	
→ Premade groups	

After tapping “Add New” we are presented with the above menu.

The various items available are grouped into similar categories. These categories are also available in the screen designer that forms part of the iEFIS G4 simulator.

Select “Complex Items” and then from the list select “MGL VHF COM Radio”.





After choosing the MGL VHF COM Radio we are presented with the property editor for this item – it only has two entries. Most items have many more entries but in this case it is simple. Select if this is radio number 1 or 2 and if you would like to show the radios status display in a small or large format.

You can reactivate the property editor for any user screen item at any time so do not worry getting it right the first time.

The item will be placed on the screen in a default position close to the left top of the screen. The next task will be to move it where you want it.

Close the property editor by tapping the “X” button.



Once back to the main screen we can see our new item displayed. Note that the softkeys have changed. The new item was selected automatically and in case there are more than one items in the user screen file it will be the only one shown in bright color and also has a white selection frame around it.

From the softkey buttons we can select “Add new” if we want to select another item right away. Tapping “Edit” will bring up the property editor for the selected item so you can change it. “Delete” will remove the item from your user screen file. “End Edit” will cancel the item selection and all items in the user screen file will now be shown with normal, bright colors and you can select another item for editing.

Use the rotary controls to move the item to the designed position. Rotating will move the item by 1 pixel for every “click” on the rotary control – to move an item fast – push the rotary knob into its detent position (towards the screen) while turning the knob – this will move the item 10 pixels for every “click”.



In the above image we have completed moving the radio status control to its final position using the rotary controls. We have then tapped “End Edit” and finally “End Design”.

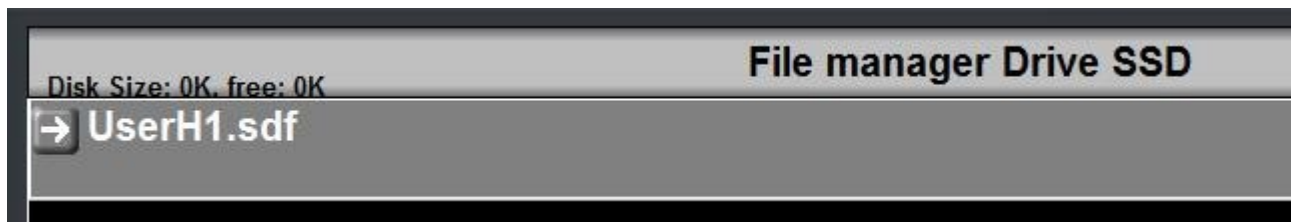
The radio status above is now fully operational (assuming you have COM1 enabled in the equipment enables menu, assigned a serial port in the Serial Port setup and routing menu for the radio and have it connected to that port.

Tapping the status results in the radio control popup. Note that the position of the popup can be moved using the button on the top left of the popup. It remembers the position for next time.



In your SCREENS folder you will now find the file “UserH1.sdf” (check this using the file manager in the Menu).

The format of this file is identical to any other screen file so it is actually permitted to either rename this file to a regular screen file such as “Flight1.sdf” or you could also rename a proper “Flight1.sdf” as “UserH1.sdf” if you would like to perform anything advanced.



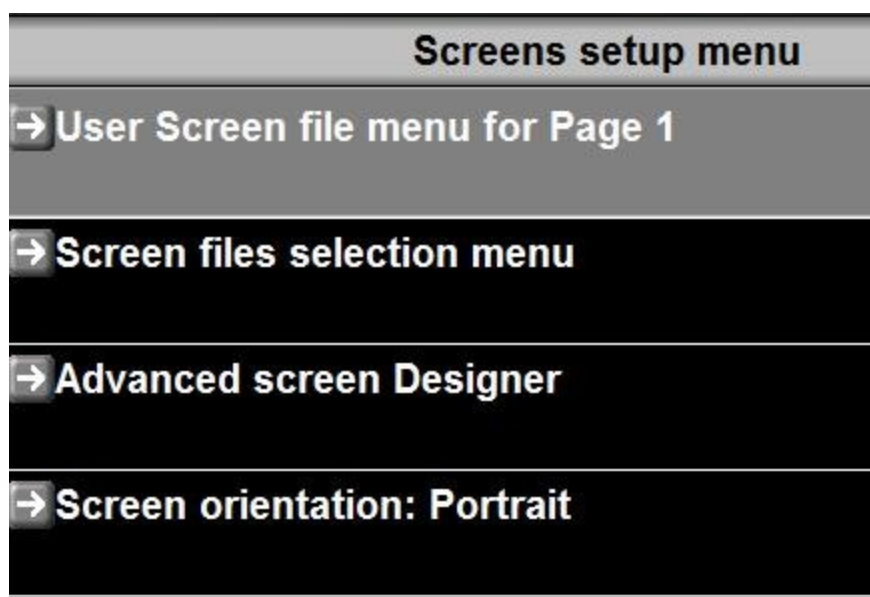
Selecting items for editing

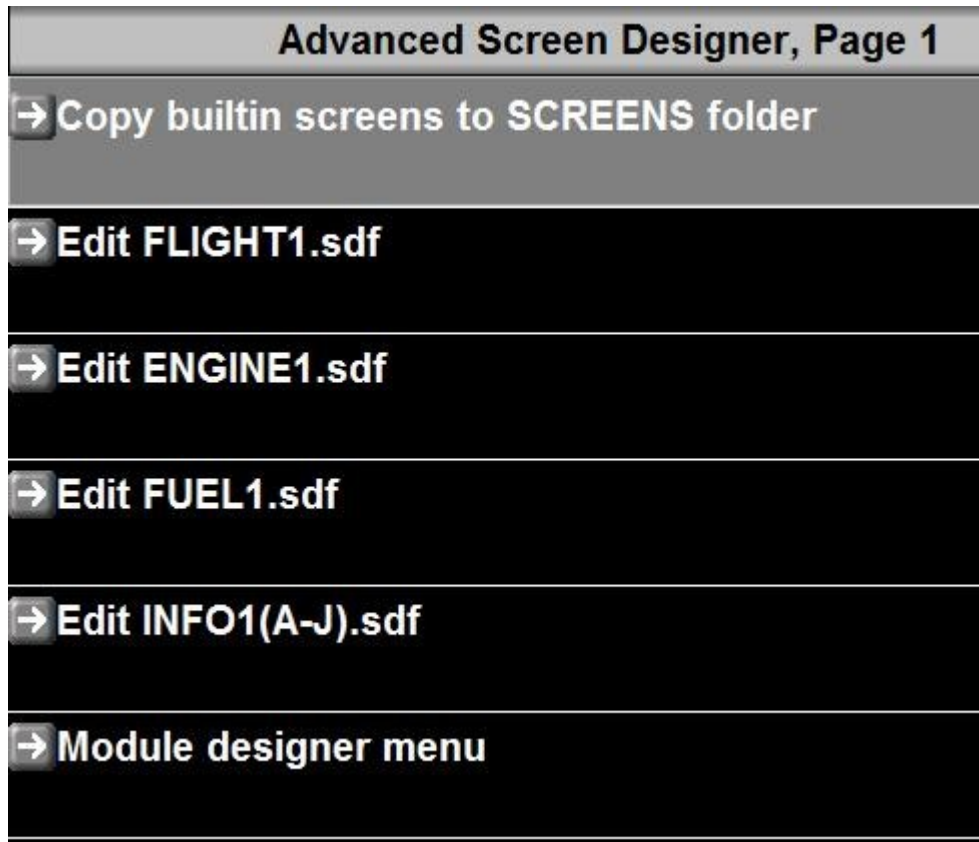
Once you have one or more items in your user screen file it may be possible for two or more items to occupy the same area on the screen.

Normally you simply tap on an item to select it – in this case it may select the wrong item. If that is the case, simply tap again until the correct item is selected. When you tap on the screen to select an item the EFIS will start the search for an applicable item with the last item select plus one and if it gets to the end of the list will wrap to the start until it finds something.

Items to do not have a visual representation on the screen can be selected from the “List” button. You can also use this button to select items that are visible as an alternate method.

The Advanced Screen Designer





The advanced screen designer allows you to create a copy of the built in screens.

Your first step should you like to do this would be to select from the “built-in” screens using the “Screen files selection menu”, here you would choose from built in screen designs, engine and fuel systems.

Once this has been selected use the function “Copy builtin screens to SCREENS folder”.

Yo can now proceed to edit these screens. Note that the built-in screens will still be shown as you cannot edit them directly. You need to tell the EFIS that you want to use your own screens (the ones you just copied). You do this in the “Screen files selection menu” by setting the relevant screen file type to “custom”. This means you can do so perhaps just for the “Engine” file if you only want to change this – our you can do so for all files and you can also do this on a per page bases.

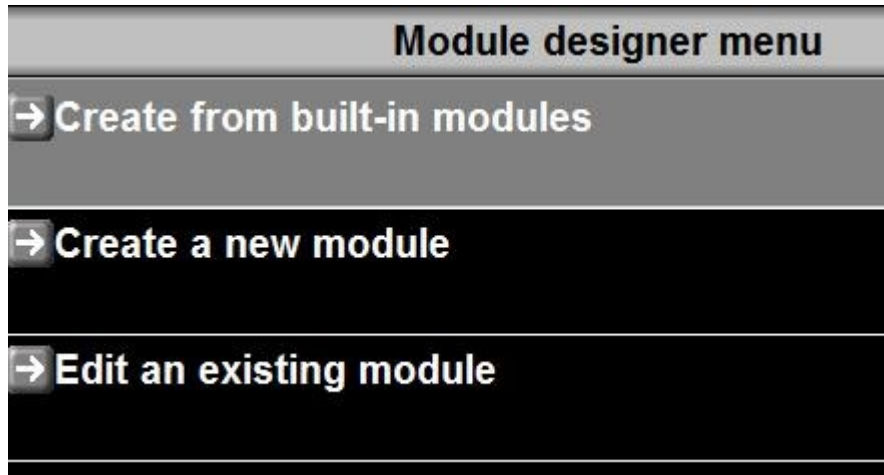
Note that each file is followed by a number. The number is from 1 to 9 and that is the page number.

As you can have more than one Info file per page these are identified with letters “A” to “J”.

At minimum you need at least the FLIGHT file or a USER file. If these do not exist the page will not exist and not be selectable even if you have any other file (ENGINE, FUEL, INFO) for that page. If this is the intention, simply create an empty Flight file.

Selecting to edit any file will create an empty file if it does not yet exist.

Module designer Menu



Modules are groups of screen items. Many built in modules are available in the system that you can use in your own screen designs. For example the altimeter tape is a collection of several text and graphic items.

Modules behave as if they were a single item – you can place them and move them around the screen.

Modules are either “built-in” similar to the built-in screen files or they are located in your SCREENS folder. Modules that are in your SCREENS folder can be edited just like any other screen file.

Create from built-in modules

This function allows you to select from any of the built-in modules and it will be copied into the screens folder. Use this if there is a module you would like to use but want to make a change to it.

Create a new module

This creates a new, empty module. You will be asked for the filename to use for this module. Note that modules have the file extension of “.mod”. So for example you can create a file called “my_module.mod”. Note that spaces are not allowed in file names for compatibility reasons but you can use the “_” (underscore) for this.

Edit an existing module

This function allows you to edit a module located in the SCREENS folder.

Notes on module editing

Modules rely on relative positioning of items belonging to the module. You can create a module with items anywhere on the screen – usually placed around the middle of the screen. Once you have completed your module it will be saved to your modules file name – the item occupying the top left most pixel will be deemed “0,0” for the X and Y position and all other

items for that module are positioned relative to that position. In other words the module moves to the top left corner of the screen.

Once you place the module using the screen designer you give it the position where you would like to place it.

Create a new page

For most built in screen designs you have 4 or 5 pages already designed. If you would like to create a new page – for example page number 6 that does not yet exist proceed as follows:

- 1) Switch to any existing page
- 2) Enter the “Screens setup menu” (towards the end of the “system setup menu”).
- 3) Enter “User screen file menu for Page...”
- 4) Enter “Create blank user screen file”

The system asks for the page number. Select page 6.

You now have an existing page 6 but it is blank (only a blank user file for that page).

You will notice that you can now use the Page rotary control to select page 6.

Select page 6.

You can now use the screen designer and do one of two things:

- 1) Edit the newly created blank user file and place your screen items into it.
- 2) Use the advanced screen designer to create blank FLIGHT, ENGINE, FUEL and INFO files as needed and then fill these with your desired screen items.

Note that the screen file names are there for convenience so you can group relevant items that normally belong together into a single named file. However you can place any available item into any file.

Creating Info files for a page

Info files for a page are special in that you can create sections of a page that are themselves pageable like the page in a book. Paging is normally done by placing a special “touch” item for paging – two are available to change info screens – one to page up and one pages down. There are also two icons you can select if you prefer a permanent paging icon.

When you create an info file first start with a rectangle covering the entire area you want the info file to cover and verify that it is the correct size (so you don't overwrite anything else on your screen). Take a note of the X/Y position and horizontal and vertical size of the rectangle so you can use this as you create further Info files (so they will all show at the same positions).

You can then delete the rectangle and place your items.

Touch fields to change the info file should be part of each info file. If you use icons to change info files you may want to consider placing these in the FLIGHT file as you only need a single set.

Larger Info files (from screen area point of view) may be useful for checklists or aerobatic

sequence diagrams. Simply create your checklists or other items as JPEG image files and use the image component as item.