



FLYSIMWARE

— FLY THE VINTAGE SKIES —

C414AW Chancellor - RAM IV Conversion

Version 2.0

Product/Sim Information

Turbo-Charger Fuel Controller

NOTE: We are happy to announce that we now have working mixture levers coded (for realism) for a turbocharged engine. You no longer have to lean for higher altitudes nor for above the critical altitude of 21K feet. This new code has a fuel controller to maintain the fuel flow. But also allows you to still set the fuel flow rate. So this way you can set the mixture rich for most of the flight and then when you descend from high altitude you can control the EGT temps so you do not crack the engine head as you now enter warmer air and prepare to land. **REMEMBER TO KEEP THE AUTOMIXTURE DISABLED!!!**

XBOX users will have forced automixture on so there is nothing you need to do. Until Wasm is working for Xbox you can simply ignore the mixture.

Pilot Altimeter Settings

To change the pilot altimeter settings from u.s standard system to metric system or vice-versa, go to :

General options > Misc > Units of measurements > Us system and metric system

XBOX Limitations

Xbox users will only be able to use the GNS530 panel. The GTN 750 panels are 3rd party software and not compatible with Xbox due to a sim limitation. We hope they fix this in the future. For Xbox users the turbocharger logic is using auto mixture for now. The Wasm turbocharger logic will be fixed in the future according to Asobo. Please visit our main website product page to download the Xbox zip file for more info.

Texture Quality

The sim controls the size of the original textures that we provided through the graphic settings. There are four graphic settings, in low and medium, the textures are half the size of the original can cause some pixelation. Using the high and ultra settings, the textures are the original size. **NOTE:** Asobo lowered the pixel density and liveries based on direction now show wavy and steps in the decal lines. There are methods to reduce the limitation but can't be removed completely. This was to allow more memory for Xbox. We have updated the textures to improve the livery quality due to this change and are happy with the results.

General Options > Graphics > Texture resolution

Autostart

Do not use the default autostart feature from the sims button controls. This aircraft requires that you use the actual starter buttons. Also, do not use hardware unless, you use third party software so it can use our logic. You can use the tablet autostart as this feature will be added soon.

Save State and Fuel Info

This aircraft has a save state. What you walk away from you return to. So parking modes and some switches including fuel levels will be saved when you exit a flight back to the main menu. Then returning will have this amount of fuel. If you add fuel from the flight planar this will get ignored so no need. Once back at the parking ramp add the fuel then update the fuel computer. Once you finish a flight leave the plane how you like to where you refuel now or when you return. This is how it would be done in real life and a save state is now becoming the standard for sims.

Product/Sim Information

Engine failures & Maintenance

1. Running the engines hot by keeping the manifold pressure at max pressure for too long will result in power loss and may not be enough to climb in altitude. Keep the manifold pressure in the green for normal flight and only full manifold pressure during takeoff.

2. All default sim failures are available to set at any time to simulate practicing failures.

Note: We hope to bring more failures to this bird in the future! Right now we are focusing on making the best possible product for MSFS. We feel maintenance and failures is only a bonus feature and not a standard requirement to make a reliable award winning product. Also there is no help from the MSFS sim to create these unique systems which has to be all custom coded and in return this can cause bugs and make the product performance drop.

Future Goals

1. Add simulated circuit breakers. Keep in mind some switches are circuit breakers and so these are already simulated and work like a traditional circuit breakers. For example the master autopilot switch on the GNS530 panel will pop off if you use the yoke AP disconnect button or the autopilot gets disconnected from abnormal reason like moving the yoke. So this is not a typical rocker switch. Same for a few other switches on the pilot side panel. So some of the traditional circuit breakers we plan to simulate at a later time you may see some missing as I just stated they are already breaker switches.

2. Add an 'optional' maintenance system. This will include things like oil simulation, spark plug replacement, air filter replacement, light bulb replacement and much more. Failure to maintain will cause a complete engine failure. If we do add an option to increase the simulation failure rate this would only be for non engine failures. Engine failures can only be triggered by actual hours.

3. Suction gauge will have red poppers for the running engine state and not red illuminated lights.

4. Tablet payload will allow the payload widget to sync so you can choose which to use.

5. Our tech pilot requested a few other things I did not list. So I am pretty sure there is more.

Hardware Binding

Why my hardware does not work for some switches?

Due to so much custom coding which brings you more realistic functions that default assignments will no longer work and there are many users that want to use their hardware for typical functions. Below is a list of known switches that you need to use the mouse or use 3rd party software that allows you to setup hardware. We have Discord channels with different sub channels for different software that you can get instant help to setup profiles.

You can use the link below to join our Discord community and see the #hardware-binding channels for more information.

[Discord Link](#)

Here is the known list of switches:

Sync Switch

BATTERY SWITCH

LEFT ENGINE ALTERNATOR SWITCH

RIGHT ENGINE ALTERNATOR SWITCH

LEFT ENGINE STARTER

RIGHT ENGINE STARTER

PRIMER SWITCHES

LEFT FUEL PUMP

RIGHT FUEL PUMP

ALL AUDIO SWITCHES (GNS-530 PANEL)

Technical Specifications

Cessna 414AW RAM Series IV

Exterior

Exterior Height: 11 ft 5 in
Wing Span: 44 ft 2 in
Length: 36 ft 3 in
External Baggage: 54 cu ft

Interior

Cabin Volume: 142 cu ft
Internal Baggage: 31 cu ft

Occupancy

Crew: 1
Passengers: 7

Operating Weights

Max T/O Weight: 7105 Lb
Max Landing Weight: 6750 Lb
Operating Weight: 4951 Lb
Empty Weight: 4764 Lb
Fuel Capacity: 1236 Lb
Payload Useful: 2012 Lb
Payload W/Full Fuel: 953 Lb
Max Payload: 1564 Lb

Range

Normal Range: 1046 nm
Max Range: 1140 nm
Service Ceiling: 30000 ft

Distances

Takeoff Distance: 2185 ft
Balanced Field Length: 2595 ft
Landing Distance: 4000 ft

Performance

Rate of Climb: 1900 fpm
Climb Rate One Engine Inop:
325 fpm
Max Speed: 240 kts
Normal Cruise: 230 kts
Economy Cruise: 210 kts
Fuel Capacity: 206

Power Plant

Engines: 2
Horse Power: 325
Engine Mfg: Continental
Engine Model: TSIO-520NB

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-7 C (19 F)			13 C (STD TEMP) (55 F)			33 C (91 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
1,000	2450	31.5				71.7%	176	245			
	2450	29.0				64.1%	169	219			
	2450	27.0				58.1%	163	199			
	2450	25.5				53.7%	158	184			
	2300	34.0				78.3%	181	268			
	2300	32.5				74.0%	177	253			
	2300	30.5				68.1%	172	233			
	2300	29.0				63.8	168	218			
	2300	27.0				57.8	162	198			
	2300	25.0				51.9	156	178			
	2200	34.0				77.6%	180	266			
	2200	33.0				74.8%	178	256			
	2200	31.0				68.9%	173	236			
	2200	29.0				63.2%	167	216			
	2200	27.0				57.5%	162	197			
	2200	25.0				51.6%	155	177			
	2100	31.5				69.8%	173	239			
	2100	29.0				62.5%	166	214			
	2100	27.5				58.4%	162	200			
	2100	25.5				52.7%	156	180			

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-15 C (5 F)			5 C (STD TEMP) (41 F)			25 C (77 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
5,000	2450	31.5				73.1%	184	250			
	2450	29.0				65.5%	176	224			
	2450	27.1				59.6%	170	204			
	2450	25.5				54.8%	165	188			
	2300	34.0				80.1%	189	274			
	2300	32.5				75.5%	185	259			
	2300	30.5				69.5%	180	238			
	2300	29.0				65.2%	176	223			
	2300	27.0				59.0%	169	202			
	2300	25.5				54.7%	164	187			
	2200	34.0				79.4%	187	272			
	2200	33.1				76.5%	185	262			
	2200	31.0				70.5%	180	241			
	2200	29.0				64.5%	175	221			
	2200	27.0				58.7%	169	201			
	2200	25.5				54.3%	164	186			
	2100	31.5				71.1%	180	243			
	2100	29.5				65.5%	175	224			
	2100	27.5				59.5%	169	204			
	2100	26.0				55.3%	164	189			

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-25 C (-13 F)			-5 C (STD TEMP) (23 F)			15 C (59 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
10,000	2450	31.5				75.3%	194	260			
	2450	29.5				68.5%	188	234			
	2450	27.5				62.3%	181	213			
	2450	26.0				57.8%	176	198			
	2300	34.1				82.0%	199	281			
	2300	33.0				78.7%	196	269			
	2300	31.1				72.8%	191	249			
	2300	29.0				66.6%	185	228			
	2300	27.0				60.5%	179	207			
	2300	25.5				55.9%	173	191			
	2200	34.0				81.1%	197	277			
	2200	32.9				77.8%	194	266			
	2200	31.0				71.9%	189	246			
	2200	29.0				65.9%	183	226			
	2200	27.5				61.4%	179	210			
	2200	25.6				55.7%	172	190			
	2100	32.0				74.3%	190	254			
	2100	30.0				68.3%	185	234			
	2100	28.1				62.6%	179	214			
	2100	26.0				56.5%	172	193			

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-35 C (-30 F)			-15 C (STD TEMP) (6 F)			5 C (42 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
15,000	2450	31.6				76.1%	204	260			
	2450	29.5				69.7%	197	238			
	2450	27.5				63.4%	191	217			
	2450	26.1				58.8%	185	201			
	2300	34.0				83.2%	208	284			
	2300	33.0				80.2%	206	274			
	2300	31.0				74.0%	200	253			
	2300	29.0				67.7%	194	232			
	2300	27.0				61.6%	187	211			
	2300	25.5				56.8%	182	195			
	2200	34.0				82.5%	206	282			
	2200	33.0				79.5%	204	272			
	2200	31.5				74.9%	200	257			
	2200	29.5				68.6%	194	235			
	2200	27.5				62.4%	187	214			
	2200	26.0				58.0%	182	199			
	2100	32.5				77.0%	200	264			
	2100	30.5				71.1%	195	243			
	2100	28.0				63.4%	187	217			
	2100	26.4				58.8%	182	201			

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-45 C (-48 F)			-25 C (STD TEMP) (-12 F)			-5 C (24 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
20,000	2450	29.5				70.6%	207	242			
	2450	27.5				64.2%	200	220			
	2450	25.9				59.3%	194	203			
	2300	34.0				84.3%	218	289			
	2300	33.0				81.1%	216	278			
	2300	30.9				74.7%	210	256			
	2300	29.1				68.7%	203	236			
	2300	27.0				62.1%	196	213			
	2300	25.6				57.8%	190	198			
	2200	34.0				83.6%	216	287			
	2200	33.0				80.3%	213	275			
	2200	31.4				75.3%	209	258			
	2200	29.5				69.3%	202	237			
	2200	28.0				64.8%	197	222			
	2200	26.0				58.6%	190	200			
	2100	32.5				77.8%	208	266			
	2100	30.5				71.6%	203	245			
	2100	28.5				65.5%	196	224			
	2100	27.0				61.2%	191	209			

Input Category here

PERFORMANCE CHART BASED ON MSFS SIMULATION WITH RAM IV CONVERSION

ALTITUDE [Feet]	RPM	MP [InHg]	-54 C (-66 F)			-34 C (STD TEMP) (-30 F)			-14 C (6 F)		
			PERCENT BHP [%]	KTAS [Knots]	TOTAL [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]	PERCENT BHP [%]	KTAS [Knots]	TOTAL LB/HR [lb/hr]
25,000	2450	31.0				78.4%	225	269			
	2450	29.6				73.7%	220	253			
	2450	27.4				67.0%	212	230			
	2450	26.0				62.3%	206	213			
	2300	29.0				71.3%	214	244			
	2300	27.0				65.2%	207	224			
	2300	26.0				61.9%	203	212			
	2200	30.0				73.9%	214	253			
	2200	28.0				67.7%	208	232			
	2200	27.0				64.7%	205	222			
30,000	2450	28.3				72.8%	225	249			
	2450	27.5				70.5%	225	241			
	2450	26.0				65.2%	217	223			
	2300	28.4				72.7%	223	249			
	2300	27.0				68.1%	217	233			
	2300	26.0				64.9%	212	222			
	2200	28.5				72.4%	219	248			
	2200	28.0				71.2%	218	244			
	2200	27.0				67.8%	214	233			

COCKPIT

OVERVIEW OF PANELS

ALL PANELS

MAIN PANELS

PILOTS & COPILOT PANELS

Pilot Panel

Copilot Panel

Engine Panel

Navigation Panel GNS-530

Navigation Panel GTN-750

Navigation Panel GTN-750XI

Pilot Lower Panel

Copilot Lower Panel

CENTER PEDESTAL

Center Pedestal

Center Pedestal Top View

LEFT CONSOLE

DETAILED INFORMATION

Fuel Computer

Garmin GFC600

GTX 345 Transponder

Davtron Clock

Altitude Alerter

Autopilot Mode Selector

Annunciator Panel

Navomatic 800B Autopilot

EFB Tablet

Magnetos & Starters

Electrical

Lights & Anti-Icing

MAIN COCKPIT

Fuel Selectors

Overhead Panel

Pilot Window

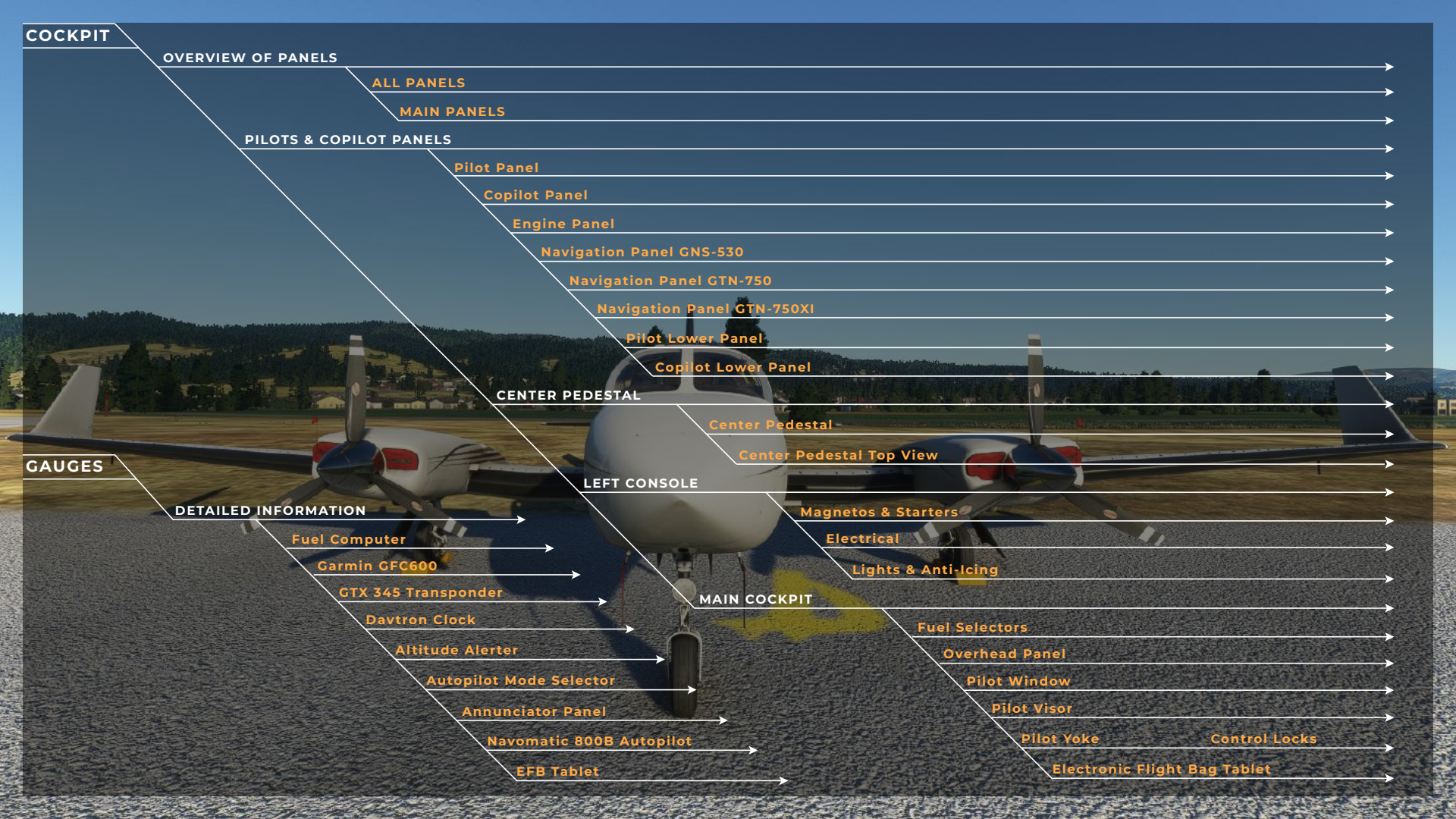
Pilot Visor

Pilot Yoke

Control Locks

Electronic Flight Bag Tablet

GAUGES



INTERIOR

CABIN

Cabin Tables

Cabin Seats

Cabin Door

Cabin Door Open

Cabin Lights

EXTERIOR

AIRCRAFT

Cabin Door

Cabin Door Open

Engine Doors

Engine Plugs

Heat Exchangers

Ground Power Unit

Ground Power Plug

Pitot Covers

Oil Doors

Fuel Caps

Hydraulic Reservoir Door

Wing Locker

Rudder Lock

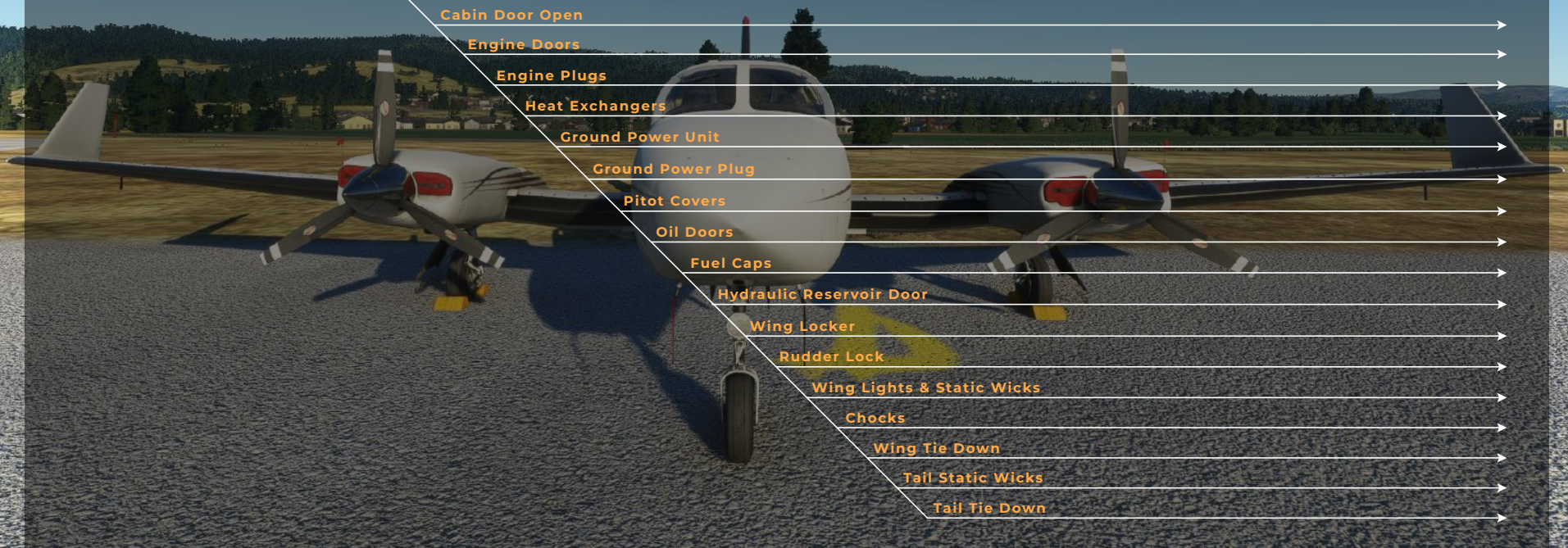
Wing Lights & Static Wicks

Chocks

Wing Tie Down

Tail Static Wicks

Tail Tie Down



MAIN PANELS



MAIN PANELS



Pilot Panel

Engine Panel

Copilot Panel

Navigation Panel

Lower Panel

Pilot Panel



Copilot Panel

Fuel Quantity Gauge

Prop De-Ice

Airspeed Indicator

Attitude Indicator

Altimeter

Heading Indicator

Vertical Speed Indicator

Engine Hours Counter



TURBO LIMITATIONS

ALT. x1000	MAX. M.P.
13	41.0
20	39.0
22	35.2
24	32.3
26	29.8
28	27.4
30	25.0

FUEL QUANTITY PRIMARY READING THE AIRCRAFT

Engine Panel

Compass

Engine RPM Gauge

Two needles for L / R Engine

EGT

Exhaust Gas Temperature

Oil Pressure Gauge

Right Engine

Manifold Pressure

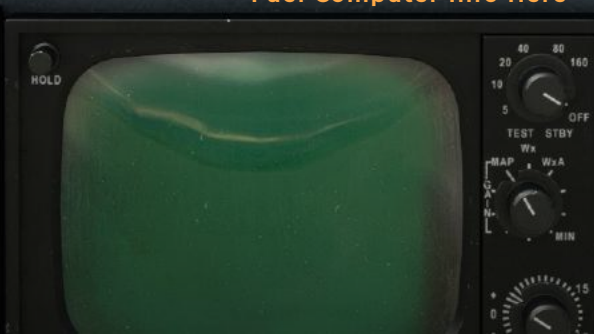
Two needles for L / R Engine

Fuel Computer

Fuel Computer Info Here

Oil Pressure Gauge

Left Engine



Navigation Panel GNS-530

GNS 530
Navigation System

COM 118.350
124.850
VLOC 110.50
113.90
VOR
RAD
DIS
DIS
VLOC
NAV 100

DTK
TRK 2
DIS
VLOC
VOR
RAD
DIS
DIS
VLOC
NAV 100

CDI OBS MSG FPL VNAV PROC GPS

Prop Sync Controls

Weather Radar Unit

Simulated for PC only

COMM 2 Radio

COMM 2 Radio

COM 124.85
124.85
RECALL
XMIT
ADF 0890
1111
RECALL
DIR
NRM
TEST

ADF 1

Automatic Directional Finder

ADF 1

Automatic Directional Finder

ID ALT TEST
ON SBY OFF
1 2 0 0

Transponder

ORIGINAL EQUIPMENT FUEL QUANTITY INDICATOR IS THE PRIMARY READING OF FUEL ON BOARD THE AIRCRAFT.

TURBO LIMITATIONS	
ALT. x1000	MAX. M.P.
13	41.0
20	39.0
22	35.2
24	32.3
26	29.8
28	27.4
30	25.0

Audio Panel

LRN / ANNUN Switch

Not simulated

NAV / GPS Switch

RNAV - NAV2 Radio

RNAV not simulated

Brightness Control

WARNING

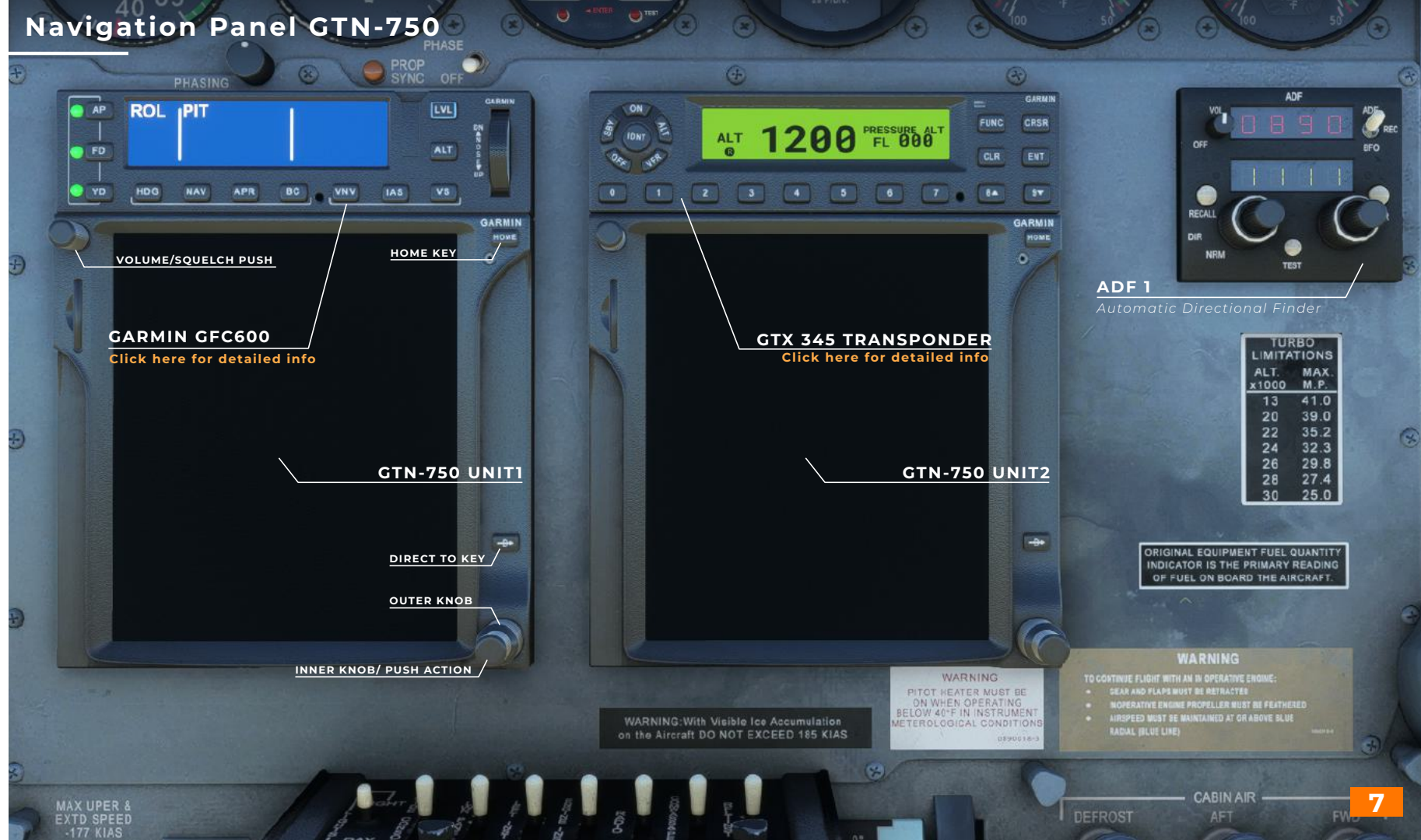
TO CONTINUE FLIGHT WITH AN IN OPERATIVE ENGINE:

- GEAR AND FLAPS MUST BE RETRACTED
- INOPERATIVE ENGINE PROPELLER MUST BE FEATHERED
- AIR SPEED MUST BE MAINTAINED AT OR ABOVE BLUE RADIAL (BLUE LINE)

WARNING-With Visible Ice Accumulation on the Aircraft DO NOT EXCEED 185 KIAS

WARNING
PITOT HEATER MUST BE ON WHEN OPERATING BELOW 40°F IN INSTRUMENT METEOROLOGICAL CONDITIONS
0290610-3

Navigation Panel GTN-750



GARMIN GFC600

[Click here for detailed info](#)

GTN-750 UNIT1

GTX 345 TRANSPONDER

[Click here for detailed info](#)

GTN-750 UNIT2

ADF 1

Automatic Directional Finder

TURBO LIMITATIONS	
ALT. x1000	MAX. M.P.
13	41.0
20	39.0
22	35.2
24	32.3
26	29.8
28	27.4
30	25.0

ORIGINAL EQUIPMENT FUEL QUANTITY INDICATOR IS THE PRIMARY READING OF FUEL ON BOARD THE AIRCRAFT.

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WARNING: With Visible Ice Accumulation on the Aircraft DO NOT EXCEED 185 KIAS

MAX UPER & EXT'D SPEED
-177 KIAS

CABIN AIR

DEFROST

AFT

FWD

Navigation Panel GTN-750XI

PHASING

PROP SYNC OFF

ROL PIT

LVL

AP FB YD

HDG NAV APR BC VNV IAS VS

VOLUME/SQUELCH PUSH

NAVIGATION SOURCE

TDS GTNX750 Unit 1
TDS GTNX750 Unit 2
FLIGHT SIMULATOR

GARMIN GFC600

[Click here for detailed info](#)

GTN-750 UNIT1

HOME KEY

DIRECT TO KEY

OUTER KNOB

INNER KNOB/ PUSH ACTION

ON OFF

ALT

ALT 1200 PRESSURE ALT FL 000

0 1 2 3 4 5 6 7 8 9

GTN-750 UNIT2

HOME

OUT

GTX 345 TRANSPONDER
[Click here for detailed info](#)

ADF

VOL

0890

OFF

RECALL

DIR

NRM

TEST

ADF REC

BFO

ADF 1
Automatic Directional Finder

TURBO LIMITATIONS	
ALT. x1000	MAX. M.P.
13	41.0
20	39.0
22	35.2
24	32.3
26	29.8
28	27.4
30	25.0

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- AIR SPEED MUST BE MAINTAINED AT OR ABOVE BLUE RADIAL (BLUE LINE)

WARNING: With Visible Ice Accumulation on the Aircraft DO NOT EXCEED 185 KIAS

MAX UPER & EXT'D SPEED
177 KIAS

DEFROST

CABIN AIR

AFT

FWD

Pilot Lower Panel



Cabin Altitude &
Differential Indicator

Cabin Altitude Control

Cabin Rate-of-climb

Pressurization Air Controls

Cabin Pressurization Mode Switch

Suction Gauge

Oxygen Cylinder Gauge

Parking Brake

Alternate Air Levers

Emer Oxy Pull

Cabin Door Light

Aircon Controls

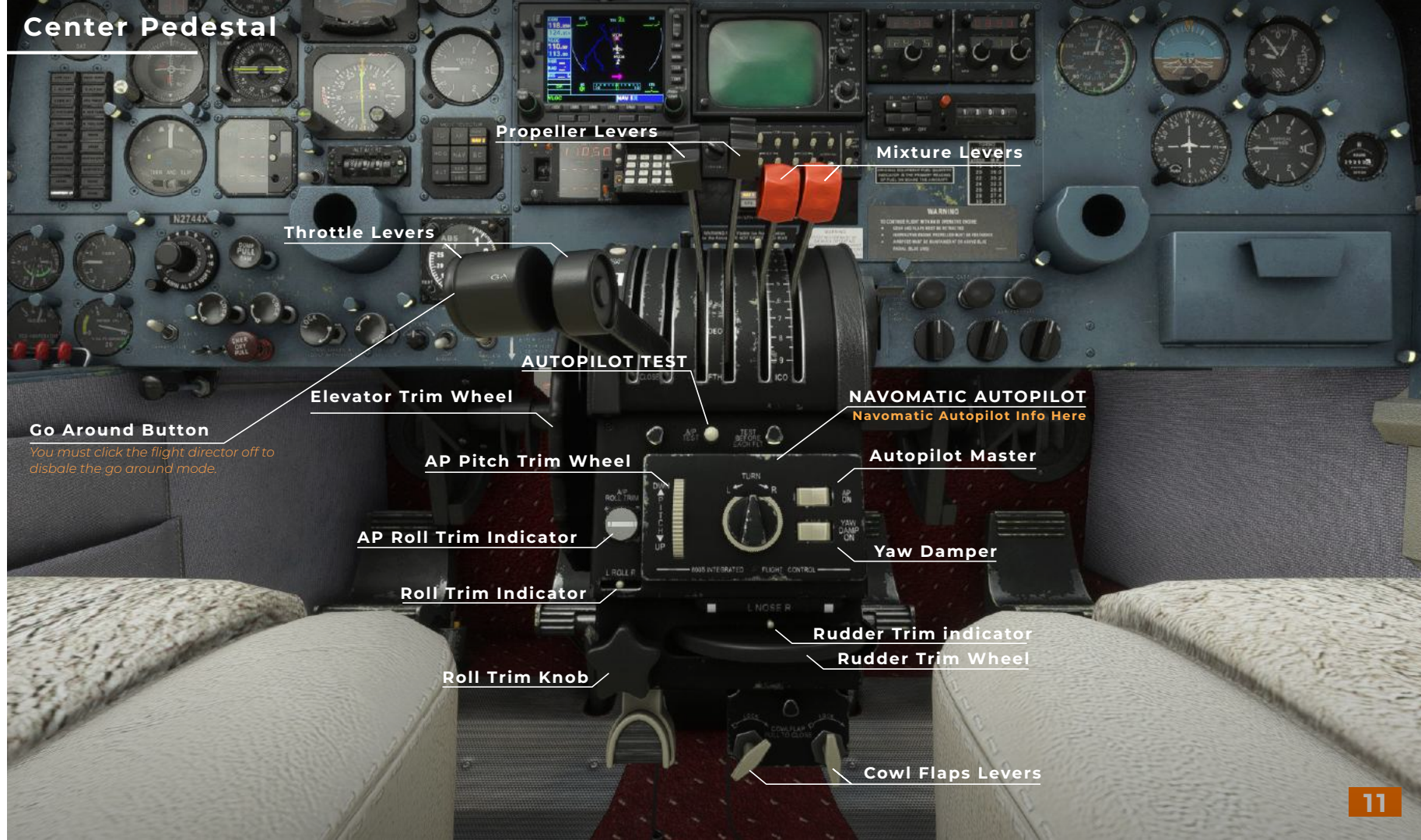
Landing Gear Handle

Emergency Gear Handle

Ground Radar

Copilot Lower Panel





Center Pedestal Top View



Master Instrument Switch

Instrument Brightness Control

Hide/Unhide Levers

Elevator Trim Wheel

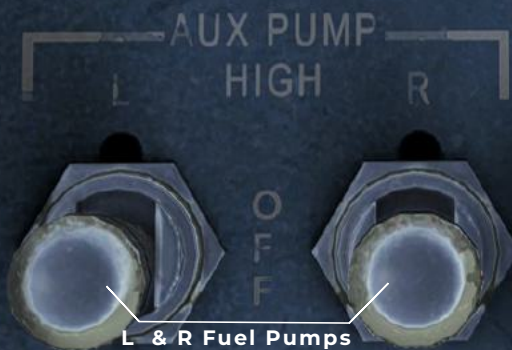
Elevator Trim Position Indicator

Magnetos & Starters

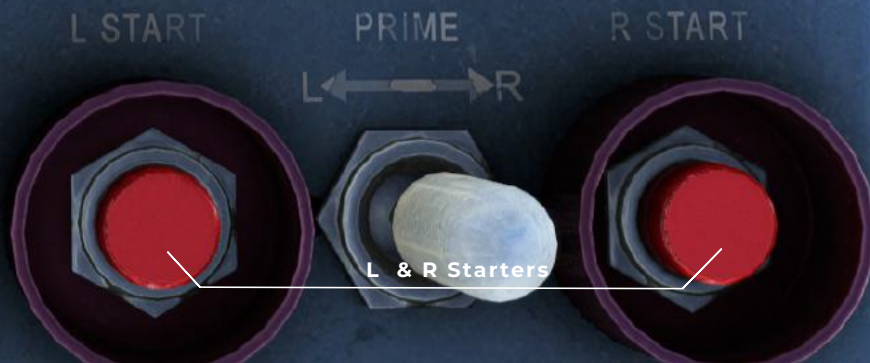


L & R Engine Magnetos

Primer Switch
Requires priming when cold



L & R Fuel Pumps

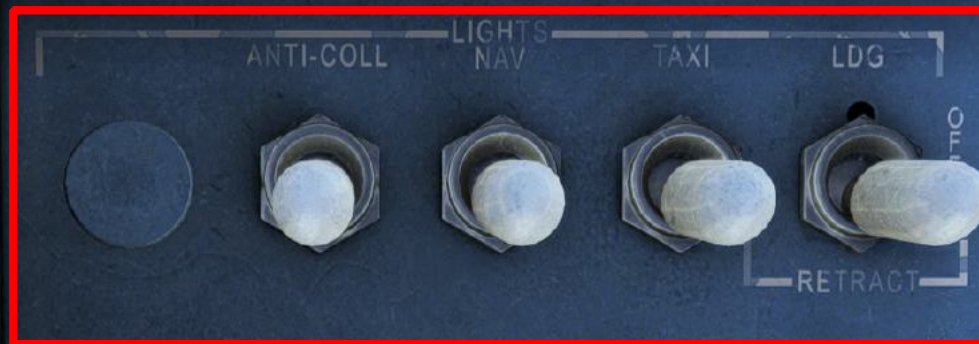


L & R Starters

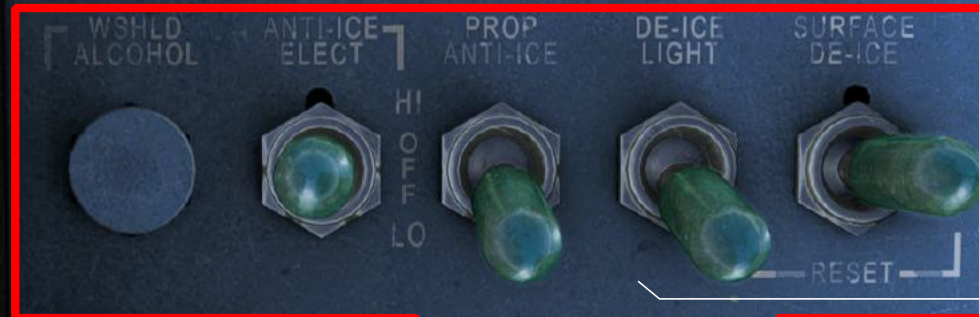
Electrical



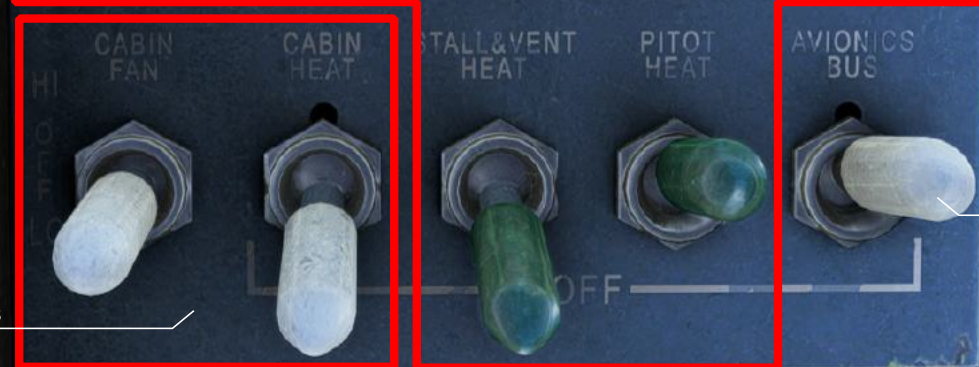
Lights & Anti-Icing



Light Switches



Anti-Icing Switches



Heater Switches

Avionics Master Switch

Fuel Selector

Left Tank

Selectors

Right Tank

Emergency Crossfeed Shutoff Lever

Isolates the fuel crossfeed lines from the fuel tanks in the event of a nacelle, wing or center section fire or a wheels up landing.

Overhead Panel

Pilot Map Light

Copilot Map Light

Cockpit Light

Pilot Window

Window Lock

Window Handle

Drag mouse to open/close window

Pilot Visor

Sun Visor

Click & Drag to move

Extender

Click & Drag to move

Knob

Click & Drag to move

Joint

Click & Drag to Rotate

Pilot Yoke

Pitch Trim

Not simulated

Not simulated

Autopilot Disconnect

Pitch Synchronization Switch

Not simulated

Control Locks



Electronic Flight Bag Tablet



Cabin Tables



Click to Close

Click to Open

Passenger Seat 7

Remove weight to remove Seat

Enter Weight

Seat 7 will appear

Cabin Door

Upper Door Handle

Click to open and close

Leather Door Strap

Click to raise and lower upper door

Hotspot

Click to raise and close lower door

Door Light

Turns on door light

Cabin Door Open

Leather Door Strap

Click to raise and lower upper door

Lower Door Handle

Click to unlock and lower door

Cabin Lights

Light Switch

Cabin Lights

AC Vents

Cabin Door

Exterior Upper Door Handle

Drag down to unlock / Drag up to lock

Hotspot

Click to raise upper door

To click these hotspots it must be from 'cockpit/instruments/cabin_door' camera view

Cabin Door Open

Hotspot

Click to raise and close lower door

Hotspot

Click to raise and close lower door

Engine Doors



Engine Plugs

Engine Plugs

Use tablet to place or remove

Heat Exchangers



Left Heat Exchanger Inlet

See page 13 for control knobs

Ground Power Unit





Pitot Covers



Fuel Caps



Hydraulic Reservoir Door



Wing Lockers



Rudder Lock

Rudder Lock
Controlled through EFB Tablet

Rudder and nose front gear steering are controlled by a bungee cable.

Note: You will see no nose gear movement until the aircraft is moving. Once the aircraft is stopped, the nose front gear steering will remain in it's last position.

Normally the rudder would hold the counter position of the nose gear, we have put the rudder back to it default animation state. The rudder lock still does work.

Wing Lights and Static Wicks



Chocks



Wing Tie Down



Tail Static Wicks



Tail Tie Down



Fuel Computer

Note: Turning off/on battery takes you back to the preflight mode.

Turning battery off then pressing test then turning battery on resets fuel value to zero.

What does it do?

The Fuel Computer is a deeply simulated component which constantly keeps track of your aircrafts fuel consumption, informs you about the remaining range and alerts you about abnormalities.

The computer operates in two modes, pre-flight (Lamps highlighted in red) and in-flight (Lamps highlighted in amber).

It's the pilots responsibility to accurately input the correct tanked quantity of fuel into the fuel computer, monitor and correct the system manually if nessesary.

For a more indepth explanation please refer to the additional **Fuel Computer Manual**.

Fuel remaining in time

In-Flight Modes

Fuel Flow Indicator

Right & Left Engine

Pre-Flight Modes

Function Selector Button

Selects pre-flight and in-flight function modes

Test Button

Operation Mode Selector

Changes operation Mode to:

ENTER - Enter data

SET - Set fuel amount

RESET - Rveset gallons, pounds or timer

Garmin GFC600



[CLICK HERE GARMIN GFC600 MANUAL](#)

GTX 345 Transponder



- POWER ON KEY
- STANDBY KEY
- IDENT KEY
- STANDBY KEY
- FUNCTION KEY
- CURSOR KEY
- POWER OFF KEY
- VFR KEY
- CLEAR KEY
- ENTER KEY
- NUMERICAL KEYS

[CLICK HERE GARMIN GTX 345 TRANSPONDER MANUAL](#)

Davtron Clock

Time Correction - Three Way Switch

Makes minor time corrections

Time Display in Hours & Minutes

Channel Selector - Three Way Switch

Up Position selects real time. This channel may be set to G.M.T. Time or local time. Use time correction and hour change to set GMT or local time. Note: To change clock mode between 12 or 24 hour format, right click the dim switch only if the battery switch is off.

Middle Position selects Flight Time

Right Position selects Elapsed Time

Brightness & Hour Change - Three Way Switch

Left Position sets display brightness for daytime

Middle Position sets display brightness for nighttime

Right Position momentary position that increases the clock time by 1 hour for every time the switch is moved to this position. Note: Right click toggles the clock mode between 12 or 24 hour format only if the battery switch is off.

Time Display in Seconds

Elapsed Time Meter - Three Way Switch

Up Position is a momentary position and sets the Elapsed Time meter to zero. The switch returns to middle position when released. NOTE: Up position will zero Flight Time only if the battery switch is off.

Middle Position stops the Elapsed Time meter

Right Position starts the Elapsed Time meter

Altitude Alert

Altitude Alert Indicator

3 Lamps indicates if aircraft is within 300 feet of selected altitude, below or above

Altitude Capure Control and Indicator

Middle ARM button activates the altitude capture function, provided the Autopilot is turned on and not in Vertical Mode

ARMD Amber Lamp lights when ARM pushbutton switch is pushed in and altitude capture function is enabled.

CPLD Green Lamp lights up when airplane reaches selected altitude. Autopilot switches to altitude hold mode automatically

Altitude Selectors

Selects altitude between 100 and 35,000 feet

Autopilot Mode Selector

Flight Director

Enables or disables FD. FD annunciator lights up and command bars on FDI will appear.

Heading Mode Selector

Engages the heading mode, which commands the air-plane to turn to and maintain @ heading selected on the HSI. The HDG annunciator will light when the mode is engaged. "A new heading may be selected at any time and will result in a command to turn to the new heading with bank angle of approximately 25°. The heading mode will cancel the go-around mode.

Nav Mode Selector

Engagement provides for capture and track of the VOR (omni) or LOC (localizer), dependent upon the frequency selected on the navigation receiver. During NAV-LOC operation, the glide slope mode will automatically engage only at the beam center and when the beam is approached from below. If the go-around switch on the left, Throttle control is actuated, the navigation mode will auto-matically be cancelled and all associated annunciator lights will go out.

Altitude Hold Mode Selector

Enables or disables ALT Mode. ALT Annunciator will light when engaged. Engagement may be accomplished in either climb, descend or level flight.

MODE SELECTOR

Autopilot

Lights when the autopilot is engaged

NAV 1 / NAV 2 Mode Selector

Selects the navigation receiver for IFCS operation. The receiver that is connected to the IFCS is annunciated. Pressing the button will transfer the IFCS to the other receiver with appropriate annunciation.

Back Course Mode Selector

Engages or disengages the back course mode and is used with localizer operation only. With the autopilot or flight director off on and the navigation receiver set to a localizer frequency, the back course mode will reverse the :: signals to provide for back course operation for either automatic or manual flight. Except with an HSI type indicator, selecting the back course mode causes reversal of the-course deviation indication, whether or not the IFCS is being used. The back course annunciator will light when the back course mode is engaged.

Go Around Light

The go-around annunciator will light when the go-around mode is engaged. You must click the flight director off to disable the go around mode.

Glide Slope Light

When the NAV/LOC mode is engaged and the glide slope automatically engages, the glide slope annunciator will light.

Localizer Light

When the AP or FD navigation mode is engage, either the VOR or LOC annunciator will light to reflect the frequency selected on the navigation receiver. The VOR/LOC light will only illuminate while in the AP or FD navigation mode.

Annunciator Panel

Low Volt

The red low voltage light advises that the airplane bus voltage is less than 25 volts

L.Alt Out

The amber left alternator out light advises that the left alternator is not generating

Cabin Alt

The amber cabin altitude light advises that cabin altitude is above 10,000 feet

L. Hyd Flow

The amber left hydraulic flow light advises that insufficient flow exists at 1000 propeller RPM or above and that the cause may be a result of pump, lines, filter or bypass valve failure.

L. Fuel Low

The amber left main tank fuel low light advises that approximately 60 pounds of fuel remains in the left main tank.

A Cond Hyd

The green air conditioning hydraulic pressure light advises that the optional air conditioning compressor is in operation

Test Button



Windshield

The green electric windshield heater light advises that the heating elements in the optional electric windshield are operating

Courtesy LT

The white courtesy light advises that the overhead flight deck flood light and main cabin door entry lights are illuminated.

LOW VOLT

L. ALT OUT

CABIN ALT

L. HYD FLOW

L. FUEL LOW

SPARE

SPARE

A COND HYD

WINDSHIELD

SPARE

COURTESY LT

DOOR WARN

R. ALT OUT

HYD PRESS

R. HYD FLOW

R. FUEL LOW

SPARE

SPARE

HEATER OVHT

SURF DEICE

SPARE

SPARE

Door Warn

R.Alt Out

Hyd Press

R. Hyd Flow

R. Fuel Low

Heater Ovht

Surf Deice

The red door warning light advises that the main cabin door is not secured for flight.

The amber right alternator out light advises that the right alternator is not generating

The amber hydraulic pressure light advises that hydraulic pressure is being applied to the landing gear retraction and extension system.

The amber right hydraulic flow light advises that insufficient flow exists at 1000 propeller RPM or above and that the cause may be a result of pump, lines, filter or bypass valve failure.

The amber right main tank fuel low light advises that approximately 60 pounds of fuel remains in the right main tank.

The amber heater overheat light advises that the heater has reached an abnormal temperature and has been automatically deenergized. Once this light illuminates, the heater can not be operated until resetting of the safety device has been completed.

The green surface deice light advises that the optional tail deice boots have reached full inflation pressure.

Navomatic 800B Autopilot

Autopilot Lateral Trim Control

When the turn command knob is centered, with no lateral modes engaged and the airplane manually trimmed for existing flight conditions, the control is used to trim the IFCS for a wings level attitude.

A/P
TEST

TEST
BEFORE
EACH FLT

Autopilot Turn Command Knob

Controls roll attitude of the airplane. When turned left or right, the knob will command a left or right bank accordingly. When moved from the center detent position, it disconnects the heading (HDG) or navigation (NAV) modes if selected on the mode selector.

A/P
ROLL TRIM

DWN
▲
PITCH
▼
UP

TURN

L

R

Autopilot Toggle Switch

Engages autopilot when in the ON position if all interlocks are valid. The autopilot annunciator on the mode selector will light when the autopilot is engaged.

AP
ON

Yaw Damper Toggle Switch

Dampens the rudder movement.

L ROLL R

800B INTEGRATED

FLIGHT CONTROL

Autopilot Pitch Command Wheel

Controls pitch attitude of the airplane. Rotating up, commands airplane pitch up proportional to rotation of the wheel. Rotating down, commands airplane pitch down.

L NOSE R

EFB Tablet

STORES/MOUNTS EFB



Hotspot

Battery life 2 hours

Note: Tablet stores in pouch near pilot leg. Click the camera again to mount the tablet.



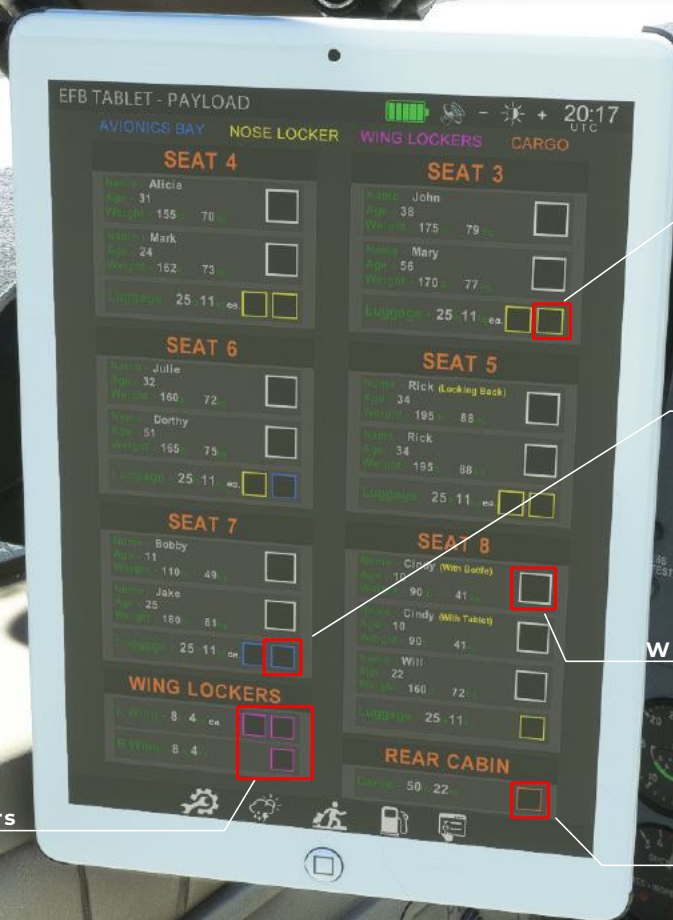
Power Button

EFB Tablet



EFB Tablet

Purple boxes for wing lockers



Yellow boxes for luggage nose locker

Blue boxes for luggage for avionics bay

White boxes for passengers

Orange is for cargo

EFB Tablet

Note: Use the widget to open the interactive copilot checklist. This display is to just help to know when to start a checklist during the flight.



Each hotspot for camera location

Note: Use a custom saved camera shortcut to return to the tablet.

Each hotspot for checklist

Note: This opens a static checklist page for that checklist stage. Click anywhere on that page to return to this page.

For more detailed information

Click here to download

(Right click for options to open a new tab)

Garmin GFC600 PDF

For video tutorial

Click here to watch

(Right click for options to open a new tab)

For more detailed information

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Garmin GTX 330 Manual PDF

**DISCLAIMER: ALTHOUGH THE BEZEL IS A GTX 345 IN THIS PRODUCT
THE CODE IS FROM THE ASOBO GTX 330**

Pilot's Operating Handbook

For

HOSKINS

CFS-2000A/2001A

COMPUTERIZED FUEL MANAGEMENT

SYSTEMS

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COMPUTERIZED FUEL SYSTEMS

1.0

GENERAL SYSTEM DESCRIPTION

The Computerized Fuel Systems, herein referred to as CFS, are designed to maximize efficiency of fuel system monitoring and management and bring space-age capability and display technology to general aviation.

The CFS systems consist of a panel mounted instrument and fuel flow transducers which are designed for installation in the aircraft fuel lines.

<u>MODEL</u>	<u>AIRCRAFT TYPE</u>	<u>TRANSDUCERS</u>
CFS-1000A/1001A	Single Engine	One
CFS-1000A/2001A	Twin Engine	Two

These systems are designed for use in all single and twin engine aircraft having not more than 60 GAL/HR continuous consumption or 78 GAL/HR intermittent consumption (take off power)

1.1 PANEL MOUNTED INSTRUMENT

The panel mounted instrument contains all system electronics, operating and programming controls, and the digital readout display.

The digital readout utilizes incandescent, seven-segment displays and the function or mode legends incorporate mini-lamps. All digital readouts and legend displays are fully sunlight readable and feature automatic dimming for night and low light level flight conditions.

The systems' electronics are completely packaged in the panel mounted instrument on three rectangular circuit boards. The electronic designs features the highest quality, solid state components available and a "single-chip" microprocessor.

The system computers are designed to precisely count the number of pulses from the fuel flow transducer(S) and convert the count to gallons. A crystal controlled clock reference is used to compute the rate of fuel flow and the "TIMER" functions. The computer also routinely calculated all other displayed functions.

The basic program is permanently "burned-in" to the microprocessor chip, while variable data and intermediate computation values are stored by the computer in a separate memory bank. The aircraft's total usable fuel is programmed into this separate memory circuit by the computer in response to the installer's original instructions.

The panel mounted instrument and the flow transducer(s) are digital devices, therefore, there is no need for adjustment or calibration. The installer programmed "FILLUP" number, or

usable fuel, is maintained in the computer memory even during aircraft shutdown. Electrical power for this function is provided by three small batteries mounted in the rear of the instrument case.

A low battery warning indicator is located on the front panel and will appear on the CFS-1000A/2000A as a minus sign in the upper display and on the CFS-1001A/2001A, a low battery legend will illuminate when the batteries become weak or need to be replaced. The batteries will typically last between 1 to 1 1/2 years and annual replacement is recommended.

1.2 FUEL FLOW TRANSDUCER

The flow transducer(s) are mounted directly in the fuel line, usually in the engine compartment. The transducer(s) measure flow of hydro-carbon fuel such as gasoline or kerosene. The transducer(s) are rated for a continuous operation to 60 gallons per hour and for intermittent flows in excess of 60 gallons per hour. In addition, the transducer(s) are precisely accurate down to 0.6 gallons per hour.

The transducer(s) supply the CFS computer with a pulse signal from a self contained opto-electronic pickup. A neutrally buoyant rotor spins with the liquid between V-jewel bearings. The rotor movement is sensed when notches in the rotor interrupt an infra-red light beam between a light emitting diode and a photo-transistor.

The transducer(s) are designed totally fail safe and complete rotor blockage cannot interrupt fuel flow. The transducer(s) life expectancy is 1,000 hours.

2.0 OPERATING PROCEDURES

The system operating procedures may be divided into two segments or conditions, Preflight and Inflight.

The Preflight, or program condition, is automatically called up by the computer when the aircraft's master switch is initially turned on. It is during the Preflight condition that the pilot updates or programs the computer to the current fuel system status.

When satisfied with current system status, the pilot verifies the accuracy of the data being entered into the computer and depresses the enter button. This action updates or programs the computer and automatically switches the system to the Inflight condition.

The words Preflight and Inflight condition do not appear in legend form on the face of the instrument. However, the legends of the Preflight condition appear on the right of the instrument and are a red color as a subtle reminder of the Preflight or program condition. The Inflight condition legends are located on the left side of the instrument and are amber in color.

2.1 FUNCTIONAL CONTROLS

The CFS system are controlled through all modes of operation by the use of three push buttons. Two are for the primary modes, and one is for the test mode. The principal operating button is in the center of the instrument display and is labeled "FUNCT" for

function. The mode operation or function is stepped automatically through a sequence by pressing the function button, in either the Preflight or the Inflight condition.

The push button located in the lower left portion of the display instrument is not labeled by silk screen as are the "FUNCT" and "TEST" push buttons. However, this push button is accompanied by a lighted legend system that automatically indicates the correct mode of operation and is controlled by the "FUNCT" push button. The three modes of operation are "ENTER", "SET" and "RESET".

"ENTER" -- Push to enter data into computer.

"SET" -- Set fuel amounts less than total usable.

"RESET" -- Reset button is used to zero or reset gallons used, pounds used or timer, allowing measurement of fuel and time for specific trips, holding pattern legs, or approaches.

The test push button is located on the lower right of the instrument display. When the test button is depressed, all legends and digits will illuminate for approximately three seconds, checking all legend lamps, the digital displays, and approximately 80% of the microcomputer. When the test button is depressed, all of the digits will illuminate as eights except the upper right digit which will illuminate as zero (8880). The microprocessor is programmed to automatically turn off the TEST circuit after three (3) seconds to assure no unnecessary heat build up.

Fuel Computer Manual

The intensity of the digital displays and the lighted legends are automatically controlled to ease pilot workload and insure reliability in low and high intensity light conditions. The push-button controls have also been designed to ease pilot workload in all conditions of cockpit lighting and air turbulence.

The "Low Fuel" warning legend, located in the center of the instrument display, is designed to come on when, at current power setting, the time remaining to fly is less than one hour. When the time drops below 30 minutes, the legend blinks to further notify the pilot of & Low Fuel Status.

2.2 PREFLIGHT OPERATION

IMPORTANT NOTE : It is absolutely essential that the pilot program the computer to equal the amount of usable fuel in the aircraft's tanks before each flight. The computer measures fuel flow, and precisely counts down the remaining usable fuel from the programmed value provided during the Preflight condition. As in all computers, the accuracy of the resultant information is a direct result of the accuracy of the information that was originally provided to the computer. Therefore, complete supervision of the fueling procedure is a must.

2.3 PREFLIGHT PROGRAMMING

PREFLIGHT MODES

<u>MODE</u>	<u>PROGRAMMING SITUATION USED</u>
FILL UP	#1 Fuel Tanks Topped
GAL REM	#2 No Fuel Added
ADD GAL	#3 Tanks Not Topped
VERIFY	Verify correct information

Situation #1: Fuel Tanks Topped

Turn on the aircraft's master switch. The legend "GAL REM" will appear on the right section of the instrument, as will the legend "ENTER" on the lower portion. Simultaneously, the top section of the instrument will display the actual usable gallons of fuel remaining from the previous flight. Press the "FUNCT" button. The CFS systems display the aircraft's total usable

Fuel Computer Manual

uel (as programmed by the installing agency) and the legend "FILLUP" will appear in red on the right section of the instrument display. The legend "ENTER" will appear on the lower center section. If you have verified the tanks being topped off, press the "ENTER" legend button, thus programming the computer. This completes the Preflight programming for a full tank situation.

The computer will automatically switch to the Inflight condition, displaying the "GAL REM" legend in amber on the left of the instrument and the usable gallons remaining across the top section. On starting the engine (or engines), fuel will begin flowing and the CFS systems will digitally display the gallons per hour fuel flow on the lower section of the instrument display. The instrument is now programmed and ready for flight.

Situation #2: No Fuel Added

Turn on the aircraft's master switch. The legend "GAL REM" will appear on the right section of the instrument, as will the legend "ENTER" on the lower portion. Simultaneously, the top section of the instrument will display the actual usable gallons of fuel remaining from the previous flight. If the amount displayed is sufficient to satisfy your planned flight needs, depress the "ENTER" button. This completes the Preflight programming for a "No Fuel Added" situation.

The computer will now automatically switch to the Inflight condition displaying the "GAL REM" legend in amber (on the left of the instrument) and the usable gallons remaining across the top section of the display. On starting the engine (or engines), fuel will begin flowing and the CFS instrument will display the gallons per hour fuel flow on the lower

section of the instrument. Procedure #2, explained above, programs the CFS instrument with the "GAL REM" quantity from the previous or last flight.

The CFS is now programmed with "GAL REM" from the last flight. When the engine(s) is started the "GAL REM" display will count downward to zero (0).

Situation #3: Fuel Added -- Less Than Topped

Turn on the aircraft's master switch. The top section of the instrument will display the actual usable gallons of fuel remaining. If the amount displayed is insufficient to satisfy your planned flight needs, but you do not desire to take on a full load (due to altitude or weight restrictions) press the "FUNCT" button. The CFS instrument will display the aircraft's total usable fuel (as programmed by the installing agency) and the legend "FILLUP" will appear in red on the right section of the instrument. Press the "FUNCT" button. The legend "ADD GAL" will appear in red on the right of the instrument, and the legend "SET" will appear on the lower center. Simultaneously, the digital readout on the top section of the instrument will read all zeros. You are now ready to set values into the computer equaling the amount of fuel you have added to the tanks (less than fuel). Note, the zero on the far left is blinking, enabling you to observe the digit you are currently setting. Press the "SET" button until the blinking digit is incremented (one digit step per button push) to the desired value of the first digit. Then press the "FUNCT" button to shift the blink to the next digit, and increment it with the "SET" button as before. When all digits are set, press the "FUNCT" button; the blinking will stop and the legend "VERIFY" will appear on the right of the instrument, and "ENTER" will appear on the lower center. If the amount of fuel displayed does not agree with your fuel ticket, press the "FUNCT"

Fuel Computer Manual

button three (3) times to return to the "ADD GAL" mode. If the amount agrees with your fuel ticket, press the "ENTER" button. The display amount will now equal the remembered "GAL REM" plus the amount just entered into the CFS computer, or total usable fuel abroad. On pressing the "ENTER" button, the computer automatically switches to the Inflight condition. If you note an error made during the "ADD GAL" sequence and wish to revise the value on the display, appears and repeat the setting procedure. The CFS instrument is now programmed and ready for flight.

NOTE: If an error was made and the wrong amount of fuel entered into the Inflight mode, the following sequence must be used to return the computer to approximately zero so the correct amount of fuel may be entered.

1. Turn master switch off, then on, to reset the computer to Preflight condition.
2. Observe the incorrect "GAL REM" number.
3. To obtain the correction number subtract the incorrect "GAL REM" number from 1001 for twin engine aircraft and 100 for single engine aircraft.

EXAMPLE FOR TWIN :

```
1001 Overflow Amount
-178 Incorrect "GAL REM"
-----
823 Correction Number
```

4. Press the function button twice to enter the "ADD GAL" mode. Enter the correction number as previously explained in

Situation #3. This will return the "GAL REM" number to approximately zero.

5. Turn master switch OFF, then ON, and step to the "ADD GAL" mode by depressing the function button. The correct "GAL REM" number may now be entered as previously explained in situation #3. This completes the correction sequence.

2.4 INFLIGHT OPERATION

As indicated in the Preflight or programming portion of this manual, the CFS systems incorporate three Preflight programming capabilities. When entering any one of these possible program situations, the computer automatically switches to the Inflight condition. Fuel flow is displayed only after the engines have been started.

The fuel flow window(s) on the lower section of the instrument will remain blank until a fuel flow is establishes. If the fuel is below 2.8 gallons per hour, the computer will blink the flow window to show a low flow situation. if at any time the flow is stopped or interrupted, the flow window will blank-out after approximately ten (10) seconds to indicate a no flow status.

The fuel flow window is updated on every 1024Th pulse. This method provides the pilot with a very stable fuel flow indication at the cruise power settings. A typical display update rate, at a fuel flow of 20 gallons per hour, would be every 2.178 seconds.

Fuel Computer Manual

There are six Inflight modes. Each mode is selected in sequence by pressing the "FUNCT" button.

The following chart indicates the mode sequence and the legend key.

<u>LEGEND</u>	<u>MODE</u>
GAL REM	Gallons Remaining
LB REM	Pounds Remaining
TIME REM	Time Remaining
GA. US'D	Gallons Used
LB. US'D	Pounds Used
TIMER	Timer (elapsed time)

During the automatic switching from the Preflight to the Inflight mode, the computer calls up the initial mode "GAL REM". From this initial mode the pilot may change modes (in the above sequence) by pressing the "FUNCT" button.

During the transfer from the Preflight to the Inflight condition, CFS computer goes through an adjusting or rounding routine and may add or subtract, from the "GAL REM" number, two

Fuel Computer Manual

tenths (2/10) for a single engine aircraft or up to one (1) gallon for a twin. This automatic adjustment compensates for the "K" factor setting of the instrument and does not affect the accuracy.

As noted in the Functional Controls Section the first three Inflight modes, "GAL REM", "LBS REM" and "TIME REM" are nonresettable in the Inflight condition. This protects the pilot from accidental changes during flight. The second three Inflight modes can only be reset by depressing the "RESET" button while in each mode. However, the "GAL US'D" and "LBS US'D" will be reset together because the "LBS US'D" quantity is computed from the "GAL REM" number. The conversion factor for this computation is 5.82 pounds per gallon.

In the first mode, "GAL REM", the upper display indicates fuel remaining in gallons, and the lower display indicates fuel flow in gallons per hour. The lower display also includes a legend that automatically indicates GAL/HR in all gallon modes and LB/HR in all pound modes.

The upper display includes a legend that automatically indicates "HR:MIN" or "MIN:SEC" depending on which is appropriate in a given situation.

The second mode in sequence is the "LB REM" mode. When operating the system in this mode, the upper display will indicate pounds of fuel remaining, and the lower display will indicate fuel flow in pounds per hour.

The third mode is "TIME REM" mode. When operating the system in this mode, the upper display will indicate time remaining to fly at the current power setting, and the lower display will indicate fuel flow in gallons per hour.

During operation in the "TIME REM" mode the time remaining display will vary as the power settings are increased or decreased.

The "LOW FUEL" warning legend located in the center of the instrument is designed to come on when the current power setting results in a "TIME REM" of less than one (1) hour. If the "TIME REM" drops below thirty (30) minutes the legend will blink to further notify the pilot of a Low Fuel Status.

The fourth mode is the "GA US'D" mode. When operating the system in this mode, the upper display will indicate gallons used and the lower display will indicate fuel flow in gallons per hour. This mode may be reset to zero by pressing the "RESET" button; however this will also reset the "LBS US'D".

The fifth mode is the "LB US'D" mode. When operating the system in this mode, the upper display will indicate pounds used and the lower display will indicate fuel flow in pounds per hour. This mode may be reset to zero by pressing the "RESET" button; however this will also reset the "GALUS'D".

The sixth mode is the "TIMER" mode. While operating the system in this mode, elapsed time is indicated. The "TIMER" mode indicates minutes and seconds up to nine minutes and fifty-nine seconds and hours and minutes beyond that point. The elapsed time is indicated in the upper display and the lower display indicates fuel flow in gallons per hour. When the "TIMER" mode is selected the elapsed time may be reset by pressing the "RESET" button.

During aircraft shutdown the "GAL REM", and "LBS REM" quantities will be retained by the computers internal memory. All other Inflight functions are reset to zero (0) when the aircraft power is turned off.

3.0 SYSTEM MAINTENANCE

The Fillup number is normally held for a period of one year by the three small Eveready MS-76 batteries in the rear of the instrument. These batteries should be replaced once each year. During installation and after replacing the batteries, the Fillup number (aircraft total usable fuel) may need to be reprogrammed. The following procedure will explain the steps necessary to change or reprogram the Fillup number.

3.1 PROGRAMMING THE FLLUP NUMBER

The CFS-1000A/1001A cannot be programmed for a "FILLUP" number greater than 99.9 gallons unless switch #3 is turned to the ON position.

FILLUP programming may be performed on the bench with a 14v or 28v DC power source or in the aircraft with aircraft power.

A. On the CFS-1000A/2000A, remove the one screw attaching the instrument battery cover. The seven mini- switches will now be exposed. On the CFS-1000A/2001A the battery cover

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need not be removed. The battery compartment will be directly below on the CFS-1000A/2000A only. Locate the far left switch marked #1 and push to the ON or CLOSED position. All other switches are pre-set at the factory. Do not change their position. In the event their position is changed, refer to the Switch Table to reposition them.

B. Turn the aircraft master switch ON. Note all the digits on the top display have gone to zero and the far left zero is blinking. The minus sign on the right hand side of the display is the low battery indicator in the CFS-1000A/2000A only.

C. Press the "SET" button to advance the blinking digit to a number equalling the first number in the aircraft's usable fuel. Press the "FUNCT" button once and observe that the second digit is now blinking. Press the "SET" button to advance the blinking digit to the desired second number of the aircraft's usable fuel.

Press the "FUNCT" button again. This will cause the third and final digit to blink as did the first two digits. Press the "SET" button, advancing the third digit to the desired final figure in the aircraft's usable fuel. Press the "FUNCT" button and note the legend "VERIFY". Press the "ENTER" button if this number corresponds to the aircraft's usable fuel. The programmed number may change or blank out. This is normal, continue programing with step D.

D. Locate the mini-switch marked #1 and push to the OFF or OPEN position. (CFS-1000A/2000A Only: Reinstall the three small batteries and the battery cover.

E. Turn the power switch off.

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F. Turn the aircraft master switch on and press the "FUNCT" button. The "FILLUP" legend will be illuminated and the number displayed should agree with the aircraft usable fuel or the number just programmed. If the number agrees, push the "ENTER" button. If the number does not agree, repeat steps A,B,C,D,E&F.

G. "GAL REM" should equal the aircraft usable fuel. Finally, push the "TEST" button to assure that all legends and digits illuminate properly. The digital displays will read eight (8) in the test position with the exception of the far right which will read zero (0). (After the "TEST" button has been depressed for 3 seconds, the CFS-1000A/2000A or 1001A/2001A will automatically cycle out of the test mode to avoid overheating).

H. Turn off the power switch. This completes the programming of the Fillup number.