

A GAUGE FOR ULM (ULTRA-LIGHT AIRCRAFT)

HISTORY

A friend of mine is building his ULM and he would like to know his consumption of gasoline, so we looking for how to do :

WHAT WE NEED

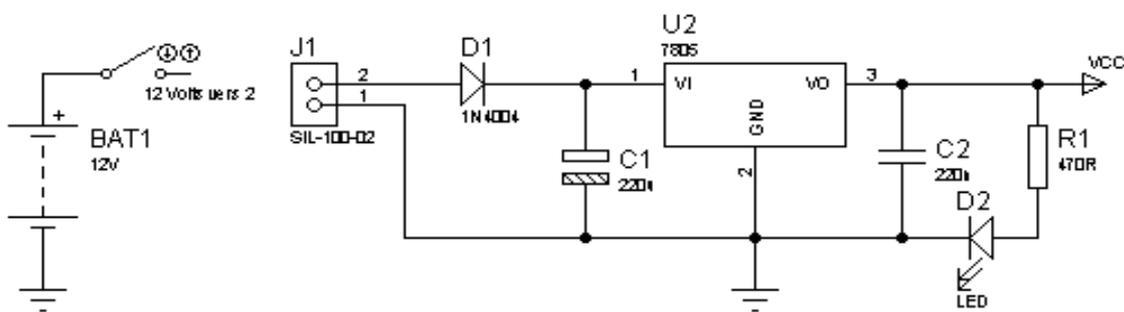
- an ULM always take of with a full tank.
- The consumption is about 6-7 litres per hour
- A bar-graph will be great (easy to read)
- But to know the quantity staying will be good
- An idea of the instant consumption will be a +++
- Something indicates that the gauge is working is necessary.
- At the end two alerts for the end of the tank are a nice idea.

We take the flowmeter Digmesa FHKSC which drives a hall effect transistor giving nice pulses.
1800 pulses per litres with a flow rate of 0.025 to 2 litres/minute



POWER SUPPLY

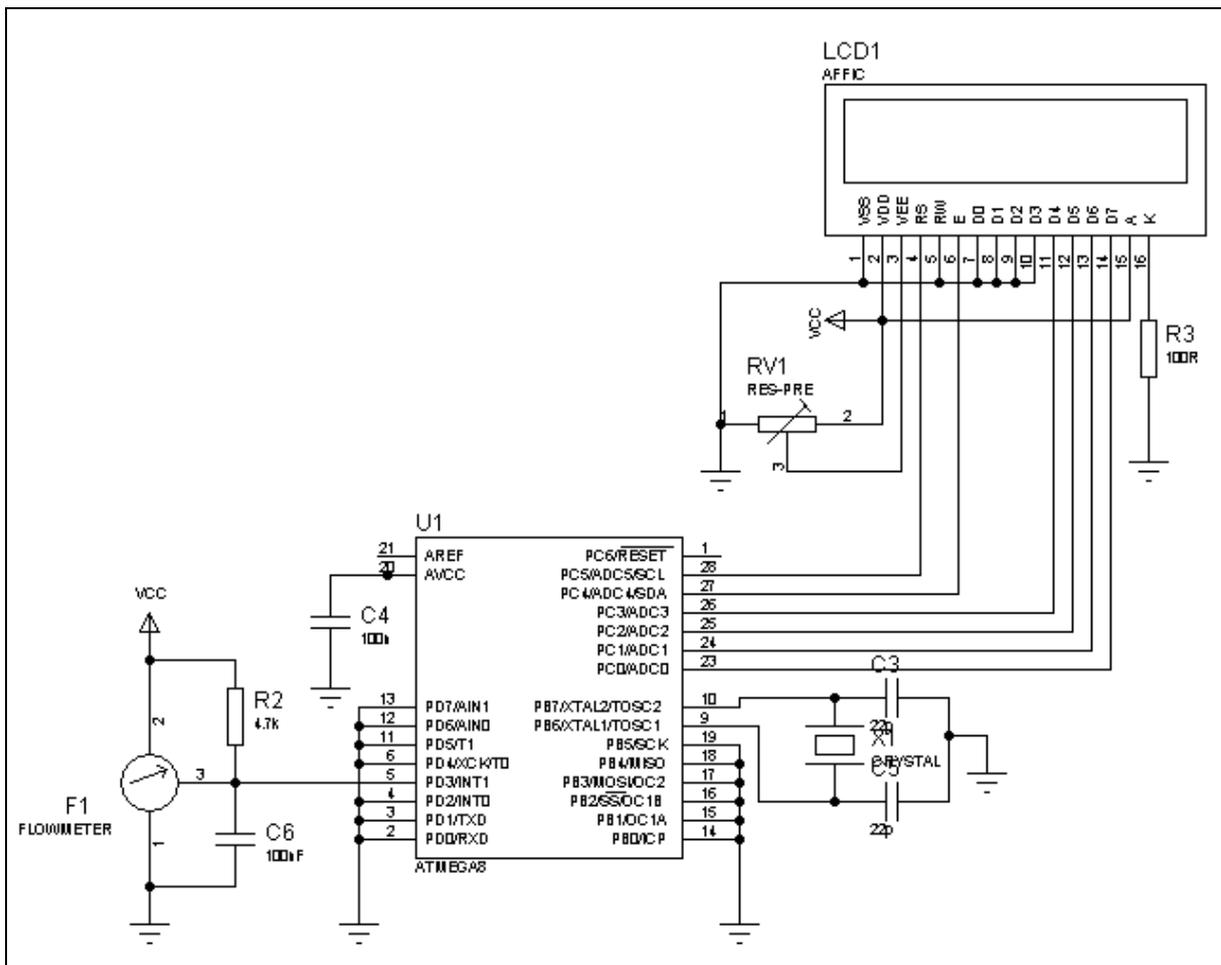
Very classical we add a fuse between the battery and the switch



DIAGRAM

We use an ATMEGA 8 which uses its internal oscillator and we add Xtal of 32768 Hz for the clock to know the instant consumption. The ports are used as following:

- 6 ports for the LCD on port C
- 1 port INT1 portD.3 received the pulses of the flowmeter
- 2 ports PortB.6 et portB.7 for the timer crystal
- we use the Brown out for reset
- the other ports are in input and wired to the ground.



We follow the data sheet of the flowmeter to use it : 1 R pull-up of 4.7 K and 1 C of 100nF (signal and ground)

See www.digmesa.com

PROGRAM

Calculation

They are very simple and explain with the rem of the program

The instant consumption is an average on 10 seconds : 10 measures divided by 10

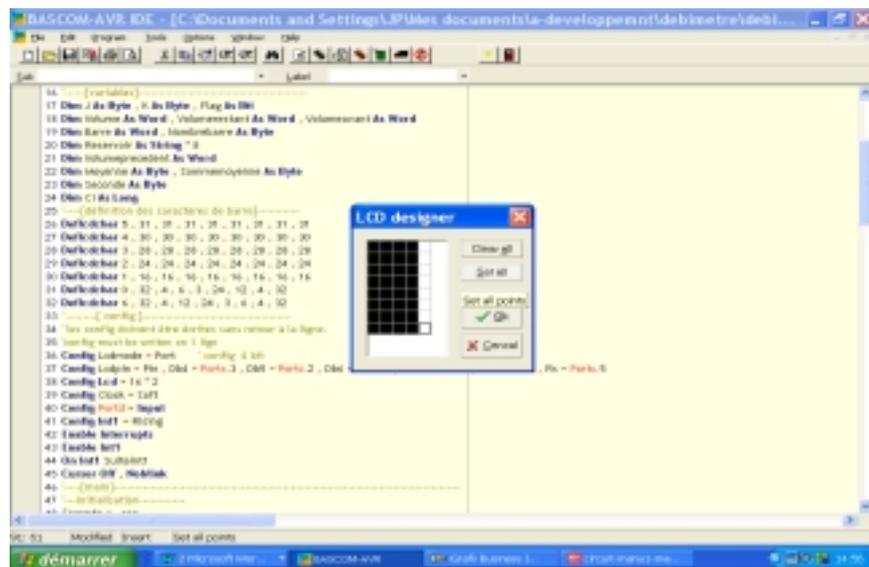
The volume staying in the tank is decremented by the interruption, we use a format statement.

The most difficult is the bargraph, but I let you trying to understand !

USE OF THE LCD DESIGNER

Five are used for the bargraph

Two are used to put a small wheel showing the flowmeter running, see the LCD.

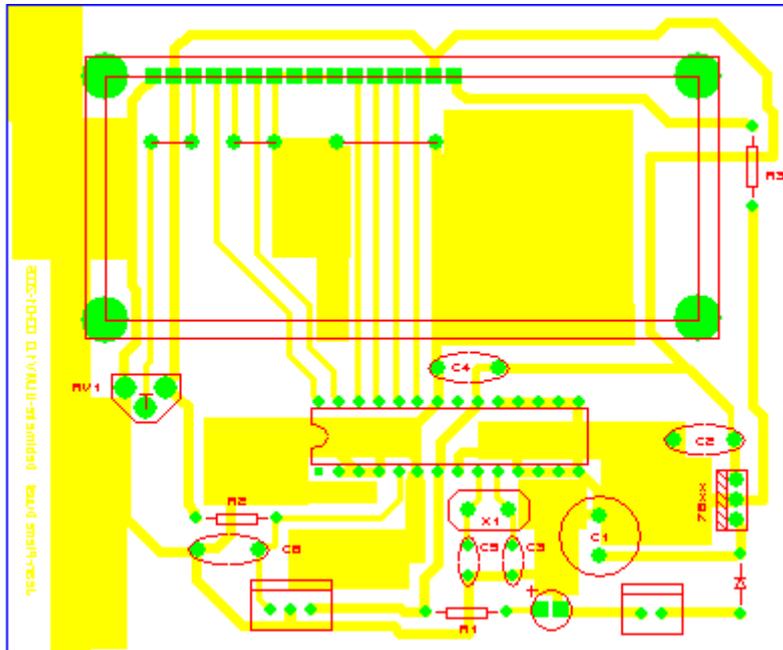


The good running indicator

It is the last character of the first line, this character change all 1/2 second if the flowmeter is running well.



THE PCB



Some remarks

C5 et C3 are not necessary if your crystal is good .

C8 is necessary if you use a long cable.

The SIL 16 connector is used by a standard LCD
R3 could be adapted.

MATERIAL LIST

Type	Designation	
Resistors	R1	470 Ω
	R2	4.7 K Ω
	R3	100 Ω
	Potentiometer RV1	10K Ω
capacitor	C1	220 μ F
	C2	220 nF
	C4 - C6	100 nF
	C3 - C5	22 pF
IC	U1	ATMEGA8 Atmel
	U2	7805
Diodes	D1	1N4004
	D2	Led
Xtal	X1	Quartz horloger 32768hz
LCD	LCD 16X2 retro	Selectronic 50.6672
flowmeter	F1	Digmaesa FHKSC 932-8501

For all your questions <http://perso.wanadoo.fr/bils-instruments/>