



Merop assembly notice

**Merop
Mounting Instructions**

Merop mounting instructions

Version 1.5

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1 PRECAUTIONS

Some elementary instructions of safety are to be respected:

- Do not breathe directly the vapors of welding (tin and lead sprayed, carcinogenic resins...) : you should choose a well ventilated area. It is healthy also to have a fan in the vicinity, even at low speed (without it being led directly on iron, otherwise it cools...)
- soldering iron is hot : burns can occur !
- Do not use soldering iron in the presence of children and pets
- Not to put the iron in the presence of flammable materials (woven fabrics, cardboard, paper, hair, flammable liquids, polystyrene, plastics...): Be sure to work in a place without crowding
- Lead (Pb) and Tin (Sn) metals are very toxic: you should not put the thread of welding in the mouth, you should not cut it with teeth, you should not eat or drink at the same time that you weld, you must always wash your hands seriously once you have finished work with welding
- Never solder mounting when supply is on : it is dangerous for the user and for the mounting. Always unplug before doing anything on a component or on a printed circuit.

Pour plus d'informations sur la sécurité et des conseils pour réaliser de bonnes soudures, il est vivement conseiller de consulter le site web suivant:
<http://www.interface-z.com/conseils/soudure.htm#principes>

The performance and stability of Merop will depend of the quality of your mounting. It is very important to :

- Perform clean soldering by heating component pin and the h..' pastille'
- Always keep the tip of your soldering iron clean using a wet sponge for example
- Well cut the legs of the components after welded
- Do not heat the components for a too long time to avoid there overheating as well as tin boiling.
- Always check your welds. If necessary, use a magnifying glass under a good lighting



Diodes

Polarity: the bar across the component must be in the same direction than the one on the serigraphy of C1

- D1 1N4148 : reference printed on the component.

Supports C1

The direction is marked by a mark on the device. It should be put in the same direction as the one on the printed circuit serigraphy.

- Sockets EPRM0 to EPRM3 : DIP 8 pins
- Socket IC3 : DIP 8 pins
- Socket MAX232 : DIP 16 pins
- Socket IC5 : DIP 6 pins
- Socket IC1 : DIP 28 pins
- Socket lithium battery

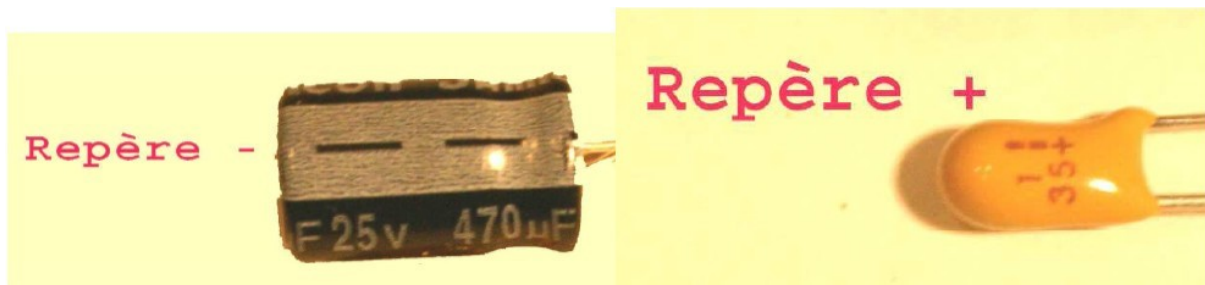
Unpolarised capacitors

- C1/C2 33pF : orange disc, value "33" printed on the component
- C8/C9 10nF : yellow square component, with the value « 10nK100 » printed on the top **(be careful : possible confusion with C10)**
- C10 100nF : yellow square component, with the value « 100nK100 » printed on the top **(be careful : possible confusion with C8 and C9)**

Polarised capacitors

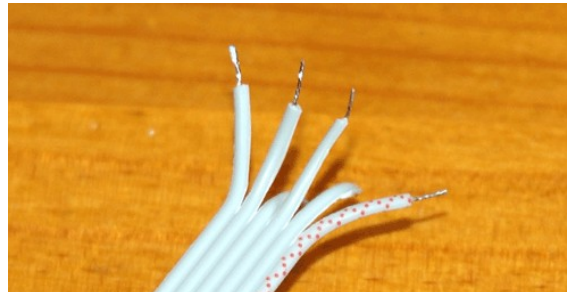
The direction is marked on the printed circuit board by a + lozenge larger than the lozenge -. Firmly drive components in the printed board to have a height of the card as small as possible.

- C3 220uF : big cylinder with a 220 μ F mark printed on. A side band shows the black -. The longest pin indicates the + and the shorter the -.
- C4 à C7 1uF: radial tantalum capacitor. They have a form of gout and the leg + is marked on the component.



To solder the IC to ribbon cable, prepare the ribbon cable by taking the following precautions :

- To separate each way from each other use your nails
- For each wire, denude them to 4mm, twist them and tinned them quickly to avoid to melt the sheath of the wire



Connector DSUB 9 (male) – RS232

From the ribbon cable supplied, extract three ways of a length of 10cm approximately, taking care to have one way identified (red or black following the models).

Prepare your ribbon cable as described above, then:

- Connect the identified wire to terminal marked GND of the IC and the pin 5 of the DSUB-9
- Connect the next wire to the TX terminal of the IC and the pin 3 of the DSUB-9
- Connect the last wire to terminal RX of the IC and the pin 2 of the DSUB-9

LCD screen connector

From the ribbon cable supplied, extract 12 ways of a length of 10cm approximately, taking care to have one way identified (red or black following the models).

Prepare your ribbon cable as described above, then by referring to the way identified as the N ° 1:

- Connect the pads S1 to S6 of the CI to the pads 1 to 6 of the LCD
- Connect the pads S11 to S14 of the CI to the pads 11 to 14 of the LCD

Be careful to solder each wire after introducing it into the pellet. Insert them one by one, this is a bit long but easy to achieve with a little care.

Due to a component change, be careful of:

- Connect the pad **S15** to pad **16** of the LCD
- Connect the pad **S16** to pad **16** of the LCD

9V battery connector

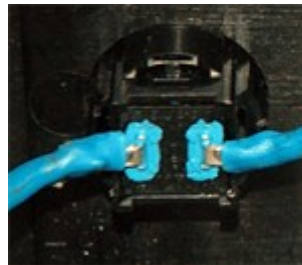
Solder the black wire to 0V pad, the red wire to the 9V pad.

Interrupteur On/Off

Solder two wires of 10 cm (from wire supplied) to terminals S1 and S2 after tinning carefully both ends, then connect one wire to the central pillar of the slide switch and the second on the remaining terminals.

Push button

Solder two wires of 13 cm (from wire supplied) on the terminals VCC and CLIC after tinning carefully both ends, then connect to the terminal of the push button.



CAUTION, you must mount the button in the box, and then bend his pins before welding, it is highly advisable to gain the pins of the button.

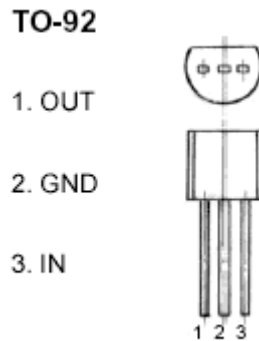
Pins jumpers JP1 and JP2

From DIN Rail Terminals provided, cut two blocks of two pins with a wirecutters. Solder them to the locations JP1 and JP2.

DO NOT CLIMB OF JUMPERS!

78L05 regulator

Mount and solder the 78L05 regulator to the IC2 location. The completely flat side of the regulator should be located towards the outer side of the motherboard !



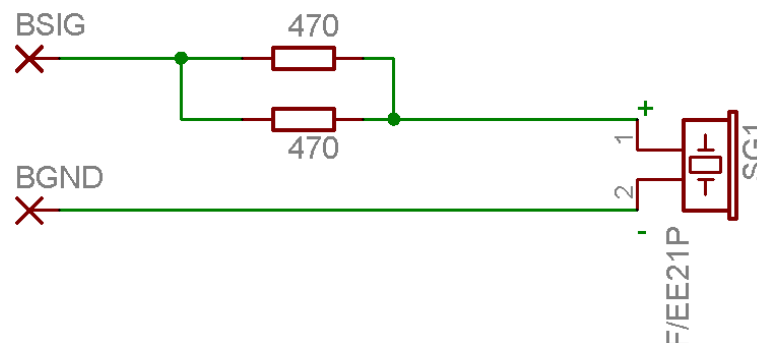
Piezoelectric transducers

Solder two wires of 10 cm (from wire supplied) to the terminals B-SIG and B-GND after tinning carefully both ends, then connect to the terminals of the pushbutton :

Due to a component change, it is necessary to add two resistors in parallel:

B-SIG → Borne + of the transducer arriving on two 470 Ohm resistors (Yellow, Purple, Brown) in parallel

B-GND → Borne – of the transducer



It is strongly advised to gain resistance to avoid short circuits, as well as to cut the legs of the transducer as short as possible.

Serial cables (to PC and Picastro)

These length of these cables depend on your installation, drivers must have 3 or 2 conductors and a shield.

Two cables are required :

- A cable Female - Female to connect the PC to Merops
- A cable Male - Female to connect Merops to Picastro

The connection is crossed, ie you must make the following connections:

Merop SUBD9 Pin	PC/Picastro SUBD9 Pin	Conducteur
2	3	first conductor
3	2	second conductor
5	5	shield or third conductor

* The serial cable Male - Female manufactured during your Picastro assembly (to connect PA to the PC) can be used as long as its length is acceptable for you.

Reflex connector (female 3.5mm mono)

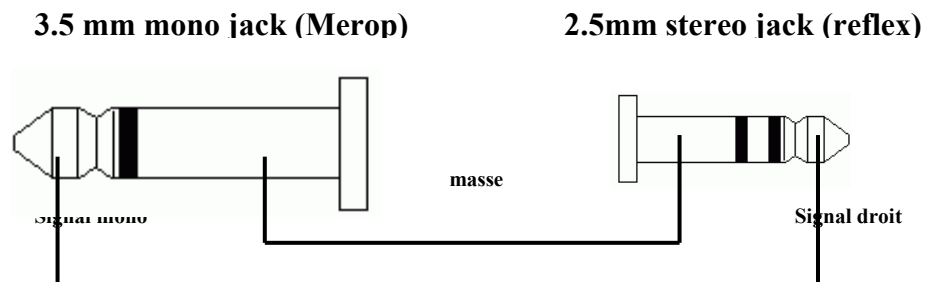
Solder two wires of 10 cm (from wire supplied) to the terminals DSLR1 and DSLR2 after tinning carefully both ends, then connect to the terminals of the connector :

DSL11 vers signal jack
DSL22 vers masse jack



Cable reflex

Make the cable connector with a 3.5 mm mono jack and a 2.5mm stereo jack connector according to the following :

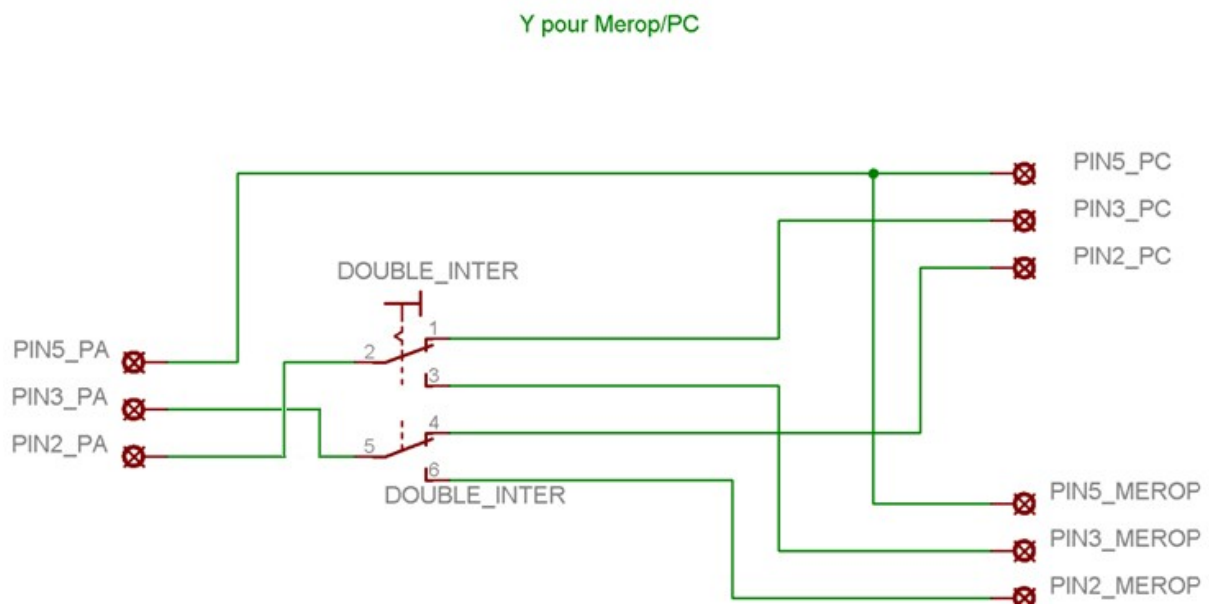


Optional : cable from Picastro to Merops or PC

The purpose of this arrangement is to enable the practical use of Merops and a PC connected simultaneously on Astro-Pic.

This is a very simple craft designed to switch between Merops and the PC without disconnecting and reconnecting the serial cables.





Schema :



This setting assumes that Merops as the PC can connect to Picastro.

The components necessary for its implementation are not provided in the kit.

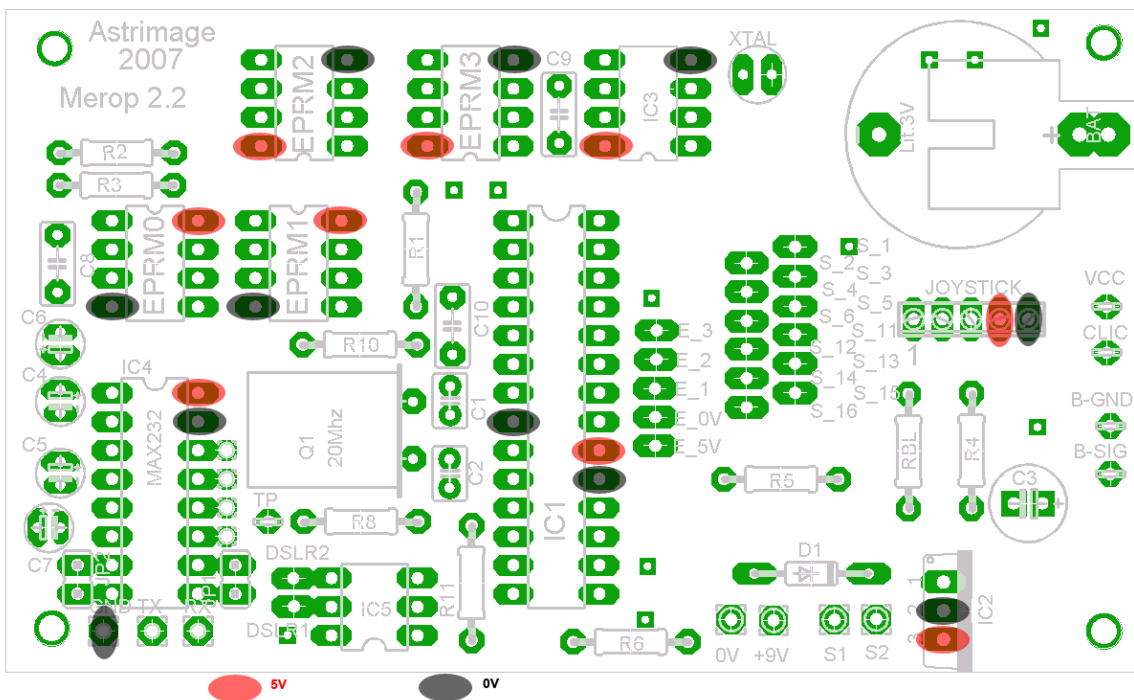
Examples of components chosen from the catalog of our partner Gotronic :

- Connector DSUB-9M DSUB male (to solder) [08105](#)  0.45 €
- Connector DSUB-9F DSUB female (to solder) [08110](#)  0.45 €
- Switch inverter with sliding B1541 [07182](#) 0.25 € 
- CM09 Metallic hood for 9 cts [08130](#) 1.50 € 

4 Test of power supply voltages

This first test is made without ANY integrated circuit on supports (EEPROM, PEAK, MAX232 etc.), but with the assembly under voltage.

Use a voltmeter, put the terminal - (black of the voltmeter) always on the pad 0V of the mother board, then move the terminal + (red of the voltmeter) on the following pad :



Think to put the switch on the good position, then measure the voltage at points represented (Red=5V, Black=0V).

If one of tensions differs from its normal value, check your welds !

5 Test of the serial port

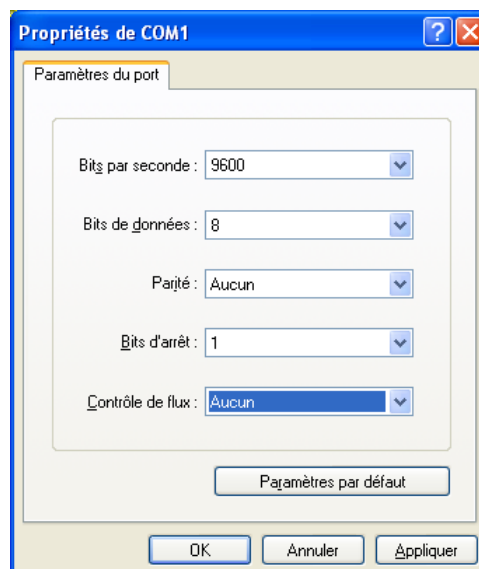
We are now going to use Hyperterminal on your PC to verify the communication through the serial port :

Hyperterminal is a software constituent (component) of Windows allowing to communicate via the serial port with Merop. It is necessary above all to set it :

- Start Hyperterminal: Start / Accessories / Communications / Hyperterminal. Enter any name and click [OK].
- Select the port number (COM1 for example) in the last drop-down list and click [OK]



- Enter the following configuration for the connection and then click [OK] :

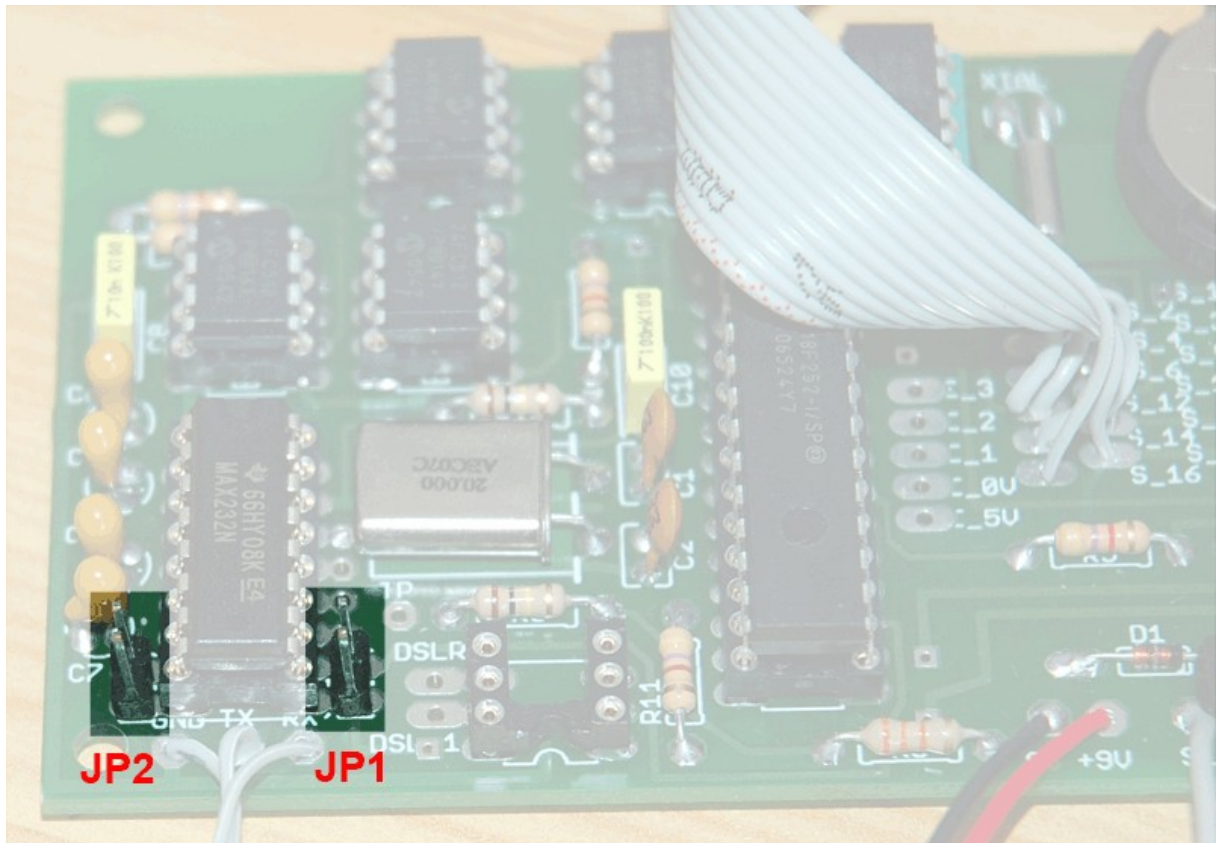


The connection is now configured, and Hyperterminal is connected to the serial port as indicates the icon with a small tinted hung up telephone :



Important note :

No local echo must be activated in Hyper terminal, that is when nothing is connected to the serial port and when you enter characters with the keyboard, nothing has to appear to the screen.



SERIAL TEST N°1 (Without ANY integrated circuit)

To perform this test, first turn off your circuit, connect your Merops to your PC via the serial port, then put the jumper JP2 (jumper side) in position.

When you put the jumper and enter keyboard characters, they must appear on the screen. If you remove the jumper and you enter characters on the keyboard, nothing could appear on the screen.

SERIAL TEST N°2 (With integrated circuit)

Now Replace the MAX-232 on its support and remove the jumper JP2:

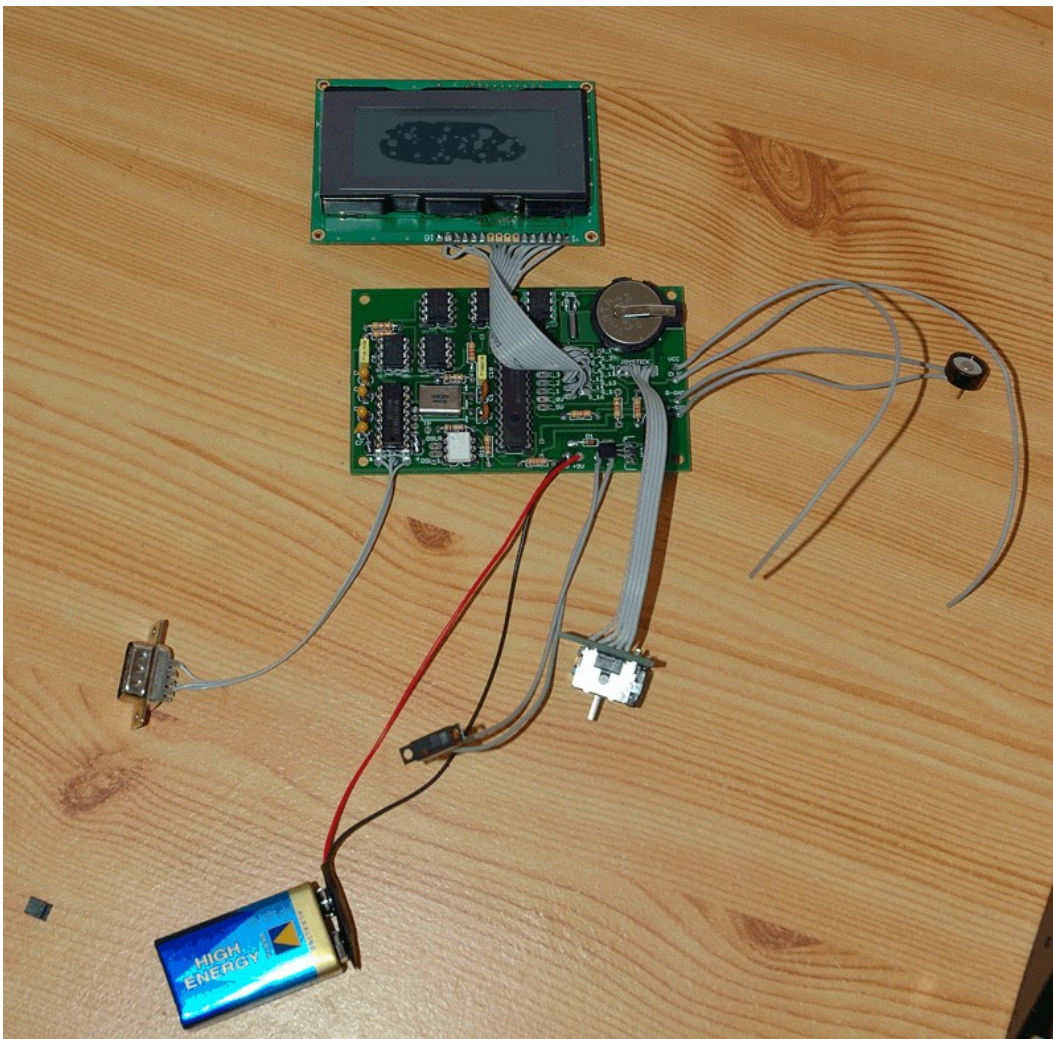
- Place the jumper JP1 (jumper inside of the circuit)
- Power on Merop
- Enter characters from the keyboard
- You must see the characters that you enter on the screen

This validates the operation of the entire chain of transmission by serial port: the signal arrives well until microcontroller. If it is not the case but everything worked in serial test No. 1, you probably do not have the right type of cable.

When these two tests are validated, remove the jumper, turn off your Merops, mount ALL chips on their support and turn on the power of Merops.

You must see after a few moments messages of type “:GD# :GR#” in HypertTerminal which show that Merops has started successfully.

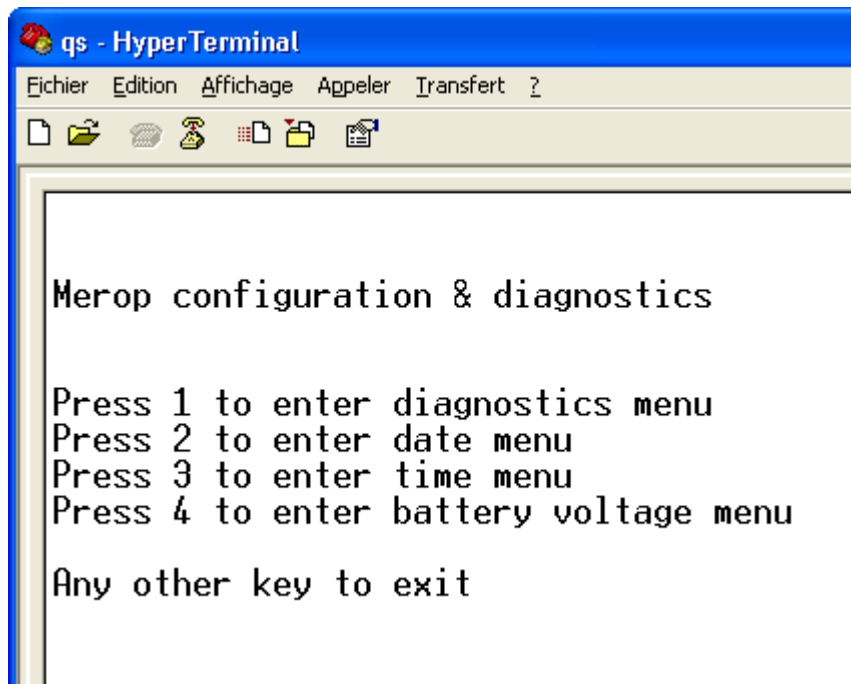
In normal operation, no jumpers should be present !



6 Configuration and diagnostics via HyperTerminal

Open a HyperTerminal session as described in Section 5 "Testing the serial port"

Once Merops started and the first messages ": GD #: GR #" appeared, press "c" on your computer, the setup menu & tests Merops appears, offering you :



The diagnostics menu (option 1) allows you to know various information such as :

- the state of Merops configuration variables
- or different EEPROM detected.

```
dd - HyperTerminal
Fichier Edition Affichage Appeler Transfert ?
Welcome in Merop 18f2525 testing routine
Firm rev 1.0 a

Clear LCD
Test LCD Line1
Test LCD Line2
Test LCD Line3
Test LCD Line4
rb0 status:0
Joystick X axis:513/1024
Joystick Y axis:549/1024
Stack underflow status bit:1
RI status bit (reversed):1
TO status bit (reversed):1
PD status bit (reversed):1
POR status bit (reversed):0
BOR status bit (reversed):0
Usart OERR status bit :0
ADCON1 :13

Hit a key to go down..._

00:00:35 connecté Détec. auto 9600 8-N-1 DÉFIL Maj Num Capturer Écho
```

Test LCD (affichage de Test LCD Line1 -> 4)

Test de la lecture du Joystick, Rb0->bouton et clic joystick, X et Y variant de 0 à 1024. Au repos la valeur doit être proche de 512

Valeurs de certains registres du PIC, informations de développement

Press a button to move to the next screen :

```
dd - HyperTerminal
Fichier Edition Affichage Appeler Transfert ?
Dumping conf values from flash:
Brightness value:HB:255, LB:255
Serial Port speed mode:255
Ext Pic-Astro1
Reading I2C Eeprom Conf values:

Start ADDR startmenuaddr:32
Start ADDR eepromstringsaddr:6944
Start ADDR 1x200stringsaddr:10320
Start ADDR messierobjectsaddr:10846
Start ADDR ngcobjectsaddr:15008
Start ADDR mainstarsaddr:12346
Eeprom detection...
Testing EEPROM0 : [OK]-> Size=512K
Testing EEPROM1 : [OK]-> Size=512K
Testing EEPROM2 : [OK]-> Size=512K
Testing EEPROM3 : [OK]-> Size=512K
Battery voltage: 6.64 Volts

Hit a key to refresh, [q] to exit...

00:00:47 connecté Détec. auto 9600 8-N-1 DÉFIL Maj Num Capturer Écho
```

Valeurs de configuration stockées dans la flash du pic

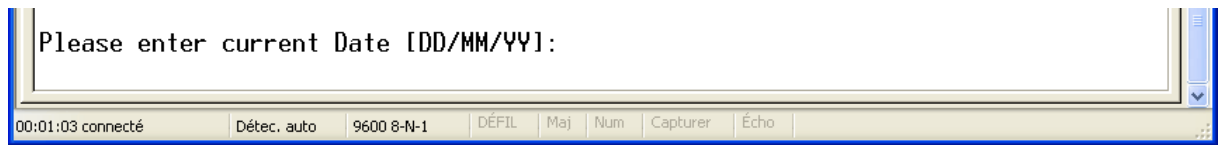
Valeurs de configuration stockées dans les EEPROM

Détection des EEPROM

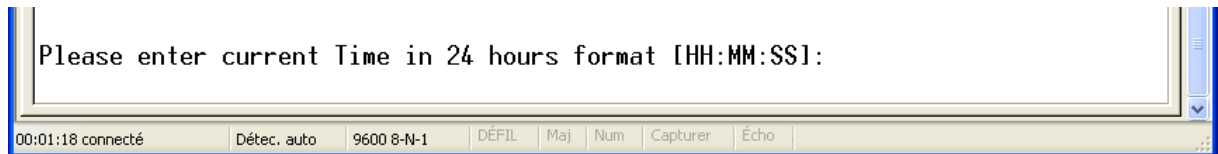
Lecture de la tension de la batterie

You can then press any key to refresh (back to previous screen) or press q to exit.

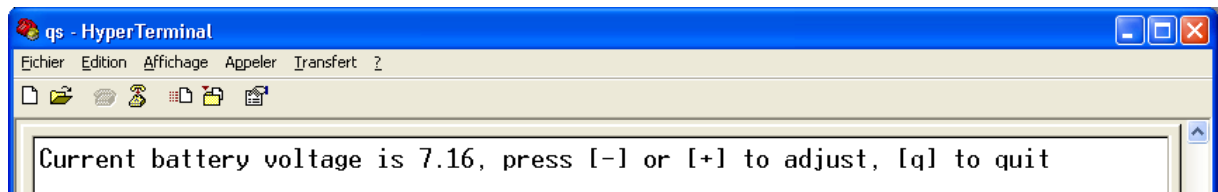
The choice 2 allows to set the date :



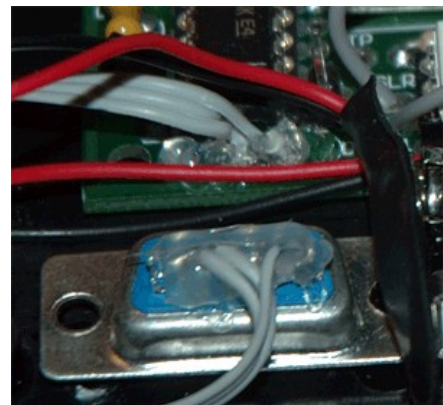
The choice 3 allows to set the time :



The choice 4 allows to adjust the measurement of battery voltage (to be carried out with a voltmeter in parallel) :



Once the functioning of Merop validated, we strongly advise you to deposit small quantities of hot glue on the wires to avoid any tearing :



7 Mounting in the box

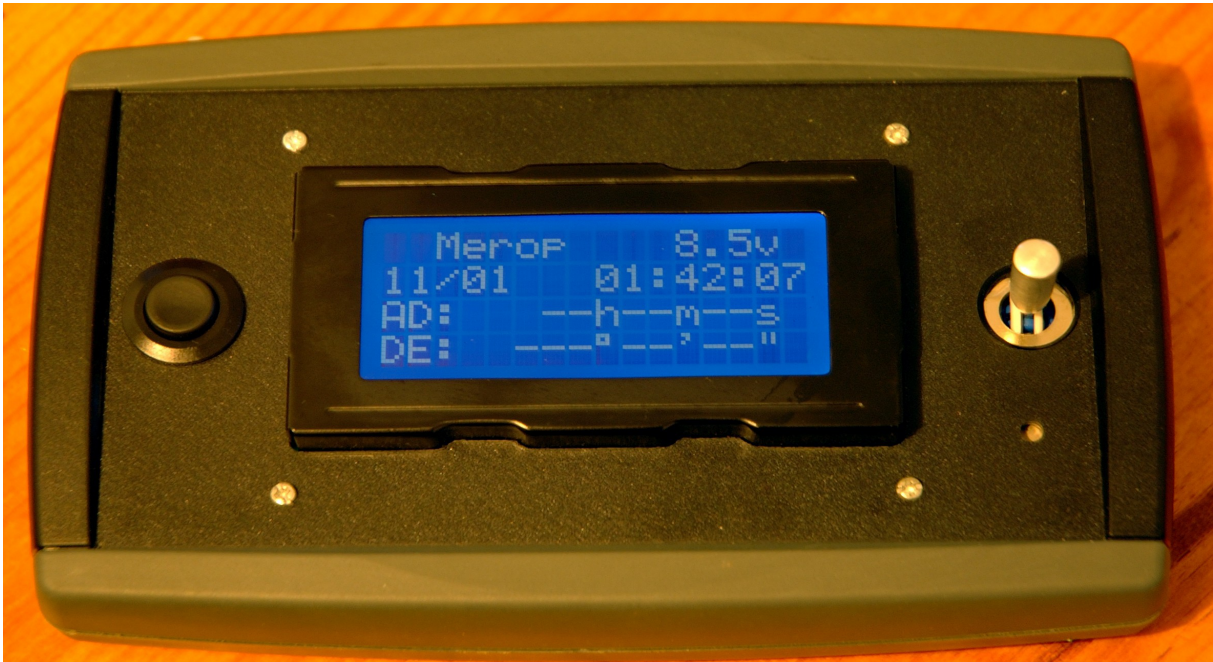


Once the functionality of your Merops validated, you can mount it in its case.

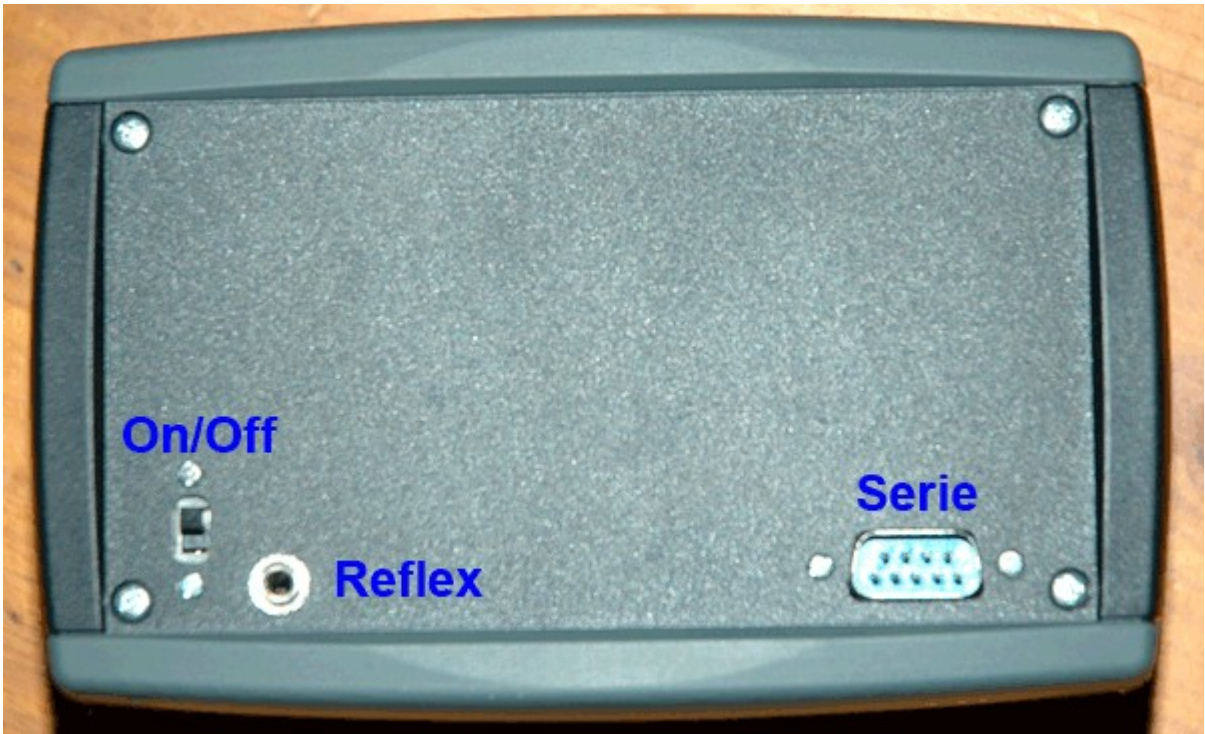
Some instructions :

- Orient the button as on the picture
- Paste the IC of the motherboard with two points of hot glue : is fast and removable if required
- Paste the Joystick with the help of 4 points of glue (glue3 type), taking care to its orientation and its center
- Mount the Jack of reflex (screwed to the case)
- Mount the connectors DSUB9 and switch on/off using the 2mm diameter screws provided
- Mount the screen using the 2mm diameter screws provided
- Place a few small dots of hot glue on the wire that may be restrained (battery and serial port SUBD9 mainly)

Front completed :

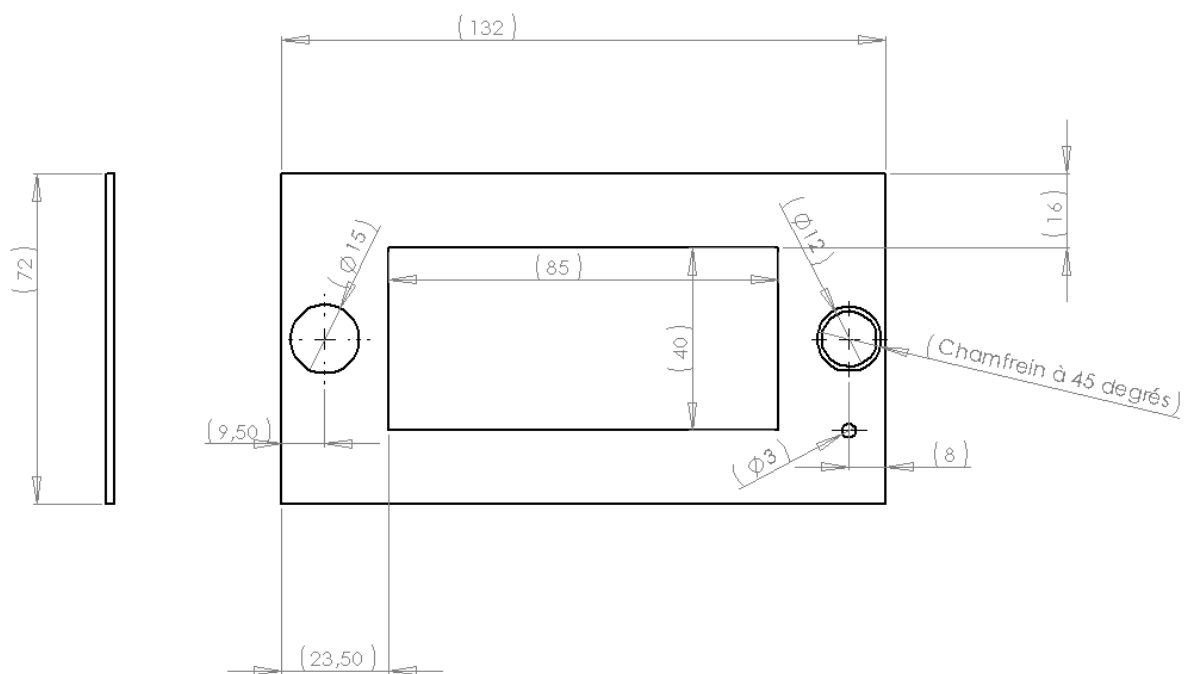


Rear Face:



Scheme of cutting of the front :

Merop - découpe du boîtier en face avant (boîtier Teko TN22)
Seule la partie rectangulaire centrale est représentée



8 Database loading

Note: It is normal that Merops does nothing when putting into service, it must load its memory

Now you can proceed to the download of databases in Merops, as described in the documentation "**Use of MeropLoader**".

Merop mounting instructions

Version 1.5

9 Annex 1 : schematic diagram

