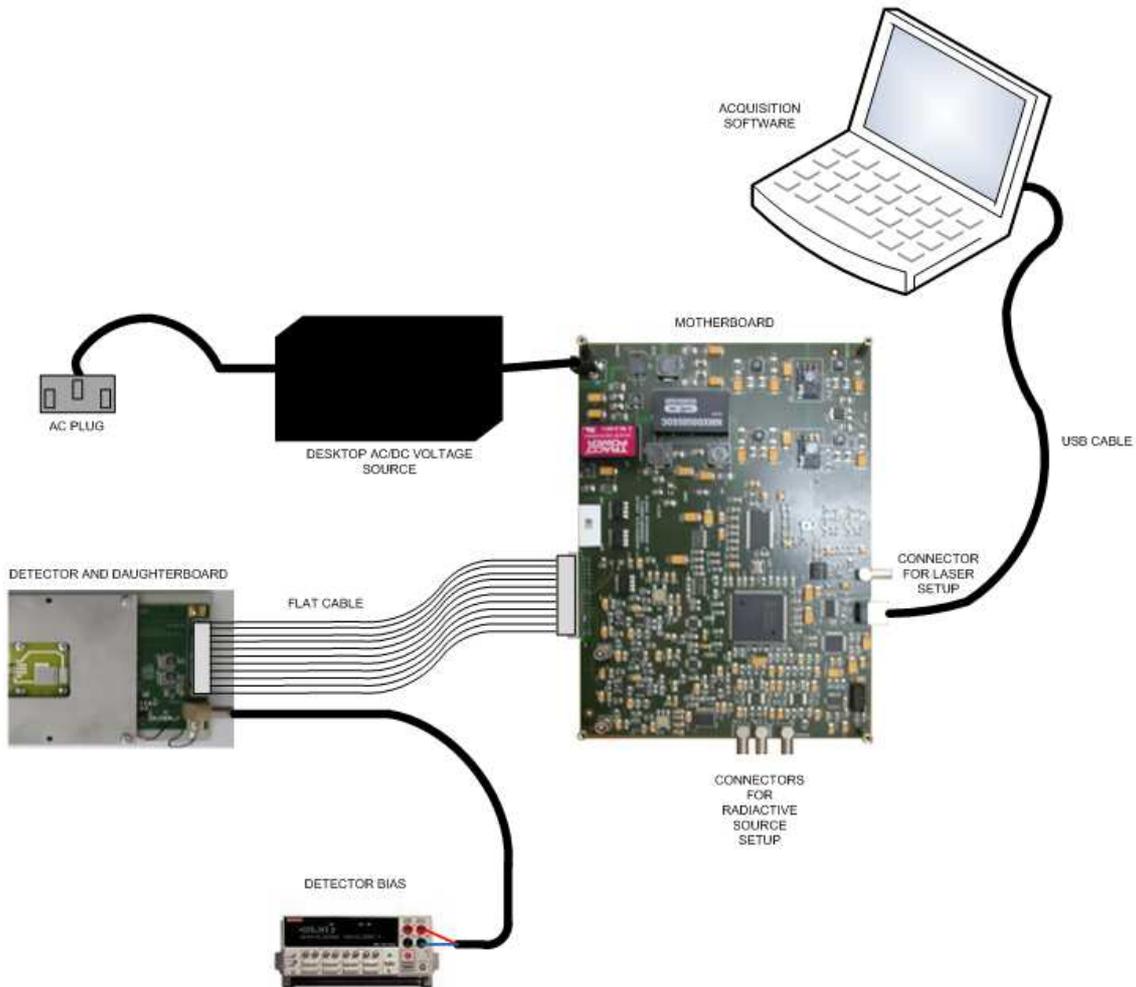


## ALIBAVA quick start guide.

### Basic connections of the ALIBAVA system and initialization of the system.

First of all, the hardware must be synchronized with the software and the system must be initialized. In the figure 1 it is shown the main ALIBAVA system connections.



**Figure 1.** ALIBAVA system block diagram with all its connections.

These are the steps that must be followed in order to initialize the system:

1. Connect the daughter board to the mother board (item 2 of the figure 2) by means of the flat cable (the IDC connectors have a defined position both in the daughter board and the mother board).
2. Power on the system by means of connecting the AC/DC adapter to the motherboard power connector (item 1 of the figure 2). The red and the green LEDs of the motherboard (item 8 of the figure 2) are switched on.
3. Connect the USB cable to a USB port on the computer where the software is installed and to the USB connector of the motherboard (item 6 of the figure 2).

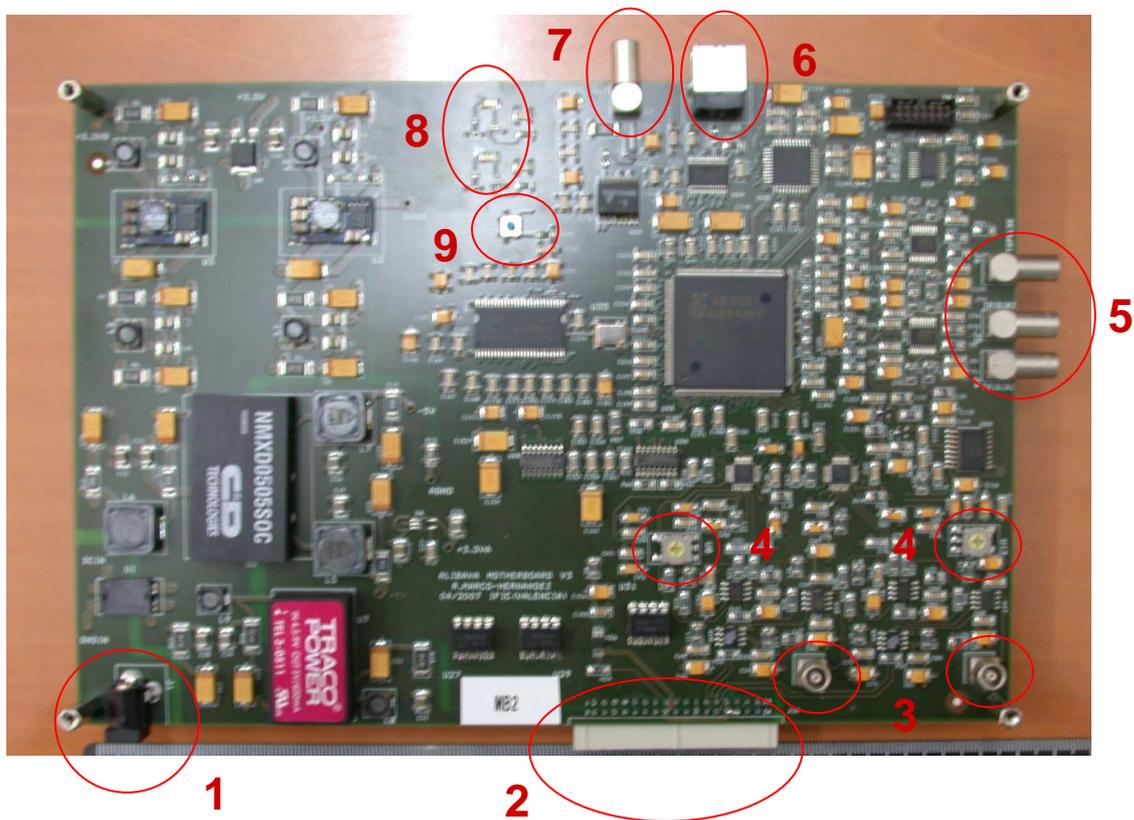
4. Push the reset button (item 9 of the figure 2) of the motherboard to initialize the system.

5. Launch the software following the software documentation. Now the hardware has been synchronized with the software and the red LED of the motherboard will be switched off (item 8 of the figure 2).

At this point the system has been initialized correctly and it is ready for carrying out the connections of the laser setup or the radioactive source setup.

The detector(s) of the daughter board must be powered on by means of an independent power supply. The daughter board has a Lemo power connector (with a defined position for connecting the power plug of the cable) dedicated for this supply.

Calibrations and pedestals acquisitions can be carried out at this point once the detector(s) have been powered on.



**Figure 2.** Connectors, switches and LEDs of the ALIBAVA motherboard.

### Laser setup connections.

In order to take laser acquisitions the motherboard has a trigger output which uses the LEMO connector next to the USB connector (item 7 of the figure 2) for exciting a pulse generator which will drive the laser. The name of this output (TRIG OUT) is printed on the motherboard next to the corresponding connector.

The input of the pulse generator must have a  $50\ \Omega$  termination and a coaxial cable of  $50\ \Omega$  must be used for this connection. The levels of this motherboard output are 3.3 V LVTTTL/LVCMOS compatible.

### **Radioactive setup connections.**

For this setup the motherboard has three trigger inputs which use three LEMO connectors (item 5 of the figure 2). The name of each trigger input is printed on the motherboard next to the corresponding connector.

The TRIG IN1 and TRIG IN2 trigger inputs are intended for signals coming from a photomultiplier. They are terminated with a  $50\ \Omega$  resistor and the input range is  $\pm 5\text{V}$  (do not exceed this input range). Therefore a  $50\ \Omega$  coaxial cable should be used for these inputs. These inputs are discriminated using a discrimination level. Look the software documentation for configuring the discrimination threshold of each input (Trigger Configuration). These inputs can be ORed or ANDed (coincidence) once they have been discriminated. Look the software documentation to carry out this configuration (Trigger Configuration).

The TRIG PULSE IN input is intended for a digital current/voltage pulsed signal (for instance a signal photomultiplier signal discriminated externally). It can accept positive and negative pulses (NIM logic, CMOS logic and TTL logic). This input is terminated with a  $50\ \Omega$  resistor and the input range is  $\pm 5\text{V}$  ( $\pm 100\ \text{mA}$ ). This input has a positive threshold and a negative threshold in order to distinguish the input signal levels (for example if a 3.3V LVCMOS logic is used, a valid value for the positive threshold could be 1000 mV and -1000 mV for the negative threshold). Look the software documentation to configure these thresholds (Trigger configuration).

The selection between the trigger inputs can be carried out with the software as well (Trigger Configuration).

### **Beetle output signals probing with an oscilloscope.**

There are two analogue outputs at the motherboard in order to probe the analogue output signal of each Beetle chip before they are digitized. These output signals use the two vertical LEMO connectors of the motherboard (item 3 of the figure 2). These outputs must be connected to the  $50\ \Omega$  input of an oscilloscope. A  $50\ \Omega$  coaxial cable must be used for these connections.

### **ADC input range modification.**

There are two rotary switches of three positions on the motherboard (item 4 of the figure 2) to modify the ADC input range for each Beetle chip. The position 2 corresponds to an input range of  $\pm 512\ \text{mV}$  (with a resolution of 1 mV). The position 3 corresponds to an input range of 1024 mV (with a resolution of 1 mV) only for positive signals. The position 1 corresponds to a input range of -1024 mV (with a resolution of 1 mV) only for negative signals.