Alibava: A startup guide

Alibava Systems

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Basic connections and initialization of the system

There are a number of very easy steps required to get the system ready. Please read the `Alibava GUI` manual first to have the data acquisition software properly installed and ready. Then, the daughter board should be connected to the motherboard, provide power to the later and connect it to the USB port of the computer.

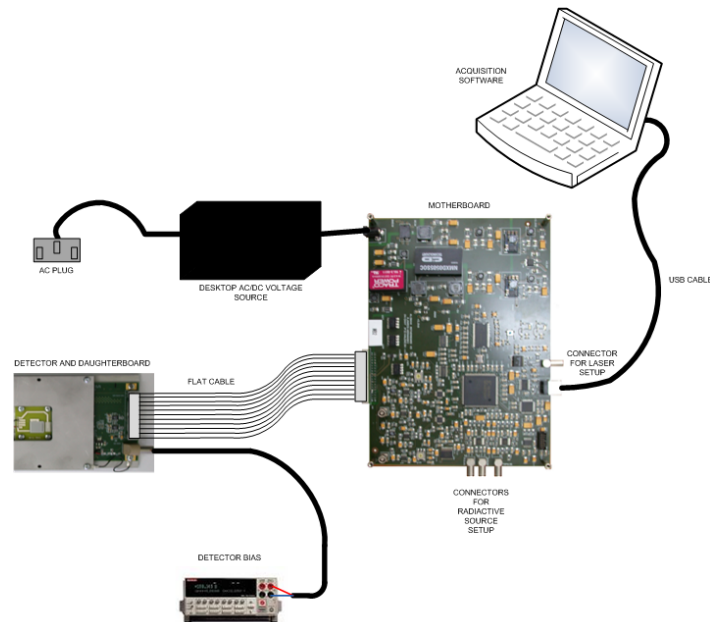Figure 1 shows the main ALIBAVA system connections.

Figure 1. Alibava system sketch with all the needed 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 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 Figure 2). The red and the green LEDs of the motherboard (item 8 of 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 Figure 2).

4. Push the reset button (item 9 of 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 Figure 2).

At this point the system has been initialized correctly and it is ready for preparing the required connections for the laser or the radioactive source runs.

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.
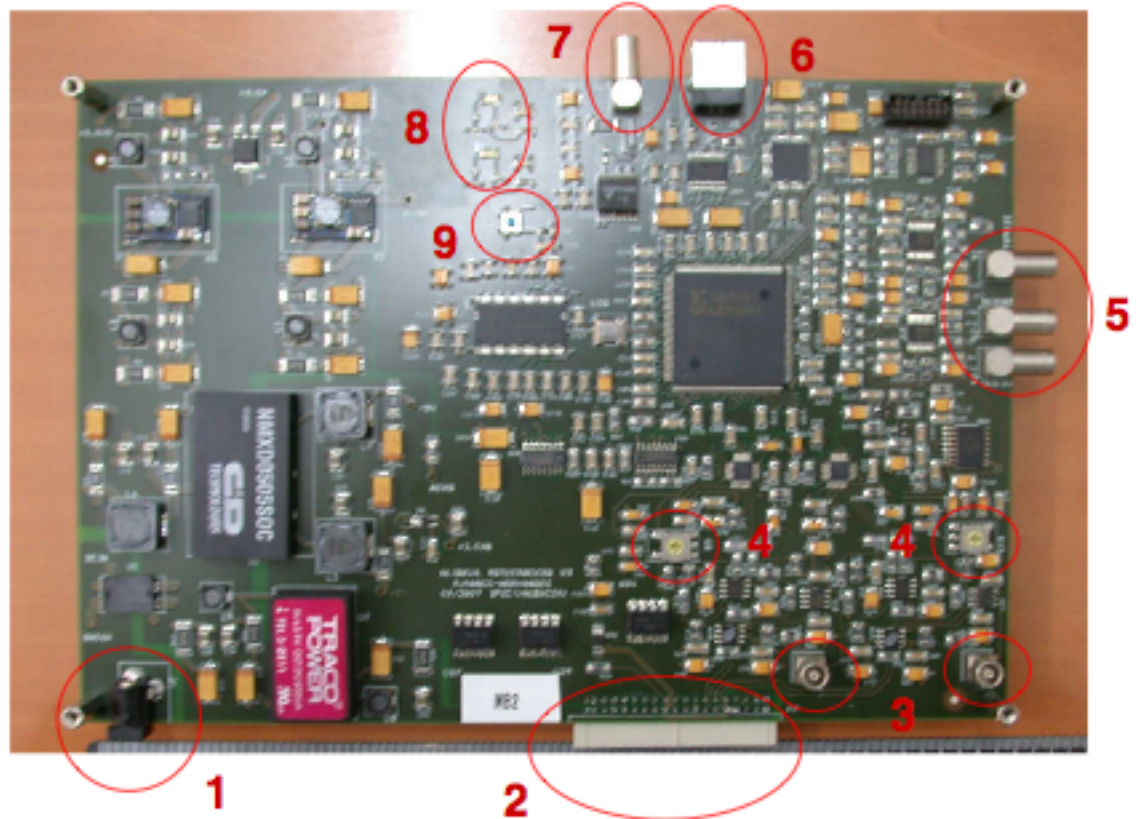

Figure 2. Connectors, switches and LEDs of the ALIBAVA motheboard.

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 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 Ω termination and a coaxial cable of 50 Ω must be used for this connection. The levels of this motherboard output are 3.3 V LVTTL/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 Ω resistor and the input range is $\pm$5V (do not exceed this input range). Therefore a 50 Ω 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 thay 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 Ω resistor and the input range is $\pm$5V ($\pm$100 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).

Probing the Beetle ouput signals 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 Ω input of an oscilloscope. A 50 Ω 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 Figure 2) to modify the ADC input range for each Beetle chip. The position 2 corresponds to an input range of $\pm$512 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.