

ALIBAVA – Daughter Board Status

Recap of what the Daughter Board is:

- **Single PCB with pad locations for 2 x BEETLE ASICs.**



Either serial or parallel readout of Analogue Data.

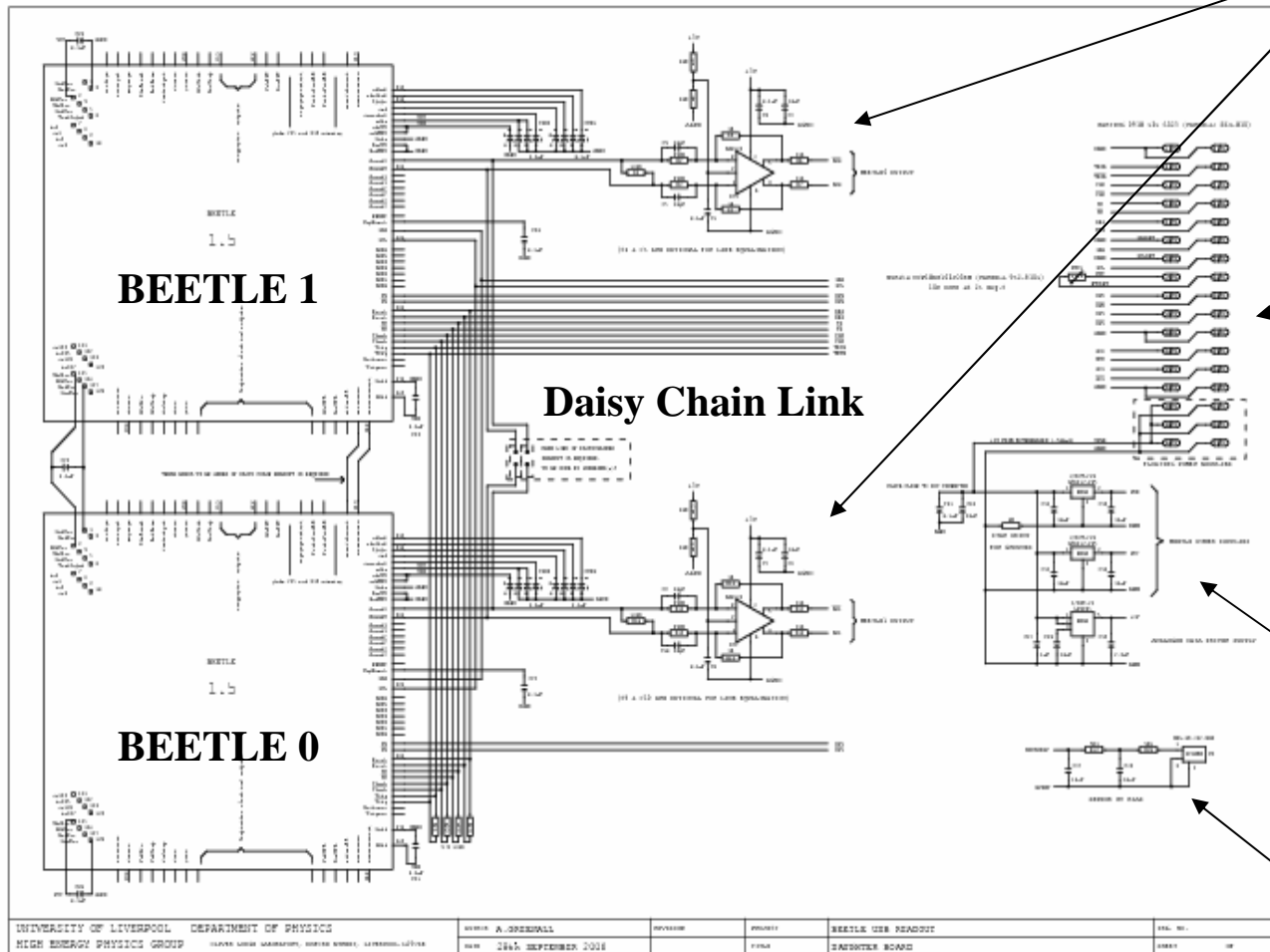
- **Interfaces directly to the ALIBAVA DAQ Mother Board.**
- **Single 34-way IDC connector, provides the Power, Clock, Fast/Slow Commands and Analogue data streams.**
- **Separate HV connector for Sensor bias.**
- **Space adjacent to the BEETLE ASICs for the Sensor to ASIC Fan-in.**



Available space is ~15mm x 20mm (w x h).

ALIBAVA – Daughter Board Status

Schematic of Daughter Board:



Analogue Data Buffers
(Back Terminated with 51R resistors)

ALIBAVA Motherboard Connection

Daisy Chain Link

Mixed Power supplies:
VCC (2V5) } BEETLE
VDD (2V5) }

Data Buffers: +3V

HV Connection + RC filter

ALIBAVA – Daughter Board Status

The main features are:

- All ‘fast’ LVDS inputs are un-buffered with 100R termination onboard (CLK, TRIG etc.)
- BEETLE configuration is by I²C interface, unbuffered CMOS input.
- 1 x Data-Valid per BEETLE: LVDS output.
- 1 x Analogue Data Output per BEETLE, buffered with high speed differential output driver
 - Designed to drive high speed signals over twisted pair cables ($T_r / T_f < 5\text{ns}$)
 - Gain set to +2, BUT back termination of output reduces overall gain to +1
- Provision for Daisy Chaining of two BEETLEs – BUT uncertain if this feature of the ASICs works. Hence parallel readout of BEETLEs is also provided.
- Separate power supplies for Analogue and Digital stages of the BEETLE (VCC and VDD).
- Analogue data buffers have own +3V supply.
- Single Ground Plane.

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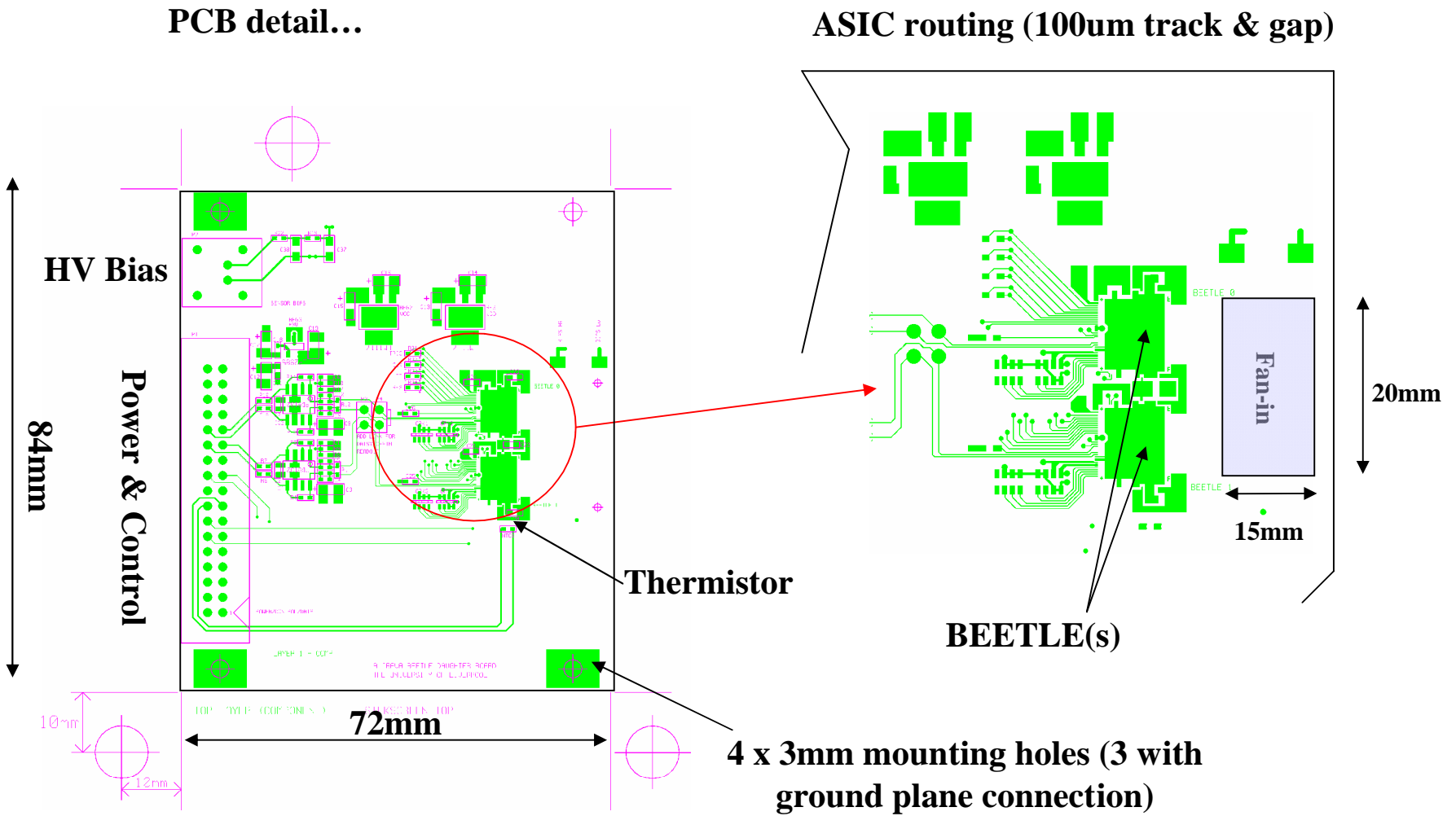
The PCB construction details are:

- **Multilayered, 4 layers, of FR4 type laminate with 1/2oz Cu (17um).**
- **Board dimensions: 84mm x 72mm**
- **1.6mm finished thickness.**
- **Minimum track and gap is 100um (4 mil).**
- **Board finish is Electroless Nickel/Immersion Gold (~0.1um Gold plated over ~5um Nickel underlay) - this technique is used to enable Al wire bonding to the PCB.**

The PCB Stack up (layer ordering) is:

- 1. Component/Signal**
- 2. Common Ground Plane**
- 3. Power Plane (mixed analogue & digital).**
- 4. Solder/Signal**

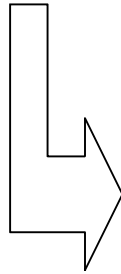
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Status:

- **Board Design frozen – Awaiting ok for manufacture (Gerber & Drill files finished etc.).**
- **Fan-ins from ASIC to Sensor not done**



- **4 –layer bonds at ASIC (40.24um pitch).**
- **Needs to fan-out to either 50um or 80um at Sensor end.**
- **Require 2 flavours of pitch adaptor - to match differing sensor pitches?**

Further information, as and when it becomes available can be found at:

http://hep.ph.liv.ac.uk/~ashley/ALIBAVA_Beetle.html