HASP Payload Specification and Integration Plan

Cajun Probe I

Payload Title: Cajun Probe I

Payload Class: [✓ Small] Large (circle one)

Payload ID: 6

Institution: University of Louisiana at Lafayette

Contact Name: Mark Roberts

Contact Phone: 985-707-6327

Contact E-mail: lordofentropy@gmail.com

Submit Date: 6/1/2009

I. Mechanical Specifications:

A. Measured weight of the payload

The Geiger counter board has a mass of approximately 0.8 kg as shown in Figure 1. Table 1 shows the mass breakdown for the revised Cajun Probe I Geiger counter payload. The foam box has a mass of about 0.1 kg while the entire payload will have a mass of approximately 1.6 kg. The total mass of Cajun Probe I should be about 2 kg considering the addition of a power board, bolts, and the internal payload.

Table 1. Mass budget for Cajun Probe I.

Mass		
Weight of Foam Box	0.10 Kg	0.22 lbs
Weight of internal payload	1.590 Kg	3.5 lbs
Total Weight of Cajun Probe I	**2.0 Kg**	**4 lbs**

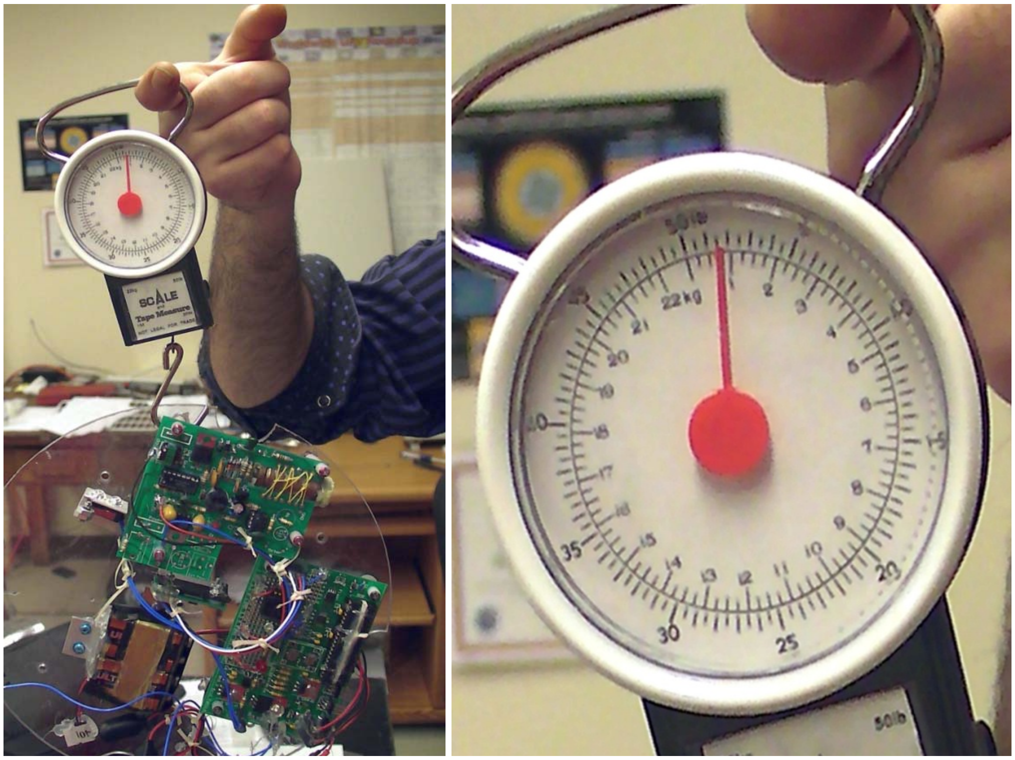

Figure 1. How mass is quantified.

B. Mechanical drawings detailing payload

Figure 2 shows a block diagram of the internal circuitry of Cajun Probe I that will be implemented with HASP 2009. The internal surface of the foam box and each foam separator is coated with a copper foil creating a Faraday Cage to reduce external noise and to contain internal noise to each compartment therefore reducing possible effects to data collected. Power will be drawn from HASP and will lead into the foam container from the top exterior of the container, an LED is also located on the top exterior of the foam container to signify proper power and operation of Cajun Probe I.

Figure 3 specifies how Cajun Probe I will be mounted to HASP's mounting plate. Cajun Probe I will be attached to the mounting plate by four bolts which will span the entire length of the foam container which is also shown in Figure 2. Quarter Inch bolts will be used in the four corners of the foam container and mounting plate and will be located approximately one-half of an inch away from each side. The epoxy being used to construct the foam container has a shear strength temperature range of -40°C to 149°C, which is within the limits of operation in a near space environment.

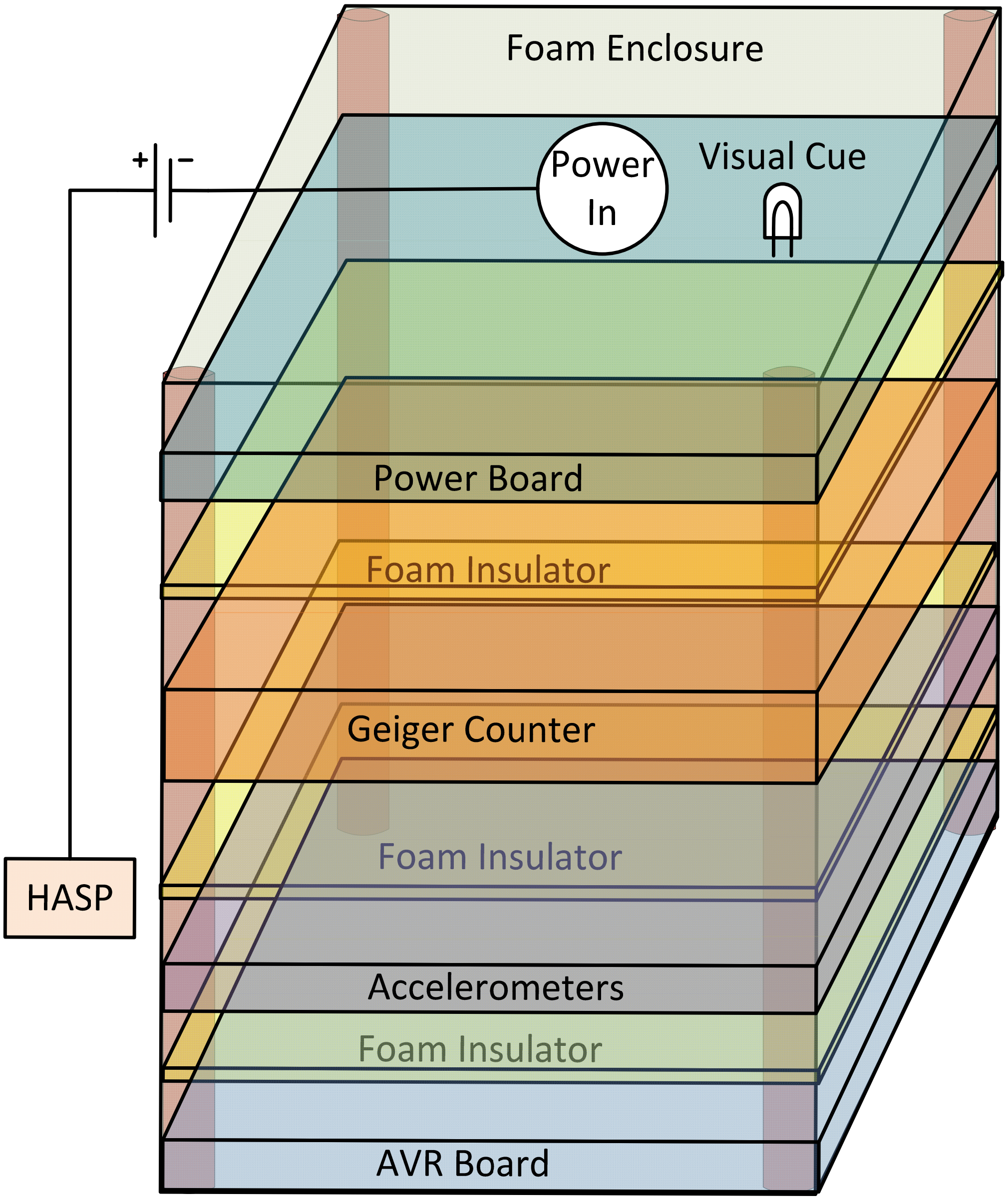

Figure 2. Layout of Cajun Probe I.

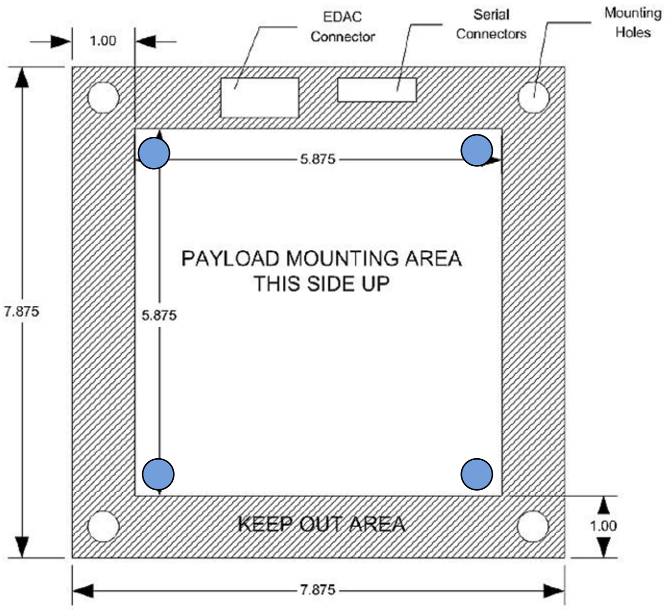

Figure 3. Mounting of Cajun Probe I.

II. Power Specifications:

A. *Measured current draw*

The measured current draw for Cajun Probe I is 200 mA and the input voltage will be down shifted to 9 V by a DC/DC converter.

B. *Power system wiring diagram*

Figure 4 specifies the power system and sub systems wiring and voltage consumption. As shown by the figure Cajun Probe I will only be using pins A,B,C,D and W,T,U,X from the EDAC 516 connector. The 30 V is fed into a single wire which is then inputted into the DC/DC converter. As shown by the diagram, this particular DC/DC converter has an input voltage range of 15 V to 34 V which covers the input voltage range specified by HASP. The voltage will be down shifted to 9 V and the current will be kept constant at 200 mA. The output voltage of the DC/DC converter is than inputted into the AVR board where it powers the microcontroller, temperature sensor, pressure sensor, and the X/Y accelerometer.

Also located on the AVR board is a smaller power subsystem which regulates the necessary voltage for the Z accelerometer and the Geiger counter. Figure 5 is the AVR board schematic illustrating the specifics of the board. Figure 5 also shows the power subsystem located on the AVR board and the break down voltages for which it supplies all other systems. Figure 6 is the schematic of the AVR and accelerometers PCB’s. This figure shows the details of the board and the electrical connections within.

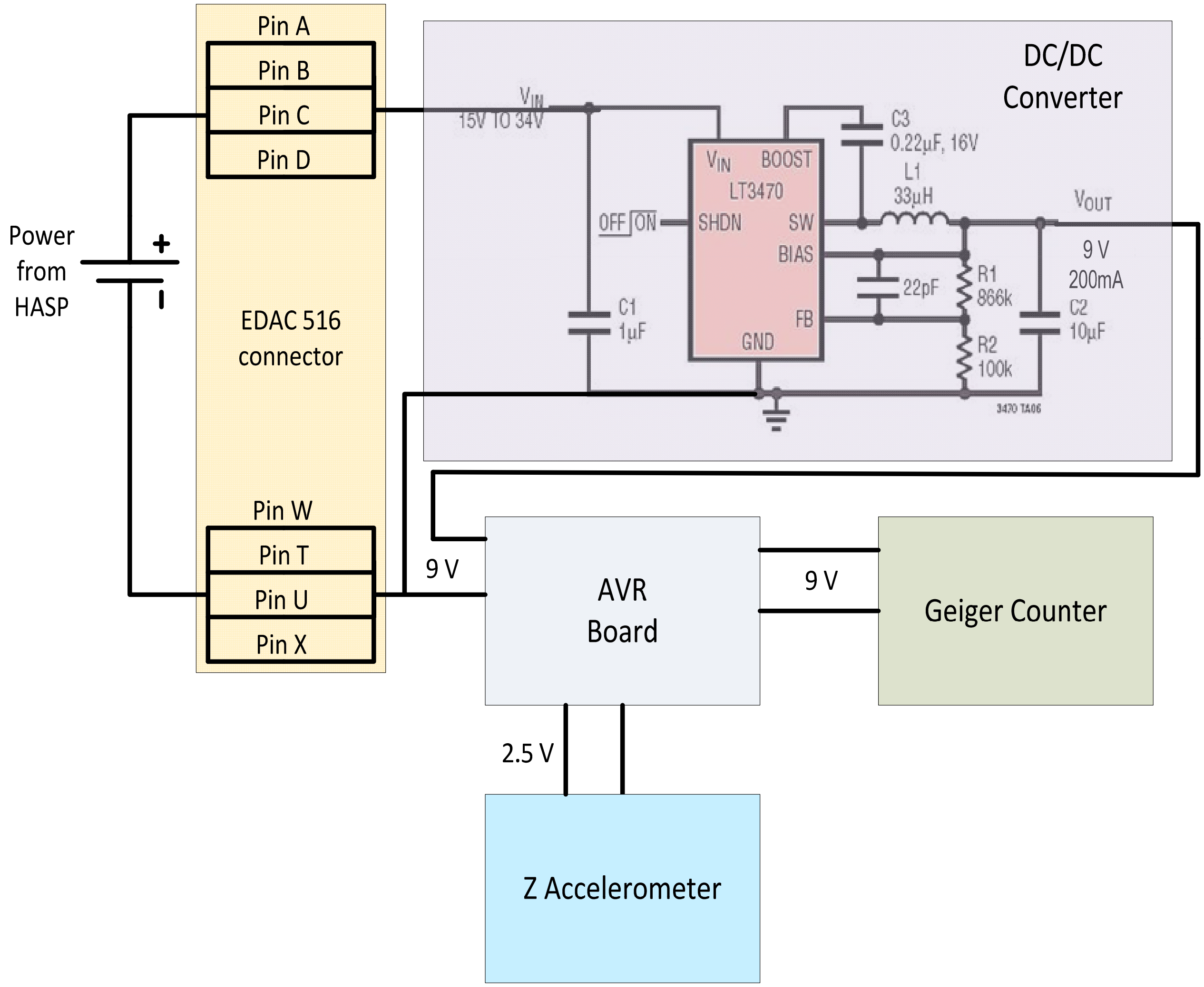

Figure 4. Power system wiring diagram.

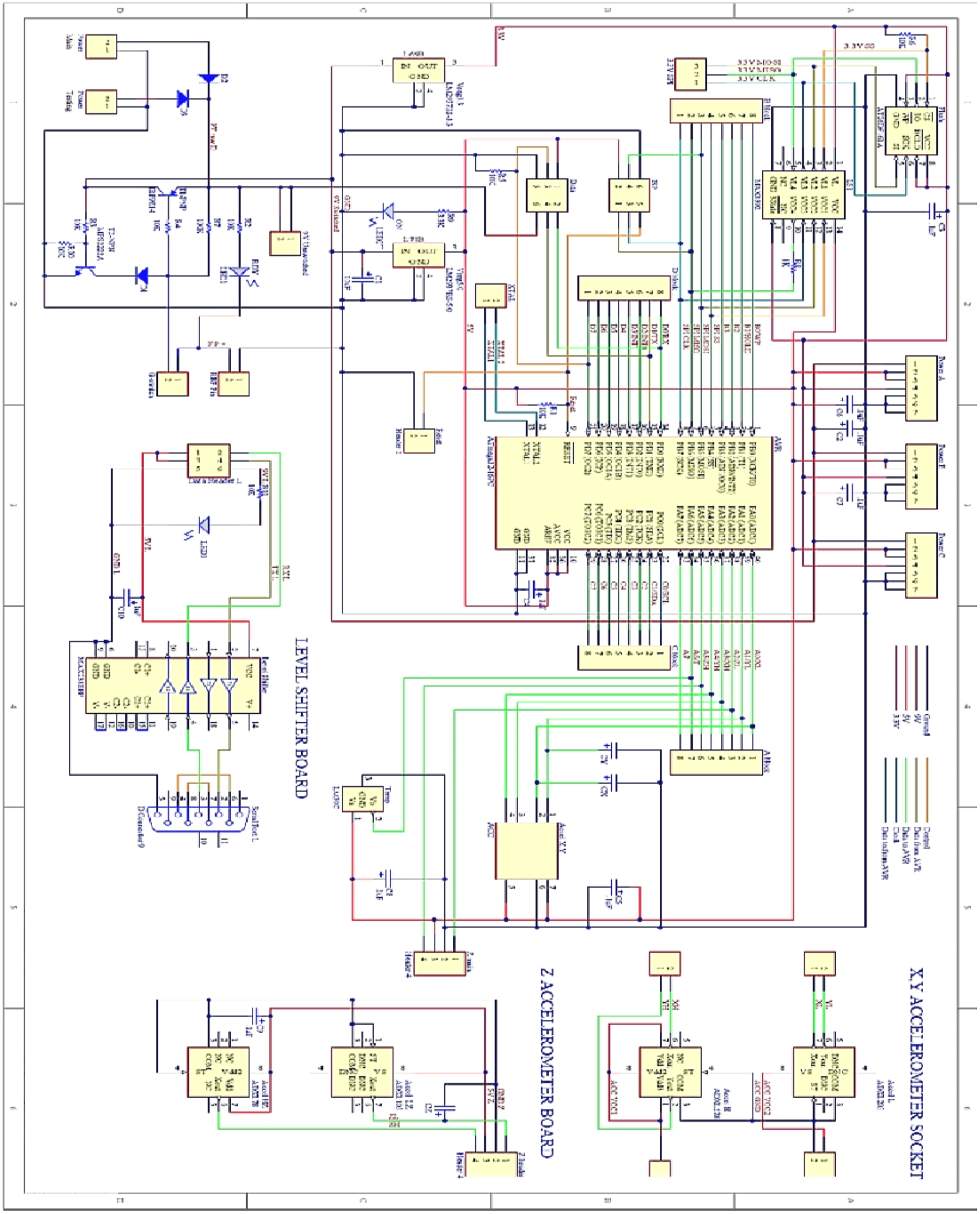

Figure 5. Schematic of AVR board.

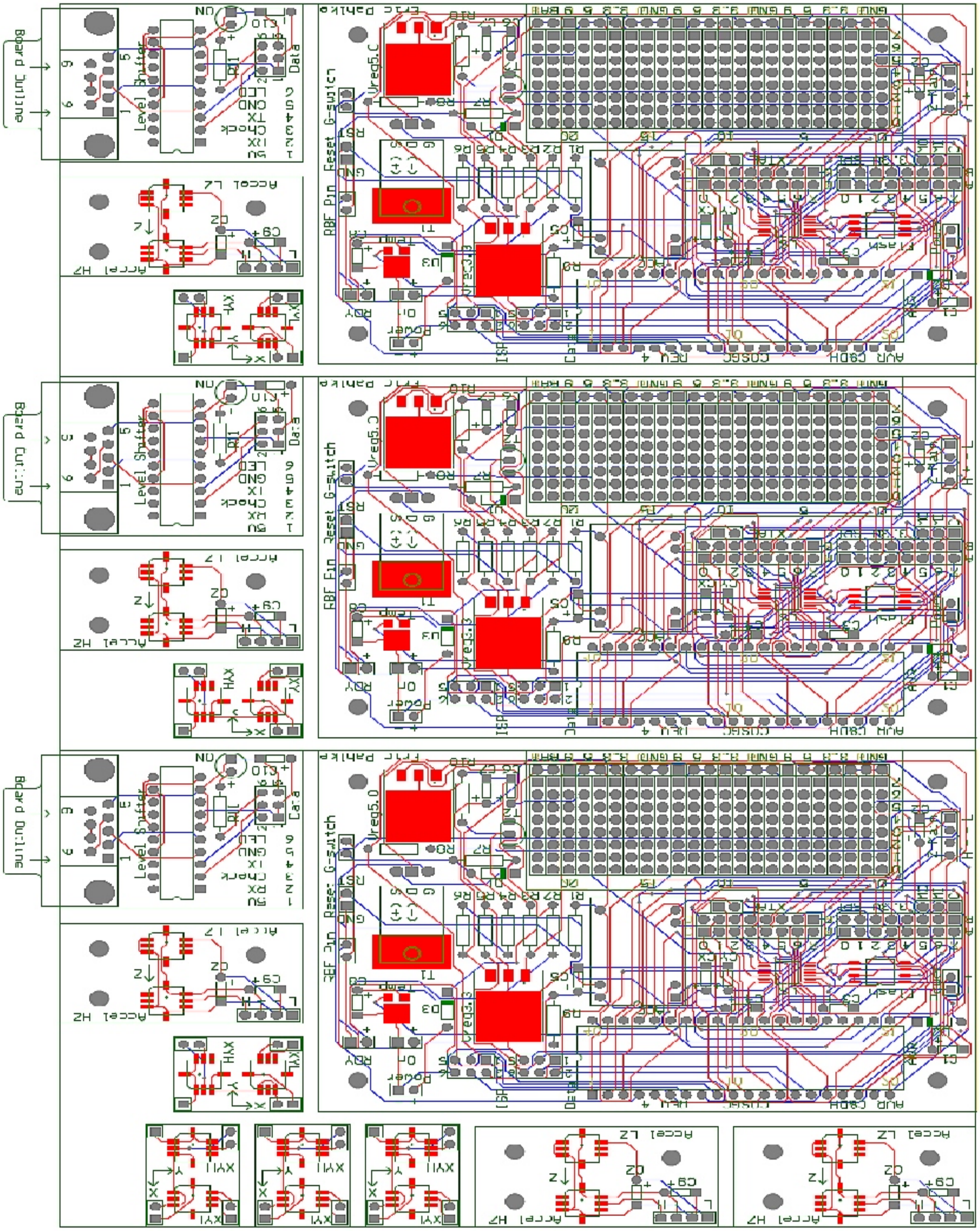

Figure 6. Schematic of AVR PCB.

III. Downlink Telemetry Specifications:

- Cajun Probe I is not using this function.

IV. Uplink Commanding Specifications:

- Cajun Probe I is not using this function.

V. Integration and Logistics

A. *Date and Time of your arrival for integration:*

- Arrival Date: 8/1/2009
- Integration Date and time: To be determined by HASP

B. *Approximate amount of time required for integration:*

- Integration should take no longer than thirty minutes to an hour.

C. *Name of the integration team leader:*

- Integration team leader: Mark Roberts

D. *Email address of the integration team leader:*

- Email: lordofentropy@gmail.com

E. *Integration participants:*

- Mark Roberts
  lordofentropy@gmail.com

F. *Successful integration of your payload:*

- Successful integration of the payload once it is powered will be determined if the visual cue located on the exterior of the foam container is on. Also, lack of blood loss and/or tears defines a successful integration.

G. *Expected integration steps:*

- Mount payload to the HASP platform.
- Connect power to the EDAC 516 connector.
- Secure all wires.

H. *Checks that will determine a successful integration:*

- Check exterior LED.
- Check that all wires and that the payload is securely fastened.
- Listen carefully for the audio cues of the Geiger counter.