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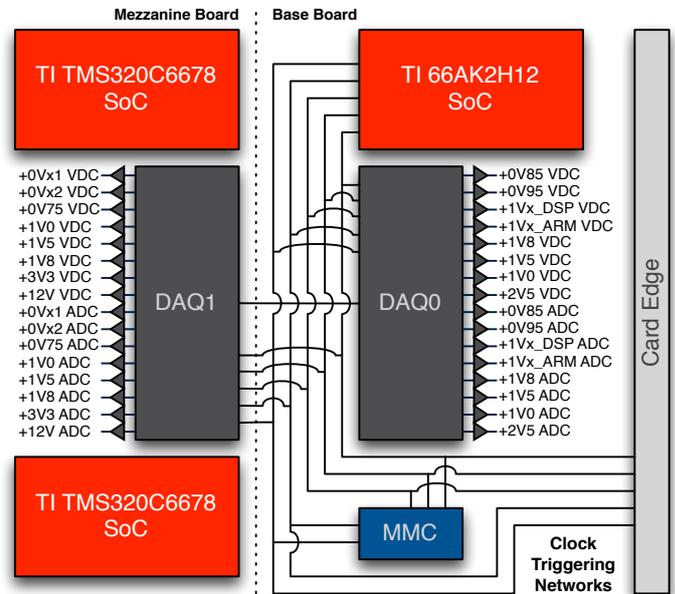
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BrownDwarf Y-Class Power Telemetry Data Acquisition System

The BrownDwarf Y-Class system compute node has unprecedented onboard power measurement capability for power consumption vs. compute experiments and energy usage monitoring. Telemetry is captured from all power supply rails using a data acquisition system with two 16 channel multiplexers and six high performance analog to digital converters.

With a user controlled, nanosecond accurate triggering and clocking mechanism, high-resolution measurements are captured out-of-band and directly synchronized with algorithm results during analysis.

There are 36 measurement points on each Y-Class node. 16 VDC/ADC measurement points each on the base and mezzanine boards with an additional low resolution global VDC/ADC points and two temperature sensors on the base board.



Power Telemetry Overview

Measurement Points	36 per node - 18 (Base Board) + 16 (Mezzanine Board) + 2 (Temperature)
Measurement Location and Type	Post voltage regulator - Current amplifier and sensing resistor via kelvin connection
Out-Of-Band Data Acquisition System	2 x DAQ blocks with a 16 channel multiplexer and 3 A/D converters each
A/D Performance	100Khz/Channel
A/D Resolution	12Bit
A/D Capture Modes	Completely user configurable with fine grained control of A/D converter settings Single channel and multichannel modes Single, continuous and interleaved conversion modes Simultaneous current and voltage
Clocking Mechanism	5 chassis wide clocking networks (A-D, F) used as source or sink triggers or clocks
Clock Triggering	Trigger or clock from/to the K2H SoC, Data Acquisition System or optionally a system wide triggering signal Maximum 200ns between trigger and sample data acquisition
Telemetry Software	User library with start, stop, marker and configuration commands Local or centralized collection of telemetry data via Linux OS daemon Clock accurate synchronization of start, stop and marker locations with captured telemetry data
Base Board Rails (ADC + VDC)	+0V85 +0V95 +1Vx_DSP +1Vx_ARM +1V8 +1V5 +1V0 +2V5 / +3V3 (10hz) +3v3_MP (10hz)
Mezzanine Board Rails (ADC + VDC)	+0Vx1 +0Vx2 +0V75 +1V0 +1V5 +1V8 +3V3 +12V
Temperature Sensors	TC0 TC1