Video Board Test Results-VB2

1. Attach video board, do smoke test, measure basic voltages (same as driver). Measure on boards and at connectors.

Table 1: Power Supply Voltages

	+5V	+15V	-15V	+24V	2.5 V	3.3V
Before LSE load	0.497 A	0.038 A	0.034 A	0.000 A	2.429 V	3.272 V
Load LSE	0.471 A	0.065 A	0.061 A	0.001 A	2.398 V	3.278 V
Run LSE	0.398 A	0.065A	0.061 A	0.001 A	2.301 V	3.281 V
	0.442 A	0.109 A	0.103 A	0.001 A	2.443 V	3.281 V
Stop LSE	0.471 A	0.065 A	0.061 A	0.001 A	2.395 V	1.278

2. Set the DAC's using vdm60f.fpg (most likely already done as part of the driver board testing). Record the set values from vdm60f and calculate the expected values in Table

Table 2: DAC Set values and Expected Output Voltages

DAC SET	Set (Hex)	Set (Dec)	/4096	Expected Value
OG	0940	2368	.578125	1.908
IG1	06FB	1787	0.436279296875	1.440
IG2	0730	1840	0.44921875	1.482421875
SCP	0CD9	3289	0.802978515625	2.6498291015625
RD	0CC4	3268	0.7978515625	2.63291015625
BS	0000	0	0	0
SUB	0ED8	3800	0.927734375	3.0615234375
DR-A	0CDE	3294	0.80419921875	2.653857421875
DR-B	0CDE	3294	0.80419921875	2.653857421875
DR-C	0CDE	3294	0.80419921875	2.653857421875
DR-D	0CDE	3294	0.80419921875	2.653857421875

3. Check DACs: Measure voltage of each output of the DACs. Value should be within 1% TBR of expected values.

DAC	CCD1	CCD2	CCD3	CCD4
REF	3.308	3.309	3.307	3.310
OG	1.890	1.907	1.894	1.927
IG1	1.442	1.439	1.443	1.446
IG2	1.491	1.496	1.468	1.494
SCP	2.67	2.650	2.636	2.646
RD	2.654	2.632	2.628	2.653
BS	0.000	0.016	0.003	0.000
SUB	3.083	3.079	3.071	3.090
DR-A	2.653	2.652	2.681	2.666
DR-B	2.687	2.660	2.669	2.662
DR-C	2.651	2.663	2.682	2.676
DR-D	2.651	2.640	2.642	2.666

4. Measure to actual voltages corresponding to each of the parameters above and record in Table

DAC	CCD1	CCD2	CCD3	CCD4
OG	1.094	1.030	1.045	1.064
IG1	-2.746	-2.813	-2.779	-2.780
IG2	-2.590	-2.607	-2.687	-2.618
SCP	12.17	12.11	12.03	12.07
RD	12.11	12.03	11.99	12.09
BS				
SUB	-46.22	-46.51	-46.03	-46.46
TEMP				
DR-A	20.06	19.99	20.10	20.11
DR-B	20.13	20.07	20.08	20.07
DR-C	20.09	20.04	20.01	20.12
DR-D	20.12	19.95	19.91	20.14
V1				
V2				
V3				
V4				

5. Using the LSE, query each of the housekeeping values for each of the video board voltages and record below.

DAC	CCD1	CCD2	CCD3	CCD4
OG	-1.15	-1.08	-1.21	-1
IG1	-2.82	-2.88	-2.71	-2.89
IG2	-2.66	-2.59	-2.79	-2.69
SCP	12.23	11.96	11.90	12.01
RD	12.08	11.88	11.97	12.12
BS	0.0	0.02	-0.01	0.02
SUB	-46.16	-46.08	-45.76	-46.32
TEMP				
DR-A	20.11	20.25	20.10	20.14
DR-B	19.93	20.17	20.04	20.05
DR-C	20.26	20.26	20.17	19.97
DR-D	20.15	20.15	20.05	20.14
V1				
V2				
V3				
V4				

1. Install dummy RTDs and measure all temperature HK. Intent is to check precision of temperature sensors? Plug all resistance temperature detector (device) (RTDs) in and place next to thermometer. Measure temperatures as environmental temperature changes. Expected accuracy is 5%. TBR. Alternatively, use programmable electronic load to measure precision. (for reference only) (2 days)
2. Take no-load full frame image (FFIs). Measure noise via histogram of pixel values. Compare to TBD requirement on video chain noise. (1 day - assuming software is complete)
3. Install pulser into one video chain at a time. Take FFIs at various pulser amplitudes and periods. Measure from FFIs all of the below. Note that any anomalies will be followed by debugging to understand and mitigate the first time.
    a. Cross-talk: pulse one video channel, look for signals (at TBD level; look at Kepler requirement/performance) on other channels. More a measurement in RRU, input to combined differential photometric performance (CDPP) spreadsheet (1 day)
    b. Linearity and gain: Vary pulse amplitude, measure signal, plot (compare to what?)(1 day)
    c. Over/undershoot: Burst 100-200 pixels. Should have sharp edges. Over/undershoot is over/undershoot over square wave. (Need a picture here). Quantity to measure is amplitude of

over/undershoot: what do we compare that to? Kepler actual performance (as requirement), while goal is much better.(1 day)

d. Noise: histogram of pixels at various pulser levels, get video chain noise (compare to video chain noise allocation)(1 day)
e. Bias flatness: requires capacitive load. Look for sag/brightening at edges of image. Doesn't really need pulser. Criterion TBR. Need picture to describe effect.(1 day)
f. Saturation: where the linearity test falls off the edge, measures saturation in volts. Should at least read full-scale of ADC, ±3V.(1 day)

4. Hook up to cold CCD to measure sensitivity to photons (for reference only) (1 day)
   a. Fe55, optical light
   b. Confirms performance of parallel clocks under load
   c. Can one do this with a smaller CCD? yes