AIDA FEE64 TEST PROCEDURE

Author: Mos Kogimtzis
Date: 10/02/2011
Department: NPG, Technology
Project: AIDA
Customer: Internal

1. Equipment Used

Power supply: TTi QPX1200 60V 50A PSU, TTi QL355TP dual or similar
Oscilloscope: Tektronix DPO 7054 or similar
Sine wave generator: ROHDE & SCHWARZ SML01 or similar
Multi-meter: Fluke 187 or similar

2. Set up preparation

Collect the following:

Power cable
RS232 cable
Ethernet CAT5 or better cable
Xilinx programmer
Input adapter board
JTAG/RS232 adapter board
Analogue voltage in cable

Set the power supplies to the following settings:

	OVP	OCP	Voltage Limit	Current Limit
QPX1200	7V	15A	5V	10A
QL355TP 1	9V	1A5	7V	1A5
QL355TP 2	-8V	1A5	-6V	1A2

3. Visual Inspection

For the inspection below, consult the PCB IC orientation map.
Visually check for dry joints and shorts, orientation of ICs and polarized components. Verify, also, (and replace with correct value) that:

R1010=7K5
R1011=1K96
R1016=3K6
R1019=2K49

For the inspection below, consult the PCB power supply map.
Check for shorts on the input (+5, +7, -6) and output of U53 and U54.

4. Connections

Connect power cable to fee card (verify that voltages on the power connector are correct first).
Plug input adapter board (short inputs) and JTAG/RS232 adapter board to fee card.
Connect RS232 and Ethernet cable from fee card to host pc.
Connect Xilinx programmer between JTAG/RS232 board and to host pc.
Connect Analogue voltage in cable from sine wave generator to fee input.

5. Power supply tests

Power-up the board. Check that the power supplies do not current limit.
Check the voltages on all the power supply ICs outputs with a voltmeter and verify that are within range. Record in excel sheet.
Check the voltages on all the power supply ICs outputs with oscilloscope and verify that are no low/high frequency oscillations.

6. Read MAC address

Open a COM port and then download ReadMacAddr_top_level_download.bit from Impact.
Record the MAC address that shows on the COM port.

7. DDR2 test

Open a putty session and select serial (COM console).
Download \\Nnlxs1\mk38\da_scripts\fee64A_tests\bit_files\mpmc_DDR_mem_test_download.bit to exercise the DDR2 memories.
Check report on COM console and verify that test has passed. Save report.

8. Boot-up Linux

Download \\nnlxs1\mk38\da_scripts\fee64A_tests\bit_files \ppc440_0_bootloop_download.bit
verify that done led is on.
To download Linux to DDR2 manually, open command prompt and type xmd. In xmd type the following:

```
XMD% connect ppc hw -debugdevice deviceNr 1 cpunr 1
XMD% dow W:/1_da_scripts/fee64A_tests/kernel/simpleImage.virtex440-aida_hs_v6.elf
XMD% run
Note: deviceNr is the fpga position in the jtag chain
```

Verify that Linux boots up ok.

9. Program Platform Flash

Open another putty session SSH (193.62.115.247) and
Login as: root
Password: root4linux
Execute the following commands to unlock the mtd2 and mtd3 flash partitions and then and copy the firmware and kernel to those areas:

flash_unlock /dev/mtd2
flash_unlock /dev/mtd3
flash_eraseall /dev/mtd2
flash_eraseall /dev/mtd3
flashcp linux_boot_loader_top_level_download.bin /dev/mtd2
flashcp simpleImage.virtex440-aida_hs_v6 /dev/mtd3

Power cycle the card. Verify that fpga programs (program DONE led is lit) and Linux boots from flash.

10. Ethernet PPC Tx speed Test

On the existing Putty session, type:

At the Linux PC.
Cd /disc/mk38/1_da_scripts/fee64A_tests/netperf/netperf-2.4.4/src
./netserver (./ cause it is running from current directory). Run it only once per test session.

At PPC
On the existing Putty session, type:
netperf -H nndhcp078 -t TCP_STREAM -- -m65535 -s253952 -S253952

Verify that the Tx link speed is between 200Mb/s – 400Mb/s. Copy results from RS232 window.

11. Ethernet PPC Rx speed Test

At PPC
On the existing Putty session, type:
netserver

At Linux PC
./netperf –H 193.62.115.247 -t TCP_STREAM -- -m65535 -s253952 -S253952

Verify that the Tx link speed is between 100Mb/s – 500Mb/s. Copy results from RS232 window.

12. ADC SPI test

On the existing Putty session, type:

aida_spi_test -regs-adc -p=2

Verify that the test completes successfully.

13. ADC calibration test

Run adc calibration 1000 times, in order to check the eye width spread and the bitslip values.

Open another putty session SSH (193.62.115.247) and
Login as: mk38
Password: aidatest

Then type the following:

```
cd da_scripts/
da.server
~config
@calib loop 1000
```

Make sure that Xming is launched (X icon on bottom right taskbar).
If not, launch it from the start>All Programs>xming>XLaunch

Open another putty session and log on to the card

```
export DISPLAY=<pcname or IP address>:0
imgd
```

in imgd goto:

File>Open Data Modules>Headed Data Module

From files select tap_delay1000, bit_slip1000 and eye_width1000 and click Display 1d.

Make sure that the tap delay values are 24 to 29. Record a screenshot.

Make sure that the bit slip values take the values of 1 or 3. Record a screenshot.

Make sure that the eye window values are 16 to 20. Record a screenshot.

14. ADC pseudo-random test

Quit da.server (Cntr + D) and type the following test:

xhtest -prbs-all

Verify that the test completes with zero errors.

15. Static analog front end test

With all inputs and vrefs shorted to ground and take raw data of all channels.

cd da_scripts/
da.server
~scope_raw "fee64A_tests/data/<*pcbNo*>/hist/inputs_shorted_adcChip" 0 7

Or

~scope_raw "/mnt/scratch/mk38/fee64A_tests/data/Aplus/<*pcbNo*>/hist/inputs_shorted_adcChip" 0 7

Then, run hist_calc.m and select the 8 files generated from the command above.

Then, verify that the R2, mean and standard deviation values are within specified thresholds.

16. Dynamic analog front end test

Apply a sine wave to the vref pin (freq.19.7MHz and amplitude 500mV) and take raw data as follows:

~scope_raw "fee64A_tests/data/<pcbNo>/fft/sine_19MHz7_0V5_adcChip" 0 1
~scope_raw "fee64A_tests/data/<pcbNo>/fft/sine_19MHz7_0V5_adcChip" 2 3
~scope_raw "fee64A_tests/data/<pcbNo>/fft sine_19MHz7_0V5_adcChip" 4 5
~scope_raw "fee64A_tests/data/<pcbNo>/fft/sine_19MHz7_0V5_adcChip" 6 7

Then, run fft_calc.m and select the 8 files generated from the command above

Then, verify that the SNR, THD, SINAD and ENOB values are within specified thresholds.