

Building the IBox

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Purpose

- a processing platform for digital video surveillance
- a teaching platform for AOS (CS9242)

Purpose

- motion detection;
- number recognition;
- face recognition.

Requirements: Functional

- Performance: five frames per second at 352x288
- IO: Ethernet, audio, video, alarm, video overlay
- Video compression: MPEG4 at 768x576
- System software update: by an engineer, on-site
- Power supply: up to 24V AC or DC
- Power consumption: less than 5V
- Software interfaces: video, audio, network, overlay, MPEG compression

Requirements: Non-Functional

- Cost
- Modularity
- Size
- Development time
- Connectors
- Un-trusted software

It should cost nothing, use no power, be
infinitely small, and take no time to develop.
What's the problem?

Trade-offs

- Cost vs. Performance
- Size vs. Performance
- Size vs. Utility
- Power vs. Performance
- Development Time vs. Everything
- Cost vs. Manufacturing Quantity

Design Options

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- FPGA

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- FPGA
- DSP

Design Options

- FPGA
- DSP
- DSP + Generic CPU

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- FPGA
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- Generic CPU

Design Options

- FPGA
- DSP
- DSP + Generic CPU
- Generic CPU
- SMP Generic CPU

Decisions, Decisions

- Rough out the designs: identify components
- Don't worry about the easy bits (PSU, connectors)
- Obtain development kits and test performance

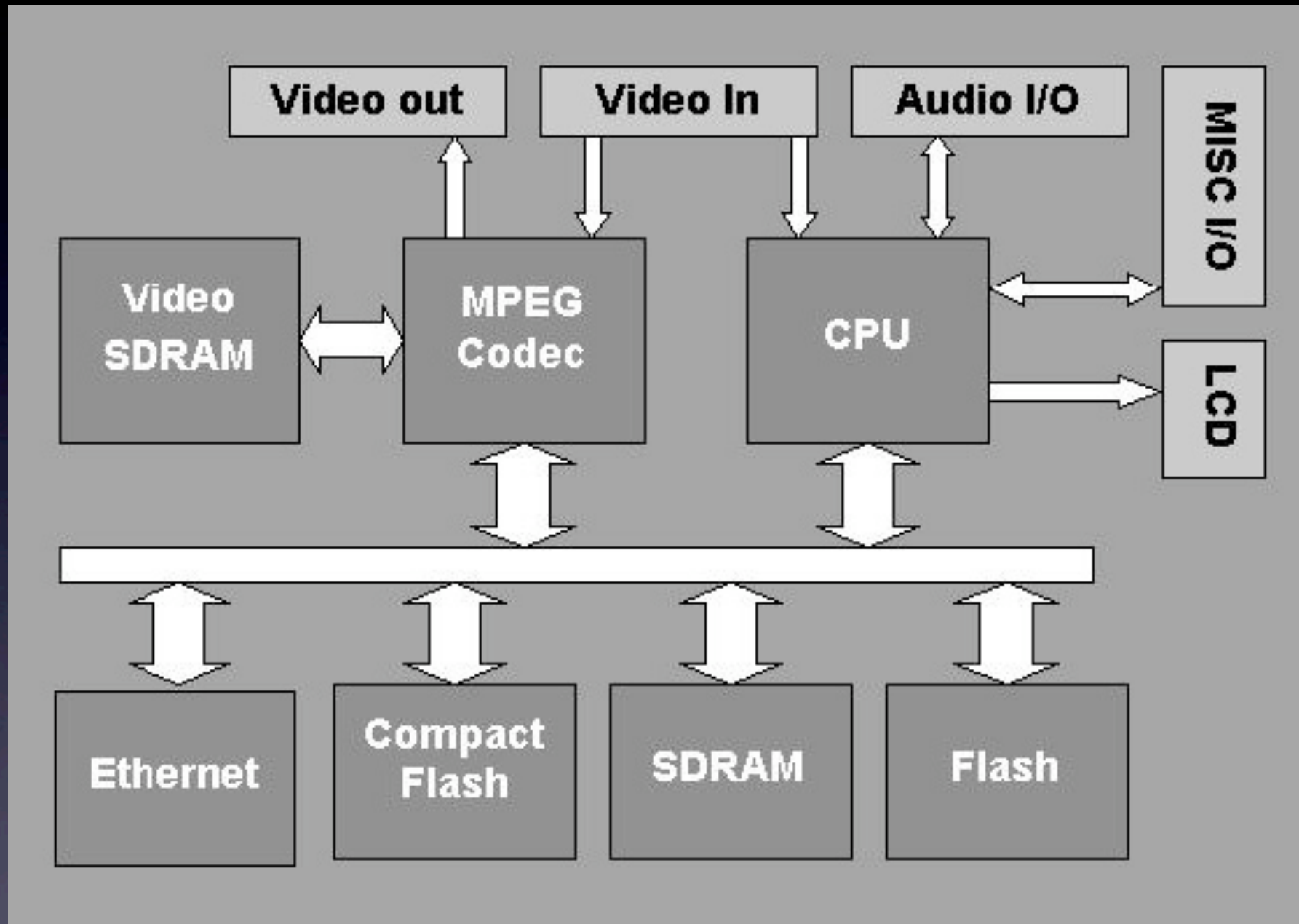
Decisions, Decisions

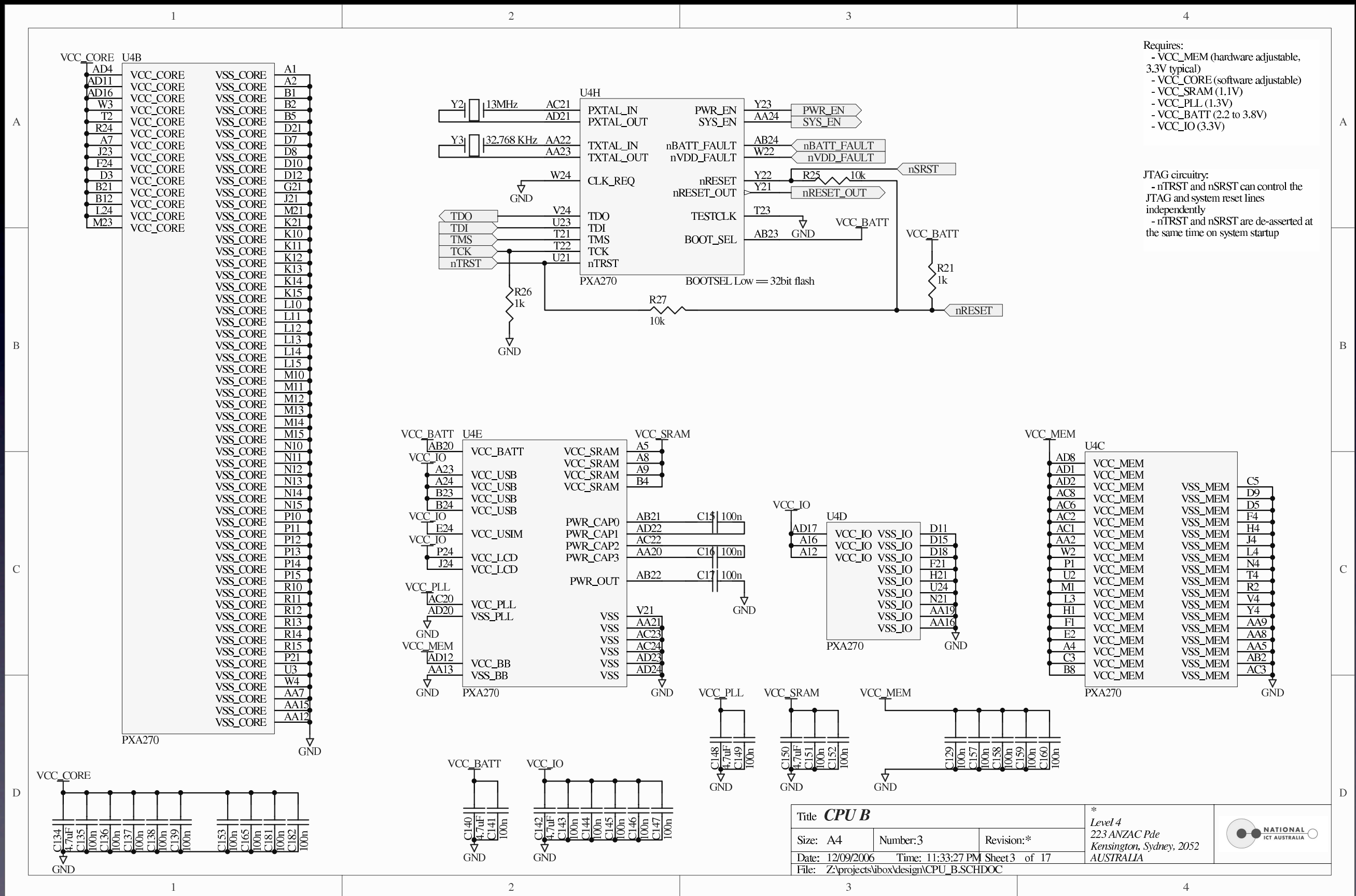
Look at:

- Cost
- Parts count
- Parts availability
- Power consumption

Specific designs

- PXA270
- TI Da Vinci (OMAP)
- Sierra MIPS





Title <i>CPU B</i>			<
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1

2

3

4

A

A

B

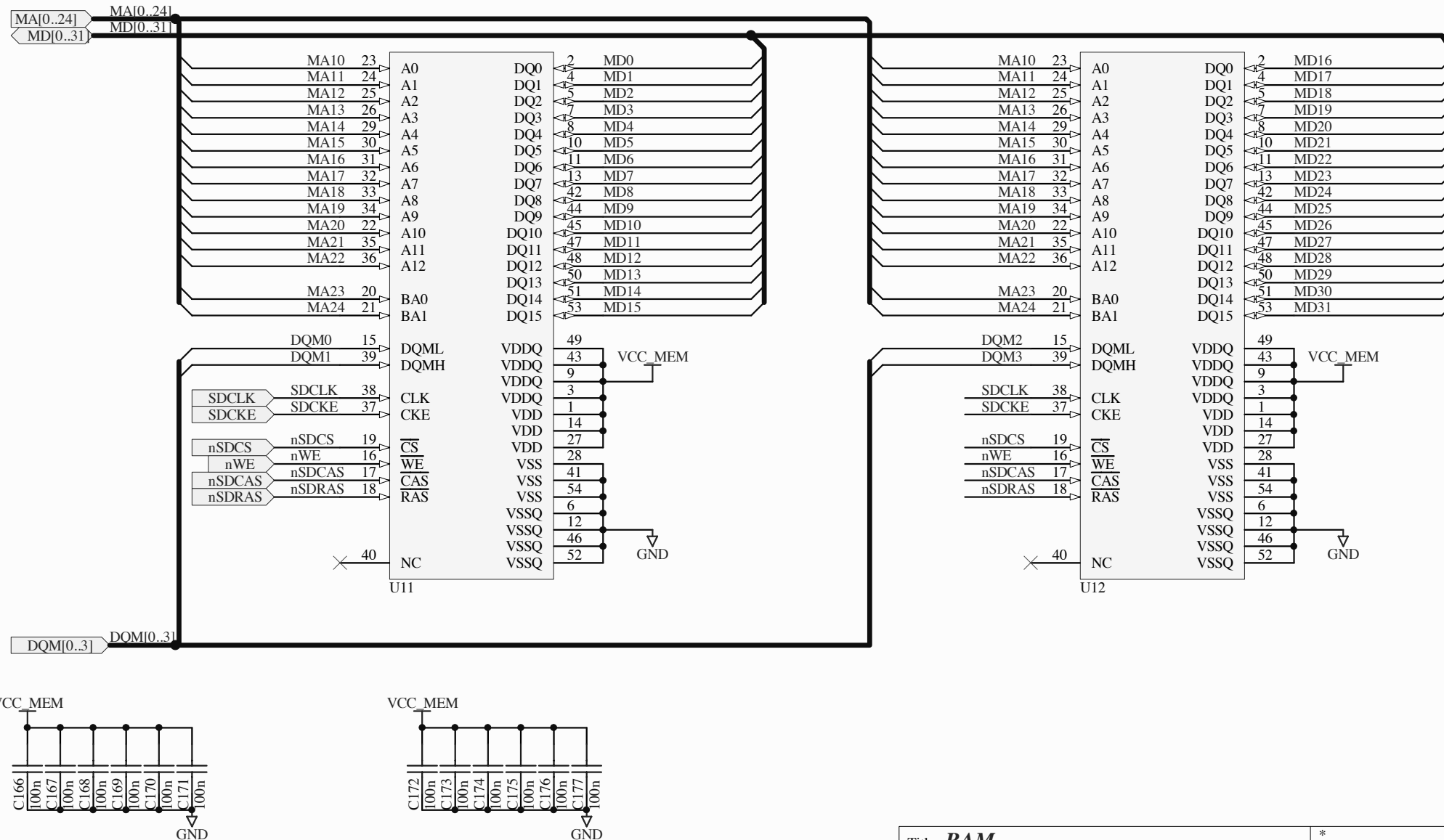
B

C

C

D

D



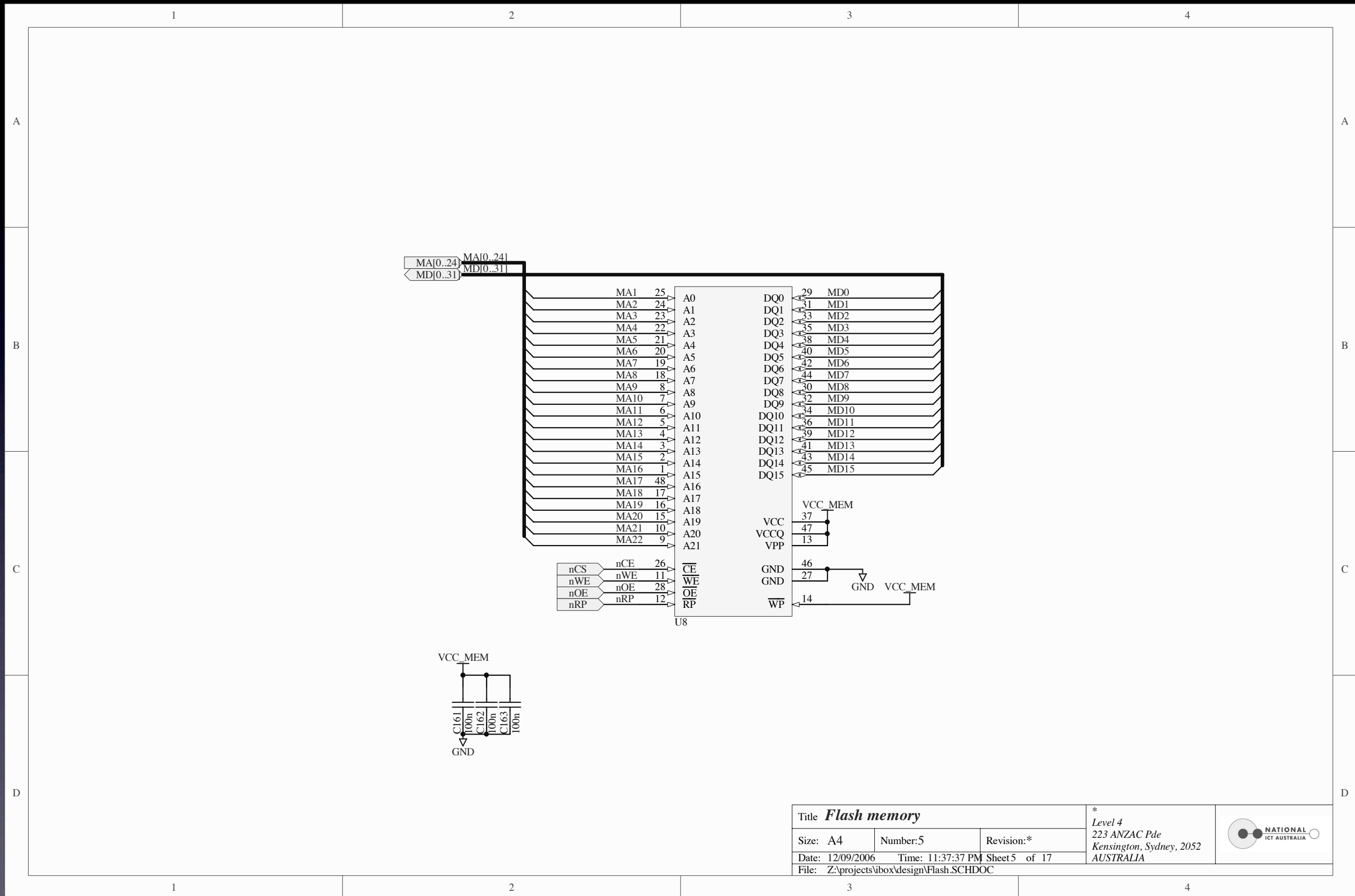
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Size: A4	Number:4	Revision:*		
Date: 12/09/2006	Time: 11:37:29 PM	Sheet 4 of 17		
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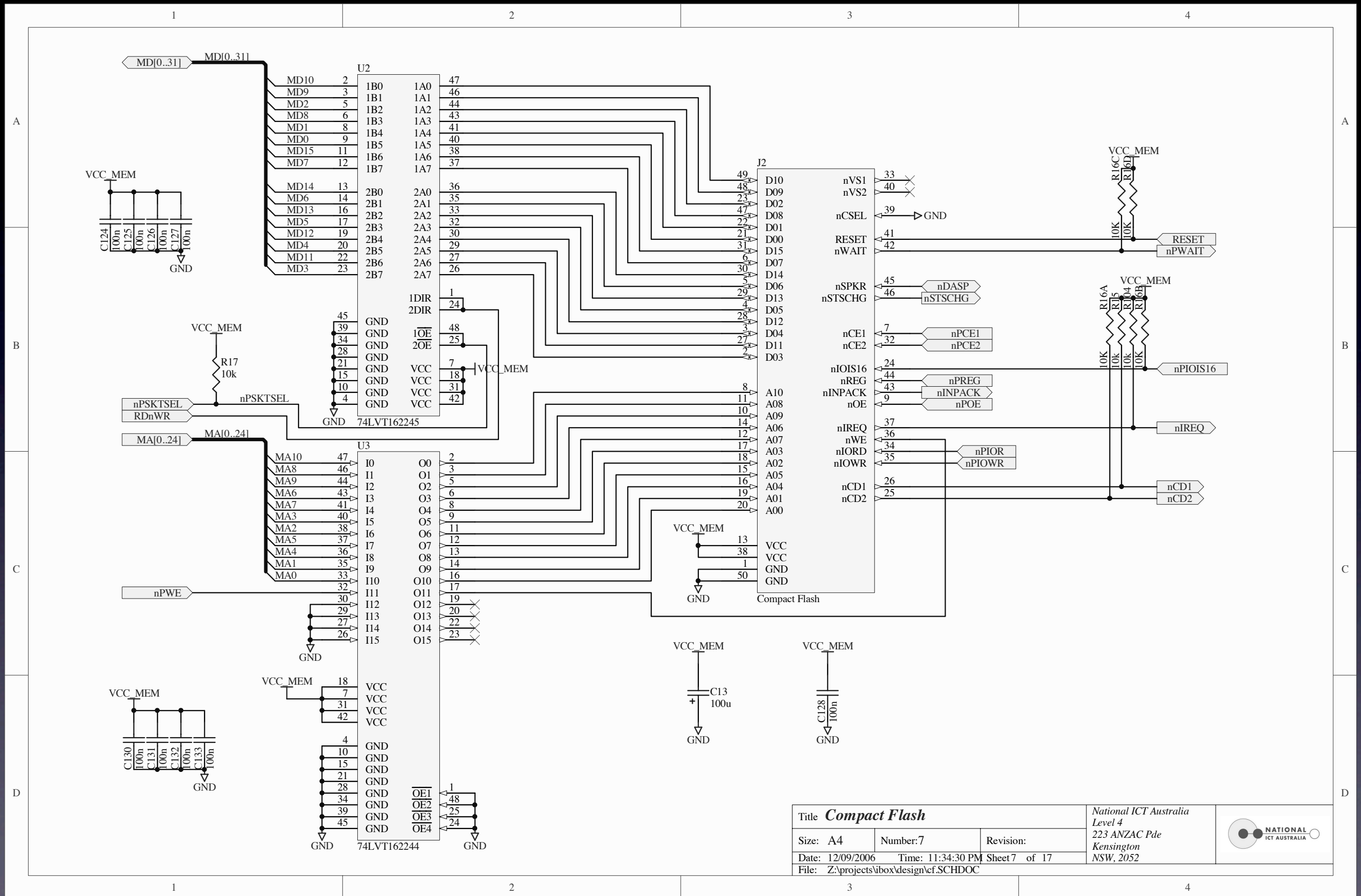
1

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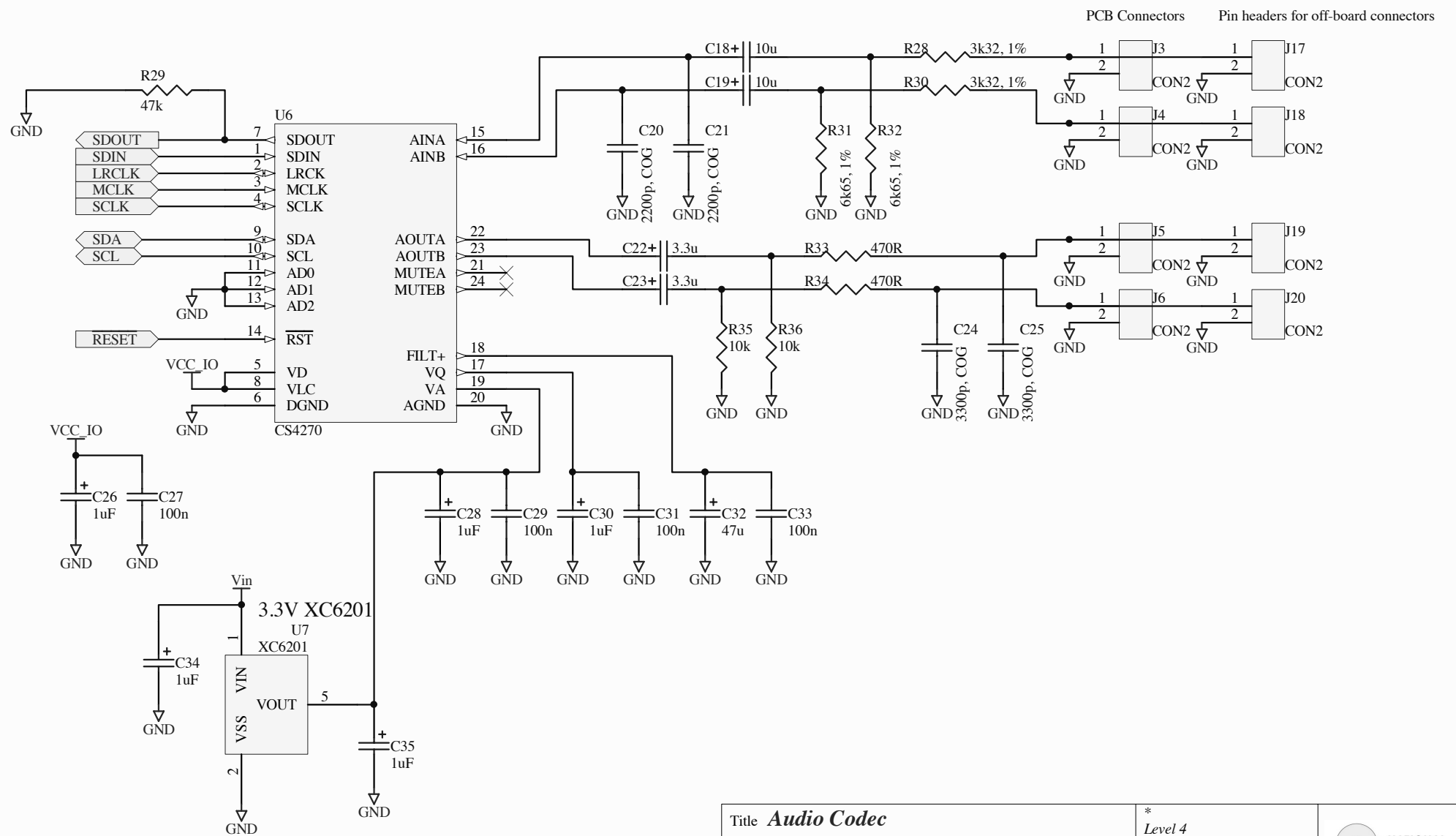
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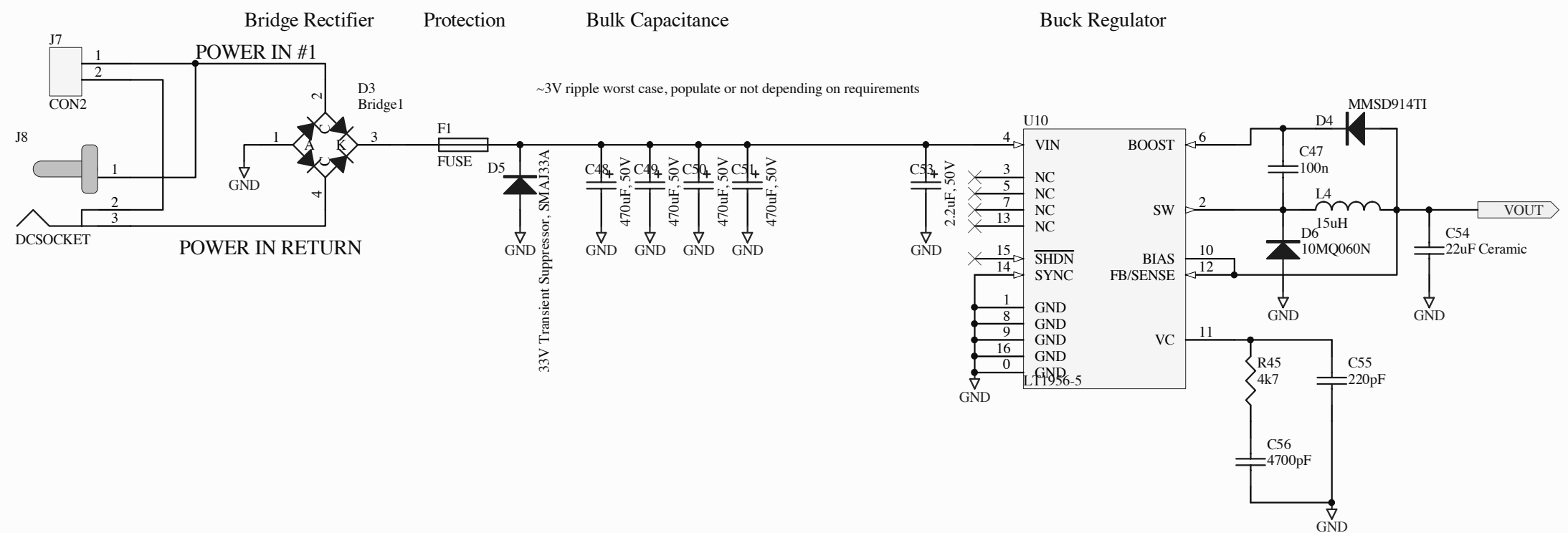


Title <i>Compact Flash</i>			National ICT Australia Level 4 223 ANZAC Pde Kensington NSW, 2052	
Size: A4	Number: 7	Revision:		
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File: Z:\projects\ibox\design\cf.SCHDOC				

Selects master mode

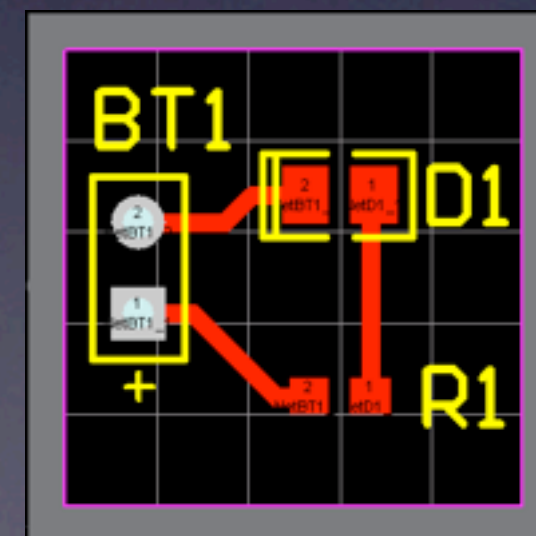
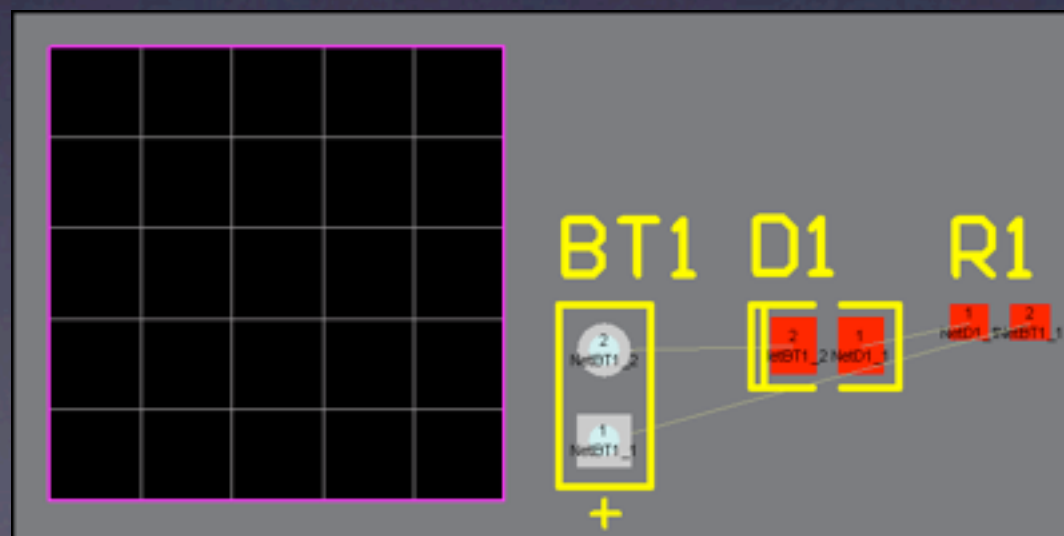
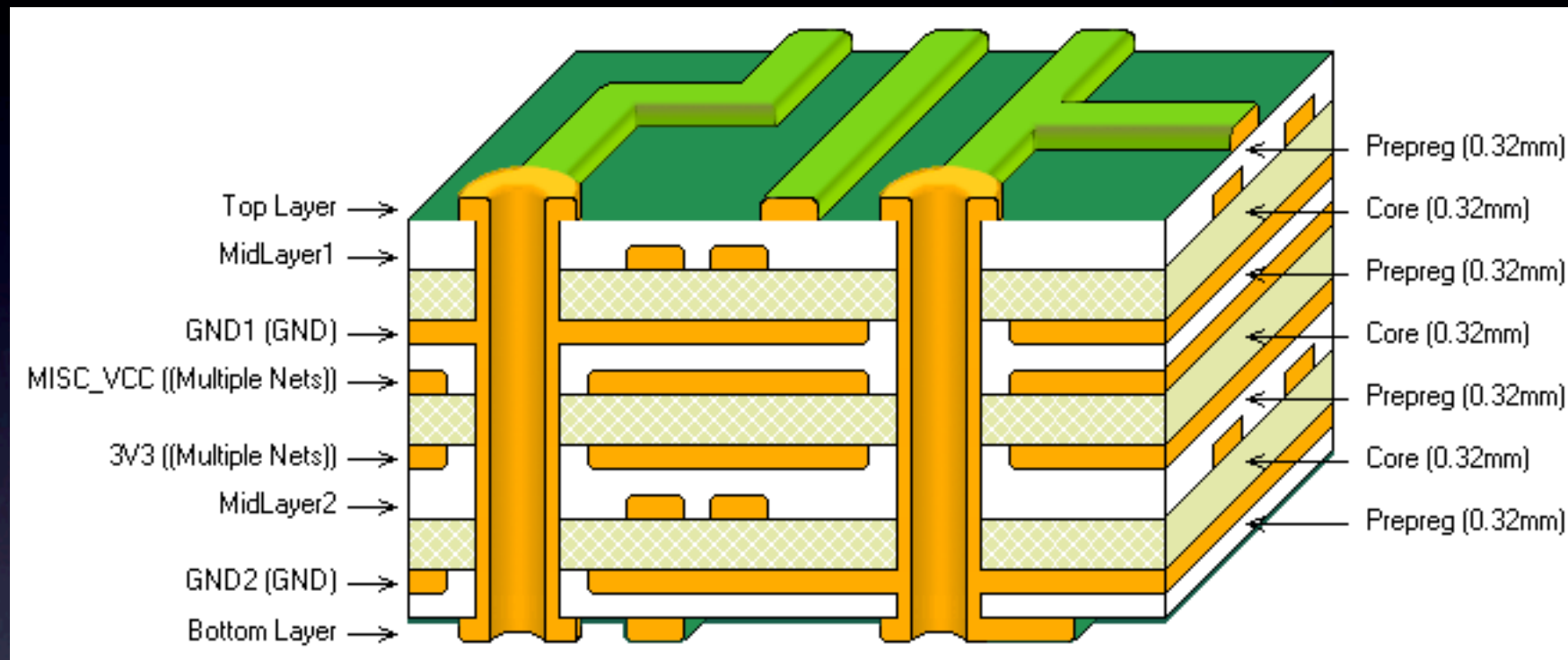


Title <i>Audio Codec</i>			<i>* Level 4 223 ANZAC Pde Kensington, Sydney, 2052 AUSTRALIA</i>	
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File: Z:\projects\ibox\design\CS4270.SCHDOC				

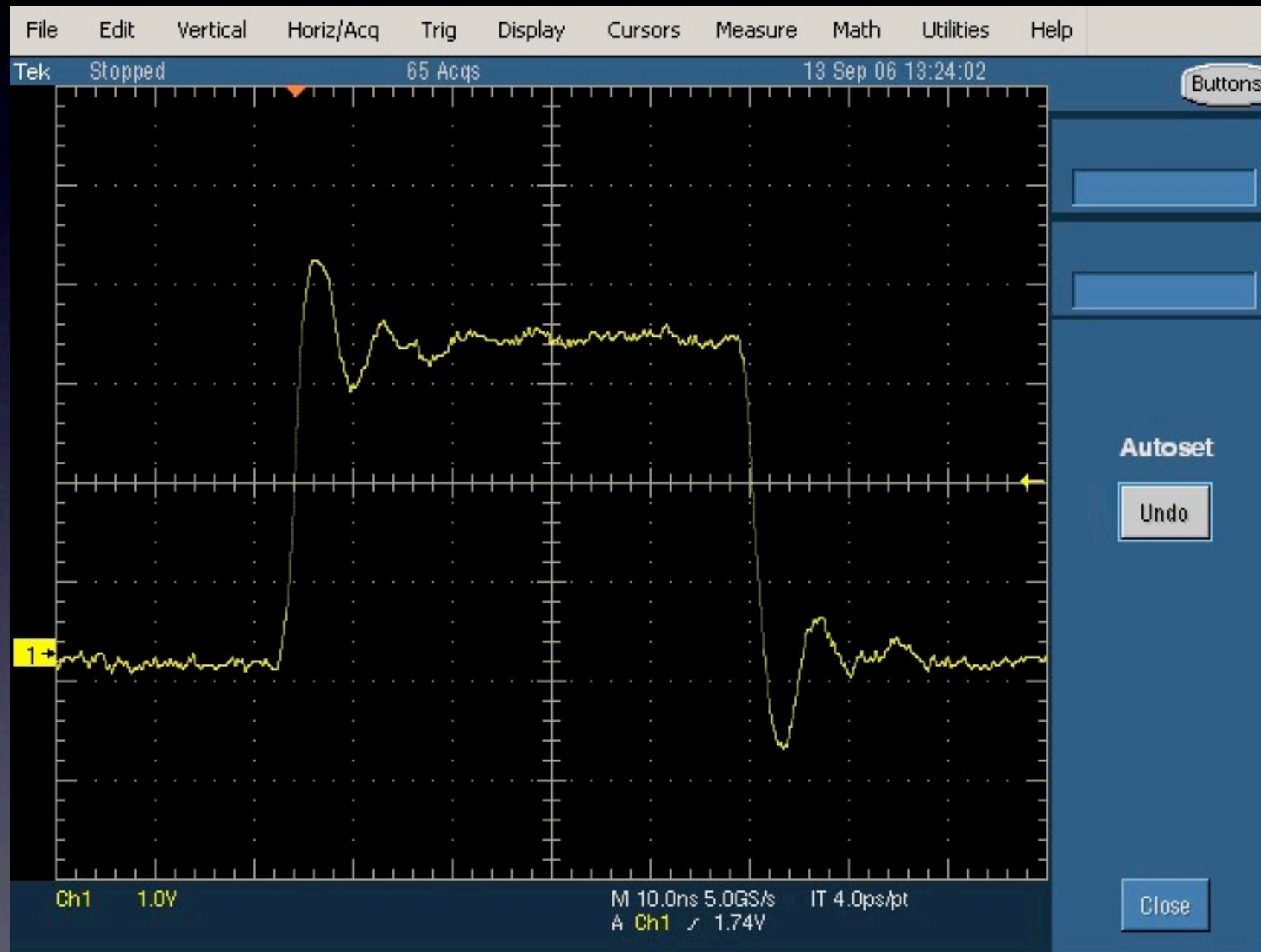


Title <i>Power input and conditioning</i>			<i>National ICT Australia Level 4 223 ANZAC Pde Kensington NSW, 2052</i>	
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Layout

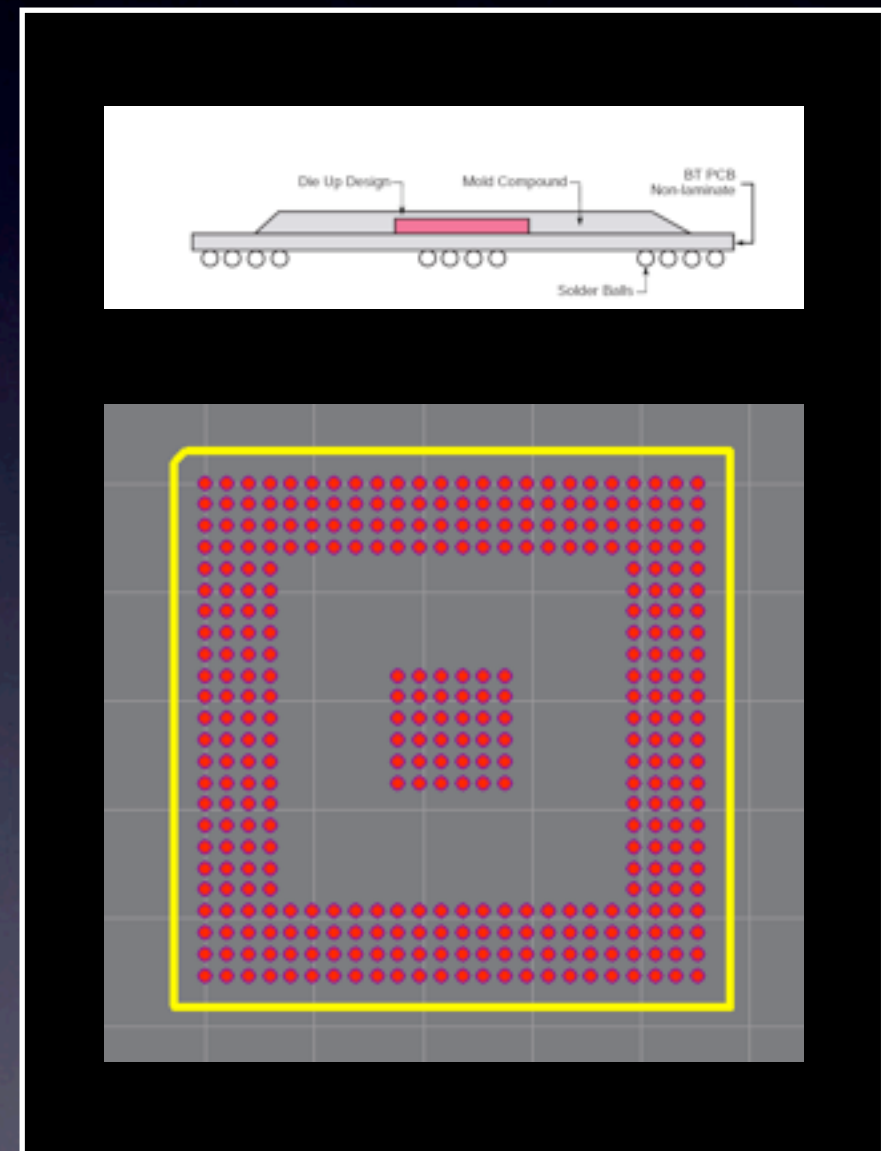


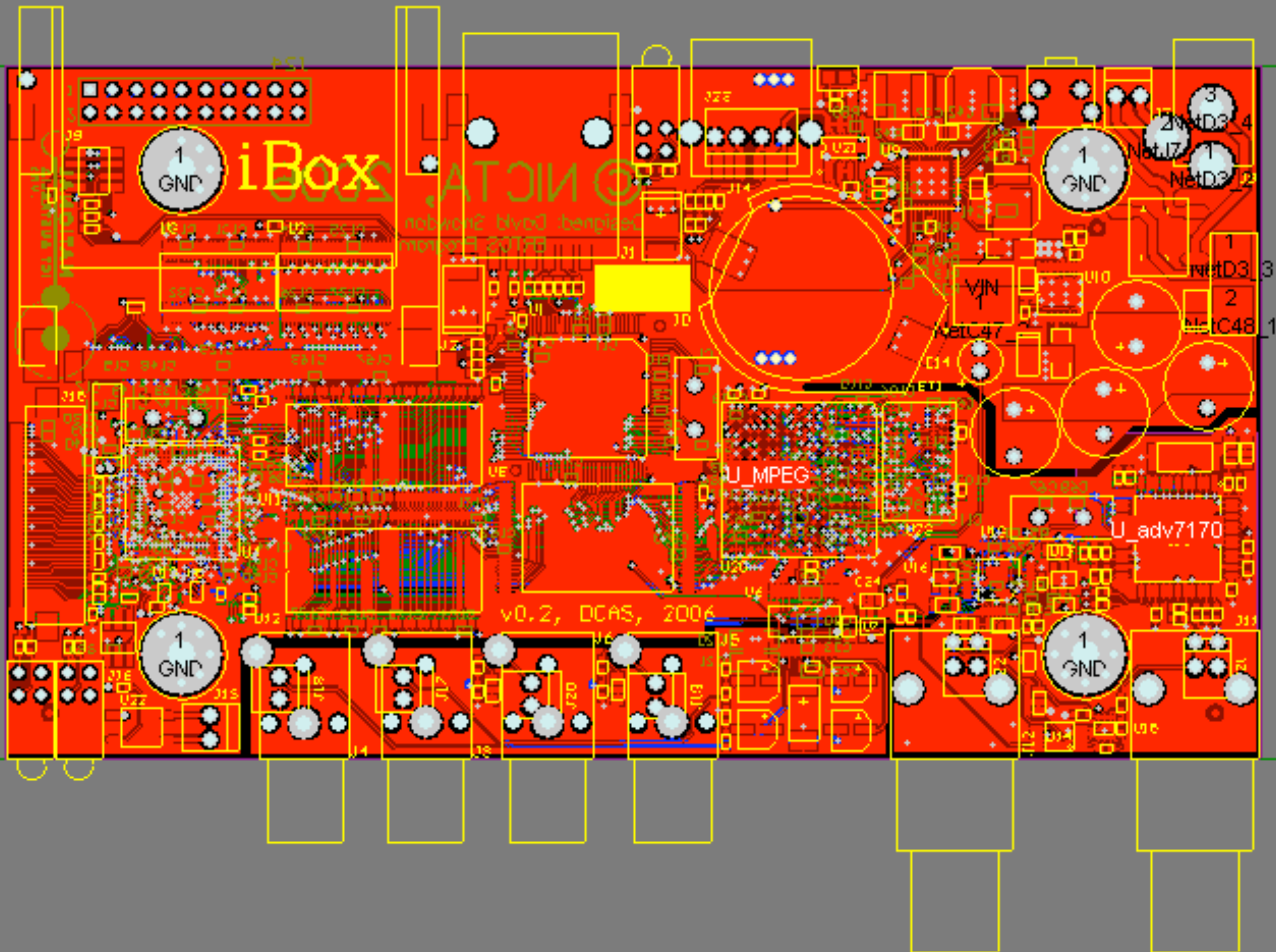
Signal Integrity



More trickiness

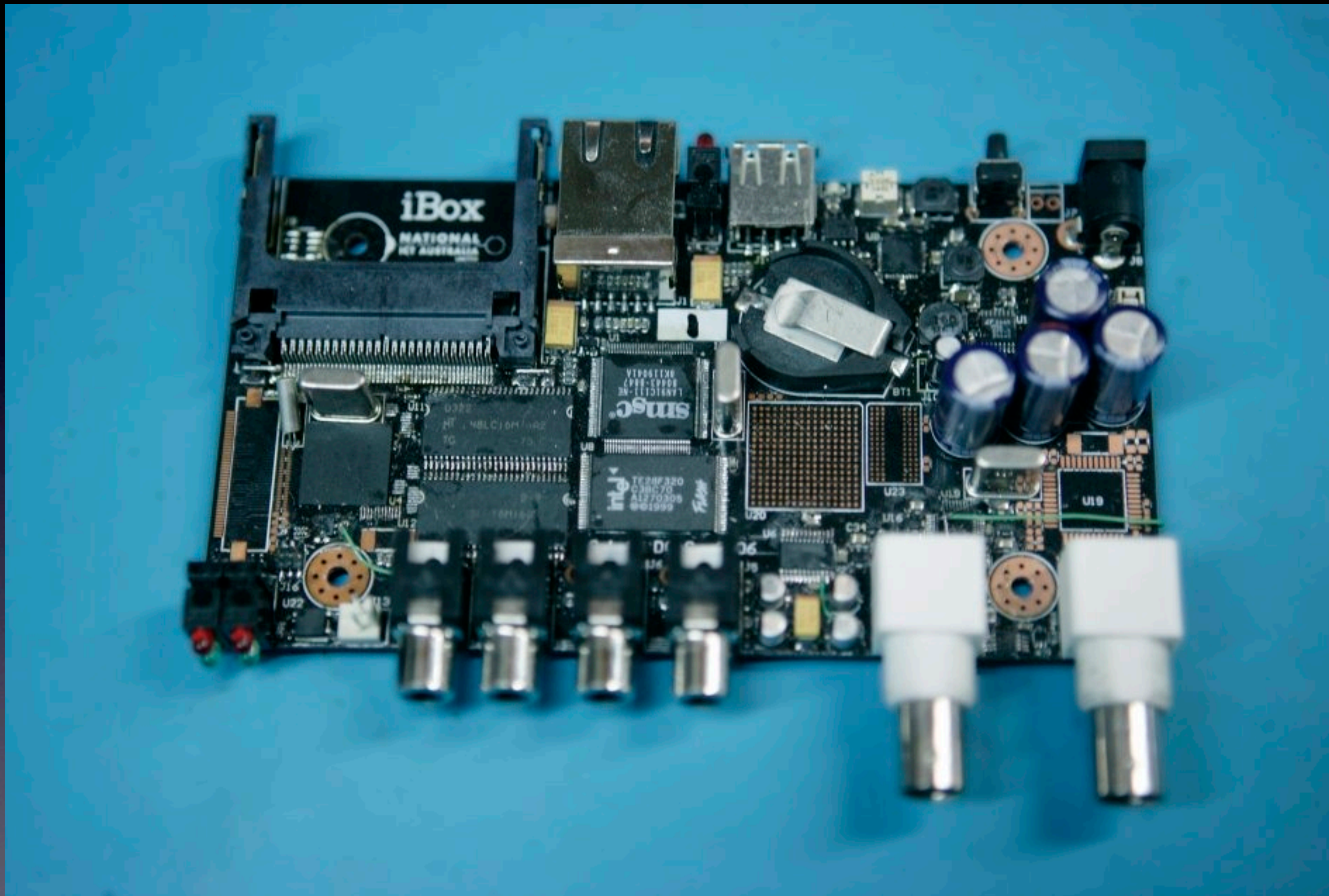
- 624MHz PXA270 is a BGA -- 0.5mm pitch
- Requires very small vias -- LASER drilling.
- Buried and blind vias.





Bring-up

- JTAG interface and routines for testing/programming
- Port the bootloader
- Port an OS (or two)
- Get the drivers working to test hardware



More Information

- <http://www.snowdon.id.au/Projects/Projects.html>
- <http://ertos.nicta.com.au/hardware/ibox/>
- dave@snowdon.id.au