



ATI Corporate Presentation

AMD1044_0188869

ATI Ex. 2055
IPR2023-00922
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Software Status - BIOS

- New BIOS Architecture – table based with command decoder shared by driver and BIOS
- Major modifications of command decoder have been done since last review

	Review	Implemented	To Be		To Be Verified
			Implemented	Verified	
Macros	Last Review	36 (78%)	10 (22%)	12 (33%)	24 (67%)
	This Review	20 (100%)	0 (0%)	20 (100%)	0 (0%)
Commands	Last Review	34 (69%)	15 (31%)	13 (38%)	21 (62%)
	This Review	24 (96%)	1 (4%)	12 (50%)	12 (50%)

- Driver (CAIL and DAL) has integrated with the new command decoder and boot up to Windows desktop with R300
- Call table function is complete and parameter passing is under way
- BIOS is ready for IKOS BIOS bringup; after some sequences confirmed on IKOS, they will be converted to tables (~1 week effort) for IKOS driver bringup
- For final R400 BIOS (before A11 back), 69 BIOS tables are defined and need to be implemented and tested on IKOS by BIOS team



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Software Status – 2D Drivers

Component	Review	Critical			High			Medium			Low			Total
		Q	A	FA+	Q	A	FA+	Q	A	FA+	Q	A	FA+	
CMM/QS	Last Review	1	2	7	2	4	1	5	1	2	2	1	0	28
	This Review	0	0	8	1	4	3	7	1	2	2	1	0	29
CAIL	Last Review	0	3	1	2	0	2	2	1	0	1	0	0	12
	This Review	0	2	2	0	1	3	2	0	1	1	0	0	12
DAL/GXO	Last Review	2	2	10	27	4	2	23	1	2	8	0	1	82
	This Review	0	3	10	7	7	19	21	3	3	7	1	1	82
2D/NTx	Last Review	0	4	14	5	6	4	2	2	3	5	0	0	45
	This Review	0	1	17	2	5	8	4	0	4	5	0	0	46
2D/9x	Last Review	0	0	0	3	1	4	11	1	3	3	1	1	28
	This Review	0	0	0	3	1	4	10	0	5	3	0	2	28
Subtotal	Last Review	3	11	32	39	15	13	43	6	10	19	2	2	195
	This Review	0	6	37	13	18	37	44	4	15	18	2	3	197
Summary	Last Review	6.52%	23.91%	69.57%	58.21%	22.39%	19.40%	72.88%	10.17%	16.95%	82.61%	8.70%	8.70%	
	This Review	0.00%	13.95%	86.05%	19.12%	26.47%	54.41%	69.84%	6.35%	23.81%	78.26%	8.70%	13.04%	
	Progress	-6.52%	-9.96%	16.48%	-39.09%	4.08%	35.01%	-3.04%	-3.82%	6.86%	-4.35%	0.00%	4.35%	



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Software Status – 3D Drivers

• Compiler

11/27/2002 Milestones	Status	12/20/2002 Milestones	Status
IL to IR conversion (move from 80% to 100%)	Now at 95+% (additional OGL2 and DX9 opcodes support moved to Jan 31 milestone)		
SSA Generation (move from ???% to 100%)	Code complete, but not well tested		
Optimizations (move from 0% to 25%); dead code elimination, copy elimination and constant folding	Moved optimization work to Jan 31 milestone to focus on feature implementation		
Sched/Local Reg Alloc (move from 0% to 100%)	75% done; testing and completion moved to Dec 20 milestone	Sched/Local Reg Alloc (move from 75% to 100%)	Testing, debugging, and tuning are under way
Interference Graph (move from 0% to 100%)	all moved to Jan 31 milestone		
Global Reg Alloc (move from 0% to 100%)	all moved to Jan 31 milestone		
Assembler (move from 80% to 100%)	complete		
All DX8 Shader Programs (i.e., non-branching)	All DX8 required opcodes are coded and tested; relative addressing of constant registers is coded, awaiting test; support for point/Line AA and pixel fog is under way	Remaining DX8 Shader support - testing for relative addressing of constant registers; Point AA code complete awaiting test; Line AA & pixel fog in progress	Point AA is being tested right now. Line AA will be implemented next followed by pixel fog
All DX9 Shader Programs without Wildcarding	(DX9 opcodes plus control flow support) moved to Dec 20 milestone	All DX9 Shader Programs without Wildcarding - DX9 opcodes plus control flow support	All the code to deal with control flow is in place but has not been tested; 3 opcodes awaiting implementation.



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Software Status – 3D Drivers

- SSM

11/27/2002 Milestones	Status	12/20/2002 Milestones	Status
Support drivers, compiler, and SSM debug efforts	complete	SSM support for Flat shading (requires CC_COMPILED_PROGRAM interpolator usage)	30% complete
PS/VS Debugger and registry utilities	Basic registry utilities are complete. The PS/VS debugger is non-critical and is moved to Jan/Feb 2003	Update SSM interface	10% complete
Implement SSM-internal Textures	code complete (Point AA is being tested. Testing for Pixel Fog and Line AA requires support from TEXTURE_SERVER and Compiler)	SSM support for Cylindrical wrapping	not started
Design Expanded SSM-Compiler interface	complete	Complete POST_PROCESSOR implementation	80% complete
New SSM-Compiler Interface: basic framework	complete	Finish Implemenion of Compiler-AbstractState "AS_Query" functions	complete
New SSM-Compiler Interface: Compiled Programs	complete	Texture Formats (Part 2)	complete
Start Implemenion of Compiler-AbstractState "AS_Query" functions	complete	Implement Cubemap support	code complete
Implement TEXTURE_SERVER to enable internal textures	70% complete (in progress to populate textures for Pixel Fog and line AA)	ProgramStore updates	70% complete
Texture Formats (Part I: ARGB 32 and 16 bit formats)	complete	Implement SSMSetPreamble	code complete
Implement LCC support	complete	Texture Filtering	not started
MSAA support	complete	Add AS_STATES	not started



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Software Status – 3D Drivers

- D3D

11/27/2002 Milestones	Status	12/20/2002 Milestones	Status
Z and Stencil (fast/slow) Clears	code complete (wait for support from emulator)	Gamma Correction (RT and Texture)	not started
Vertex Shader 2.0	40% complete	Multi-sample 4xAA	20% complete
Pixel Shader 2.0	code complete (test will be done in Dec 20 milestone)	Cubemap	code complete, need support from emulator and compiler for testing
Color (fast/slow) clear	code complete (wait for support from emulator)	3D Texture	code complete, need support from emulator and compiler for testing
Vertex Fog	complete (wait for fix from next release of emulator)	State Blocks	investigating to see if anything need to be done
YUV-RGB Conversion	code complete (tested via copy-bit interface, wait for compiler support)	Lock/Unlock Framebuffer	just started
Texture Formats (ARGB16 and 32 formats)	complete	Line Stippling	not started
Candidate DX8 SDK apps to run	MFC Texture, MFC Shader, Vertex Shader, and Clip Mirror ran successfully	Pixel Fog	code complete
		Simple N-Path Tri HOS	20% complete
		Texture Formats (PART II)	50% complete
		DX8 Apps (Part 1: PS/VS 2.0 Shaders)	test and debug not started
		Cylindrical Wrap	not started
		HostBLT Test/Debug (new)	not started
		Texture Filtering (new)	not started
		4 More DX8 SDK apps to run	20% complete

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Software Status – 3D Drivers

- OpenGL

11/27/2002 Milestones	Status	12/20/2002 Milestones	Status
GLReadPixels	complete (emulator issue on PCI GART reads)	Render to Texture	started
DisplayLists	trivial implementation complete; optimization moved to Jan 31 milestone	Mipmap Generation	started
Multi-sample AA	complete (rendering has been tested, emulator issue with bil)	Shadow Buffers	not yet start
Polygon Fill Mode	complete	HP_occlusion_test	started; emulator support required
Fragment Program (ARB)	complete (limited test due to lack of cube map and 3D texture support in emulator)	NV_occlusion_query	not yet start; emulator support required
Polygon Offset	complete	Testing of Cubemap and 3D Texture	wait for emulator support
Fog (vertex)	complete (Fixed function fog still being debugged - possibly emulator problem)	Testing of Point and Line AA	wait for compiler support
Line and Polygon Stipple	Line stipple complete; Polygon Stipple moved to Jan 31 milestone	2 Sided Lighting	not yet start
Front and Back Rendering	complete	Candidate Apps: Quake3 and Doom3 shader test	
User Clip Plane	complete		
Point Sprite	moved to Jan 31 milestone		
Candidate Apps: Blue Pony and X-29	successfully ran with some corruption on the models		

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Software Verifications

- BIOS
 - Use existing ASICs for verifying new BIOS architecture
 - Verify BIOS functionality on IKOS
- 2D Drivers
 - Use QS-EMU for verifying all applicable 2D tasks
 - Modified DDT for testing on QS-EMU and incoming IKOS
 - Run thru all DCT GDI tests for 32bpp, 16bpp, and 8bpp
 - Dump packets and expected images; provide them to h/w teams for verifications



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Software Verifications (cont.)

- SSM & Compiler
 - Currently about 24,000 test cases developed
 - 1406 tests PASS with Nov 20 QS-EMU release
 - Moving forward to group tests into following categories:
 - Smooth shaded triangles (trivial shader)
 - Textured triangles (simple shader)
 - Simple scenes (complex shader)
 - Complicated render states (to be developed)

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Software Verifications (cont.)

- D3D
 - Internal Verification Tests
 - DX (render) Test Suite: 413 out of 539 cases PASS (77%)
 - DX8 Shader Test Suite: 848 out of 936 cases PASS (91%)
 - DX9 Shader Test Suite: ready to test on Dec 20 milestone
 - Internal Func Tests: most fixed functions
 - DX7: about 30 tests and 30 cases per test
 - DX8: about 30 tests and 30 cases per test
 - DX9: about 30 tests and 30 cases per test
 - SDK Applications
 - DX7: about 30 applications
 - DX8: about 30 applications
 - DX9: about 30 applications
 - Simple Applications
 - 3D WinBench
 - 3DMark 2000
 - Unreal Tournament
 - Commanche
 - Advanced Applications
 - 3DMark 2001
 - 3DMark 2003
 - Unreal Tournament 2003
 - ARG Demos
 - WHQL



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Software Verifications (cont.)

- OpenGL
 - Red Book Suite
 - Smooth: 100%
 - Alpha: 100%
 - Checker 100%
 - Light: 100%
 - Scene: 90% (possibly emulator issues)
 - Texgen
 - Teapots
 - Conformance Testing
 - WHQL Test Set
 - OpenGL Conformance Test Suite: 29 out of 70 cases PASS (41%)
 - ATI's Quickcheck Test Suite
 - Applets
 - Blue Pony: 50%
 - X29: 50%
 - Glutdino
 - Chick Berry
 - Ideas
 - Rollercoaster
 - Dinoshade
 - Bubble
 - Simple Games/Applications
 - Quake2 & Quake3
 - Glaze
 - Serious Sam
 - 3DArg Doom3 Shader test: 20%
 - ViewPerf/CDRS
 - Complex Games/Applications
 - Vulpine GLmark & Vulpine GLmark2
 - Viewperf/UGS
 - Serious Sam 2
 - Doom3
 - 3DArg R300 Demos



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IKOS Preparation

- R400 Bringup plan
 - Updated sections for IKOS Bring Up for BIOS and 2D components
 - Need to update IKOS sections for 3D and MM components
- BIOS Bringup
 - BIOS is ready and wait for netlist 3.0
- Driver Bringup
 - Target to complete all planned IKOS-verifiable 2D features by Dec 20
 - Working with IKOS lab to setup necessary environment

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Risks – s/w side

- BIOS: new architecture – minor risk
- DAL/GXO: new Display Controller; amount of software work is large; good progress recently
- Delay of implementation of AAFont and AlphaBlend 2D packets introduces a small but new risk
- Compiler is still pushed to have complete functionality support; capacity and performance will soon become new focal points
- Overall performance target is always challenging risk



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Risks – h/w related

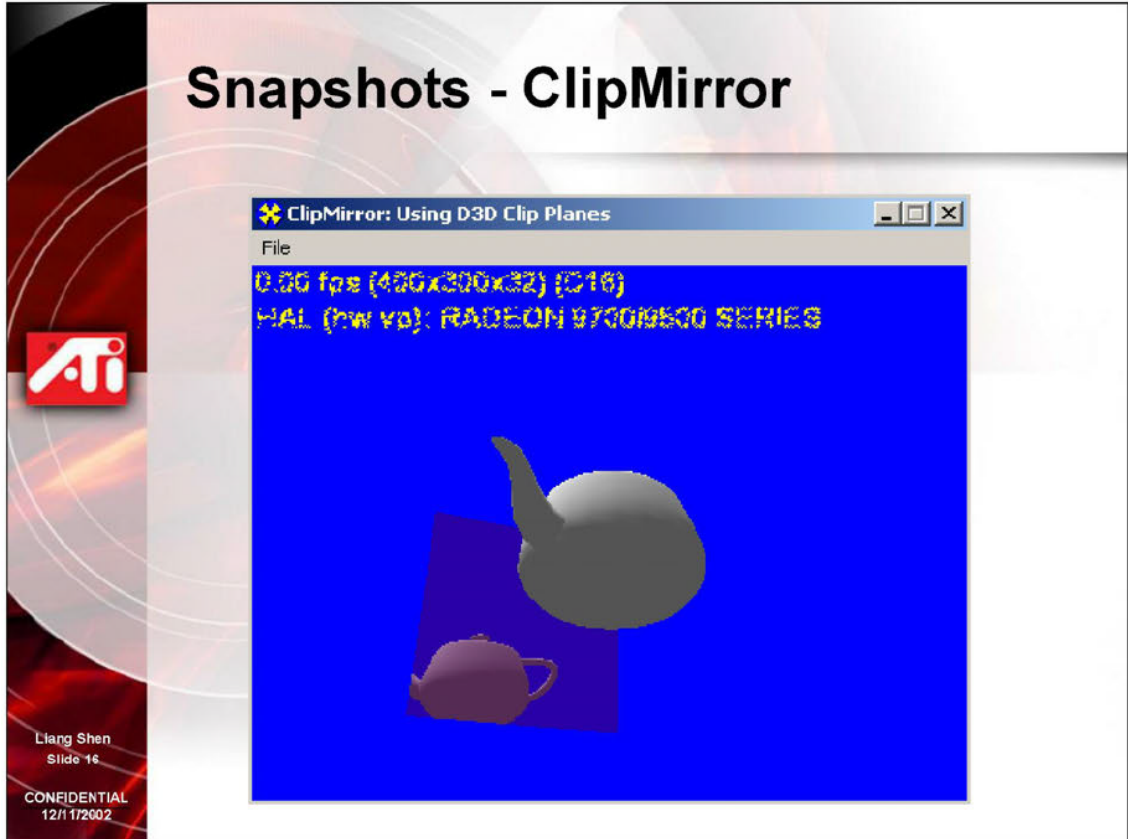
- Use of QuickTurn box (instead of IKOS) introduces some unknowns
- Delay start of simulation squeezes overall verification efforts
- Emulator issues and feature completeness are critical for s/w development; need a better mechanism to sync emulator release and necessary changes required for QS-EMU



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Snapshots - ClipMirror

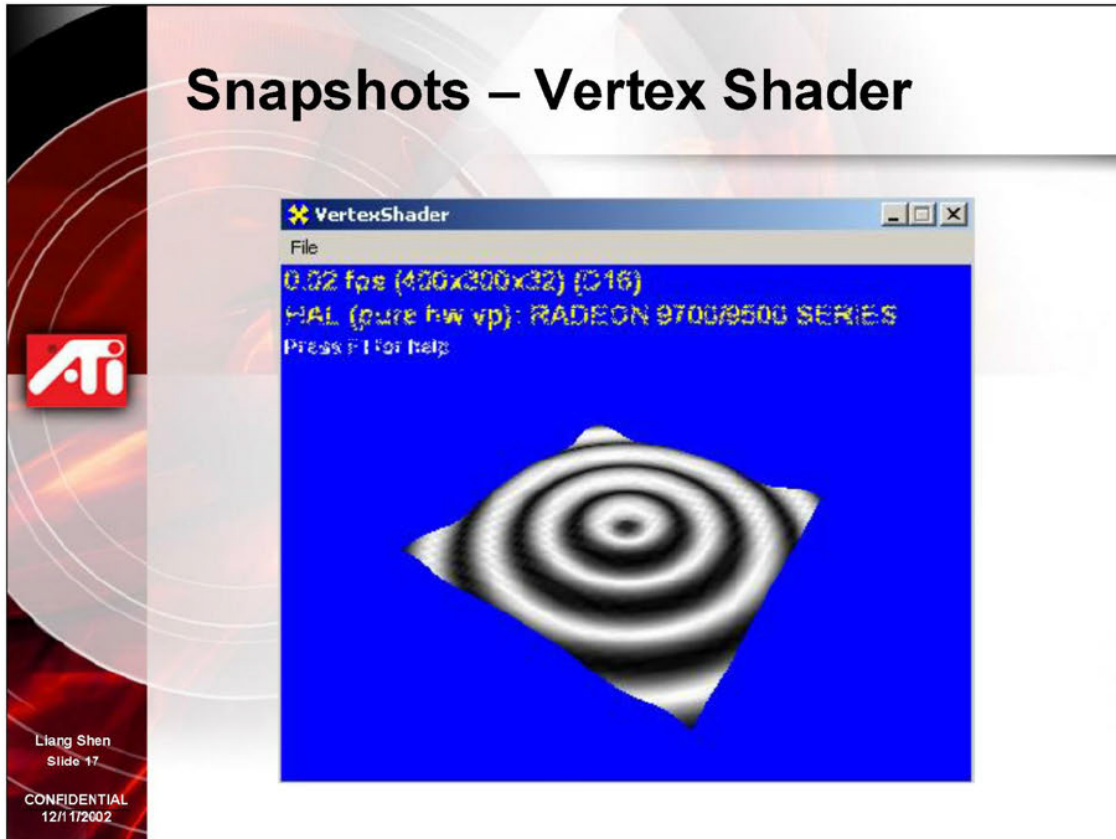


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Snapshots – Vertex Shader



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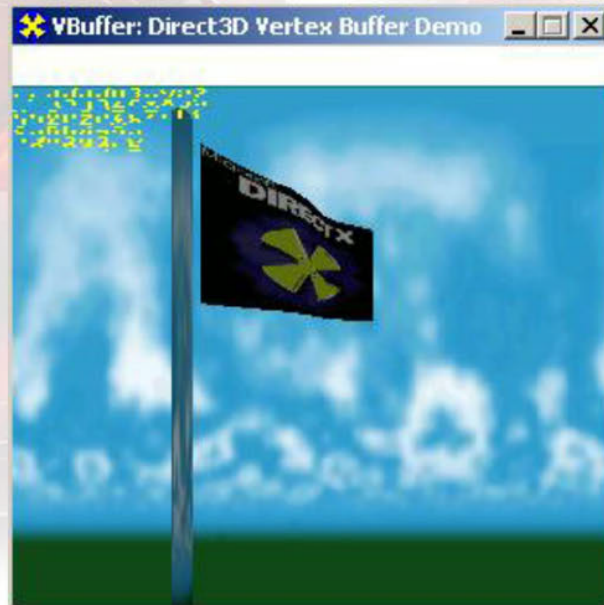
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Snapshots – Vertex Buffer



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Snapshots – Yellow Bend



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Snapshots – Dolphin (no Fog)



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Component	Week	Critical			High			Medium			Low			Total	Note
		Q	A	FA+	Q	A	FA+	Q	A	FA+	Q	A	FA+		
CMM/QS	Last Week	0	0	8	2	4	2	6	1	2	2	1	0	28	
	This Week	0	0	8	1	4	3	7	1	2	2	1	0	29	
CAIL	Last Week	0	2	2	2	0	2	2	0	1	1	0	0	12	
	This Week	0	2	2	0	1	3	2	0	1	1	0	0	12	
DAL/GXO	Last Week	0	3	10	10	8	15	22	3	2	8	0	1	82	
	This Week	0	3	10	7	7	19	21	3	3	7	1	1	82	
2D/NTx	Last Week	0	2	16	5	4	6	4	0	4	5	0	0	46	
	This Week	0	1	17	2	5	8	4	0	4	5	0	0	46	
2D/9x	Last Week	0	0	0	3	1	4	10	1	4	3	0	2	28	
	This Week	0	0	0	3	1	4	10	0	5	3	0	2	28	
Subtotal	Last Week	0	7	36	22	17	29	44	5	13	19	1	3	196	
	This Week	0	6	37	13	18	37	44	4	15	18	2	3	197	
Summary	Last Week	0.00%	16.28%	83.72%	32.35%	25.00%	42.65%	70.97%	8.06%	20.97%	82.61%	4.35%	13.04%		
	This Week	0.00%	13.95%	86.05%	19.12%	26.47%	54.41%	69.84%	6.35%	23.81%	78.26%	8.70%	13.04%		
	Progress	0.00%	-2.33%	2.33%	-13.24%	1.47%	11.76%	-1.13%	-1.72%	2.84%	-4.35%	4.35%	0.00%		

Component	Week	Critical (man-days)	High-Priority (man-days)	Subtotal (man-days)	Average (full-time)
CMM/QS	Last Week	0	23	23	2.3
	This Week	0	15	15	1.5
CAIL	Last Week	4	8	12	1.2
	This Week	2	3	5	0.5
DAL/GXO	Last Week	2	48	50	5.0
	This Week	2	41	43	4.3
2D/NTx	Last Week	3	57	60	6.0
	This Week	1	49	50	5.0
2D/9x	Last Week	0	8	8	0.8
	This Week	0	8	8	0.8
Total	Last Week	<i>Workdays</i>	10	<i>Full-time</i>	15.3
	This Week	<i>Workdays</i>	10	<i>Full-time</i>	12.1

2D	PM4 Packet	Brief Test Method Description	QS-EMU Version	Test Results	Note
Legacy	PAINT				
	SMALL_TEXT				
	BITBLT				
	HOSTDATA_BLT				
	POLYLINE				
	POLYSCANLINES				
	NEXTCHAR				
	SET_SCISSORS				
	PAINT_MULTI				
	BITBLT_MULTI				
	TRANS_BITBLT				
	LOAD_PALETTE				
	New	HOSTDATA_BLT2			
HOSTDATA_BLT_PNTR					
GRADFILL					
ALPHABLEND					
AAFONT					

Component	Critical			High			Medium			Low			Total
	Q	A	FA+	Q	A	FA+	Q	A	FA+	Q	A	FA+	
CMM/QS	1	2	7	2	4	1	5	1	2	2	1	0	28
CAIL	0	3	1	2	0	2	2	1	0	1	0	0	12
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2D/NTx	0	4	14	5	6	4	2	2	3	5	0	0	45
2D/9x	0	0	0	3	1	4	11	1	3	3	1	1	28
Subtotal	3	11	32	39	15	13	43	6	10	19	2	2	195
Percentage	6.52%	23.91%	69.57%	58.21%	22.39%	19.40%	72.88%	10.17%	16.95%	82.61%	8.70%	8.70%	

Priority	Man-days (Oct 7 - Nov 15)	Man-days (Nov 18 - Mar 31)
Critical	18	18
High	10	65
Medium	5	105
Low	1	39
Total	34	227

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IKOS	Plan	Last	Current
Netlist for Diagnostic		12/2/2002	12/13/2002
Emulation Starts	10/11/2002	12/9/2002	1/4/2003
Emulation w/ Software	11/11/2002	12/15/2002	1/16/2003
RTL Freeze/Final Netlist	11/15/2002	1/31/2003	1/31/2003
A11 Base Layers Tapeout	1/10/2003	3/28/2003	3/28/2003
A11 Metal Layers Tapeout	1/24/2003	4/11/2003	4/11/2003

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