

## U.S. ATLAS E.T.C. WBS Profile Estimates

Funding Source: All

Funding Type: Project

7/19/01 1:36:47 PM

Institutions: U. of California, Santa Cruz-Jr  
U. of California, Santa Cruz-Sr

WBS Number	Description	FY 96 (k\$)	FY 97 (k\$)	FY 98 (k\$)	FY 99 (k\$)	FY 00 (k\$)	FY 01 (k\$)	FY 02 (k\$)	FY 03 (k\$)	FY 04 (k\$)	FY 05 (k\$)	Total (k\$)
1.1.2	<b>Silicon Strip System</b>	0	0	0	0	659	2651	345	117	0	0	3771
1.1.2.1	<b>IC Electronics</b>	0	0	0	0	595	2534	239	104	0	0	3472
1.1.2.1.1	<b>Design</b>	0	0	0	0	160	158	158	104	0	0	580
1.1.2.1.1.1	<b>Bipolar preamp/comp</b>	0	0	0	0	78	0	0	0	0	0	78
1.1.2.1.1.1.1	<b>IC Design</b>	0	0	0	0	55	0	0	0	0	0	55
1.1.2.1.1.1.1.1	<b>IC Design - LBNL</b>	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.1.1.2	<b>IC Design - UCSC</b>	0	0	0	0	55	0	0	0	0	0	55
1.1.2.1.1.1.2	<b>Test Engineering</b>	0	0	0	0	23	0	0	0	0	0	23
1.1.2.1.1.1.2.1	<b>Test Eng. - LBNL</b>	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.1.2.2	<b>Test Eng. - UCSC</b>	0	0	0	0	23	0	0	0	0	0	23
1.1.2.1.1.2	<b>CMOS digital pipeline (ABC)</b>	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.2.1	<b>IC Design</b>	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.2.1.1	<b>IC Design - UCSC</b>	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.2.1.2	<b>IC Design-LBNL</b>	0	0	0	0	0	0	0	0	0	0	0

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1.1.2.1.1.2.2	Test Engineering	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.2.2.1	Test Eng. - UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.2.2.2	Test Eng. At LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.3	Systems Engineering/Admi	0	0	0	0	81	158	158	104	0	0	502
1.1.2.1.1.3.1	Systems Engineering	0	0	0	0	72	98	98	49	0	0	317
1.1.2.1.1.3.2	Administrative Support	0	0	0	0	0	55	55	55	0	0	164
1.1.2.1.1.3.2.1	Administrative Support - U	0	0	0	0	0	55	55	55	0	0	164
1.1.2.1.1.3.2.2	Administrative Support - L	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.1.3.3	Systems Materials	0	0	0	0	9	6	6	0	0	0	21
1.1.2.1.2	Development and Prototypes	0	0	0	0	87	0	0	0	0	0	87
1.1.2.1.2.1	Bipolar preamp/comp (CAF	0	0	0	0	17	0	0	0	0	0	17
1.1.2.1.2.1.1	Prototype fabs	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2	Testing	0	0	0	0	17	0	0	0	0	0	17
1.1.2.1.2.1.2.1	Equipment/hardware	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.1	Equipment/hardware - LBN	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.1	Probe Card	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.1	DAQ	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.1	Misc. Elect Components	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.1	Equipment/hardware - UCS	0	0	0	0	0	0	0	0	0	0	0

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1.1.2.1.2.1.2.1.	Probe Card	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.	DAQ	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.1.	Misc. Elect Components	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.2	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.2.	Supervision - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.2.	Supervision - UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.3	Labor	0	0	0	0	17	0	0	0	0	0	17
1.1.2.1.2.1.2.3.	Labor - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.1.2.3.	Labor - UCSC	0	0	0	0	17	0	0	0	0	0	17
1.1.2.1.2.2	CMOS digital pipeline (ABC	0	0	0	0	70	0	0	0	0	0	70
1.1.2.1.2.2.1	Prototype fabs	0	0	0	0	70	0	0	0	0	0	70
1.1.2.1.2.2.2	Testing	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1	Equipment/hardware	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	Equipment/hardware - UCS	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	Probe Card	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	Automatic Probe Station	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	DAQ	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	Misc. Elect Components	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.1.	High speed test system at	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.2	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.2.	Supervision - UCSC	0	0	0	0	0	0	0	0	0	0	0

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1.1.2.1.2.2.2.3	Labor	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.2.2.3.	Labor - UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.3	Focused Ion Beam Repairs	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.2.4	Thinning/metal for prototyp	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3	Production	0	0	0	0	347	2376	81	0	0	0	2804
1.1.2.1.3.1	Preproduction	0	0	0	0	328	0	0	0	0	0	328
1.1.2.1.3.1.1	Chip Fab	0	0	0	0	324	0	0	0	0	0	324
1.1.2.1.3.1.2	Wafer Saw	0	0	0	0	1	0	0	0	0	0	1
1.1.2.1.3.1.3	Wafer thin	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3.1.4	Backside metallization	0	0	0	0	1	0	0	0	0	0	1
1.1.2.1.3.1.5	Shipping	0	0	0	0	1	0	0	0	0	0	1
1.1.2.1.3.2	Full Production	0	0	0	0	0	2218	0	0	0	0	2218
1.1.2.1.3.2.1	Chip Fab	0	0	0	0	0	2147	0	0	0	0	2147
1.1.2.1.3.2.2	Wafer Saw	0	0	0	0	0	29	0	0	0	0	29
1.1.2.1.3.2.3	Wafer thin	0	0	0	0	0	4	0	0	0	0	4
1.1.2.1.3.2.4	Backside metallization	0	0	0	0	0	29	0	0	0	0	29
1.1.2.1.3.2.5	Shipping	0	0	0	0	0	10	0	0	0	0	10
1.1.2.1.3.3	Testing	0	0	0	0	20	158	81	0	0	0	259
1.1.2.1.3.3.1	Equipment/hardware	0	0	0	0	14	138	0	0	0	0	152
1.1.2.1.3.3.1.1	Equipment/hardware	0	0	0	0	14	138	0	0	0	0	152
1.1.2.1.3.3.1.1.	Probe Card	0	0	0	0	0	1	0	0	0	0	1
1.1.2.1.3.3.1.1.	Misc Elect Components	0	0	0	0	0	1	0	0	0	0	1

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1.1.2.1.3.3.1.1.	Pin Driver Board	0	0	0	0	2	4	0	0	0	0	6
1.1.2.1.3.3.1.1.	Probe Station	0	0	0	0	0	75	0	0	0	0	75
1.1.2.1.3.3.1.1.	Tester Components	0	0	0	0	12	57	0	0	0	0	69
1.1.2.1.3.3.2	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3.3.2.1	Supervision - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3.3.2.2	Supervision - UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3.3.3	Labor	0	0	0	0	6	20	81	0	0	0	107
1.1.2.1.3.3.3.1	Labor - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.1.3.3.3.2	Labor - UCSC	0	0	0	0	6	20	81	0	0	0	107
1.1.2.2	Hybrids/Cables/Fanouts	0	0	0	0	29	76	88	5	0	0	198
1.1.2.2.1	Design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.1.1	Hybrid design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.1.1.1	Prototypes - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.1.1.2	Production - LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.2	Development and prototype f	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.2.1	Assembly	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3	Production	0	0	0	0	29	76	88	5	0	0	198
1.1.2.2.3.1	Testing assembled hybrids	0	0	0	0	25	56	32	5	0	0	118
1.1.2.2.3.1.1	DAQ and Burn-In	0	0	0	0	0	41	0	0	0	0	41
1.1.2.2.3.1.1.1	DAQ	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.1.2	Burn-in	0	0	0	0	0	41	0	0	0	0	41

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1.1.2.2.3.1.2	Training labor	0	0	0	0	25	0	0	0	0	0	25
1.1.2.2.3.1.2.1	Labor LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.2.2	Labor UCSC	0	0	0	0	25	0	0	0	0	0	25
1.1.2.2.3.1.3	Production labor	0	0	0	0	0	4	32	5	0	0	40
1.1.2.2.3.1.3.1	Supervision LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.3.2	Supervision UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.3.3	Labor LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.3.4	Labor UCSC	0	0	0	0	0	4	32	5	0	0	40
1.1.2.2.3.1.4	Hybrid rework	0	0	0	0	0	12	0	0	0	0	12
1.1.2.2.3.1.4.1	Tools	0	0	0	0	0	12	0	0	0	0	12
1.1.2.2.3.1.4.2	Labor UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.5	Probing	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.1.5.1	Flying Probe	0	0	0	0	0	0	0	0	0	0	0
1.1.2.2.3.5	Assembly	0	0	0	0	4	20	56	0	0	0	80
1.1.2.2.3.5.1	Parts loading	0	0	0	0	4	20	56	0	0	0	80
1.1.2.2.3.5.2	Wirebonding	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3	Module Assembly and Test	0	0	0	0	34	41	17	9	0	0	102
1.1.2.3.1	Design of assembly and test	0	0	0	0	34	0	0	0	0	0	34
1.1.2.3.1.1	Prototype design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.1.1	Tooling design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.1.2	Assembly design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2	Production design	0	0	0	0	34	0	0	0	0	0	34

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1.1.2.3.1.2.1	Tooling design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.2	Process design	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.3	Testing design	0	0	0	0	34	0	0	0	0	0	34
1.1.2.3.1.2.3.1	Mechanical	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.3.1.	Technical labor LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.3.1.	Technical labor UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.3.2	Electronic and software	0	0	0	0	34	0	0	0	0	0	34
1.1.2.3.1.2.3.2.	Engineering labor LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.1.2.3.2.	Engineering labor UCSC	0	0	0	0	34	0	0	0	0	0	34
1.1.2.3.2	Development and prototypes	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1	Tooling for prototype asse	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.1	Screen printer for adhesive	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.2	Mechanical motion stages	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.3	Microscope	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.4	Computer for control	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.5	Pattern recognition softwar	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.6	Fixtures	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.7	Oven	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.8	Isolation table	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.9	Video camera	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.10	GPIB controllers	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.11	Digitization card	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.1.12	Miscellaneous parts	0	0	0	0	0	0	0	0	0	0	0

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1.1.2.3.2.2	Prototype materials	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.2.1	Heat spreaders	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.2.2	Beryllia frames	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.3	Assembly labor for prototy	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.3.1	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.2.3.2	Labor	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3	Production	0	0	0	0	0	41	17	9	0	0	67
1.1.2.3.3.1	Facilities preparation	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.2	Assembly equipment	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.2.1	Wirebonder	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.2.2	Coordinate measuring syst	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.2.3	Glue Dispense Robot	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.3	Assembly tooling (covered	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.4	Materials and supplies	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.4.1	Adhesives	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5	Assembly labor	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.1	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.2	Training labor	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.3	Production labor	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.3.1	Assembly - senior	0	0	0	0	0	0	0	0	0	0	0



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1.1.2.3.3.5.3.2	Assembly -junior	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.3.3	Wirebonding	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.5.3.4	Machining of heat spreader	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6	Module testing	0	0	0	0	0	41	17	9	0	0	67
1.1.2.3.3.6.1	Equipment	0	0	0	0	0	26	0	0	0	0	26
1.1.2.3.3.6.1.1	Environmental box	0	0	0	0	0	5	0	0	0	0	5
1.1.2.3.3.6.1.1.	LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.1.1.	UCSC	0	0	0	0	0	5	0	0	0	0	5
1.1.2.3.3.6.1.1.	UCI	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.1.2	DAQ/Burn-in system	0	0	0	0	0	21	0	0	0	0	21
1.1.2.3.3.6.1.2.	LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.1.2.	UCSC	0	0	0	0	0	21	0	0	0	0	21
1.1.2.3.3.6.1.2.	UCI	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2	Testing labor	0	0	0	0	0	15	17	9	0	0	41
1.1.2.3.3.6.2.1	Supervision	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2.1.	LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2.1.	UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2.1.	UCI	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2.2	Training labor	0	0	0	0	0	11	0	0	0	0	11
1.1.2.3.3.6.2.2.	LBNL	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.6.2.2.	UCSC	0	0	0	0	0	11	0	0	0	0	11
1.1.2.3.3.6.2.3	Production labor	0	0	0	0	0	4	17	9	0	0	30
1.1.2.3.3.6.2.3.	LBNL	0	0	0	0	0	0	0	0	0	0	0

WBS Number	Description	FY 96 (k\$)	FY 97 (k\$)	FY 98 (k\$)	FY 99 (k\$)	FY 00 (k\$)	FY 01 (k\$)	FY 02 (k\$)	FY 03 (k\$)	FY 04 (k\$)	FY 05 (k\$)	Total (k\$)
1.1.2.3.3.6.2.3.	UCSC	0	0	0	0	0	4	17	9	0	0	30
1.1.2.3.3.7	Rework -UCSC	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.8	Production database and c	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.8.1	Software	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.8.2	Barcode system	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.9	Shipping	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.9.1	Boxes for each module	0	0	0	0	0	0	0	0	0	0	0
1.1.2.3.3.9.2	Crates	0	0	0	0	0	0	0	0	0	0	0