WBS Number: 1.1.2 **Description:** Silicon Strip System

Institution : **Contact:**

The silicon strip system is part of the ATLAS Inner Tracker. It is composed of four barrel layers and a number of annular disk layers made up of individual silicon detectors with associated readout electronics. The US contribution includes work on front-end electronics, module design and construction, and the ROD system for receiving information from the detector. The US groups will be organized to provide one of the construction centers for ATLAS with the goal of producing and testing front-end electronics, producing barrel detector modules, and RODs. This will follow and is based on significant contributions to the design and prototyping of these items.

Details of Estimate: The silicon strip system is part of the ATLAS Inner Tracker. It is composed of four barrel layers and a number of annular disk layers made up of individual silicon detectors with associated readout electronics. The US contribution includes work on front-end electronics, module design and construction, and the ROD system for receiving information from the detector. The US groups will be organized to provide one of the construction centers for ATLAS with the goal of producing and testing front-end electronics, producing barrel detector modules, and RODs. This will follow and is based on significant contributions to the design and prototyping of these items.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
2230	673	30	2903	389	1136	49	657	25.6	4.1

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	3300	0	0	200	3544	0	0	13200	0	0	16520	1136.083
MFG B/I	0	0	0	0	0	3520	0	1760	0	0	240	0	175.624
EDIA P	0	1696	0	0	2640	440	0	0	3520	0	0	0	388.627
EDIA B/I	0	1306	440	0	0	0	0	0	0	0	0	0	161.484
	0	6302	440	0	2840	7504	0	1760	16720	0	240	16520	1861.818

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	521	0	0	6	0	103.9	656.560
MFG MC	381	0	0	0	0	0.0	380.814
EDIA P	4	20	20	0	0	0.0	48.660
	905	20	20	6	0	103.9	1086.034

PROFILE SUMMARY:

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$)
0	0	17	0	0	0	2008	923	0	0	2948

WBS Number: 1.1.2.1 **Description:** IC Electronics

Institution : **Contact:** A. Grillo

This estimate covers the US contribution to ATLAS SCT for on-detector electronics. We assume that the full electronics design, development and procurement will be shared by the collaborating institutions. This procurement includes the fabrication and testing so that good working ICs are provided to the hybrid assembly operations and the various collaborating institutions. The baseline architecture calls for "Binary Readout" consisting of an amplifier, comparator and binary pipeline.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
719	288	40	1007	350	64	49	257	6.8	1.7

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	4200	63.777
EDIA P	0	1496	0	0	2640	0	0	0	3520	0	0	0	349.999
EDIA B/I	0	1306	0	0	0	0	0	0	0	0	0	0	120.014
	0	2802	0	0	2640	24	0	0	3520	0	0	4200	533.790

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	145	0	0	6	0	103.9	256.604
MFG MC	381	0	0	0	0	0.0	380.814
EDIA P	4	20	20	0	0	0.0	48.660
	529	20	20	6	0	103.9	686.078

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	982	238	0	0	1220

WBS Number: 1.1.2.1.1 **Description:** Design

Institution : **Contact:** A. Grillo

Continued support of testing engineering, systems engineeing and administrative support.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
302	27	9	329	238	0	49	15	2.9	1.7

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	1496	0	0	0	0	0	0	3520	0	0	0	238.042
EDIA B/I	0	1306	0	0	0	0	0	0	0	0	0	0	120.014
	0	2802	0	0	0	0	0	0	3520	0	0	0	358.056

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	15	0	0	0	0	0.0	15.000
EDIA P	4	20	20	0	0	0.0	48.660
	19	20	20	0	0	0.0	63.660

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	241	181	0	0	422

WBS Number: 1.1.2.1.1.1 **Description:** Test Engineering

Institution : **Contact:** A. Grillo

Continuation of test engineering support to complete the ABCD test system.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
45	10	22	55	41	0	4	0	0.3	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	440	0	0	0	0	0	0	0	0	0	0	41.470
	0	440	0	0	0	0	0	0	0	0	0	0	41.470

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
EDIA P	4	0	0	0	0	0.0	3.780
	4	0	0	0	0	0.0	3.780

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	45	0	0	0	45

WBS Number: 1.1.2.1.1.1.1 **Description:** Test Eng. - UCSC

Institution : U. of California, Santa Cruz-Jr **Contact:** A. Grillo

The EE and ME test engineering at UCSC.

Basis of Estimate: Engineering judgement

Details of Estimate: None.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

WBS Number: 1.1.2.1.1.1.2 **Description:** Test Eng. At LBNL

Institution : LBNL/UC-Junior **Contact:** A. Grillo

Engineering time for test engineering

Basis of Estimate: Parametric estimate

Details of Estimate: Chinh Vu at 0.25 FTE. Plus computer support.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
45	10	22	55	41	0	4	0	0.3	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	440	0	0	0	0	0	0	0	0	0	0	41.470
	0	440	0	0	0	0	0	0	0	0	0	0	41.470

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
EDIA P	4	0	0	0	0	0.0	3.780
	4	0	0	0	0	0.0	3.780

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	45	0	0	0	45

WBS Number: 1.1.2.1.1.2 **Description:** Systems Engineering/Administration

Institution : **Contact:** A. Grillo

Costs associated with systems engineering of SCT electronics system and with administrative support for shipping, export control and parts tracking

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
256	18	7	274	197	0	45	15	2.6	1.7

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	1056	0	0	0	0	0	0	3520	0	0	0	196.572
EDIA B/I	0	1306	0	0	0	0	0	0	0	0	0	0	120.014
	0	2362	0	0	0	0	0	0	3520	0	0	0	316.586

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	15	0	0	0	0	0.0	15.000
EDIA P	0	20	20	0	0	0.0	44.880
	15	20	20	0	0	0.0	59.880

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	196	181	0	0	376

WBS Number: 1.1.2.1.1.2.1 **Description:** Systems Engineering

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Systems engineering for SCT electronics systems, including ICs, hybrids and modules and grounding specifications and requirements and electromagnetic shielding.

Basis of Estimate: Level of Effort

Details of Estimate: Labor days represents 67% time for Senior Engineer, Ned Spencer, devoted to ATLAS. Travel and misc expenses.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
132	0	0	132	97	0	35	0	0.6	0.7

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	1056	0	0	0	0	0	0	0	0	0	0	97.040
EDIA B/I	0	1306	0	0	0	0	0	0	0	0	0	0	120.014
	0	2362	0	0	0	0	0	0	0	0	0	0	217.054

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
EDIA P	0	10	20	0	0	0.0	34.880
	0	10	20	0	0	0.0	34.880

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	0	0	0	0

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	126	126	0	0	252

WBS Number: 1.1.2.1.1.2.2 **Description:** Administrative Support

Institution : **Contact:** A. Grillo

Administrative support for IC procurements, export licenses, parts tracking and similar support for hybrids and modules

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
110	14	13	124	100	0	10	0	2.0	1.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	0	0	0	0	0	0	0	3520	0	0	0	99.532
	0	0	0	0	0	0	0	0	3520	0	0	0	99.532

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
EDIA P	0	10	0	0	0	0.0	10.000
	0	10	0	0	0	0.0	10.000

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	55	55	0	0	110

WBS Number: 1.1.2.1.1.2.2.1 **Description:** Administrative Support - UCSC

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Administrative support at Santa Cruz

Basis of Estimate: Physicist estimate

Details of Estimate: Estimate is for 1 full time admin assistant for the duration of the chip production period. Start in FY01 to cover pre-production period and to help setup tracking systems. Material estimate of $5k/year is for computer and software for support.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
110	14	13	124	100	0	10	0	2.0	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	0	0	0	0	0	0	0	3520	0	0	0	99.532
	0	0	0	0	0	0	0	0	3520	0	0	0	99.532

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
EDIA P	0	10	0	0	0	0.0	10.000
	0	10	0	0	0	0.0	10.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
2	1	8	0	2	1	1	13

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	55	55	0	0	110

WBS Number: 1.1.2.1.1.2.2.2 **Description:** Administrative Support - LBNL

Institution : **Contact:** A. Grillo

Administrative Support at LBNL

Basis of Estimate: Physicist estimate

Details of Estimate: From internal support

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	1.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
2	1	8	0	2	1	1	13

WBS Number: 1.1.2.1.1.2.3 **Description:** Systems Materials

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Materials and supplies for CERN based-activities

Basis of Estimate: Physicist estimate

Details of Estimate: Based on estimates from CERN.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
15	3	22	18	0	0	0	15	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	15	0	0	0	0	0.0	15.000
	15	0	0	0	0	0.0	15.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
2	6	4	8	2	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	15	0	0	0	15

WBS Number: 1.1.2.1.2 **Description:** Development and Prototypes

Institution : **Contact:** A. Grillo

Complete

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	0	0	0	0

WBS Number: 1.1.2.1.3 **Description:** Production

Institution : **Contact:** A. Grillo

This item covers all cost associated with the procurement of the full production quantity of ICs needed for construction. It also includes the pre-production order.

Details of Estimate: The production phase will commence with selection of vendors for IC fabrication. It is planned to select only one vendor from those proven to be qualified. This will provide the cheapest cost by maximizing the volume price discounts from the selected vendor. A pre-production order will be placed for one lot of wafers (typically about 20). After this lot is delivered, it will be thoroughly tested to verify that it meets all requirements. If those results are positive, the remaining production order will be released. If any changes are required to the pre-production mask set, another pre-production run will be made before full production release. The goal being to receive one lot of acceptable chips with the production mask set before full production release. It is expected that the vendor will fabricate all the required ICs over about a 12 month period.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
417	261	63	678	112	64	0	242	3.9	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	4200	63.777
EDIA P	0	0	0	0	2640	0	0	0	0	0	0	0	111.957
	0	0	0	0	2640	24	0	0	0	0	0	4200	175.734

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	130	0	0	6	0	103.9	241.604
MFG MC	381	0	0	0	0	0.0	380.814
	510	0	0	6	0	103.9	622.418

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	741	57	0	0	798

WBS Number: 1.1.2.1.3.1 **Description:** Preproduction

Institution : **Contact:** A. Grillo

Covers preproduction IC fab and all related items(dicing, thinning, metallization and shipping).

Details of Estimate: Covers preproduction IC fab and all related items(dicing, thinning, metallization and shipping).

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
7	1	22	8	0	0	0	7	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	7	0	0	0	0	0.0	6.600
	7	0	0	0	0	0.0	6.600

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	7	0	0	0	7

WBS Number: 1.1.2.1.3.1.1 **Description:** Chip Fab

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Fabrication costs with vendor for preproduction chip fab

Basis of Estimate: Vendor quotation

Details of Estimate: Based on Frame Contract with Temic. 2 lots total. 1 lot from US. Temic quote in French Francs. These values in US$ assume an exchange rate of 6FF/US$.Also include acceleration payments for both lots of $3850 per week for 10 weeks total each lot.

The FY02 carry-over of $5k is for a second VIA mask that was ordered in Dec-00 to fix a design error. As of the end of FY01,
CERN had not yet recharged UCSC for this cost.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	1	22	6	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.000
	5	0	0	0	0	0.0	5.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.1.3.1.2 **Description:** Wafer Saw

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Dicing of IC wafers

Basis of Estimate: Vendor quotation

Details of Estimate: Based on vendor quotes for 6" wafers. $64.92 per wafer.

FY02 of $1k for wafers not yet cut in FY01.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
1	0	22	1	0	0	0	1	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	1	0	0	0	0	0.0	1.000
	1	0	0	0	0	0.0	1.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	1	0	0	0	1

WBS Number: 1.1.2.1.3.1.3 **Description:** Wafer thin

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Grinding(thinning) of wafers.

Basis of Estimate: Vendor quotation

Details of Estimate: Based on vendor price sheet. $8.50 per wafer.

This activity has been cancelled.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

WBS Number: 1.1.2.1.3.1.4 **Description:** Backside metallization

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Metallize backside of wafers.

Details of Estimate: Based on verbal vendor quote of $450 per batch of 7 wafers. Assume that a typical 20 wafer lot will take 3 batches.

This activity has been cancelled.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

WBS Number: 1.1.2.1.3.1.5 **Description:** Shipping

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Shipping of ICs

Basis of Estimate: Parametric estimate

Details of Estimate: Based on verbal quote from LBL assuming 3 packages per lot. Each package is $60 + $0.35 x 50000/$100 for insurance which is $705 per lot.

FY02 funds are carry-over for chips not yet shipped to collaboration for module assembly. The remaining chips will be used for qualification of module assembly sites and for continued prototypes of Forward modules.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
1	0	22	1	0	0	0	1	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	1	0	0	0	0	0.0	0.600
	1	0	0	0	0	0.0	0.600

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	1	0	0	0	1

WBS Number: 1.1.2.1.3.2 **Description:** Full Production

Institution : **Contact:** A. Grillo

Covers full production IC fab and all related items(dicing, thinning, metallization and shipping).

Details of Estimate: Covers full production IC fab and all related items(dicing, thinning, metallization and shipping).

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
80	145	181	225	0	0	0	80	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	80	0	0	0	0	0.0	80.279
MFG MC	381	0	0	0	0	0.0	380.814
	461	0	0	0	0	0.0	461.093

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	461	0	0	0	461

WBS Number: 1.1.2.1.3.2.1 **Description:** Chip Fab

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Fabrication costs with vendor for full production chip fab

Basis of Estimate: Vendor quotation

Details of Estimate: Based on Frame Contract with Temic. Confidential information. Assumes US commitment is 45% of total number of ICs needed and that US goal is 65% of ICs needed.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	114	0	114	0	0	0	0	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG MC	357	0	0	0	0	0.0	356.700
	357	0	0	0	0	0.0	356.700

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	2	8	4	4	2	1	32

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	357	0	0	0	357

WBS Number: 1.1.2.1.3.2.2 **Description:** Wafer Saw

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Dicing of IC wafers

Basis of Estimate: Vendor quotation

Details of Estimate: Based upon the following vendor quotes:

Wafer saw: $35/wafer (depends upon number of wafers per batch, take average number)
Wafer ring: $10/wafer
Pick chips, pack into gel-pack and inspect: $0.20/good chip
Gel-pack: $13.41 each holds good chips from one wafer up to 48 chips total

Ultimate cost is dependent upon yield. Assume 15% as worst case.
SCT needs 60,231 chips. US contribution is 65%.

Wafer saw + pick, pack and inspect: $53,709
Cost of Gel-packs: $13,672
Shipping cost to/from saw vendor: $12,412 (Assumes courier quote of $58/10-wafer box.

Total is $79,793 to be split between base project and management contingency.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
61	26	42	87	0	0	0	61	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	61	0	0	0	0	0.0	61.379
MFG MC	18	0	0	0	0	0.0	18.414
	80	0	0	0	0	0.0	79.793

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	2	8	4	4	2	1	32

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	80	0	0	0	80

WBS Number: 1.1.2.1.3.2.3 **Description:** Wafer thin

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Grinding(thinning) of wafers.

Basis of Estimate: Vendor quotation

Details of Estimate: Based on vendor price sheet. $8.50 per wafer.

This has been dropped from the baseline plan.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	2	8	4	4	2	1	32

WBS Number: 1.1.2.1.3.2.4 **Description:** Backside metallization

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Metallize backside of wafers.

Basis of Estimate: Parametric estimate

Details of Estimate: Based on verbal vendor quote of $450 per 7 wafer batch. Assume that each fab lot of typically 20 wafers will require 3 batches.

This has been dropped from the baseline program.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	2	8	4	4	2	1	32

WBS Number: 1.1.2.1.3.2.5 **Description:** Shipping

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Shipping of ICs

Basis of Estimate: Parametric estimate

Details of Estimate: New quotes for FY02:

FedEx shipments to Japan, Sweeden and LBNL:

Value of chip: 106.77
Insurance cost/chip: 0.53
Shipping Cost/(10 gelpacks): 36.00
Shipping Cost/chip: 0.09
Total Cost/chip: 0.63
Total number of chips: 24,571

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
19	5	29	24	0	0	0	19	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	19	0	0	0	0	0.0	18.900
MFG MC	6	0	0	0	0	0.0	5.700
	25	0	0	0	0	0.0	24.600

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	2	8	0	4	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	25	0	0	0	25

WBS Number: 1.1.2.1.3.3 **Description:** Testing

Institution : **Contact:** A. Grillo

All costs associated with US ATLAS testing of production ICs which are performed after ICs are delivered from the foundry.

Details of Estimate: Production testing must screen out bad parts to a high confidence level so that the number of chips which fail after being assembled onto hybrids is acceptably low to keep re-work costs to a minimum. This will require a complete AC test of all 128 channels of each chip as well as tests of the other functions such as calibration and threshold control. If the performance uniformity of the chips is found to have too broad a distribution, it may be necessary to also sort the "good" chips in a few categories so that chips with similar characteristics can be assembled together on the same hybrid. An adequate test program will be developed and proven during the prototype development phase.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
330	114	35	445	112	64	0	155	3.9	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	4200	63.777
EDIA P	0	0	0	0	2640	0	0	0	0	0	0	0	111.957
	0	0	0	0	2640	24	0	0	0	0	0	4200	175.734

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	43	0	0	6	0	103.9	154.725
	43	0	0	6	0	103.9	154.725

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	273	57	0	0	330

WBS Number: 1.1.2.1.3.3.1 **Description:** Equipment/hardware

Institution : **Contact:** A. Grillo

Test equipment needed (over and above that already purchased for prototype testing) which is needed to complete testing of production ICs.

Details of Estimate: The test equipment has been developed and has been qualified during the pre-productin phase. This was reported at the PRR in Jul-01. A second probe station has not been purchased for UCSC. This is necessary to keep up with the production schedule. Other costs are anticipated for maintenance during the production phase, e.g. probe card repair/replacement.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
148	20	14	168	0	1	0	147	0.0	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	0	1.079
	0	0	0	0	0	24	0	0	0	0	0	0	1.079

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	35	0	0	6	0	103.9	146.525
	35	0	0	6	0	103.9	146.525

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	148	0	0	0	148

WBS Number: 1.1.2.1.3.3.1.1 **Description:** Equipment/hardware

Institution : **Contact:** A. Grillo

Test hardware needed for ABCD

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
148	20	14	168	0	1	0	147	0.0	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	0	1.079
	0	0	0	0	0	24	0	0	0	0	0	0	1.079

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	35	0	0	6	0	103.9	146.525
	35	0	0	6	0	103.9	146.525

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	148	0	0	0	148

WBS Number: 1.1.2.1.3.3.1.1.1 **Description:** Probe Card

Institution : LBNL/UC-Junior **Contact:** A. Grillo

Passive probe card for production testing.

Basis of Estimate: Parametric estimate

Details of Estimate: Based on previous purchases.

For FY02, costs are to cover extra probe cards needed to complete production testing as the probe cards wear out.

8 blank probe cards (board fab): $5,560
Labor to load passive components onto cards: 24 hours
Cost to have probe pins mounted on blank cards or to replace pins when they wear out: $21,000.
This last cost assumes that pins will need to be replaced every 40 wafers tested based upon past experience. Cost to replace pins is $500.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
30	4	14	34	0	1	0	29	0.0	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	24	0	0	0	0	0	0	1.079
	0	0	0	0	0	24	0	0	0	0	0	0	1.079

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	27	0	0	0	0	0.0	28.685
	27	0	0	0	0	0.0	28.685

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
2	2	8	0	2	1	1	14

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	30	0	0	0	30

WBS Number: 1.1.2.1.3.3.1.1.2 **Description:** Misc Elect Components

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Miscellaneous electronics to interface between probe card and readout electronics.

Basis of Estimate: Engineering judgement

Details of Estimate: These costs cover miscellaneous components still needed to complete the 2 wafer testers:

$1500 UPS for 2 testers
$3500 VME Crate
$ 500 Aux. Power Supplies
$2500 Probe Station Maintenance

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
8	3	34	11	0	0	0	8	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	8	0	0	0	0	0.0	8.000
	8	0	0	0	0	0.0	8.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	4	1	1	34

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	8	0	0	0	8

WBS Number: 1.1.2.1.3.3.1.1.3 **Description:** Pin Driver Board

Institution : LBNL/UC-Junior **Contact:** A. Grillo

Interface to probe card with DAQs, ADCs and window comparators.

Basis of Estimate: Engineering judgement

Details of Estimate:

This has been completed prior to FY02

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

WBS Number: 1.1.2.1.3.3.1.1.4 **Description:** Probe Station

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

Production wafer prober

Basis of Estimate: Vendor quotation

Details of Estimate: UCSC now has one probe station which was purchased with other funds and will be used for production wafer testing. However, the present schedule now requires two stations running simultaneously. Therefore, another probe station must be purchased.

This estimate is based upon a quote received for a probe station very similar to one used by our collaborators at RAL. That probe stations has demonstrated good noise performance without any extra work by RAL. The present UCSC probe station required extensive work on its mechanics to properly elecrically shield the wafer and electrically refernce the various metal objects near the wafer in order to achieve acceptable noise performance. Such work on the second probe station would cost substantial amounts of labor and is not consistant with the production schedule.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
104	12	12	116	0	0	0	104	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	103.9	103.900
	0	0	0	0	0	103.9	103.900

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
1	2	8	0	2	1	1	12

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	104	0	0	0	104

WBS Number: 1.1.2.1.3.3.1.1.5 **Description:** Tester Components

Institution : LBNL/UC-Junior **Contact:** A. Grillo

This covers costs of production chip testing system.

Basis of Estimate: Catalog price

Details of Estimate:
For FY02, there remains to load 6 VME boards for the testers. This cost by outside service is $5,500 based upon previous boards already loaded.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
6	1	16	7	0	0	0	6	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	0	0	0	6	0	0.0	5.940
	0	0	0	6	0	0.0	5.940

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
2	4	8	0	2	1	1	16

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	6	0	0	0	6

WBS Number: 1.1.2.1.3.3.2 **Description:** Supervision

Institution : **Contact:** A. Grillo

This item covers supervision of the less skilled test laborers by a more experienced technician. The technician will provide training of the test labor, a critical watch over the testing being done and the results obtained and will also provide support in diagnosing problems and fixing test equipment. The supervisors will also be responsible for maintaining control over the inventory of wafers and ICs.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
112	25	22	137	112	0	0	0	1.5	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	0	0	0	2640	0	0	0	0	0	0	0	111.957
	0	0	0	0	2640	0	0	0	0	0	0	0	111.957

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	75	37	0	0	112

WBS Number: 1.1.2.1.3.3.2.1 **Description:** Supervision - LBNL

Institution : LBNL/UC-Junior **Contact:** A. Grillo

Completion of test development at LBNL.

Basis of Estimate: Engineering judgement

Details of Estimate: Support of Chinh Vu is covered under 1.1.2.1.1.1.2

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

WBS Number: 1.1.2.1.3.3.2.2 **Description:** Supervision - UCSC

Institution : U. of California, Santa Cruz-Jr **Contact:** A. Grillo

The test supervision at UCSC.

Details of Estimate: Cost estimate for FY02 and FY03 assumes 1 FTE for duration of wafer testing to keep equipment in order and to monitor test data to assure accuracy of operation.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
112	25	22	137	112	0	0	0	1.5	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	0	0	0	2640	0	0	0	0	0	0	0	111.957
	0	0	0	0	2640	0	0	0	0	0	0	0	111.957

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	75	37	0	0	112

WBS Number: 1.1.2.1.3.3.3 **Description:** Labor

Institution : **Contact:** A. Grillo

This labor item is to perform the necessary tests of the IC including operation of the test equipment and simple tracking of the data.

Details of Estimate: This labor item is to perform the necessary tests of the IC including operation of the test equipment and simple tracking of the data. It is expected to be performed by undergraduate students or other semi-skilled workers who are hired expressly for this task.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
71	69	98	140	0	63	0	8	2.4	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	0	0	0	0	0	0	4200	62.698
	0	0	0	0	0	0	0	0	0	0	0	4200	62.698

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	8	0	0	0	0	0.0	8.200
	8	0	0	0	0	0.0	8.200

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	51	20	0	0	71

WBS Number: 1.1.2.1.3.3.3.1 **Description:** Labor - LBNL

Institution : LBNL/UC- Senior **Contact:** A. Grillo

The test labor at LBNL

Basis of Estimate: Engineering judgement

Details of Estimate: This operation has been moved to UCSC for production.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
6	2	8	0	2	1	1	22

WBS Number: 1.1.2.1.3.3.3.2 **Description:** Labor - UCSC

Institution : U. of California, Santa Cruz-Sr **Contact:** A. Grillo

The test labor at UCSC

Basis of Estimate: Engineering judgement

Details of Estimate: At start of FY02, production plan calls for testing wafers until Feb-03. Present plan requires 2 four hour shifts of students, one in the morning to start first wafers and second shift in evening to start second set of wafers. First shift will be manned by 1 student, second shift by 2 students to maintain lab policy of no one working alone.

Material costs are for clean room diposable tooling:

Clean room garments: $200/month - $2400/year
Nitrogen $2100/year

Misc. Items e.g. air filters, gloves, clean room wipes: $1500

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
71	69	98	140	0	63	0	8	2.4	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	0	0	0	0	0	0	4200	62.698
	0	0	0	0	0	0	0	0	0	0	0	4200	62.698

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	8	0	0	0	0	0.0	8.200
	8	0	0	0	0	0.0	8.200

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
15	15	8	0	4	2	1	98

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	51	20	0	0	71

WBS Number: 1.1.2.2 **Description:** Hybrids/Cables/Fanouts

Institution : **Contact:** C. Haber

This item covers the design, prototyping, production, and testing of the electronic package which is part of the module. This package consists of a substrate patterned with metal planes and traces (the "hybrid"),

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
797	190	24	987	39	693	0	66	11.6	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	3300	0	0	200	1760	0	0	8360	0	0	6160	692.911
EDIA P	0	200	0	0	0	440	0	0	0	0	0	0	38.628
	0	3500	0	0	200	2200	0	0	8360	0	0	6160	731.539

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	63	0	0	0	0	0.0	65.828
	63	0	0	0	0	0.0	65.828

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	421	376	0	0	797

WBS Number: 1.1.2.2.1 **Description:** Design

Institution : **Contact:** C. Haber

Assembly and test design.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
39	9	22	47	39	0	0	0	0.4	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	200	0	0	0	440	0	0	0	0	0	0	38.628
	0	200	0	0	0	440	0	0	0	0	0	0	38.628

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	39	0	0	0	39

WBS Number: 1.1.2.2.1.1 **Description:** Hybrid design

Institution : **Contact:** C. Haber

This is for design of assembly of hybrids provided by ATLAS/Japan.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
39	9	22	47	39	0	0	0	0.4	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	200	0	0	0	440	0	0	0	0	0	0	38.628
	0	200	0	0	0	440	0	0	0	0	0	0	38.628

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	39	0	0	0	39

WBS Number: 1.1.2.2.1.1.1 **Description:** Prototypes - LBNL

Institution : LBNL/UC-Junior **Contact:** C. Haber

Details of Estimate: 200 hours of EE for debugging hybrid test procedures

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
19	5	25	24	19	0	0	0	0.1	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	200	0	0	0	0	0	0	0	0	0	0	18.850
	0	200	0	0	0	0	0	0	0	0	0	0	18.850

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
25	0	0	0	1	0	0	25

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	19	0	0	0	19

WBS Number: 1.1.2.2.1.1.2 **Description:** Production - LBNL

Institution : LBNL/UC-Junior **Contact:** C. Haber

Basis of Estimate: Physicist estimate

Details of Estimate: 440 hours of a mechanical technician for fixture design and oversight of fabrication.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
20	4	20	24	20	0	0	0	0.3	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA P	0	0	0	0	0	440	0	0	0	0	0	0	19.778
	0	0	0	0	0	440	0	0	0	0	0	0	19.778

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	4	2	1	1	20

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	20	0	0	0	20

WBS Number: 1.1.2.2.2 **Description:** Development and prototype fabrication

Institution : **Contact:** C. Haber

This covers prototype assembly of hybrids provided by others.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	0	0	0	0

WBS Number: 1.1.2.2.3 **Description:** Production

Institution : **Contact:** C. Haber

This item covers the assembly and test of the production lot of the hybrids provided by others.. The production lot will cover the required parts for the 700 modules to be constructed in the United States plus yield losses.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
759	181	24	940	0	693	0	66	11.3	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	3300	0	0	200	1760	0	0	8360	0	0	6160	692.911
	0	3300	0	0	200	1760	0	0	8360	0	0	6160	692.911

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	63	0	0	0	0	0.0	65.828
	63	0	0	0	0	0.0	65.828

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	383	376	0	0	759

WBS Number: 1.1.2.2.3.1 **Description:** Testing equipment/hardware

Institution : **Contact:** C. Haber

The full assembly will be tested with a DAQ system which will have the functionality of the final DAQ system. The goal will be a complete calibration done on the hybrids before the sensors are attached. Rework will be done as necessary. We are planning to test the US complement of the total, i.e. the 819 hybrids assembled for the 700 modules, at two sites, LBL and UCSC.

COST SUMMARY: (Project)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
	0	0	0	0	0	0	0	0	0.0	0.0

WBS Number: 1.1.2.2.3.1.1 **Description:** DAQ and Burn-In

Institution : LBNL/UC- Senior **Contact:** C. Haber

The test systems will consist of mechanical fixtures and the DAQ systems. DAQ and related(cable, etc) costs are covered here. See backup spreadsheet for details. All costs are covered under 1.1.2.3.3.2.5 since some items are shared.

COST SUMMARY: (Project)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
	0	0	0	0	0	0	0	0	0.0	0.0

WBS Number: 1.1.2.2.3.1.1.1 **Description:** Test and burn-in-LBNL

Institution : LBNL/UC-Junior **Contact:** C. Haber

Testing and Burn-in hardware and systems

Basis of Estimate: Physicist estimate

Details of Estimate: See higher level.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
30	0	0	0	1	0	0	30

WBS Number: 1.1.2.2.3.1.1.2 **Description:** Test and Burn-in UCSC

Institution : U. of California, Santa Cruz-Sr **Contact:** C. Haber

Test and burn-in systems

Basis of Estimate: Physicist estimate

Details of Estimate: See higher level

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
30	0	0	0	1	0	0	30

WBS Number: 1.1.2.2.3.2 **Description:** Assembly Equipment

Institution : LBNL/UC- Senior **Contact:** C. Haber

Assembly equipment and fixtures needed for hybrid assembly and testing.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
33	8	24	41	0	0	0	33	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	30	0	0	0	0	0.0	32.908
	30	0	0	0	0	0.0	32.908

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	33	0	0	0	33

WBS Number: 1.1.2.2.3.2.1 **Description:** Fixtures

Institution : LBNL/UC-Junior **Contact:** C. Haber

Fixtures for hybrid bonding, testing and burn-in.

Basis of Estimate: Parametric estimate

Details of Estimate: Estimated as lump sum from detailed list.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
33	8	24	41	0	0	0	33	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	30	0	0	0	0	0.0	32.908
	30	0	0	0	0	0.0	32.908

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
5	3	8	8	1	1	1	24

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	33	0	0	0	33

WBS Number: 1.1.2.2.3.3 **Description:** Hybrid rework fixtures/supplies

Institution : **Contact:** C. Haber

Some hybrids which malfunction will have to be repaired. This item covers that repair process.

Basis of Estimate: Engineering judgement

Details of Estimate: Hybrid rework required is based on the experience from previous hybrid assemblies..

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
25	5	20	30	0	0	0	25	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	24	0	0	0	0	0.0	24.600
	24	0	0	0	0	0.0	24.600

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	16	9	0	0	25

WBS Number: 1.1.2.2.3.3.1 **Description:** Fixtures/Supplies

Institution : **Contact:** C. Haber

A bonding machine is the main tool used for rework along with fixtures. Supplies are for bonder maintenance and consumables.

Basis of Estimate: Physicist estimate

Details of Estimate: Estimate of fixtures and other items to remove ICs from hybrids, replace passive components.

10.1K for maintenance, wire etc in FY02
9.1K in FY03

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
25	5	20	30	0	0	0	25	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	24	0	0	0	0	0.0	24.600
	24	0	0	0	0	0.0	24.600

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	16	9	0	0	25

WBS Number: 1.1.2.2.3.3.1.1 **Description:** Fixtures

Institution : LBNL/UC-Junior **Contact:** Not available

Fixtures for bonding and rework

Basis of Estimate: Physicist estimate

Details of Estimate: Included already in hybrid fixtures

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	1	20	6	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.400
	5	0	0	0	0	0.0	5.400

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	4	2	1	1	20

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.2.3.3.1.2 **Description:** Supplies

Institution : U. of California, Santa Cruz-Jr **Contact:** Not available

Supplies and bonder maintenance

Basis of Estimate: Physicist estimate

Details of Estimate: Supplies and Maintenance for rework and wire bonding:

	FY02	FY03
Wire for Bonding	1,200	1,200
Bonder Wedges	400	400
Man.Bonder Main	3,000	3,000
Auto.Bonder Main	4,500	4,500
Misc. Tools	1,000	0
Total	10,100	9,100

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
19	4	20	23	0	0	0	19	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	19	0	0	0	0	0.0	19.200
	19	0	0	0	0	0.0	19.200

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	4	2	1	1	20

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	10	9	0	0	19

WBS Number: 1.1.2.2.3.4 **Description:** Assembly and Testing Labor

Institution : **Contact:** Not available

This is all labor for assembly and testing of hybrids

Details of Estimate: See spreadsheet. We also include here shipping costs for hybrids between LBL and UCSC

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
701	168	24	870	0	693	0	8	11.3	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	3300	0	0	200	1760	0	0	8360	0	0	6160	692.911
	0	3300	0	0	200	1760	0	0	8360	0	0	6160	692.911

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	8	0	0	0	0	0.0	8.320
	8	0	0	0	0	0.0	8.320

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	334	367	0	0	701

WBS Number: 1.1.2.2.3.4.1 **Description:** LBNL

Institution : LBNL/UC-Junior **Contact:** Not available

LBNL labor for hybrid assembly and testing

Basis of Estimate: Physicist estimate

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
360	86	24	446	0	356	0	4	5.9	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	200	1760	0	0	4840	0	0	3520	355.543
	0	0	0	0	200	1760	0	0	4840	0	0	3520	355.543

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	4	0	0	0	0	0.0	4.320
	4	0	0	0	0	0.0	4.320

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	8	2	1	1	24

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	176	184	0	0	360

WBS Number: 1.1.2.2.3.4.2 **Description:** UCSC

Institution : U. of California, Santa Cruz-Jr **Contact:** Not available

Basis of Estimate: Physicist estimate

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
341	82	24	423	0	337	0	4	5.4	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	3300	0	0	0	0	0	0	3520	0	0	2640	337.368
	0	3300	0	0	0	0	0	0	3520	0	0	2640	337.368

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	4	0	0	0	0	0.0	4.000
	4	0	0	0	0	0.0	4.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	8	2	1	1	24

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	158	183	0	0	341

WBS Number: 1.1.2.3 **Description:** Module Assembly and Test

Institution : **Contact:** C. Haber

This item covers the mechanical and electrical assembly of the SCT silicon strip modules and electrical testing. The components which comprise the module are the electronics hybrid package described above, the 4 silicon detectors (provided by non-US institutes), and the heat spreader plate(provided by non-US). Assembly will take place at LBNL. Testing will be at LBNL, UCSC.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
714	195	27	908	0	379	0	334	7.3	2.4

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	1760	0	0	4840	0	0	6160	379.395
MFG B/I	0	0	0	0	0	3520	0	0	0	0	240	0	175.624
EDIA B/I	0	0	440	0	0	0	0	0	0	0	0	0	41.470
	0	0	440	0	0	5280	0	0	4840	0	240	6160	596.489

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	314	0	0	0	0	0.0	334.128
	314	0	0	0	0	0.0	334.128

PROFILE SUMMARY:

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$)
0	0	17	0	0	0	604	309	0	0	931

WBS Number: 1.1.2.3.1 **Description:** Design of assembly and test tooling

Institution : **Contact:** C. Haber

The design of tooling and test fixtures.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.3

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA B/I	0	0	440	0	0	0	0	0	0	0	0	0	41.470
	0	0	440	0	0	0	0	0	0	0	0	0	41.470

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	41	0	0	0	41

WBS Number: 1.1.2.3.1.1 **Description:** Production design

Institution : **Contact:** C. Haber

This covers design of systems for use in production assembly and testing of modules.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.3

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA B/I	0	0	440	0	0	0	0	0	0	0	0	0	41.470
	0	0	440	0	0	0	0	0	0	0	0	0	41.470

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	41	0	0	0	41

WBS Number: 1.1.2.3.1.1.1 **Description:** Tooling design

Institution : LBNL/UC-Junior **Contact:** C. Haber

Design of module assembly tooling not done by RAL

Basis of Estimate: Physicist estimate

Details of Estimate: 0.25 FTE of base program, mechanical tech covered under hybrids

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.3

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
EDIA B/I	0	0	440	0	0	0	0	0	0	0	0	0	41.470
	0	0	440	0	0	0	0	0	0	0	0	0	41.470

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	8	4	2	1	1	24

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	41	0	0	0	41

WBS Number: 1.1.2.3.2 **Description:** Development and prototypes

Institution : **Contact:** C. Haber

This item covers the fabrication of prototype tools and modules for the pre-production phase. Some of this material will also be used in the production phase.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	0	0	0	0

WBS Number: 1.1.2.3.3 **Description:** Production

Institution : **Contact:** C. Haber

Module production and testing. Shipment

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
714	195	27	908	0	379	0	334	7.3	2.1

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	1760	0	0	4840	0	0	6160	379.395
MFG B/I	0	0	0	0	0	3520	0	0	0	0	240	0	175.624
	0	0	0	0	0	5280	0	0	4840	0	240	6160	555.019

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	314	0	0	0	0	0.0	334.128
	314	0	0	0	0	0.0	334.128

PROFILE SUMMARY:

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$)
0	0	17	0	0	0	563	309	0	0	889

WBS Number: 1.1.2.3.3.1 **Description:** Facilities preparation

Institution : LBNL/UC- Senior **Contact:** C. Haber

Complete

Basis of Estimate: Engineering judgement

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
0	0	0	0	0	0	0	0	0.0	0.1

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG B/I	0	0	0	0	0	0	0	0	0	0	240	0	17.400
	0	0	0	0	0	0	0	0	0	0	240	0	17.400

CONTINGENCY FACTORS:

	Risk				*Weight*			
	Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
	30	0	0	0	1	0	0	30

PROFILE SUMMARY:

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$)
0	0	17	0	0	0	0	0	0	0	17

WBS Number: 1.1.2.3.3.2 **Description:** Assembly and test equipment

Institution : **Contact:** C. Haber

Equipment for module assembly.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
150	32	21	182	0	0	0	150	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	142	0	0	0	0	0.0	150.400
	142	0	0	0	0	0.0	150.400

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	134	16	0	0	150

WBS Number: 1.1.2.3.3.2.1 **Description:** Wirebonder

Institution : LBNL/UC- Senior **Contact:** C. Haber

Wirebonder

Basis of Estimate: Vendor quotation

Details of Estimate: Maintenance and supplies

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
22	3	12	24	0	0	0	22	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	20	0	0	0	0	0.0	21.600
	20	0	0	0	0	0.0	21.600

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
1	2	8	1	1	1	1	12

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	11	11	0	0	22

WBS Number: 1.1.2.3.3.2.2 **Description:** Coordinate measuring system

Institution : LBNL/UC- Senior **Contact:** C. Haber

SmartScope

Details of Estimate: Maintenance

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
11	0	0	11	0	0	0	11	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	10	0	0	0	0	0.0	10.800
	10	0	0	0	0	0.0	10.800

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	1	0	0	0

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	5	0	0	11

WBS Number: 1.1.2.3.3.2.3 **Description:** Glue Mixing

Institution : LBNL/UC-Junior **Contact:** C. Haber

Glue mixing equipment

Basis of Estimate: Engineering judgement

Details of Estimate: 5K from Keyence

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	1	22	7	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.400
	5	0	0	0	0	0.0	5.400

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
1	4	8	8	2	1	1	22

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.3.3.2.4 **Description:** Environmental box

Institution : **Contact:** C. Haber

Environmental boxes for temperature cycling of modules

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
10	3	25	13	0	0	0	10	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	10	0	0	0	0	0.0	10.400
	10	0	0	0	0	0.0	10.400

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	10	0	0	0	10

WBS Number: 1.1.2.3.3.2.4.1 **Description:** LBNL

Institution : LBNL/UC- Senior **Contact:** C. Haber

Basis of Estimate: Physicist estimate

Details of Estimate: Estiamte based on previous purchase of refurbished box.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	1	25	7	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.400
	5	0	0	0	0	0.0	5.400

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
25	0	0	0	1	0	0	25

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.3.3.2.4.2 **Description:** UCSC

Institution : U. of California, Santa Cruz-Sr **Contact:** C. Haber

Basis of Estimate: Catalog price

Details of Estimate: Same as previous

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	1	25	6	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.000
	5	0	0	0	0	0.0	5.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	3	8	10	1	1	1	25

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.3.3.2.5 **Description:** DAQ/Burn-in system

Institution : **Contact:** C. Haber

DAQ systems for module testing and/or module burn-in. These are same type of systems as under hybrids.

Details of Estimate: See spreadsheet. Hybrid testing hardware also covered here.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
102	26	25	128	0	0	0	102	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	97	0	0	0	0	0.0	102.200
	97	0	0	0	0	0.0	102.200

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	102	0	0	0	102

WBS Number: 1.1.2.3.3.2.5.1 **Description:** LBNL

Institution : LBNL/UC- Senior **Contact:** C. Haber

DAQ systems for module testing and module burn-in.

Basis of Estimate: Parametric estimate

Details of Estimate: See spreadsheet. $65K

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
70	18	25	88	0	0	0	70	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	65	0	0	0	0	0.0	70.200
	65	0	0	0	0	0.0	70.200

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	8	8	6	1	1	1	25

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	70	0	0	0	70

WBS Number: 1.1.2.3.3.2.5.2 **Description:** UCSC

Institution : U. of California, Santa Cruz-Sr **Contact:** C. Haber

DAQ system for module testing.

Basis of Estimate: Physicist estimate

Details of Estimate: See spreadsheet. $29K

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
32	8	25	40	0	0	0	32	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	32	0	0	0	0	0.0	32.000
	32	0	0	0	0	0.0	32.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
3	8	8	6	1	1	1	25

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	32	0	0	0	32

WBS Number: 1.1.2.3.3.3 **Description:** Assembly tooling

Institution : LBNL/UC- Senior **Contact:** C. Haber

Details of Estimate: See spreadsheet for details. $54600.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
59	0	0	59	0	0	0	59	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	55	0	0	0	0	0.0	58.968
	55	0	0	0	0	0.0	58.968

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
0	0	0	0	1	0	0	0

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	59	0	0	0	59

WBS Number: 1.1.2.3.3.4 **Description:** Materials and supplies

Institution : **Contact:** C. Haber

Adhesive, clean room supplies, misc materials.

Basis of Estimate: Physicist estimate

Details of Estimate: 10K/year

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
20	4	20	24	0	0	0	20	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	20	0	0	0	0	0.0	20.000
	20	0	0	0	0	0.0	20.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	4	4	2	1	1	20

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	10	10	0	0	20

WBS Number: 1.1.2.3.3.5 **Description:** Assembly and testing labor

Institution : **Contact:** C. Haber

Assembly will consist of a training period ramping up to a production period.

Details of Estimate: All labor included here - see spreadsheet.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
379	106	28	486	0	379	0	0	7.3	2.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	1760	0	0	4840	0	0	6160	379.395
MFG B/I	0	0	0	0	0	3520	0	0	0	0	0	0	158.224
	0	0	0	0	0	5280	0	0	4840	0	0	6160	537.619

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	255	283	0	0	538

WBS Number: 1.1.2.3.3.5.1 **Description:** LBNL

Institution : LBNL/UC-Junior **Contact:** C. Haber

LBNL technical labor for module assembly and testing

Basis of Estimate: Physicist estimate

Details of Estimate: See spreadsheet

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
347	97	28	444	0	347	0	0	5.8	2.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	1760	0	0	4840	0	0	3520	346.553
MFG B/I	0	0	0	0	0	3520	0	0	0	0	0	0	158.224
	0	0	0	0	0	5280	0	0	4840	0	0	3520	504.777

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	8	8	2	1	1	28

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	244	261	0	0	505

WBS Number: 1.1.2.3.3.5.2 **Description:** UCSC

Institution : U. of California, Santa Cruz-Jr **Contact:** C. Haber

UCSC labor for module testing

Basis of Estimate: Physicist estimate

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
33	9	28	42	0	33	0	0	1.5	0.0

MANPOWER SUMMARY:

	S.W. Prof (hrs)	EE (hrs)	ME (hrs)	Design (hrs)	ET (hrs)	MT (hrs)	Admin. Super. (hrs)	Other Admin. (hrs)	Contract Labor (hrs)	Shops (hrs)	Tech. Serv. (hrs)	Student (hrs)	Total w/ overhead (k$)
MFG P	0	0	0	0	0	0	0	0	0	0	0	2640	32.842
	0	0	0	0	0	0	0	0	0	0	0	2640	32.842

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
4	4	8	8	2	1	1	28

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	11	22	0	0	33

WBS Number: 1.1.2.3.3.6 **Description:** Production database and control

Institution : **Contact:** C. Haber

A standard ATLAS-SCT wide software package for documenting and storing test and construction information for the modules and hybrids ahs been develped. It also covers a bar-code inventory system.

Details of Estimate: This covers the cost of a standard ATLAS-SCT wide software package for documenting and storing test and construction information for the modules and hybrids. It also covers a bar-code inventory system. This is covered by US ATLAS.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
16	8	50	24	0	0	0	16	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	15	0	0	0	0	0.0	16.200
	15	0	0	0	0	0.0	16.200

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	16	0	0	0	16

WBS Number: 1.1.2.3.3.6.1 **Description:** Software

Institution : LBNL/UC- Senior **Contact:** C. Haber

Software for database related items.

Basis of Estimate: Physicist estimate

Details of Estimate: The cost is 10K and is based upon informal discussions with members of a non-US group setting up a commercial package for use by ATLAS.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
11	5	50	16	0	0	0	11	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	10	0	0	0	0	0.0	10.800
	10	0	0	0	0	0.0	10.800

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
15	15	8	12	1	1	1	50

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	11	0	0	0	11

WBS Number: 1.1.2.3.3.6.2 **Description:** Barcode system

Institution : LBNL/UC- Senior **Contact:** C. Haber

This allows the modules to be labelled.

Basis of Estimate: Physicist estimate

Details of Estimate: This covers the cost of a labeling system for the ATLAS modules. The is cost is $5000.00. This is covered by US-ATLAS.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
5	3	50	8	0	0	0	5	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	5	0	0	0	0	0.0	5.400
	5	0	0	0	0	0.0	5.400

Units	Unit Cost
1	5000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
15	15	8	12	1	1	1	50

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	5	0	0	0	5

WBS Number: 1.1.2.3.3.7 **Description:** Shipping

Institution : **Contact:** C. Haber

Boxes to hold completed modules and groups of modules for transport to CERN or another barrel assembly site are required.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
89	44	50	133	0	0	0	89	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	82	0	0	0	0	0.0	88.560
	82	0	0	0	0	0.0	88.560

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	89	0	0	0	89

WBS Number: 1.1.2.3.3.7.1 **Description:** Boxes for each module

Institution : LBNL/UC- Senior **Contact:** C. Haber

Boxes to hold completed modules and groups of modules for transport to CERN or another barrel assembly site are required.

Basis of Estimate: Engineering judgement

Details of Estimate: We require 700 boxes at a cost of $10.00 each. This is covered by US ATLAS.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
76	38	50	113	0	0	0	76	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	70	0	0	0	0	0.0	75.600
	70	0	0	0	0	0.0	75.600

Units	Unit Cost
700	50

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
15	15	8	12	1	1	1	50

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	76	0	0	0	76

WBS Number: 1.1.2.3.3.7.2 **Description:** Crates

Institution : LBNL/UC- Senior **Contact:** C. Haber

Boxes to hold completed modules and groups of modules for transport to CERN or another barrel assembly site are required.

Basis of Estimate: Physicist estimate

Details of Estimate: We require 25 crates at a cost of $500.00 each. This is covered by US ATLAS.

COST SUMMARY: (Project)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project	FTEs Other
13	6	50	19	0	0	0	13	0.0	0.0

MATERIAL SUMMARY:

	Pur. Mat. (k$)	Stores (k$)	Travel (k$)	Low Level (k$)	R + D (k$)	High Level (k$)	Total w/ overhead (k$)
MFG P	12	0	0	0	0	0.0	12.960
	12	0	0	0	0	0.0	12.960

Units	Unit Cost
25	500

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	Cost	Schedule	Design	Technical	Cost	Schedule	Cont %
15	15	8	12	1	1	1	50

PROFILE SUMMARY:

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$)
0	0	0	0	0	0	13	0	0	0	13