Part X

Costs, Schedules, Deliverables

Chapter 49

Electronics WBS Dictionary

[Minor]
Last Updated:

SVT ELECTRONICS **PRELIMINARY DRAFT** **RHM 7/5/95**

W.B.S..	NAME	DESCRIPTION
SVT ELECTRONICS WBS DICTIONARY		**DRAFT 7/18/1995 RHM**
W.B.S..	**NAME**	**DESCRIPTION**
4.1.6	**SVT Electronics**	All Electronics to support the STAR Silicon Vertex Tracker
4.1.6.1	**System Design**	
4.1.6.1.1	**Q/A and EH&S**	The analysis of potential hazards in the SVT and their control and mitigation
	Q/A plan	Quality Assurance plan for the SVT electronics
	EH&S plan	Hazard identification and control including High Voltage and the use of Beryllium and Beryllia in the mechanical support of the SVT electronics
4.1.6.1.2	**System Design**	
	requirements doc	All relevant requirements including SDD, front end electronics, power supplies, interfaces, etc.
	system block system wiring diagram	to include all SVT electronics essential models and implementation models wiring from SDD to Readout modules and Readout modules to Rack electronics
4.1.6.1.3	**Prelim Interface Specs**	
	interface specs	first generation of interface specs for interfaces to DAQ, STAR control, conventional system, etc..
4.1.6.1.4	**Generate WBS/est/schedule**	Cost estimate, WBS dictionary, deliverables, etc..
4.1.6.2	**Requirement Review**	Review of requirements as laid out in Requirements Document, Essential models, etc.
4.1.6.3	**SVT Electronics Design**	
4.1.6.3.1	**PASA design and proto**	Design and prototype fabrication of Preamp/Shaper amplifier. This is a custom Integrated Circuit. Includes production of sufficient quantity to support early system test. Also includes design and fabrication of semi-automatic test stand.
4.1.6.3.2	**SCA design and proto**	Design and prototype fabrication of Switched Capacitor Array. This is a custom Integrated Circuit. Includes production of sufficient quantity to support early system test. Also includes the design and fabrication of a semi_automatic test stand.
4.1.6.3.3	**MCM HYBRID design and proto**	Design and prototype fabrication of MCM Hybrid. This hybrid includes the PASA and SCA. Includes production of sufficient quantity to support early system test. Also includes the design and fabrication of a semi_automatic test stand.
4.1.6.3.4	**CARRIER design and proto**	Design and prototype fab. of the Carrier I/O hybrid. Connects the MCM hybrid to cables to the Readout module . Production of sufficient quantity to support early system test. Also includes the design and fabrication of a semi_automatic test stand.
4.1.6.3.5	**READOUT design and proto**	Design and Prototype of the Readout receiver card. This card receives analog data from the carrierI/O and digitizes to 10 bit accuracy. includes PGA for timing and control and test stand.
4.1.6.3.6	**FIBER/TIMING design and proto**	Design and prototype of the Fiber/timing card in the readout module. Transfers data to DAQ via fiber optic cable. Includes PGA for timing and test stand.
4.1.6.3.7	**MASTER TIMING design and proto**	Design and prototype of the master timing card. Includes clock generation and distribution as well as command word timing.

W.B.S..	NAME	DESCRIPTION
4.1.6.3.8	**CABLE PLANT design and proto**	Design and prototype of each type of cable used in SVT. Sufficient quantity to support early testing included.
4.1.6.3.9	**LV SYSTEM design and proto**	Design and prototype of Low Voltage power supplies system. OEM supplies are integrated into SVT.
4.1.6.3.10	**HV SYSTEM design and proto**	Design and prototype of High Voltage power supplies system. OEM supplies are integrated into SVT.
4.1.6.3.11	**CALIBRATION design and proto**	Calibration system is designed and prototyped. Includes pulse generation and distribution. STAR control interface is included.
4.1.6.3.12	**CAGES & HARDWARE design and proto**	
4.1.6.3.12.1		Readout modules and rack hardware are designed and prototyped.
4.1.6.2.13	**Software Design**	Software design including essential models, data flow diagrams, data dictionary etc..
4.1.6.3.14	**UPDATE documentation**	Interface specs, Preliminary safety report and WBS,cost and schedule are updated
4.1.6.4	**PDR**	Preliminary design review of SVT electronics including safety PDR.
4.1.6.5	**SVT Prod. Models**	All production models include updating design, fab models, test models and updating manuals.
4.1.6.5.1	**PASA prod models**	One production run of PASA
4.1.6.5.2	**SCA prod models**	One Orbit "start 10" run
4.1.6.5.3	**MCM HYBRID prod models**	Fab and test final version of MCM Hybrid.
4.1.6.5.4	**CARRIER prod models**	Fab and test final version of Carrier I/O
4.1.6.5.5	**RDO card Prod. Models**	Fab and test final version of RDO receiver cards (qty 2)
4.1.6.5.6	**F/T card Prod. Models**	Fab and test final version of F/T card.
4.1.6.5.7	**Master Timing card Prod. Models**	Fab and test final version of Master Timing card.
4.1.6.5.8	**CABLES prod mod**	Fab and test all types of cables for SVT.
4.1.6.5.9	**LV SYSTEM prod models**	prototype from design phase serves as production model.
4.1.6.5.10	**HV SYSTEM prod models**	prototype from design phase serves as production model.
4.1.6.5.11	**CAL Prod. Models**	prototype from design phase serves as production model.
4.1.6.5.12	**CAGES & HARDWARE prod models**	modify prototype to serve as production model.
4.1.6.5.13	**code and test SOFTWARE**	Code and test software. Update software manual.
4.1.6.5.14	**UPDATE documentation**	Preliminary Acceptance Test Plan, update of safety report, WBS, Cost & Deliverables.
4.1.6.5.15	**system test**	System test using production models for electrical compatability test, including noise, dynamic range, etc. Does not require beam.
4.1.6.6	**FDR**	Final Design Review including system test results, safety review, & ATP review.

SVT ELECTRONICS **PRELIMINARY DRAFT** **RHM 7/5/95**

W.B.S..	NAME	DESCRIPTION
4.1.6.7	**SVT Production Electronics**	All production phase items include parts purchasing, pc card fab, assly, test and rework as required.
4.1.6.7.1	**PASA fab**	Fabrication of all remaining PASA ICs including testing at die level.
4.1.6.7.2	**SCA fab**	Fabrication of remaining SCA ICs including testing at die level
4.1.6.7.3	**MCM HYBRID fab**	Fabrication of MCM hybrid including installation of PASA and SCA and testing and rework of completed Hybrid.
4.1.6.7.4	**CARRIER fab**	Fabrication of Carrier I/O hybrids including testing and rework as required.
4.1.6.7.5	**RDO card fab**	Fab, testing and rework of Readout receiver cards.
4.1.6.7.6	**F/T card fab**	Fab, testing and rework of readout transmitter F/T cards
4.1.6.7.7	**Master Timing card fab**	Fab, testing and rework of Master timing cards.
4.1.6.7.8	**Cables fab**	Fab, testing and rework of all SVT related cables.
4.1.6.7.9	**LV SYSTEM fab**	Purchase of OEM supplies and integration into rack electronics. Test and rework as required.
4.1.6.7.10	**HV SYSTEM fab**	Purchase of OEM supplies and integration into rack electronics icluding interlock system. Test and repair as required.
4.1.6.7.11	**CAL fab**	Fab, test and rework of Cal pulse generator.
4.1.6.7.12	**Cage and Hardware FAB**	Fab all rack hardware, all sector readour hardware, etc..
4.1.6.8	**Install Electronics**	Installation includes assembling and testing readout modules, rack electronics etc. after shipping to site. On site testing and rework in included.
4.1.6.9	**Management**	Management of SVT Electronics is costed elsewhere.

Chapter 50

SVT Cost Summaries by Object

Last Updated:

Level_3_summary_95

WBS	**Description**	**Materials**	**Mat. +Mfg**	**EDIA**	**Base Cost**	**Avg. Cont.**	**Total Cost**
L3 Cost by Object		**(K$)**	**Lab. (K$)**	**(K$)**	**(K$)**	**(%)**	**(K$)**
4.1.0	STAR SVT						6121.3
4.1.1.	Mechanical Structures (support)	65.57	332.32	99.9	432.22	27%	549.4
4.1.2.	Wafer production	525	525	200	725	31%	950.0
4.1.3.	Cooling system	32.5	414.5	106.1	520.6	27%	659.6
4.1.4	Miscellaneous Sys.	104.2	104.2	18.8	123	33%	163.7
4.1.5	Assemble & test	13.4	73.2	187	260.2	27%	331.5
4.1.6.	SVT Electronics	1094	1094	998	2092	25%	2615.5
4.1.7.	SVT-DAQ	313.1	313.1	33.3	346.4	25%	431.4
4.1.8.	SVT computing	53	53	65	118	20%	142.0
4.1.9.	SVT installation	1.5	7.5	64	71.5	21%	86.2
4.1.10.	Project management	0	0	166.94	166.94	15%	192.0

SVT COST MATRIX (NO LINKS)

DRAFT		SVT ELECTRONICS SUMMARY BY OBJECT				RHM		7/5/95			**DRAFT**	
		L5 Cost by Object										
		SYSTEM DESIGN	**REQ REVIEW**	**ELECT DESIGN**	**PDR**	**PROD MODELS**	**FDR**	**PROD ELECT**	**INSTALL**	**MANAGE**	**OBJECT SUBTOTAL**	
		4.1.6.1	4.1.6.2	4.1.6.3	4.1.6.4	4.1.6.5	4.1.6.6	4.1.6.7	4.1.6.8	4.1.6.9		
SYSTEM DESIGN												
	Qty	1										
Material	K$	0									0.0	K$
Labor E	DAYS	75									75.0	DAYS
Labor T	DAYS	35									35.0	DAYS
BASE	K$	50									50.0	K$
CONT	%	0									15%	%
TOTAL	K$	58									57.5	K$
											57.5	unit cost
PASA												
x.x.x.x.1	Qty	7250										
Material	K$			70.0		60.0		103.7			233.7	K$
Labor E	DAYS			70.0		35.0		25.0			130.0	DAYS
Labor T	DAYS			45.0		25.0		80.0			150.0	DAYS
BASE	K$			120.6		86.1		142.1			348.7	K$
CONT	%			30%		20%		20%			23%	%
TOTAL	K$			156.7		103.3		170.5			430.5	K$
											0.059	unit cost
SCA												
x.x.x.x.2	Qty	7250										
Material	K$			25.0		74.0		86.0			185.0	K$
Labor E	DAYS			70.0		35.0		25.0			130.0	DAYS
Labor T	DAYS			35.0		15.0		80.0			130.0	DAYS
BASE	K$			72.4		96.9		124.4			293.7	K$
CONT	%			30%		50%		30%			37%	%
TOTAL	K$			94.1		145.4		161.7			401.2	K$
											0.055	unit cost
MCM HYBRID												
x.x.x.x.3	Qty	460										
Material	K$			21.0		10.0		92.0			123.0	K$
Labor E	DAYS			85.0		30.0		30.0			145.0	DAYS
Labor T	DAYS			95.0		40.0		60.0			195.0	DAYS
BASE	K$			95.2		38.3		126.6			260.1	K$
CONT	%			30%		20%		30%			29%	%
TOTAL	K$			123.8		45.9		164.6			334.3	K$
											0.7	unit cost
CARRIER I/O (CI)												
x.x.x.x.4	Qty	160										
Material	K$			21.0		10.0		20.0			51.0	K$
Labor E	DAYS			105.0		30.0		30.0			165.0	DAYS
Labor T	DAYS			85.0		40.0		60.0			185.0	DAYS
BASE	K$			102.4		38.3		54.6			195.3	K$
CONT	%			30%		20%		30%			28%	%
TOTAL	K$			133.1		45.9		71.0			250.1	K$
											1.6	unit cost

SVT COST MATRIX (NO LINKS)

DRAFT		SVT ELECTRONICS SUMMARY BY OBJECT					RHM		7/5/95		**DRAFT**	
		SYSTEM DESIGN	**REQ REVIEW**	**ELECT DESIGN**	**PDR**	**PROD MODELS**	**FDR**	**PROD ELECT**	**INSTALL**	**MANAGE**	**OBJECT SUBTOTAL**	
		4.1.6.1	4.1.6.2	4.1.6.3	4.1.6.4	4.1.6.5	4.1.6.6	4.1.6.7	4.1.6.8	4.1.6.9		
READOUT (RDO)												
x.x.x.x.5	Qty	52										
Material	K$			17.0		10.0		139.4			166.4	K$
Labor E	DAYS			96.0		21.0		1.3			118.3	DAYS
Labor T	DAYS			65.0		34.0		3.3			102.3	DAYS
BASE	K$			87.4		31.7		141.1			260.2	K$
CONT	%			30%		20%		30%			29%	%
TOTAL	K$			113.6		38.0		183.4			335.0	K$
											6.4	unit cost
FIBER/TIMING CARD (FT)												
x.x.x.x.6	Qty	26										
Material	K$			17.0		9.0		25.8			51.8	K$
Labor E	DAYS			96.0		21.0		9.0			126.0	DAYS
Labor T	DAYS			68.0		34.0		15.0			117.0	DAYS
BASE	K$			88.4		30.7		35.2			154.3	K$
CONT	%			30%		20%		30%			28%	%
TOTAL	K$			114.9		36.8		45.8			197.5	K$
											7.6	unit cost
MASTER TIMING												
x.x.x.x.7	Qty	2										
Material	K$			5.0		4.0		2.5			11.5	K$
Labor E	DAYS			95.0		19.0		4.0			118.0	DAYS
Labor T	DAYS			61.0		32.0		5.1			98.1	DAYS
BASE	K$			73.6		24.0		6.2			103.9	K$
CONT	%			30%		20%		10%			26%	%
TOTAL	K$			95.7		28.8		6.9			131.4	K$
											65.7	unit cost
CABLE												
x.x.x.x.8	Qty	1										
Material	K$			4.0		0.0		17.3			21.3	K$
Labor E	DAYS			18.0		0.0		5.4			23.4	DAYS
Labor T	DAYS			31.0		0.0		12.7			43.7	DAYS
BASE	K$			23.2		0.0		24.1			47.3	K$
CONT	%			20%		20%		10%			15%	%
TOTAL	K$			27.8		0.0		26.5			54.3	K$
											54.3	unit cost
LV POWER SUPPLIES												
x.x.x.x.9	Qty	50										
Material	K$			2.0		0.0		16.5			18.5	K$
Labor E	DAYS			24.0		0.0		5.7			29.7	DAYS
Labor T	DAYS			20.0		0.0		15.7			35.7	DAYS
BASE	K$			20.8		0.0		24.5			45.2	K$
CONT	%			20%		20%		10%			15%	%
TOTAL	K$			25.0		0.0		26.9			51.8	K$
											1.0	unit cost

SVT COST MATRIX (NO LINKS)

DRAFT		SVT ELECTRONICS SUMMARY BY OBJECT				RHM		7/5/95			**DRAFT**	
		SYSTEM DESIGN	**REQ REVIEW**	**ELECT DESIGN**	**PDR**	**PROD MODELS**	**FDR**	**PROD ELECT**	**INSTALL**	**MANAGE**	**OBJECT SUBTOTAL**	
		4.1.6.1	4.1.6.2	4.1.6.3	4.1.6.4	4.1.6.5	4.1.6.6	4.1.6.7	4.1.6.8	4.1.6.9		
HV POWER SUPPLIES												
x.x.x.x.10	Qty	2										
Material	K$			5.0		0.0		30.0			35.0	K$
Labor E	DAYS			34.0		0.0		5.6			39.6	DAYS
Labor T	DAYS			35.0		0.0		15.3			50.3	DAYS
BASE	K$			33.7		0.0		37.8			71.6	K$
CONT	%			20%		20%		20%			20%	%
TOTAL	K$			40.5		0.0		45.4			85.9	K$
											42.9	unit cost
CALIBRATION SYSTEM												
x.x.x.x.11	Qty	2										
Material	K$			1.0		0.0		3.3			4.3	K$
Labor E	DAYS			34.0		0.0		0.3			34.3	DAYS
Labor T	DAYS			24.0		0.0		2.0			26.0	DAYS
BASE	K$			26.2		0.0		4.1			30.4	K$
CONT	%			20%		20%		10%			19%	%
TOTAL	K$			31.5		0.0		4.5			36.0	K$
											18.0	unit cost
CAGES & HARDWARE												
x.x.x.x.12	Qty	1										
Material	K$			3.0		3.0		7.5			13.5	K$
Labor E	DAYS			17.0		9.0		6.3			32.3	DAYS
Labor T	DAYS			25.0		25.0		21.5			71.5	DAYS
BASE	K$			19.8		15.6		17.6			53.0	K$
CONT	%			25%		20%		10%			19%	%
TOTAL	K$			24.7		18.7		19.4			62.8	K$
											62.8	unit cost
SOFTWARE												
x.x.x.x.13	Qty	1										
Material	K$			0.0		0.0					0.0	K$
Labor E	DAYS			40.0		40.0					80.0	DAYS
Labor T	DAYS			0.0		5.0					5.0	DAYS
BASE	K$			20.7		22.3					43.0	K$
CONT	%			20%		20%					20%	%
TOTAL	K$			24.9		26.8					51.6	K$
											51.6	unit cost
SYSTEM TEST												
	Qty	1										
Material	K$					0.0					0.0	K$
Labor E	DAYS					30.0					30.0	DAYS
Labor T	DAYS					30.0					30.0	DAYS
BASE	K$					25.1					25.1	K$
CONT	%					20%					20%	%
TOTAL	K$					30.1					30.1	K$
											30.1	unit cost

SVT COST MATRIX (NO LINKS)

DRAFT		SVT ELECTRONICS SUMMARY BY OBJECT					RHM		7/5/95		**DRAFT**	
		SYSTEM	**REQ**	**ELECT**	**PDR**	**PROD**	**FDR**	**PROD**	**INSTALL**	**MANAGE**	**OBJECT**	
		DESIGN	**REVIEW**	**DESIGN**		**MODELS**		**ELECT**			**SUBTOTAL**	
		4.1.6.1	4.1.6.2	4.1.6.3	4.1.6.4	4.1.6.5	4.1.6.6	4.1.6.7	4.1.6.8	4.1.6.9		
REVIEWS AND DOCUMENTATION												
	Qty	1										
Material	K$		2.0	3.0	6.0	1.0	9.0				21.0	K$
Labor E	DAYS		5.0	12.0	10.0	17.0	20.0				64.0	DAYS
Labor T	DAYS		5.0	12.0	7.0	12.0	9.0				45.0	DAYS
BASE	K$		6.2	13.0	13.4	13.6	22.2				68.5	K$
CONT	%		10%	10%	10%	10%	10%				10%	%
TOTAL	K$		6.8	14.3	14.7	15.0	24.4				75.3	K$
											75.3	unit cost
INSTALLATION												
	Qty	1										
Material	K$								2.0		2.0	K$
Labor E	DAYS								15.0		15.0	DAYS
Labor T	DAYS								39.0		39.0	DAYS
BASE	K$								22.2		22.2	K$
CONT	%								10%		10%	%
TOTAL	K$								24.4		24.4	K$
											24.4	unit cost
MANAGEMENT												
	Qty 1	costed elsewhere										
Material	K$									0.0	0.0	K$
Labor E	DAYS									0.0	0.0	DAYS
Labor T	DAYS									0.0	0.0	DAYS
BASE	K$									0.0	0.0	K$
CONT	%									0%	0%	%
TOTAL	K$									0.0	0.0	K$
											0.0	unit cost
SUBTOTALS												
Material	K$	0	2	194	6	181	9	544	2	0	938	K$
Labor E	DAYS	75	5	796	10	287	20	148	15	0	1356	DAYS
Labor T	DAYS	35	5	601	7	292	9	370	39	0	1358	DAYS
BASE	K$	50	6	797	13	423	22	738	22	0	2072	K$
CONT	%	0	10%	28%	10%	27%	10%	25%	10%	0%	26%	%
TOTAL	**K$**	**58**	**7**	**1021**	**15**	**535**	**24**	**927**	**24**	**0**	**2610**	**K$**

Chapter 51

SVT Cost Summaries by Task

Last Updated:

SVT ELECTRONICS **PRELIMINARY DRAFT** **RHM** **7/5/95**

W.B.S.	Description	Qty	Each	Sub	Material	Labor E	Labor T	BASE	CONT	TOTAL	Notes
Electronics L4			**preliminary**		7/5/95	**draft**					
Costs by Task											
				$ or hrs	K$	DAYS	DAYS	K$	%	K$	
4.1.6	SVT Electronics				938	1356	1358	2072	26%	2610	K$ (E=518$/day,T=318$/day
4.1.6.1	System Design				0.0	75.0	35.0	50.0	15%	57.5	K$ (E=518$/day,T=318$/day
4.1.6.2	Requirement Review				2.0	5.0	5.0	6	10%	6.8	K$ (E=518$/day,T=318$/day
4.1.6.3	SVT Electronics Design				194.0	796.0	601.0	797.4	28%	1020.6	K$ (E=518$/day,T=318$/day
4.1.6.4	PDR				6.0	10.0	7.0	13.4	10%	14.7	K$ (E=518$/day,T=318$/day
4.1.6.5	SVT Prod. Models				181.0	287.0	292.0	422.5	27%	534.7	K$ (E=518$/day,T=318$/day
4.1.6.6	FDR				9.0	20.0	9.0	22.2	10%	24.4	K$ (E=518$/day,T=318$/day
4.1.6.7	SVT Production Electronics				544.2	147.5	370.5	738.4	25%	926.6	K$ (E=518$/day,T=318$/day
4.1.6.8	Install Electronics				2	15.0	39.0	22	10%	24.4	K$ (E=518$/day,T=318$/day
4.1.6.9	Management				0.0	0.0	0.0	0	10%	0.0	costed elsewhere

L5 Cost by Tasks					preliminary	7/5/95	draft				
W.B.S.	Description	Qty	Each	Sub	Material	Labor E	Labor T	BASE	CONT	TOTAL	Notes
				$ or hrs	K$	DAYS	DAYS	K$	%	K$	
4.1.6	SVT Electronics				938	1356	1358	2072	26%	2610	K$ (E=518$/day,T=318$/day
4.1.6.1	System Design				0.0	75.0	35.0	50.0	15%	57.5	K$ (E=518$/day,T=318$/day
4.1.6.1.1	Q/A and EH&S				0.0	20.0	10.0	14	10%	14.9	
4.1.6.1.2	System Design				0.0	40.0	15.0	25	20%	30.6	
4.1.6.1.3	Prelim Interface Specs				0.0	10.0	5.0	7	10%	7.4	
4.1.6.1.4	Generate WBS/est/schedule				0.0	5.0	5.0	4	10%	4.6	
4.1.6.2	Requirement Review				2.0	5.0	5.0	6	10%	6.8	K$ (E=518$/day,T=318$/day
4.1.6.3	SVT Electronics Design				194.0	796.0	601.0	797.4	28%	1020.6	K$ (E=518$/day,T=318$/day
4.1.6.3.1	PASA design and proto				70.0	70.0	45.0	120.6	30%	156.7	
4.1.6.3.2	SCA design and proto				25.0	70.0	35.0	72.4	30%	94.1	
4.1.6.3.3	MCM HYBRID design and proto				21.0	85.0	95.0	95.2	30%	123.8	
4.1.6.3.4	CARRIER design and proto				21.0	105.0	85.0	102.4	30%	133.1	
4.1.6.3.5	READOUT design and proto				17.0	96.0	65.0	87.4	30%	113.6	
4.1.6.3.6	FIBER/TIMING design and proto				17.0	96.0	68.0	88.4	30%	114.9	
4.1.6.3.7	MASTER TIMING design and proto				5.0	95.0	61.0	73.6	30%	95.7	
4.1.6.3.8	CABLE PLANT design and proto				4.0	18.0	31.0	23.2	20%	27.8	
4.1.6.3.9	LV SYSTEM design and proto				2.0	24.0	20.0	20.8	20%	25.0	
4.1.6.3.10	HV SYSTEM design and proto				5.0	34.0	35.0	33.7	20%	40.5	
4.1.6.3.11	CALIBRATION design and proto				1.0	34.0	24.0	26.2	20%	31.5	
4.1.6.3.12	CAGES & HARDWARE design and proto				3.0	17.0	25.0	19.8	25%	24.7	
4.1.6.2.13	Software Design				0.0	40.0	0.0	21	20%	24.9	calibration and fault detection
4.1.6.3.14	UPDATE documentation				3.0	12.0	12.0	13.0	10%	14.3	
4.1.6.4	PDR				6.0	10.0	7.0	13.4	10%	14.7	K$ (E=518$/day,T=318$/day
4.1.6.4.1	PDR				4.0	5.0	5.0	8	10%	9.0	TRAVEL 5@2K$
4.1.6.4.2	Safety PDR				2.0	5.0	2.0	5	10%	5.7	TRAVEL 4@2K$
4.1.6.5	SVT Prod. Models				181.0	287.0	292.0	422.5	27%	534.7	K$ (E=518$/day,T=318$/day
4.1.6.5.1	PASA prod models				60	35.0	25.0	86	20%	103.3	
4.1.6.5.2	SCA prod models				74	35.0	15.0	97	50%	145.4	5 wafer min out
4.1.6.5.3	MCM HYBRID prod models				10	30.0	40.0	38	20%	45.9	
4.1.6.5.4	CARRIER prod models				10	30.0	40.0	38	20%	45.9	
4.1.6.5.5	RDO card Prod. Models				10.0	21.0	34.0	32	20%	38.0	
4.1.6.5.6	F/T card Prod. Models				9.0	21.0	34.0	31	20%	36.8	
4.1.6.5.7	Master Timing card Prod. Models				4.0	19.0	32.0	24	20%	28.8	

W.B.S.	Description	Qty	Each	Sub	Material	Labor E	Labor T	BASE	CONT	TOTAL	Notes
				$ or hrs	K$	DAYS	DAYS	K$	%	K$	
4.1.6.5.8	CABLES prod mod				0.0	0.0	0.0	0	20%	0.0	prototype is prod model
4.1.6.5.9	LV SYSTEM prod models				0.0	0.0	0.0	0	20%	0.0	prototype is prod model
4.1.6.5.10	HV SYSTEM prod models				0.0	0.0	0.0	0	20%	0.0	prototype is prod model
4.1.6.5.11	CAL Prod. Models				0.0	0.0	0.0	0	20%	0.0	prototype is prod model
4.1.6.5.12	CAGES & HARDWARE prod models				3.0	9.0	25.0	16	20%	18.7	moddify proto
4.1.6.5.13	code and test SOFTWARE				0.0	40.0	5.0	22	20%	26.8	calibration and fault detection
4.1.6.5.14	UPDATE documentation				1.0	17.0	12.0	13.6	10%	15.0	
4.1.6.5.15	system test				0.0	30.0	30.0	25	20%	30.1	local test
4.1.6.6	FDR				9.0	20.0	9.0	22.2	10%	24.4	K$ (E=518$/day,T=318$/day
4.1.6.6.1	FDR				4.0	10.0	5.0	11	10%	11.8	travel 5@2k
4.1.6.6.2	Safety FDR				2.0	5.0	2.0	5	10%	5.7	travel 3@2k
4.1.6.6.3	ATP Review				3.0	5.0	2.0	6	10%	6.8	travel 3@2k
4.1.6.7	SVT Production Electronics				544.2	147.5	370.5	738.4	25%	926.6	K$ (E=518$/day,T=318$/day
4.1.6.7.1	PASA fab				103.7	25.0	80.0	142	20%	170.5	fab and test 6480 ics
4.1.6.7.2	SCA fab				86.0	25.0	80.0	124	30%	161.7	fab and test 6580 ics
4.1.6.7.3	MCM HYBRID fab				92.0	30.0	60.0	127	30%	164.6	fab and test 460 hybrids
4.1.6.7.4	CARRIER fab				20.0	30.0	60.0	55	30%	71.0	fab and test 40 carriers
4.1.6.7.5	RDO card fab				139.4	1.3	3.3	141.1	30%	183.4	fab and test 52 cards
4.1.6.7.6	F/T card fab				25.8	9.0	15.0	35	30%	45.8	fab and test 26 cards
4.1.6.7.7	Master Timing card fab				2.5	4.0	5.1	6	10%	6.9	fab & test 2 cards
4.1.6.7.8	Cables fab				17.3	5.4	12.7	24	10%	26.5	
4.1.6.7.9	LV SYSTEM fab				16.5	5.7	15.7	24	10%	26.9	
4.1.6.7.10	HV SYSTEM fab				30.0	5.6	15.3	38	20%	45.4	
4.1.6.7.11	CAL fab				3.3	0.3	2.0	4	10%	4.5	build 2 cards
4.1.6.7.12	Cage and Hardware FAB				7.5	6.3	21.5	18	10%	19.4	
4.1.6.8	Install Electronics				2	15.0	39.0	22	10%	24.4	K$ (E=518$/day,T=318$/day
4.1.6.8.1	Assemble and test crates of electronics				2.0	15.0	39.0	22	10%	24.4	
4.1.6.8.2	ship electronics				0.0	0.0	0.0	0	10%	0.0	costed elsewhere
4.1.6.9	Management				0.0	0.0	0.0	0	10%	0.0	costed elsewhere

Chapter 52

SVT Schedules

Last Updated:

svt-electronics-eps

task-timeline-eps

resource-histogram-org-eps

resource-histogram-tech-eps

system-design-eps

electronics-design-eps

preliminary-design-review-eps

production-model-eps

critical-design-review-eps

electronic-production-eps

svt-installation-eps

Chapter 53

SVT Electronics L5 List of Deliverables

Last Updated: 15 June 1995

SVT ELECTRONICS PRELIMINARY DRAFT RHM 7/5/95

W.B.S.	Description		Qty	notes
	SVT ELECTRONICS DELIVERABLES		7/5/95	
W.B.S.	Description		Qty	notes
4.1.6	SVT Electronics			
4.1.6.1	System Design			
4.1.6.1.1		Q/A and EH&S	1	document
4.1.6.1.2		System Design	1	document
4.1.6.1.3		Prelim Interface Specs	1	document
4.1.6.1.4		Generate WBS/est/schedule	1	document
4.1.6.2	Requirement Review		1	
4.1.6.3	SVT Electronics Design			
4.1.6.3.1		PASA design and proto	1 lot	schematic, manual, & proto
4.1.6.3.2		SCA design and proto	1 lot	schematic, manual, & proto
4.1.6.3.3		HYBRID design and proto	1 lot	schematic, manual, & proto
4.1.6.3.4		CARRIER design and proto	1 lot	schematic, manual, & proto
4.1.6.3.5		READOUT design and proto	1	schematic, manual, & proto
4.1.6.3.6		FIBER/TIMING design and proto	1	schematic, manual, & proto
4.1.6.3.7		MASTER TIMING design and proto	1	schematic, manual, & proto
4.1.6.3.8		CABLE PLANT design and proto	1 lot	schematic, manual, & proto
4.1.6.3.9		LV SYSTEM design and proto	1	schematic, manual, & proto
4.1.6.3.10		HV SYSTEM design and proto	1	schematic, manual, & proto
4.1.6.3.11		CALIBRATION design and proto	1	schematic, manual, & proto
4.1.6.3.12		CAGES & HARDWARE design and proto	1 lot	schematic, manual, & proto
4.1.6.2.13		Software Design	1	
4.1.6.3.14		UPDATE documentation	1	document
4.1.6.4	PDR			
4.1.6.4.1		PDR	1	
4.1.6.4.2		Safety PDR	1	
4.1.6.5	SVT Prod. Models			
4.1.6.5.1		PASA prod models	1 lot	
4.1.6.5.2		SCA prod models	1 lot	
4.1.6.5.3		HYBRID prod models	1 lot	
4.1.6.5.4		CARRIER prod models	1 lot	
4.1.6.5.5		RDO card Prod. Model	1	
4.1.6.5.6		F/T card Prod. Model	1	
4.1.6.5.7		Master Timing card Prod. Model	1	
4.1.6.5.8		CABLES prod mod	1 lot	
4.1.6.5.9		LV SYSTEM prod model	1 of 50	
4.1.6.5.10		HV SYSTEM prod model	1 of 2	
4.1.6.5.11		CAL Prod. Model	1	
4.1.6.5.12		CAGES & HARDWARE prod models	1 lot	
4.1.6.5.13		code and test software	1 lot	
4.1.6.5.14		UPDATE documentation	1 lot	document
4.1.6.5.15		system test	1	
4.1.6.6	FDR			
4.1.6.6.1		FDR	1	
4.1.6.6.2		Safety FDR	1	
4.1.6.6.3		ATP Review	1	
4.1.6.7	SVT Production Electronics			
4.1.6.7.1		PASA fab	7250	includes spares
4.1.6.7.2		SCA fab	7250	includes spares
4.1.6.7.3		HYBRID fab	460	includes spares
4.1.6.7.4		CARRIER fab	160	includes spares
4.1.6.7.5		RDO card fab	52	includes spares
4.1.6.7.6		F/T card fab	26	includes spares
4.1.6.7.7		Master Timing card fab	2	includes spares
4.1.6.7.8		Cables fab	1 lot	includes spares
4.1.6.7.9		LV SYSTEM fab	1 (50)	includes spares
4.1.6.7.10		HV SYSTEM fab	1 (2)	includes spares
4.1.6.7.11		CAL fab	2	includes spares
4.1.6.7.12		CAGES & HARDWARE FAB	1 lot	includes spares
4.1.6.8	Install Electronics			
4.1.6.8.1		Assemble and test crates of electronics	1 lot	
4.1.6.8.2		ship electronics	1 lot	
4.1.6.9	Management		1	