

Basis of Estimate –M&S line 1.3.1 Level 2 Beta Upgrade

1.3.1.1 Motherboards

1.3.1.1.1 Firmware support

\$10,000 - Estimated effort, if new interrupt control added and for minor register redefinitions

1.3.1.2 Processors

1.3.1.2.1 Upgrade Boards

1.3.1.2.1.1 New SBC

\$ 3500 per SBC - Based on market price; 30 % contingency based on range of boards available today. Total of 12 for 42,000 are budgeted for.

1.3.1.2.1.2 Heat sink modification

\$125 per SBC; total of 12 for \$1,500- Based on Run2a price estimates

1.3.1.2.1.3 Disk drive

\$200 per SBC; total of 12 for \$2,400- Based on Run2a price estimates

1.3.1.2.1.4 2nd CPU chip

\$300 per SBC; total of 12 for \$3,600- Based on Run2a price estimates

1.3.1.2.2 Disk Connector for new SBC

Design and layout	\$10,000	estimate based on previous experience
Prototype adaptor (2)	\$1,000	prototype adaptors - 2 at \$500 per prototype; estimate based on previous experience
Production adaptors(16)	\$1,600	Production adaptors, 16 at \$100 per adaptor; estimate based on previous experience

Total is \$12,600 + 50% contingency

Basis of Estimate –M&S line 1.3.2 Level 2 Silicon Track Trigger

The following tables list the unit cost for parts, PC boards, and assembly for the components of the L2STT Run 2B upgrade. The basis of the estimate is listed in the right column.

1.3.2.1.1 Motherboard

Parts	\$660	actual cost of parts for Run 2A STT
PCB	\$600	vendor quote
Assembly	\$400	vendor quote
cost per unit	\$1725	

30 motherboards + 2 spares are budgeted

1.3.2.1.2 STC module

Parts	\$2000	estimate based on prototype parts list
PCB	\$600	prototype boards
Assembly	\$400	prototype assembly
cost per unit	\$3000	

18 STC daughterboards + 2 spares are budgeted

1.3.2.1.3 Link transmitter board

Parts	\$98	actual cost of prototype parts
PCB	\$207	actual cost of prototype PCB
Assembly	\$28	actual cost of prototype assembly
cost per unit	\$333	

48 LTBs + 4 spares are budgeted

1.3.2.1.4 Link receiver board

Parts	\$236	actual cost of prototype parts
PCB	\$207	actual cost of prototype PCB
Assembly	\$61	actual cost of prototype assembly
cost per unit	\$504	

54 LRBs + 6 spares are budgeted

1.3.2.1.5 Buffer Controller (BC) board

Parts	\$802	vendor quote
PCB	\$80	vendor quote
Assembly	\$45	vendor quote
cost per unit	\$927	

30 BCs + 2 spares are budgeted

1.3.2.1.6 VME Transition Module (VTM)

Fabricate	\$2354	actual cost for Run 2A STT
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18 VTMs are budgeted (we have enough spares from Run 2A)

1.3.2.1.7 Track Fit Card (TFC) module

Parts	\$4000	estimate based on prototype parts list
PCB	\$500	estimate based on prototype boards
Assembly	\$500	estimate based on prototype assembly
cost per unit	\$5000	

12 TFCs are required. We have enough extra boards from Run 2A that we only need to budget an additional 8 TFCs.

1.3.2.1.8 Hotlink transmitter

Parts	\$350	actual cost of prototype parts
PCB	\$200	estimate based on similar boards (LTB/LRB)
Assembly	\$50	estimate based on similar boards (LTB/LRB)
cost per unit	\$600	

12 hotlink transmitters + 2 spares are budgeted

1.3.2.2 LVDS fanout board

Prototype	\$1000	prototypes of similar boards (LTB/LRB)
Parts	\$250	on similar boards (LTB/LRB)
PCB	\$200	similar boards (LTB/LRB)
Assemble	\$50	similar boards (LTB/LRB)
cost per unit	\$500	

We budget for two prototype boards and 6 production boards + 2 spares.

1.3.2.3 Software and Firmware Changes

960 hours at \$35 per hour for a total of \$33,600 + 100% contingency

1.3.2.4 J3 backplane

Parts	\$327	actual cost of J3 backplanes for Run 2A
Setup for production	\$2300	actual cost of J3 backplanes for Run 2A
Fabricate PCB	\$314	actual cost of J3 backplanes for Run 2A
Assemble	\$0	done by physicists

We budget for 6 backplanes for the STT crates + 1 spare + 1 backplane for a teststand.

1.3.2.5 Cables

LVDS Cables	\$30	actual cost of prototype cables
Splitters	\$125	actual cost of splitters bought for Run 2A
Fibers	\$25	actual cost of fibers bought for Run 2A

We budget 156 LVDS cables + 14 spares, 72 splitters + 8 spares, and 144 fibers +16 spares.