

A. Supplementary Documentation

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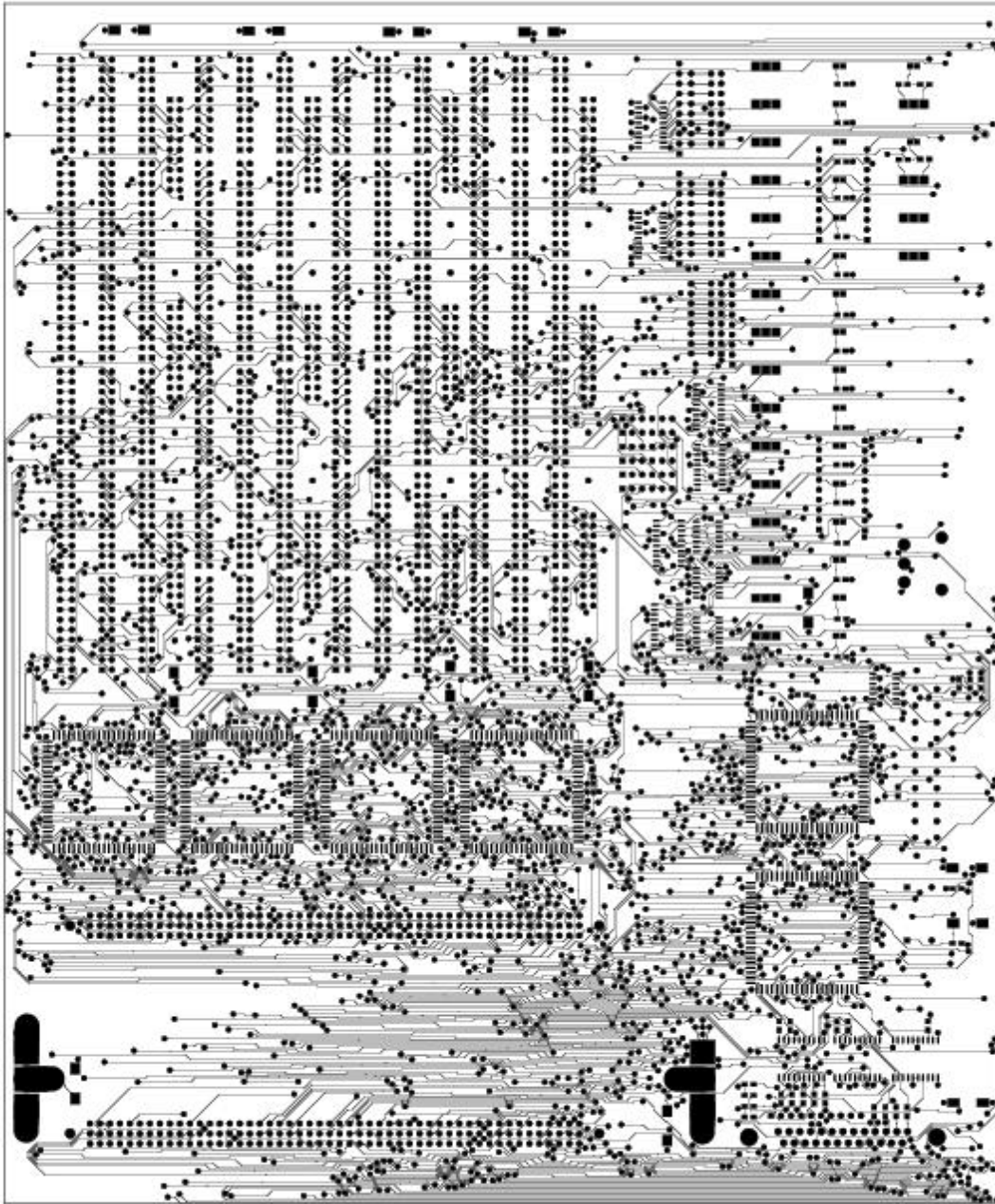
Embedded Controller Board

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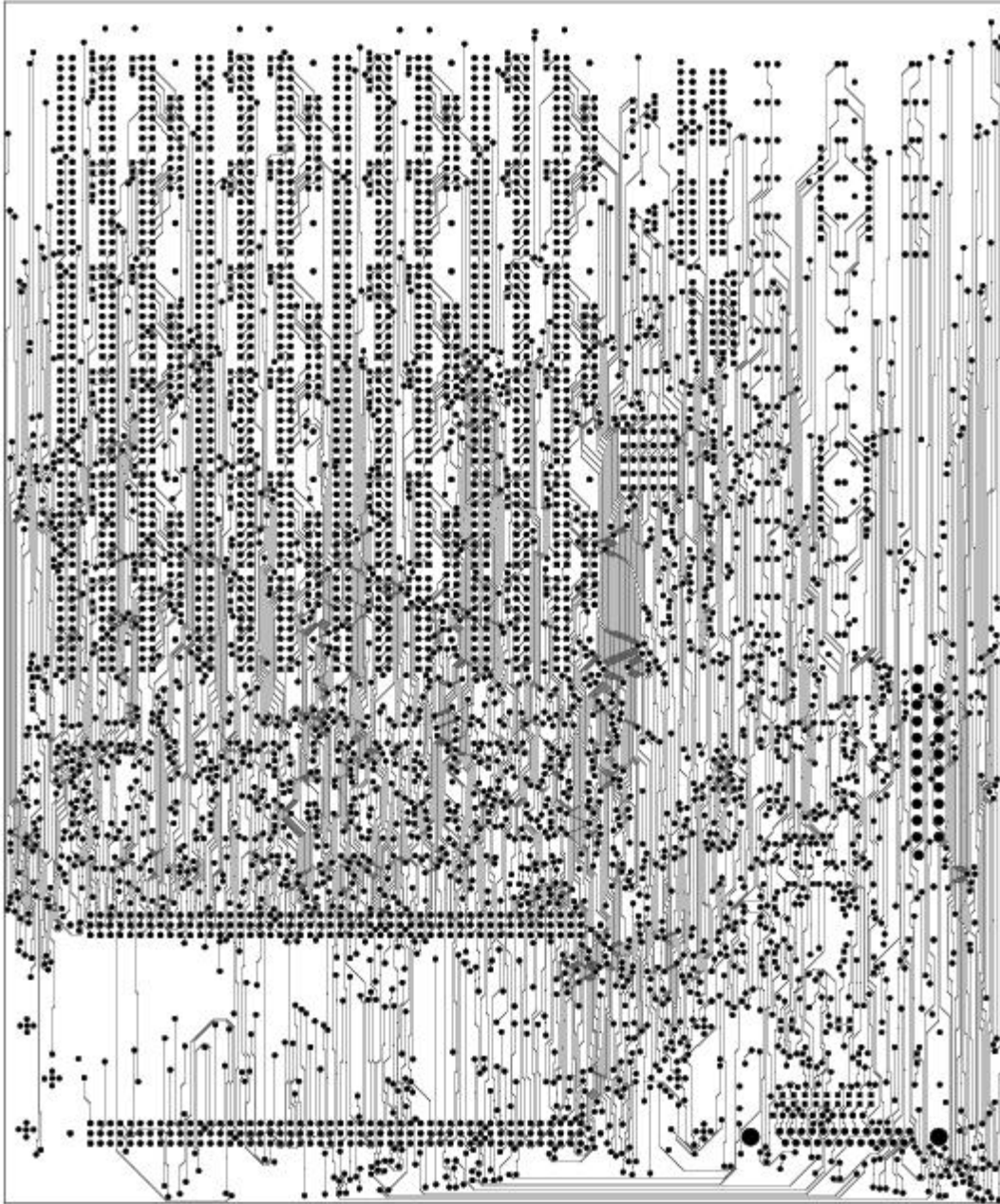
Logic Engine Base Parts List

Part Type	Quantity	Unit Cost	Extended Cost
BUTTON,THRU,2 PIN	18	\$0.91	\$16.38
CAPACITOR,0805, 0.1UF, CERAMIC,25V	100	\$0.05	\$4.60
CAPACITOR,7343,47UF,TANALUM,16V	14	\$0.71	\$9.94
CAPACITOR,THRU,470UF,ELECTROLYTIC,16V	2	\$2.15	\$4.30
CONNECTOR,DB25,MALE	1	\$3.97	\$3.97
CONNECTOR,150 PIN DIN,MALE	2	\$4.42	\$8.84
CONNECTOR,20 PIN,ATX POWER CONNECTOR	1	\$1.65	\$1.65
CONNECTOR,20 PIN,LOGIC ANALYZER PORT	12	\$1.41	\$16.92
DISPLAY,10 SEGMENT LED BAR GRAPH	24	\$1.29	\$30.96
DISPLAY,THRU,SINGLE LED	3	\$0.25	\$0.75
ENCLOSURE,ALUMINUM,12"x10"x2" OPEN BOX	1	\$16.42	\$16.42
HEADER,6 PIN	6	\$0.18	\$1.08
IC,INTERFACE,74ACT1284 IEEE 1284 TRANSCEIVER	3	\$1.38	\$4.14
IC,INTERFACE,74HC245A OCTAL 3-STATE TRANSCEIVER	6	\$0.45	\$2.70
IC,INTERFACE,74HC573 OCTAL D-TYPE LATCH	24	\$0.35	\$8.40
IC,LOGIC,74HC14 INVERTER	4	\$0.41	\$1.64
IC,LOGIC,XC95108 CPLD	1	\$10.25	\$10.25
IC,LOGIC,XC9572 CPLD	5	\$4.45	\$22.25
IC,SM,20MHZ OSCILLATOR	1	\$3.25	\$3.25
PWB,LOGIC ENGINE,BASE	1	\$103.00	\$103.00
RES,0805,0,0.1W	24	\$0.004	\$0.10
RES,0805,1.2K,0.1W	2	\$0.004	\$0.01
RES,0805,10K,0.1W	26	\$0.004	\$0.10
RES,0805,220K,0.1W	6	\$0.004	\$0.02
RES,0805,30,0.1W	4	\$0.004	\$0.02
RES,0805,300,0.1W	23	\$0.004	\$0.09
RES,SIP,220K,9 RES COMMON CONNECTION	56	\$0.15	\$8.40
SUPPLY,ATX,200W,LOW PROFILE	1	\$35.00	\$35.00
SWITCH,DIP,8 CIRCUIT	3	\$1.05	\$3.15
SWITCH,THRU,SLIDE	1	\$2.52	\$2.52
SWITCH,THRU,SPDT	20	\$1.51	\$30.20
TOTAL			\$351.05

Logic Engine Base Top Side Layout



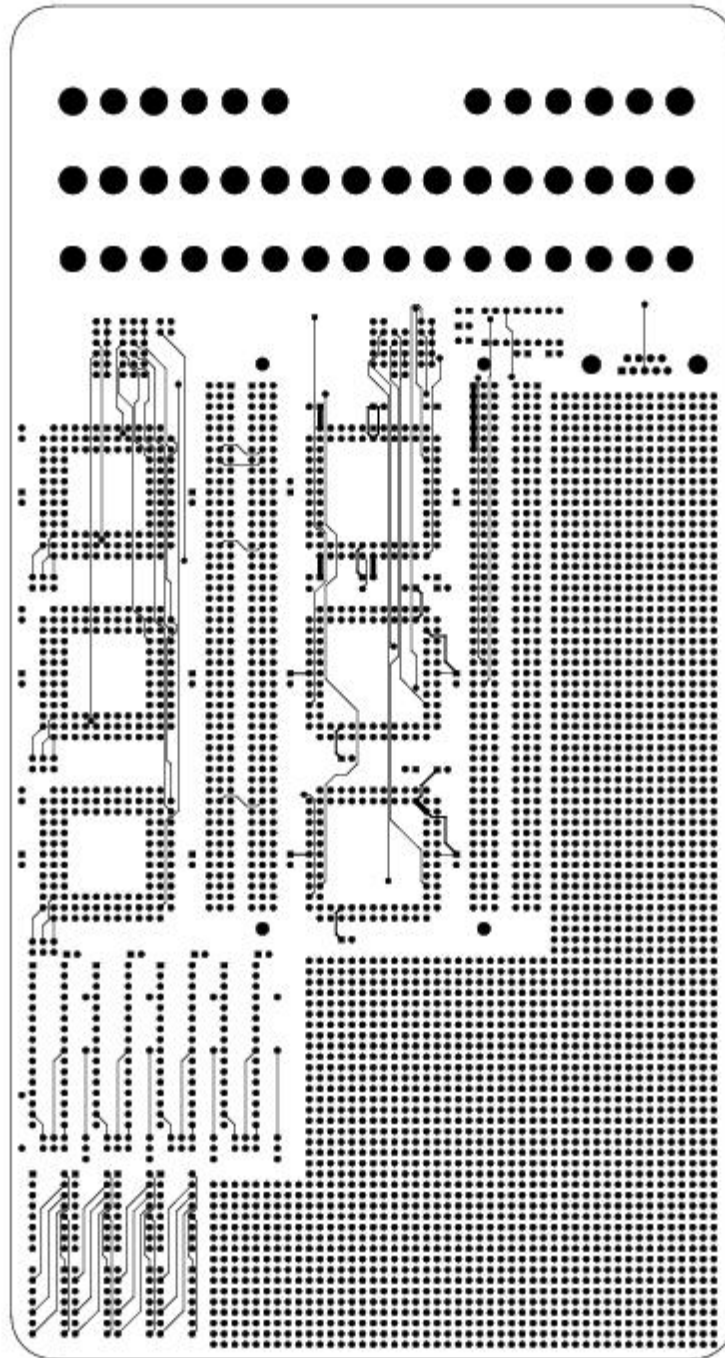
Logic Engine Base Bottom Side Layout



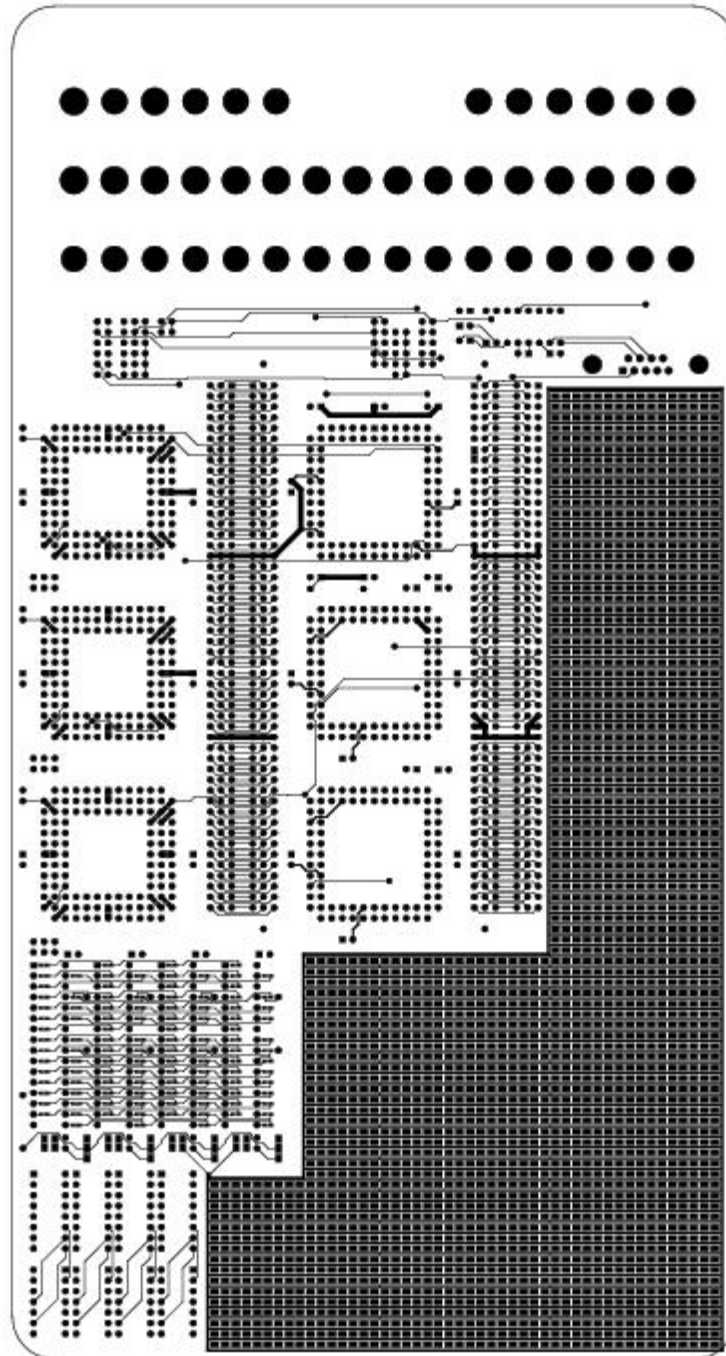
PDP8 Daughter Card Parts List

Part Type	Quantity	Unit Cost	Extended Cost
CAPACITOR,THRU, 0.1UF, CERAMIC	32	\$0.11	\$3.36
CONNECTOR,DB9,FEMALE	1	\$5.82	\$5.82
CONNECTOR,150 PIN DIN,FEMALE	2	\$6.61	\$13.22
DISPLAY,7 SEGMENT LED	4	\$1.40	\$5.60
HEADER, 2 PIN	34	\$0.06	\$2.04
HEADER,150 PIN,WIREWRAP	2	\$4.68	\$9.36
HEADER,3 PIN	10	\$0.09	\$0.90
HEADER,4 PIN	4	\$0.12	\$0.48
IC,INTERFACE,MAX232 RS232 LINE DRIVER	1	\$3.68	\$3.68
IC,LOGIC,XC9572 CPLD	2	\$4.45	\$8.90
IC,LOGIC,XC3020A FPGA	3	\$11.15	\$33.45
IC,LOGIC,XC4010E FPGA	1	\$57.90	\$57.90
IC,MEMORY,IS61C256 SRAM	4	\$6.50	\$26.00
PWB,LOGIC ENGINE,PDP8 DAUGHTER CARD	1	\$56.83	\$56.83
RES,DIP,220,8 CIRCUITS	4	\$0.45	\$1.80
RES,THRU,10K,0.25W	10	\$0.01	\$0.09
SOCKET,PGA68,3 LEVEL WIREWRAP	3	\$6.64	\$19.92
SOCKET,PGA88, 3 LEVEL WIREWRAP	3	\$8.04	\$24.12
SOCKET,PLCC68	3	\$0.62	\$1.86
SOCKET,PLCC84	3	\$0.78	\$2.34
TOTAL			\$277.67

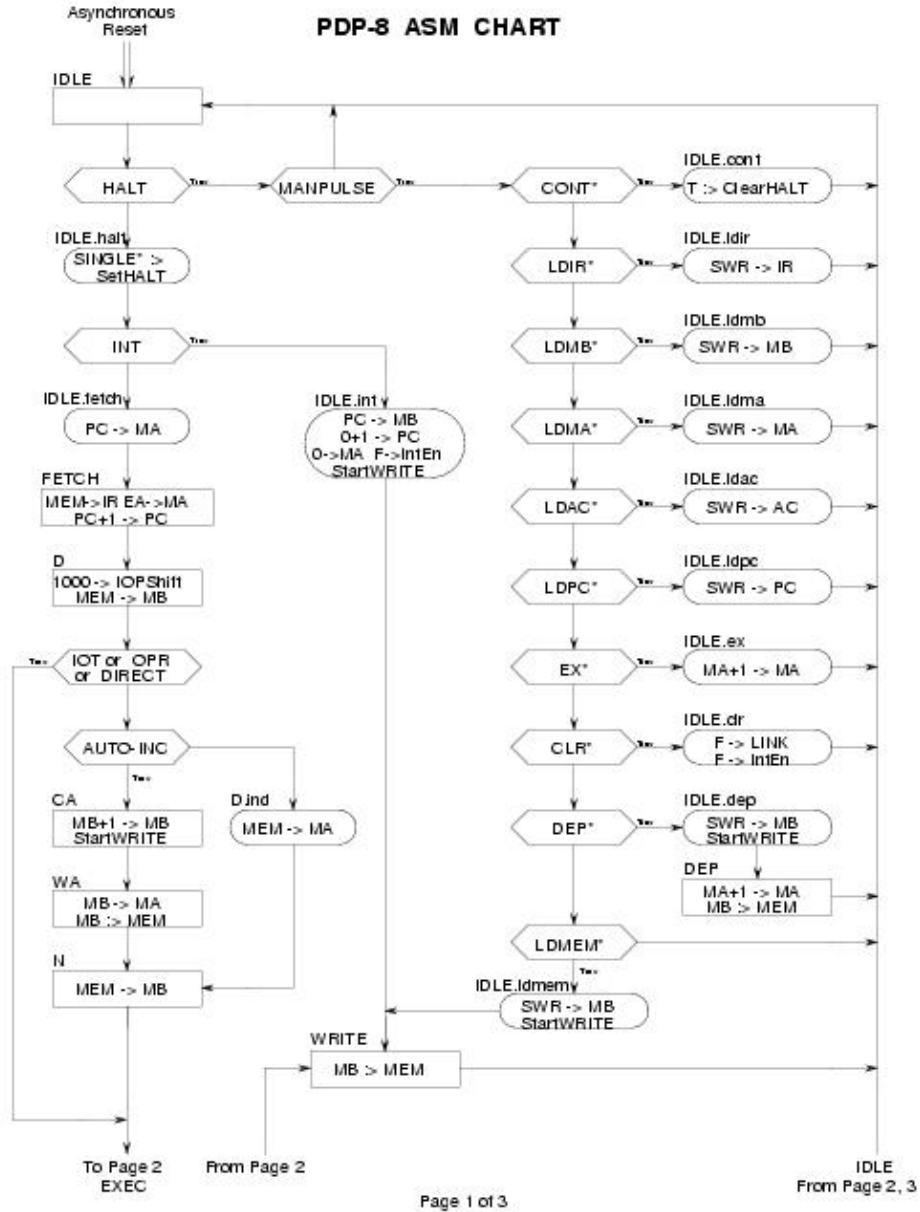
PDP8 Daughter Card Top Side Layout



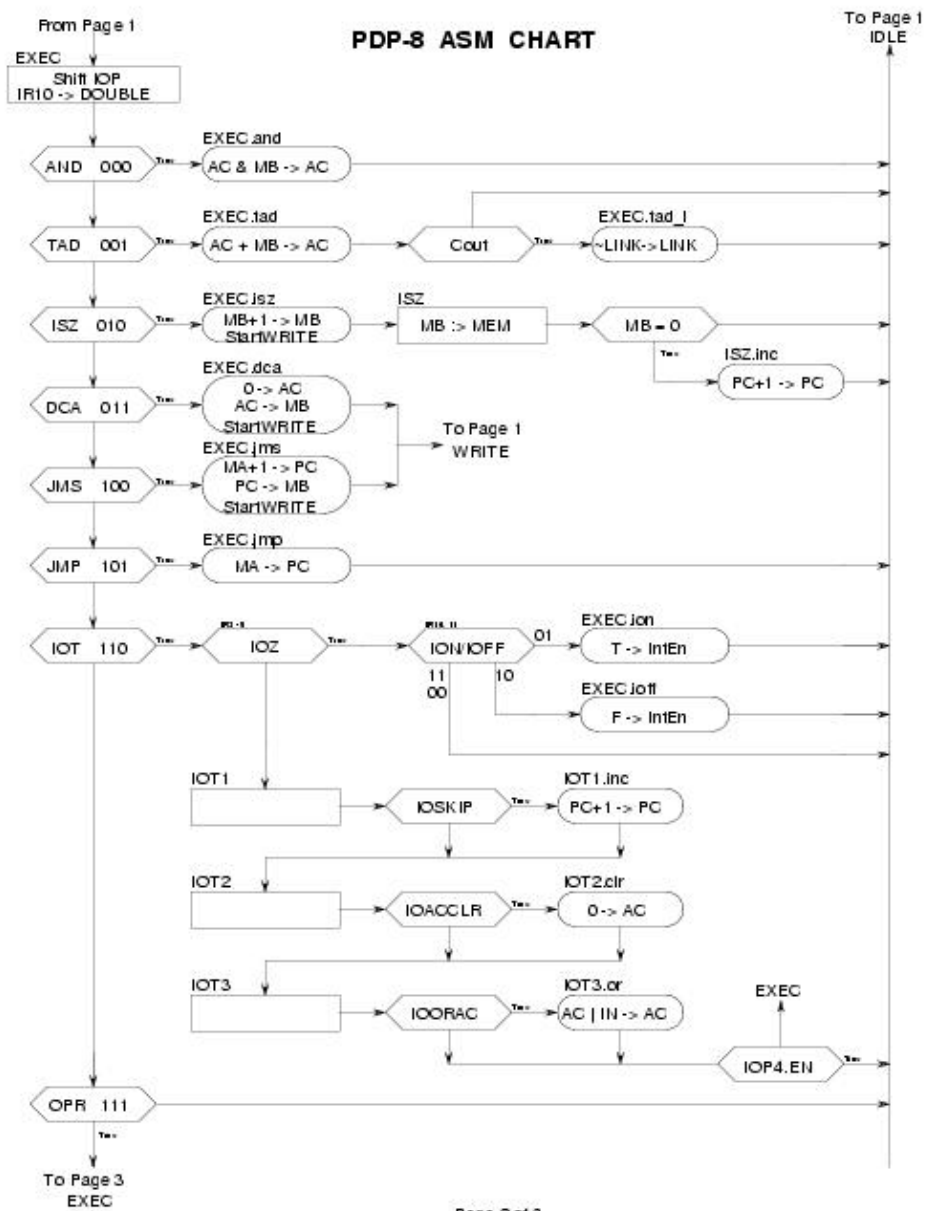
PDP8 Daughter Card Bottom Side Layout



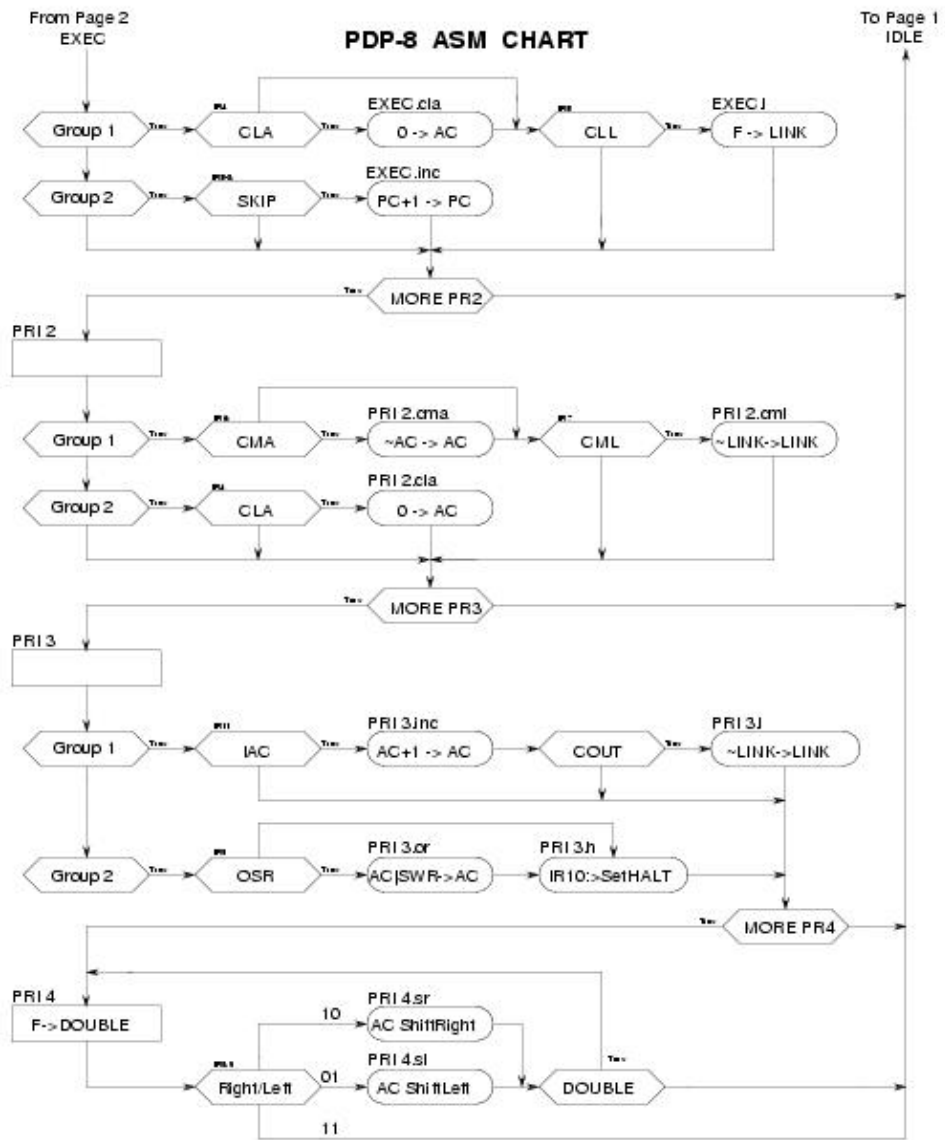
PDP8 ASM Chart Sheet 1



PDP8 ASM Chart Sheet 2



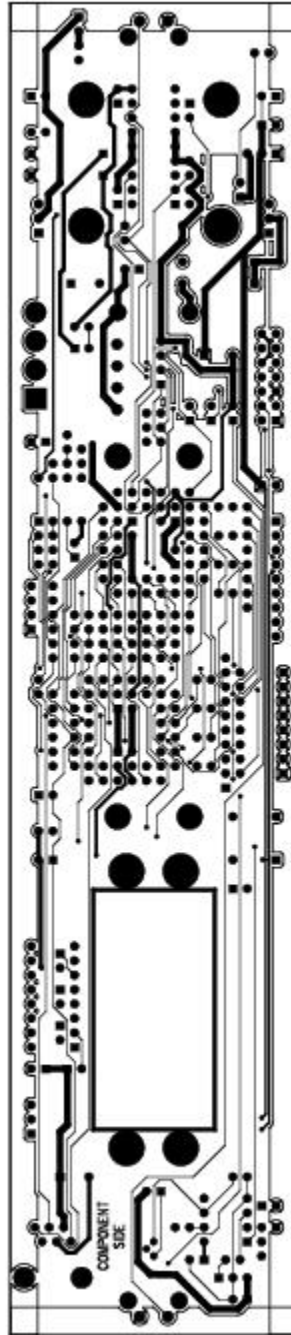
PDP8 ASM Chart Sheet 3



Embedded Controller Board Parts List

Part Type	Quantity	Unit Cost	Extended Cost
RECTIFIER,AXIAL,1A,50V	4	\$0.24	\$0.96
TRANSISTOR,THRU,2N2222A NPN	1	\$0.54	\$0.54
HEADER, 2 PIN	1	\$0.07	\$0.07
HEADER,3 PIN	2	\$0.10	\$0.20
CONNECTOR,4 PIN MOLEX,MALE	1	\$1.09	\$1.09
HEADER,4 PIN	1	\$0.14	\$0.14
HEADER,4 PIN,RIGHT ANGLE	1	\$0.78	\$0.78
MISC,9V BATTERY HOLDER	1	\$0.93	\$0.93
RECTIFIER,THRU,BRIDGE,2A	1	\$0.69	\$0.69
PB_SWITCH	1	\$4.28	\$4.28
CAPACITOR,THRU,4.7UF,TANALUM,16V	1	\$0.33	\$0.33
CAPACITOR,THRU, 0.1UF, CERAMIC	26	\$0.18	\$4.68
CAPACITOR,THRU,470UF,ELECTROLYTIC,16V	3	\$0.30	\$0.90
HEADER,14 PIN,DUAL ROW	1	\$0.48	\$0.48
HEADER,6 PIN	1	\$0.30	\$0.30
SWITCH,DIP,8 CIRCUIT	1	\$1.59	\$1.59
IC,POWER,L6202 INTEGRATED H-BRIDGE	1	\$8.79	\$8.79
DISPLAY,THRU,SINGLE LED	3	\$0.18	\$0.54
IC,LINEAR,LM2904 DUAL OP-AMP	2	\$0.59	\$1.18
IC,POWER,LT1086 5V LINEAR REGULATOR	1	\$3.75	\$3.75
IC,INTERFACE,MAX232 RS232 LINE DRIVER	1	\$4.88	\$4.88
IC,THRU,20MHZ OSCILLATOR	1	\$2.47	\$2.47
IC,MICROCONTROLLER,PIC16F877	1	\$11.45	\$11.45
CONNECTOR,6 PIN MODULAR	1	\$0.67	\$0.67
RES,THRU,1K,0.1W	18	\$0.02	\$0.36
RES,THRU,330,0.1W	18	\$0.02	\$0.36
RES,SIP,10K,9 RES COMMON CONNECTION	1	\$0.30	\$0.30
RES,THRU,200K,0.1W	1	\$0.02	\$0.02
RES,THRU,100K,0.1W	2	\$0.02	\$0.04
RES,THRU,27K,0.1W	1	\$0.02	\$0.02
RES,THRU,10K,0.1W	14	\$0.02	\$0.28
RES,THRU,1.2K,0.1W	1	\$0.02	\$0.02
RES,THRU,600,0.1W	1	\$0.02	\$0.02
RES,THRU,100,0.1W	1	\$0.02	\$0.02
RES,THRU,10,0.1W	1	\$0.02	\$0.02
RES,THRU,0.5,2W	1	\$1.59	\$1.59
SWITCH,THRU,MOMENTARY	2	\$0.62	\$1.24
SWITCH,THRU,SPDT	2	\$3.90	\$7.80
IC,LOGIC,XC9572 CPLD	1	\$5.53	\$5.53
MISC,TRANSIENT SUPPRESSOR,VARISTOR	1	\$0.28	\$0.28
SOCKET,PLCC44	2	\$0.77	\$1.54
MISC,HOBBY SERVO,FUTABA S3003	1	\$11.99	\$11.99
MISC,IR RANGE FINDER,GP2D12	1	\$12.00	\$12.00
MISC,MODEL TRAIN,ATHEARN_03239	1	\$25.13	\$25.13
PWB,TRAIN	1	\$28.70	\$28.70
TOTAL			\$148.95

Embedded Controller Board Top Side Layout



Embedded Controller Board Bottom Side Layout

