

*Élan™ SC520 Microcontroller
Customer Development Platform
Schematics and
Bill of Materials*



Élan™ SC520 Microcontroller

Customer Development Platform

ÉlanSC520 Microcontroller Development System With On-Board Am79C973 10/100Mbps Ethernet Controller, Integrated SDRAM Controller, PCI Controller, GP-Bus Controller, RTC, etc.

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Rev 0.0: Pre-CAD Design

Rev 1.0: First Rev For CAD

Rev 1.1: Incorporated with the reworks done on Rev1.0
(See ÉlanSC520 CDP Rev1.0 Rework List_b)

Rev 1.2: Incorporated with the reworks done on Rev1.1
(See ÉlanSC520 CDP Rev1.1 Rework List_a)

- 1) Removed Clock Delay IC;
- 2) Removed Series Rs on TIP and IDE;
- 3) Connected SPD to SSI with Rs
- 4) Removed POD3
- 5) Removed SRAM
- 6) Redirected AMDebug_VCC to PWRGOOD

Rev 1.3: Incorporated with the reworks done on Rev1.2

- 1) Inserted an R184 for CLKMEMOUT impedance match;
- 2) Inserted an C240 for temp solution by damping the glitch on CLKMEMOUT;
- 3) Inserted an R185 for U17 CS# P/U when PROMICE is used.

Rev 1.4: Incorporated with the reworks done on Rev1.3

- 1) Connect U44 power pins to VCC5 net (sheet20);
- 2) Replace GPAEN net with IDEBACK# net on U4 PAL (sheet 6);
- 3) Add net names to some unnamed nets.

SCHEMATICS: DO NOT COPY

7/23/1998: Rev 1.0 DESIGN STARTED
 6/14/1999: Rev 1.1 MODIFICATION STARTED
 9/01/1999: Rev 1.2 MODIFICATION STARTED
 2/14/2000: Rev 1.3 MODIFICATION STARTED
 8/21/2000: Rev 1.4 MODIFICATION STARTED

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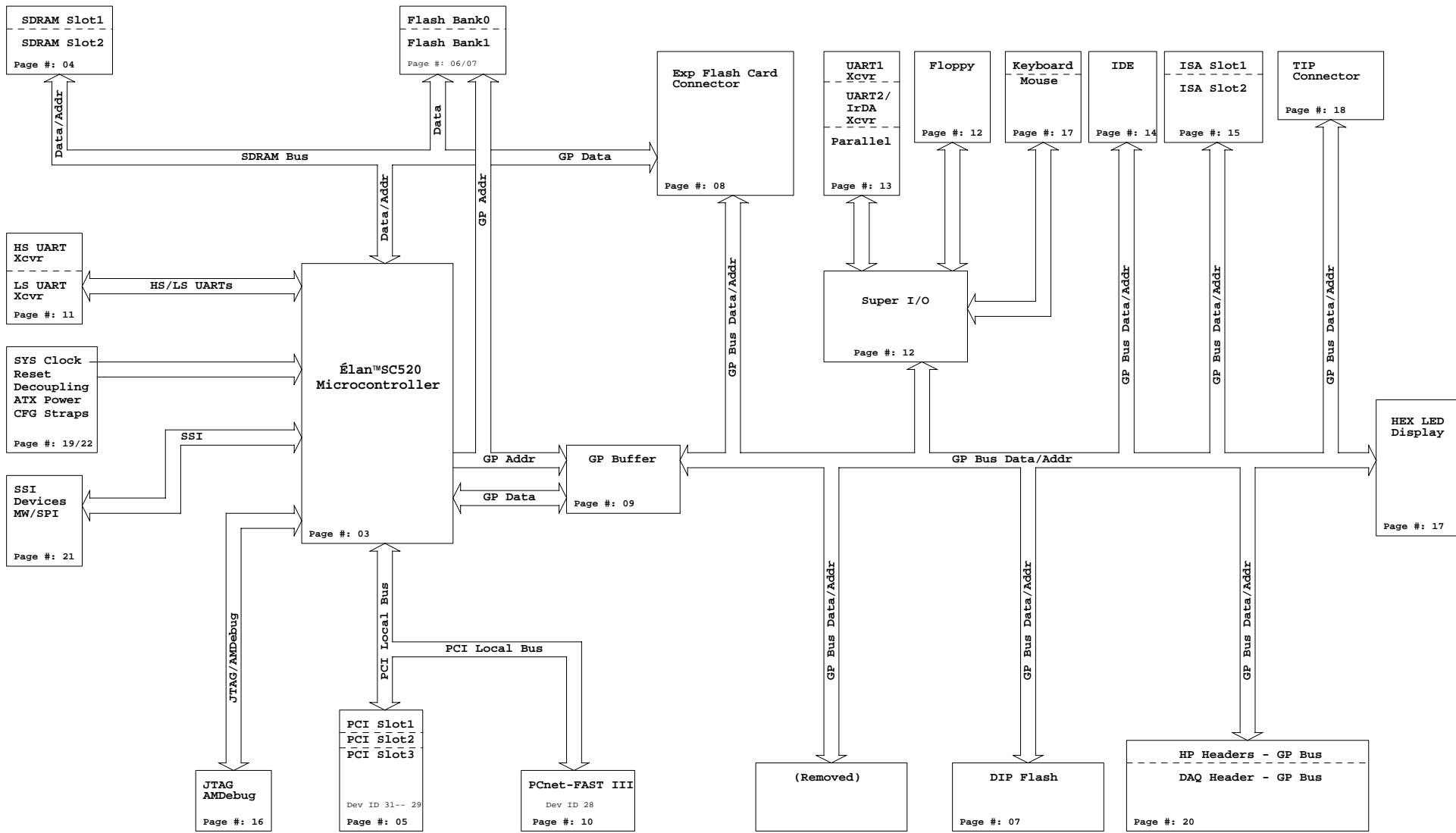
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BLOCK DIAGRAM



ElanSC520 :

1. JTAG & AMDebug
2. SSI & Devices
3. Clock Driver for SDRAM
4. CFG Jumpers
5. Power Supply and Decoupling
6. Test Headers for HP & DAQ
7. Clock Sources - 33MHz & 32kHz
8. SDRAM

Flash Mem :

1. Flash_MEM_16M : 2x8MB 3.3V + Buffer to MD[31..0]
2. Flash_MEM_DIP : DIP 5V onto GPD[15..0]
3. SRAM : Removed
4. Daughter Card Connector

SDRAM :

1. DIMM sockets x2
2. Clock Driver - 1-to-4

GP-Bus :

1. GP Buffer : Buffer for GPD[15..0], GPA[25..0]
2. IDE : Buffer to IDE, IDE connectors
3. HEX Display x4 - 80H & 680H
4. ISA_CONN : ISA Connectors, PAL logic
5. Super_I/O_M512x : SuperI/O - ALI M512x
6. Serial_SC520 : UARTs - 3.3V(RS-232) & 5V(RS-422)
7. Serial_Parallel_SuperI/O : UARTs & Parallel - SuperI/O
8. Parallel_Port : Parallel Port of Aspen
9. KEYBOARD_MOUSE : Keyboard & Mouse
10. IrDA Port
11. FDD Connector

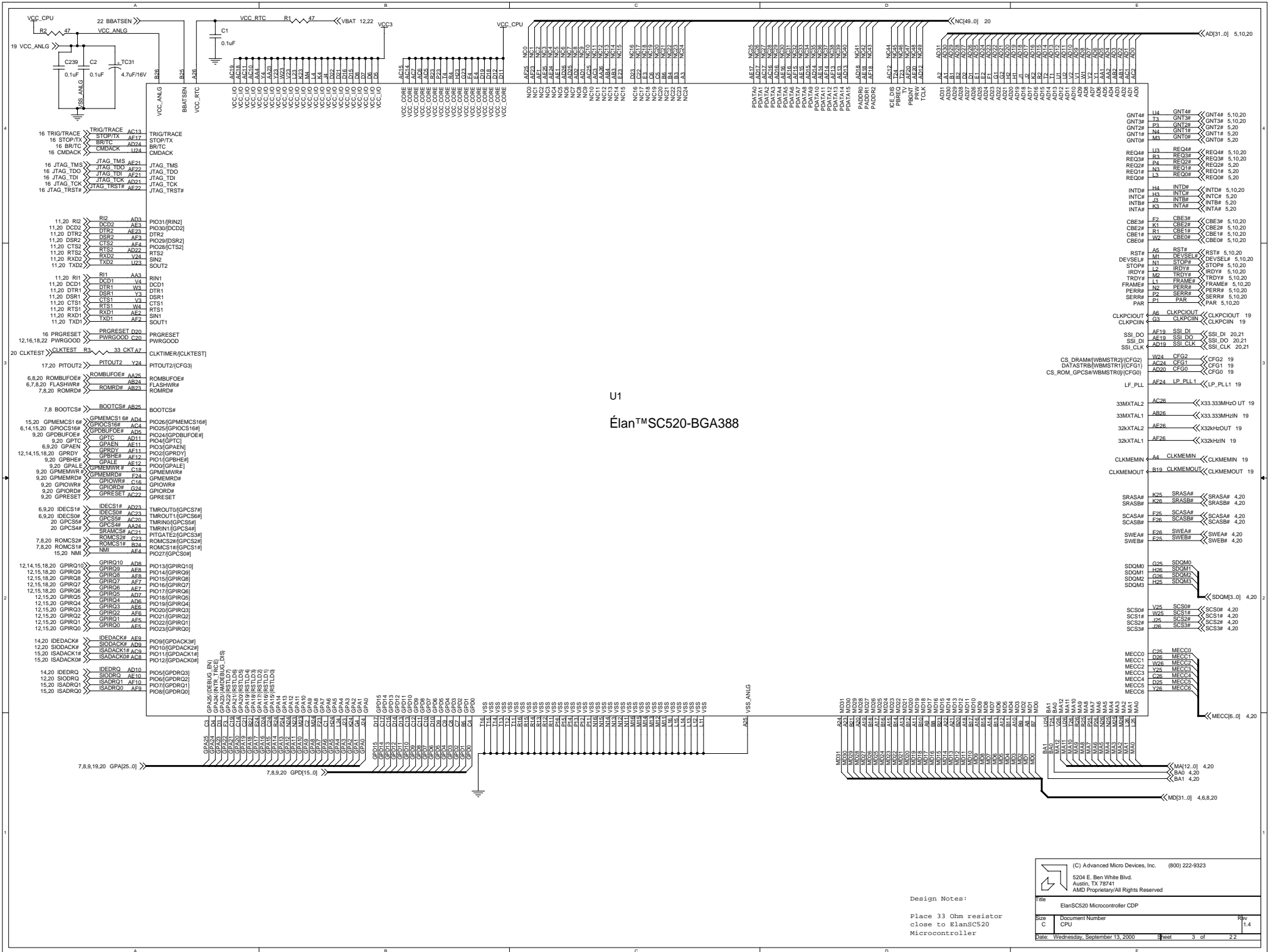
PCI Bus :

1. PCI Connectors
2. Ethernet - PCnetFast-III EEPROM 3.3V

Note:

1. Unless otherwise stated the resistors are a 0805 package and 5% Tol.
2. Unless otherwise stated the capacitors are a 0805 package and 10% Tol.

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U1
 Elan™ SC520-BGA388

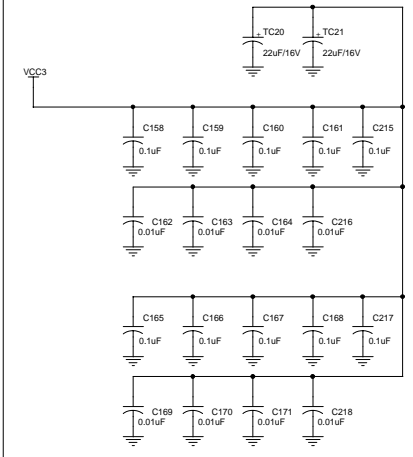
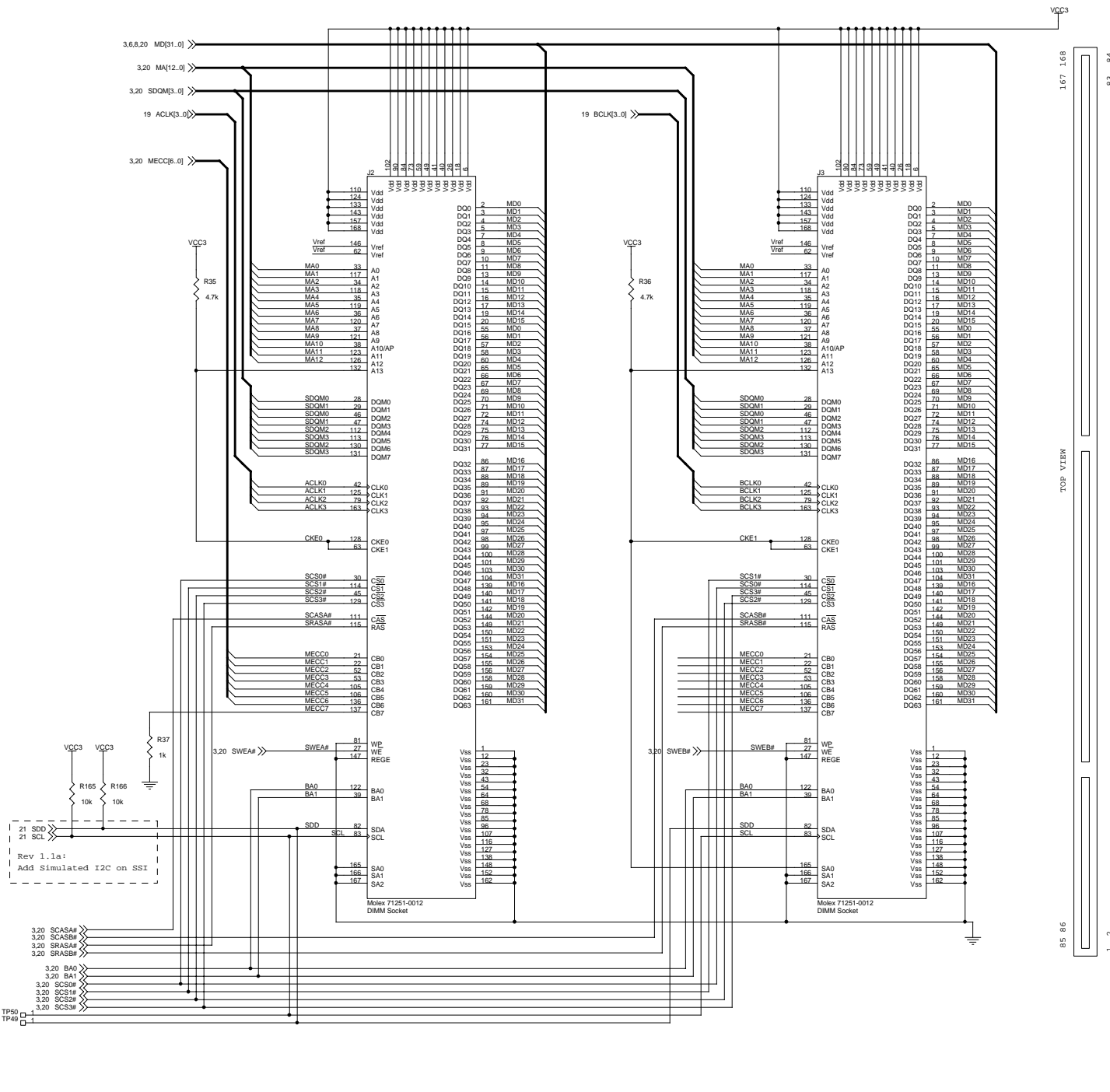
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Design Notes:

Place 33 Ohm resistor
 close to ElanSC520
 Microcontroller

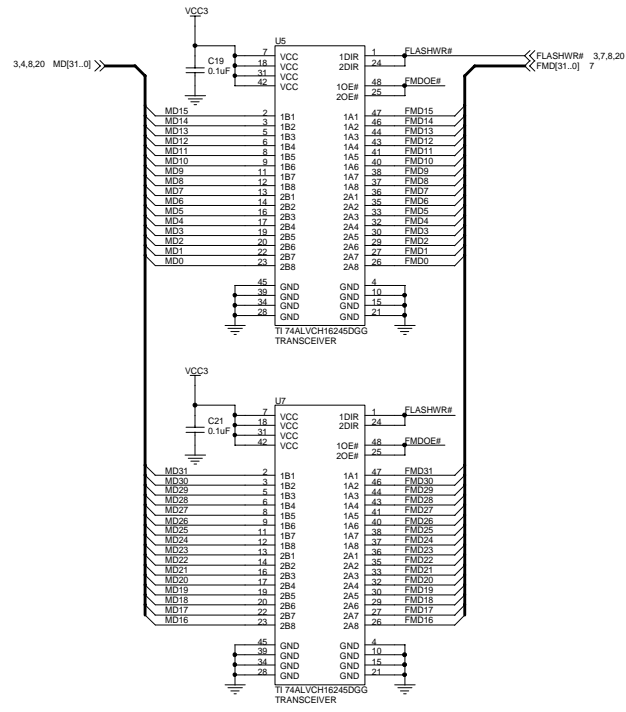
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SDRAM DIMM Sockets

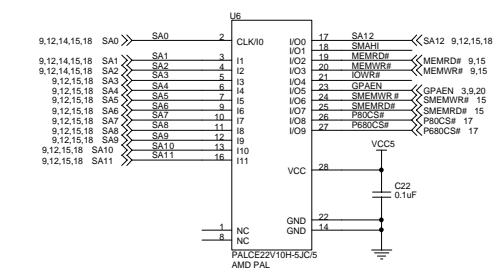
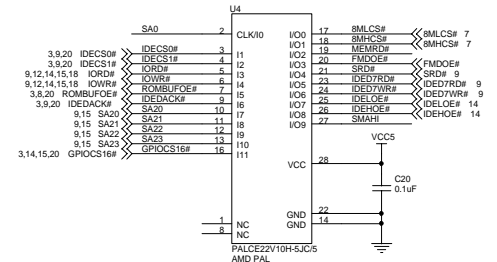


Place the above Caps next to each DIMM socket

Flash Memory Buffer



On-Board Flash Bank Data Buffer to MD[31..0] (3.3V-to-3.3V)



```

FMOE# == (8MCS# + 8MCS#) * ROMBUFOE#
SRD# == GPIORD# + GPMEMRD#
IDED7RD# == IORD# * [IDECO# + (IDEC1# * SA0# * IORD#)]
+ IDEACK# * IORD#
IDED7WR# == IOWR# * [IDECO# + (IDEC1# * SA0#)]
+ IDEACK# * IOWR#
IDELO# == [IDECO# * (IORD# + IOWR#)]
+ [IDEC1# * ((IOWR# * SA0#) + IORD#)]
+ IDEACK# * (IORD# + IOWR#)
IDEHI# == IOCS16# * IDECO# * (IORD# + IOWR#)
+ IDEACK# * (IORD# + IOWR#)
SMAHI# == SA23# * SA22# * SA21# * SA20#
SMEMWR# == MEMWR# * GPAEN * SMAHI#
SMEMRD# == MEMRD# * GPAEN * SMAHI#
PBOCS# == IOWR# * GPAEN# * (SA12# * SA11# * SA10# * SA9# * SA8#
* SA7 * SA6# * SA5# * SA4# * SA3# * SA2# * SA1# * SA0#)
P68OCS# == IOWR# * GPAEN# * (SA12# * SA11# * SA10 * SA9 * SA8#
* SA7 * SA6# * SA5# * SA4# * SA3# * SA2# * SA1# *
SA0#)
    
```

Design Notes:

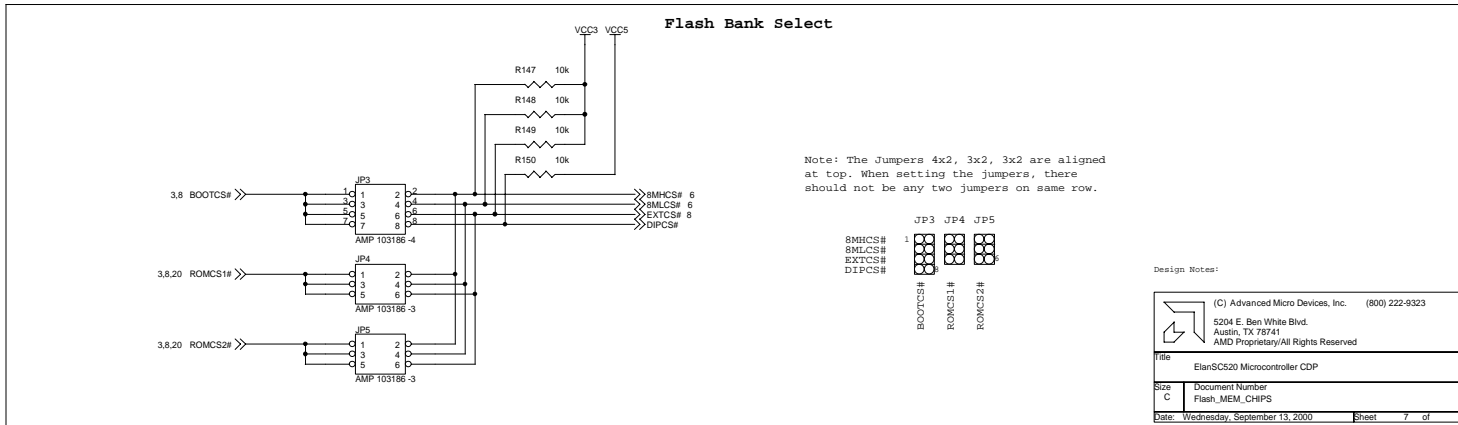
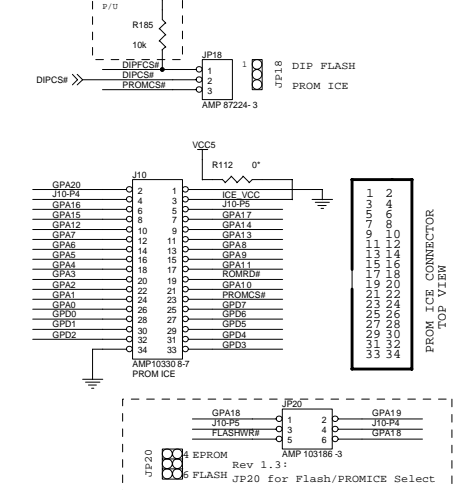
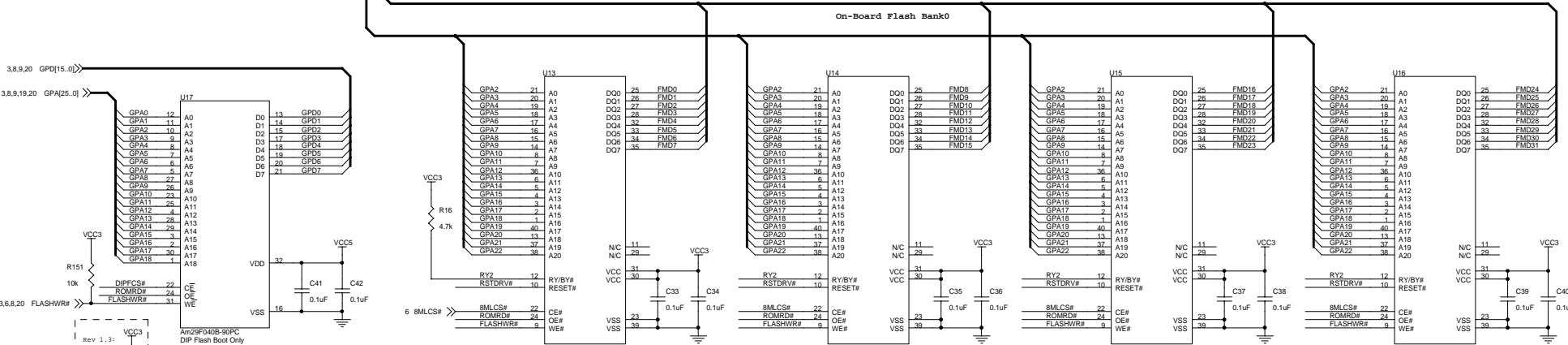
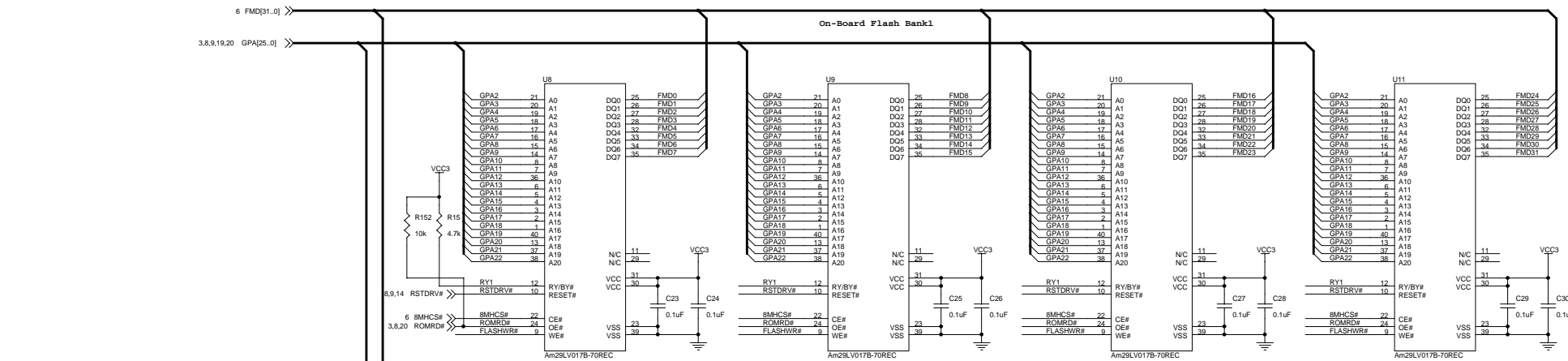
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Flash Memory Banks



Note: The Jumpers 4x2, 3x2, 3x2 are aligned at top. When setting the jumpers, there should not be any two jumpers on same row.

Design Notes:

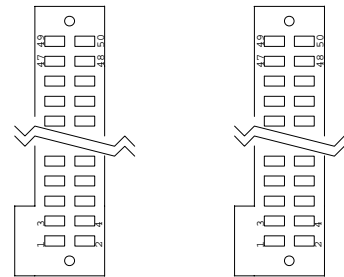
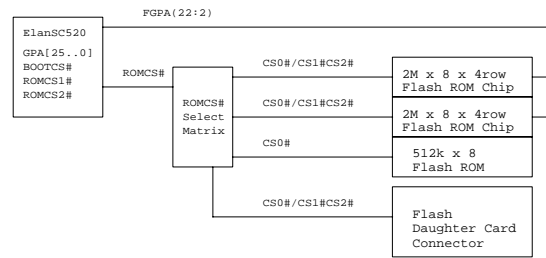
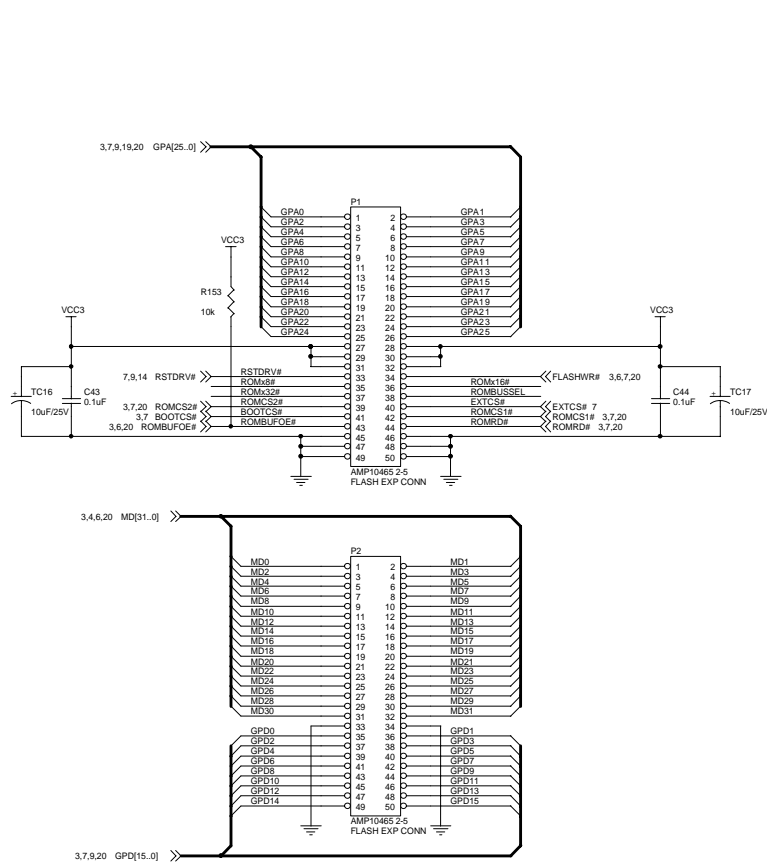
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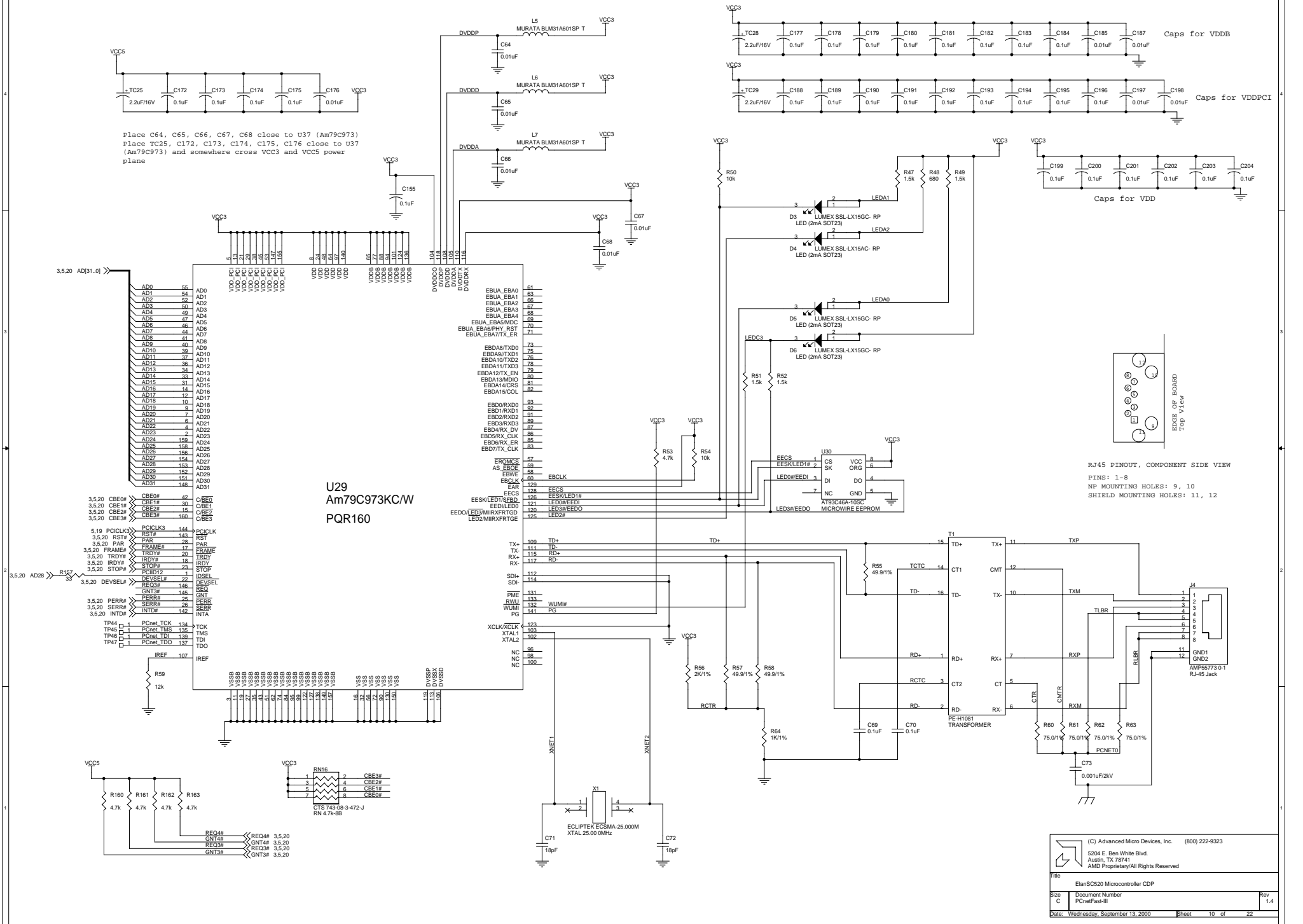
Size C Document Number Rev 1.4
 Flash_MEM_CHIPS

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Flash Memory Expansion Connector



10/100Base-T NIC (PCnetFast-III)

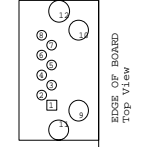


Place C64, C65, C66, C67, C68 close to U37
Place TC25, C172, C173, C174, C175, C176 close to U37
(Am79C973) and somewhere cross VCC3 and VCC5 power plane

Caps for VDDP

Caps for VDDPCI

Caps for VDD



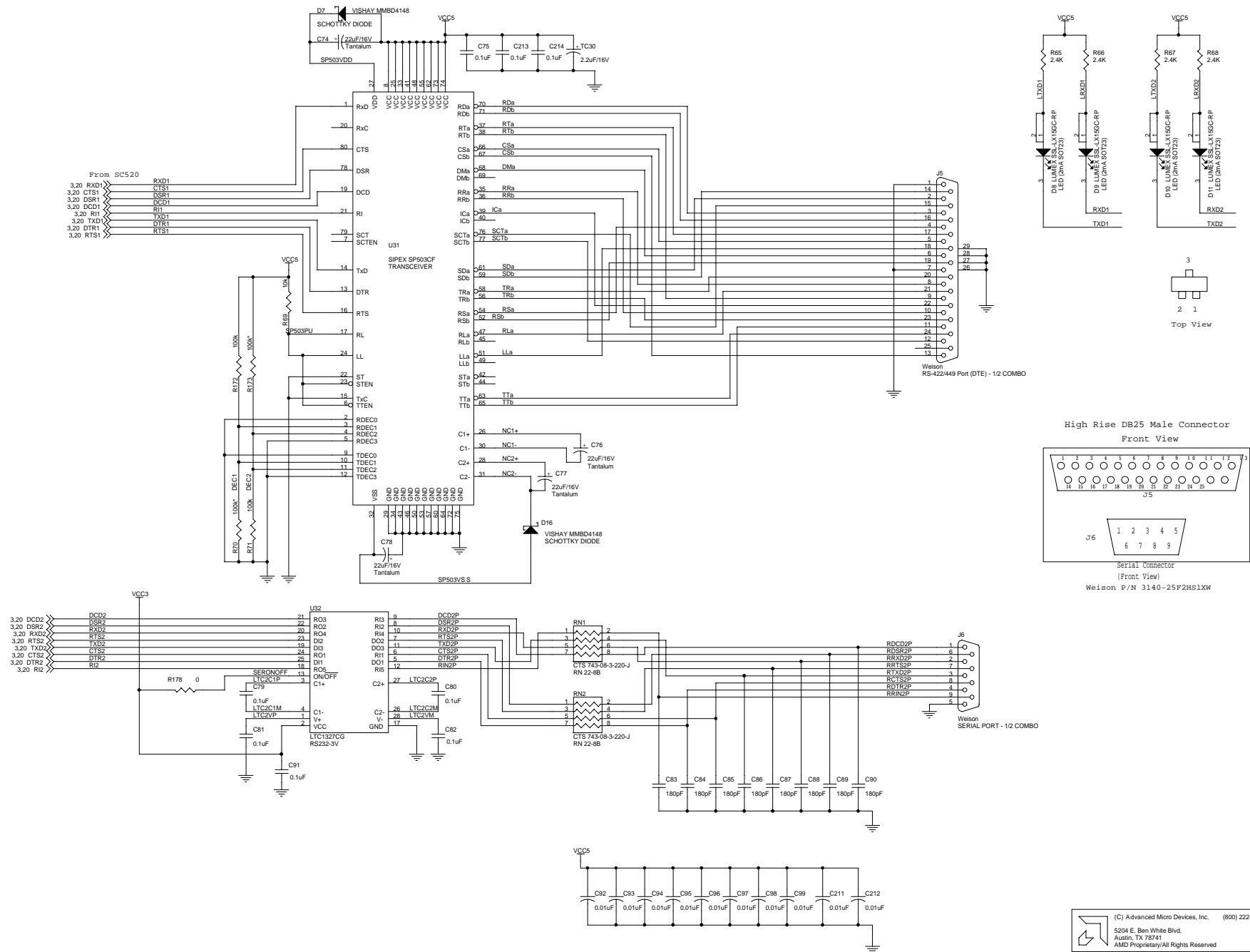
RJ45 PINOUT, COMPONENT SIDE VIEW
PINS: 1-8
NP MOUNTING HOLES: 9, 10
SHIELD MOUNTING HOLES: 11, 12

U29
Am79C973KC/W
PQR160

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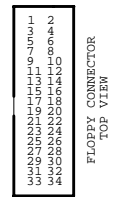
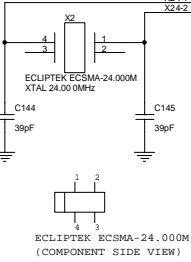
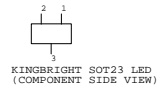
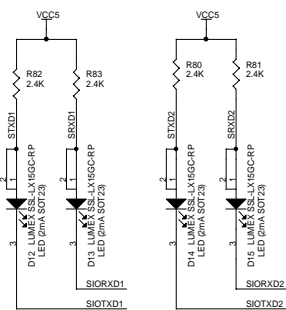
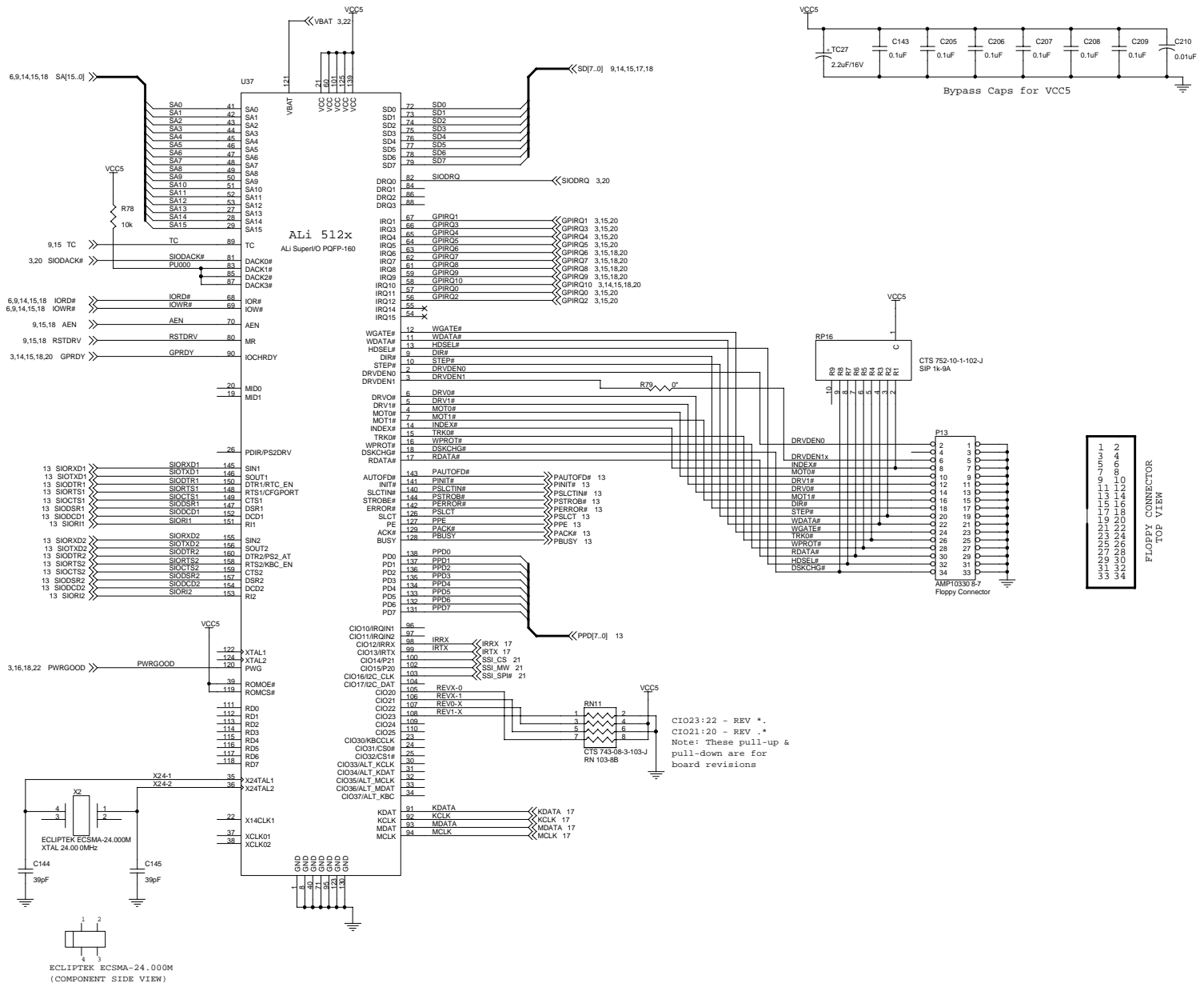
Elan™SC520 Microcontroller Serial Ports - RS-422/RS-232



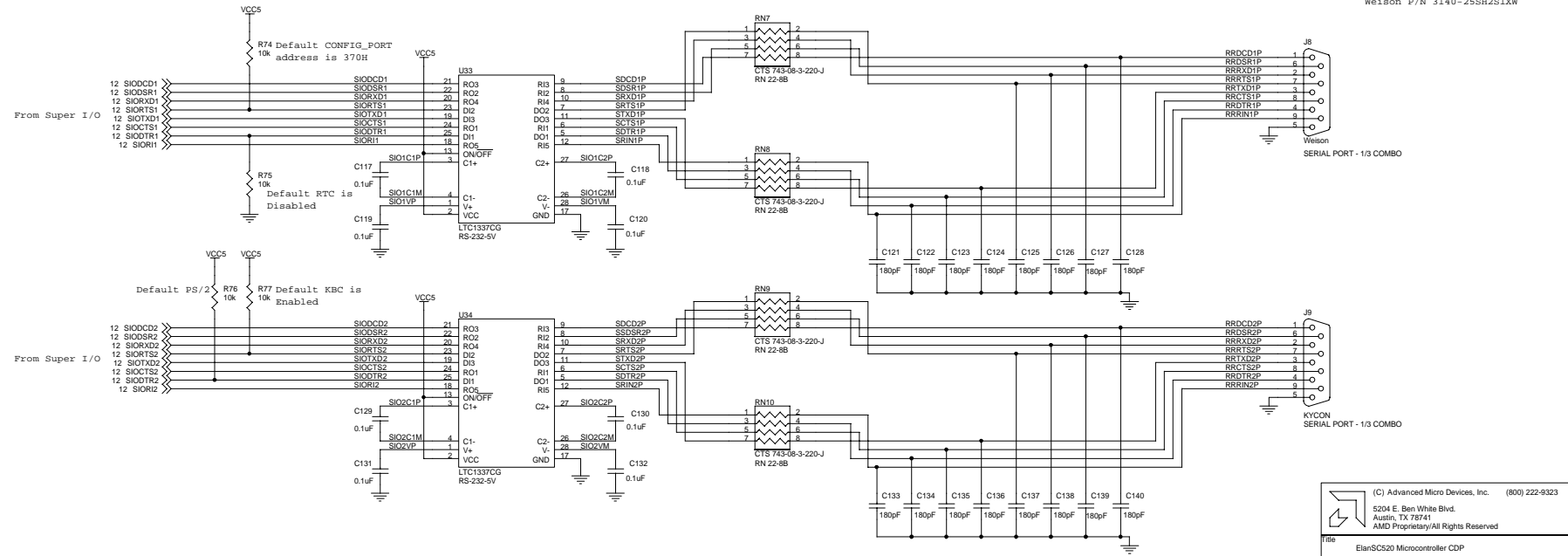
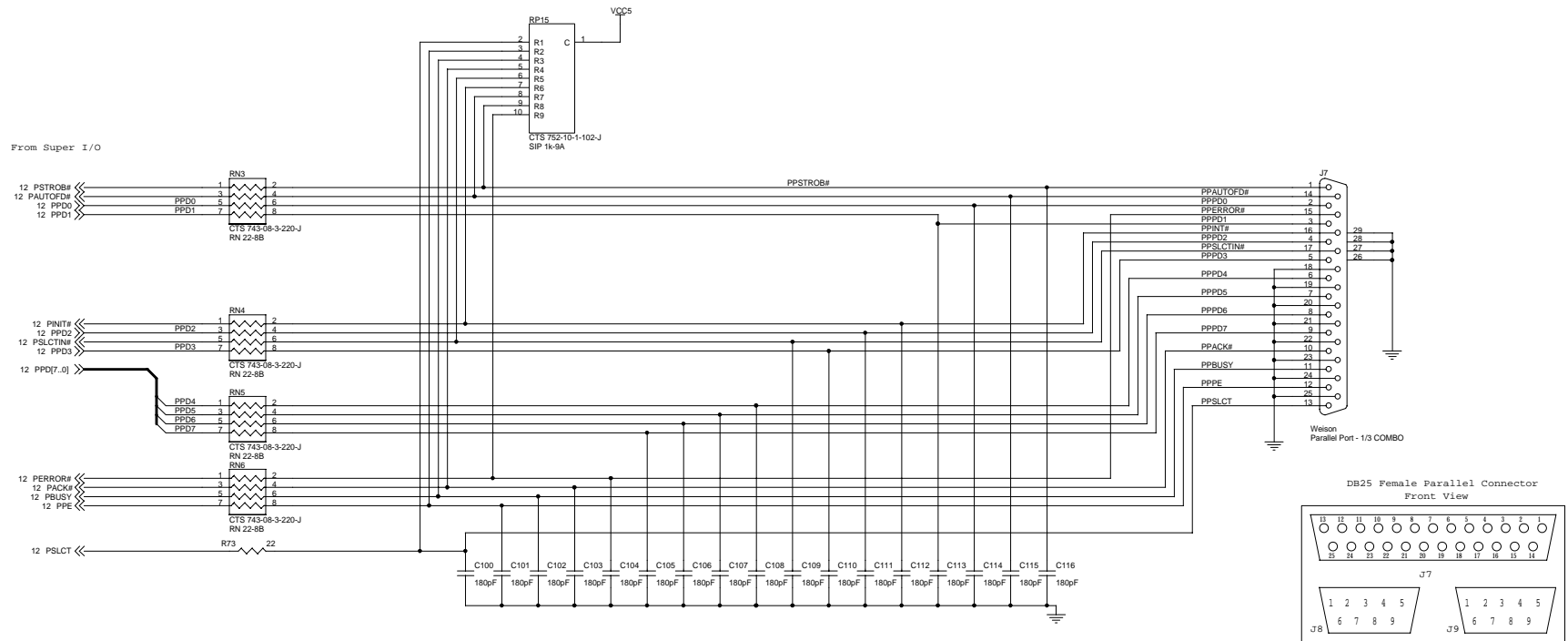
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Title		
ElanSC520 Microcontroller CDP		
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SuperI/O - ALi M5123



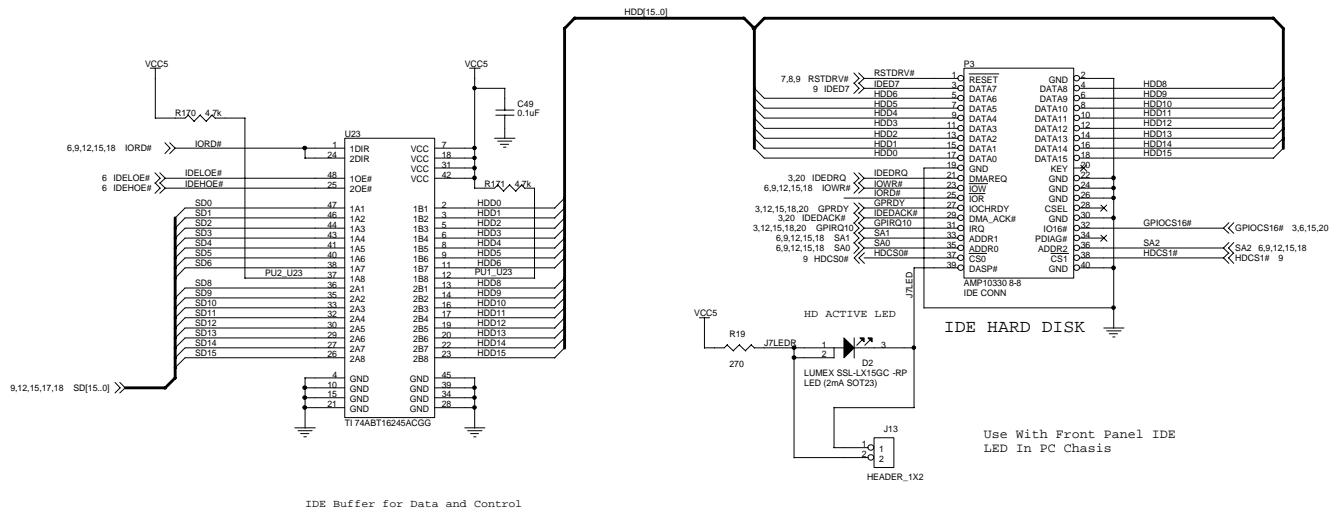
SuperIO Serial & Parallel Ports (RS-232 & EPP)



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IDE Port

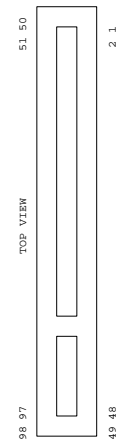
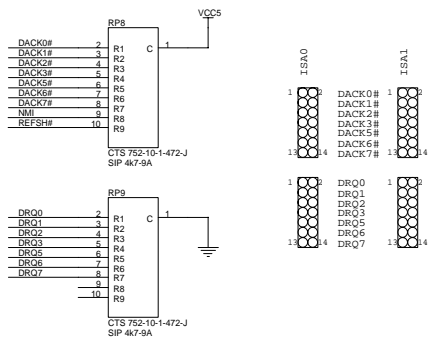
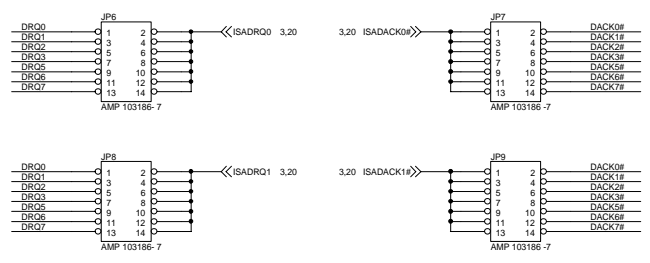
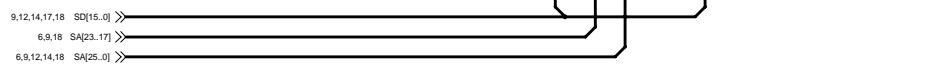
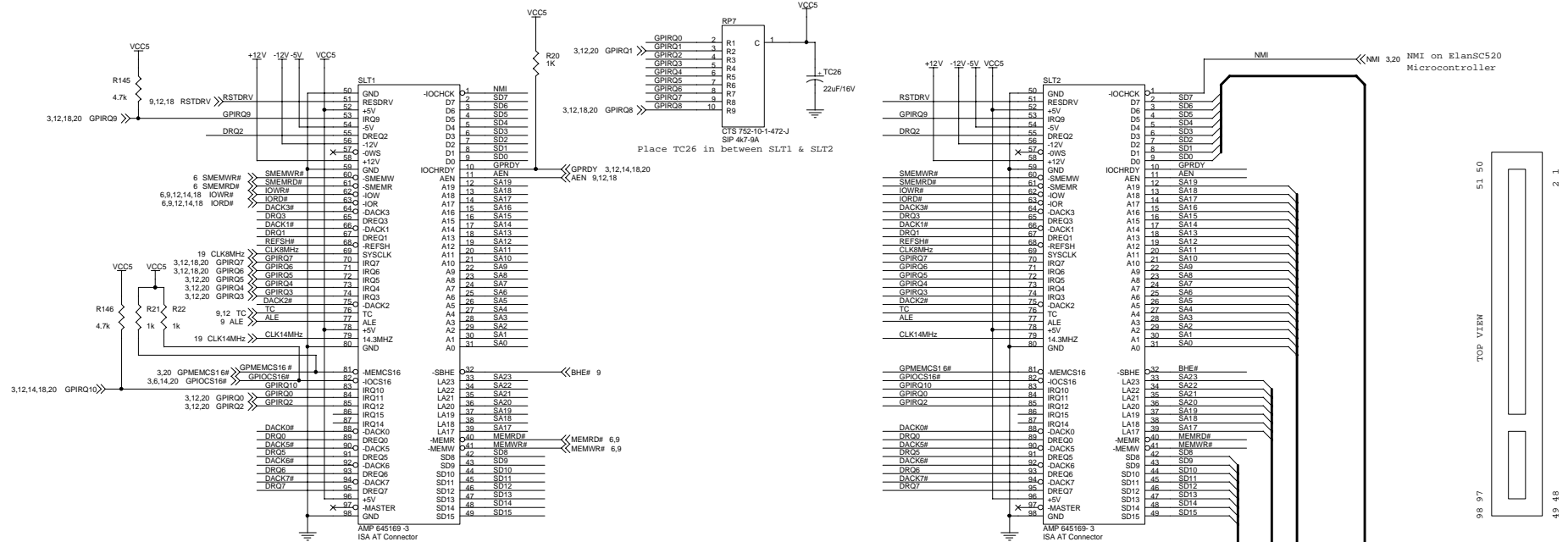


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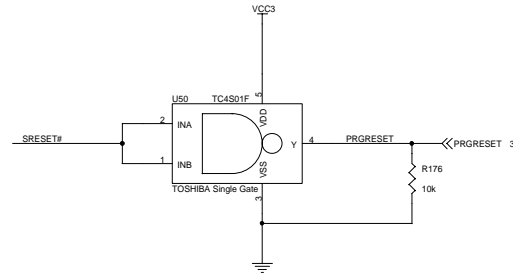
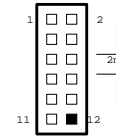
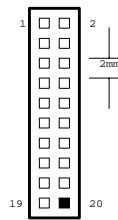
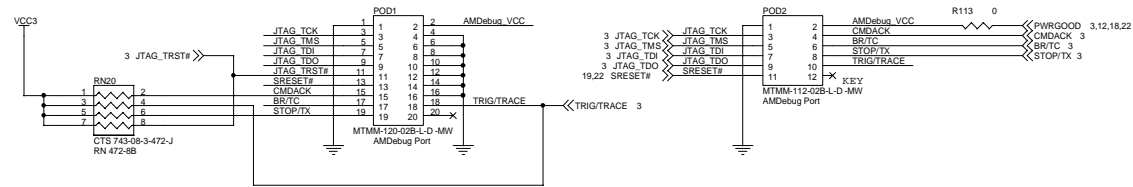
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ISA Bus Connector



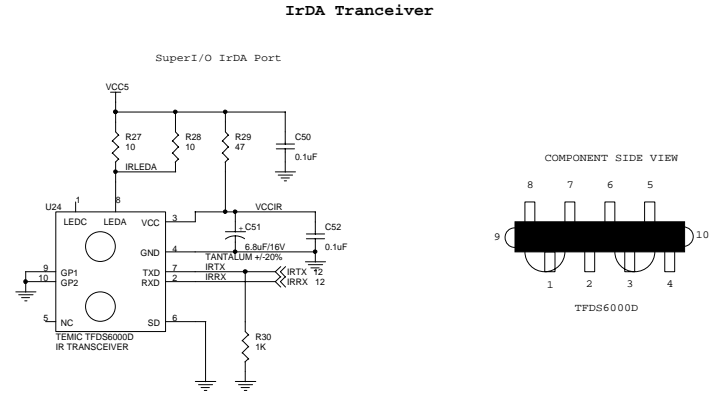
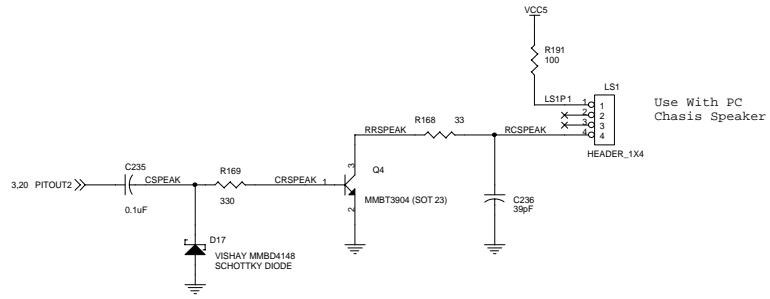
JTAG & AMDebug Port



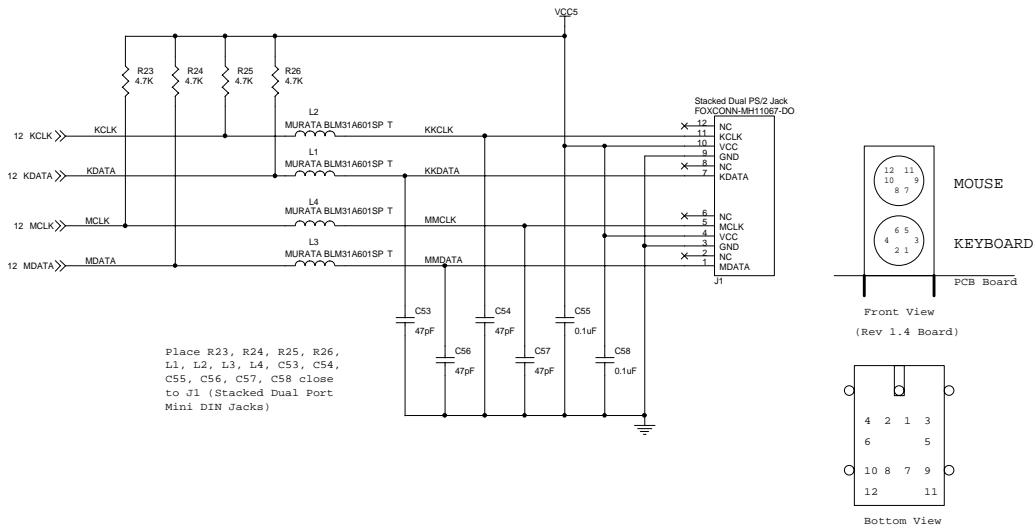
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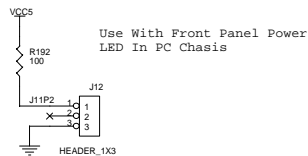
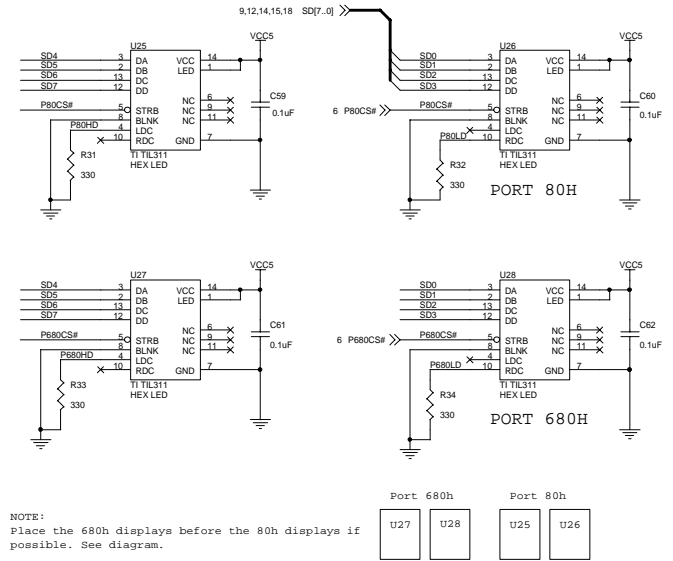
Keyboard, Mouse, IrDA & HEX LED



KEYBOARD_MOUSE



HEX LED Display



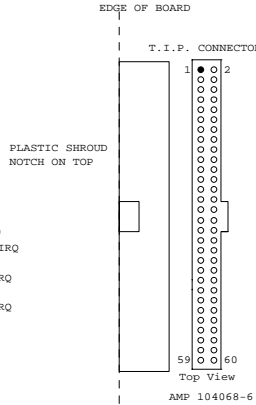
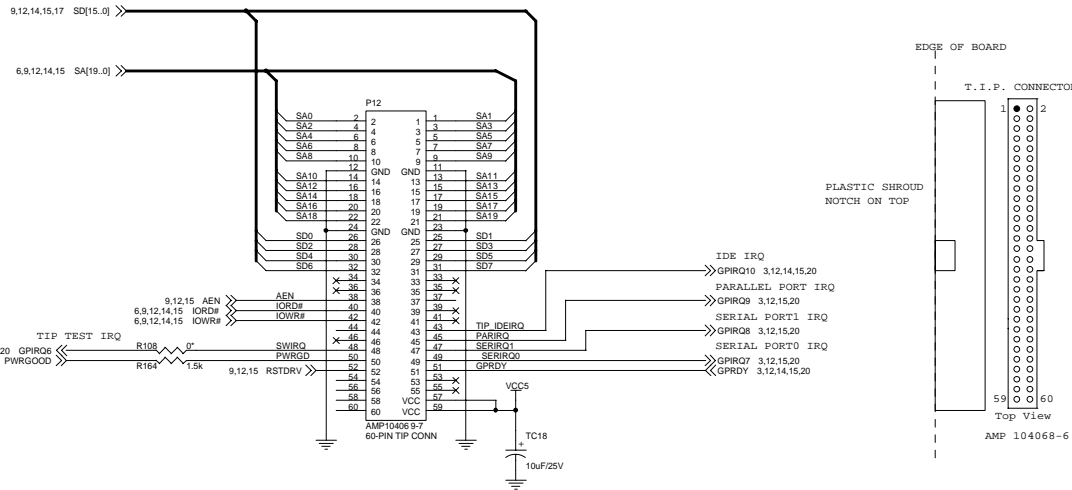
Design Notes:

- Show pin location of the Stacked PS/2 connector

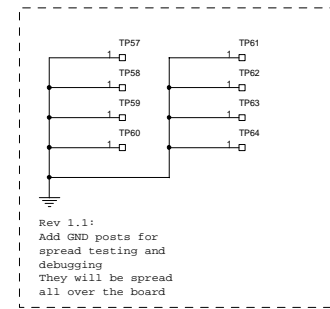
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T.I.P. CONNECTOR



GND POST

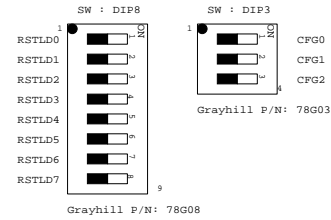
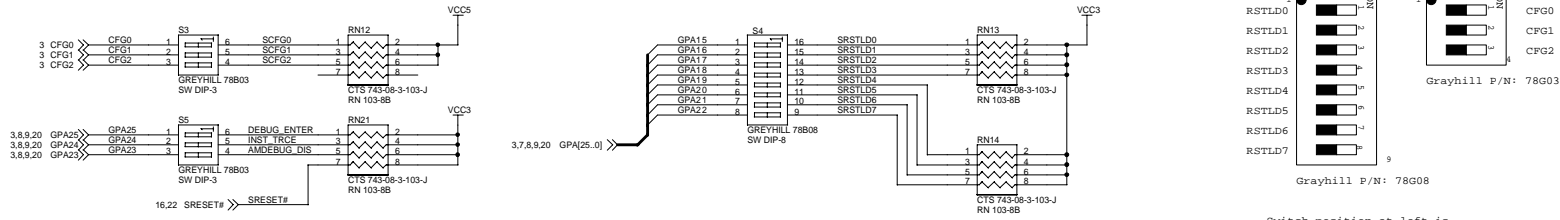


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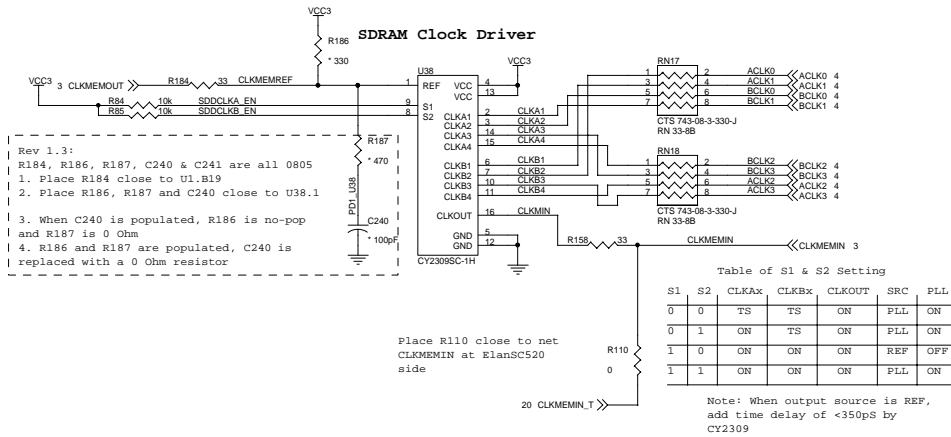
System Clocks & Boot Straps

System Boot Pin Strap

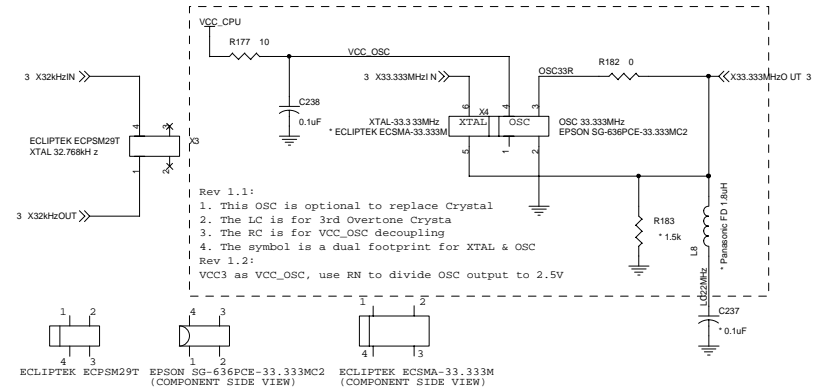


Switch position at left is OFF state and the graphs are showing 00000000/000 state

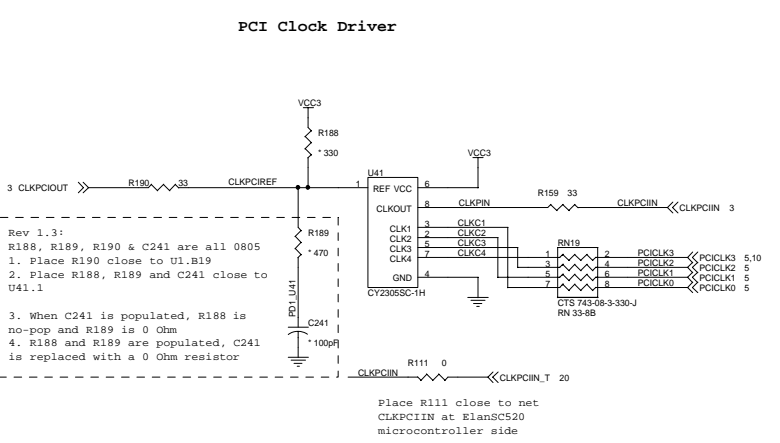
SDRAM Clock Driver



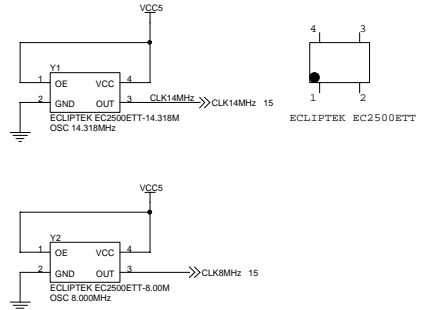
System Clock



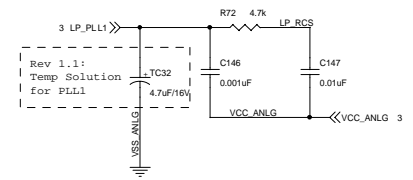
PCI Clock Driver

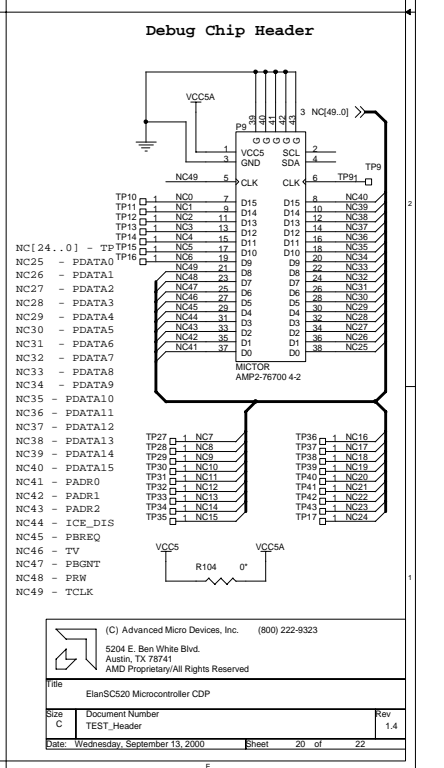
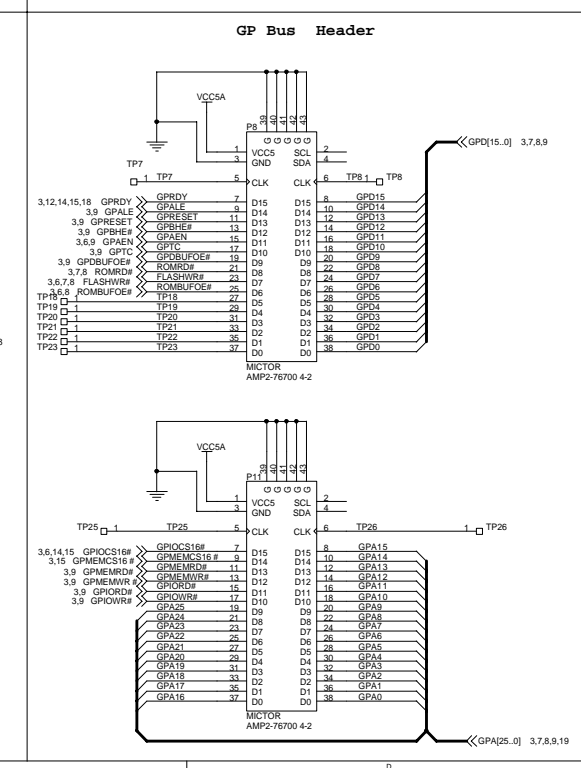
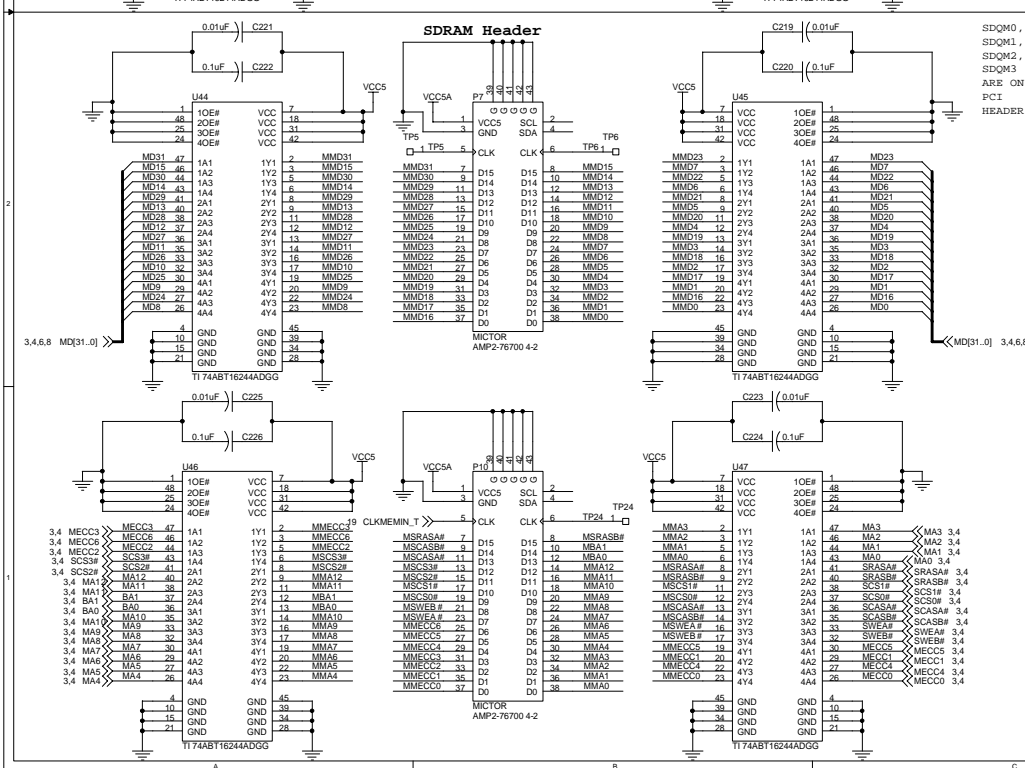
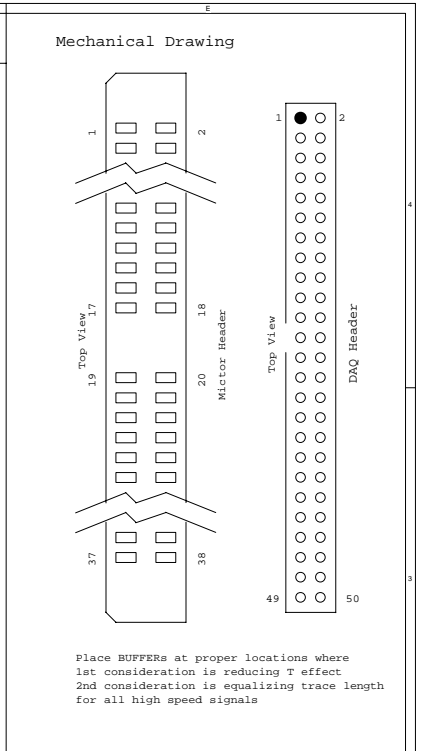
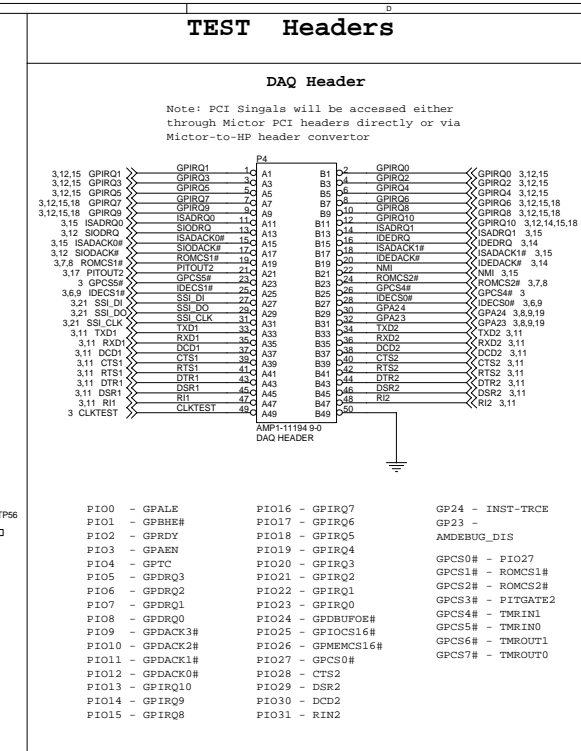
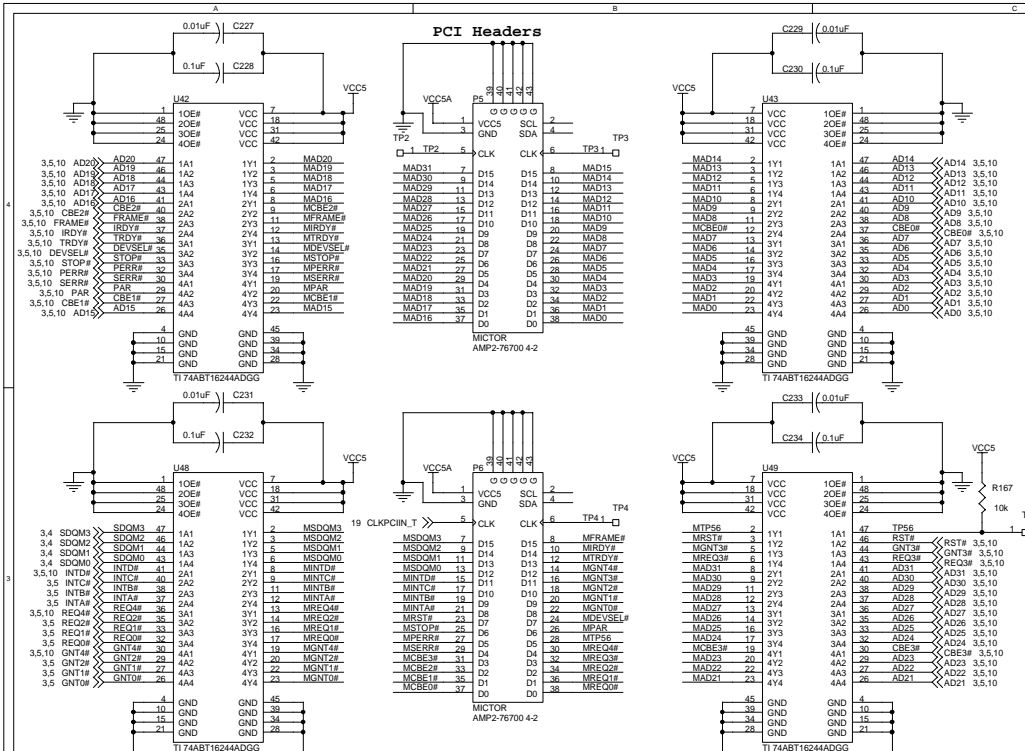


ISA Clocks

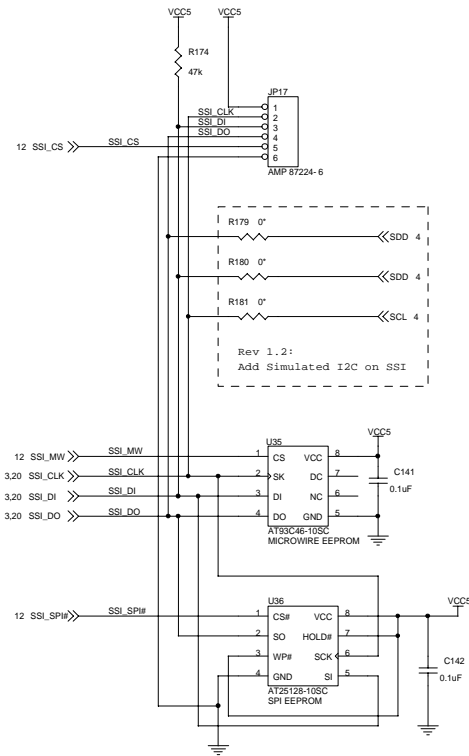


PLL Loop Filter



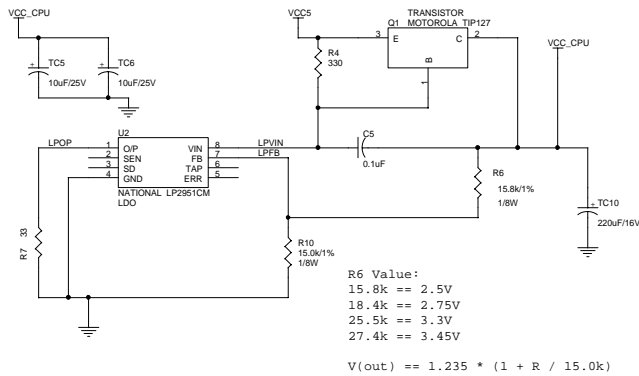


Synchronous Serial Interface

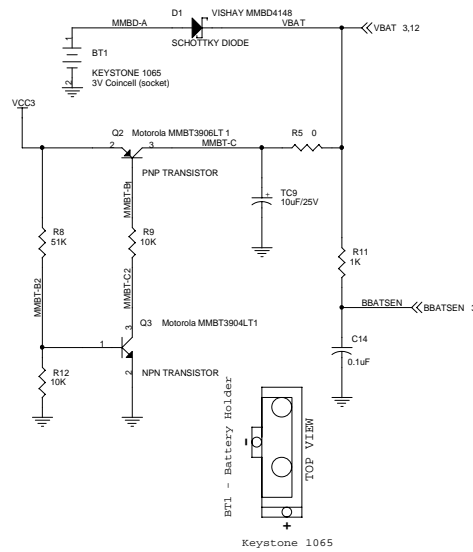


Power Sources & Reset Circuit

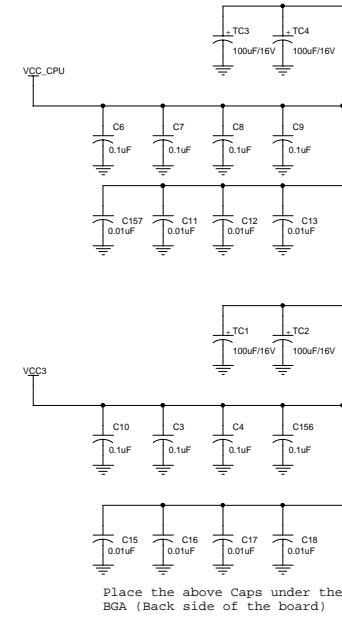
CPU Power Regulator



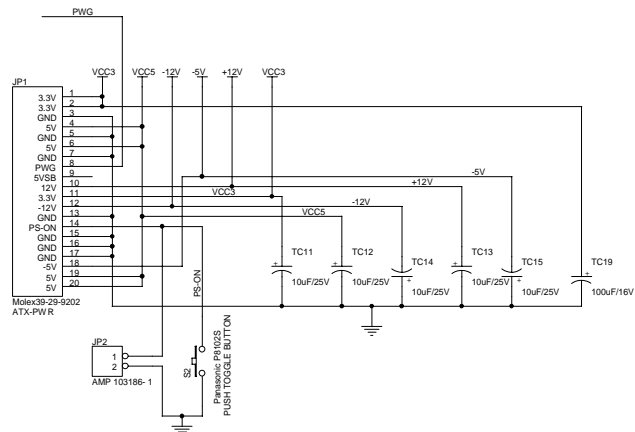
RTC VBAT Power



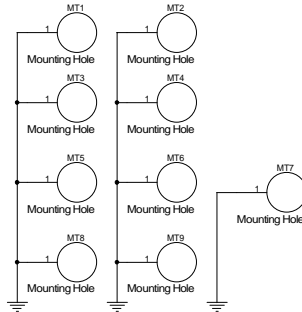
VCC_CPU Decoupling



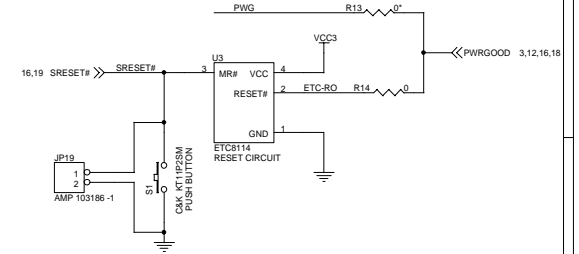
ATX Power Connector



Mounting Hole Grounding



System Reset Control



Design Notes:

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Date: Wednesday, September 13, 2000	Sheet: 22 of 22	

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 COVER Revision: 1.4

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Bill Of Materials Page1

Item	Quantity	Reference	Part	PCB Footprint	Part Spec
1	1	BT1	KEYSTONE 1065		3V Coincell (socket)
2	127	C1,C2,C3,C4,C5,C6,C7,C8, C9,C10,C14,C19,C20,C21, C22,C23,C24,C25,C26,C27, C28,C29,C30,C33,C34,C35, C36,C37,C38,C39,C40,C41, C42,C43,C44,C45,C46,C47, C48,C49,C50,C52,C55,C58, C59,C60,C61,C62,C69,C70, C75,C79,C80,C81,C82,C91, C117,C118,C119,C120,C129, C130,C131,C132,C141,C142, C143,C152,C153,C154,C155, C156,C158,C159,C160,C161, C165,C166,C167,C168,C172, C173,C174,C175,C177,C178, C179,C180,C181,C182,C183, C184,C188,C189,C190,C191, C192,C193,C194,C195,C196, C199,C200,C201,C202,C203, C204,C205,C206,C207,C208, C209,C213,C214,C215,C217, C220,C222,C224,C226,C228, C230,C232,C234,C235,C238, C239	0.1uF	805	X7R +/-10% 50V
3	46	C11,C12,C13,C15,C16,C17, C18,C64,C65,C66,C67,C68,	0.01uF	805	X7R +/-10% 50V

		C92,C93,C94,C95,C96,C97, C98,C99,C147,C157,C162, C163,C164,C169,C170,C171, C176,C185,C187,C197,C198, C210,C211,C212,C216,C218, C219,C221,C223,C225,C227, C229,C231,C233			
4	1	C51	6.8uF/16V	C-CASE	TANTALUM +/-20%
5	4	C53,C54,C56,C57	47pF	805	NPO +/-5% 50V
6	1	C63	15pF	805	NPO +/-5% 50V
7	2	C71,C72	18pF	805	NPO +/-5% 50V
8	1	C73	0.001uF/2kV	TH	SPRAGUE 30GAD10
9	4	C74,C76,C77,C78	22uF/16V	C-CASE	Tantalum
10	41	C83,C84,C85,C86,C87,C88, C89,C90,C100,C101,C102, C103,C104,C105,C106,C107, C108,C109,C110,C111,C112, C113,C114,C115,C116,C121, C122,C123,C124,C125,C126, C127,C128,C133,C134,C135, C136,C137,C138,C139,C140	180pF	805	NPO +/-10% 50V
11	2	C145,C144	39pF	805	NPO +/-5% 50V
12	1	C146	0.001uF	805	NPO +/-10% 50V
13	1	C236	39pF	805	RC0805, NPO, +/-5%, 50V
14	1	C237	* 0.1uF	805	X7R +/-10% 50V
15	2	C241,C240	* 100pF	805	X7R +/-10% 50V
16	4	D1,D7,D16,D17	VISHAY MMBD4148	SOT-23	SCHOTTKY DIODE
17	12	D2,D3,D5,D6,D8,D9,D10, D11,D12,D13,D14,D15	LUMEX SSL-LX15GC-RP	SURSOT-23	LED (2mA SOT23)
18	1	D4	LUMEX SSL-LX15AC-RP	SURSOT-23	LED (2mA SOT23)
19	1	JP1	Molex39-29-9202		ATX-PWR
20	3	JP2,J13,JP19	AMP 103186-1	TH-1X2	1x2HEADER 0.025' SQ. POST
21	1	JP3	AMP 103186-4	TH-2X4	2x4HEADER 0.025' SQ. POST
22	3	JP4,JP5,JP20	AMP 103186-3	TH-2X3	2x3HEADER 0.025' SQ. POST
23	4	JP6,JP7,JP8,JP9	AMP 103186-7	TH-2X7	2x7HEADER 0.025' SQ. POST
24	7	JP10,JP11,JP12,J12,JP13, JP14,JP18	AMP 87224-3	TH-1X3	1x3HEADER 0.025' SQ. POST
25	1	JP17	AMP 87224-6	TH-1X6	1x6HEADER 0.025' SQ. POST
26	1	J1	FOXCONN-MH11067-DO		Stacked Dual PS/2 Jack
27	2	J3,J2	Molex 71251-0012		DIMM Socket
28	1	J4	AMP557730-1	TH	RJ-45 Jack

29	1	J5	Weison	DB25 Male	RS-422/449 Port (DTE) - 1/2 COMBO
30	1	J6	Weison	DB9	SERIAL PORT - 1/2 COMBO
31	1	J7	Weison	DB25 Female	Parallel Port - 1/3 COMBO
32	1	J8	Weison	DB9	SERIAL PORT - 1/3 COMBO
33	1	J9	KYCON	DB9	SERIAL PORT - 1/3 COMBO
34	1	J10	AMP103308-7		PROM ICE
35	1	LS1	HEADER_1X4	TH1X4	AMP 87224-4
36	7	L1,L2,L3,L4,L5,L6,L7	MURATA BLM31A601SPT	1206	FERRITE BEAD
37	1	L8	* Panasonic FD 1.8uH	805	FERRITE BEAD
38	9	MT1,MT2,MT3,MT4,MT5,MT6,MT7,MT8,MT9	Mounting Hole		
39	1	POD1	MTMM-120-02B-L-D-MW		AMDebug Port
40	1	POD2	MTMM-112-02B-L-D-MW		AMDebug Port
41	2	P2,P1	AMP104652-5	SMT-2x25	FLASH EXP CONN
42	1	P3	AMP103308-8		IDE CONN
43	1	P4	AMP1-111949-0		DAQ HEADER
44	7	P5,P6,P7,P8,P9,P10,P11	AMP2-767004-2		MICTOR
45	1	P12	AMP104069-7	TH-60	60-PIN TIP CONN
46	1	P13	AMP103308-7		Floppy Connector
47	1	Q1	MOTOROLA TIP127	TO-220	TRANSISTOR
48	1	Q2	Motorola MMBT3906LT1	SOT-23	PNP TRANSISTOR
49	1	Q3	Motorola MMBT3904LT1	SOT-23	NPN TRANSISTOR
50	1	Q4	MMBT3904 (SOT23)	SOT-23	VISHAY MMBT3904
51	10	RN1,RN2,RN3,RN4,RN5,RN6,RN7,RN8,RN9,RN10	CTS 743-08-3-220-J		RN 22-8B
52	5	RN11,RN12,RN13,RN14,RN21	CTS 743-08-3-103-J		RN 103-8B
53	1	RN16	CTS 743-08-3-472-J		RN 4.7k-8B
54	3	RN17,RN18,RN19	CTS 743-08-3-330-J		RN 33-8B
55	1	RN20	CTS 743-08-3-472-J		RN 472-8B
56	10	RP1,RP2,RP3,RP4,RP5,RP7,RP8,RP9,RP10,RP11	CTS 752-10-1-472-J		SIP 4k7-9A
57	2	RP15,RP16	CTS 752-10-1-102-J		SIP 1k-9A
58	3	R1,R2,R29	47	805	1/8W +/-5% 50V
59	10	R3,R7,R154,R155,R156,R157,R158,R159,R184,R190	33	805	1/8W +/-5% 50V
60	9	R4,R31,R32,R33,R34,R38,R39,R40,R41	330	805	1/8W +/-5% 50V
61	7	R5,R14,R110,R111,R113,R178,R182	0	805	1/8W +/-5% 50V
62	1	R6	15.8k/1%	805	1/8W +/-1% 50V
63	1	R8	51K	805	1/8W +/-5% 50V

64	25	R9,R12,R46,R50,R54,R69, R74,R75,R76,R77,R78,R84, R85,R147,R148,R149,R150, R151,R152,R153,R165,R166, R167,R176,R185	10k	805	1/8W +/-5% 50V
65	1	R10	15.0k/1%	805	1/8W +/-1% 50V
66	6	R11,R20,R21,R22,R30,R37	1k	805	1/8W +/-5% 50V
67	8	R13,R79,R104,R108,R112, R179,R180,R181	0*	805	1/8W +/-5% 50V
68	46	R15,R16,R23,R24,R25,R26, R35,R36,R53,R72,R114, R115,R116,R117,R118,R119, R122,R123,R124,R125,R126, R127,R128,R129,R130,R131, R132,R133,R135,R136,R137, R138,R139,R140,R141,R142, R143,R144,R145,R146,R160, R161,R162,R163,R170,R171	4.7K	805	1/8W +/-5% 50V
69	1	R19	270	805	1/8W +/-5% 50V
70	3	R27,R28,R177	10	805	1/8W +/-5% 50V
71	4	R42,R43,R44,R45	470	805	1/8W +/-5% 50V
72	5	R47,R49,R51,R52,R164	1.5k	805	1/8W +/-5% 50V
73	1	R48	680	805	1/8W +/-5% 50V
74	3	R55,R57,R58	49.9/1%	805	1/8W +/-1% 50V
75	1	R56	2K/1%	805	1/8W +/-1% 50V
76	1	R59	12k	805	1/8W +/-5% 50V
77	4	R60,R61,R62,R63	75.0/1%	805	1/8W +/-1% 50V
78	1	R64	1K/1%	805	1/8W +/-1% 50V
79	8	R65,R66,R67,R68,R80,R81, R82,R83	2.4K	805	1/8W +/-5% 50V
80	2	R173,R70	100k*	805	1/8W +/-5% 50V
81	2	R71,R172	100k	805	1/8W +/-5% 50V
82	1	R73	22	805	1/8W +/-5% 50V
83	1	R168	33	805	RC0805, 1/8W, +/-5%, 50V
84	1	R169	330	805	RC0805, 1/8W, +/-5%, 50V
85	1	R174	47k	805	1/8W +/-5% 50V
86	1	R183	* 1.5k	805	1/8W +/-5% 50V
87	2	R188,R186	* 330	805	1/8W +/-5% 50V
88	2	R189,R187	* 470	805	1/8W +/-5% 50V
89	2	R192,R191	100	805	RC0805, 1/8W, +/-5%, 50V
90	2	SLT2,SLT1	AMP 645169-3		ISA AT Connector

91	3	SLT3,SLT4,SLT5	AMP 145154-4		PCI CONN
92	1	S1	C&K KT11P2SM		PUSH BUTTON
93	1	S2	Panasonic P8102S		PUSH TOGGLE BUTTON
94	2	S3,S5	GREYHILL 78B03		SW DIP-3
95	1	S4	GREYHILL 78B08		SW DIP-8
96	5	TC1,TC2,TC3,TC4,TC19	100uF/16V	E-CASE	TANTALUM +/-20%
97	11	TC5,TC6,TC9,TC11,TC12, TC13,TC14,TC15,TC16,TC17, TC18	10uF/25V	C-CASE	TANTALUM +/-20%
98	1	TC10	220uF/16V	E-CASE	TANTALUM +/-20%
99	6	TC20,TC21,TC22,TC23,TC24, TC26	22uF/16V	C-CASE	TANTALUM +/-20%
100	5	TC25,TC27,TC28,TC29,TC30	2.2uF/16V	B-CASE	TANTALUM +/-20%
101	2	TC32,TC31	4.7uF/16V	B-CASE	TANTALUM +/-20%
102	62	TP2,TP3,TP4,TP5,TP6,TP7, TP8,TP9,TP10,TP11,TP12, TP13,TP14,TP15,TP16,TP17, TP18,TP19,TP20,TP21,TP22, TP23,TP24,TP25,TP26,TP27, TP28,TP29,TP30,TP31,TP32, TP33,TP34,TP35,TP36,TP37, TP38,TP39,TP40,TP41,TP42, TP43,TP44,TP45,TP46,TP47, TP49,TP50,TP51,TP52,TP53, TP54,TP55,TP56,TP57,TP58, TP59,TP60,TP61,TP62,TP63, TP64	TP		
103	1	T1	PE-H1081		TRANSFORMER
104	1	U1	ElanSC520-BGA388	BGA-388	
105	1	U2	NATIONAL LP2951CM	SO8	LDO
106	1	U3	ETC8114	SOT-143	RESET CIRCUIT
107	2	U4,U6	PALCE22V10H-5JC/5	PLCC	AMD PAL
108	2	U5,U7	TI 74ALVCH16245DGG	DGG-48	TRANSCEIVER
109	8	U8,U9,U10,U11,U13,U14, U15,U16	Am29LV017B-70REC	TSOP-40	
110	1	U17	Am29F040B-90PC	DIP Flash Boot Only	
111	2	U50,U18	TC4S01F	SSOP5-P	TOSHIBA Single Gate
112	11	U19,U20,U22,U42,U43,U44, U45,U46,U47,U48,U49	TI 74ABT16244ADGG	DGG-48	
113	1	U21	TI 74ABT16245ADGG	DGG-48	
114	1	U23	TI 74ABT16245ACGG	DGG-48	

115	1	U24	TEMIC TFDS6000D	SMD	IR TRANSCEIVER
116	4	U25,U26,U27,U28	TI TIL311	TH	HEX LED
117	1	U29	Am79C973KC/W	PQFP-160	PQR160
118	1	U30	AT93C46A-10SC	SO-8	MICROWIRE EEPROM
119	1	U31	SIPEX SP503CF	PQFP-80	TRANSCEIVER
120	1	U32	LTC1327CG	SSOP28	RS232-3V
121	2	U34,U33	LTC1337CG	SSOP28	RS-232-5V
122	1	U35	AT93C46-10SC	SO-8	MICROWIRE EEPROM
123	1	U36	AT25128-10SC	SO-8	SPI EEPROM
124	1	U37	ALi M5123	PQFP-160	ALi SuperI/O PQFP-160
125	1	U38	CY2309SC-1H	SOIC-16	CLOCK DRIVER
126	1	U41	CY2305SC-1H	SO-8	CLOCK DRIVER
127	1	X1	ECLIPTEK ECSMA-25.000M	SMD	XTAL 25.000MHz
128	1	X2	ECLIPTEK ECSMA-24.000M	SMD	XTAL 24.000MHz
129	1	X3	ECLIPTEK ECPSM29T	SMD	XTAL 32.768kHz
130	1	X4	EPSON SG-636PCE-33.333MC2	SMD	OSC 33.333MHz
131	1	Y1	ECLIPTEK EC2500ETT-14.318M	SMD	OSC 14.318MHz
132	1	Y2	ECLIPTEK EC2500ETT-8.00M	SMD	OSC 8.000MHz