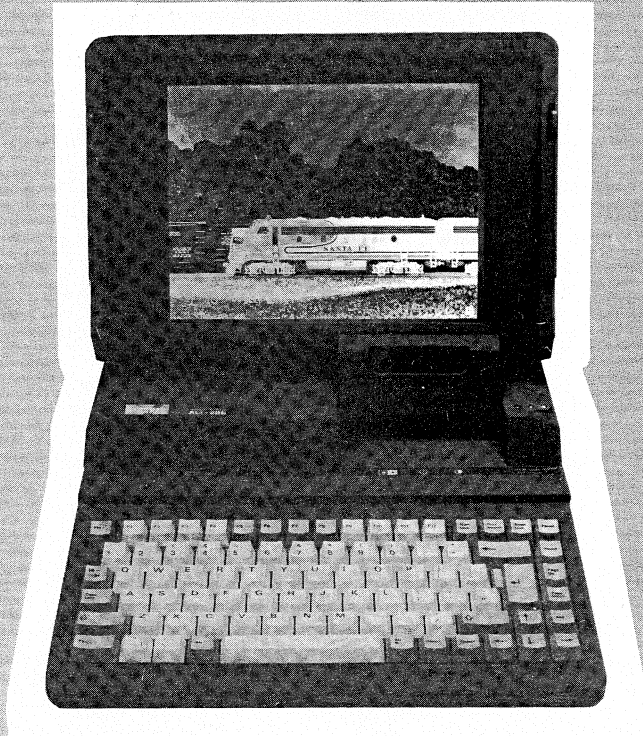


# AMSTRAD



**ALT286 / ALT386SX**

**LAPTOP COMPUTER**

**V.FTZ**

**SERVICE MANUAL**

# CONTENTS

	Page		
Technical Specifications	2	ALT286 Main P.C.B. Top & Bottom Views	14 & 15
Safety Tests	2	ALT386SX Main P.C.B. Top & Bottom Views	16 & 17
ALT286/386SX LCD Inverter P.C.B.	3	ALT286 Main P.C.B. Schematic Diagram (1)	19
ALT286/386SX Keyboard P.C.B.	4	ALT286 Main P.C.B. Schematic Diagram (2)	20
ALT286/386SX Expansion Slot P.C.B.	5	ALT286 Co-Processor/Memory Schematic Diagram	21
ALT286 Co-Processor P.C.B. Top & Bottom Views	6 & 7	ALT286/386SX VGA Schematic Diagram	22
ALT286/386SX VGA P.C.B. Top & Bottom Views	8 & 9	ALT286/386SX Peripheral Schematic Diagram	23
ALT286/386SX Electrical Parts List	10 & 11	ALT386SX Main P.C.B. Schematic Diagram (1)	24
Cabinet Parts List	12	ALT386SX Main P.C.B. Schematic Diagram (2)	25
Cabinet Exploded View	13	ALT386SX Co-Processor/Memory Schematic Diagram	26

## TECHNICAL SPECIFICATION


MODEL	ALT286	ALT386SX
Processor	80286	80386SX
Speed	16MHz (switchable to 8 MHz)	16MHz (switchable to 8MHz)
Wait States	1 (0 with 60ns DRAM)	0.6 (0 with 60ns DRAM)
RAM	1Mb (2Mb and 4Mb upgrades)	1Mb (2Mb and 4Mb upgrades)
Expansion Slot	nal 16-bit, half length	1 x 16-bit, half length
Power Save Features	Power down of LCD & HDD after user selectable time or keystroke	Power down of LCD & HDD after user selectable time or keystroke
Hard Disk (Voice Coil Type)	20Mb (28ms access time)	40Mb (25ms access time)
Floppy Drive	1 x 3.5" x 1.44Mb	1 x 3.5" x 1.44Mb
External Floppy Drive	1 x 3.5" x 720Kb or 1.44Mb	1 x 3.5" x 720Kb or 1.44Mb
Connector suitable for use with	/5.25" x 360Kb or 1.2Mb	/5.25" x 360Kb or 1.2Mb
Graphics	VGA/EGA/CGA/MDA/Hercules	VGA/EGA/CGA/MDA/Hercules
Parallel Port	1 x 25-pin D-type	1 x 25-pin D-type
Serial Port	2 x 9-pin D-type	2 x 9-pin D-type
Keyboard	85-key, integrated numeric keypad, 12 function keys	85-key, integrated numeric keypad, 12 function keys
Maths co-processor	Socket available	Socket available
System Reset Switch	Available	Available
External Interfaces	VGA Monitor Port IBM AT Compatible Keyboard Socket	VGA Monitor Port IBM AT Compatible Keyboard Socket
Power Supply	Internal 110-220-240V AC Self-Switching PSU Removable Rechargeable NiCad Battery Pack 2 Hour Life with Normal Usage	Internal 110-220-240V AC Self-Switching PSU Removable Rechargeable NiCad Battery Pack 2 Hour Life with Normal Usage
Battery Charging	Built In Battery Charger Unit 2 Hour Charge Time on "Quick Charge"	Built In Battery Charger Unit 2 Hour Charge Time on "Quick Charge"
Supplied Software	MS-DOS 3.30 Operating System	MS-DOS 3.30 Operating System
<b>DIMENSIONS</b>		
Width	318mm	318mm
Depth	380mm	380mm
Height	95mm	95mm
Weight	7.00Kg (inc. battery pack) 6.00Kg (without battery pack)	7.00Kg (inc. battery pack) 6.00Kg (without battery pack)
<b>SCREEN</b>		
Type	Backlit LCD	Backlit LCD
Dimensions	223 x 169mm	223 x 169mm
Resolution	640 x 480 pixels	640 x 480 pixels
Grey Scales	32 in 256-colour VGA mode	32 in 256-colour VGA mode

## SAFETY TEST

All monitors are tested to the following specifications.

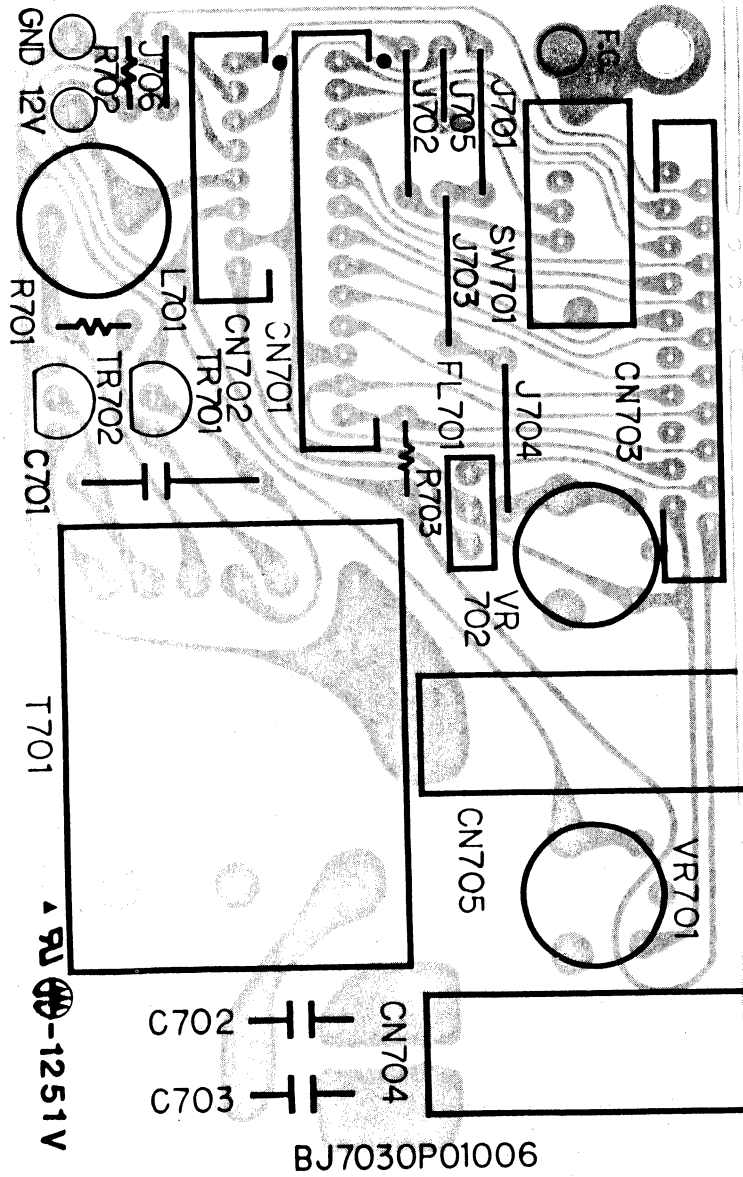
- Flash Test:** Test at 1.5kV RMS / 3 sec between the live and neutral poles of the mains lead and all accessible metal points on the exterior of the set.
- Insulation Resistance Test:** Test at 1.5kV RMS / 3 sec between the live and neutral poles of the mains lead and all accessible metal points on the exterior of the set to show a resistance greater than 4Mohms.
- Earth Continuity Test:** The resistance of the mains lead shall not exceed 0.5ohms.

**PLEASE NOTE:** When any work is completed on this unit, correct safety tests must be carried out to ensure continued electrical safety.

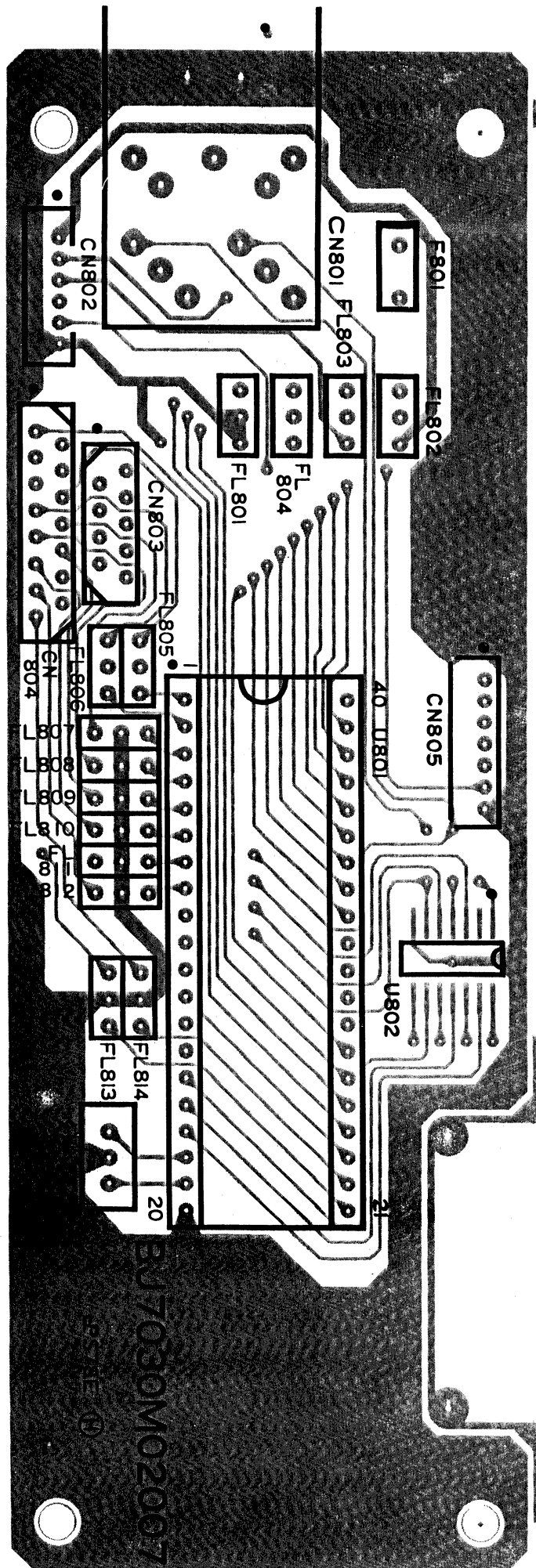
**PLEASE NOTE:** All parts shown with the part number prefix  are Safety Items and must be replaced with similar items having an identical safety specification.

All those items may be purchased direct from AMSTRAD plc.

ALT286/386SX  
 LCD INVERTER P.C.B. COMPONENT VIEW



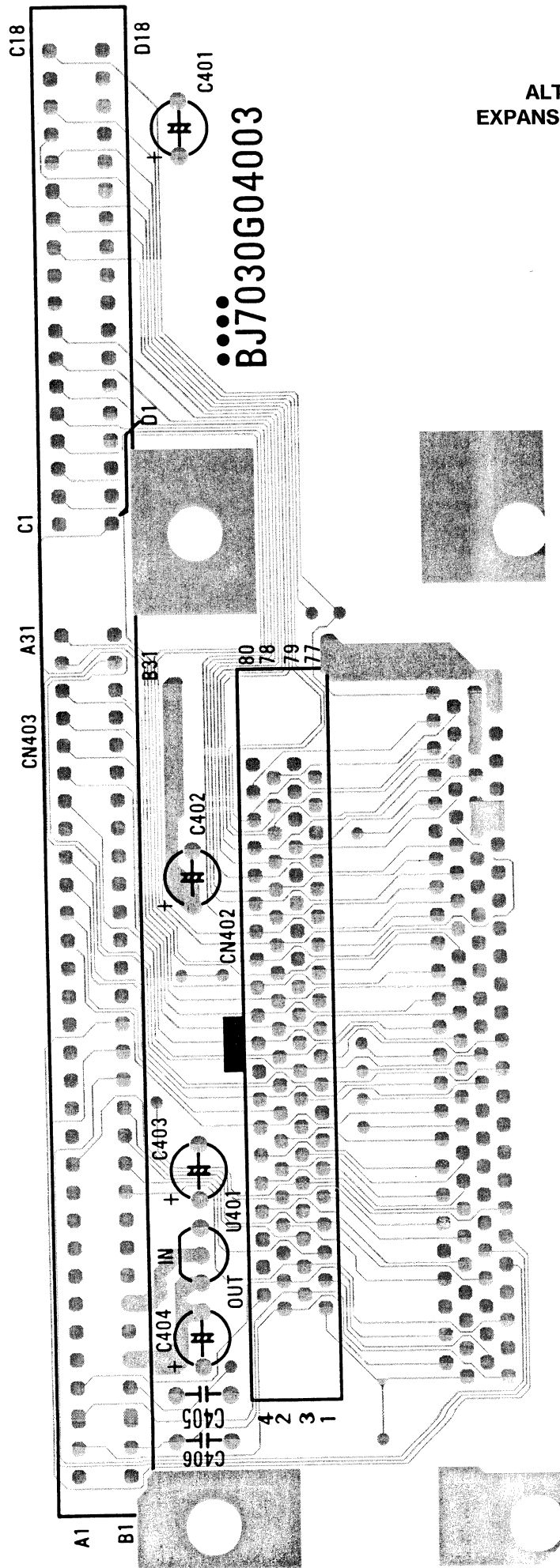
ALT286/386SX  
KEYBOARD P.C.B.



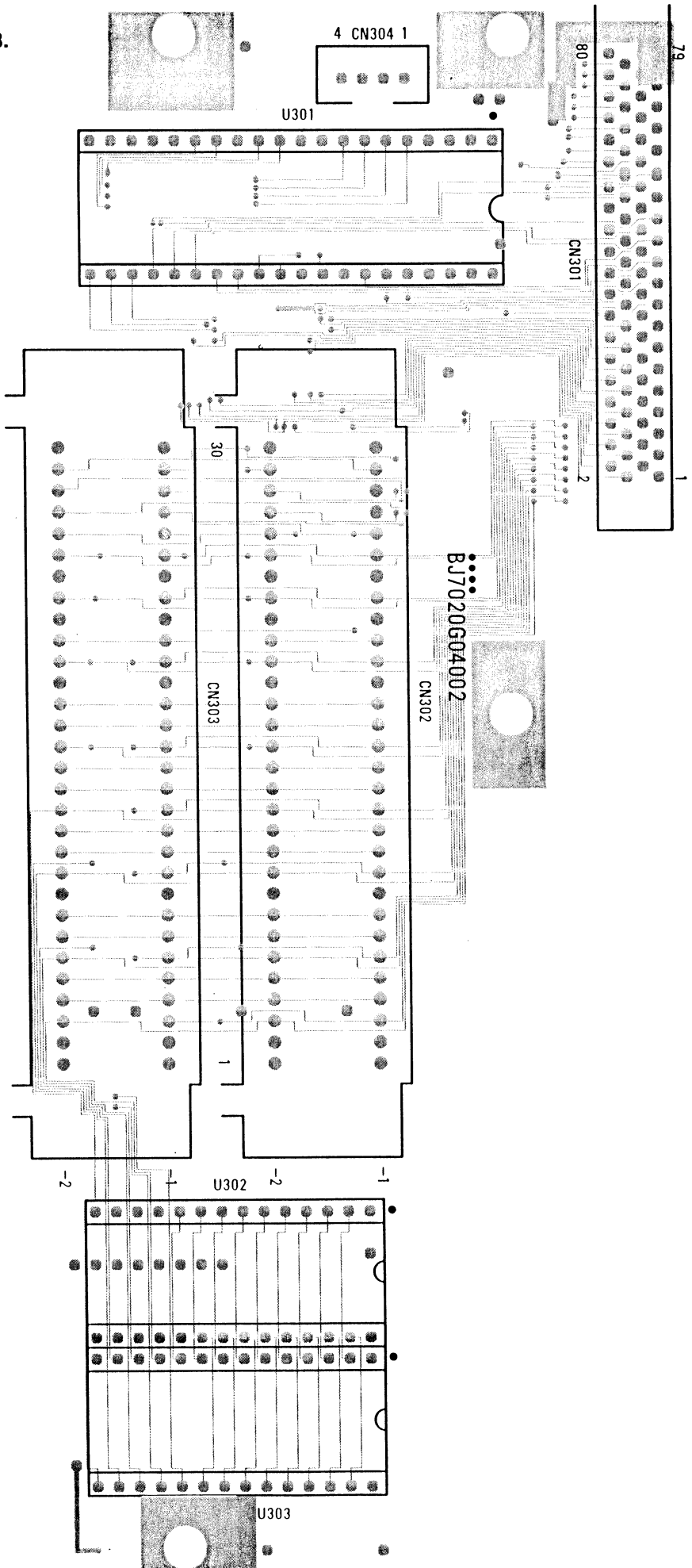
BU7030M02007

SCALE 10

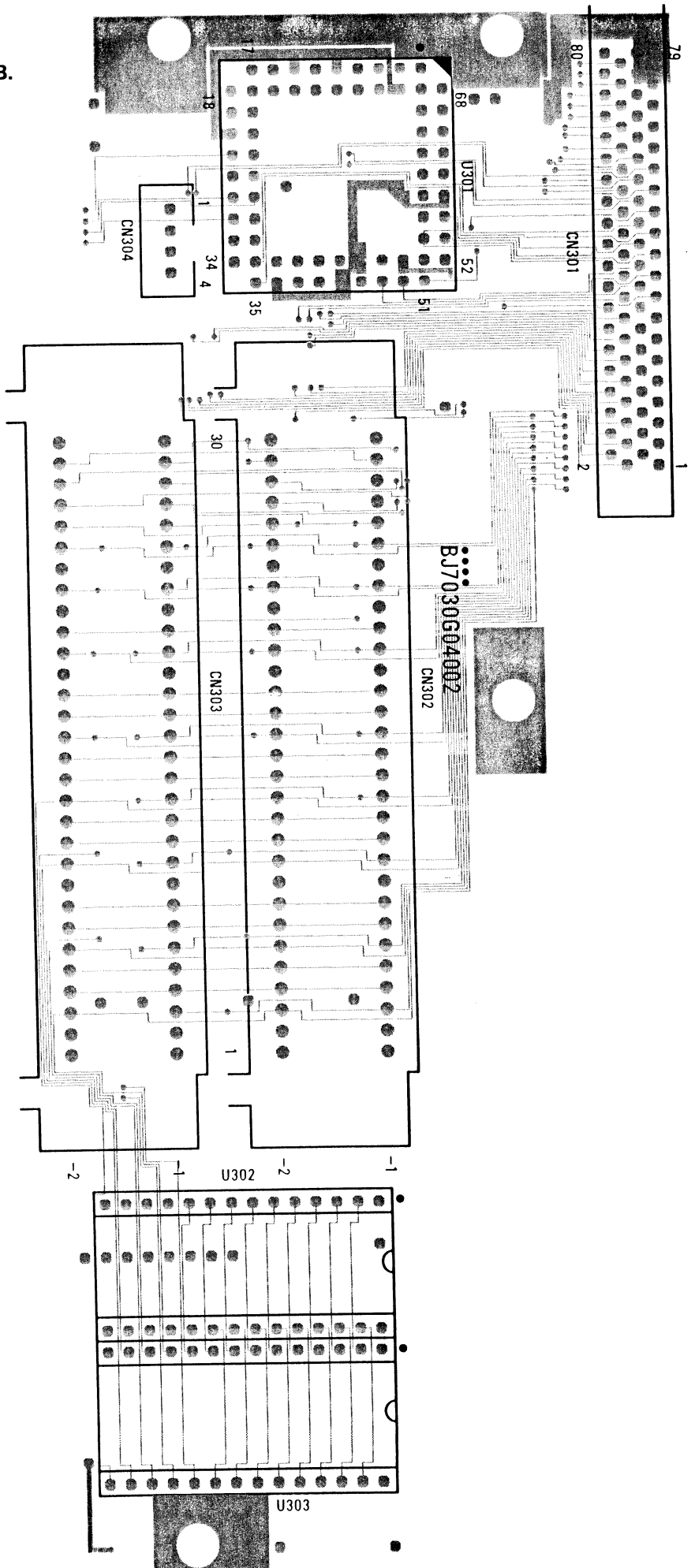
ALT286/386SX  
EXPANSION SLOT P.C.B.



ALT286  
CO-PROCESSOR P.C.B.  
TOP VIEW

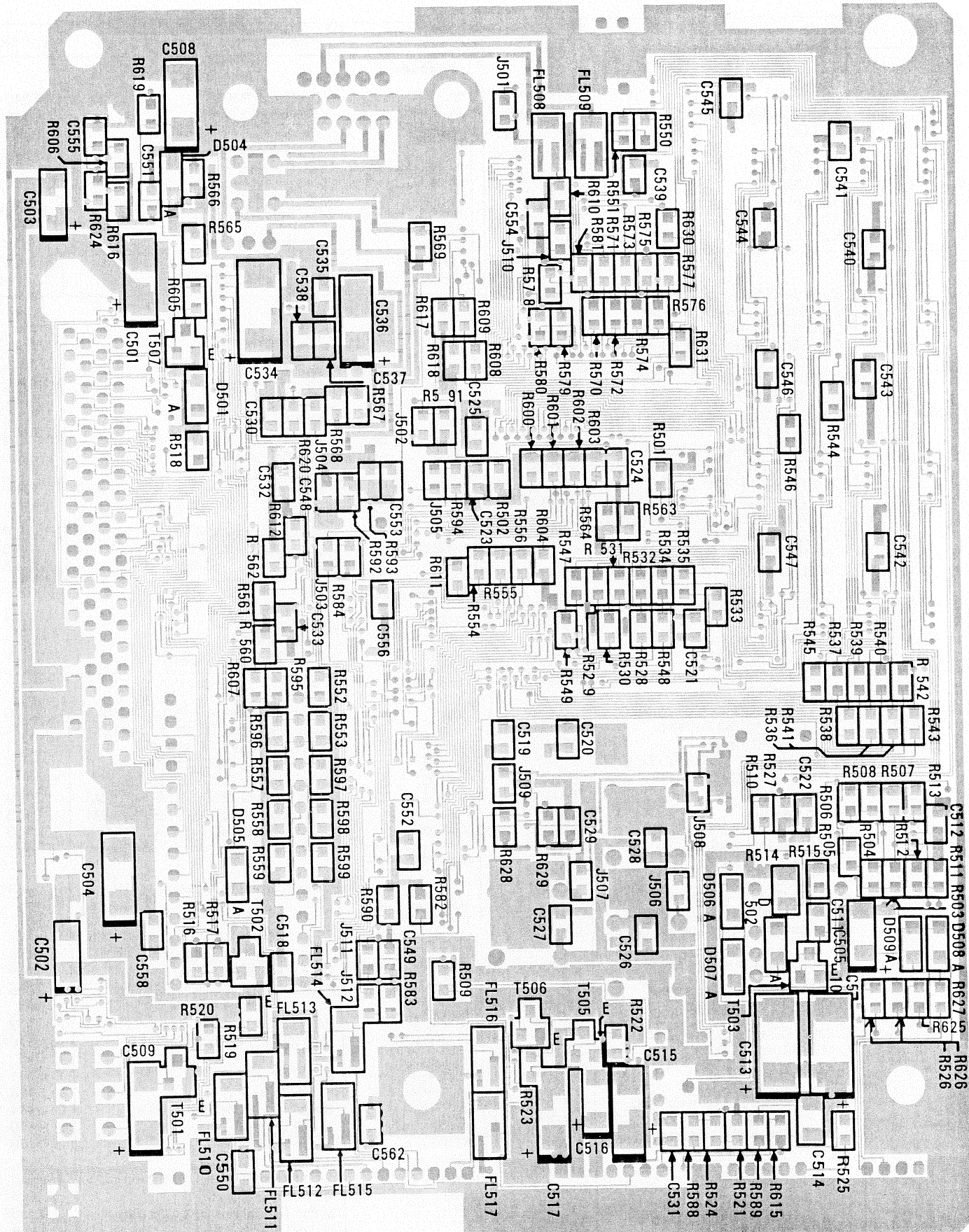


ALT386SX  
CO-PROCESSOR P.C.B.  
TOP VIEW









**ALT286/386SX ELECTRICAL PARTS LIST**

Ref. No.	Description	Part No.	Ref. No.	Description	Part No.
<b>PCB's</b>			<b>Switches</b>		
PCB1	PCB Main	270354FTZ	SW101	Switch, DIP KSP10	270407
PCB1-2	PCB LED Reset	270354-2	SW501	Switch, DIP KSP02	270408
PCB1-3	PCB LED	270354-3	SW701	Switch, Slide SSSF-S-001	270409
PCB2	PCB Co-Pro	270351FTZ	SW1001	Switch, Tact SKHHQN001	270410
PCB3	PCB Slot	270353FTZ	<b>Diodes</b>		
PCB4	PCB VGA	270563	D101-104, 501, 504-507, 801	D RLS4151	270411
PCB5	PCB D-Ram	270352	D502	DZ RLZ3.3B	270412
PCB6	PCB Keyboard	270355FTZ	D503	D RGP-10D	270413
PCB7	PCB DC/AC	270356FTZ	DA101	D SN74S1053NS Array	270414
<b>IC's</b>			<b>Transistors</b>		
U101	IC FIP N80L286-16XS 16 Bit CPU	270358	T101, 105	TR 2SC2412(K)	270415
U102	IC VL82C201-16QC Chip Set	270359	T102	TR 2SD1664	270416
U103	IC VL82C204-16QC Chip Set	270360	T103, 106, 107	TR DTA144EK	270417
U104	IC VL82C203-16QC Chip Set	270361	T104	TR 2SA1037K	270418
U105	IC VL82C100-QC Chip Set	270362	T501, 505	TR 2SB1198K	270419
U106	IC MB88202-1008 4 Bit 1 Chip Micro Processor	270363	T502	TR 2SD1483K	270420
U113, 504	IC PC74HCT245T-T HCMOS LOGIC	270364	T503, 506, 507	TR DTC144EK	270421
U114	IC 74F04SJ/63	270365	T504	TR 2SC2334-S3	270422
U115	IC TC74ACT32F-EL ACMOS LOGIC	270366	T701, 702	TR 2SC3328YTPE6	270423
U117, 505	IC PC74HCT125T-T HCMOS LOGIC	270367	<b>Coils &amp; Inductors</b>		
U118	IC PC74HCT74T-T HCMOS LOGIC	270368	L501	Chip Inductor BLM31A02	270424
U119, 529	IC PC74HCT00T-T HCMOS LOGIC	270369	L502-504	Choke Coil (SN) SNT-S20	270425
U120	IC PC74HCT367T-T HCMOS LOGIC	270370	L701	Inductor TSL1110-221KR68	270426
U121	IC VL82C202-16QC Chip Set	270371	<b>Variable Resistors</b>		
U123	IC VL16C452-AQC	270372	VR501	VRSF RH0421C	270427
U124	IC M5L8042 8 Bit 1 Chip Micro Processor	270373	VR701	VROT RK08H1110 1kΩ	176673
U125	IC DP8473V FDD Controller	270374	VR702	VROT RK08H1110 5kΩ	270429
U126	IC MC146818AF RTC Controller	171399	<b>Crystals</b>		
U127	IC HEF4069UBT-T	270375	X101	X'Tal Resonator AT-49 14.31818M	270430
U128	IC PAL20L8BCNSTD	270376	X103	X'Tal Resonator DT-38-32.768kHz	176174
U129-130	IC SN74HCT244NS/TC74HCT244AF-EL	270377	X104	X'Tal Resonator AT-49 24M	270431
U132, 135	IC DS14C88M/63 RS232C Driver	270378	XM101	X'Tal Module DOC-70 64M	270432
U133, 134, 136	IC DS14C89AM/63 Receiver	270379	XM102	X'Tal Module DOC-2E 1.8432M	176173
U137	IC PST529D-2 Reset	270380	XM501	X'Tal Module KHO-CS1-E 25.175M	176179
U138	IC PC74HCT14T-T HCMOS LOGIC	270381	XM502	X'Tal Module KHO-CS1-E 28.322M	176178
U139	IC TC74HCT00AF-EL	270382	XM503	X'Tal Module DOC-431CC 32.514M	270433
U141	IC 74F00SJ/63	270383	<b>Miscellaneous</b>		
U142	IC 74F10SJ/63	270384	FL101, 102, 104, 109-113, 115, 116	Chip Tube Filter NFM61T20472	270434
U143	IC N74F19D-T	270385	FL105, 107, 108	Filter NFV610-655-T2A-506	270435
U302	IC TMS27C256-20JL	270386	FL106	Filter NFV610-655-T2A-107	270436
U303	IC TMS27C256-29JL	270387	FL301	Chip Filter NFM61T20472	270437
U501	IC TC74ACT08F-EL	270388	FL117-123, 501-119	Chip Filter NLL4532T-4R7222H	270438
U502	IC PC74HCT08T-T HCMOS LOGIC	270389	FL701	Filter DSS30S-91B471M	270439
U503	IC M5T494FP Switching Control	270390	D1001-1003, 1006	LED (Green) GL3KG18	270440
U122, 506, 507, 512	IC PC74HCT244T-T HCMOS LOGIC	270391	D1004, 1005	2 Colour LED	270441
U508	IC M5M27C512AK-15 CMOS EPROM	270392	L101-104, 109	Bead Core	270443
U509	IC CL-GD620 VGA	270393	L801-804	Bead Core BL02RN2-R62T2	270444
U510	IC CL-GD610 VGA	270394	BT101	NI-CD Battery	270450
U511	IC IM5G176J-4 Colour Palette	270395	TC101	Trimmer Capacitor	270446
U513	IC M5M4464AJ-8 Dram	270396	F801	ICPF25 IC Protector	270447
U514-521	IC MN41464AJ-09/UPD41464L-10-E3	270397	X801	Ceramic Resonator CST6.00MGW	270448
U522	IC LM337LM/63 3 Terminal Reg.	270398	T701	Transformer FN-1051	270449
U523	IC PC74HCT04T-T HCMOS LOGIC	270399	Mains Lead U.K.		
U524	IC PC74HCT240T-T HCMOS LOGIC	270400	Mains Lead Euro		
U525	IC LM334M/63 Regulator	270401	Users Instructions ALT286/386SX		
U526, 530	IC TC74ACT32F-EL	270402	System Disk VER 3.3		
U401	IC LM79L05ACZ 3 Terminal Reg.	270403	Soft		
U801	IC MSM80C51RS 1 Chip Micro	270404	Country Variance KBD + Key Puller		
U803	IC SN74LS07NS TTL(LS)	270405			270445
U901	IC MN41C4256SJ-08 DRAM	270406			
U902	IC UPD424256LA-80-E2 DRAM	174025			
U903	IC MN41256AJ-08 DRAM	270564			

**ALT386SX ELECTRICAL PARTS LIST**  
(parts additional to preceding list)

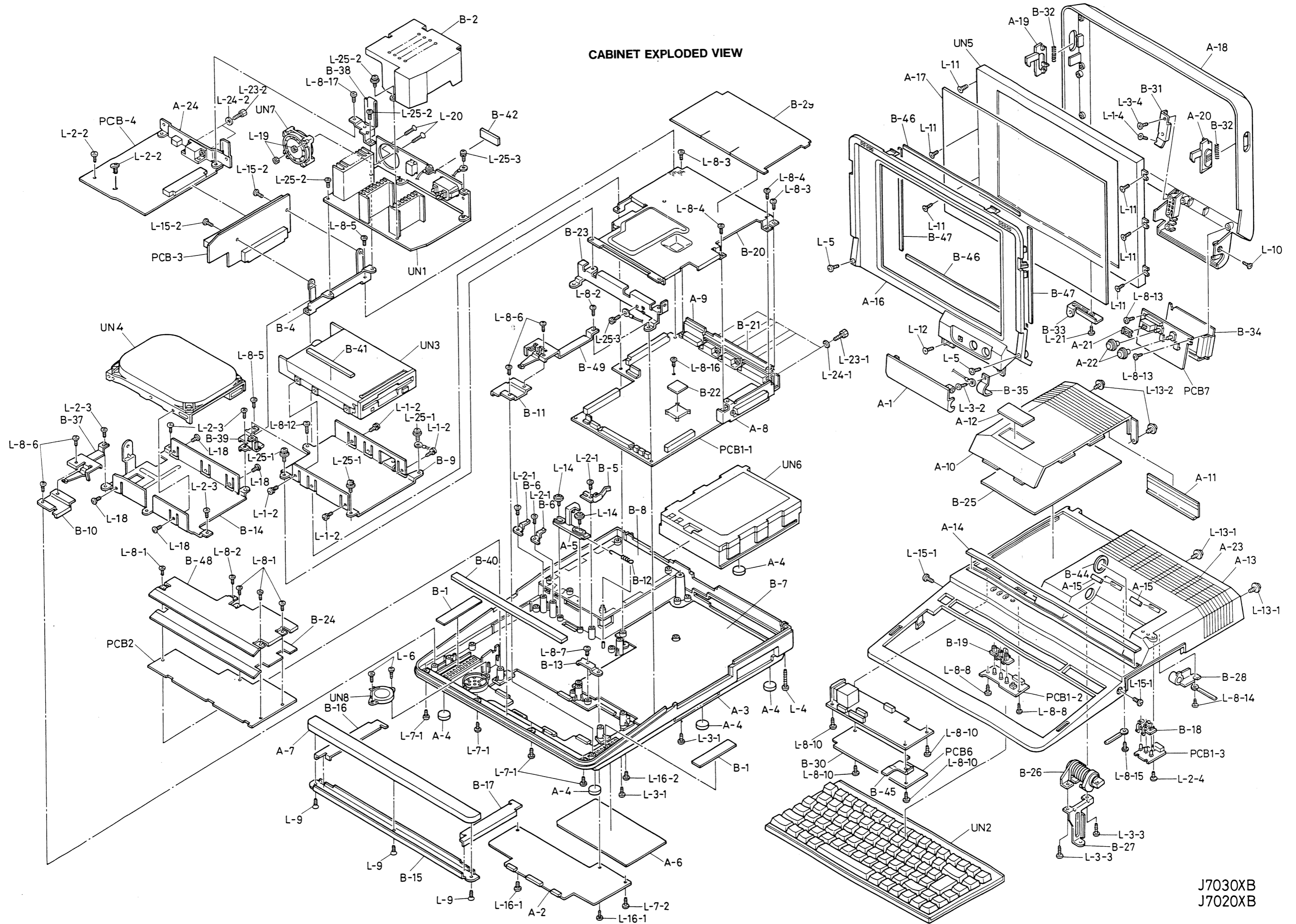
Ref. No.	Description	Part No.
<b>P.C.B.s</b>		
PCB1	PCB Main	270673FTZ
PCB2	PCB Co Pro/Mem	270650FTZ
<b>IC's</b>		
U101	IC NG80386SX-16 32 Bit CPU FIP	270653
U107	IC PAL16R8BCNSTD PAL	270654
U108	IC PAL16R8ACNSTD PAL	270655
U109-111	IC PC74HCT373T-T HCMOS LOGIC	270656
U116	IC SN74LS06NS TTL (LS)	175043
U122	IC VL82C205A-16QC Chip Set	270658
U302	IC TMS27C256-20 JL EPROM	270674
U303	IC TMS27C256-20JL EPROM	270675
U401	IC LM79L05ACZ 3 Terminal Reg.	270403
U501	IC TC74ACT08F-EL ACMOS LOGIC	270388
U113, 129, 130, 504	IC PC74HCT245T-T HCMOS LOGIC	270364
U505	IC PC74HCT125T-T HCMOS LOGIC	270367
U112, 131	IC PC74HCT244T-T HCMOS LOGIC	270391
U144	IC PC74HCT04T-T HCMOS LOGIC	270399
U115	IC TC74ACT32F-ELACMOS LOGIC	270402
U119, 139, 529	IC PC74HCT00T-T HCMOS LOGIC	270369
U902	IC UPD424256LA-10-E2 DRAM	174025
U903	IC MN42156AL-08/ UPD41256L-10-E3	171400
<b>Diodes</b>		
D101-104, 501, 504-507, 801	D RLS4151	270411
D502	DZ RLZ3.3B Zener Diode	270412
D503	D RGP-10	270413
DA101	D SN74S1053NS Array	270414
<b>Transistors</b>		
T502	TR 2SD1484K	270661
<b>Miscellaneous</b>		
FL101-104, 109-116	Chip Tube Filter NFM61T20472	270434
FL103, 106	Filter NFV610-655-T2A-107	270436
FL105, 107, 108	Filter NFV610-655-T2A-506	270435
FL301, 302	Chip Filter NFM61T20472	270437

### CABINET PARTS LIST

Ref.	Description	Part No.
UN-6	NI-CD Battery Pack	270450
A-1	LCD Cover	270451
B-5	Battery Terminal -	270453
B-6	Battery Terminal +	270454
UN-8	Speaker	270455
A-3	Bottom Cabinet 286	270456FTZ-2
A-3*	Bottom Cabinet 386	270456FTZ-3
A-13 + A-14 + A-15 + B25 + L15	Top Cabinet Assembly	270458
A-13	Top Cabinet	270459
A-14	Main LED Cover	270461
B-26	Tilt Arm Unit	270462
A-15	Spacer	270463
B-27	Support Bracket	270464
UN-2	Keyboard Unit	270465
A-16	LCD Panel	270466
UN-5 + A17	LCD Protect Sheet + LCD Unit	270468
A-18	LCD Case	270469
B-7	Main PCB Sheet	270470
A-4	Foot	270471
A-5	Lock Knob Battery	270472
B-9	FDD Chassis	270473
B-10	Handle Bracket L	270474
B-11	Handle Bracket R	270475
A-2	Bottom Case Cover	270476FTZ
B-13	Bottom Cover Support Bracket	270477
B-12	Lock Spring B	270479
B-8	VGA Sheet	270481
B-14	HDD Bracket	270482
UN-4	Hard Disk Unit 20MB	270483-20
UN-4*	Hard Disk Unit 40MB	270483-40
A-7	Handle Assembly	270484
B-15	Handle Chassis	270485
B-16	Handle Chassis L	270486
B-17	Handle Chassis R	270487
A-6	Rating Label ALT286	270488
A-6*	Rating Label ALT386SX	270668
A-12	Brand Badge ALT286	270489
B-9	Floppy Bracket	270490
UN-3	Floppy Disk Unit	270491
UN-1	Power Supply Unit	270492
A-10 + A-12	Case Cover Assembly 286	270493FTZ-2
A-10 + A-12*	Case Cover Assembly 386	270493FTZ-3
A-10	Case Cover	270494
A-11	Window Cover	270495
A-12*	Badge ALT386SX	270676
A-19	Lock Lever L	270497
A-20	Lock Lever R	270498
B-31	Hinge Bracket	270499
A-21	Switch Cover	270500
A-22	Contrast Knob	270501
B-28	LCD Case Bush	270502
B-32	Lock Spring A	270503
B-33	LCD Support Bracket	270504
UN-7	Fan Motor 0410-12	270505
B-34	Inverter Seat	270442
B-36	Skid Bracket	270496
B-2	Power Cover	270562

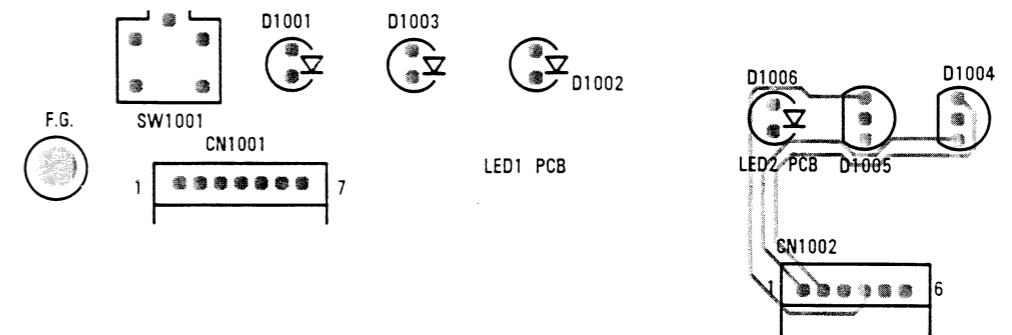
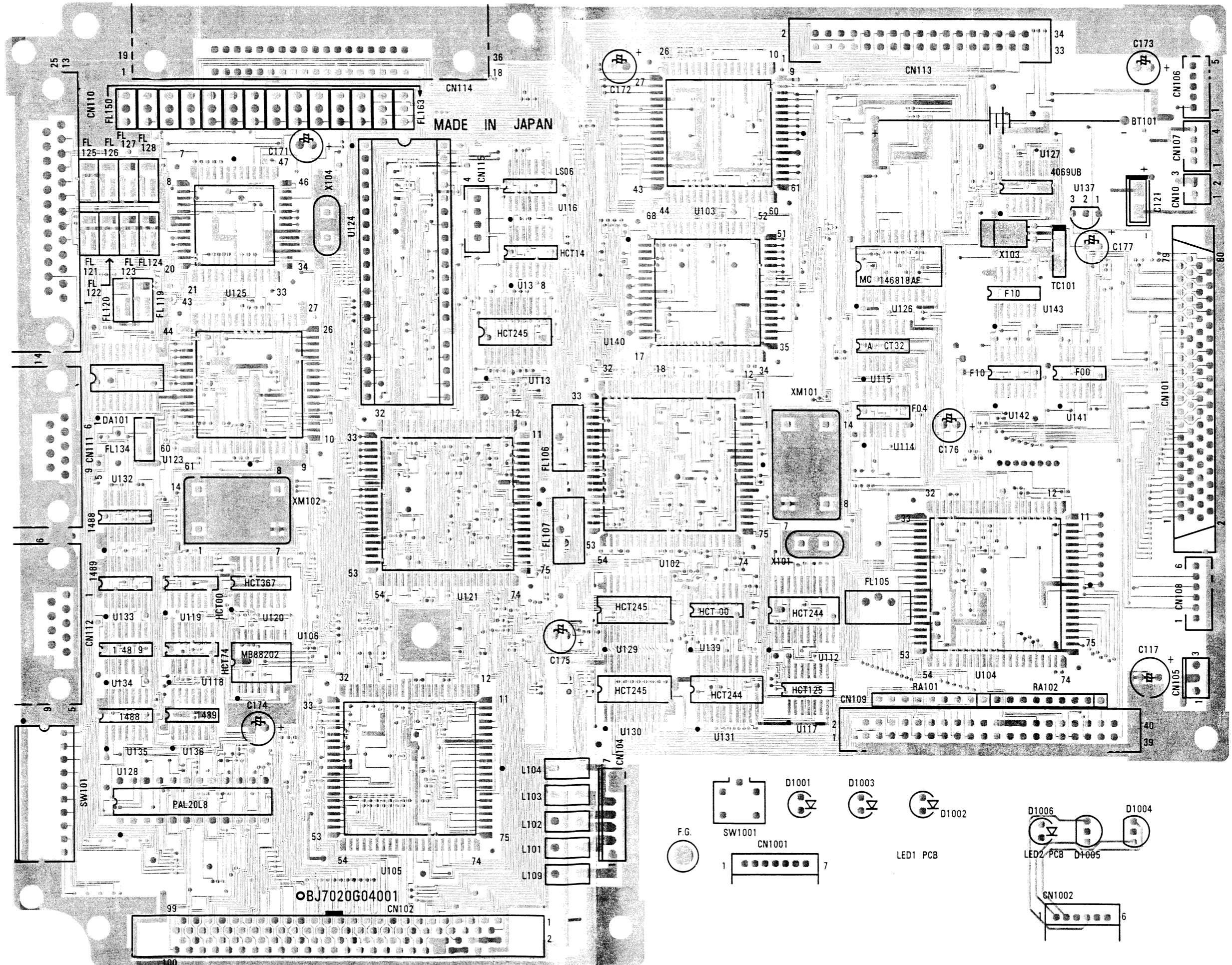
\* Parts apply to ALT386SX only.

CABINET EXPLODED VIEW

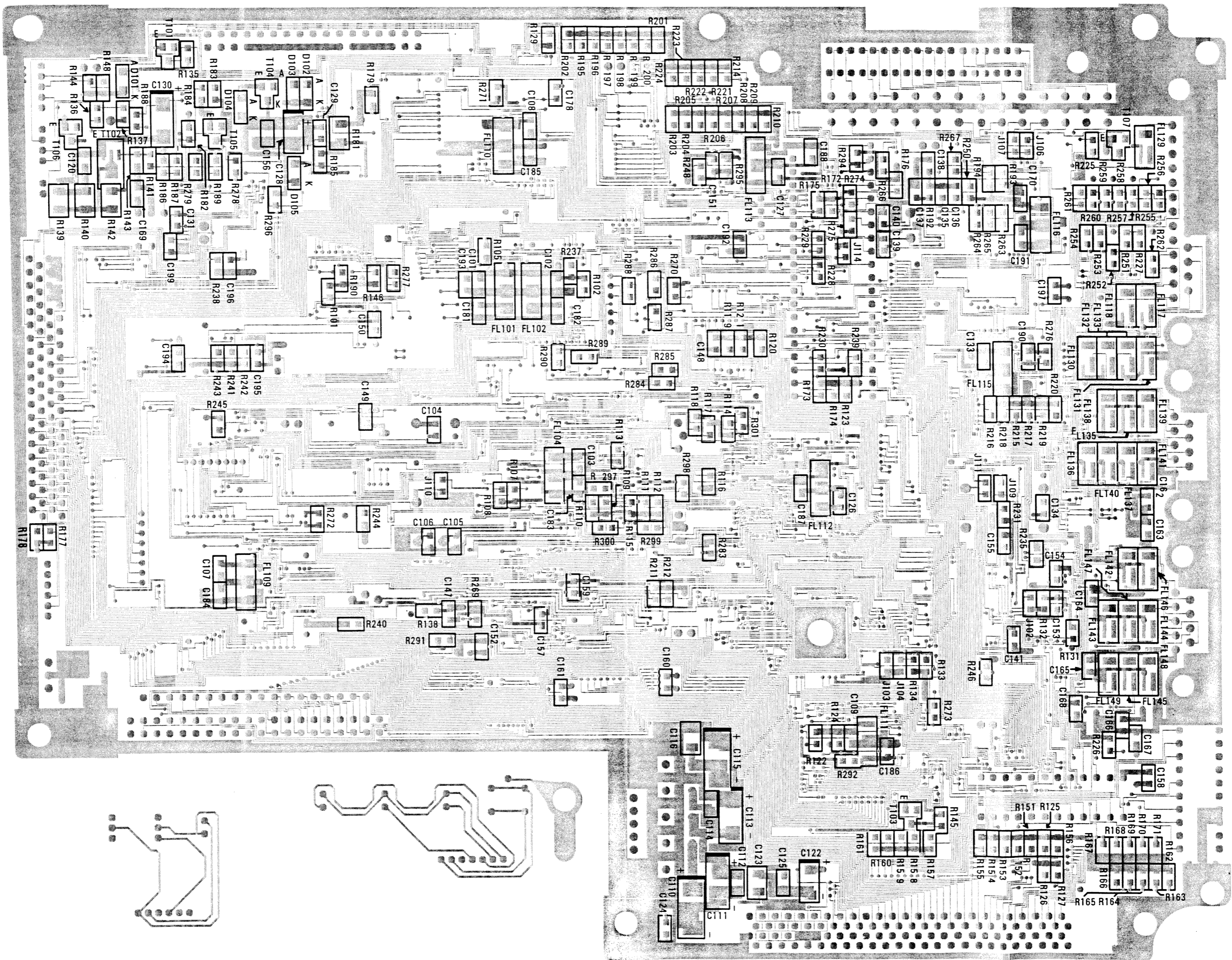


J7030XB  
J7020XB

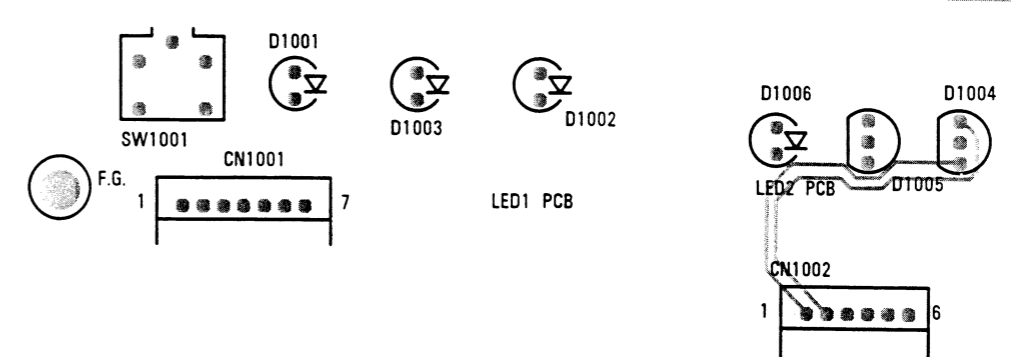
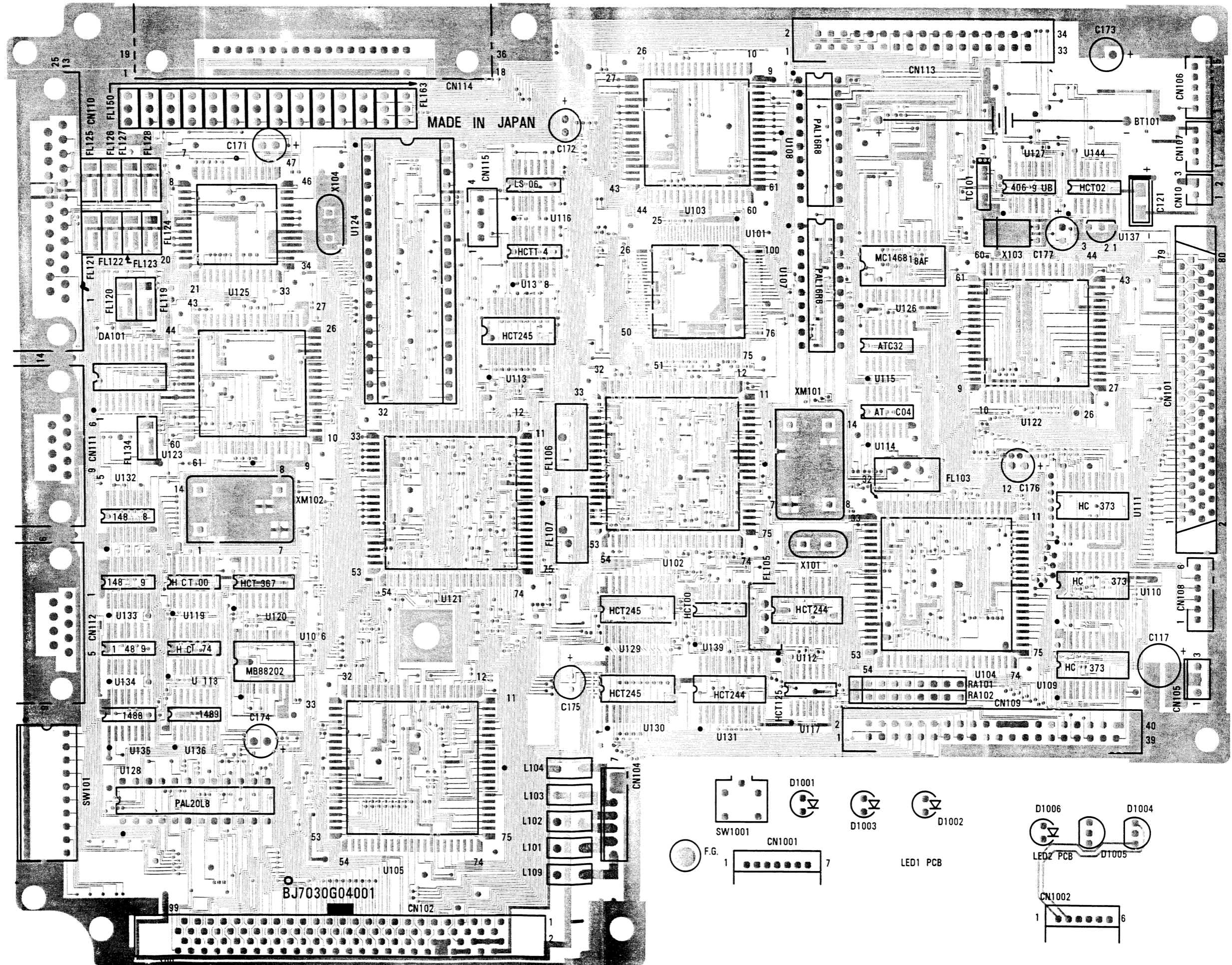
ALT286 MAIN P.C.B. TOP VIEW



ALT286 MAIN P.C.B. BOTTOM VIEW

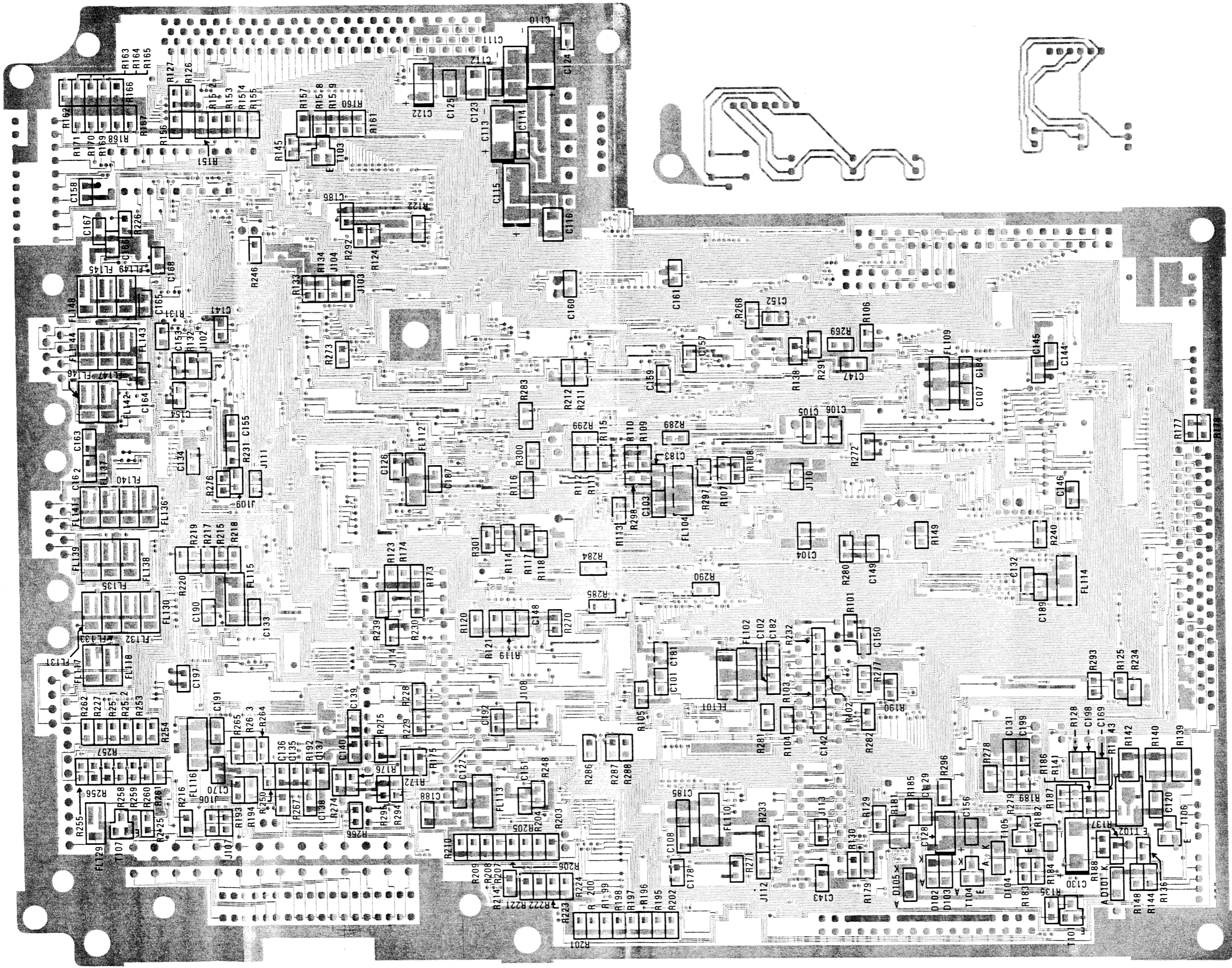


ALT386SX MAIN P.C.B. TOP VIEW





ALT386SX MAIN P.C.B. BOTTOM VIEW





ALT286 MAIN P.C.B. SCHEMATIC DIAGRAM (1)

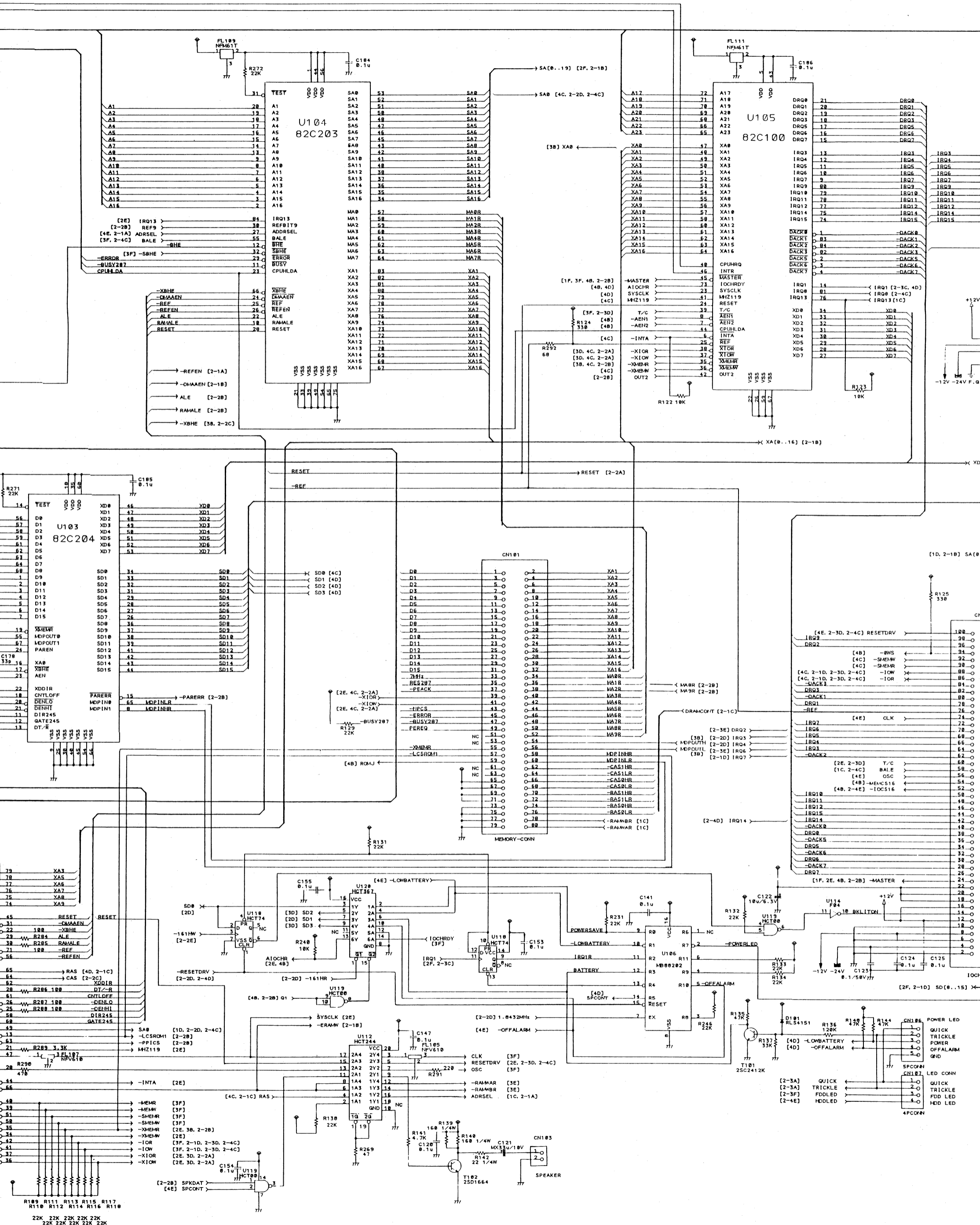
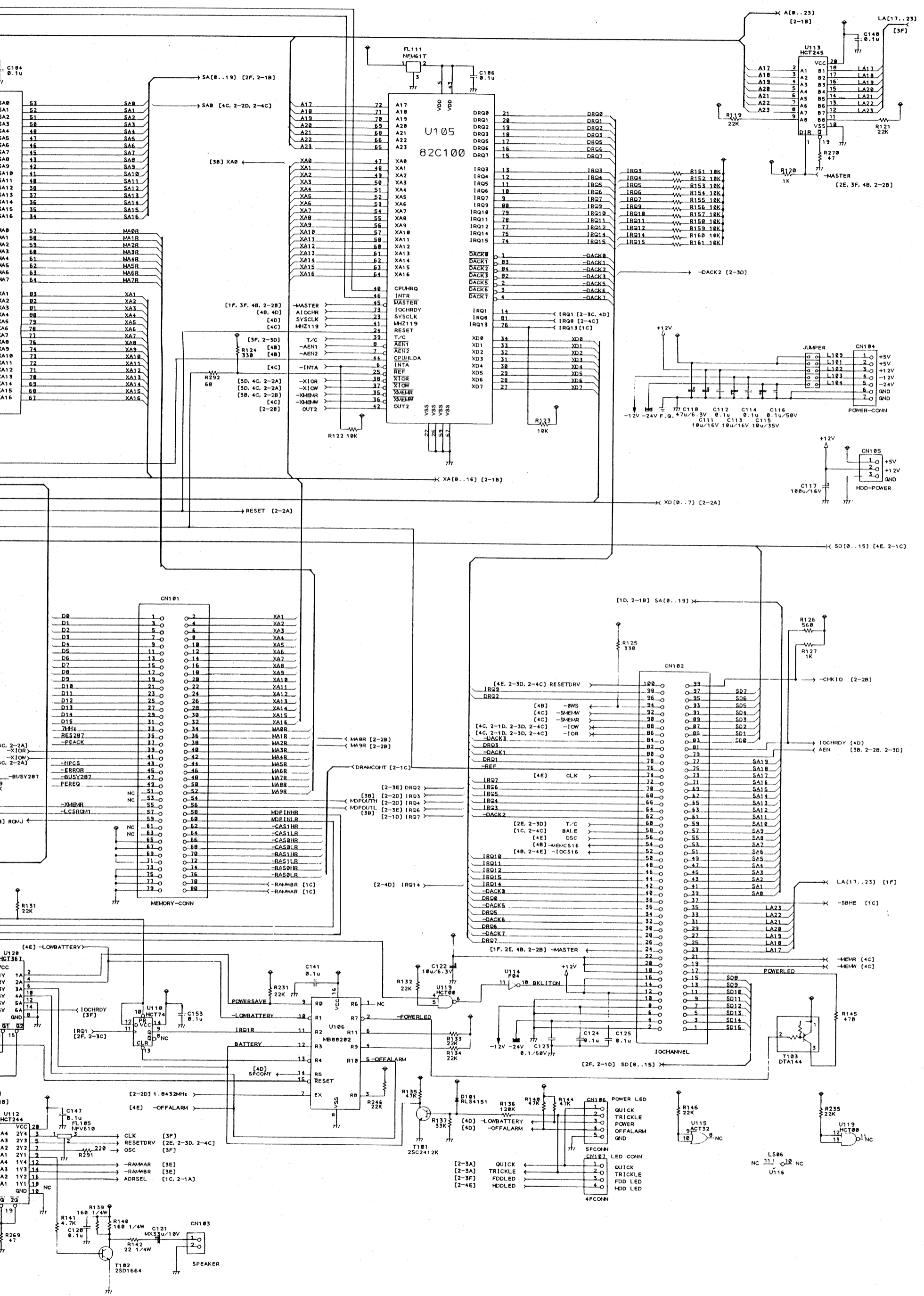


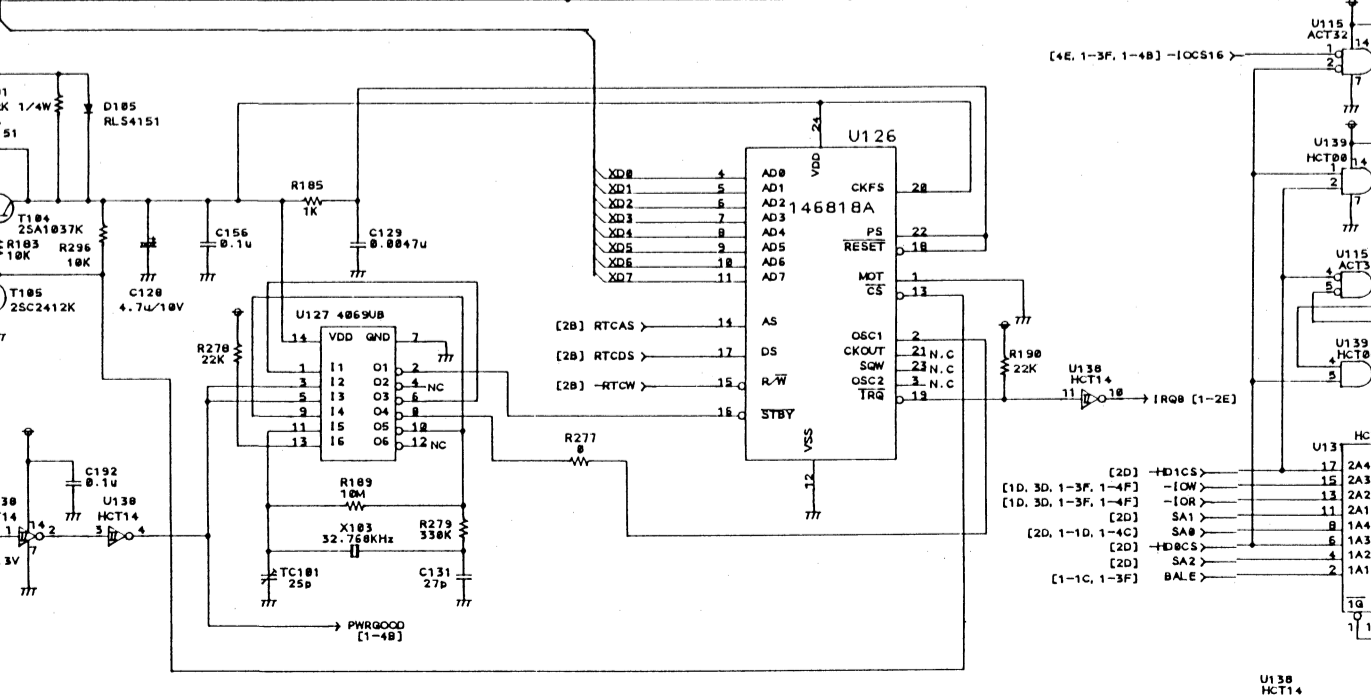
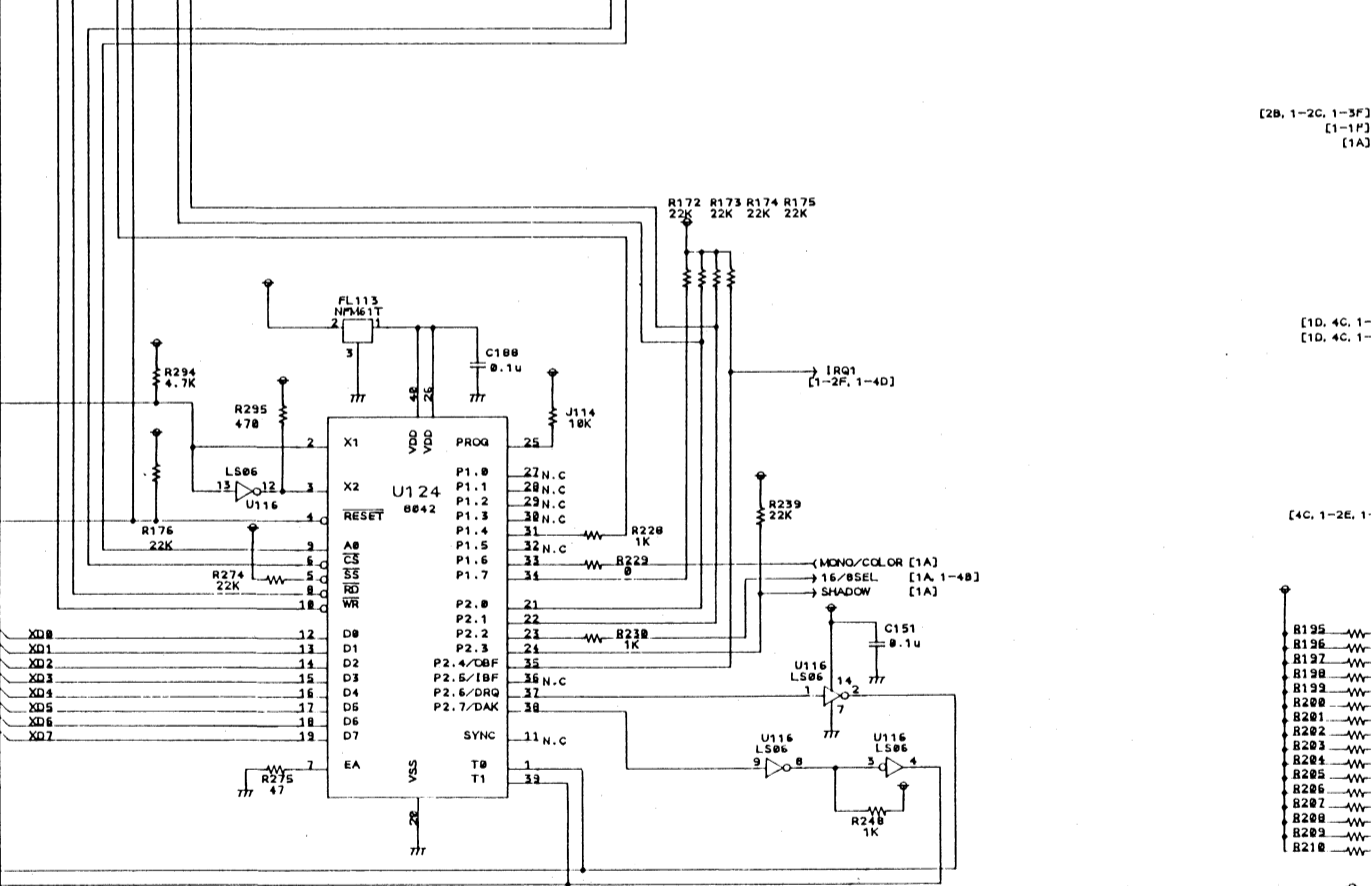
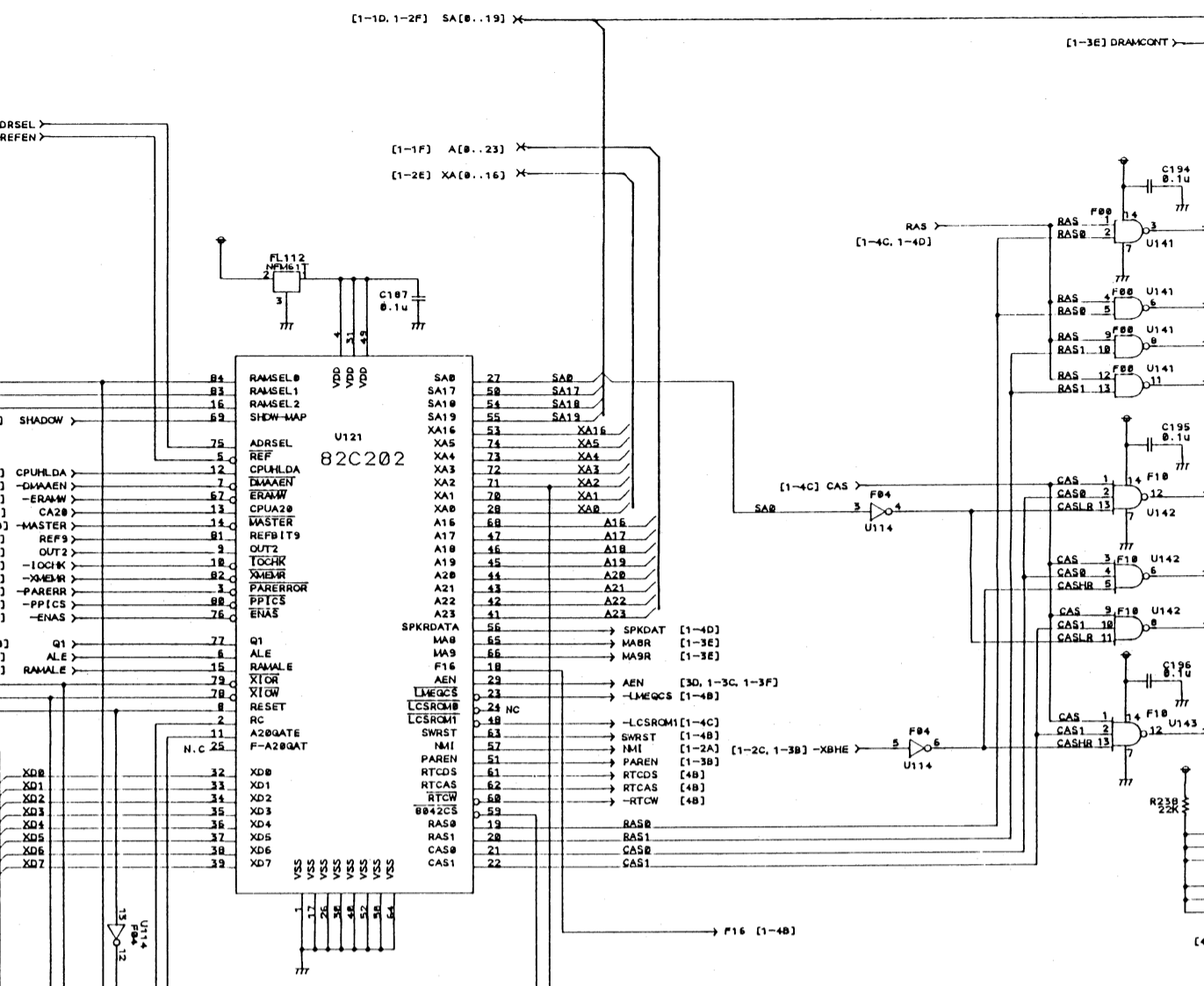
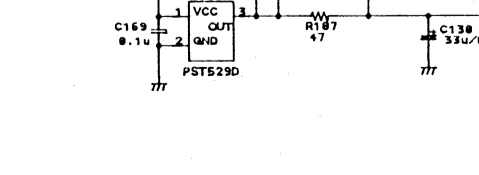
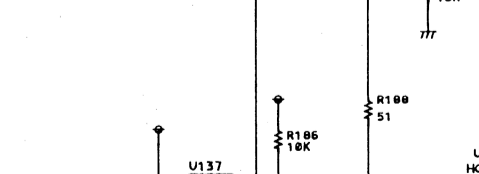
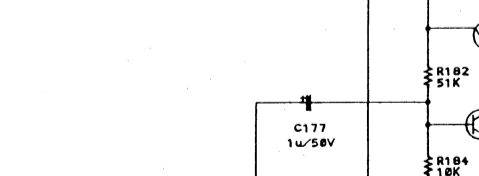
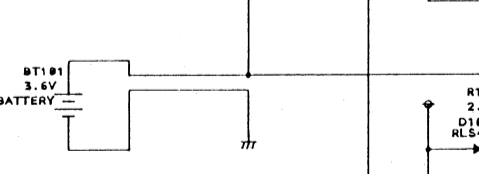
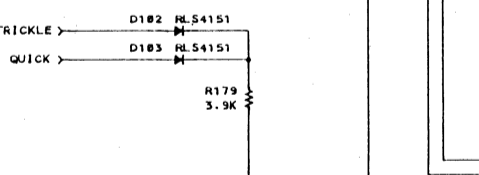
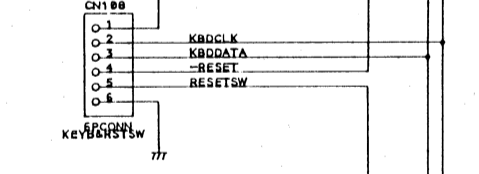
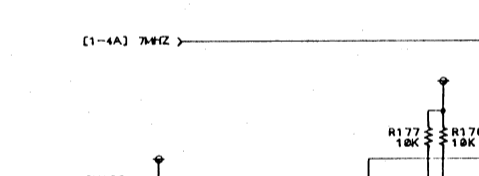
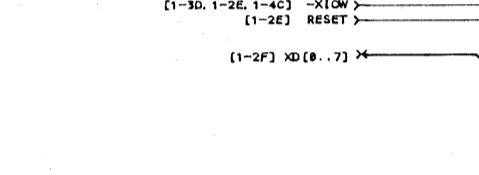
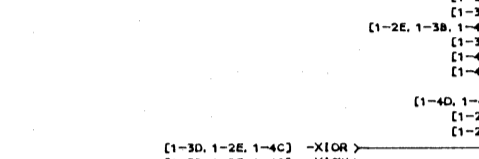
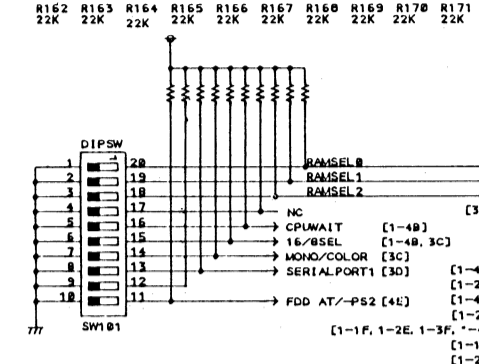
DIAGRAM (1)



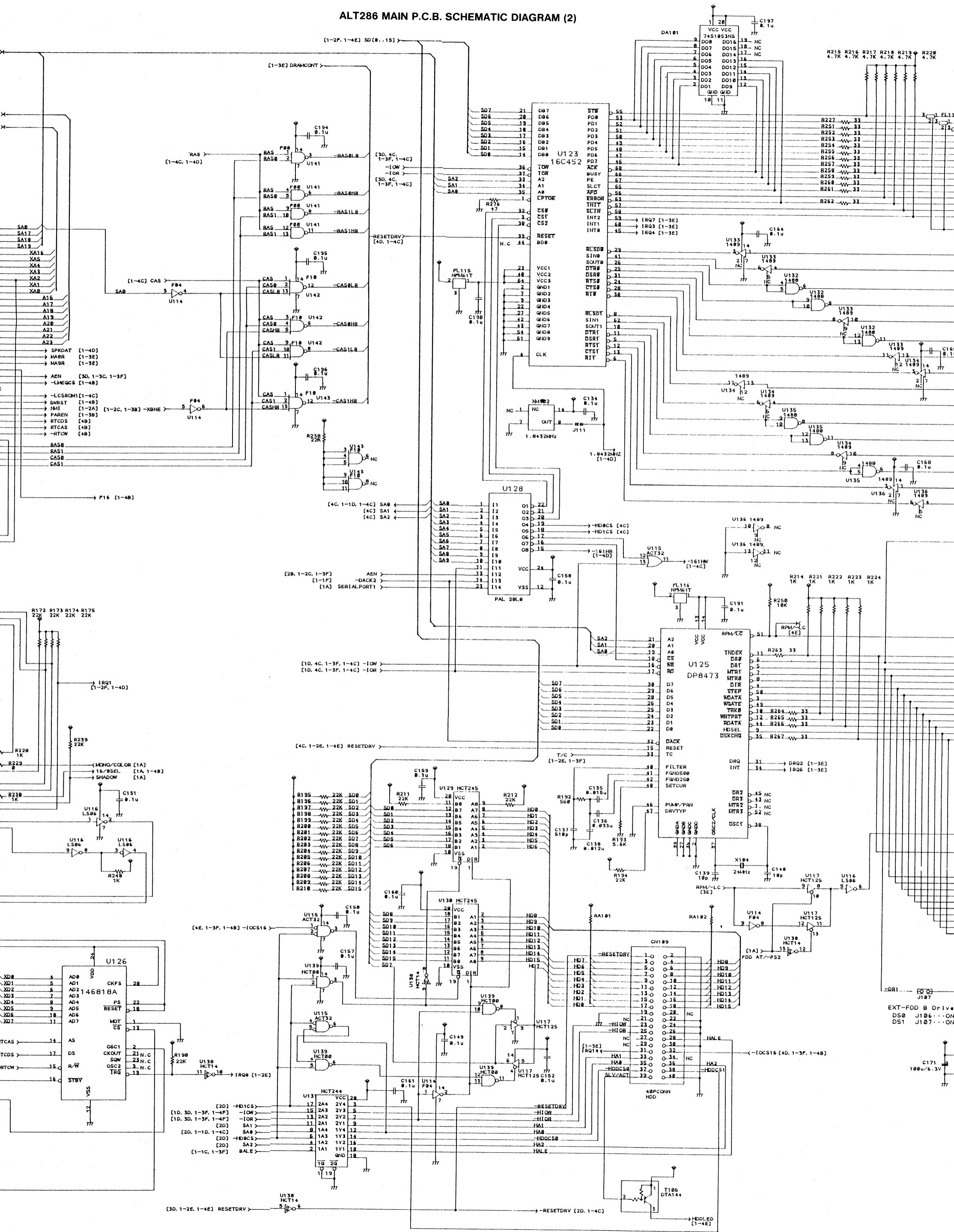
DIP SWITCH

SW.	FUNCTION	SETTING	SETTING	SETTING	SETTING
1	RAM SEL 0	OFF	ON	OFF	ON
2	RAM SEL 1	ON	OFF	ON	OFF
3	RAM SEL 2	ON	ON	OFF	OFF
		512KB	1MB	2MB	4MB

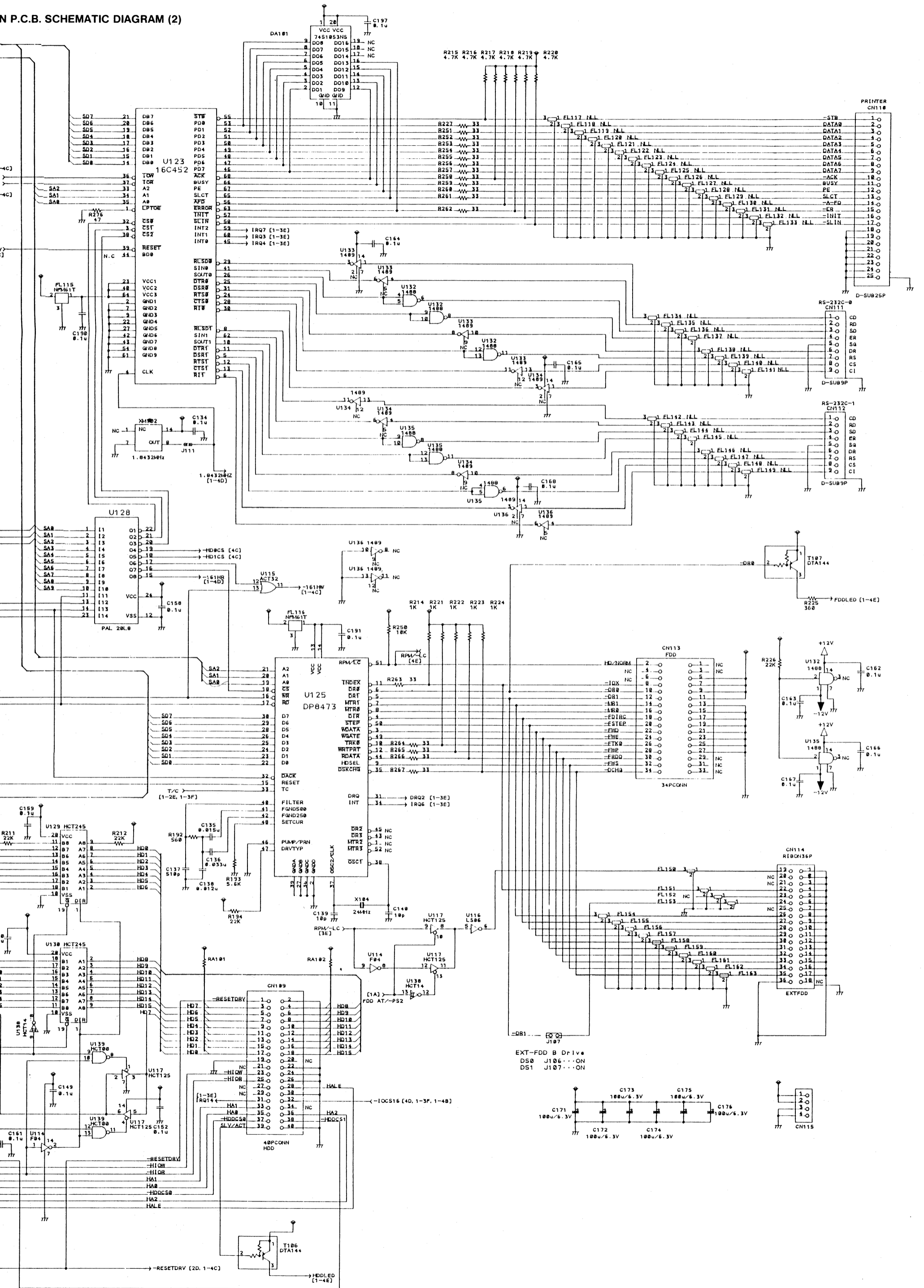
SW.	FUNCTION	SETTING	SETTING
4	NON	ON	OFF
5	CPU WAIT	0WAIT	1WAIT
6	CLOCK	8MHz	16MHz
7	MONO/COLOR	COLOR	MONO
8	SERIAL PORT1	ENABLE	DISABLE
9	NON	ON	OFF
10	FDD AT/PS2	PS2	AT

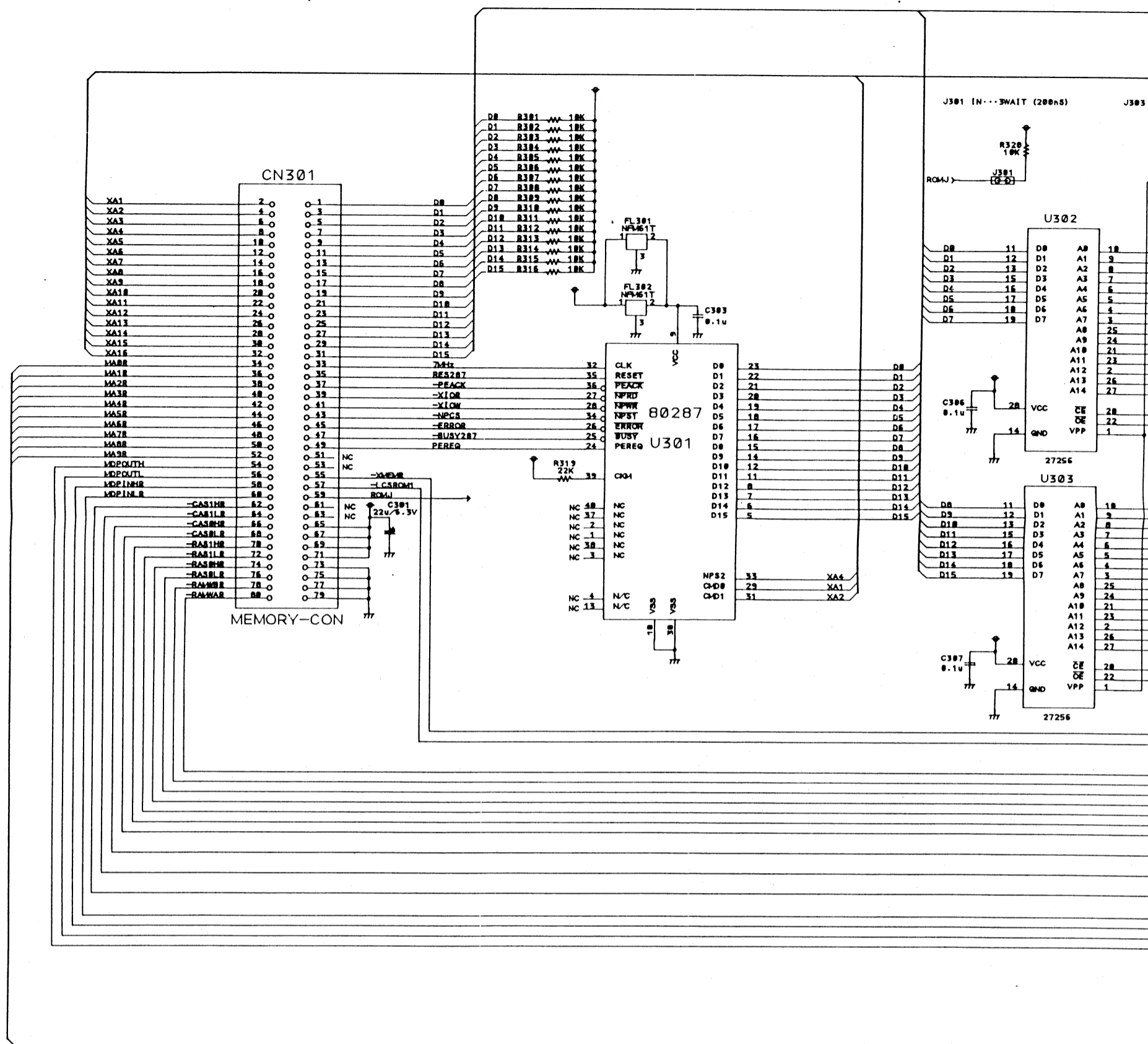


ALT286 MAIN P.C.B. SCHEMATIC DIAGRAM (2)

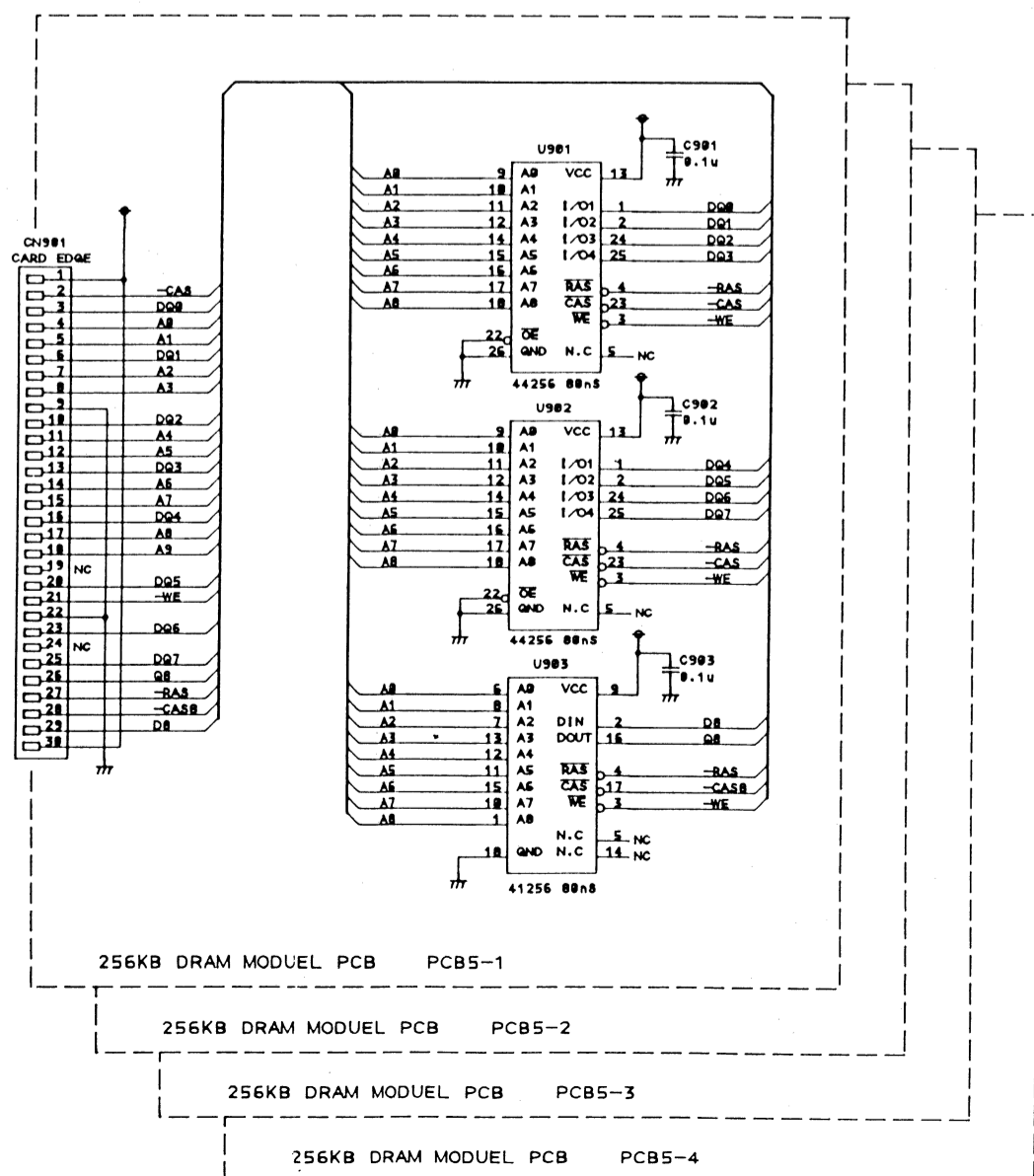


P.C.B. SCHEMATIC DIAGRAM (2)



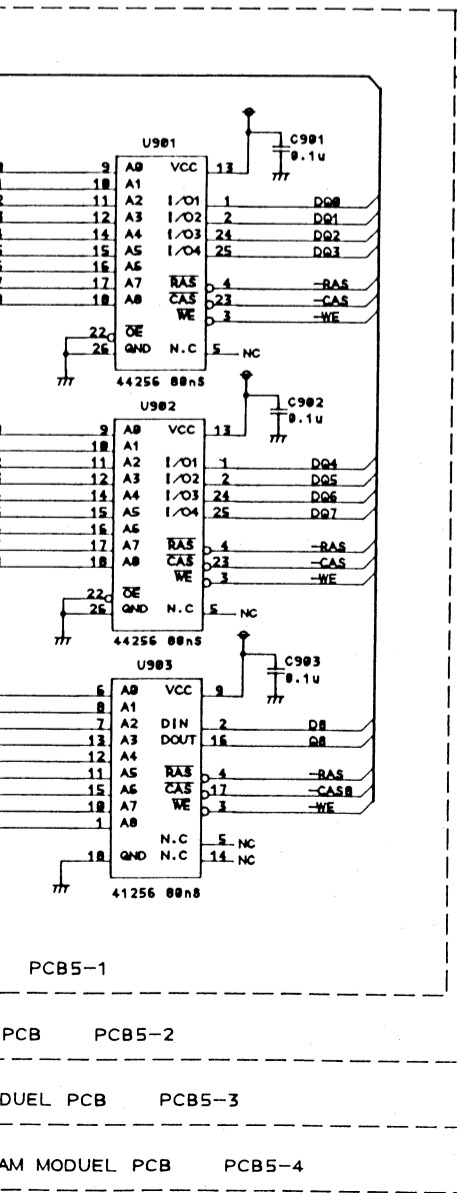
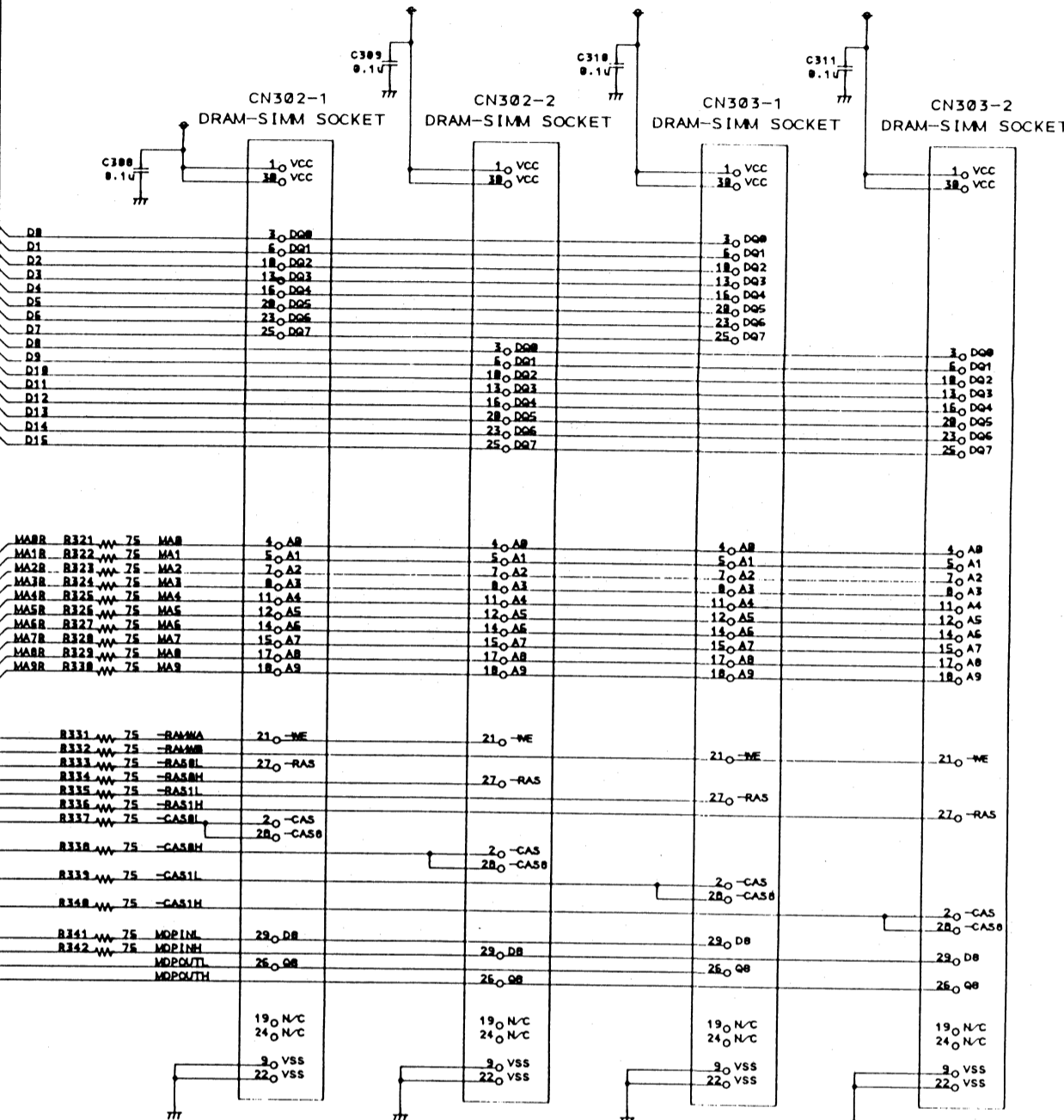
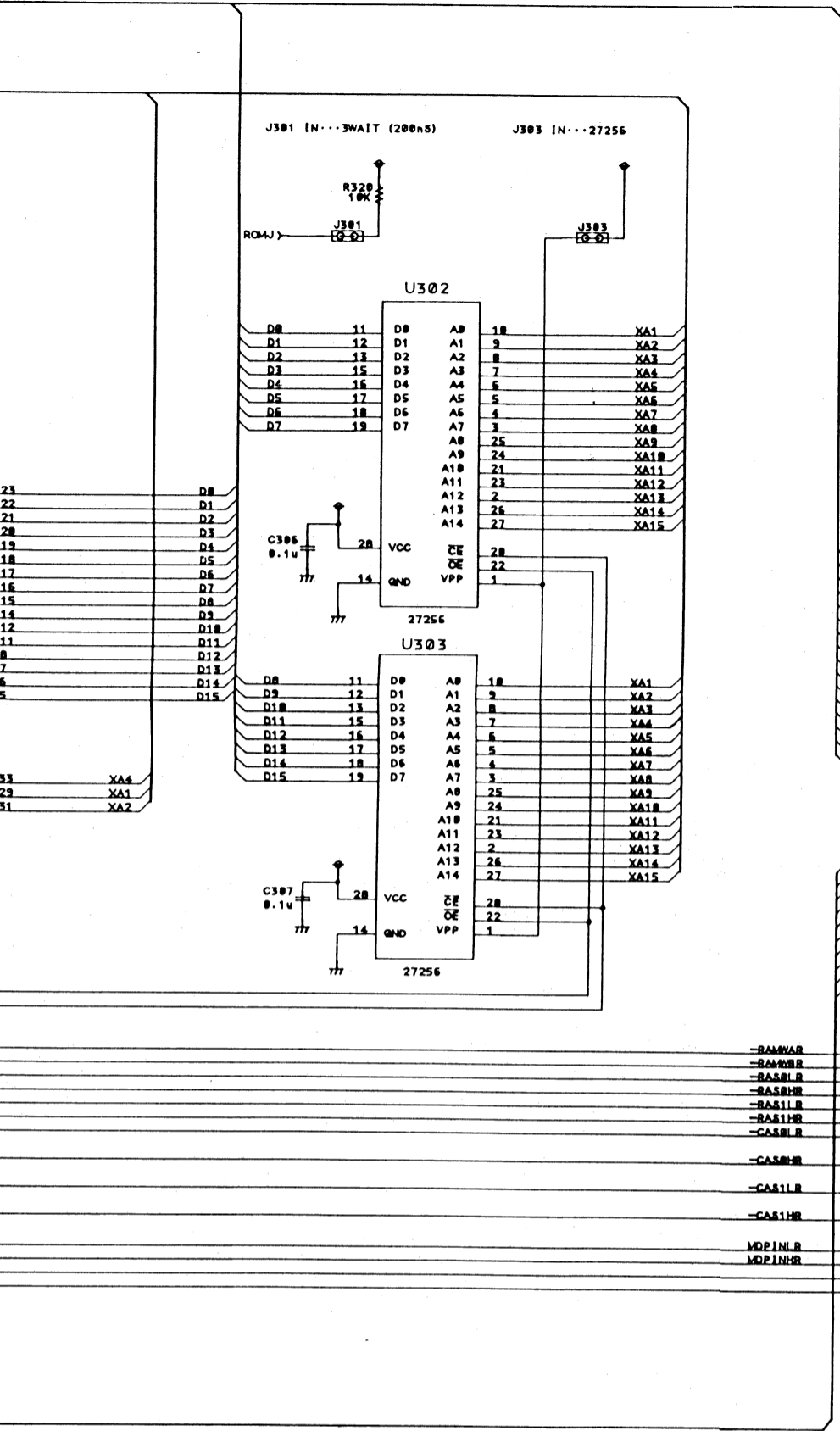


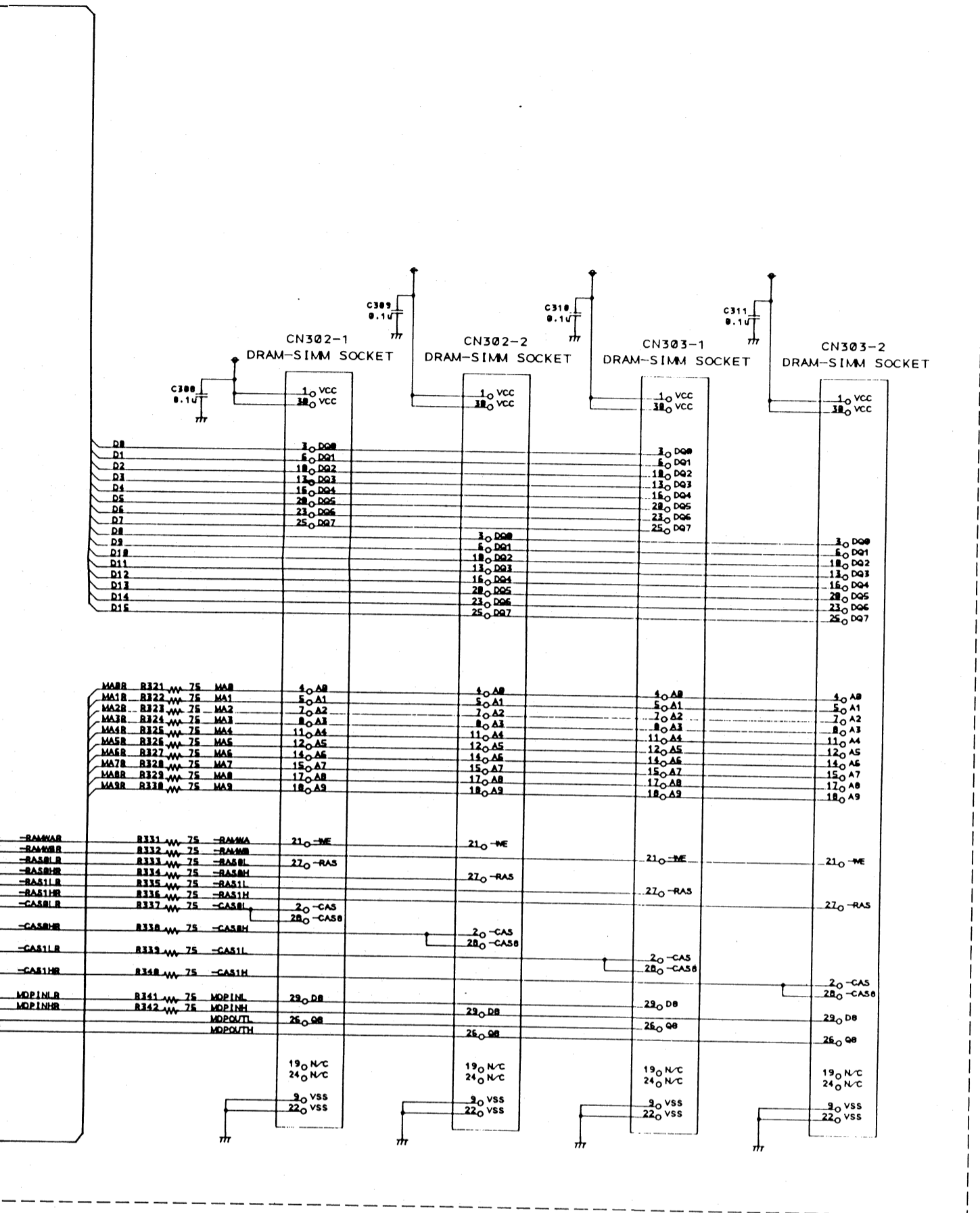
CO-PRO/MEM PCB PCB2



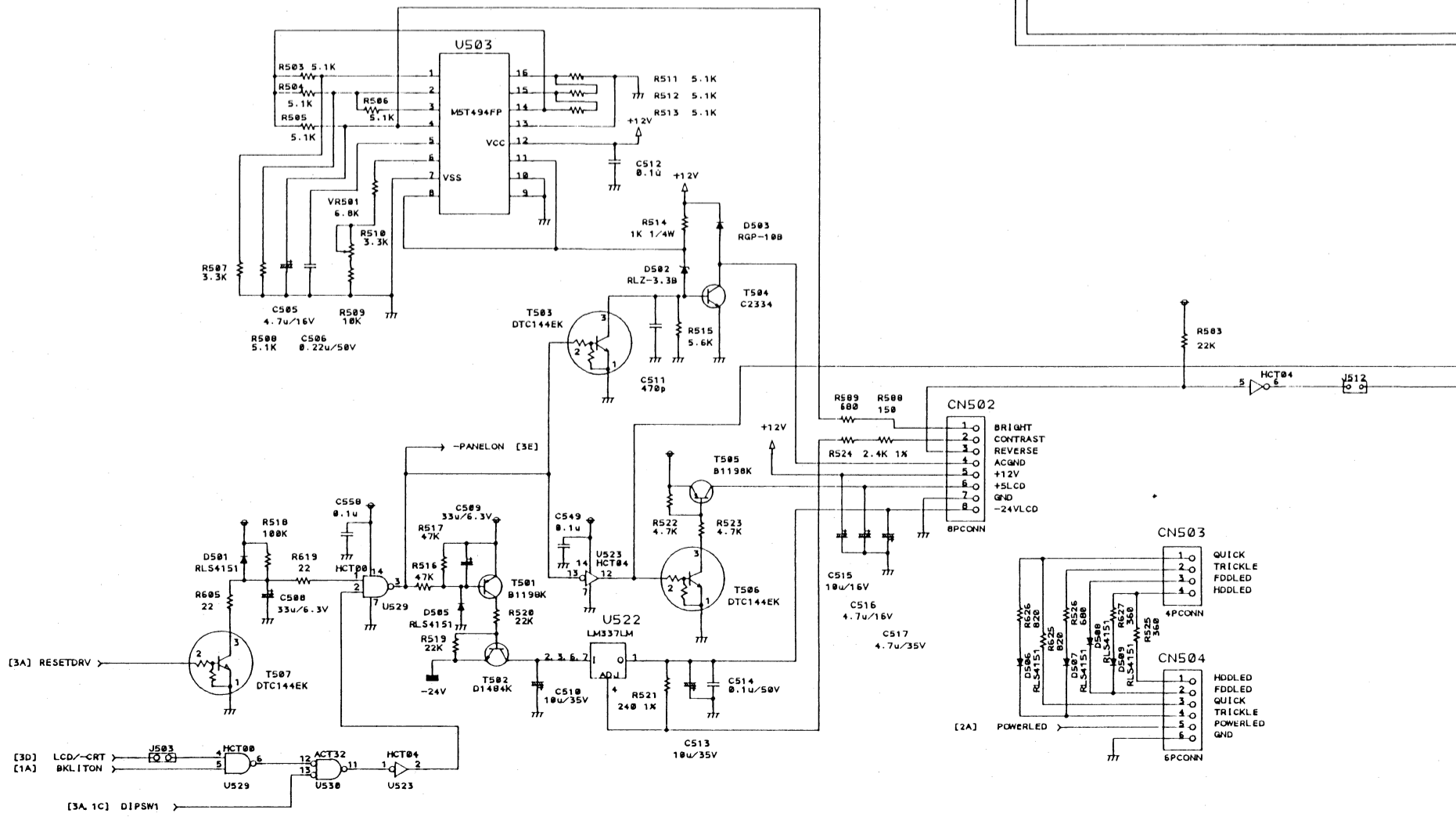
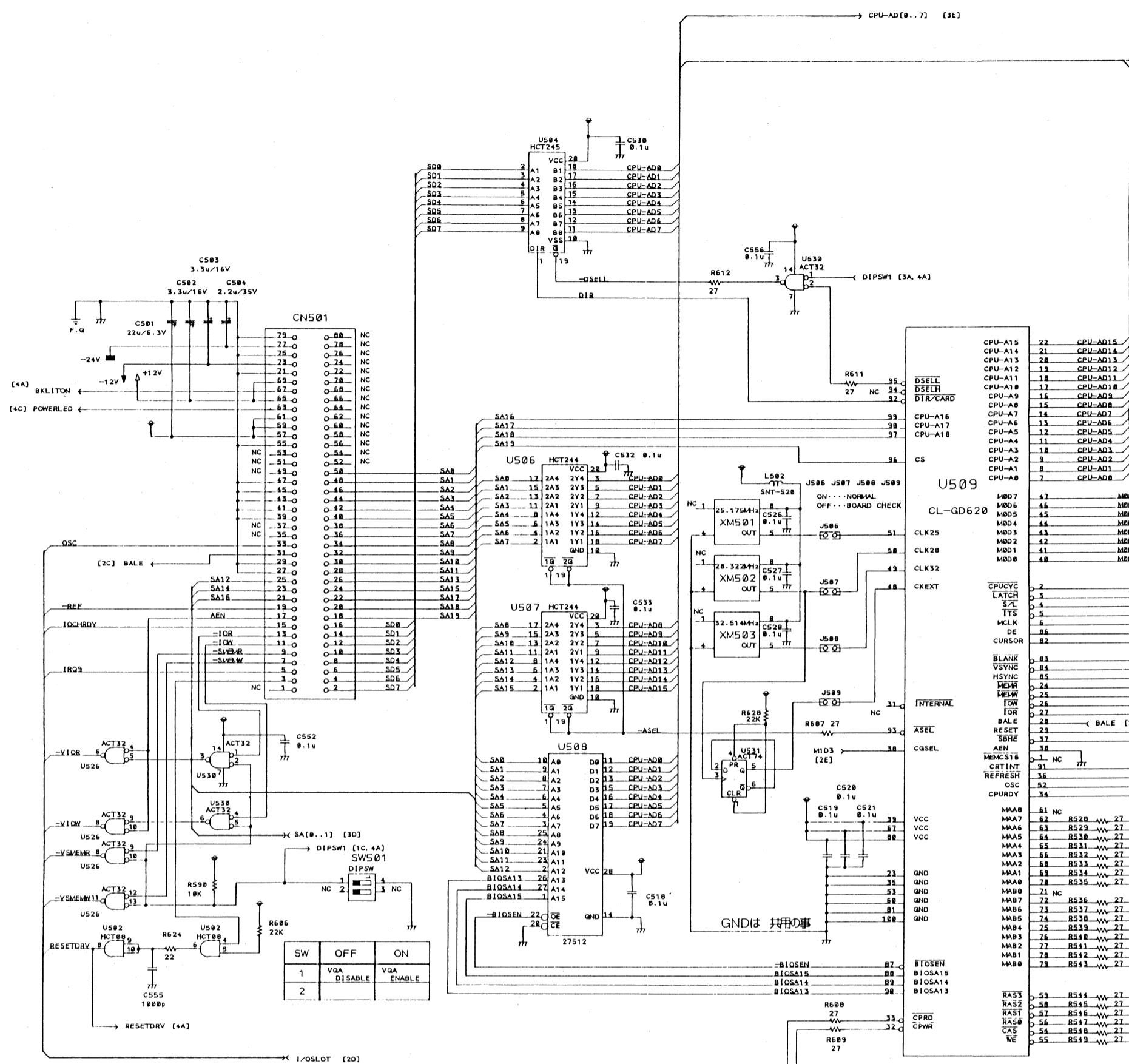


ALT286 CO-PROCESSOR / MEMORY SCHEMATIC DIAGRAM

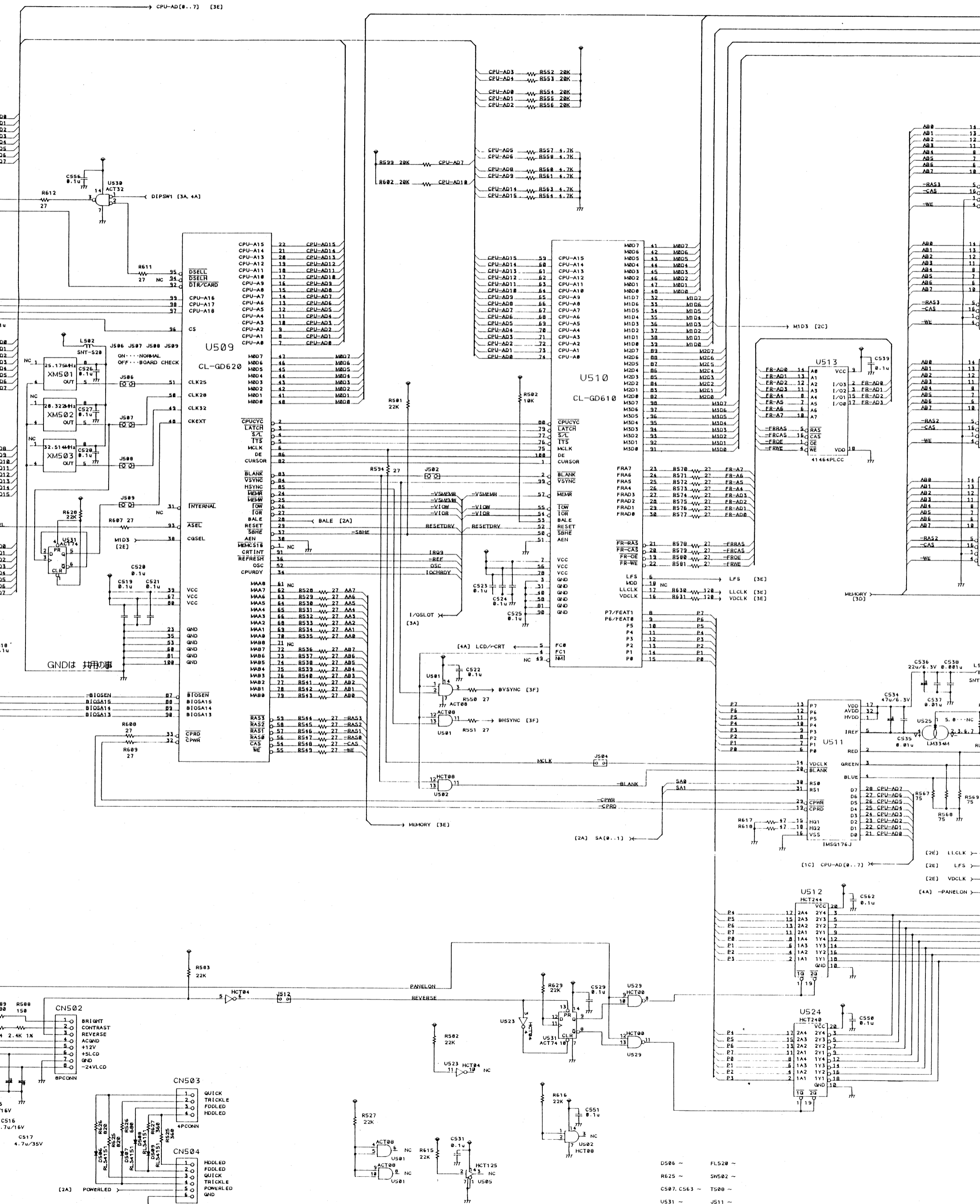




TO  
256KB DRAM  
MODULE PCB  
X 4PCS

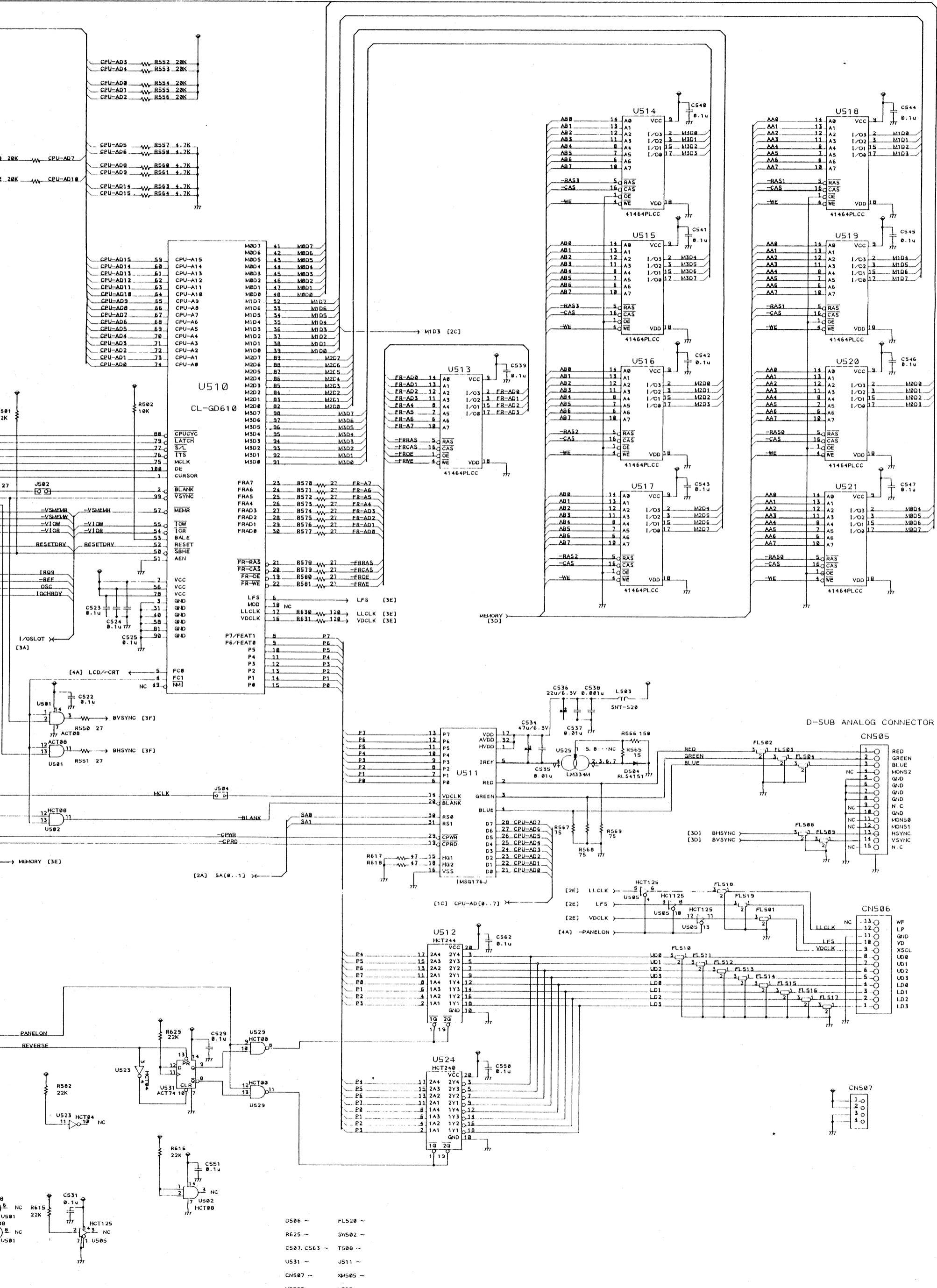


ALT286/386SX VGA SCHEMATIC DIAGRAM

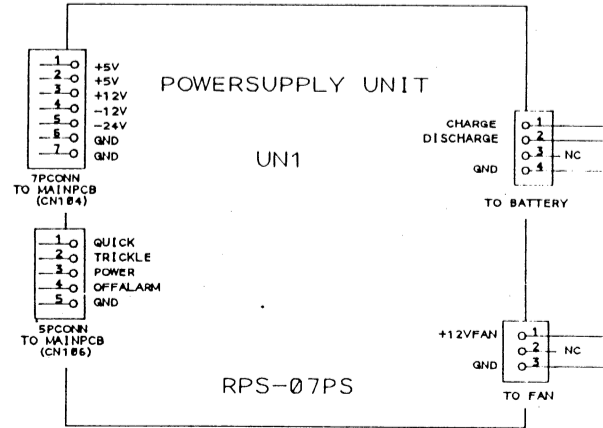
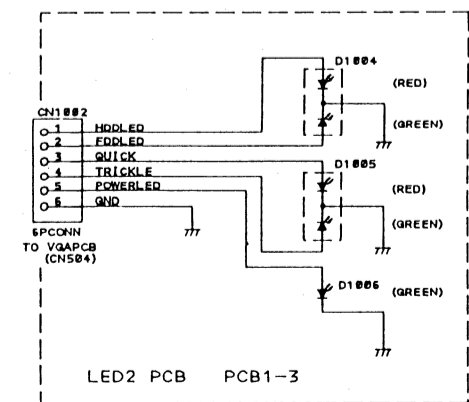
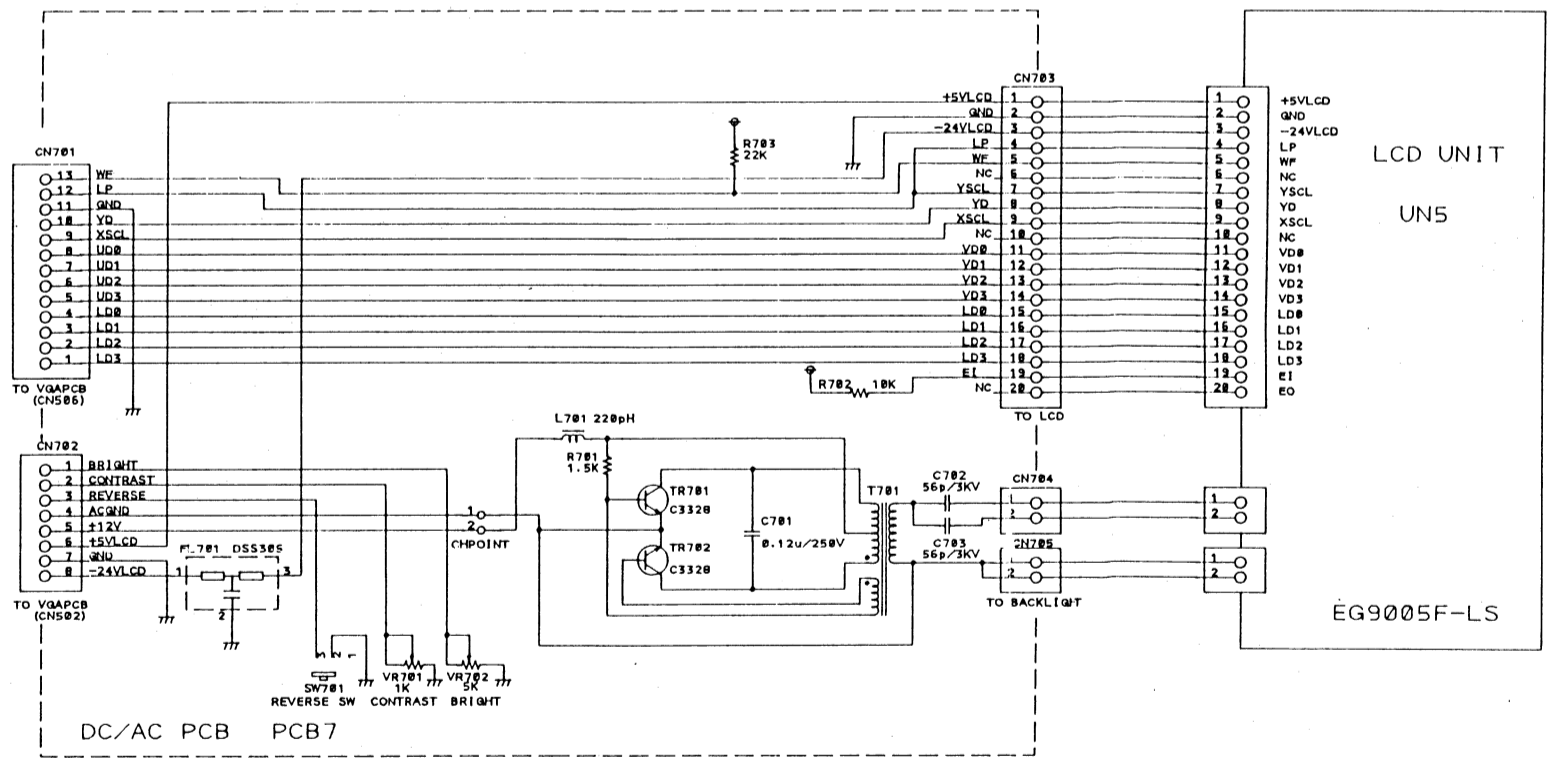
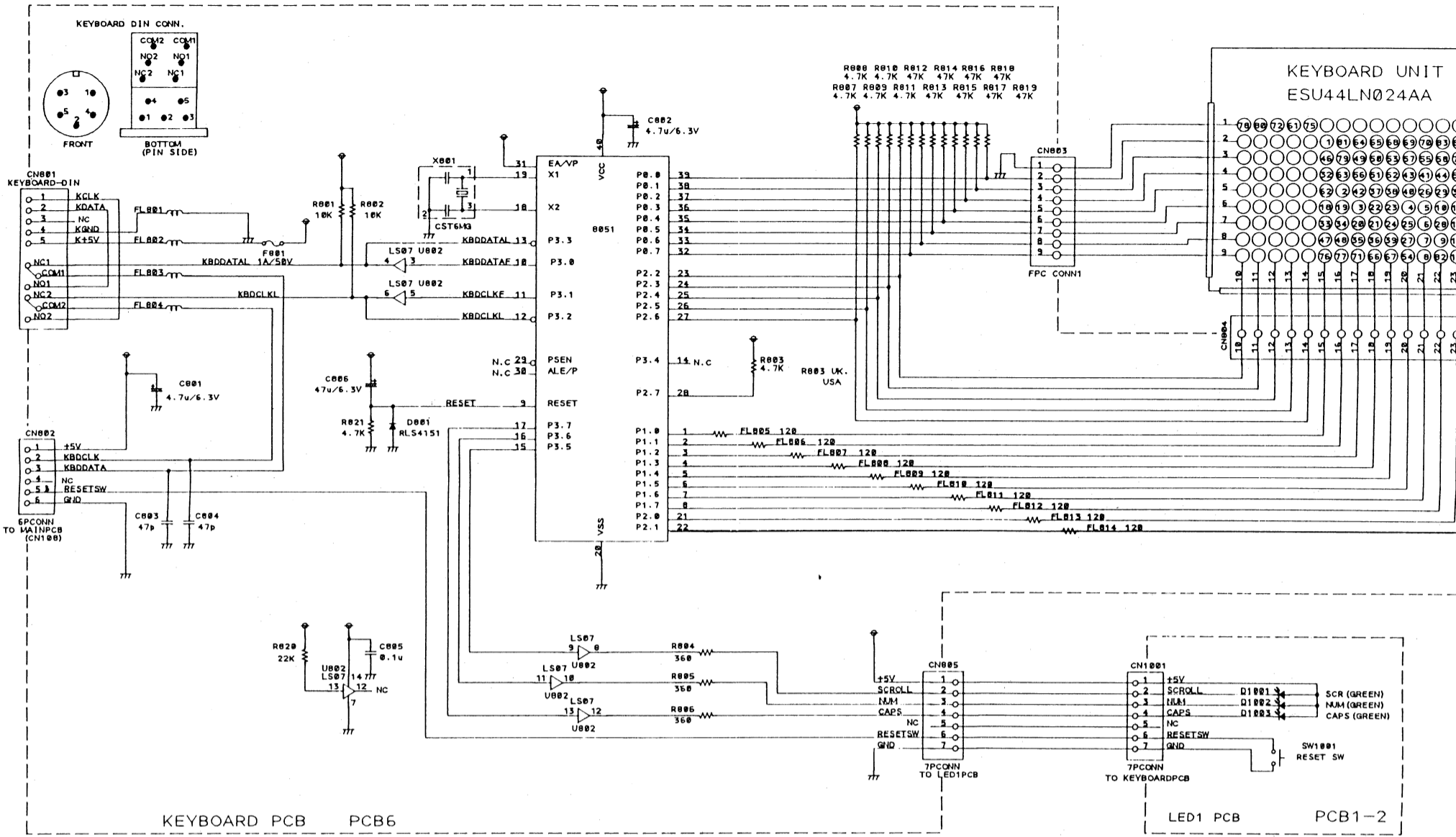


- D506 ~ FL520 ~
- R625 ~ SW502 ~
- C507, C563 ~ T500 ~
- U531 ~ J511 ~
- CN507 ~ XMS05 ~
- VR502 ~ L505 ~

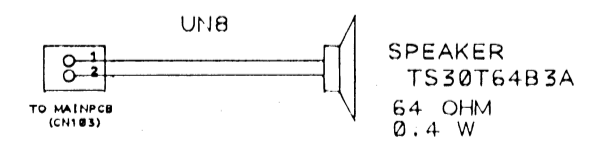
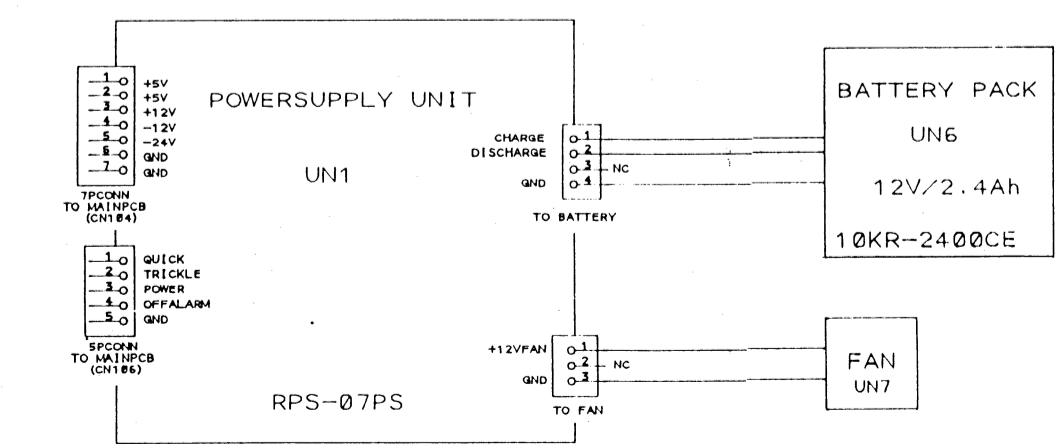
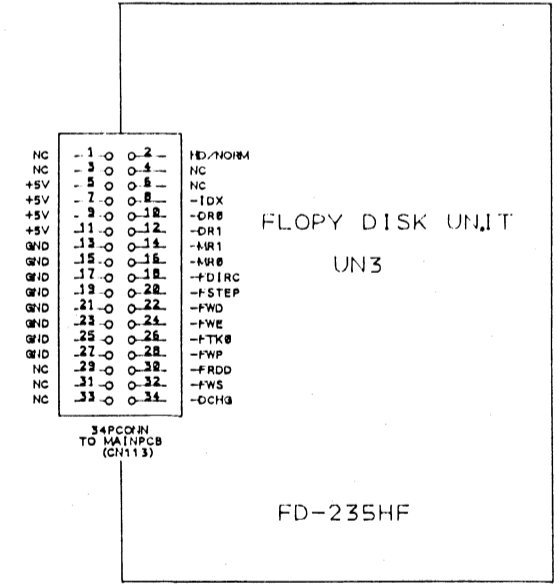
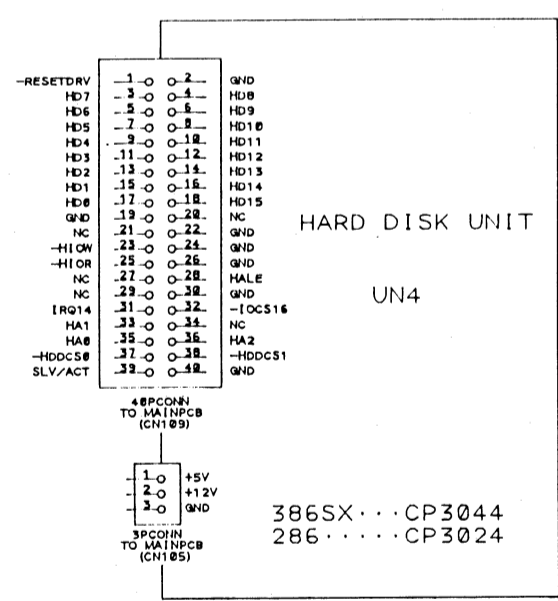
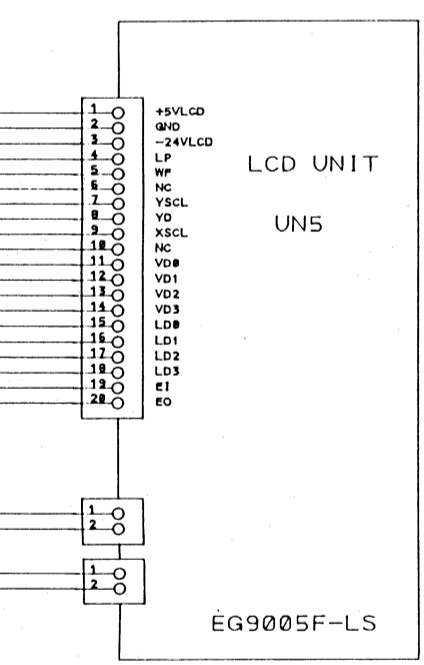
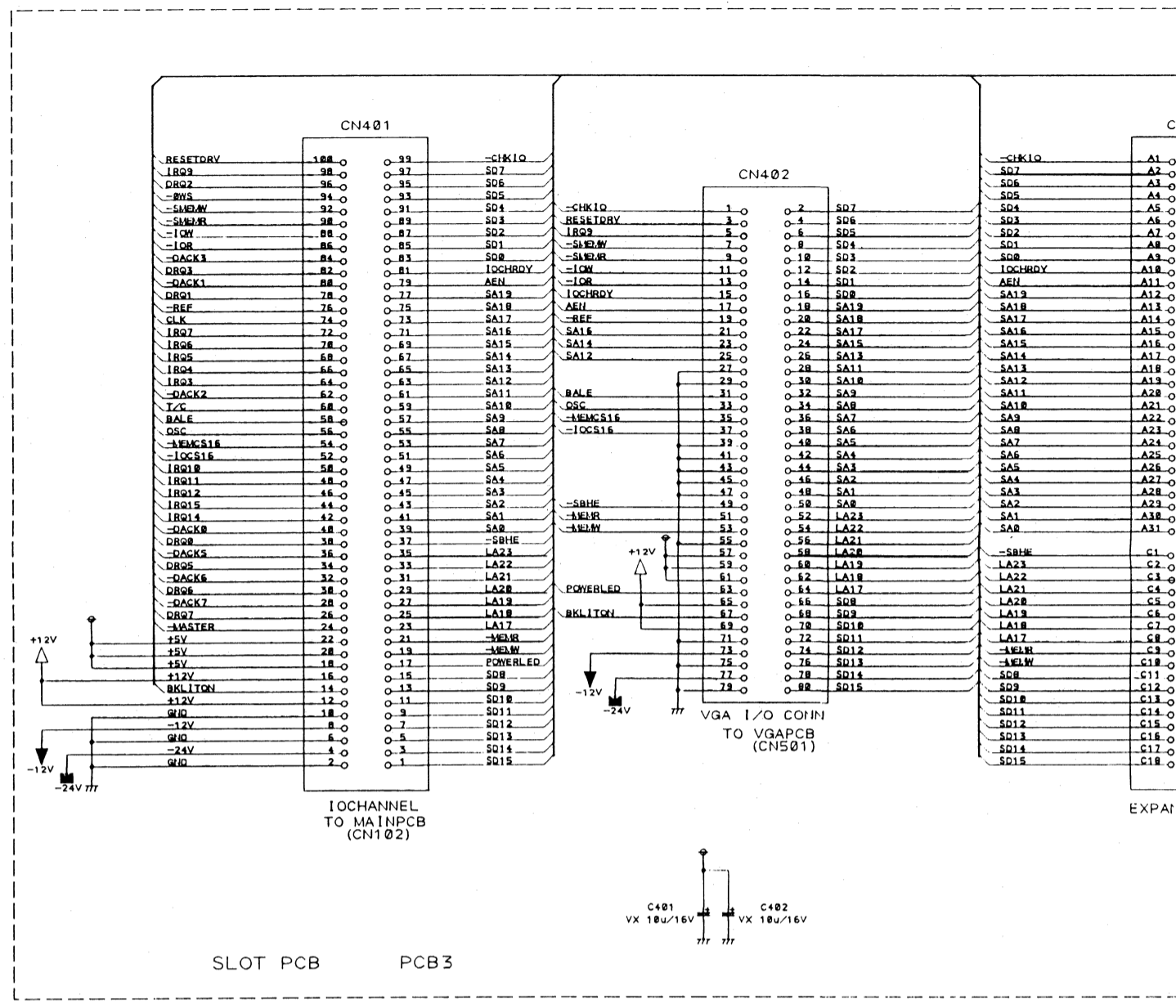
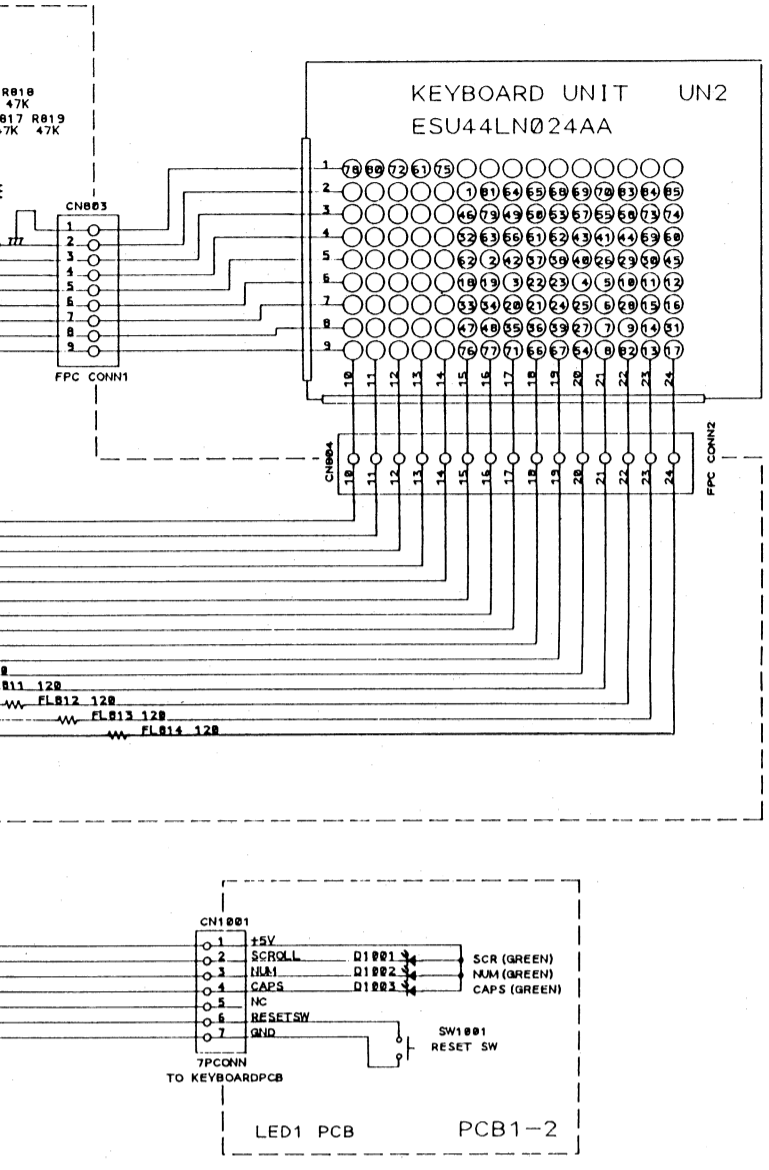
SSX VGA SCHEMATIC DIAGRAM

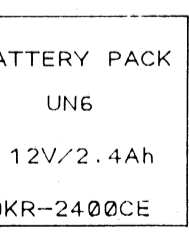
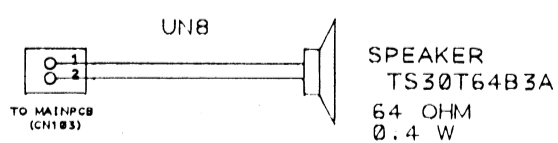
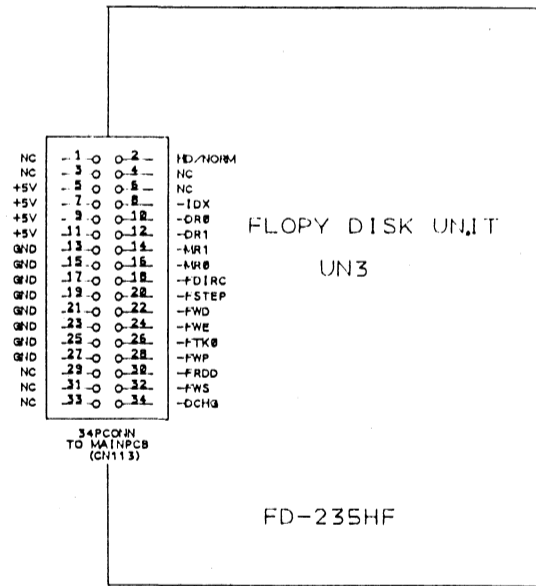
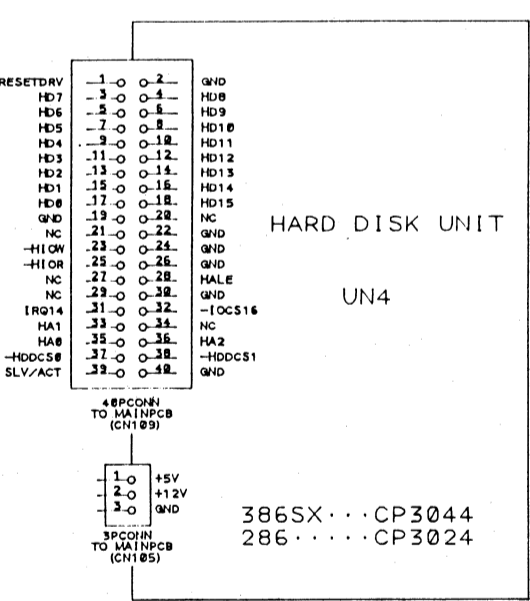
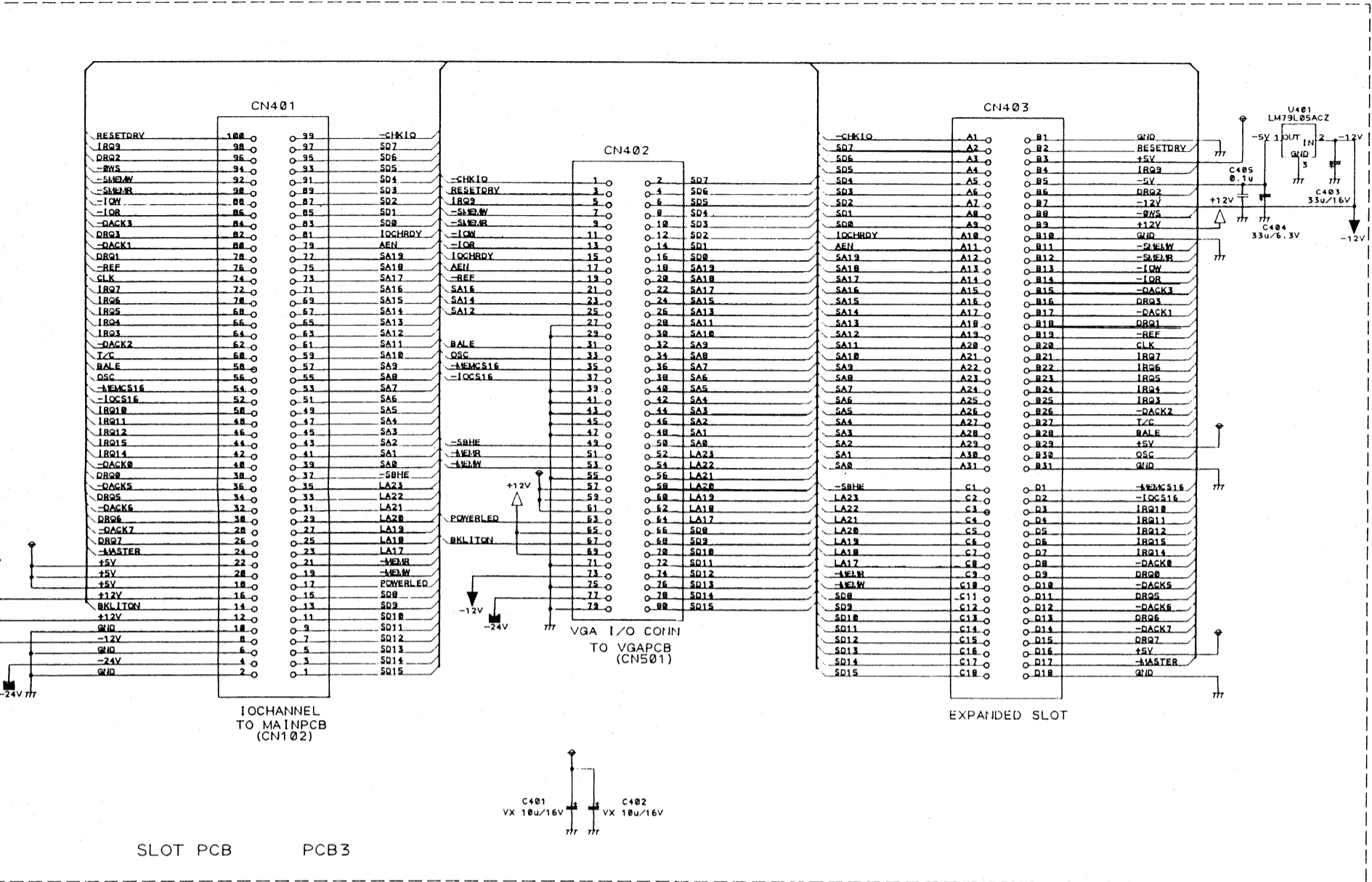


- D506 ~ FL520 ~
- R625 ~ SWS02 ~
- C507, C563 ~ TS00 ~
- U531 ~ J511 ~
- CNS07 ~ XMS05 ~
- VR502 ~ L505 ~



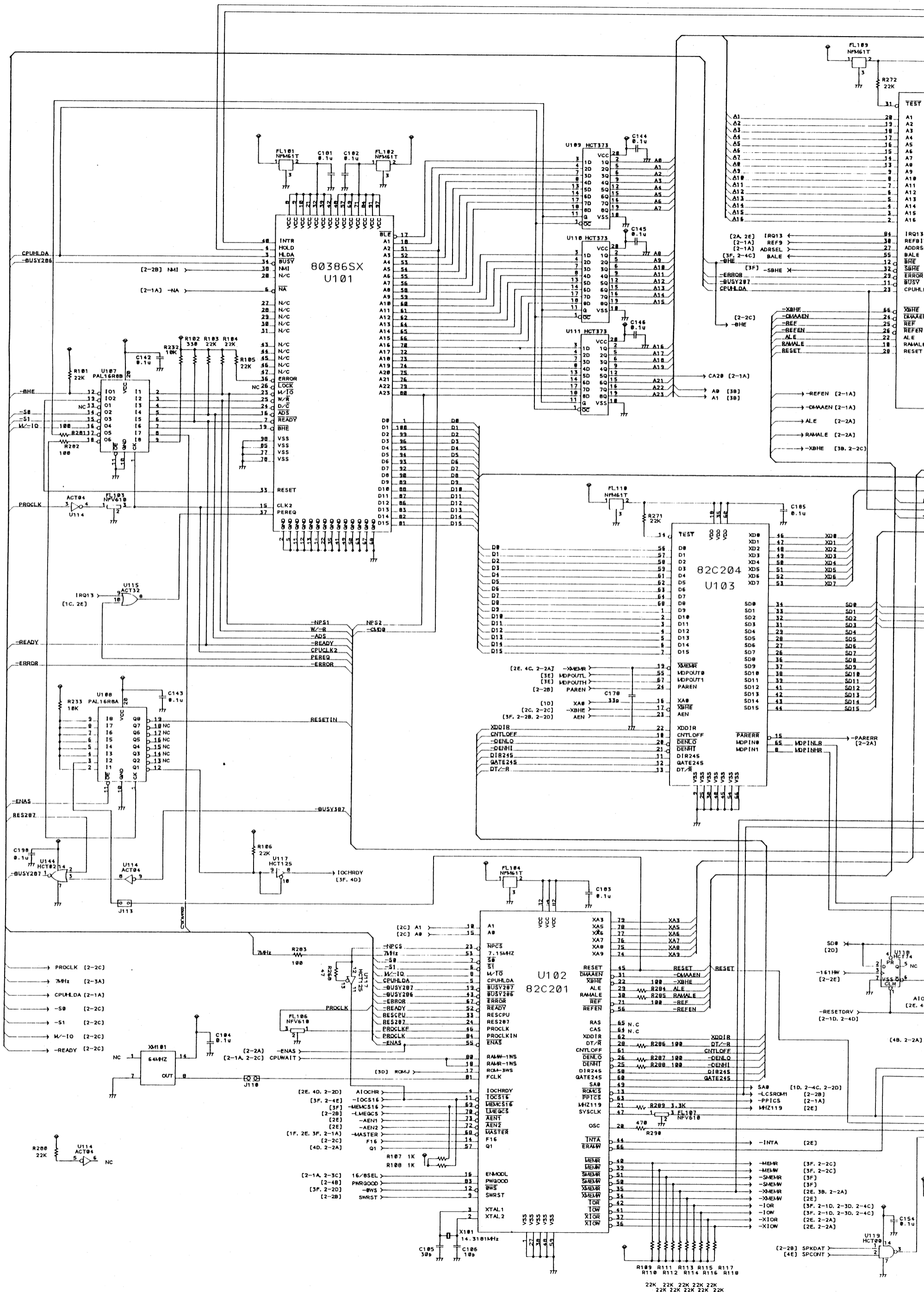
ALT286/386SX PERIPHERAL SCHEMATIC DIAGRAM



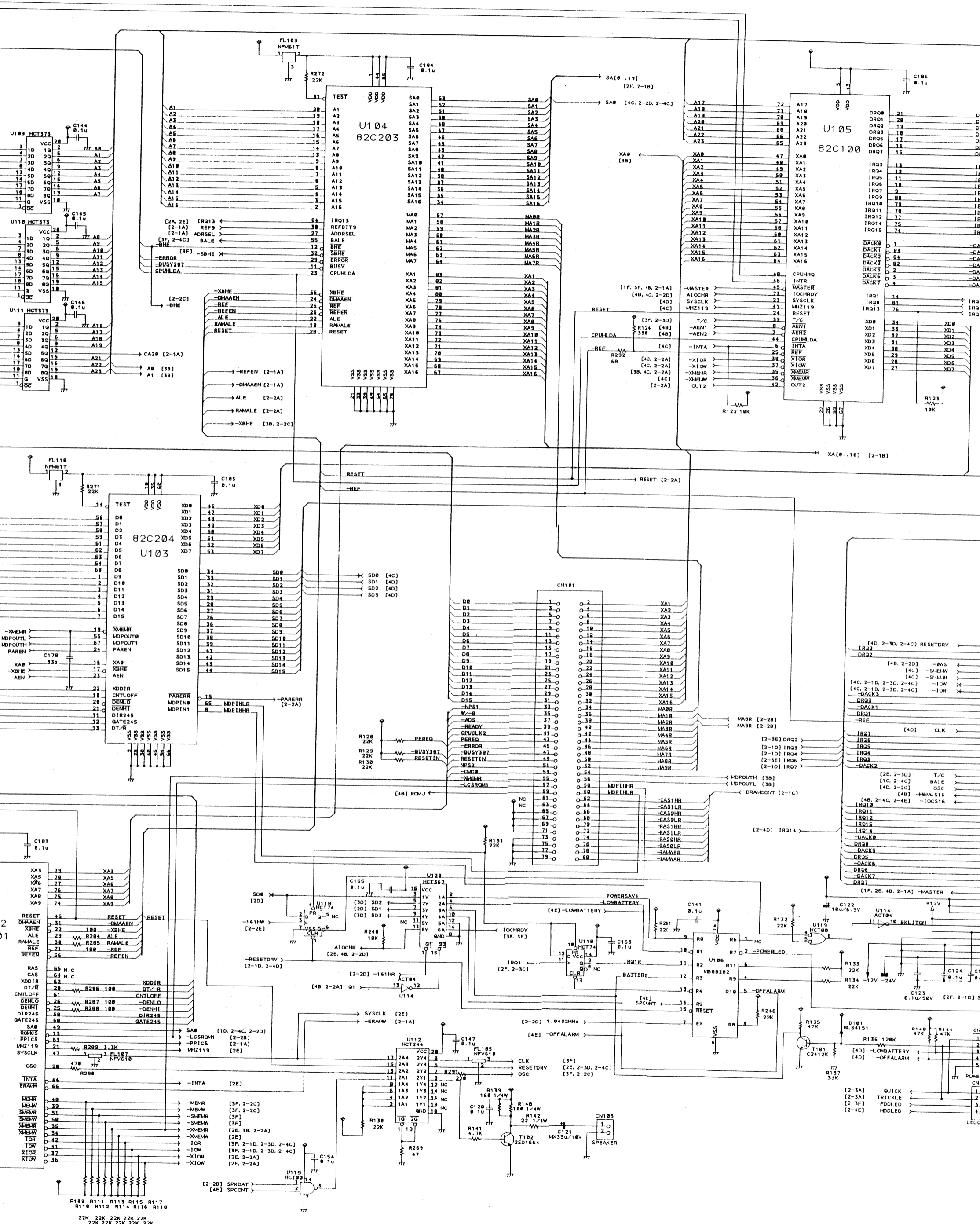


AN  
UN7

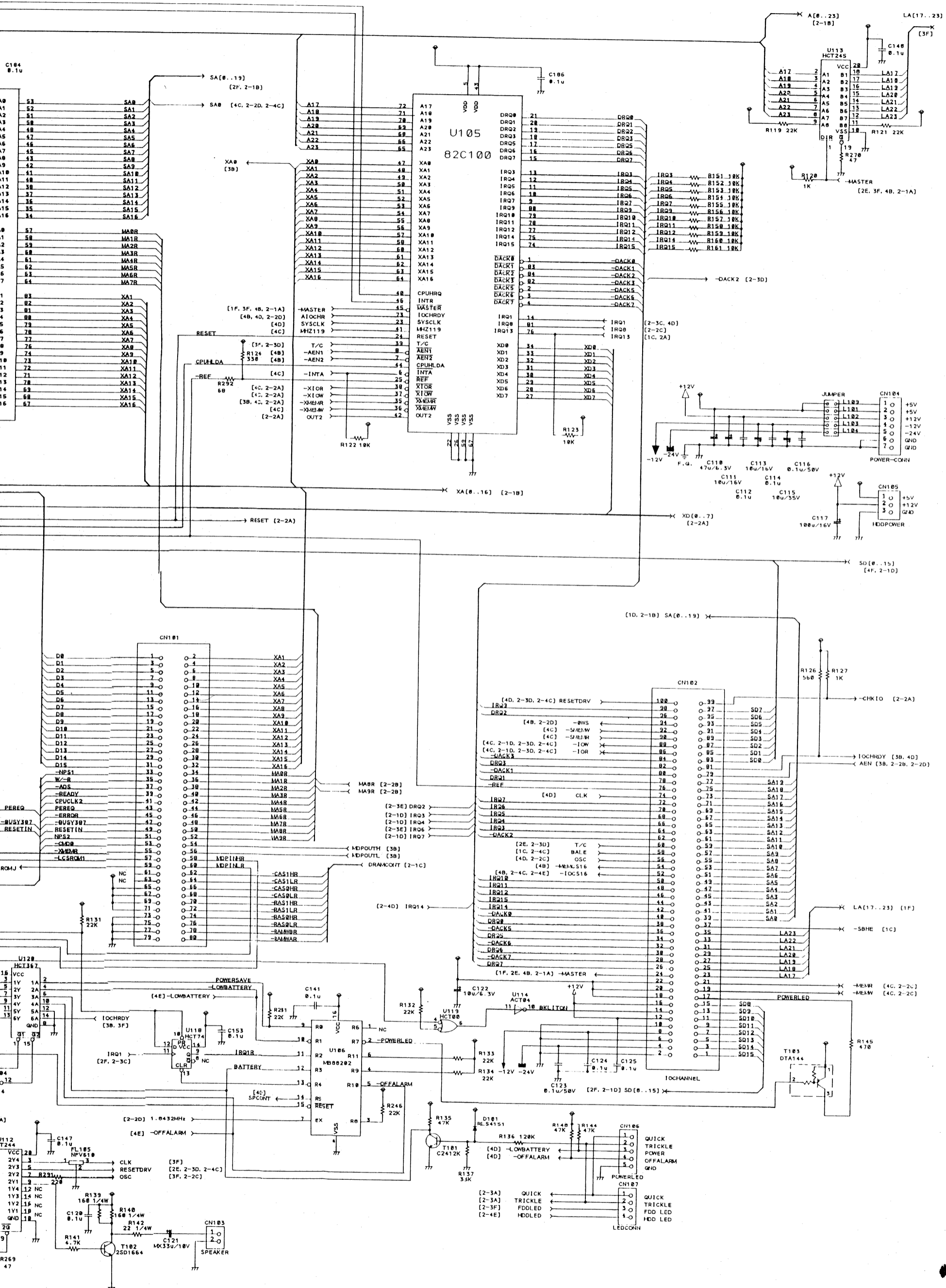




ALT386SX MAIN P.C.B. SCHEMATIC DIAGRAM (1)



SCHEMATIC DIAGRAM (1)

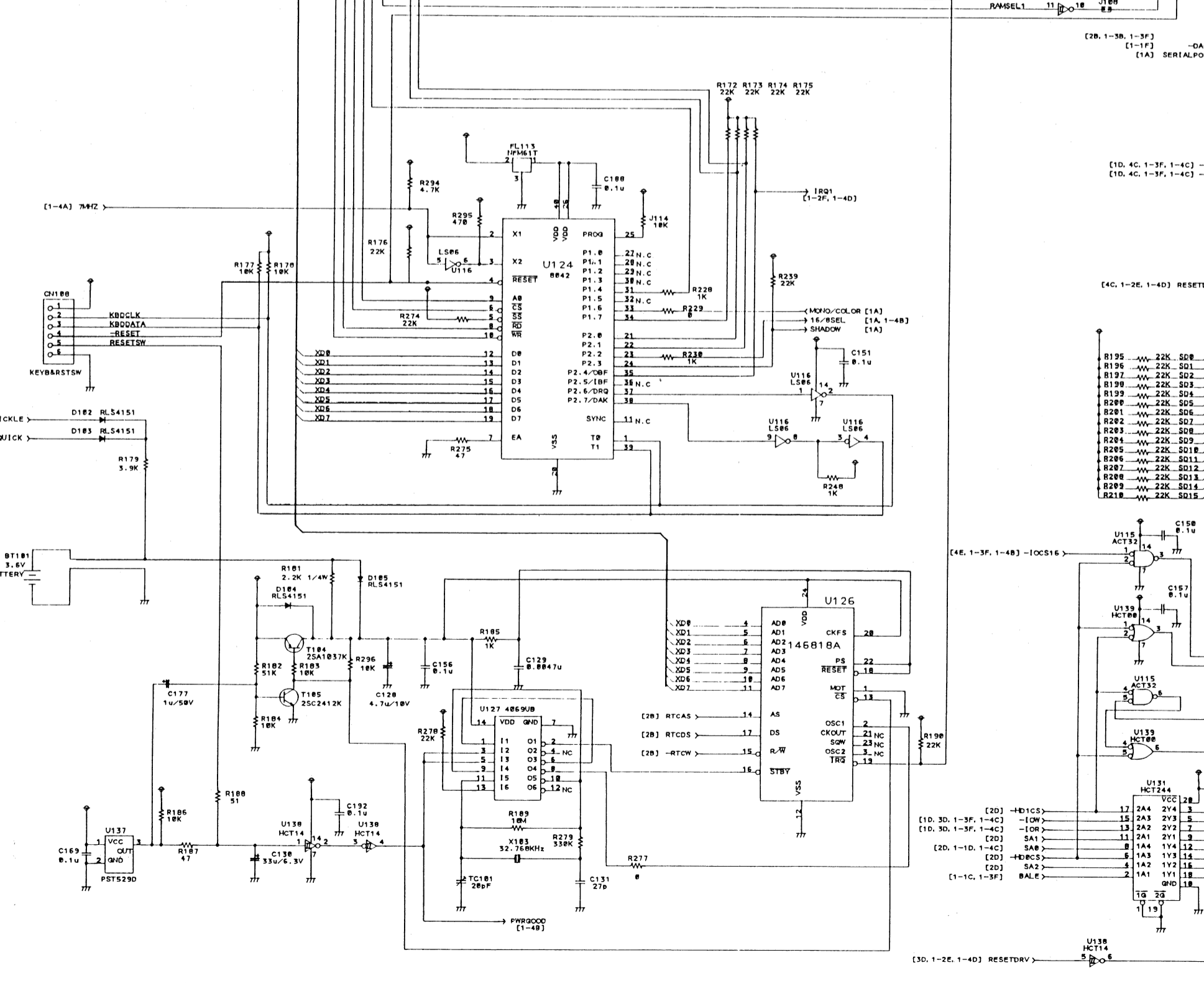
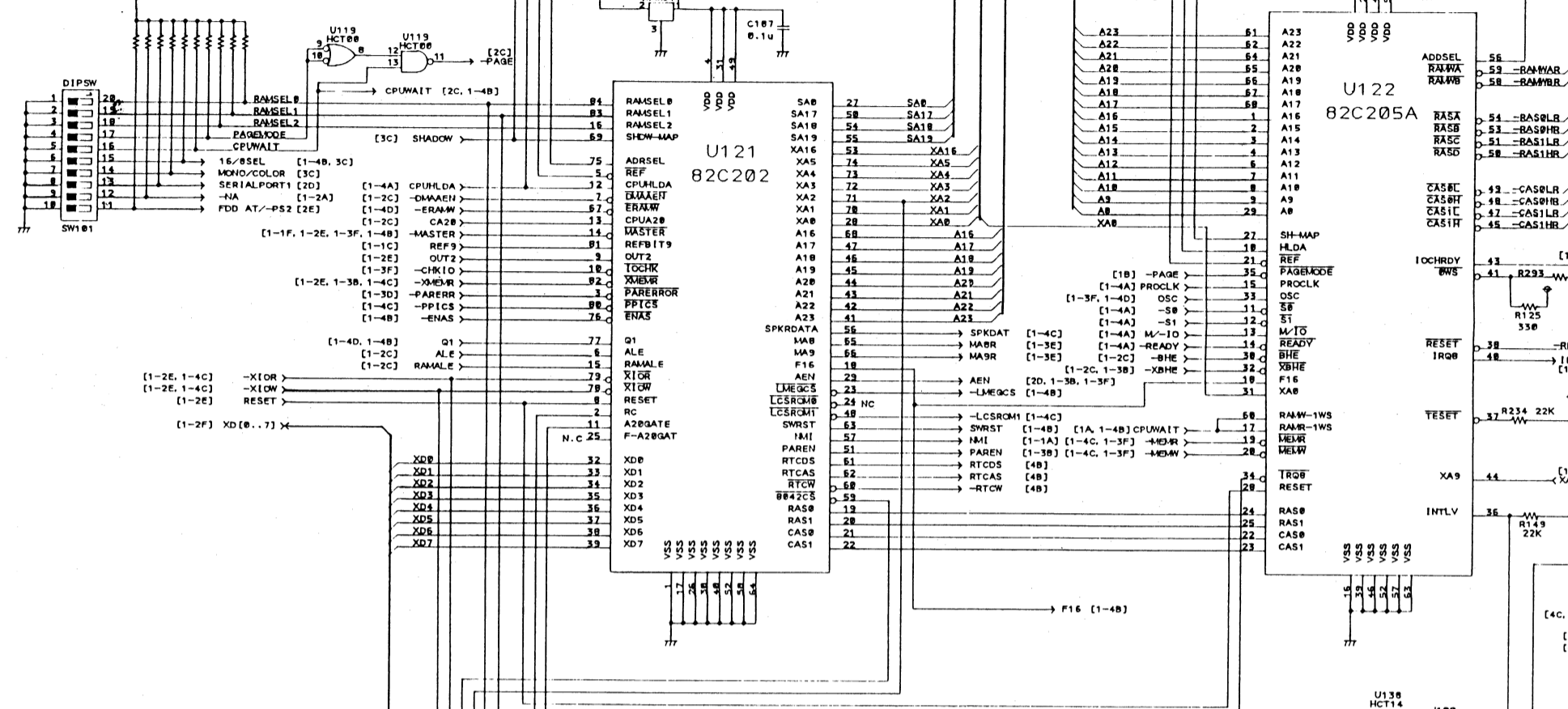


DIP SWITCH

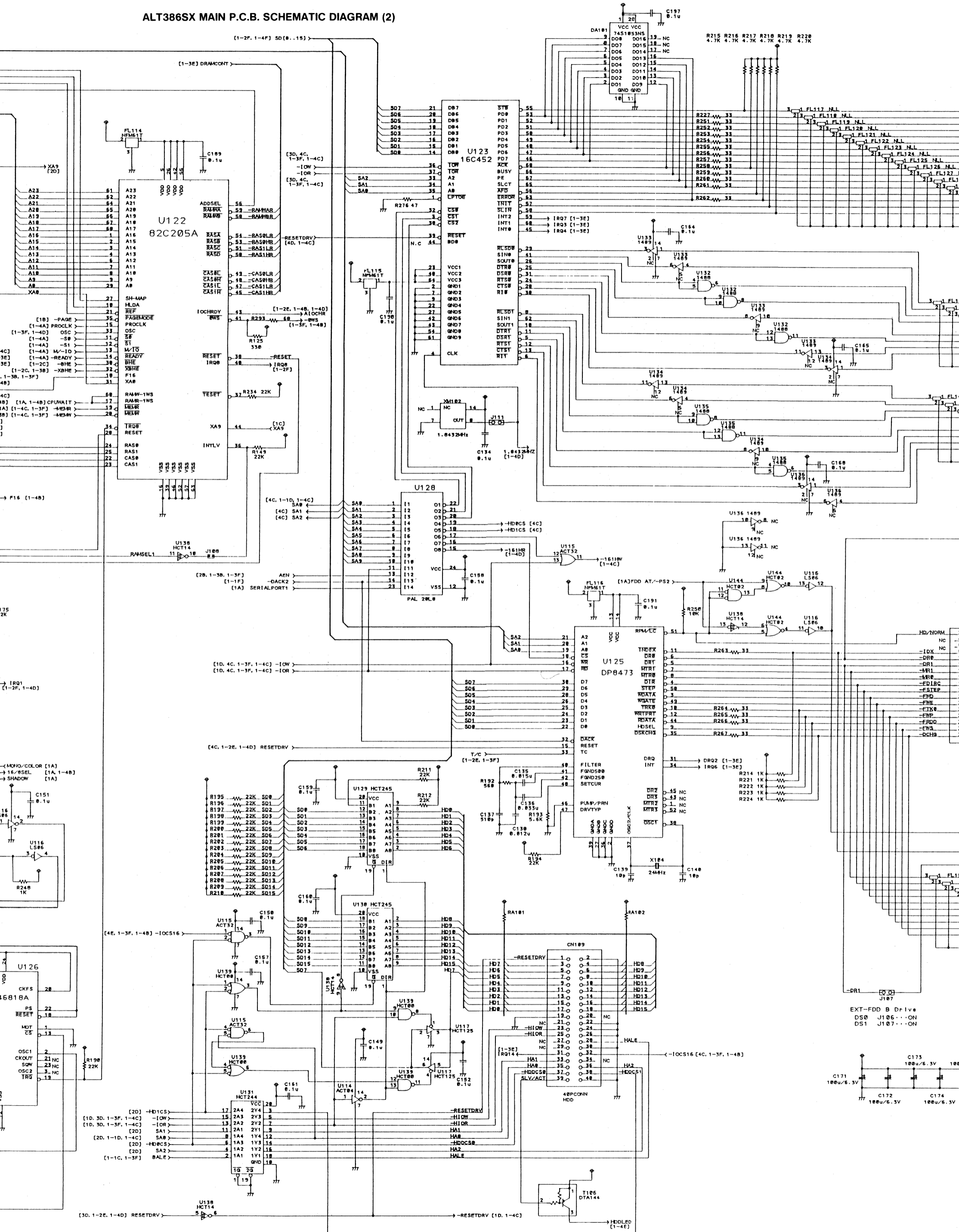
SW.	FUNCTION	SETTING
1	RAM SEL 0	ON OFF ON OFF
2	RAM SEL 1	ON OFF ON OFF
3	RAM SEL 2	ON OFF ON OFF
		512KB 1MB 2MB 4MB

SW.	FUNCTION	SETTING
4	PAGE MODE	ON OFF
5	CPU WAIT	PAGE MODE NORMAL
6	CLOCK	8MHz 16MHz
7	MONO/COLOR	COLOR MONO
8	SERIAL PORT 1	ENABLE DISABLE
9	PIPELINE/ NON-PIPELINE	PIPELINE NON-PIPELINE
10	FDD AT/PS2	AT

R162 R163 R164 R165 R166 R167 R168 R169 R170 R171  
22K 22K 22K 22K 22K 22K 22K 22K 22K 22K



ALT386SX MAIN P.C.B. SCHEMATIC DIAGRAM (2)



RAM (2)

