

sinclair

AMSTRAD



PC200
PERSONAL COMPUTER
S-14 CM/O
COLOUR MONITOR
S-12 MM/D
MONOCHROME MONITOR
SERVICE MANUAL

CONTENTS

Technical Specification	Page
Safety Tests	2
PC200 SECTION	2
Alignment Instructions	3
Mechanical Exploded View & Parts List	3
R.F. Modulator Chassis Schematic Diagram	4
Keyboard Chassis Schematic Diagram	5
Power Supply Chassis Schematic Diagram	6 & 7
Memory Gate Array & F.D.C. Chassis Schematic Diagram	8
CPU & Video Chassis Schematic Diagram	9
Expansion Control Chassis Schematic Diagram	10
Sound & Printer Interface Chassis Schematic Diagram	11
Main PCB (Top View)	12
Main PCB (Bottom View)	13
Power/LED Board/RF Encoder PCB's	14
Electrical Parts List	15
S-14 CM/O SECTION	16 & 17
Alignment Instructions	19
Cabinet Exploded View & Parts List	19
Electrical Parts List	20 & 21
Power Supply Chassis Schematic Diagram	22 & 23
Monitor Circuit Diagram	24
Monitor/CRT/LED PCB	25
S-12 MM/D SECTION	26
Monitor Cabinet Exploded View & Parts List	27
S-12 MM Chassis Schematic Diagram	28
Main PCB/CRT PCB Bottom Views	29
Wiring Diagram	30
Power Supply PCB Top & Bottom Views	30
Electrical Parts List	31
	32

TECHNICAL SPECIFICATION

- 8MHz 8086, 16-bit processor
 - 512K RAM upgradeable by standard expansion RAM card
 - Integrated display adaptor fully compatible with CGA (TV and monitor) and MDA (monitor only)
 - Built-in Modulator for use with standard TV (CGA only)
 - Parallel Centronics Printer Port with standard socket
 - Serial (communications) Port with standard socket
 - Built-in AC Mains power supply
 - Enhanced AT type keyboard with 102/101 keys
 - Single 3½" 720K Disk Drive
 - Expansion socket for additional externally fitted 5¼" 360K or 3½" 720K floppy disk
 - Speaker with volume control
 - Compatible ROM BIOS
 - Socket for 8087 maths co-processor
 - Two full size IBM compatible expansion sockets
 - Analog joystick port, compatible with most games software
- CGA display adaptor:**
- 40 column x 25 line or 80 column x 25 line text in 16 colours; 8 x 8 dot character matrix
 - Medium resolution graphics 320 x 200 in 4 colours
 - High resolution graphics 640 x 200 in 2 colours
- MDA display adaptor:**
- 80 column x 25 line high resolution text display; 9 x 14 dot characters
 - Dimensions: 450 (w) x 85 (h) x 335 (d) mm
 - Weight: 5.4Kg

MONITORS

	S-12MM	S-14CM
Screen:	12" non-glare tube, 90deg deflection	14" 90deg deflection
Input signal:	TTL level (positive, intensity controlled) Horizontal sync: TTL positive Vertical sync: TTL negative	TTL level (positive, intensity controlled) Horizontal sync: TTL positive Vertical sync: TTL negative
Character cell:	9 x 14 block with 7 x 9 character	9 x 14 block with 7 x 9 character
Video bandwidth:	18MHz (—3dB)	7MHz
Resolution:	800 lines minimum at centre	Dot pitch -63
Display format:	2000 characters (80 characters x 25 lines)	2000 characters (80 characters x 25 lines)
Scanning frequency:	18.432kHz horizontal, 50Hz vertical.	15.7kHz
Power required:	220V 50Hz	220V 50Hz
Power consumption:	30 Watts	50 Watts
Weight:	7Kg	10.35Kg
Size:	306(w) x 289(h) x 335(d)	370(w) x 355(h) x 304(d)mm

SAFETY TEST

All monitors are tested to the following specifications.

1. **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.
2. **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.
3. **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.

PC200 SECTION

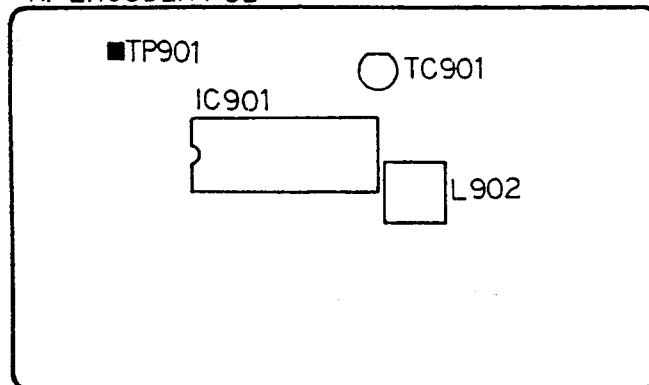
PC200 ALIGNMENT INSTRUCTIONS

Equipment required: Frequency Counter; Vector Scope; Alignment Disc for PC200.

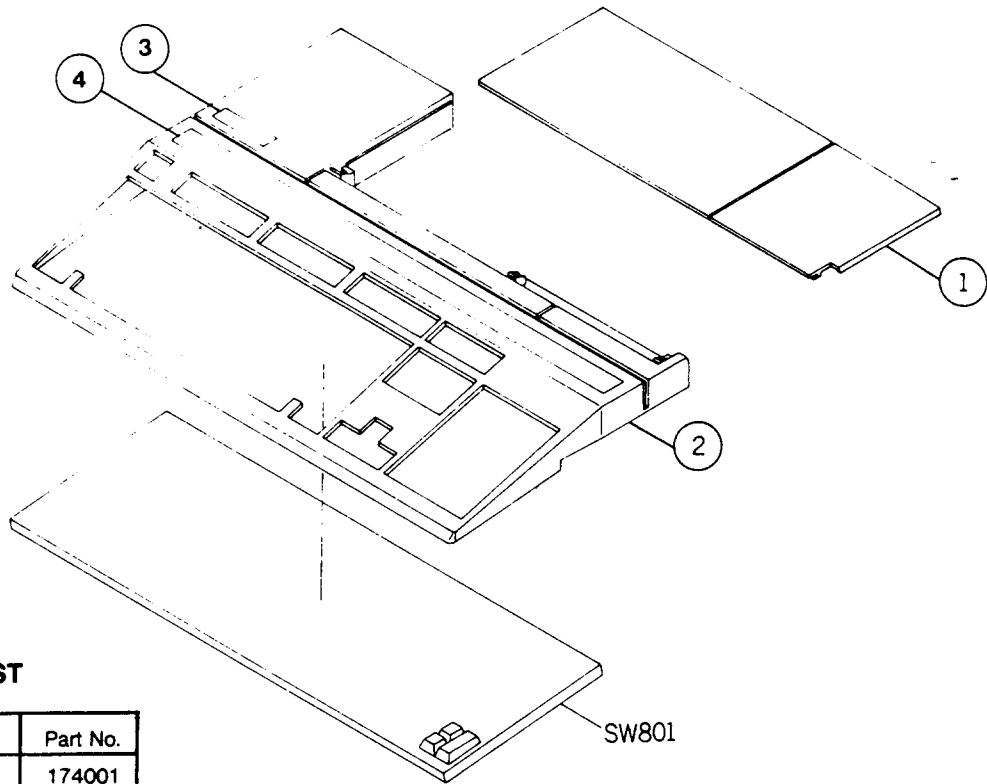
STEP	FUNCTION	SIGNAL IN	SIGNAL OUT	METHOD	REMARKS
1.	Chrome Adjustment.	Colour pattern disc in P.C.	Vector Scope.	Connect vector scope to TP901 & ground. Adjust TC901 until no waveform movement on the vectorscope screen. Frequency to FE monitored is 4.43361875MHz.	
2.	Colour Burst Signal Adjustment	Colour pattern disc in P.C.	Vector Scope.	Connect vector scope to TP901 and ground. Adjust the burst signal to max. and phase to be differential phase adjusted with L902.	
3.	Frequency Adjustment.	Colour pattern disc in P.C.	Standard T.V.	Connect PC to a standard T.V. using an R.F. cable.	Adjust coil in the R.F. modulator to see the text clearly on the screen.

MAJOR COMPONENTS LOCATION GUIDE

RF ENCODER PCB

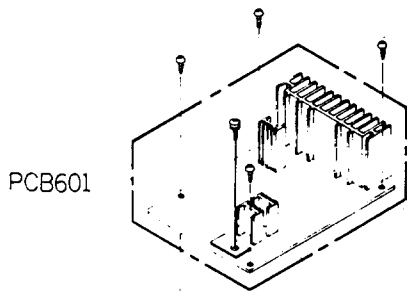
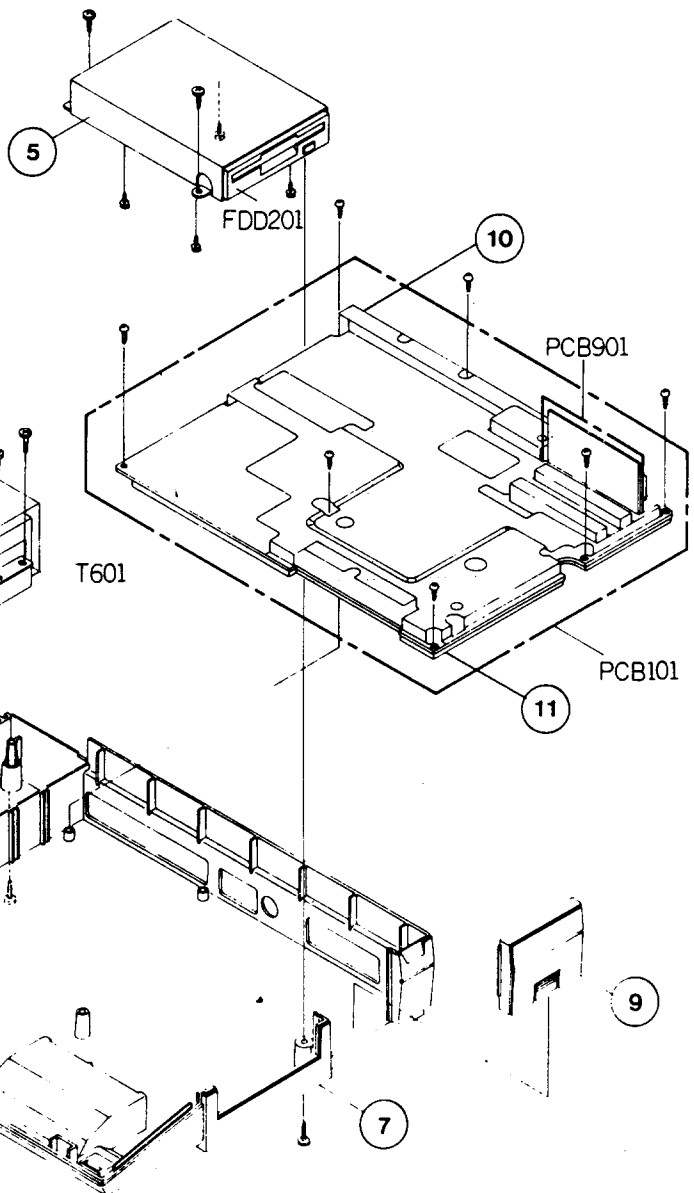


PC200 MECHANICAL EXPLODED VIEW

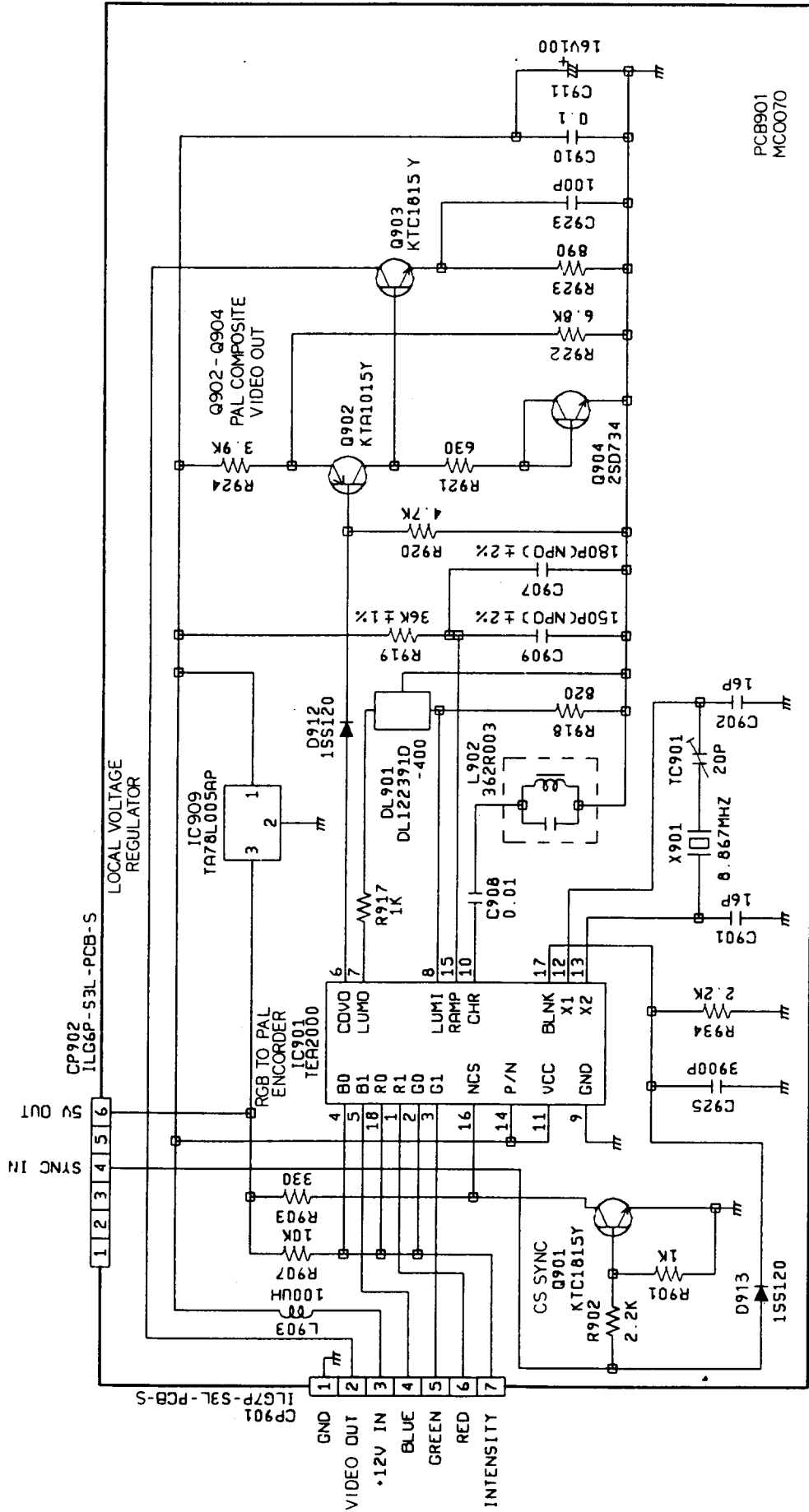


PC200 CABINET PARTS LIST

Ref.	Description	Part No.
1	Lid PCB	174001
2	Cabinet Top	174002
3	Inlay LED	174016
4	Inlay Brand	174020
5	Frame FDD	171366
6	Button Push	174003
7	Cabinet Bottom	174004
8	Sheet Rating	017400
9	Lid Jack	174005
10	Screen Top	174105
11	Screen Bottom	174106



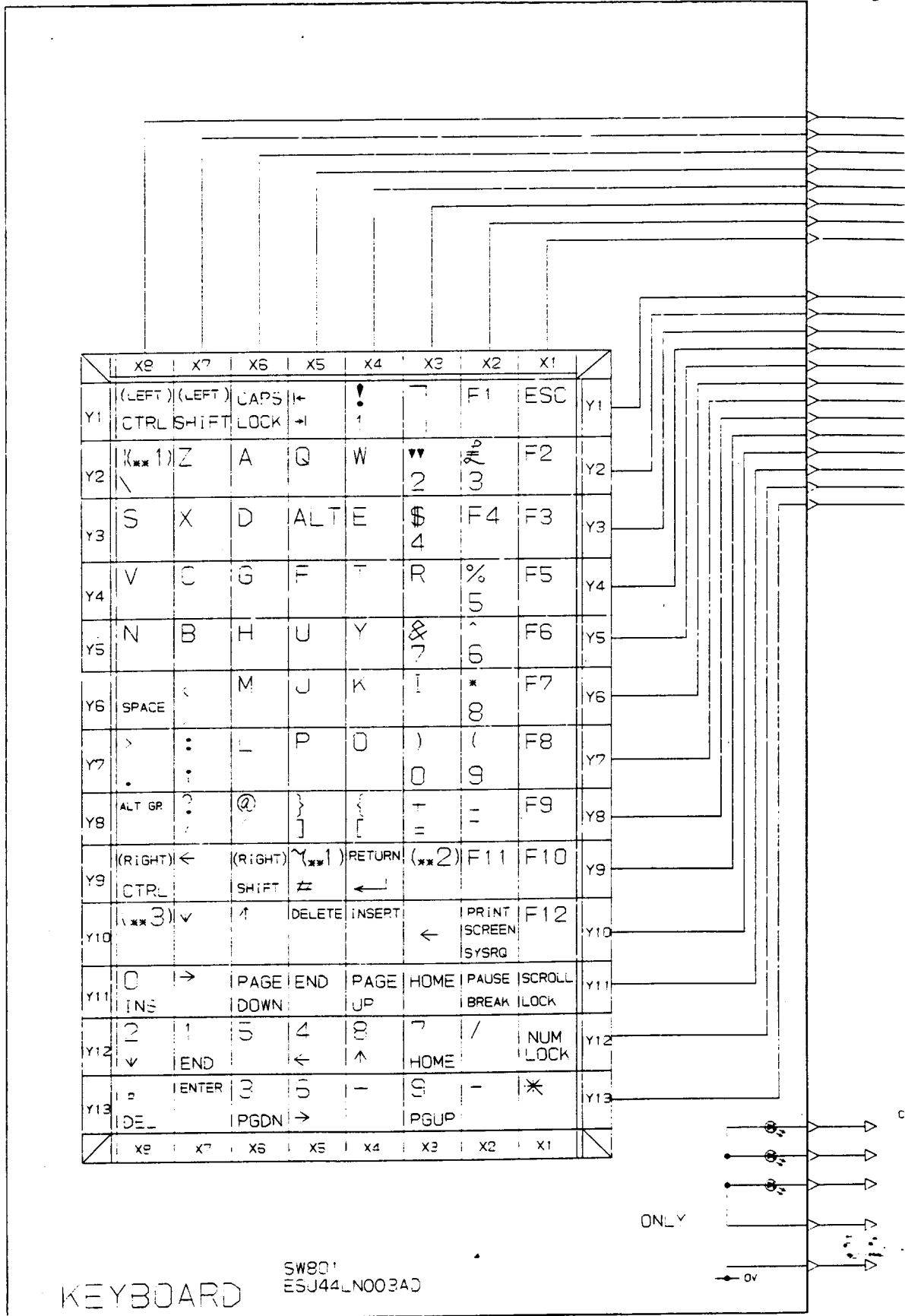
R.F. MODULATOR CHASSIS SCHEMATIC DIAGRAM



CAUTION: SINCE THESE PARTS MARKED BY ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

ATTENTION: LES PIÈCES REPAREES PAR UN ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DECRIRES DANS LA NOMENCLATURE DES PIÈCES.

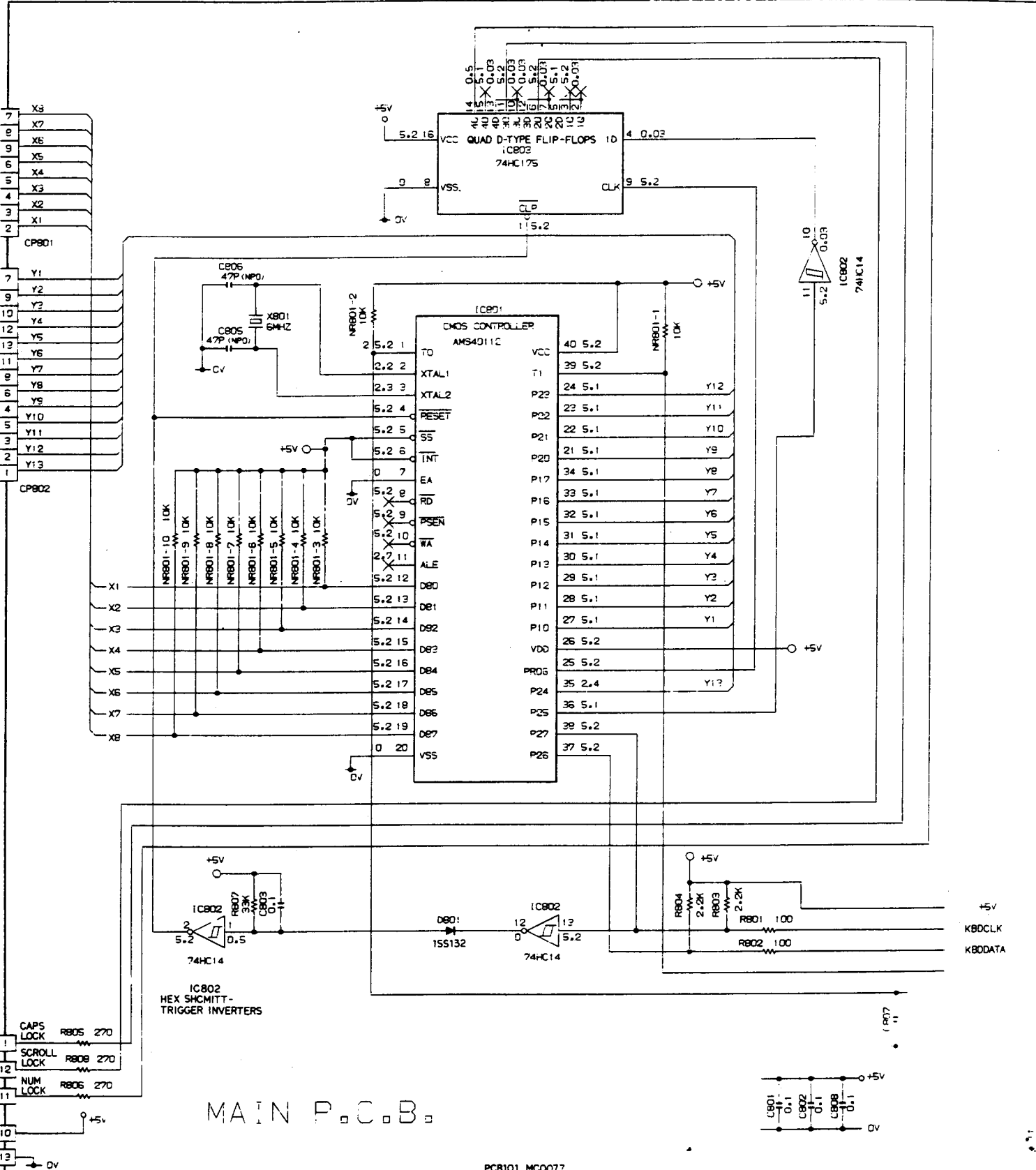
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.



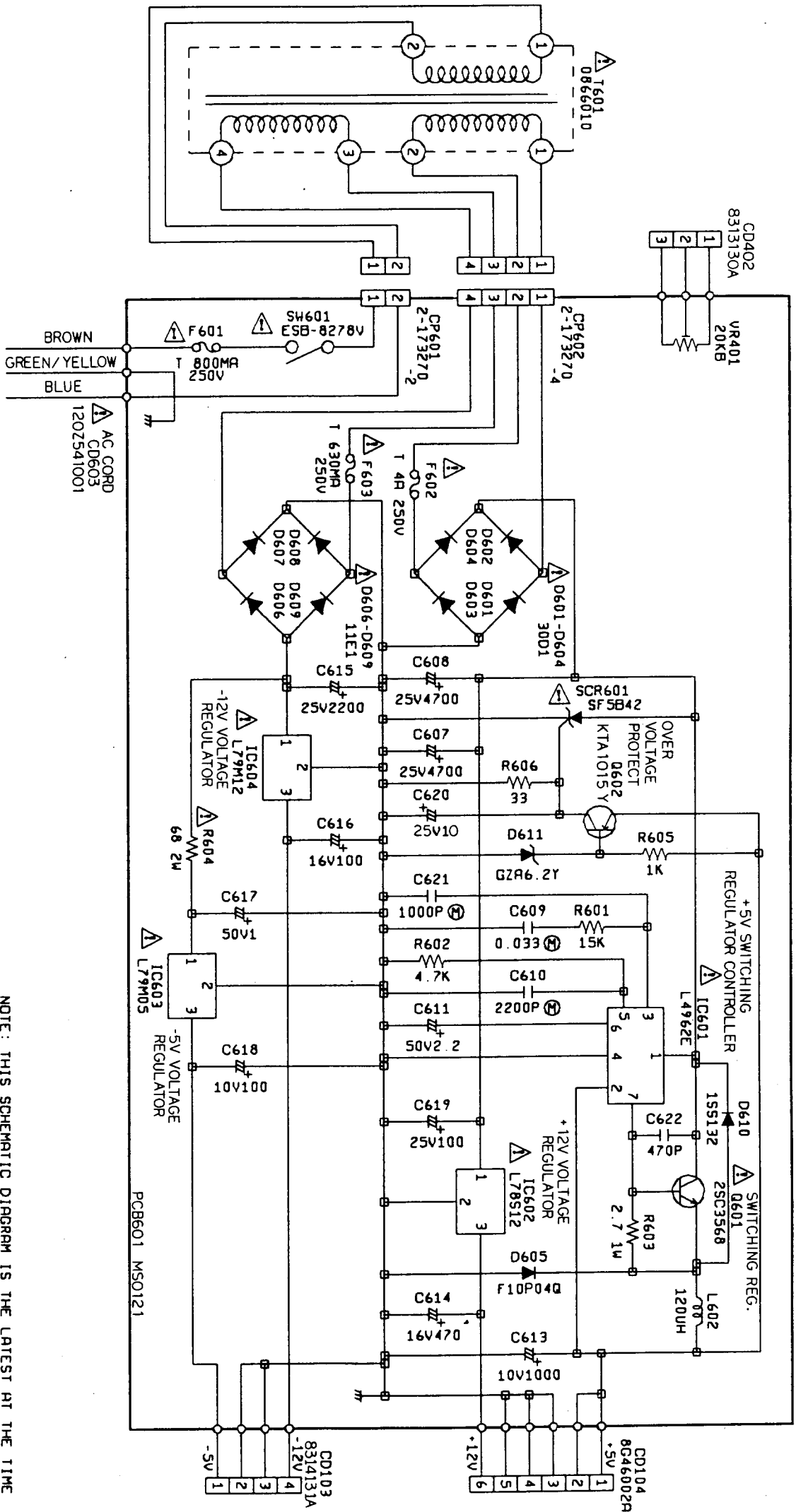
KEYBOARD

SW801
ESJ44LN003AD

KEYBOARD CHASSIS SCHEMATIC DIAGRAM



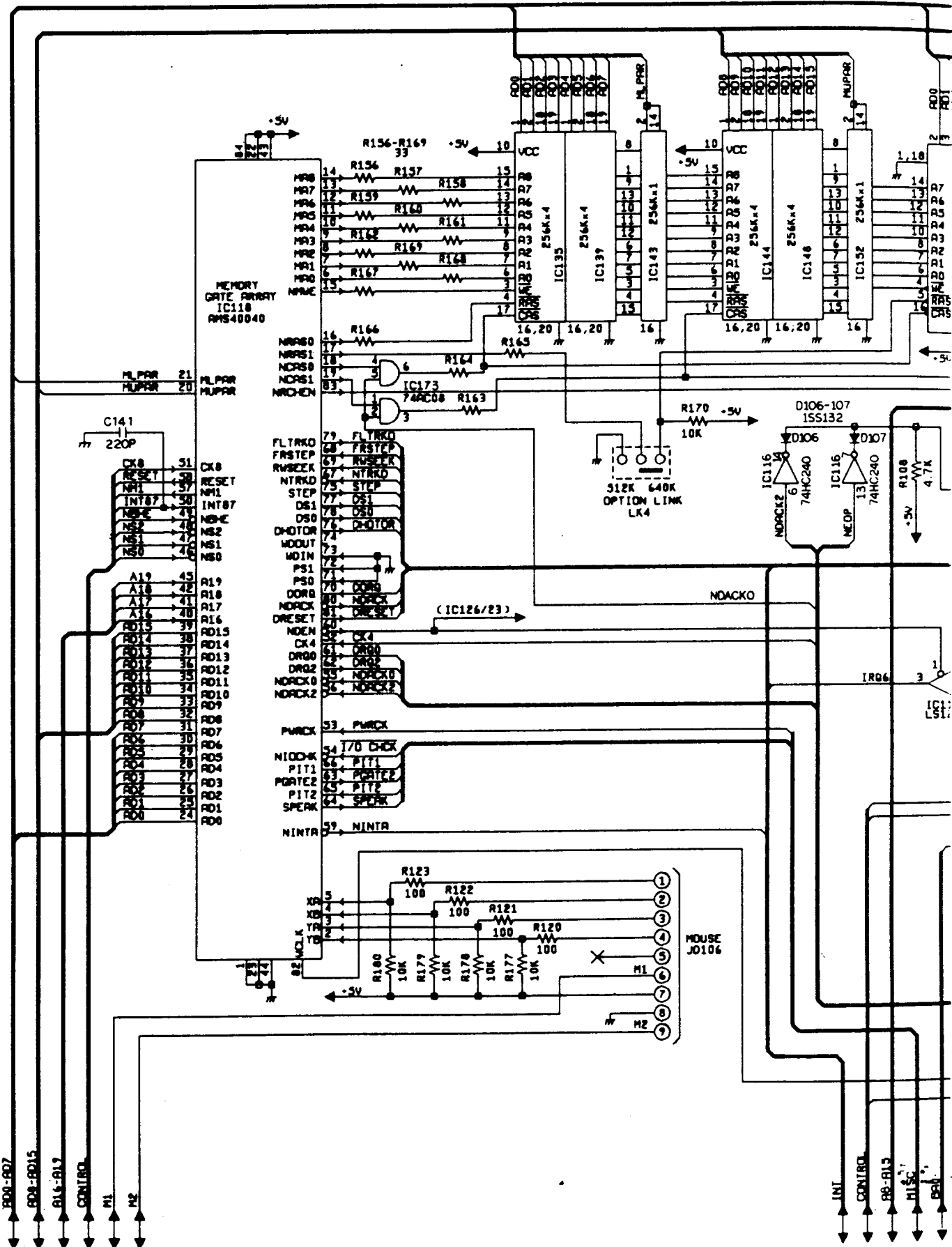
POWER SUPPLY CHASSIS SCHEMATIC DIAGRAM



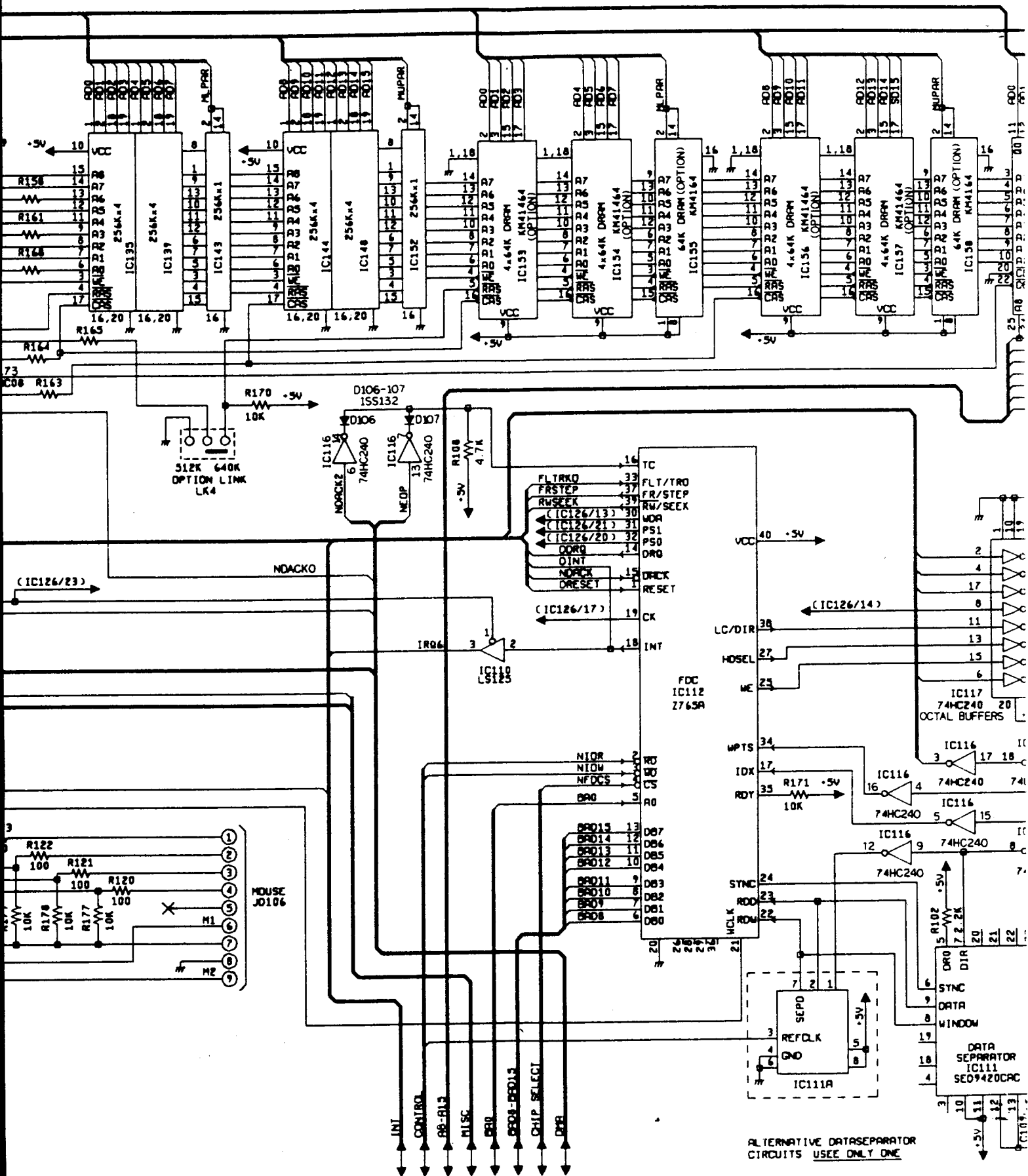
CAUTION: SINCE THESE PARTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

ATTENTION: LES PIECES REPAREES PAR UN Δ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DECRIITES DANS LA NOMENCLATURE DES PIECES.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

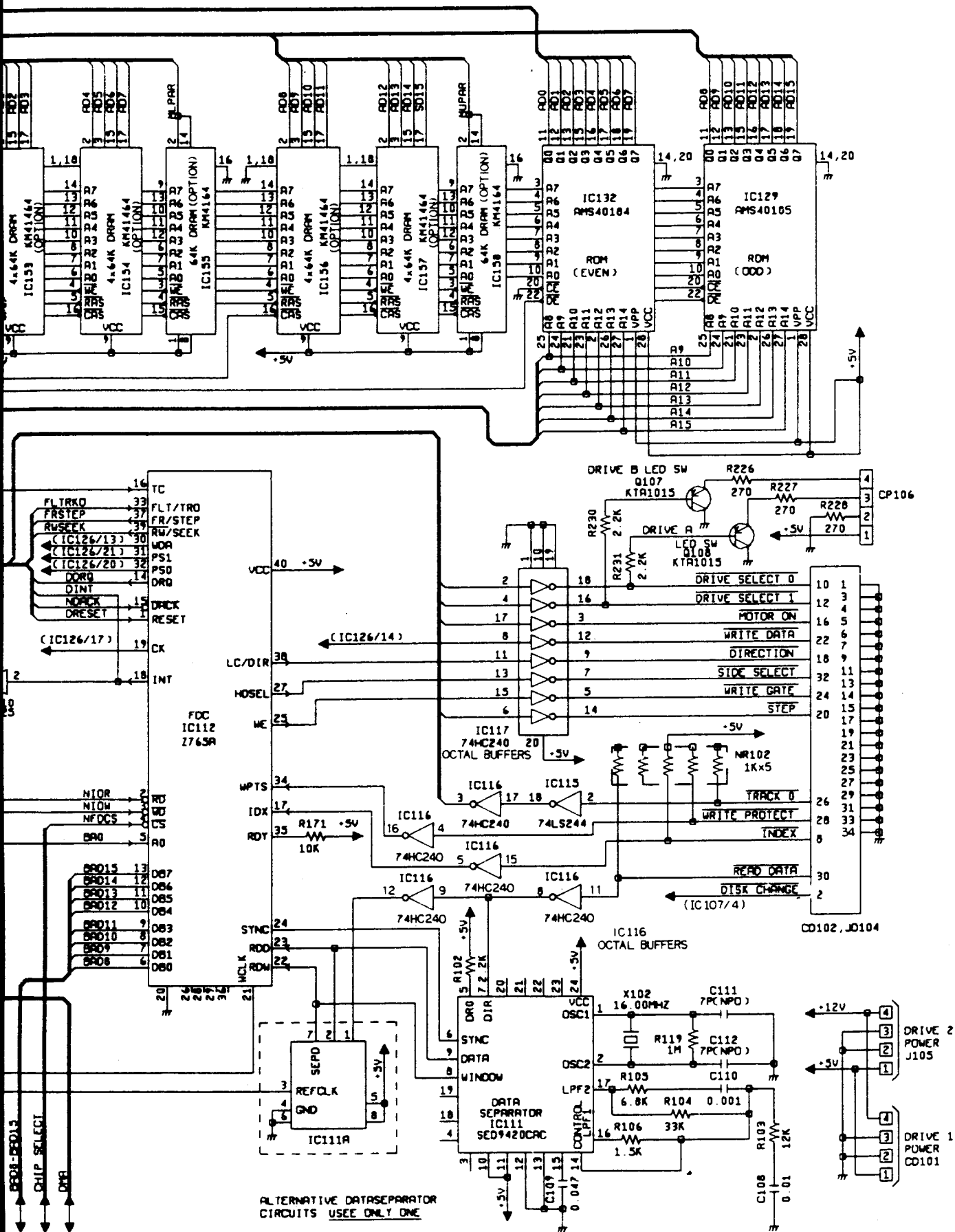


MEMORY GATE ARRAY & F.D.C. CHASSIS SCHEMATIC DIAGRAM



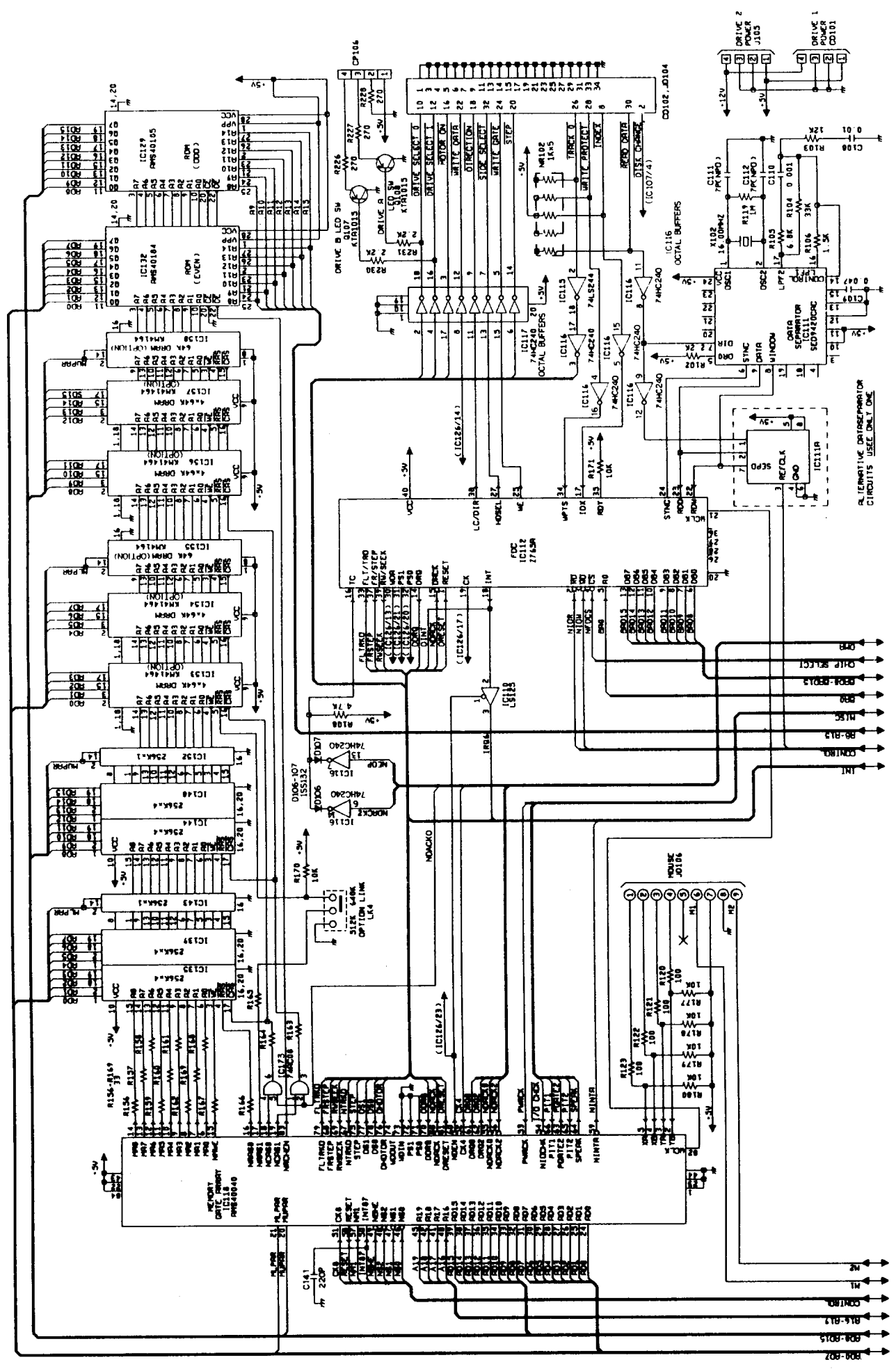
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

C. CHASSIS SCHEMATIC DIAGRAM



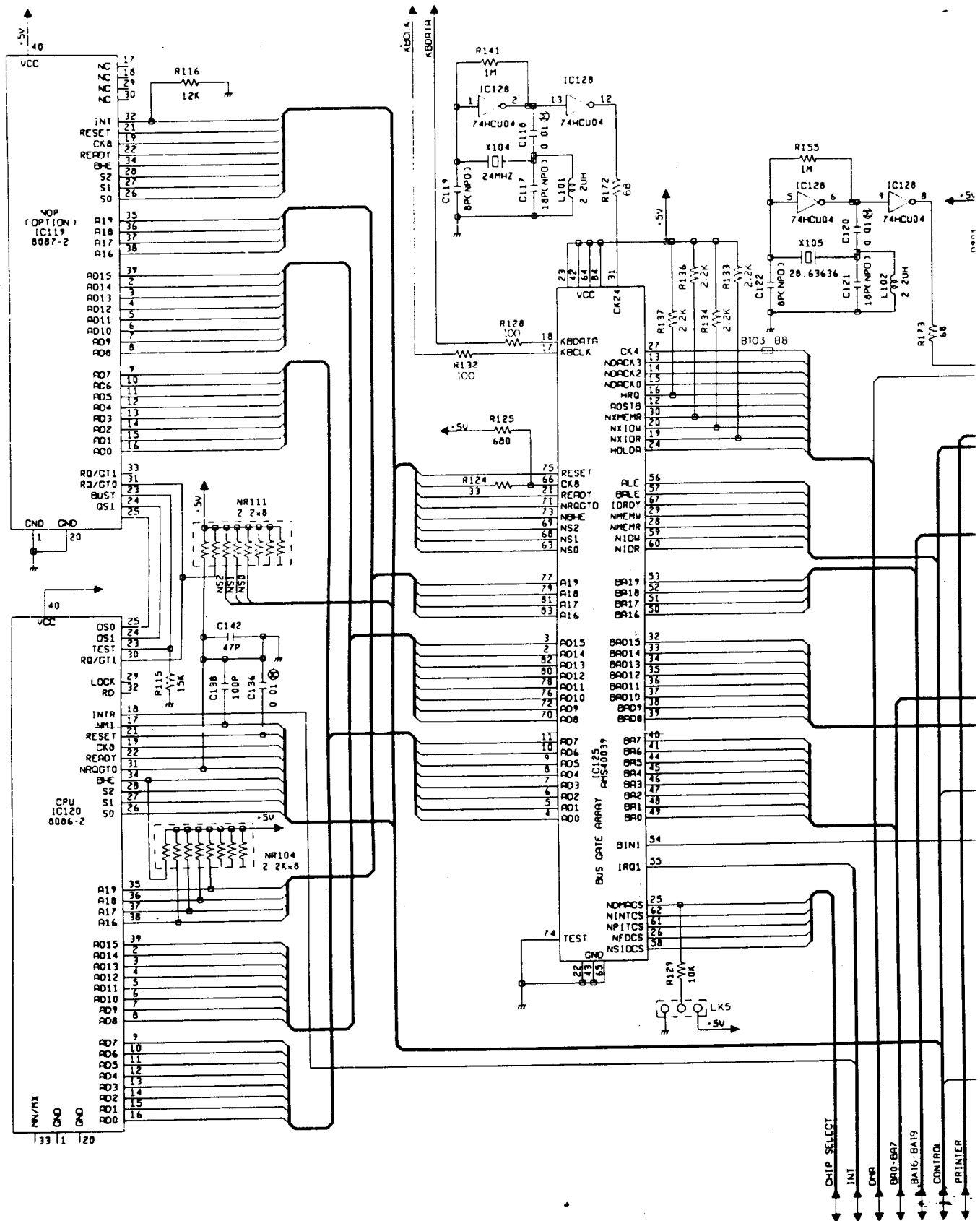
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

MEMORY GATE ARRAY & F.D.C. CHASSIS SCHEMATIC DIAGRAM

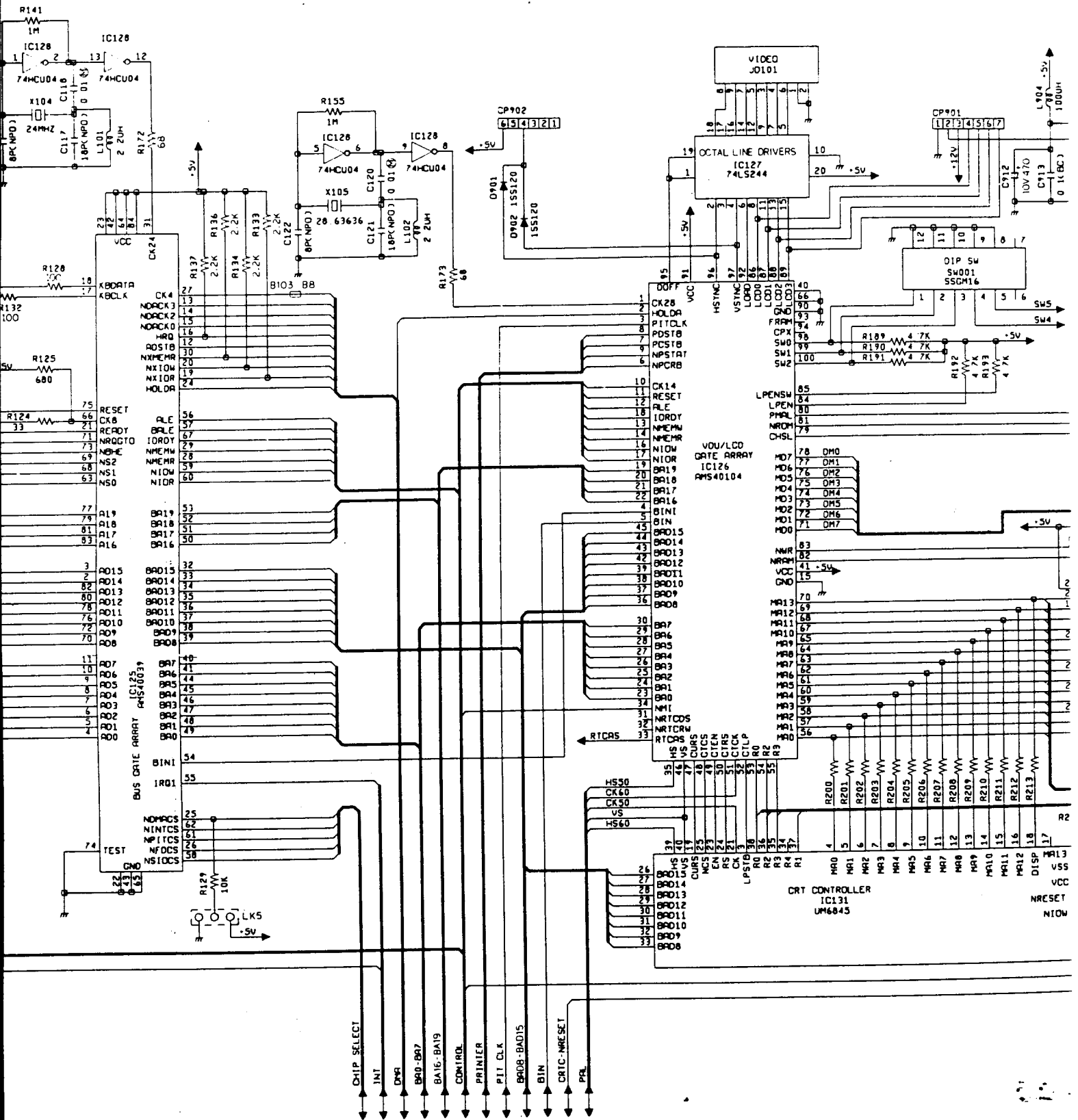


NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE

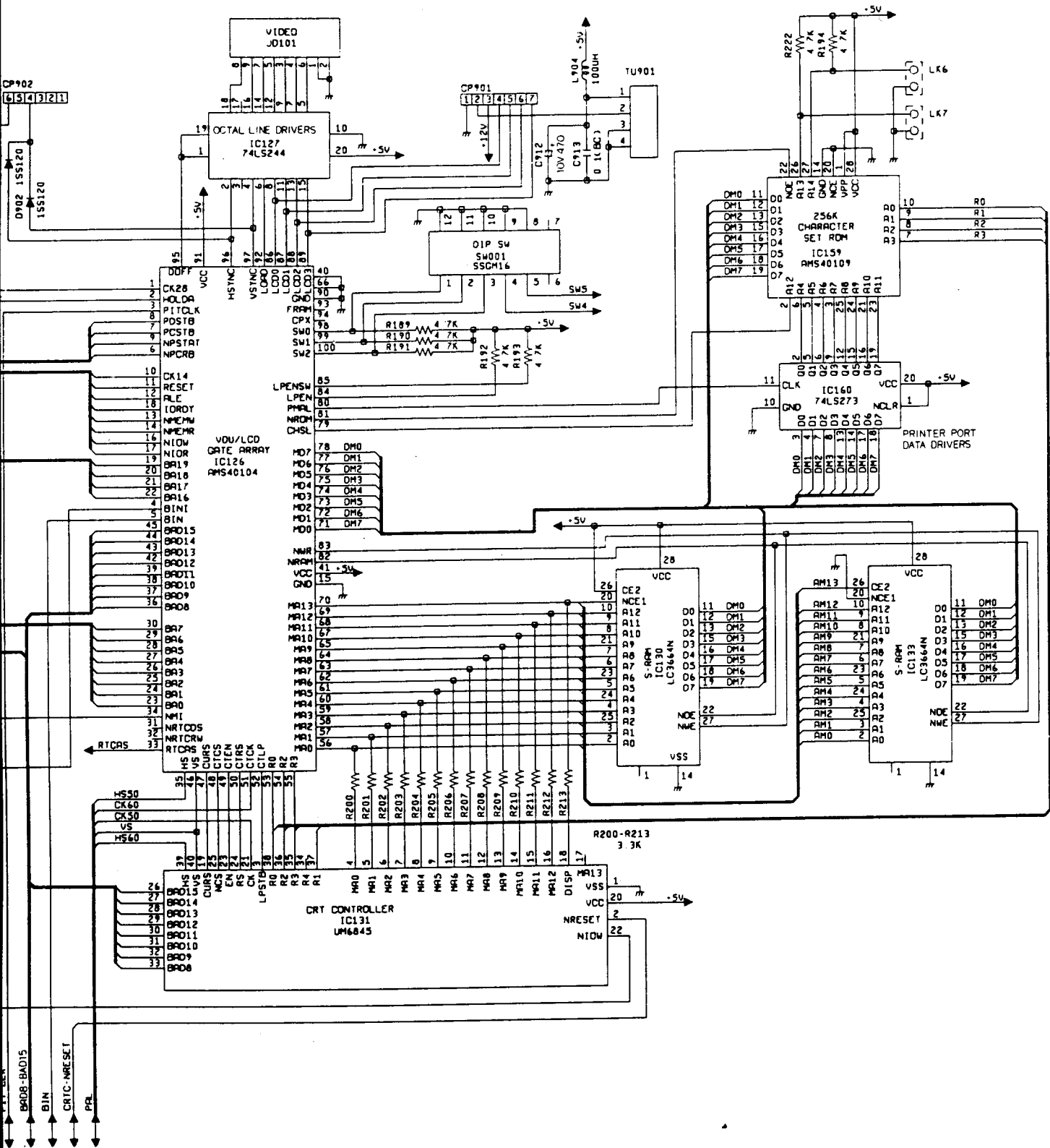
ALTERNATIVE DATABASE PARTNER CIRCUITS USE ONLY ONE



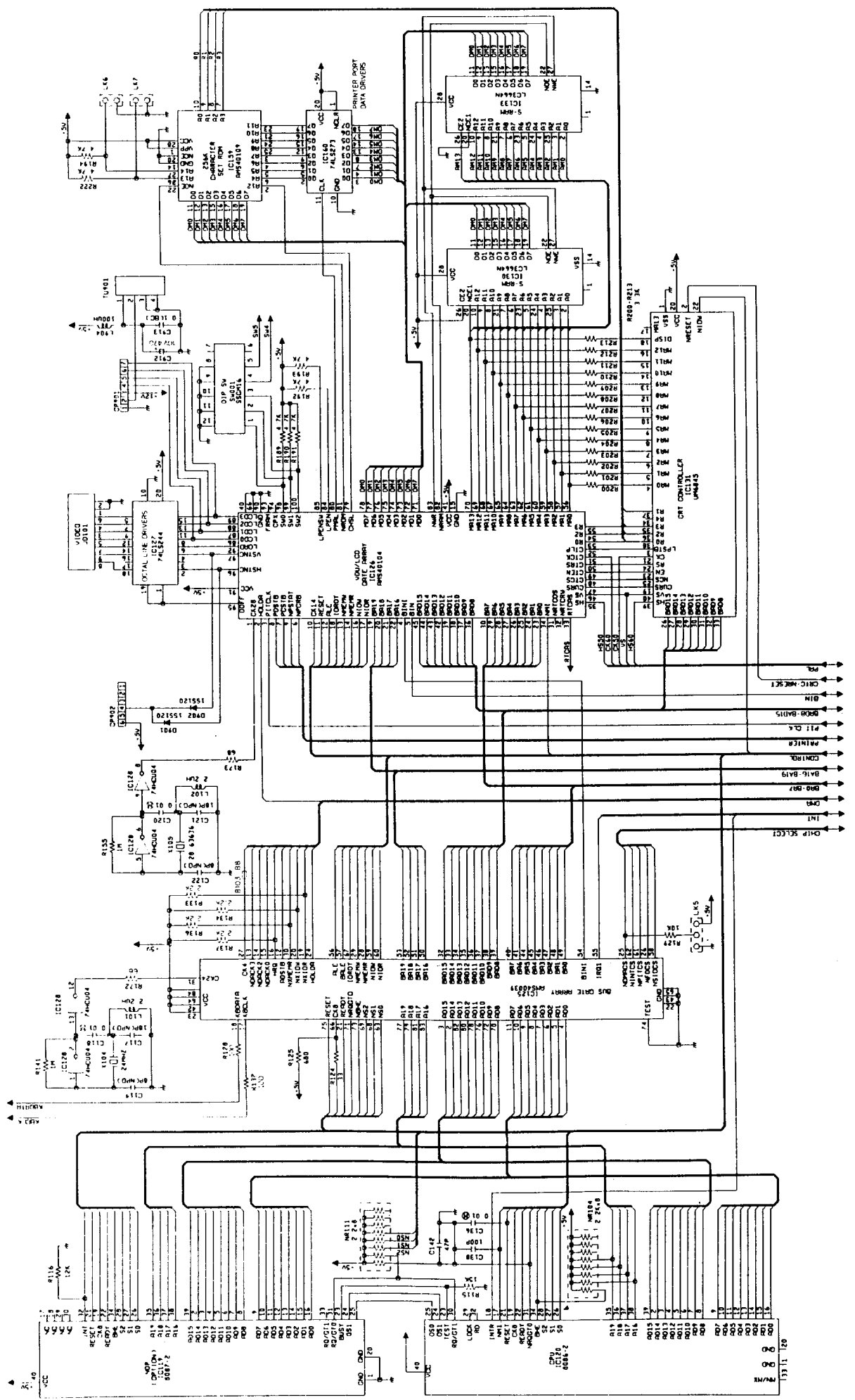
CPU & VIDEO CHASSIS SCHEMATIC DIAGRAM

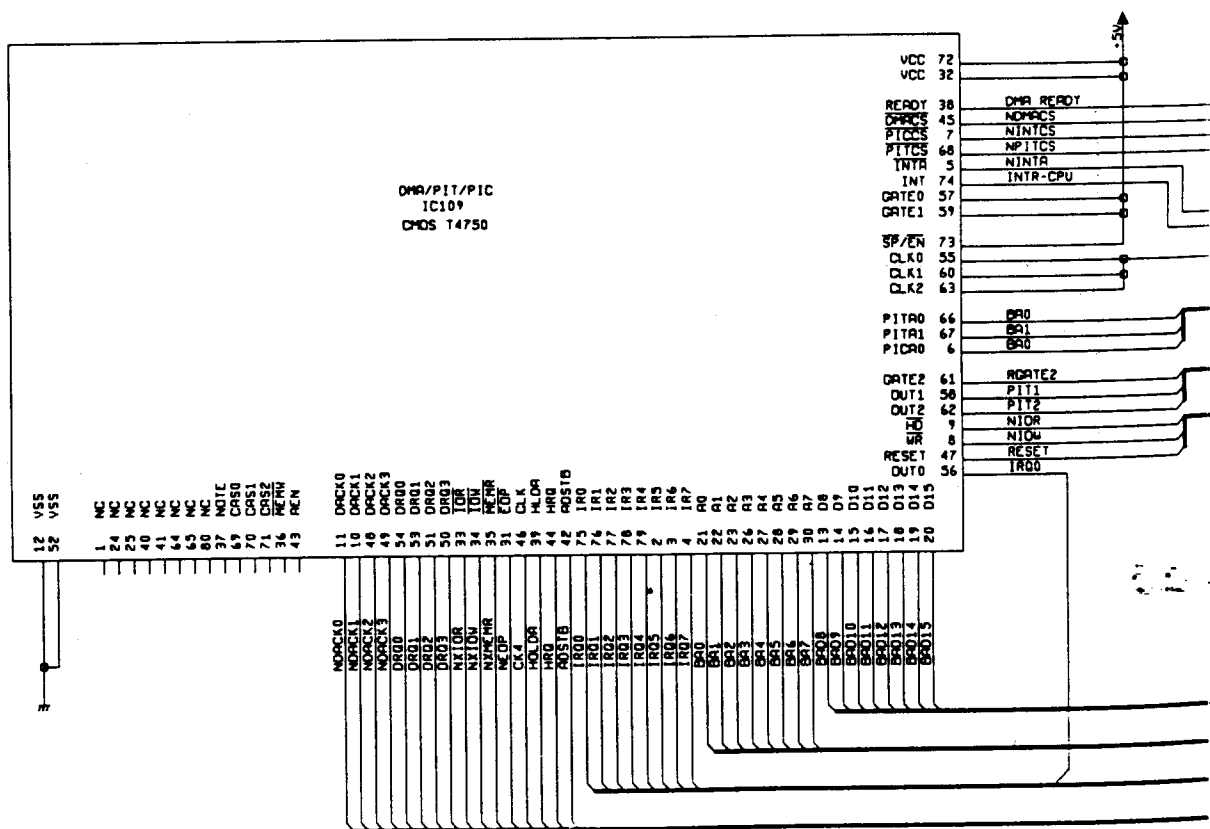
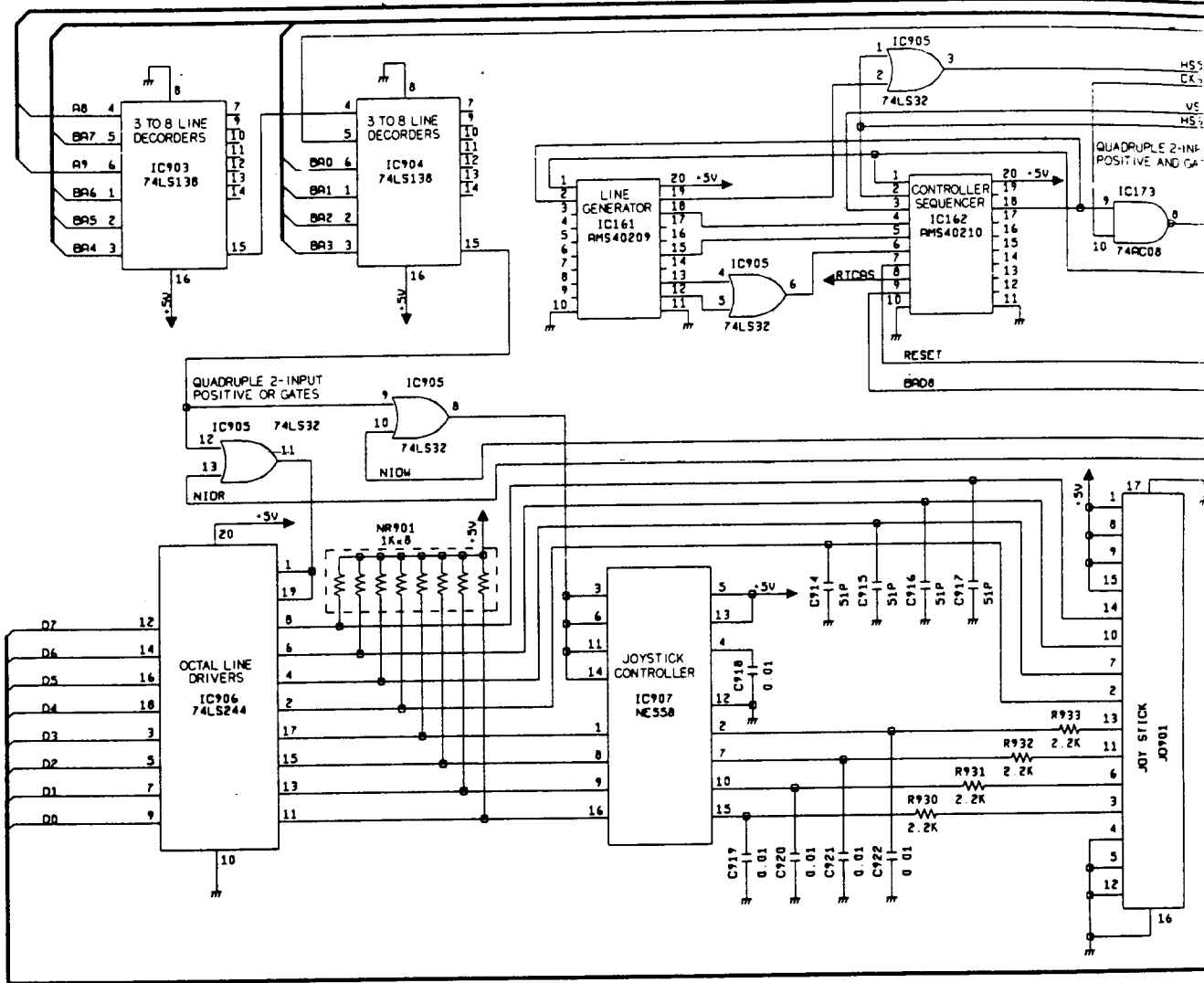


SIS SCHEMATIC DIAGRAM

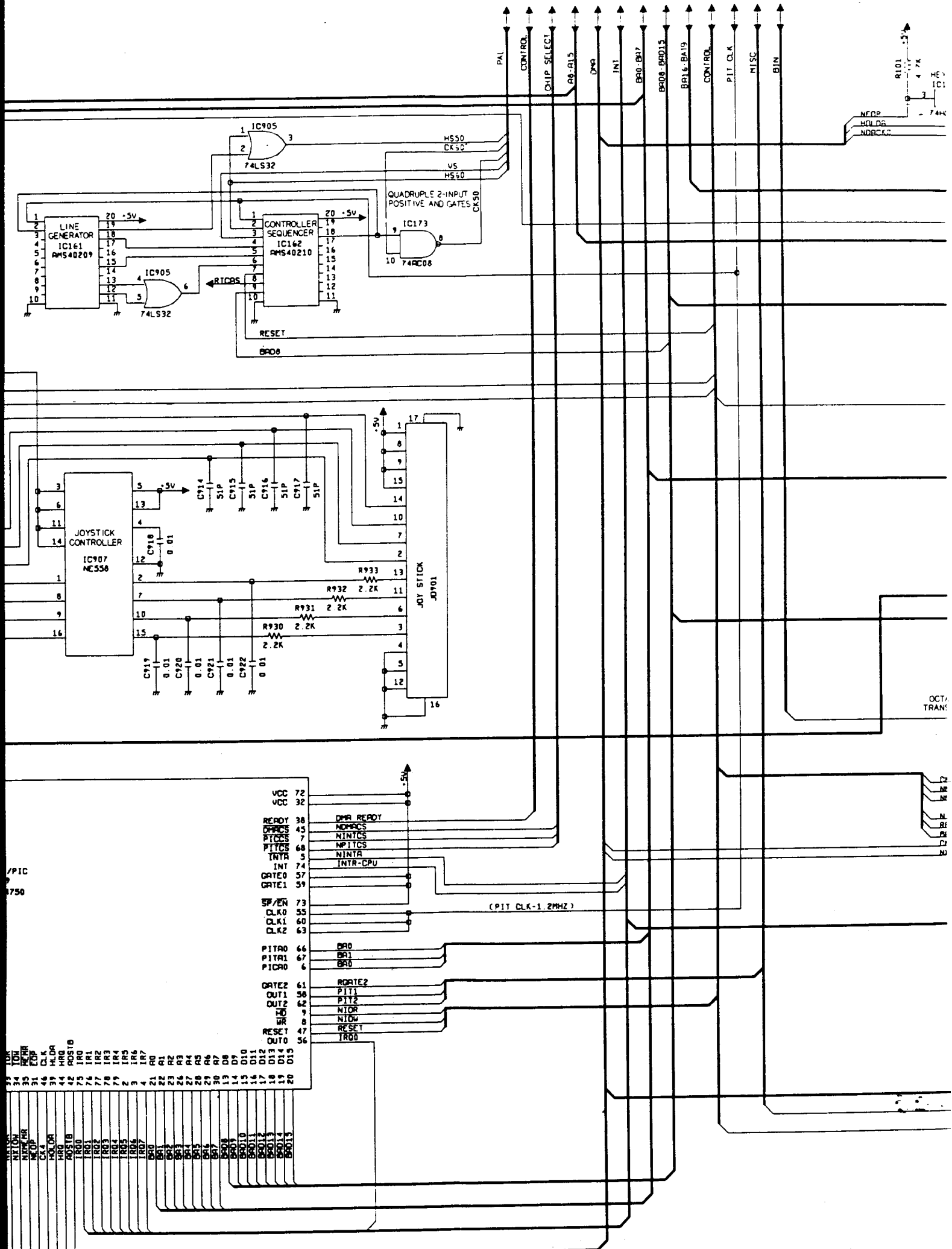


CPU & VIDEO CHASSIS SCHEMATIC DIAGRAM

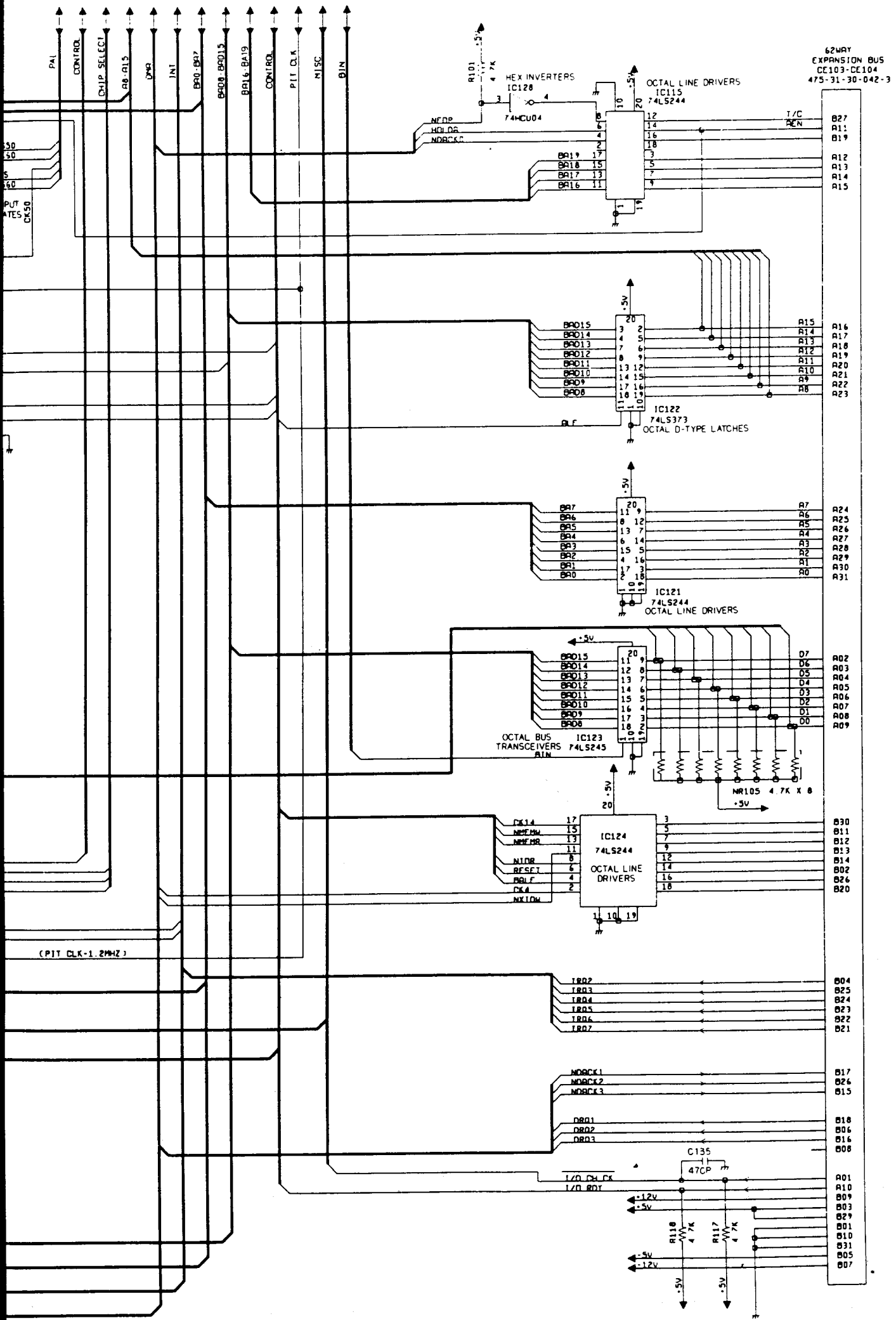




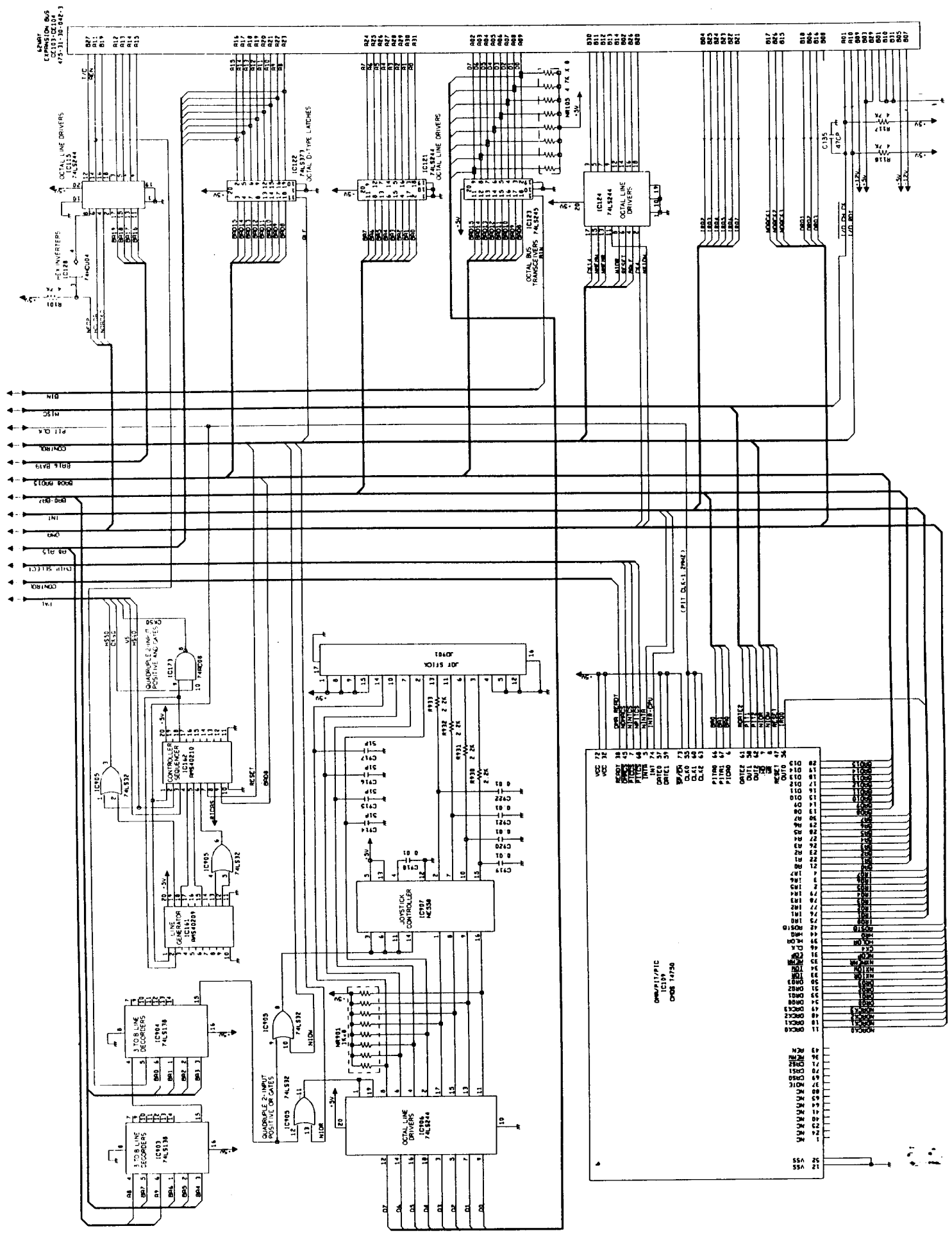
EXPANSION CONTROL CHASSIS SCHEMATIC DIAGRAM



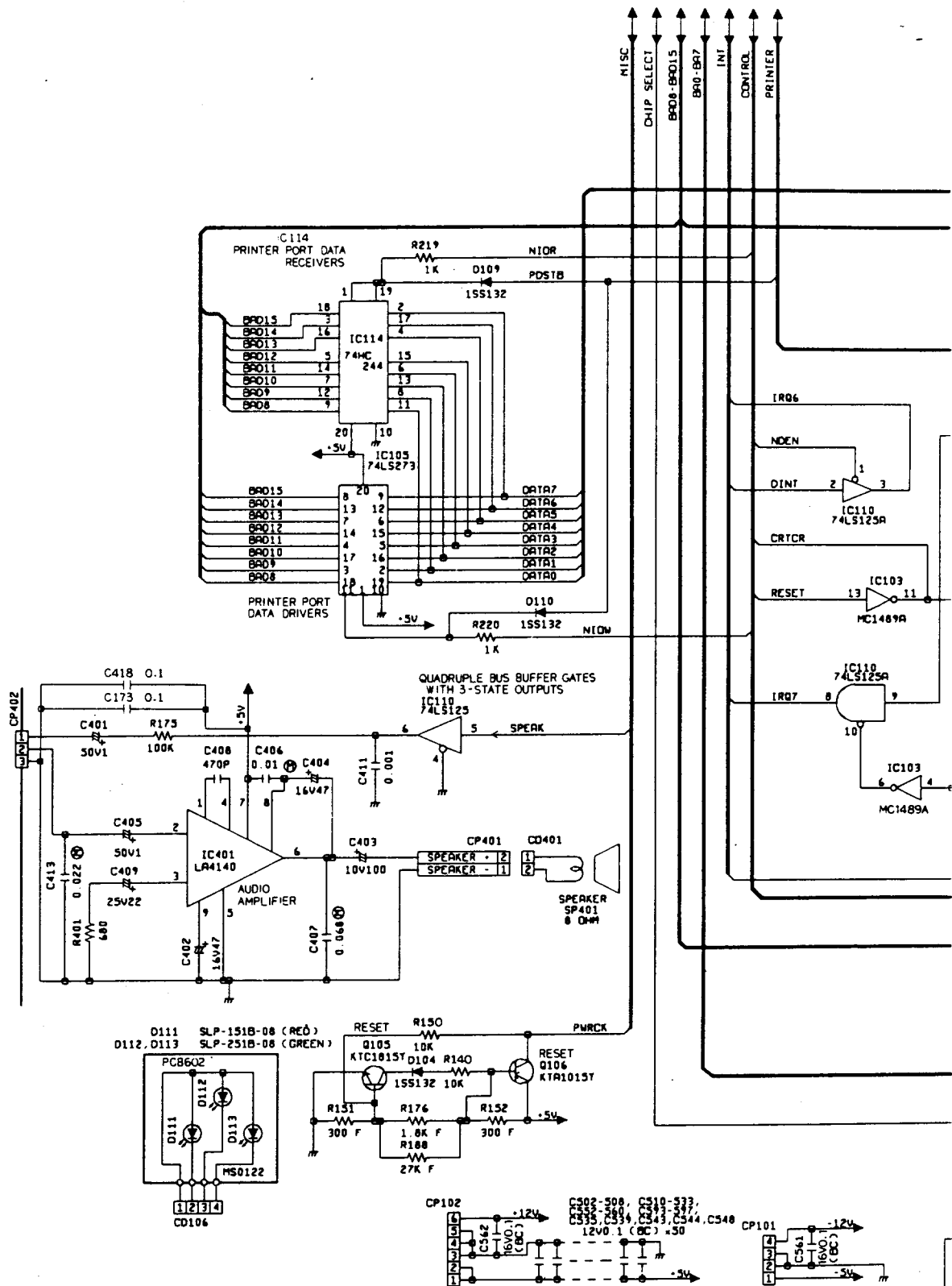
SIS SCHEMATIC DIAGRAM



EXPANSION CONTROL CHASSIS SCHEMATIC DIAGRAM



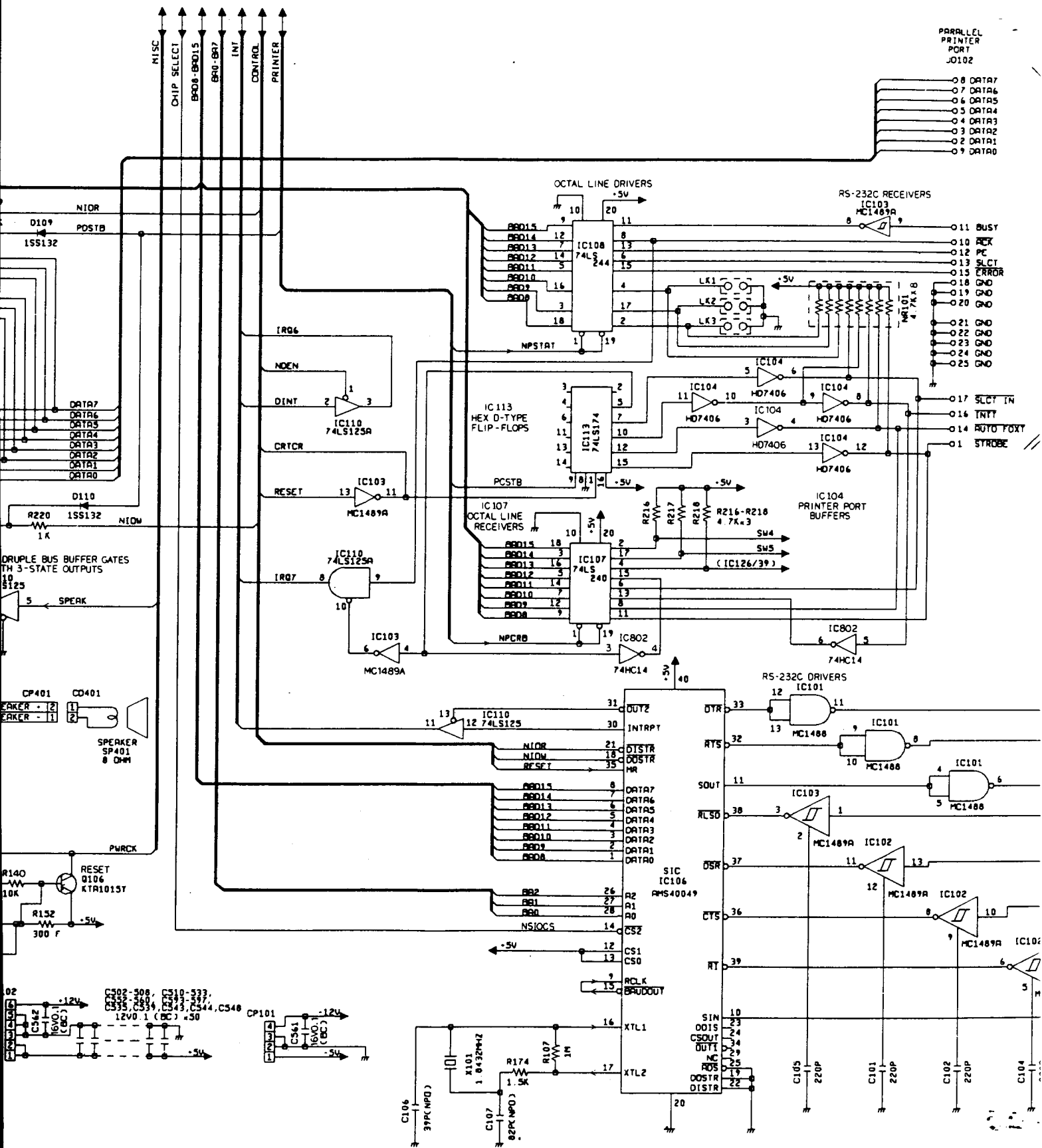
SOUND & PRINTER INTERFACE



ATTENTION: LES PIÈCES MARQUÉES PAR UN Δ ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÈCES

CAUTION: SINCE THESE PARTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

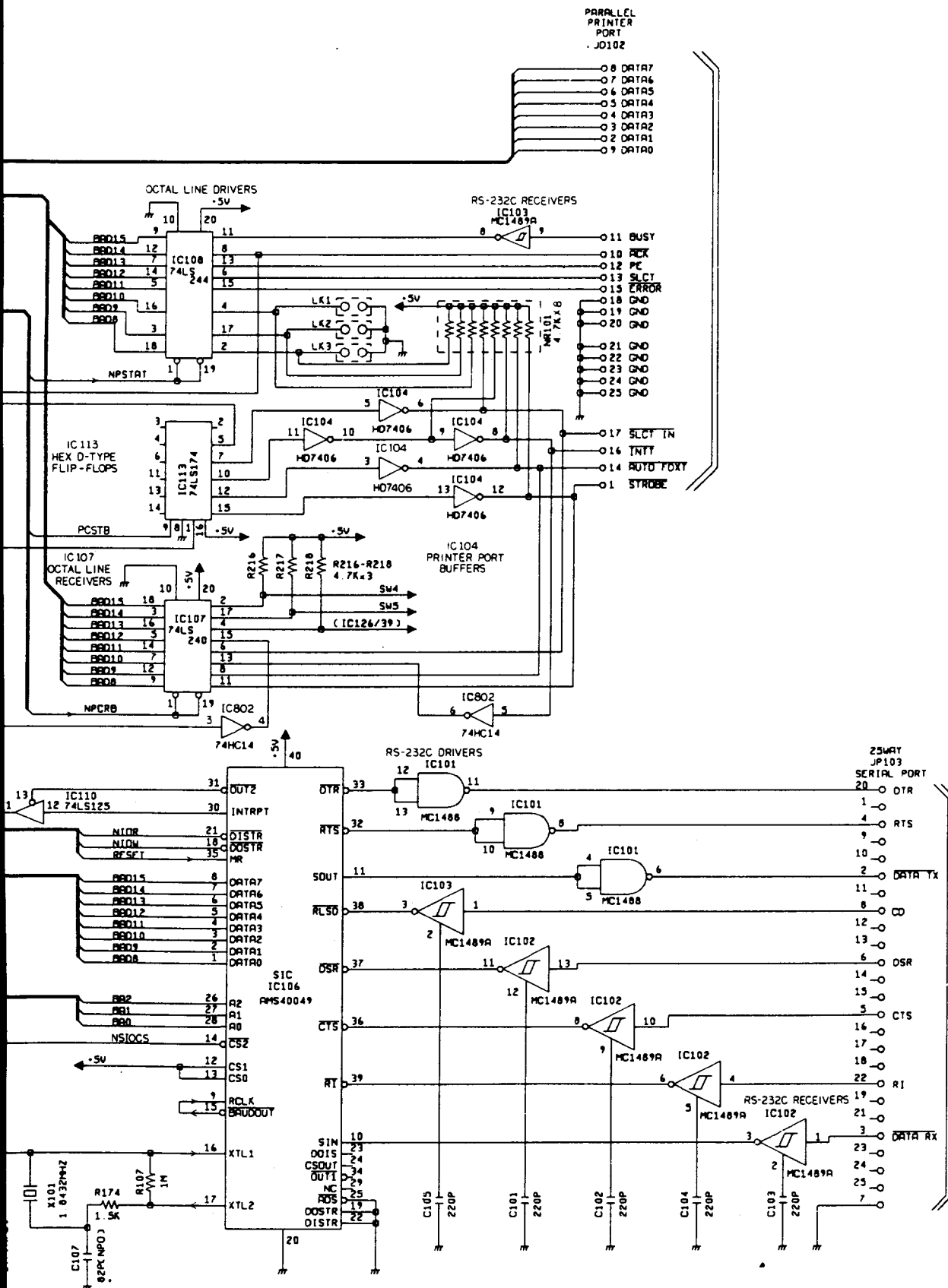
SOUND & PRINTER INTERFACE CHASSIS SCHEMATIC DIAGRAM



CAUTION: SINCE THE PARTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

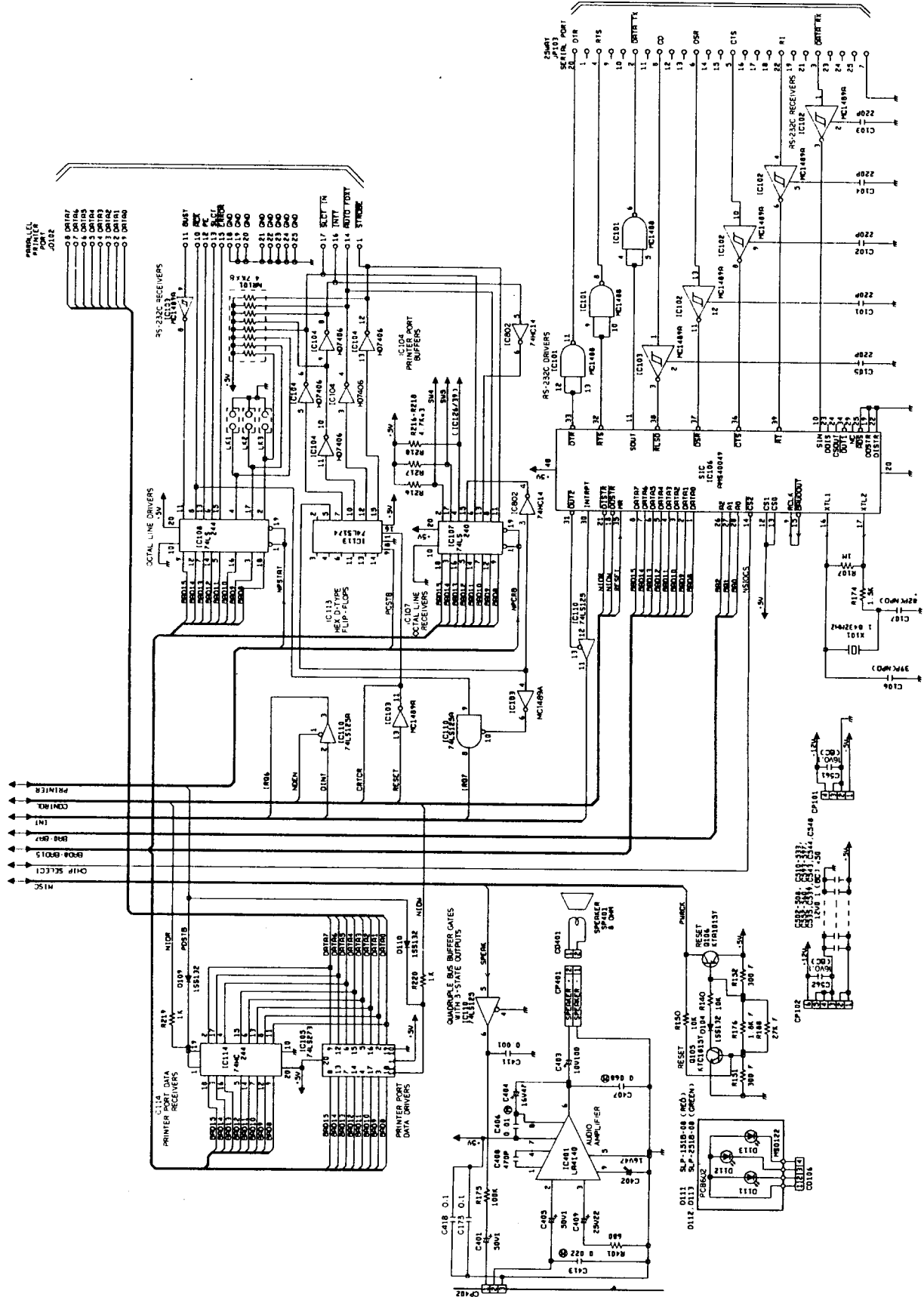
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

CHASSIS SCHEMATIC DIAGRAM



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

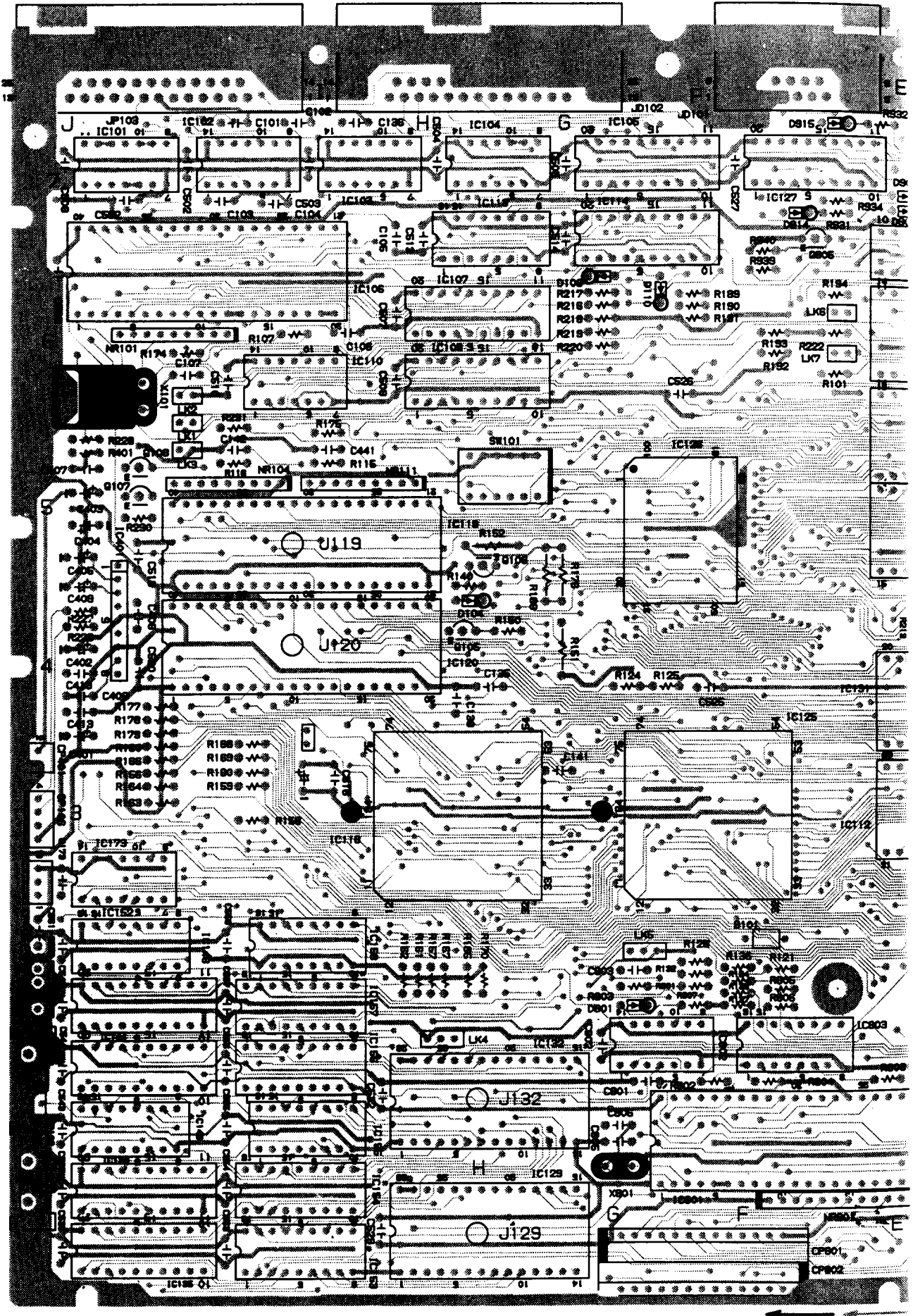
SOUND & PRINTER INTERFACE CHASSIS SCHEMATIC DIAGRAM



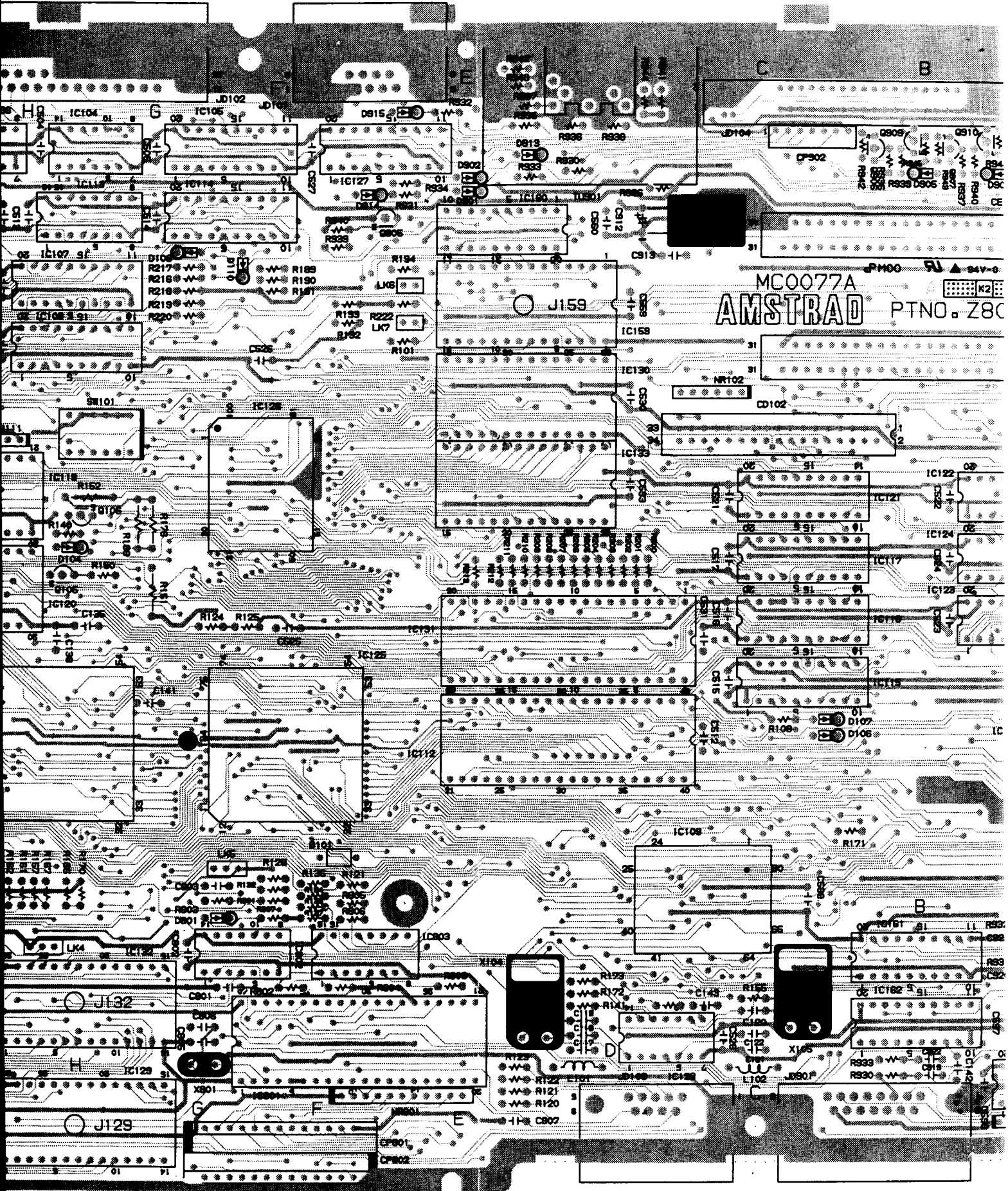
ATTENTION: LES PIÈCES REMARQUÉES PAR UN Δ SONT DISPONIBLES EN VERSION FRANÇAISE. MULTILIGER AVEC LES DÉTAILS DANS LA Nomenclature DES PIÈCES.

CAUTION: SINCE THE PARTS MARKED BY Δ ARE AVAILABLE IN FRENCH VERSION, MULTILIGER ON PARTS LIST ONLY.

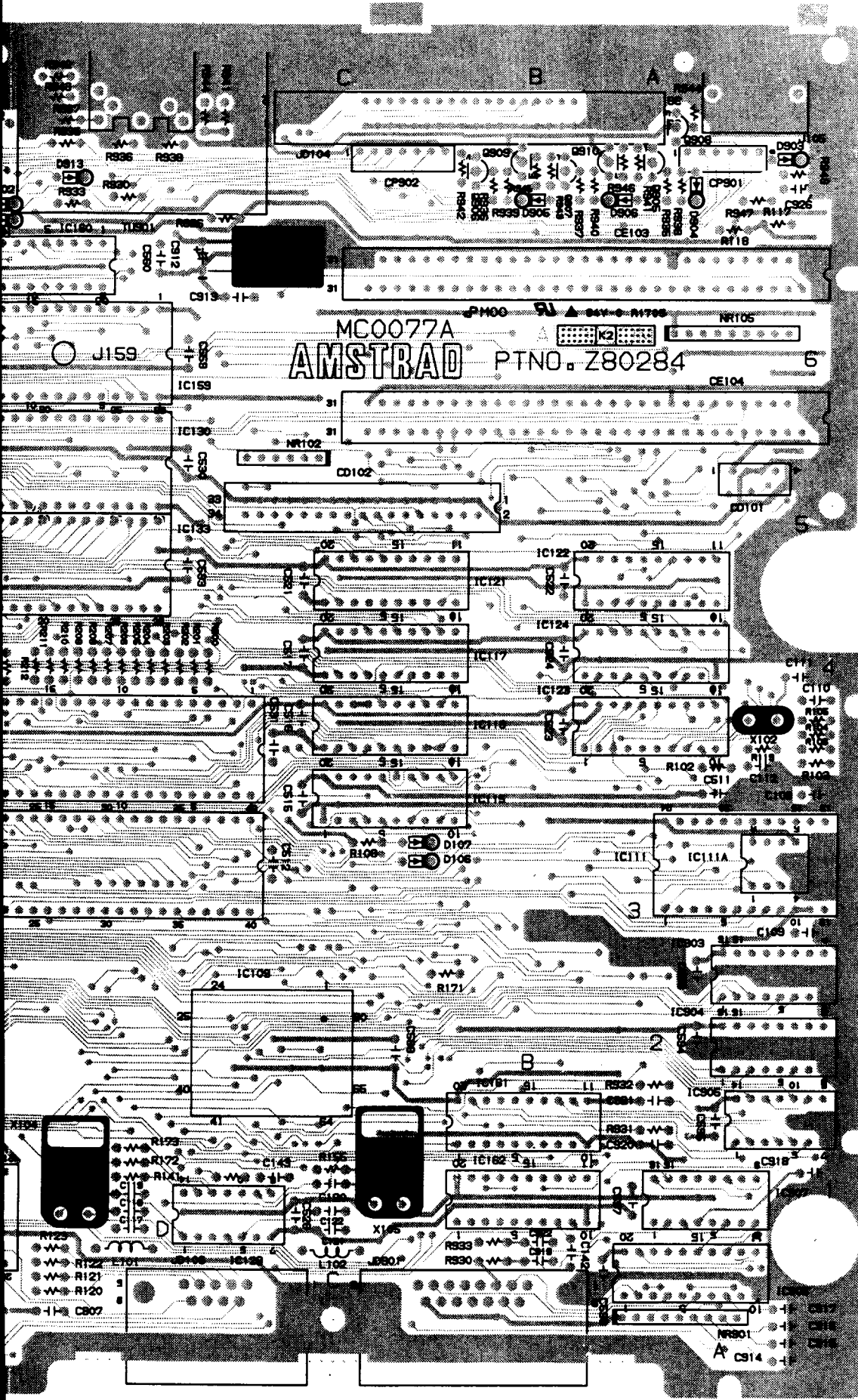
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.



MAIN PCB (TOP VIEW)



TOP VIEW)

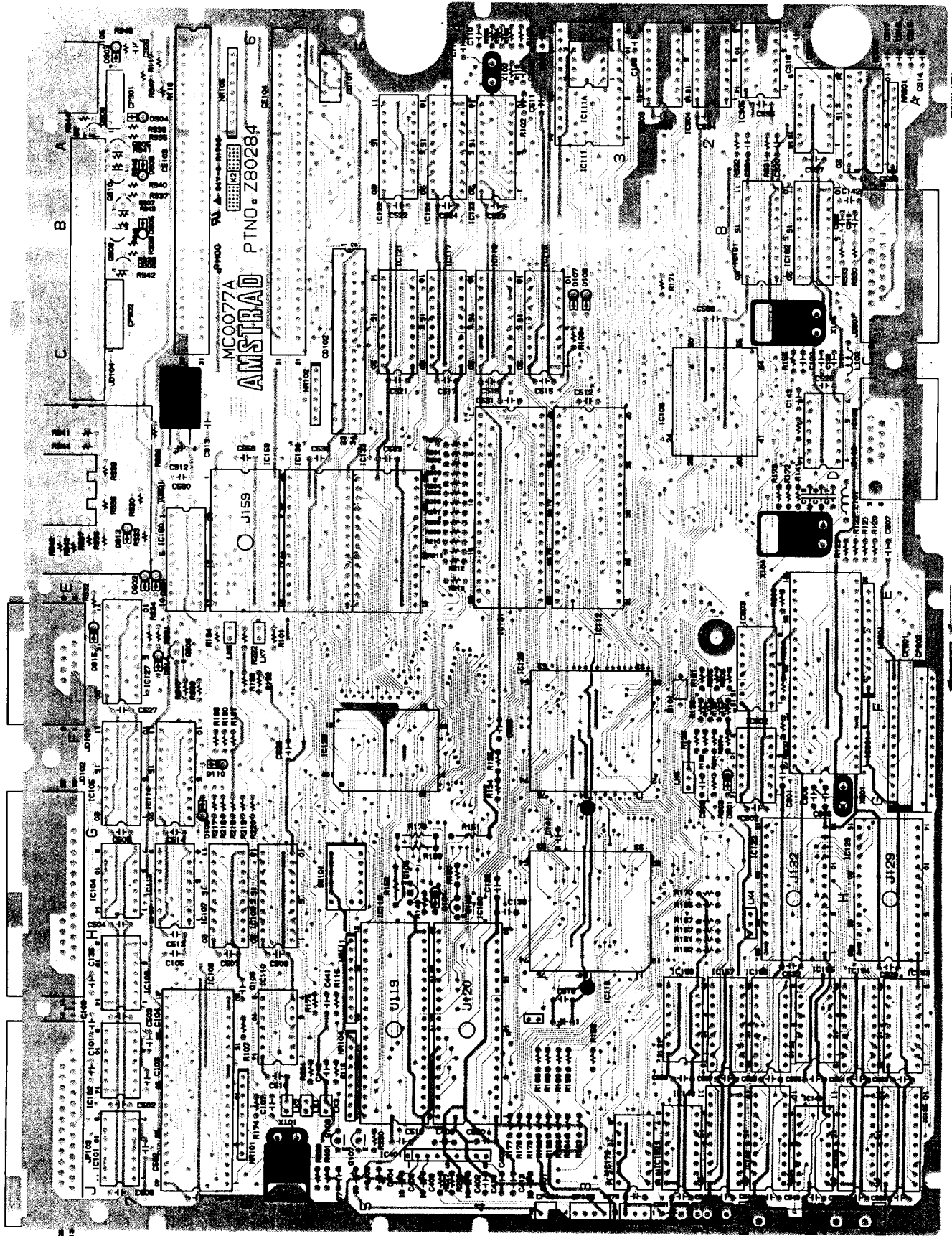


MC0077A

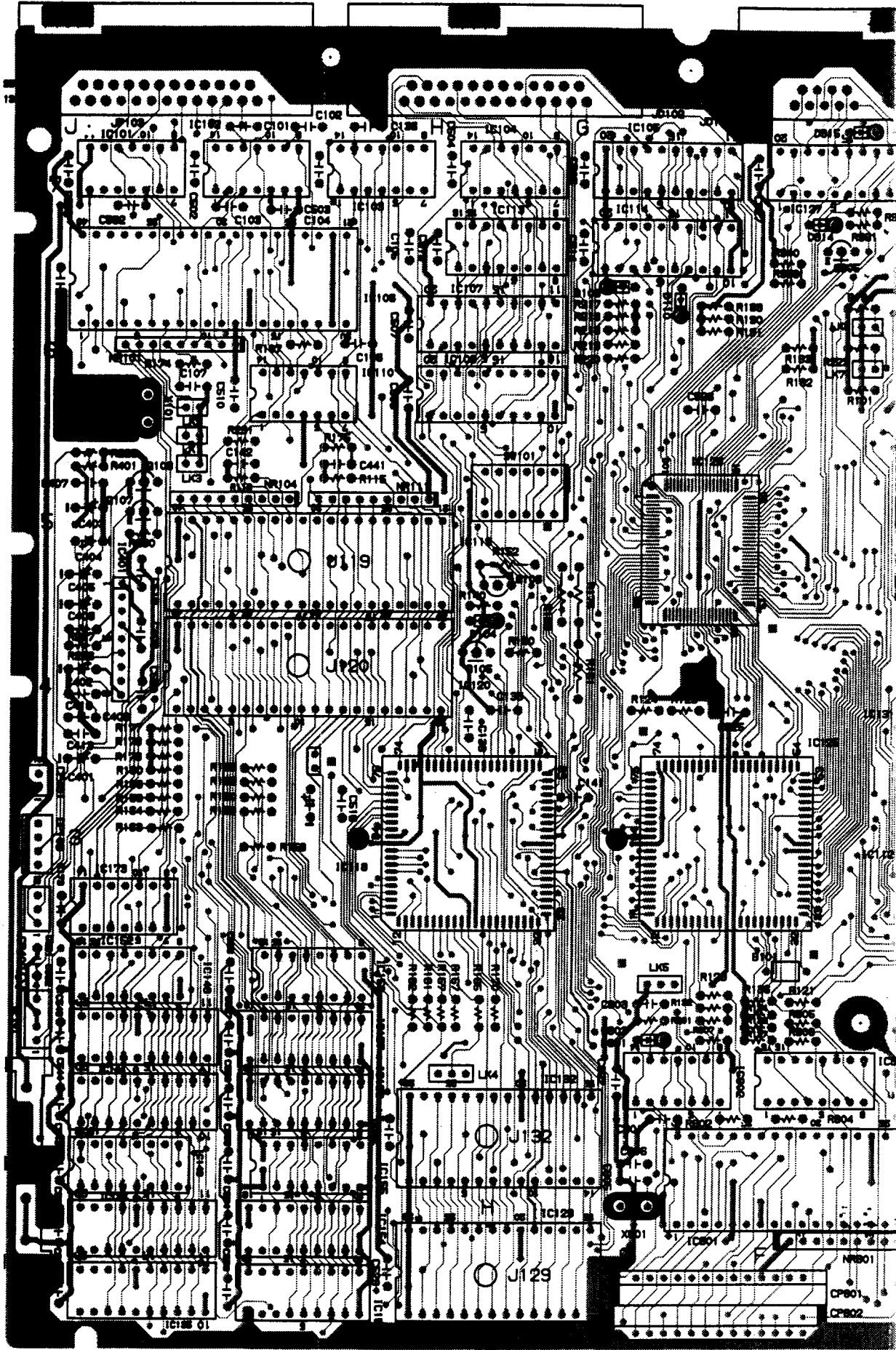
SUMIN-PEN

MAIN P.C.BOARD

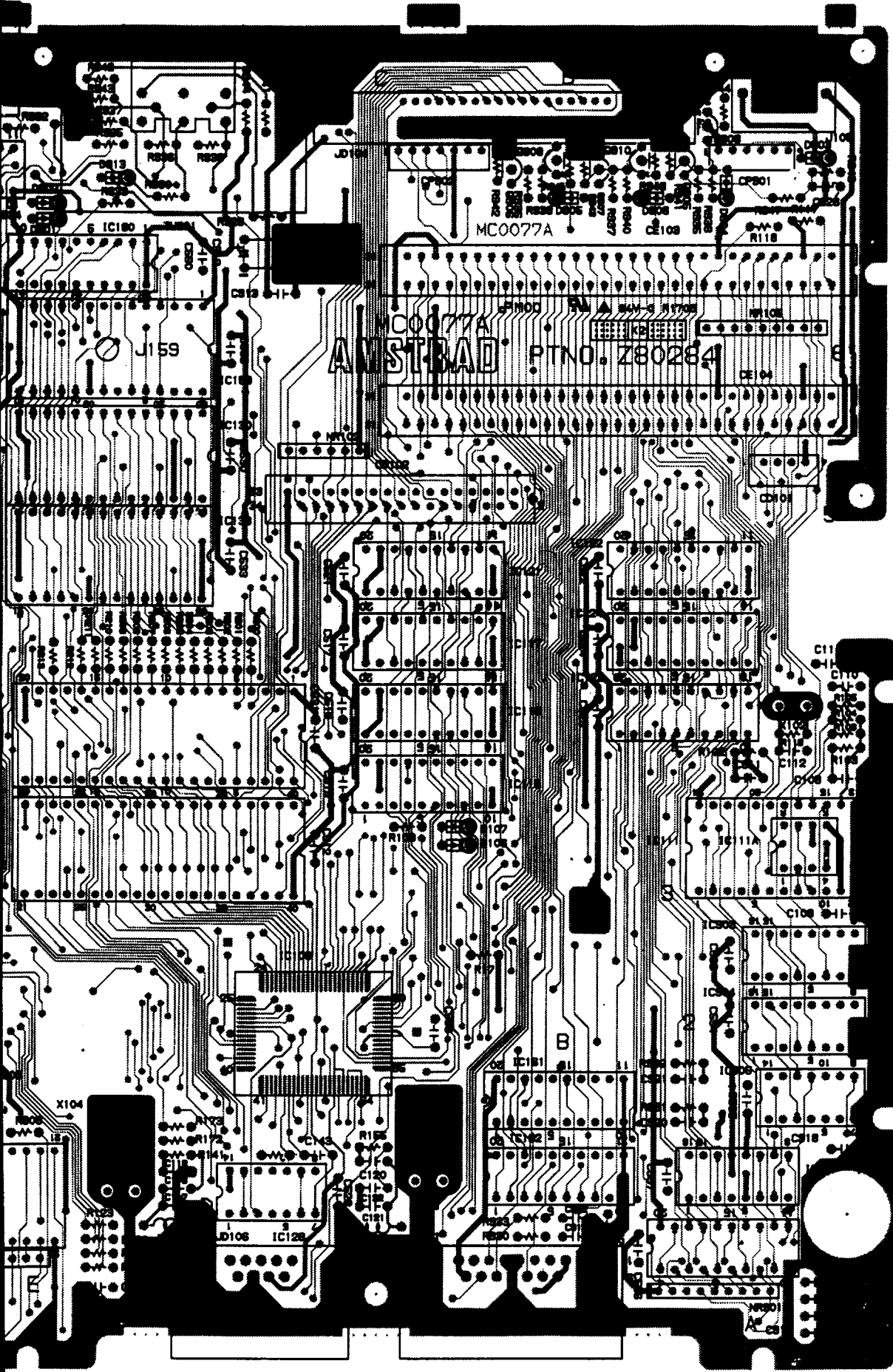
MAIN PCB (TOP VIEW)



MC0077A



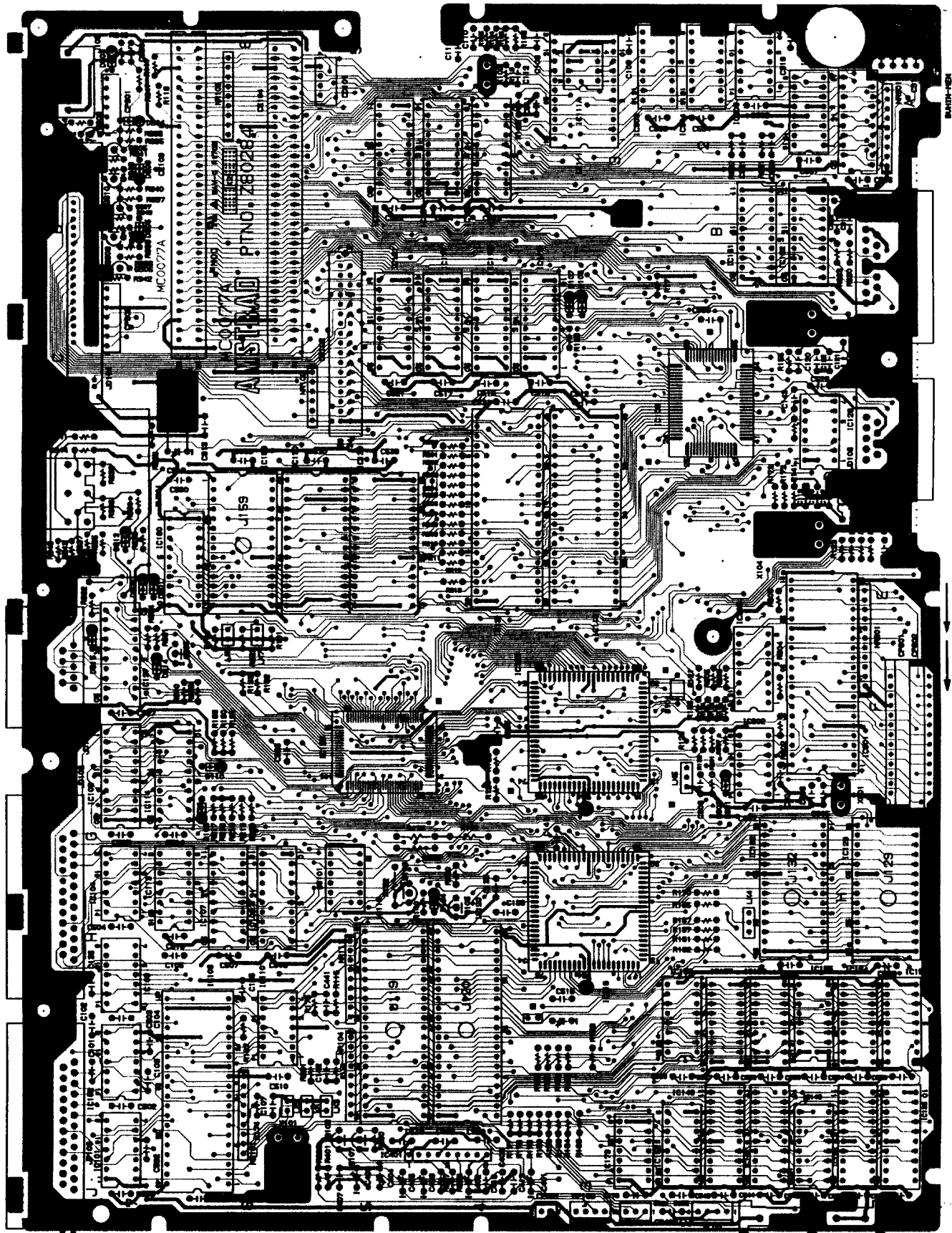
BOTTOM VIEW)



MC0077A

BUMIN-MEN

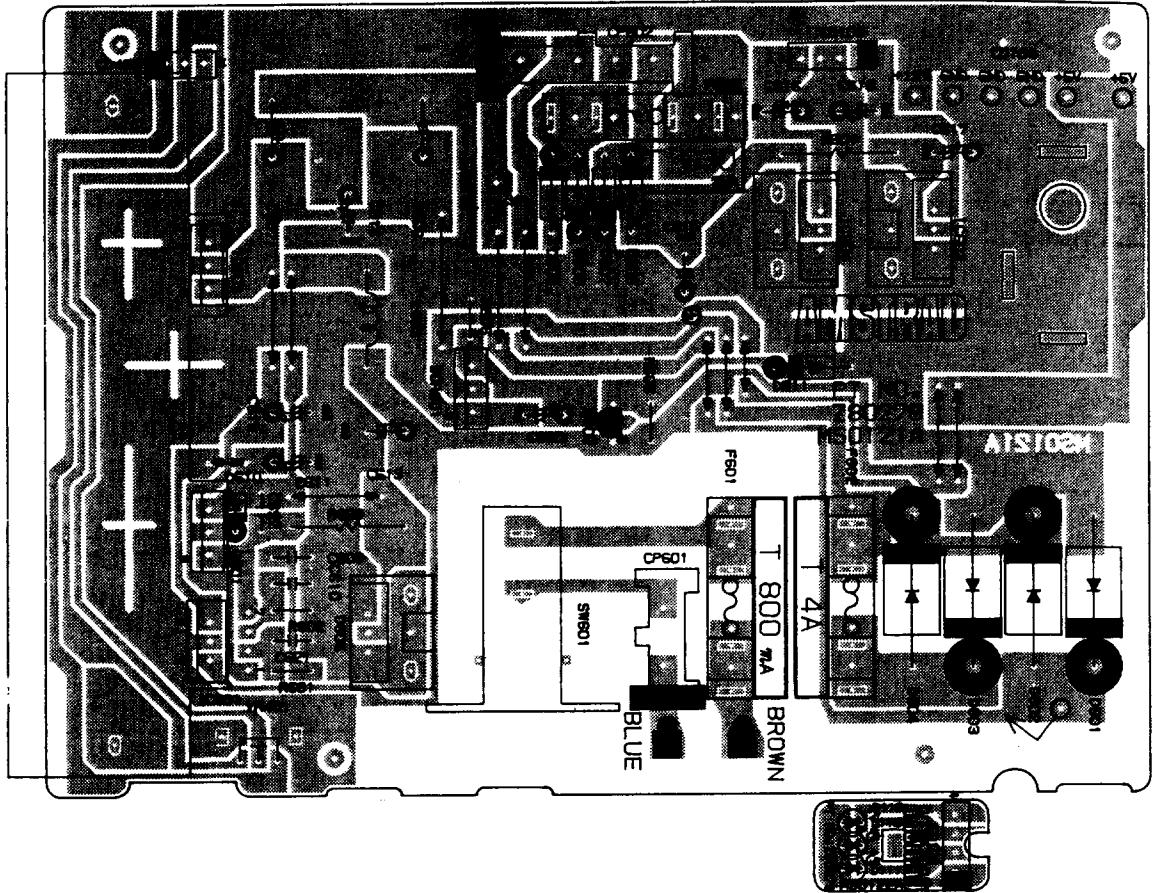
MAIN PCB (BOTTOM VIEW)



MC0077A

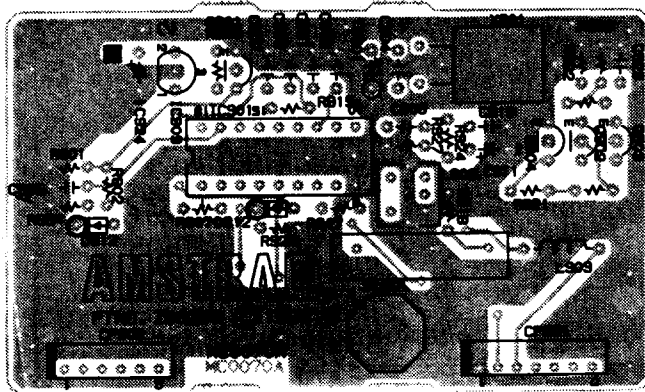
MARKING-PCB

POWER/LED P.C.B.

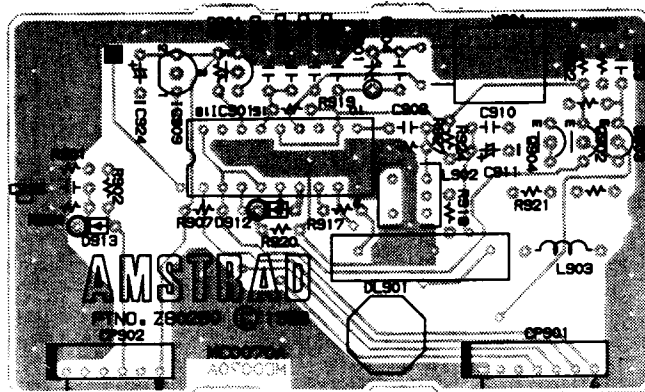


RF ENCODER P.C.B.

TOP VIEW



BOTTOM VIEW



Ref. No.	Description	Part No.
I.C.s		
IC101	IC MC1488P	171378
IC102, 103	IC MC1489AP	171379
IC104	IC HD7406P	171380
IC105	IC SN74LS273N	177277
IC106	IC INS8250N	171381
IC107	IC SN74LS240N	171382
IC109	IC T4750	40111
IC110	IC SN74LS125AN	171385
IC111	IC SED9420CAC	171034
IC112	IC Z765APS	40018
IC113	IC SN74LS174N	171387
IC114	IC TC74HC244P	177279
IC108, 115, 121, 124, 127, 906	IC SN74LS244P	171383
IC16, 117	IC TC74HC240P	177278
IC118	IC HSG5140	171577
IC120	IC AMD8086-2	171392
IC122	IC SN74LS373N	170108
IC123	IC SN74LS245N	171393
IC125	IC AMS40039	40039
IC126	IC AMS40104	40104
IC128	IC TC74HCU04P	40008/A
IC129, 132	IC TMM2464AP-113	174022
IC130, 133	IC LC3664N-10	177286
IC131	IC UM6845	177287
IC135, 139, 144, 148	IC UPD424256C-12	174025
IC143, 152	IC KM41256-15	171400
IC159	IC AMS40109	40109
IC160	IC SN74LS273N	174123
IC161	IC AMS40209	40209
IC162	IC AMS40210	40210
IC173	IC HD74AC08P	174031
IC401	IC LA4140	170111
IC601	IC L4962E	174032
IC602	IC L78S12CV	174033
IC603	IC L79M05	177289
IC604	IC L79M12	177290
IC801	IC AMS40112	40112
IC802	IC TC74HC14P	171033
IC803	IC TC74HC175P	177292
IC901	IC TEA2000	172048
IC903, 904	IC SN74LS138N	174040
IC905	IC SN74LS32N	174041
IC907	IC NE558	174042
IC909	IC TA78L005AP	174043
Transistors		
Q105, 901, 903	TR KTC1815 Y-T	170447
Q106-108, 602, 902	TR KTA1015Y	170453
Q601	TR 2SC3568L	174044
Q904	TR 2SD734-T	174045

Circ. Ref.	Description	Part No.
Diodes		
D104, 106, 107, 109, 110, 801	D 1SS132T-77	171582
D111	LED SLP-151B-08	174006
D112, 113	LED SLP-251B-08	174007
D601-604	D30D-1 FC	174008
D605	D F10P04Q	176037
D606-610	D 11E1TA1-T	171551
D611	DZ GZA6.2 Y BT	171552
D901, 902, 912, 913	D1SS120-T	174011
Coils		
L101, 102	Coil 2.2uH	174046
L602	Coil Choke 120uH	174047
L902	Coil Chroma 362R003	174048
L903, 904	Coil 100uH	174049
T601	TX Switching Power 086601	174050
PCB's		
PCB101	PCB MC0077	174055
PCB601	PCB MS0121	174056
PCB602	PCB MS0122 Part Off MS0121	
PCB901	PCB MC0070	174057
Miscellaneous		
J105	Jack DIN	176160
SW101	Switch Slide SSGM16	174051
SW601	Switch Power On/Off	174052
SW801	Switch Keyboard	174053
VR401	VR Rot 20k Ω	174054
B103	Ferrite Beads	174058
CE103, 104	Socket D-Sub	176135
DL901	Delay Line DL122391D-400	174076
F601	Fuse 800mA (T)	174077
F602	Fuse 4A (T)	174078
F603	Fuse 630mA (T)	174079
FDD201	Floppy Disc Drive OSDD-48A	174082
JD101	Socket D-Sub	174083
JD102	Socket D-Sub	174084
JD106	Socket D-Sub	176158
JD901	Socket D-Sub	174087
JP103	Socket D-Sub	174088
NR101, 105	NR 4.7k Ω x 8	174089
NR102	NR 1k Ω x 5	171441
NR104, 111	NR 2.2k Ω x 8	174090
NR801	NR 10k Ω x 10	174091
NR901	NR 1k Ω x 8	174092
SP401	Speaker	174093
SCR601	Thyrister SF5B42	174094
TC901	Ceramic Trimmer	176171
TU901	RF-Converter	174096
X101	Crystal 1.8432MHz	176173
X102	CER Resonator CSA16.00MHz	174098
X104	Crystal 24.00MHz	176175
X105	Crystal 28.63636MHz	176176
X801	CRE Resonator 6.00MHz	176182
X901	Crystal 8.8672MHz	174102
MS-3	Mouse Black	174015

PARTS LIST

Description	Ref. No.	Part No.
Resistors (all 1/6W unless otherwise stated)		
33Ω	R124, 156-169, 606	152158
68Ω	R172, 173	152162
100Ω	R120-123, 128, 132, 801, 802	152166
270Ω	R226-228, 805, 806, 808	152171
330Ω	R903	152172
630Ω	R921	174107
680Ω	R125, 401	152176
820Ω	R918	152178
890Ω	R923	174108
1kΩ	R219, 220, 605, 901, 917	152179
1.5kΩ	R106, 174	152181
2.2kΩ	R102, 133, 134, 136, 137, 230, 231, 802-804, 902, 930-934	152183
3.3kΩ	R200-213	152185
3.9kΩ	R924	152187
4.7kΩ	R101, 108, 117, 118, 189-194, 216-218, 222, 602, 920	152188
6.8kΩ	R105, 922	152190
10kΩ	R129, 140, 150, 170, 171, 177-180, 907	152194
12kΩ	R103, 116	152195
15kΩ	R115, 601	152196
33kΩ	R104, 807	152200
100kΩ	R175	152209
1MΩ	R107, 119, 141, 155	152223
Metal Resistors		
300Ω	R151, 152	177344
1.8kΩ	R176	177346
27kΩ	R188	177351
36kΩ	R919	174109
Metal Oxide Resistors		
2.7Ω/1W	R603	174110
68Ω/2W	R604	176550

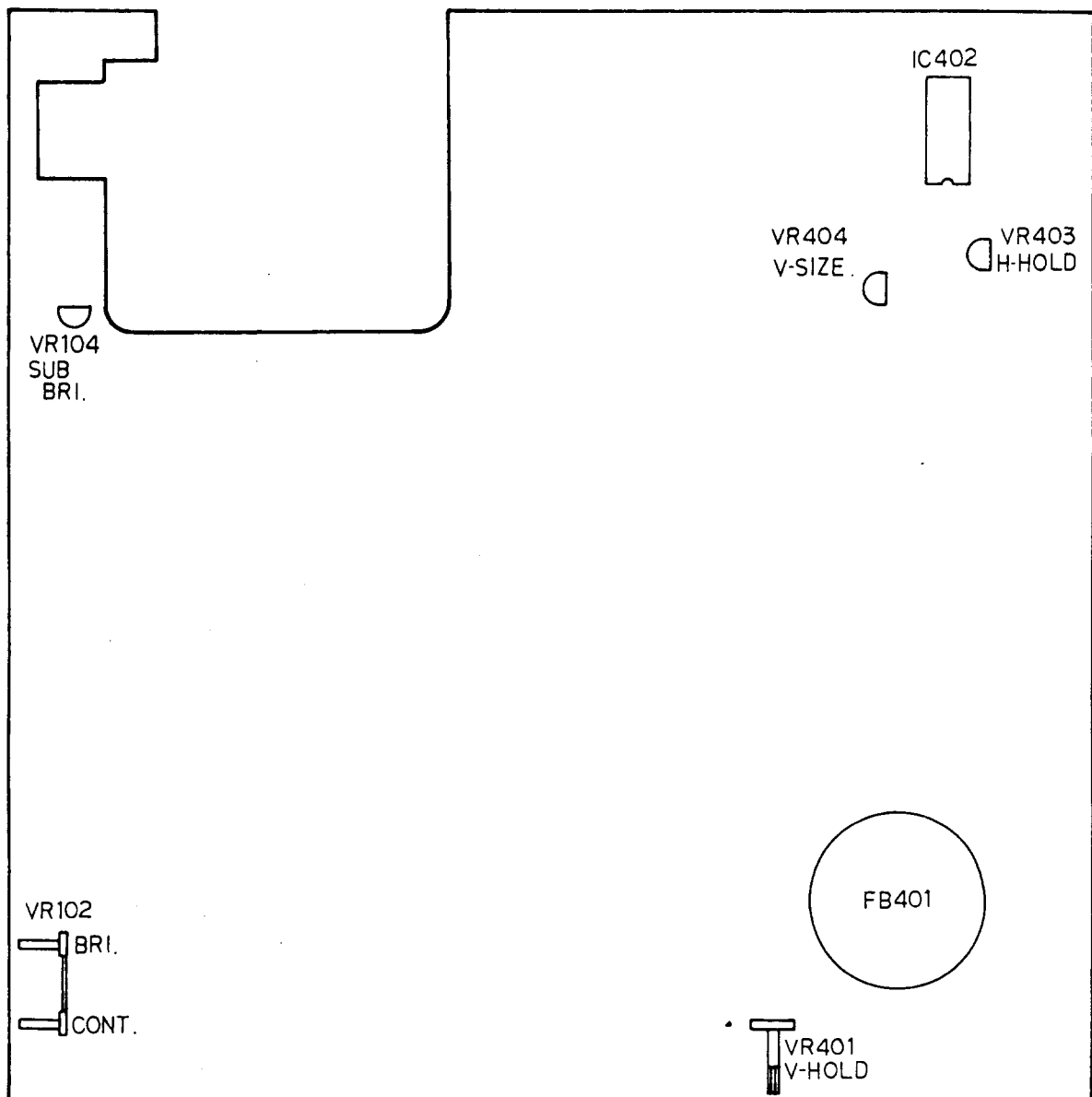
Description	Ref. No.	Part No.
Ceramic Capacitors		
7pF	C111, 112	174112
8pF	C118, 122	174113
16pF	C901, 902	174114
18pF	C117, 121	174115
39pF	C106	174116
47pF	C142	174117
47pF NPO	C805, 806	174118
51pF	C914-917	240238
82pF	C107	174119
100pF	C138, 807, 923	176351
150pF NPO	C909	150881
180pF NPO	C907	174120
220pF	C101-105, 141	400107
470pF	C135, 408, 622	190822
0.001μF	C411	150910
0.01μF	C908, 918-922	24011
0.1μF	C173, 418, 502-533, 535, 539, 543, 544, 548, 552-562, 593-597, 801-803, 808, 910, 913	24020
Electrolytic Capacitors		
1μF/50V	C401, 405, 617	20062
2.2μF/50V	C611	175144
10μF/25V	C620	174870
22μF/25V	C409	174871
47μF/16V	C402, 404	20027
100μF/10V	C403, 911	20028
100μF/16V	C616, 911	20028
100μF/25V	C619	176318
470μF/10V	C912	20031
470μF/16V	C614	1400248
1000μF/10V	C613	800372
2200μF/25V	C615	174869
4700μF/25V	C607, 608	240241
Polyester Capacitors		
0.001μF	C110, 621	171093
0.022μF	C610	174121
0.0039μF	C925	174122
0.01μF	C108, 118, 120, 136, 406	170439
0.022μF	C413	176363
0.033μF	C609	176311
0.047μF	C109	170442
0.068μF	C407	170443

S-14 CM/O SECTION

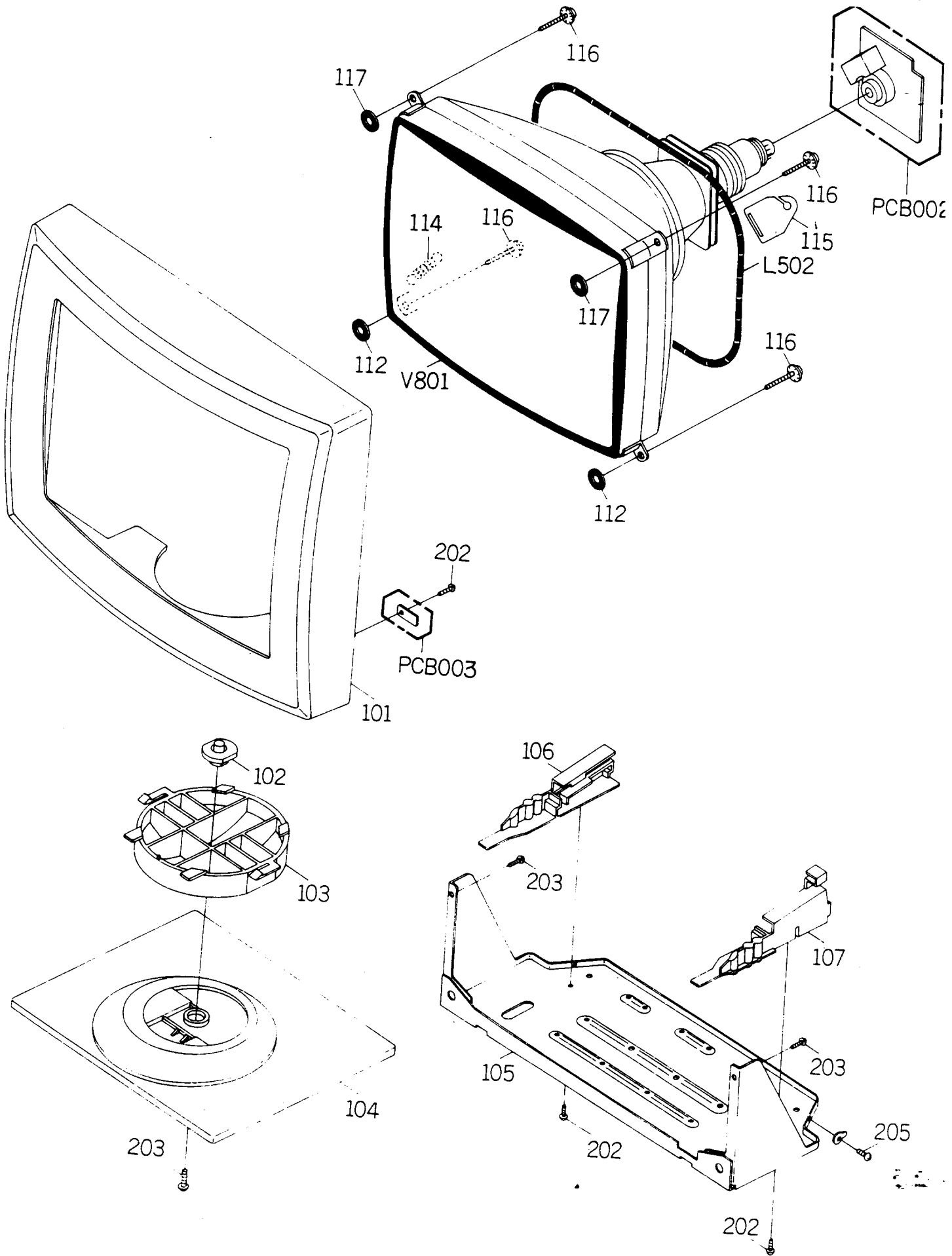
S-14CM ALIGNMENT INSTRUCTIONS

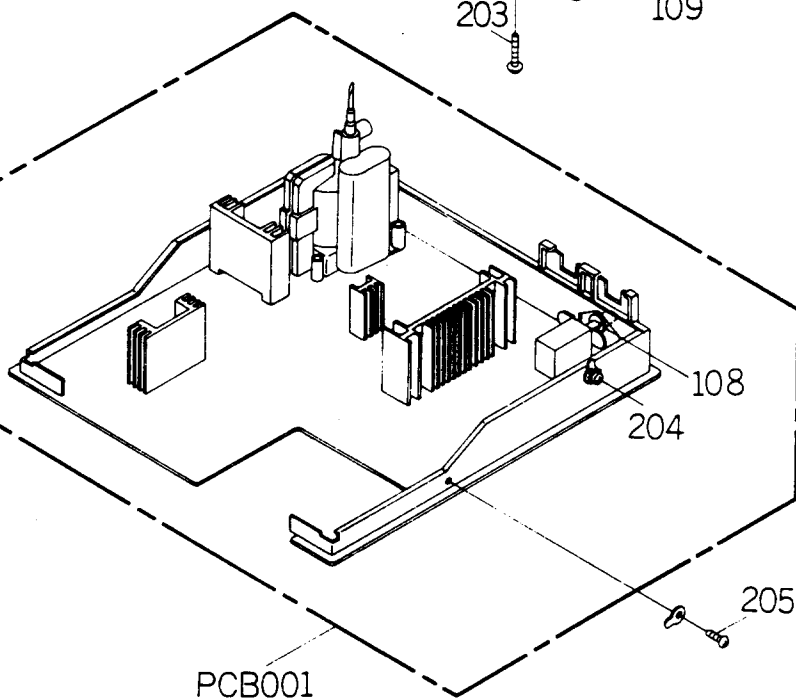
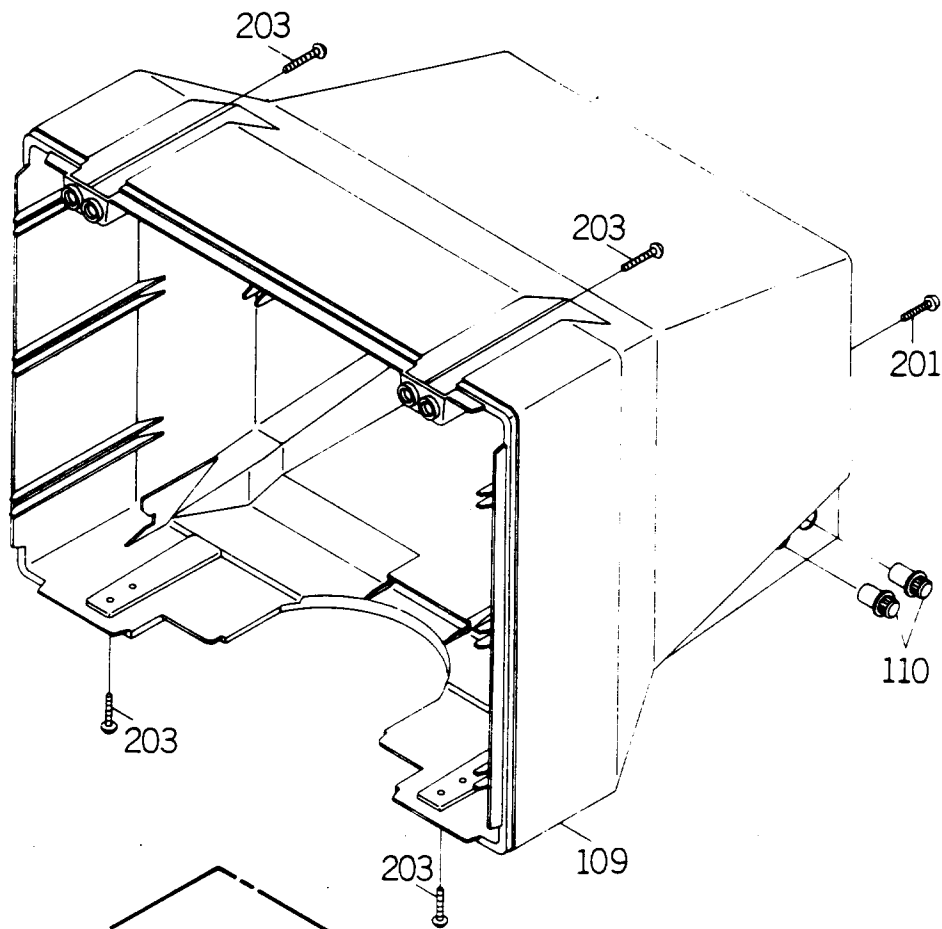
Equipment required: Frequency Counter; Alignment Disc.

STEP	FUNCTION	SIGNAL IN	SIGNAL OUT	METHOD	REMARKS
1.	Focus Adjustment.	G.W. Basic Monitor Test Disc Character Set.	Monitor	Turn Focus Control fully anticlockwise & then clockwise until characters appear in focus all along the screen.	
2.	V. Size Adjustment.	G.W. Basic Monitor Test Disc Select A O pattern.	Monitor.	Adjust VR404 so that border size becomes A & C = 10mm ± 3mm. B & D = 15mm ± 3mm.	Refer to Fig. 1.
3.	H. Hold Adjustment.	Set Switched on.	Frequency Counter.	Connect a frequency counter to Pin 5 of the F.B.T. FB401. Adjust VR403 to read 15.625kHz ± 500Hz.	
4.	Colour Purity Adjustment.		Special assistance will be given on request for dynamic & static adjustment.		Monitor must be switched on for at least 10 minutes.



S-14 CM/O MONITOR CABINET EXPLODED VIEW





S-14CM/O CABINET PARTS LIST

Ref. No.	Description	Part No.
1	Cabinet Front Assembly	175851
2	Holder Stand	175622
3	Stand Top	175852
4	Stand Bottom	175853
5	Frame Bottom	175854
6	Holder PCB (L)	175626
7	Holder PCB (R)	175627
8	Button Push	175855
9	Cabinet Back	175856
10	Knob Volume	175857
11	Sheet CRT Support	175859

S-14CM/O ELECTRICAL PARTS LIST

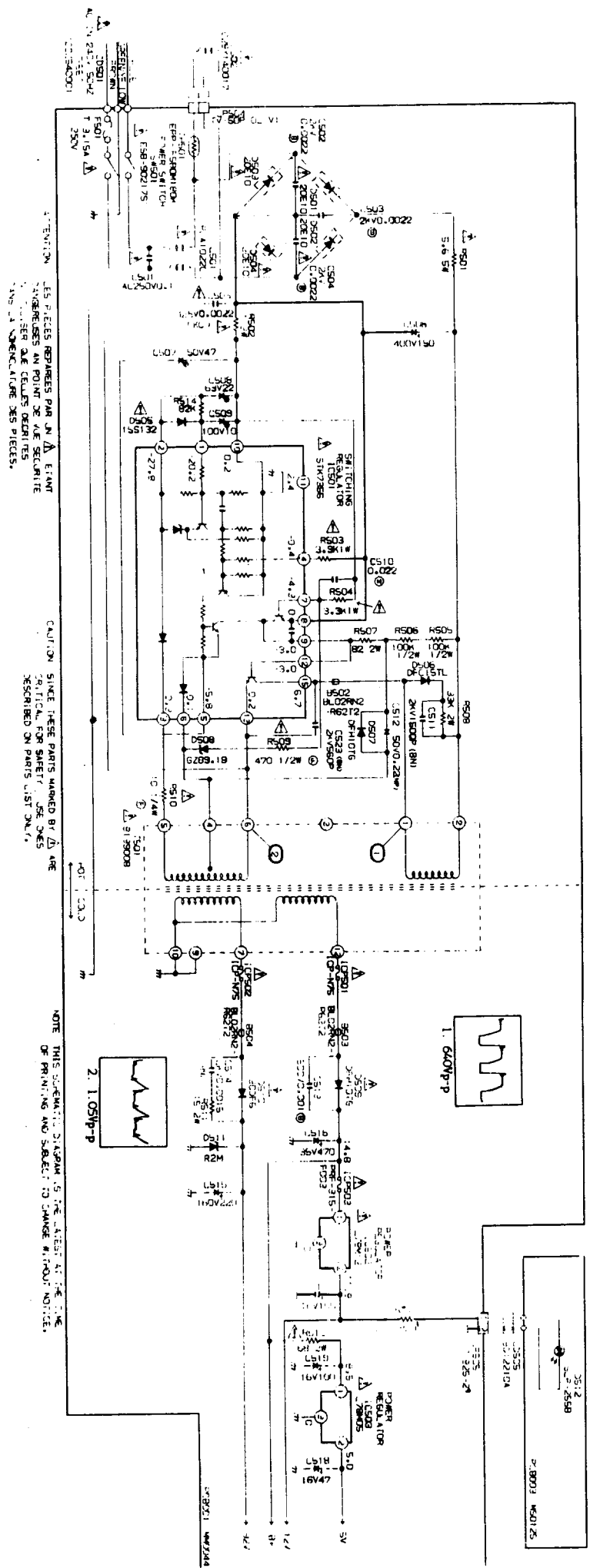
Ref. No.	Description	Part No.
IC's		
IC101	IC OEC9001	171477
IC102	IC TC74HC02P	171622
IC401	IC UPC1378H	170444/A
IC402	IC LA7820	1409199
IC501	IC STK7356	171478
IC502	IC L78M12-SA	190062
IC503	IC L78M05-SA	190063
Transistors		
Q101-103, 105-112, 401, 405, 801-803	TR 2SC1815Y	170447
Q104, 401	TR 2SA1015Y	170453
Q113	TR 2SC2120Y	170113
Q403	TR 2SD1554	175863
Q404	TR 2SC2271-AE	170449
Q804-806	TR 2SC3789E-RA	171487
Diodes		
D101-105, 116	DZ GZA6.8 Y BT	175636
D106-115, 401-405, 407-409, 505	D 1SS132T-77	171582
D406, 412, 413	D DFD05TG-BT	171490
D410	D GZA11 Y BT	810339
D411	D BB4-FC	1422116
D501-504	D 20E10FA13	171048
D506	D DFC15TL-KC5	171491
D507, 509	D DFH10TG-AT1	175862
D508	DZ GZB9.1E	171493
D510	D 30DF6 FC	171494
D511	D SR2M Avalanch	1400122
D512	LED SLP-255B	176028
Coils		
L401	Coil Linearity	175864
L402	Coil 4.7mH C9-A-472K	175865
L501	Coil Line Across Filter PLA1022C	171502
L502	Coil Degauss	175866
L801-804	Coil 100uH	175867
T401	TX Horizontal Drive 305Y001	175868
T501	Transformer Switching 8139008	175869
Switches		
SW401	Switch Slide 16G7	175680
SW501	Switch Push 217S	175679

Ref. No.	Description	Part No.
Variable Resistors		
VR102	VROT 500Ω + 500Ω B & C	175681
VR104	VRSF 2.2kΩ	175871
VR401	VROT 200kΩ V. Hold	175690
VR403	VRSF 4.7kΩ H. Hold	175872
VR404	VRSF 470Ω	175873
VR801	VRSF 5kΩ Red	175684
VR803	VRSF 5kΩ Blue	175686
VR804	VRSF 500Ω Red	175682
VR805	VRSF 500Ω Blue	175683
Miscellaneous		
J801	CRT Socket HPS1171-01-050	175870
B502-504	Ferrite Beads	176114
CD101	Cord D-Sub	175883
F501	Fuse 3.15A (T)	175711
FB401	Flyback Transformer 3714015	175879
ICP501, 502	IC Protector ICP-N75T104	171057
ICP503	IC Protector PRF-315-F003	171483
RN101	Resistor Network	175881
TH501	Degauss Element	175718
V801	CRT A34EAE01X-AT1620/94	175882
Description	Ref. No.	Part No.
Resistors (all 1/5W unless stated otherwise)		
10Ω	R119	152152
56Ω	R142	152161
82Ω	R120	152164
100Ω	R101-105, 140, 141, 150	152166
220Ω	R154	152170
270Ω	R116, 148, 152, 812, 814	152171
330Ω	R146, 456, 811, 813	152172
470Ω	R128, 131, 132, 135, 136, 139, 144	152174
560Ω	R122, 124, 126, 149	152175
680Ω	R109, 153	152176
820Ω	R110, 114, 145, 454	152178
1kΩ	R106-108, 117, 449, 451, 453	152179
1.8kΩ	R430	152182
2.2kΩ	R113, 123, 125, 127, 409, 419, 809	152183
3.9kΩ	R143	152187
4.7kΩ	R112, 421, 429	152188
5.6kΩ	R402, 423, 431	152189
6.8kΩ	R129, 133, 137	152190
8.2kΩ	R411, 426, 448	152192
10kΩ	R401, 427, 450, 452	152194
12kΩ	R413, 420	152195
18kΩ	R130, 134, 138	152197
27kΩ	R425	152199
47kΩ	R422	152203
56kΩ	R432	152204
82kΩ	R403, 514	152207
83kΩ	R439	174800
100kΩ	R415, 440	152209
120kΩ	R418, 457	152210
150kΩ	R410	152211
180kΩ	R416	152212
220kΩ	R414	152213

Description	Ref. No.	Part No.
Resistors (all 1/4W)		
82Ω	R121	10030
330Ω	R408	10044
470Ω	R111	10048
820Ω	R513	10054
1kΩ	R118	10061
82kΩ	R404	10107
Resistors (all 1/2W)		
1.5Ω	R433	174801
56Ω	R115	174802
470Ω	R405	175064
820Ω	R459	800205
2.2kΩ	R406	176283
2.7kΩ	R802-804	176749
4.7kΩ	R435	176750
100kΩ	R505, 506	176332
1MΩ	R801	176567
Fuse Resistors		
1Ω/1/2W	R443	174803
1.5Ω/1W	R442	174804
8.2Ω/1/4W	R437	170404
10Ω/1/4W	R510	809256
100Ω/1/4W	R412	174805
100Ω/1/2W	R147, 444	174806
470Ω/1/2W	R509	175064
Metal Oxide Resistors		
4.7Ω/3W	R438	174807
68Ω/2W	R512	150468
82Ω/2W	R507	800361
3.3kΩ/2W	R434, 460	174808
3.9kΩ/1W	R503, 504	151923
6.8kΩ/2W	R805-807	174809
33kΩ/2W	R508	176417
Metal Film Resistors		
1Ω/3W	R502	170416
15Ω/2W	R511	170410
Cement Resistor		
5.6Ω/5W	R501	1422138

Description	Ref. No.	Part No.
Ceramic Capacitors		
20pF	C109	176350
22pF/500V	C434, 442	1400217
75pF	C110, 802, 803	800208
82pF	C804	150517
160pF	C444	174810
220pF/500V	C405	174811
270pF/500V	C438	176345
560pF/500V	C432	1400220
560pF/2kV	C523	176427
680pF	C413	809239
680pF/2kV	C429	176463
1000pF/500V	C513	176428
1000pF/2kV	C801	176429
1500pF/2kV	C511, 514	176430
2200pF/2kV	C502-505	174812
0.1μF	C107	150887
Electrolytic Capacitors		
0.22μF/50V	C512	800211
1μF/50V	C412, 421, 425, 427, 428, 431, 806	20062
1μF/250V	C440	1422152
4.7μF/100V	C435	174813
10μF/16V	C410	174814
10μF/25V	C101, 103, 105	20037
10μF/100V	C509	176421
22μF/25V	C102, 104, 106	176432
22μF/63V	C508	176433
22μF/250V	C436	174815
47μF/16V	C518	174816
47μF/50V	C507	170421
100μF/16V	C414, 517, 519, 805	20028
100μF/50V	C407	176320
150μF/400V	C506	174867
220μF/16V	C111	20029
220μF/160V	C515	171651
470μF/35V	C516	150919
1000μF/16V	C409	174817
1000μF/35V	C437	1422159
2200μF/35V	C408	1422160
Polyester Capacitors		
0.0068μF	C415	170614
0.01μF	C402, 423	1409176
0.022μF	C510	1409182
0.033μF	C419	201571
0.047μF	C418, 420	1409178
0.068μF	C403, 416	1409179
0.1μF/100V	C404, 417, 443	240249
Plastic Capacitors		
0.0056μF	C424	174818
Tantalum Capacitors		
2.2μF/16V	C426	174819
Metal Polypropylene Capacitors		
0.0056μF/2kV	C430	174820
0.1μF/200V	C439	176470
0.68μF/200V	C433	176471
Metal Plastic Capacitors		
0.1μF/250V AC	C501	176467

POWER SUPPLY CIRCUIT DIAGRAM



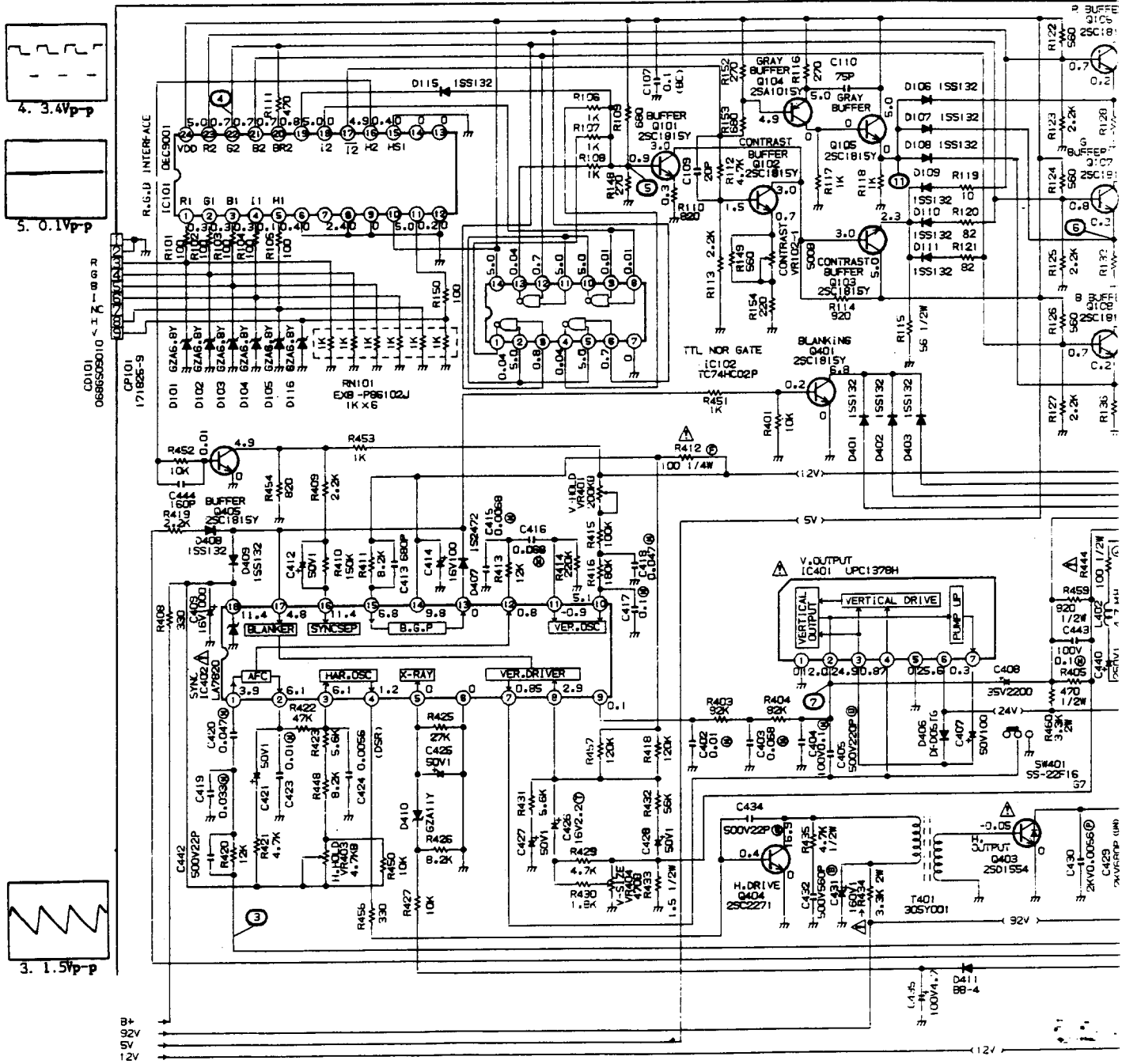
ATTENTION
LES PIÈCES REPARÉES PAR UN Δ ÉTAIENT
CHANGÉES AU POINT DE LA SECURITE
CONSIDERER QUE CELLES DROITES
SONT LA NOMENCLATURE DES PIÈCES.

CAUTION
SINCE THESE PARTS MARKED BY Δ ARE
CRITICAL FOR SAFETY, USE ONLY
THOSE DESCRIBED ON PARTS LIST ONLY.

NOTE
THIS SCHEMATIC DIAGRAM IS THE BASIS FOR THE
PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.



For Service Manuals
 contact
MAURITRON SERVICES
 8 Cherry Tree Road, Chinnor
 Oxfordshire, OX9 4QY.
 Tel (01844) 351694
 Fax (01844) 352554



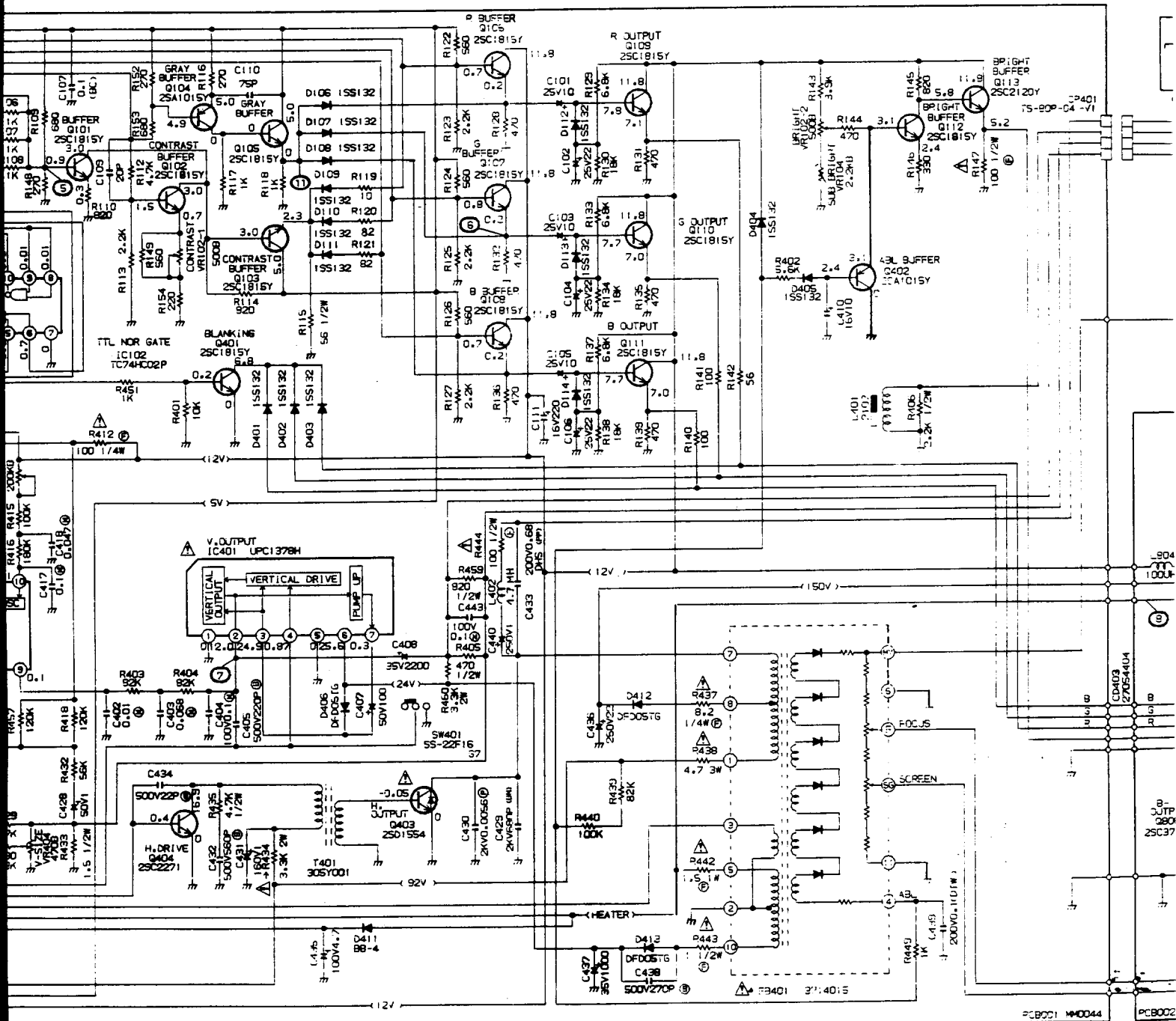
CAUTION SINCE THESE PARTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY.

ATTENTION LES PIÉCES REPARÉES PAR UN Δ ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ, N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÉCES.

MONITOR CIRCUIT DIAGRAM

Manuals
SERVICES
Chinnor
9 4QY
1694
35554

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554



USE PARTS MARKED WITH Δ ARE FOR SAFETY. USE ONES ON PARTS LIST ONLY.

ATTENTION LES PIÉCES RÉPARÉES PAR UN Δ ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÉCES.

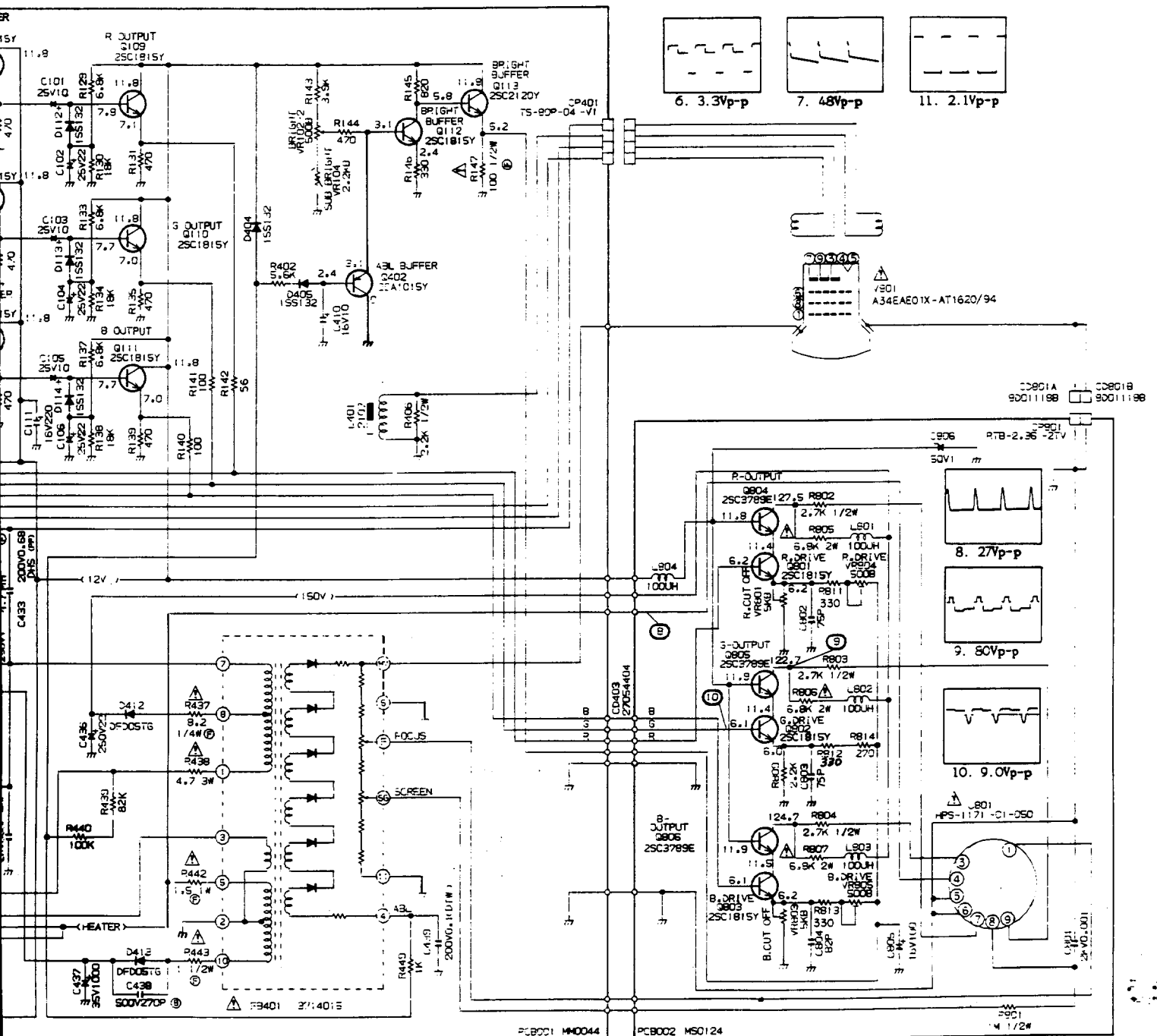
NOTE THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

PCB001 *M0044 PCB002

Circuit Diagram

For Service Manuals
 contact
MAURITRON SERVICES
 8 Cherry Tree Road, Chinnor
 Oxfordshire, OX9 4QY.
 Tel (01844) 351694
 Fax (01844) 352554

THE QUALITY OF
 THIS PAGE IS
 THE BEST THAT
 IS AVAILABLE



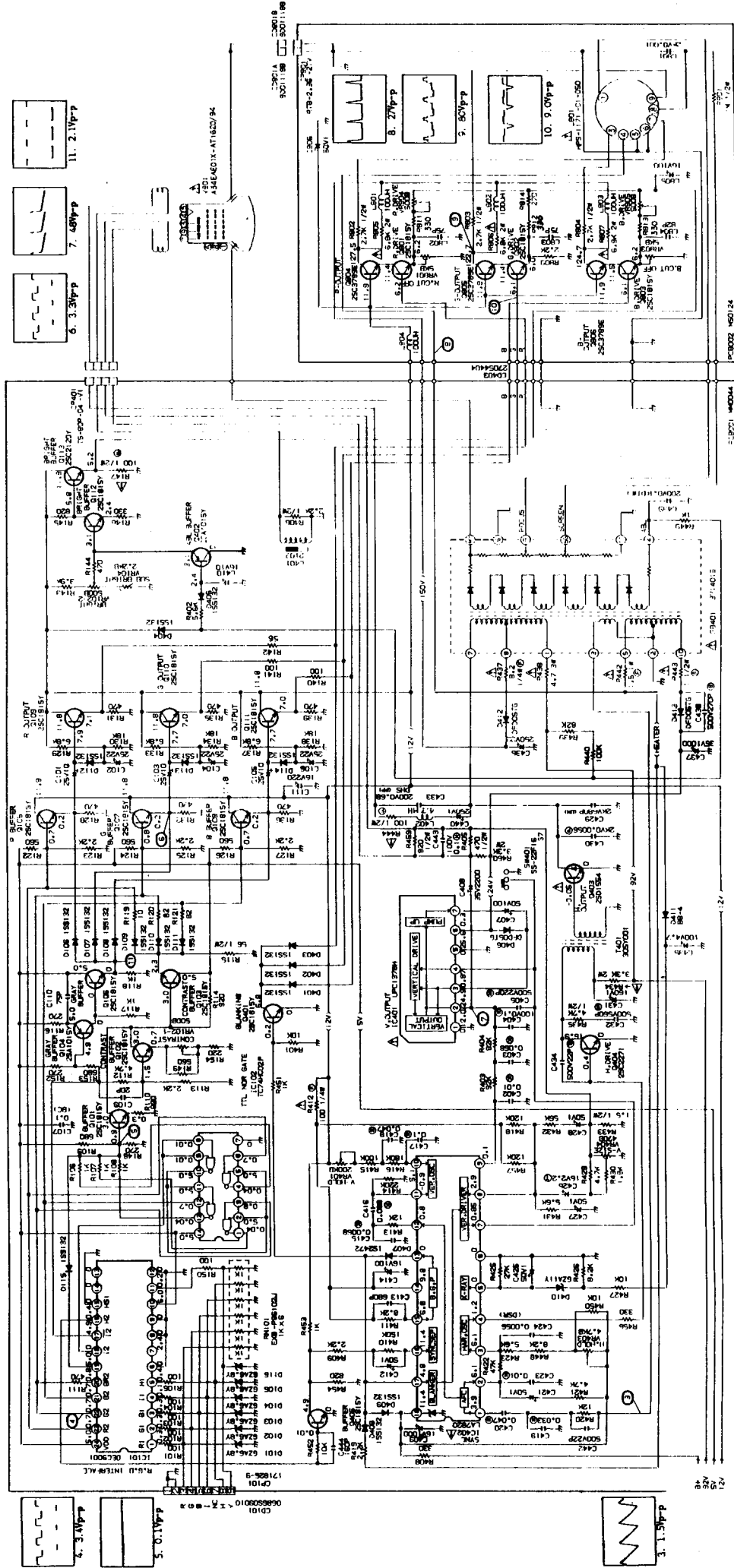
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

MONITOR CIRCUIT DIAGRAM

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chimbor
Oxfordshire, OX9 4QY
Tel: (01844) 351094
Fax: (01844) 352004

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chimbor
Oxfordshire, OX9 4QY
Tel: (01844) 351094
Fax: (01844) 352004

THE QUALITY OF
THIS PAGE IS
THE BEST THAT
IS AVAILABLE

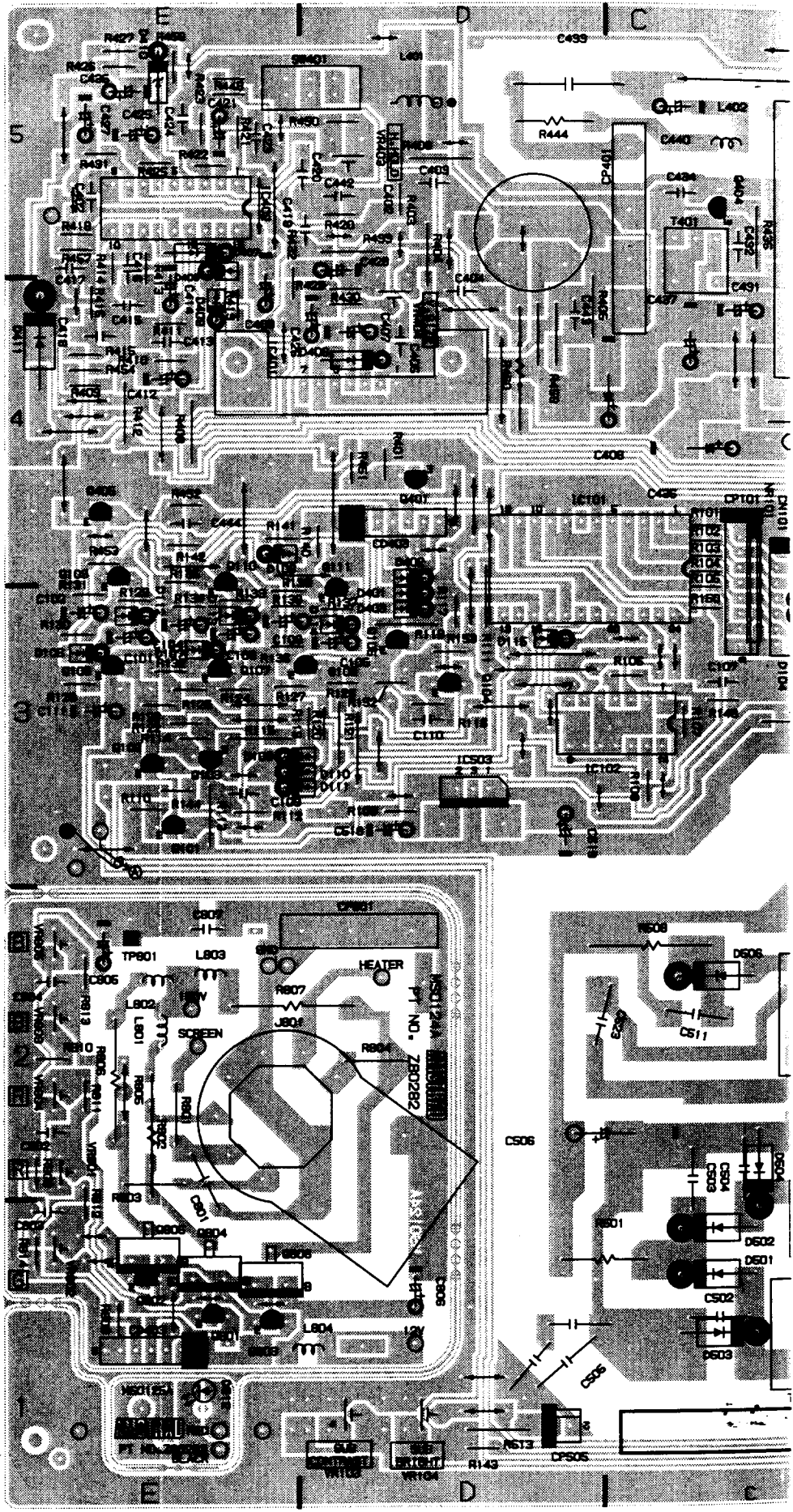


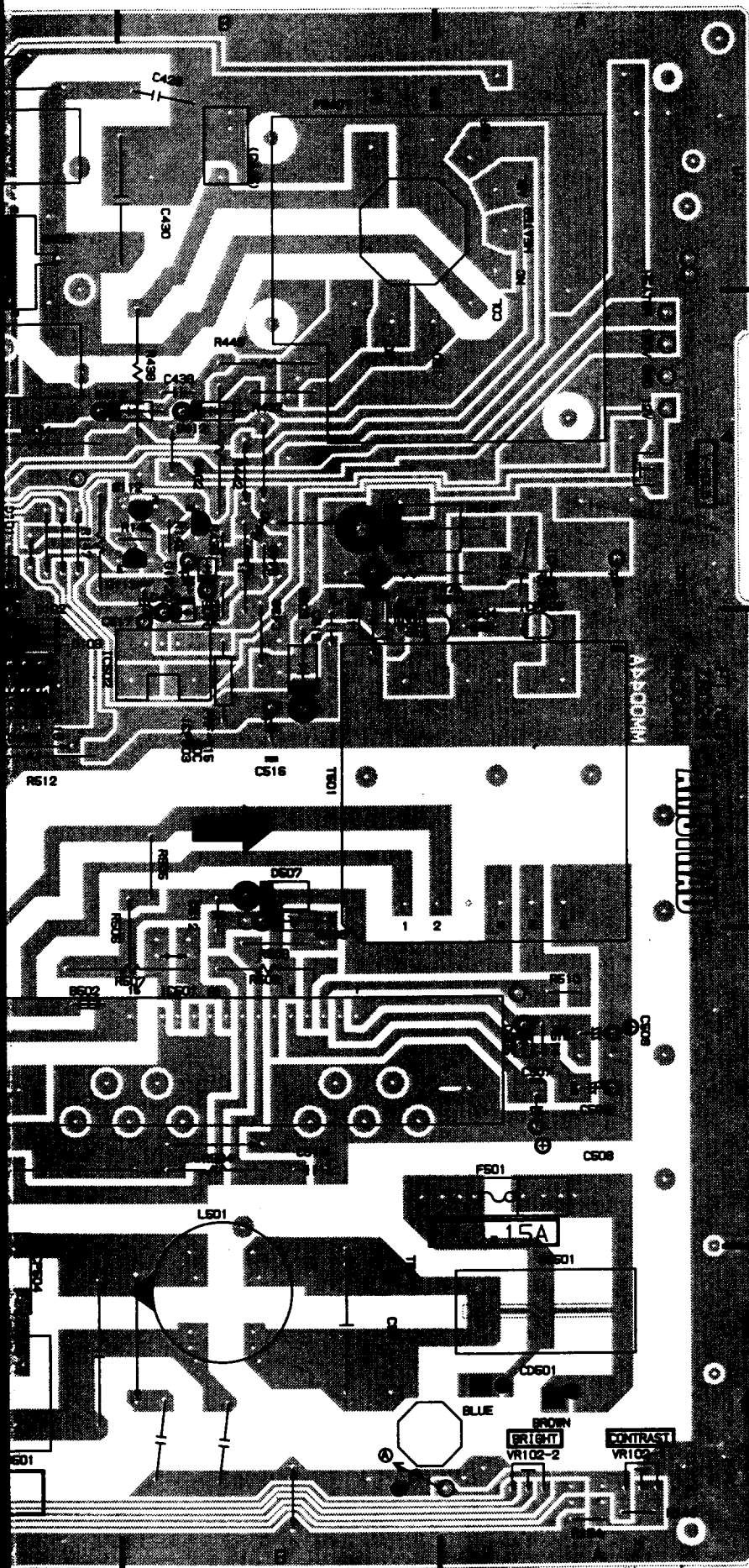
NOTE: THIS SCHEMATIC DIAGRAM IS THE PROPERTY OF MAURITRON SERVICES. IT IS THE PROPERTY OF MAURITRON SERVICES AND SUBJECT TO CHANGE WITHOUT NOTICE.

CAUTION: SHOCK HAZARD! THE MONITOR CONTAINS HIGH VOLTAGE. DISCHARGE THE MONITOR BEFORE WORKING ON IT. USE THE SAFETY PROCEDURES DESCRIBED IN THE SERVICE MANUAL.

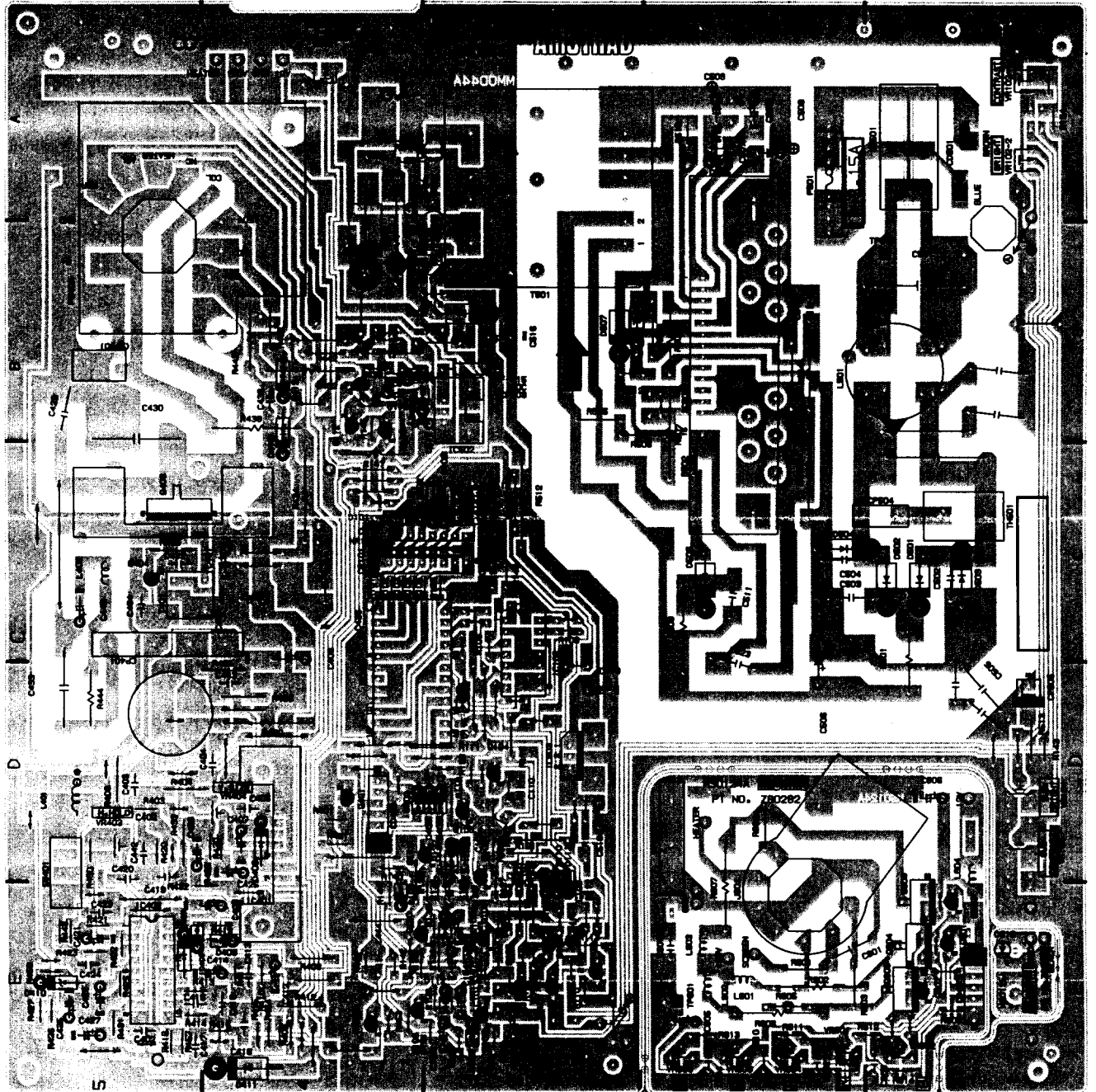
ATTENTION: USE THESE PARTS NUMBERS FOR ALL REPLACEMENT PARTS. THE PARTS LIST IS THE ONLY AUTHORITY FOR THE IDENTIFICATION OF PARTS. USE THE PARTS LIST ONLY.

UNIVERSAL ELECTRONICS





MONITOR/CRT/LED P.C.B.

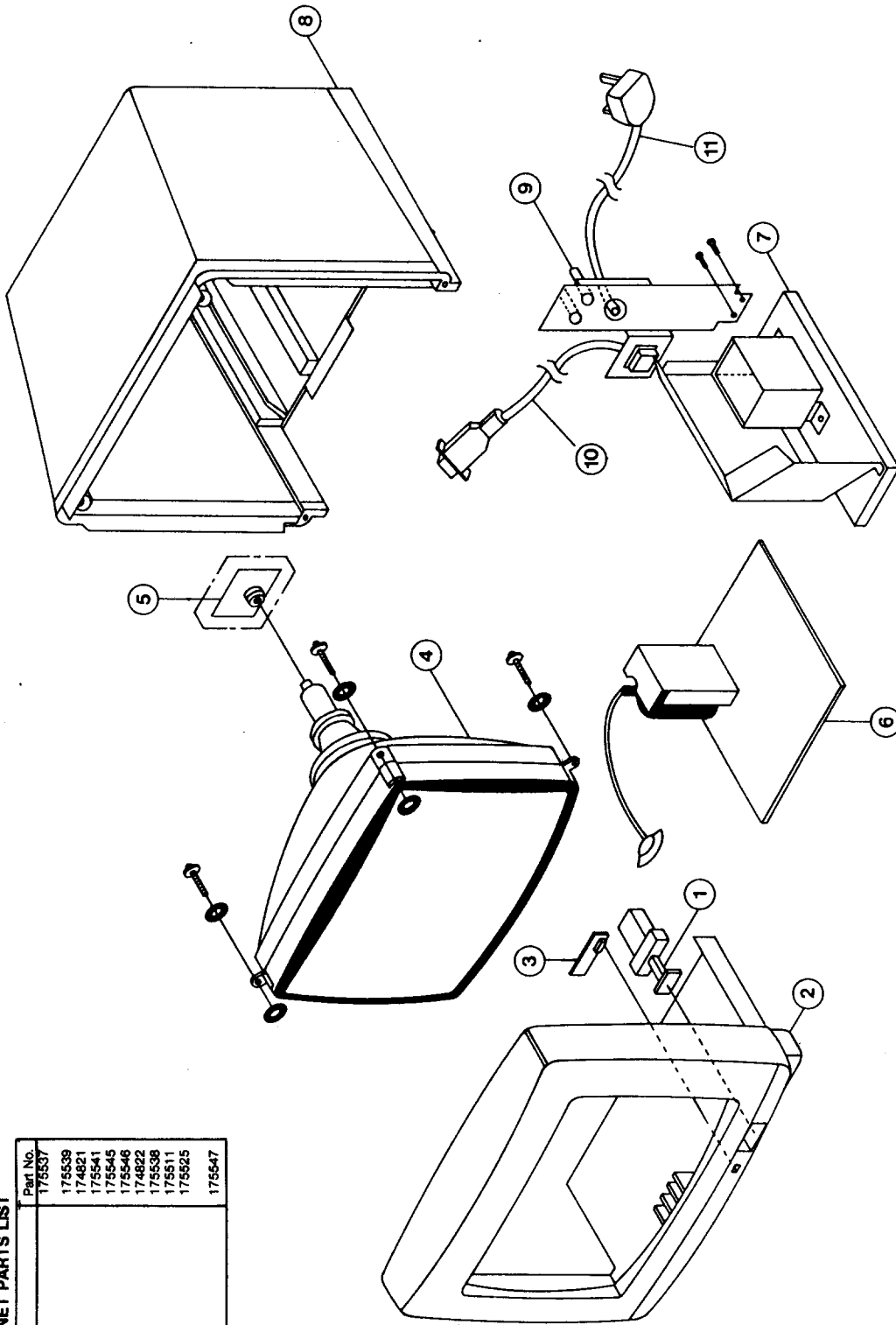


S-12 MM/D SECTION

S-12MM/D MONITOR CABINET EXPLODED VIEW

S-12MM/D CABINET PARTS LIST

Ref. No.	Description	Part No.
1	Button Power	175537
2	Front Cabinet	175538
3	LED PCB	174821
4	CRT	175541
5	Main PCB	175545
6	Bracket Power Tx.	175546
7	Back Cabinet	174822
8	Terminal Bracket	175538
9	Cable Signal	175511
10	Main Lead	175525
11	Power Supply PCB	175547

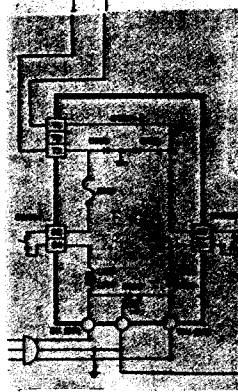
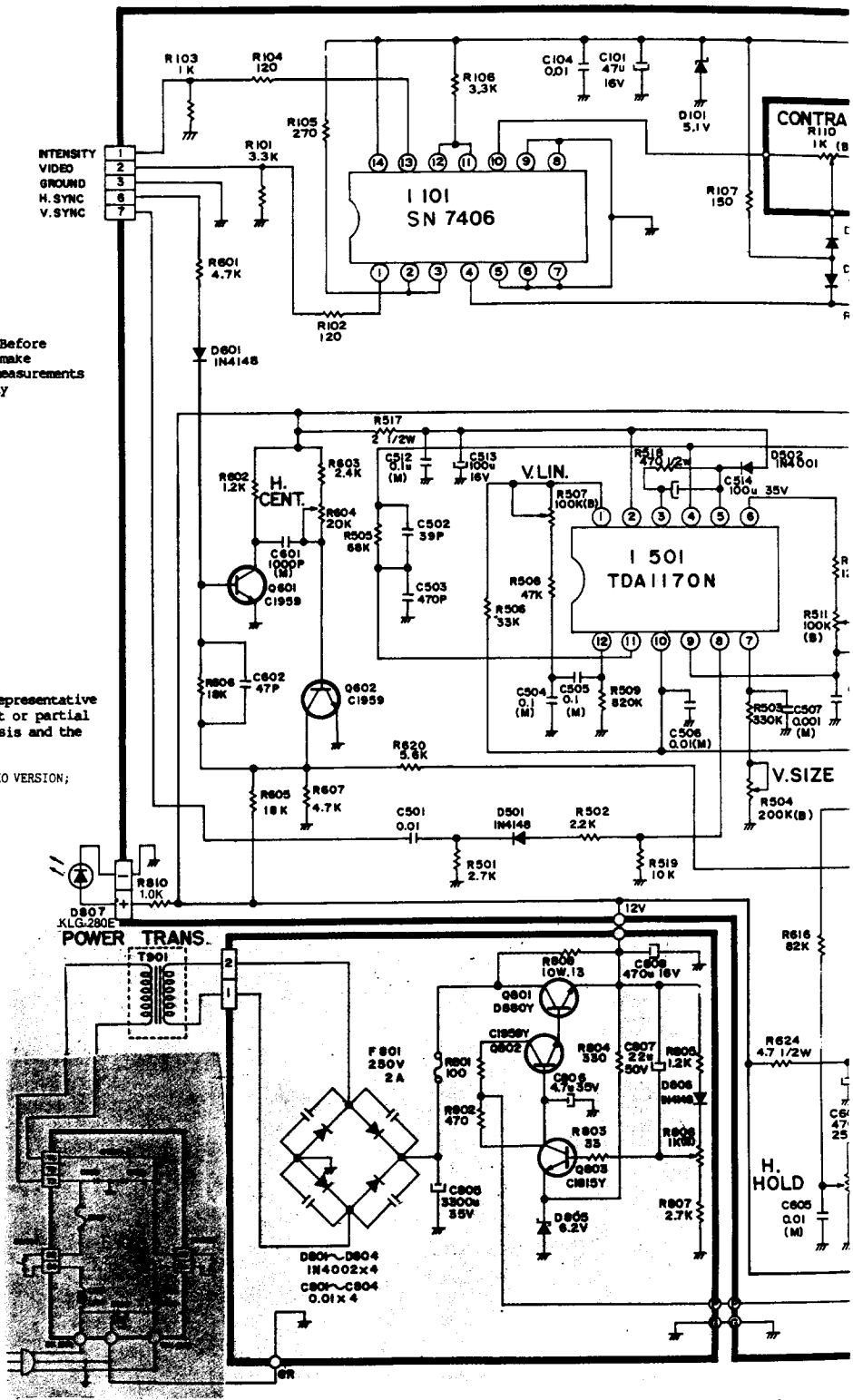


CAUTION - FOR CONTINUED SAFETY, REPLACE ALL CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS. REFER TO SERVICE LITERATURE.
ATTENTION - POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL, NE REMPLACER LES COMPOSANTS QUE PAR LES FONCTIONNEMENTS CRITIQUE FOURNIS PAR LE FABRICANT. CONSULTER LES INSTRUCTIONS.

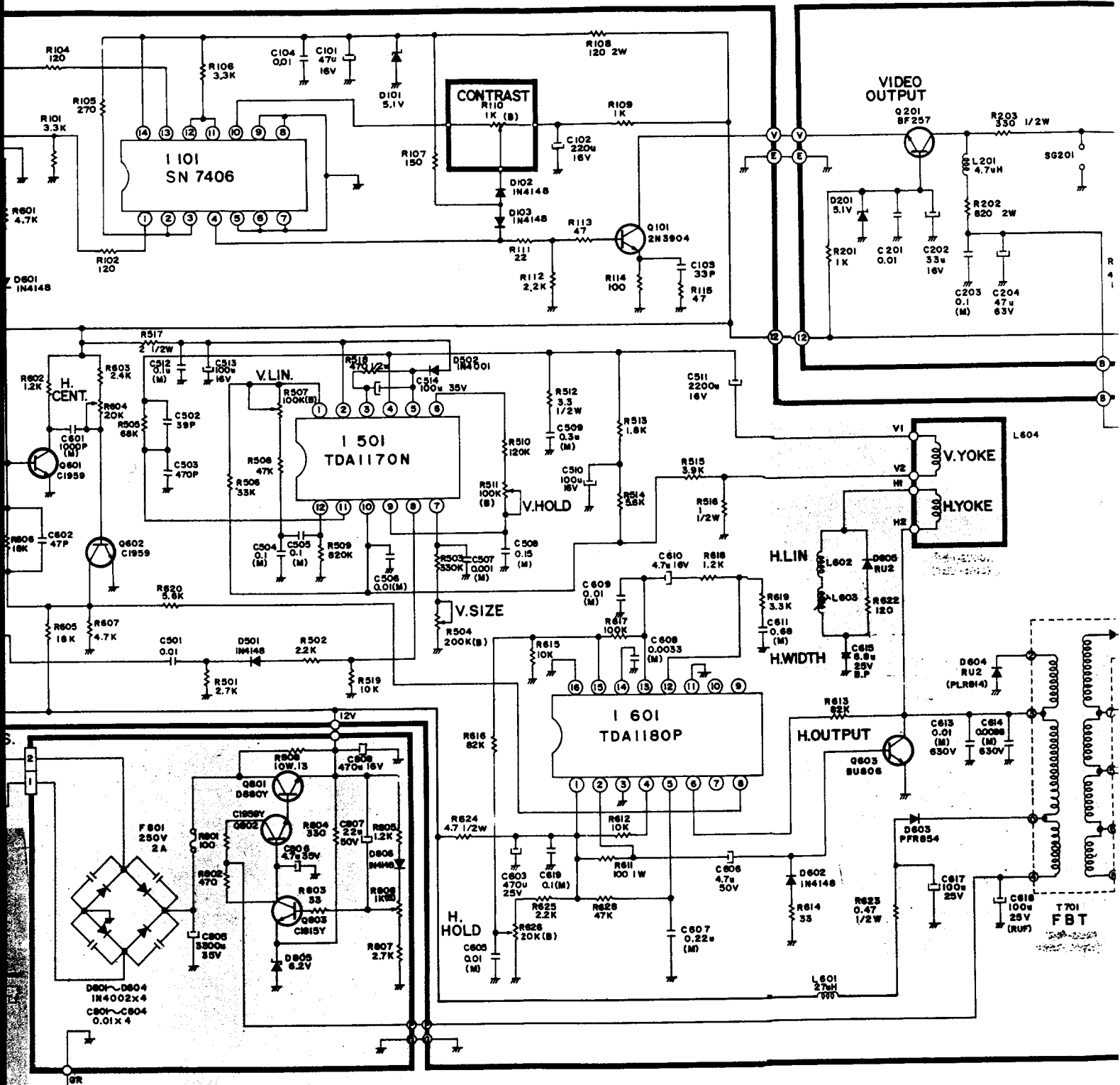
"CAUTION" - TO the service technicians - Before returning the receiver to the customer to make appropriate leakage current or resistance measurements to determine that exposed parts are properly insulated from the supply circuit.



1. All resistance values in ohms
K=1,000 M=1,000,000
2. Unless other wise noted in schematic diagram. All capacitors values less than 1 are expressed in mfd the values more than 1 are in pfd.
3. This schematic diagram cover basic or representative chassis only. there may be some component or partial schematic difference between actual chassis and the schematic diagram.
4. K, UL, CSA VERSION: 250V T 0.6A BSI, VDE, SEMKO VERSION; 250V T 0.315A

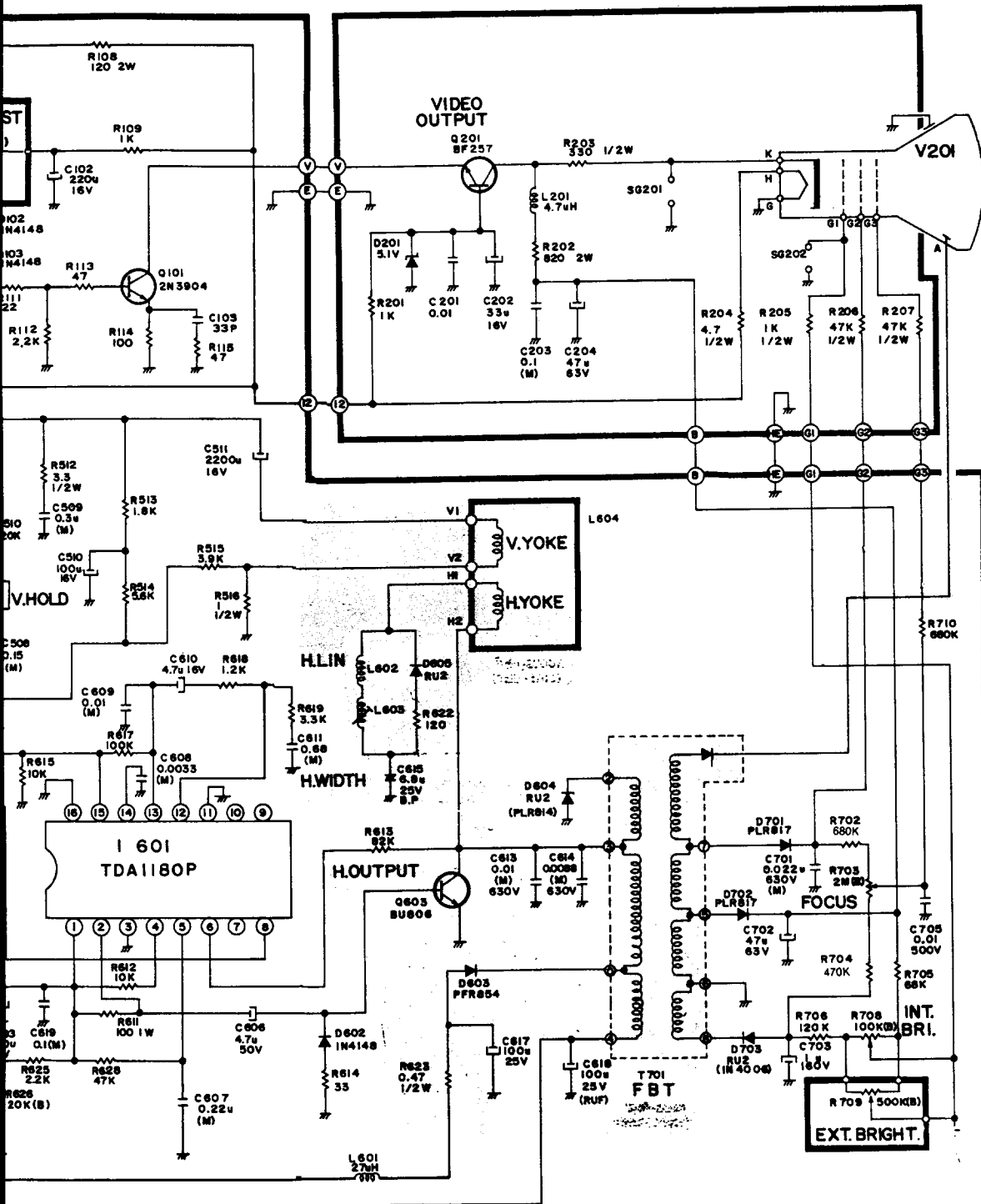


S-12 MM SCHEMATIC DIAGRAM

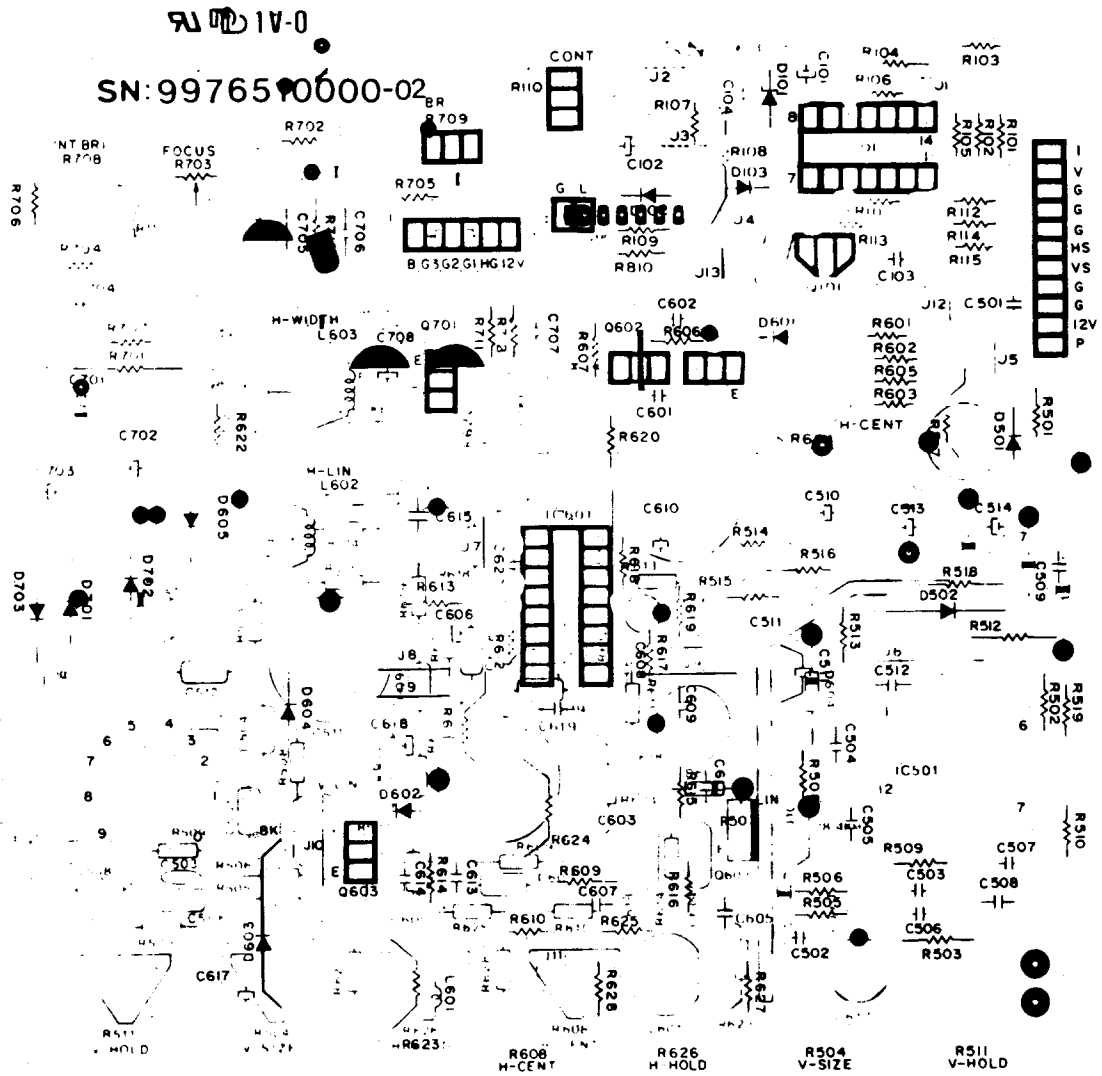


SCHEMATIC DIAGRAM

S/N. 4858806611

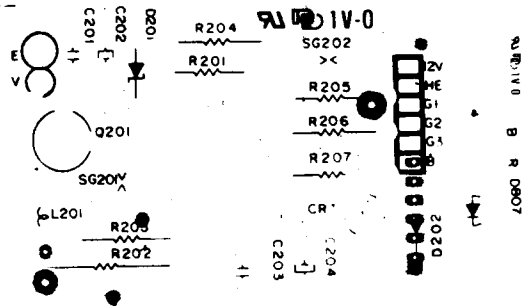


MAIN PCB (BOTTOM VIEW)

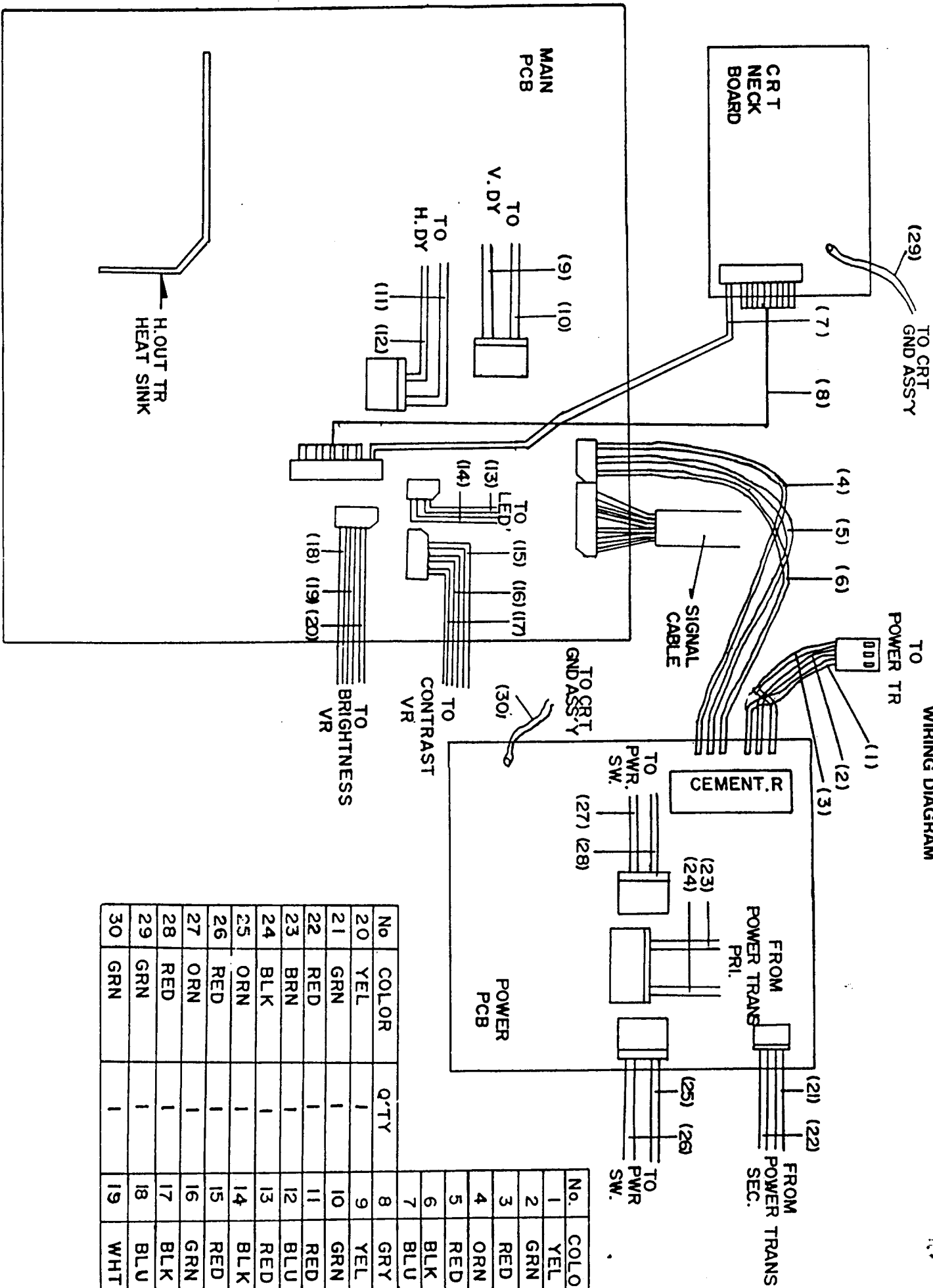


THE QUALITY OF THIS PAGE IS THE BEST THAT IS AVAILABLE

CRT PCB (BOTTOM VIEW)



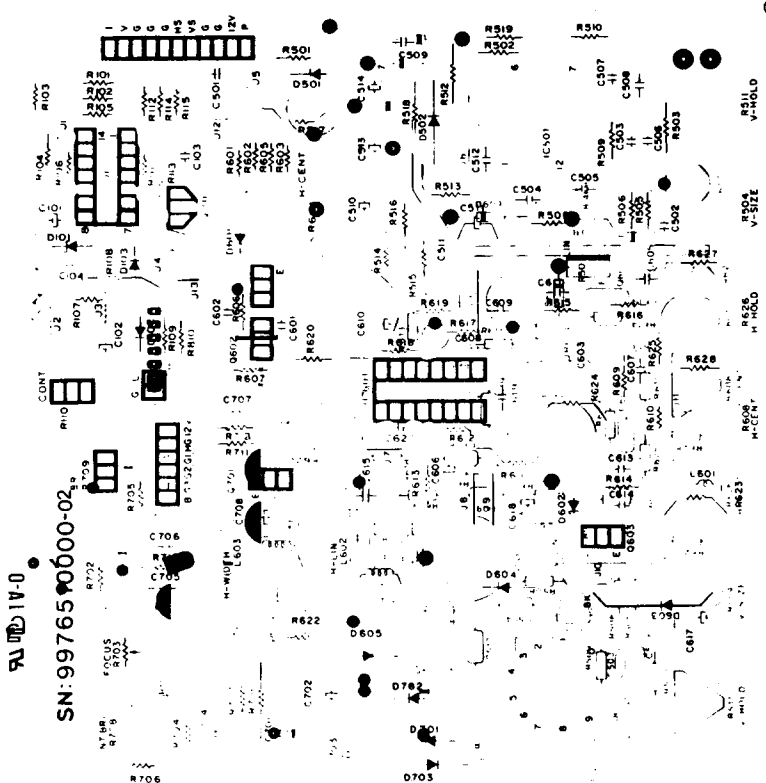
WIRING DIAGRAM



No	COLOR	Q'TY
20	YEL	1
21	GRN	1
22	RED	1
23	BRN	1
24	BLK	1
25	ORN	1
26	RED	1
27	ORN	1
28	RED	1
29	GRN	1
30	GRN	1

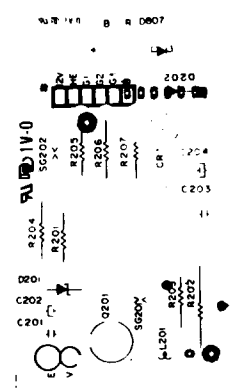
No.	COLOR	Q'TY
1	YEL	1
2	GRN	1
3	RED	1
4	ORN	1
5	RED	1
6	BLK	1
7	BLU	1
8	GRY	5
9	YEL	1
10	GRN	1
11	RED	1
12	BLU	1
13	RED	1
14	BLK	1
15	RED	1
16	GRN	1
17	BLK	1
18	BLU	1
19	WHT	1

MAIN PCB (BOTTOM VIEW)



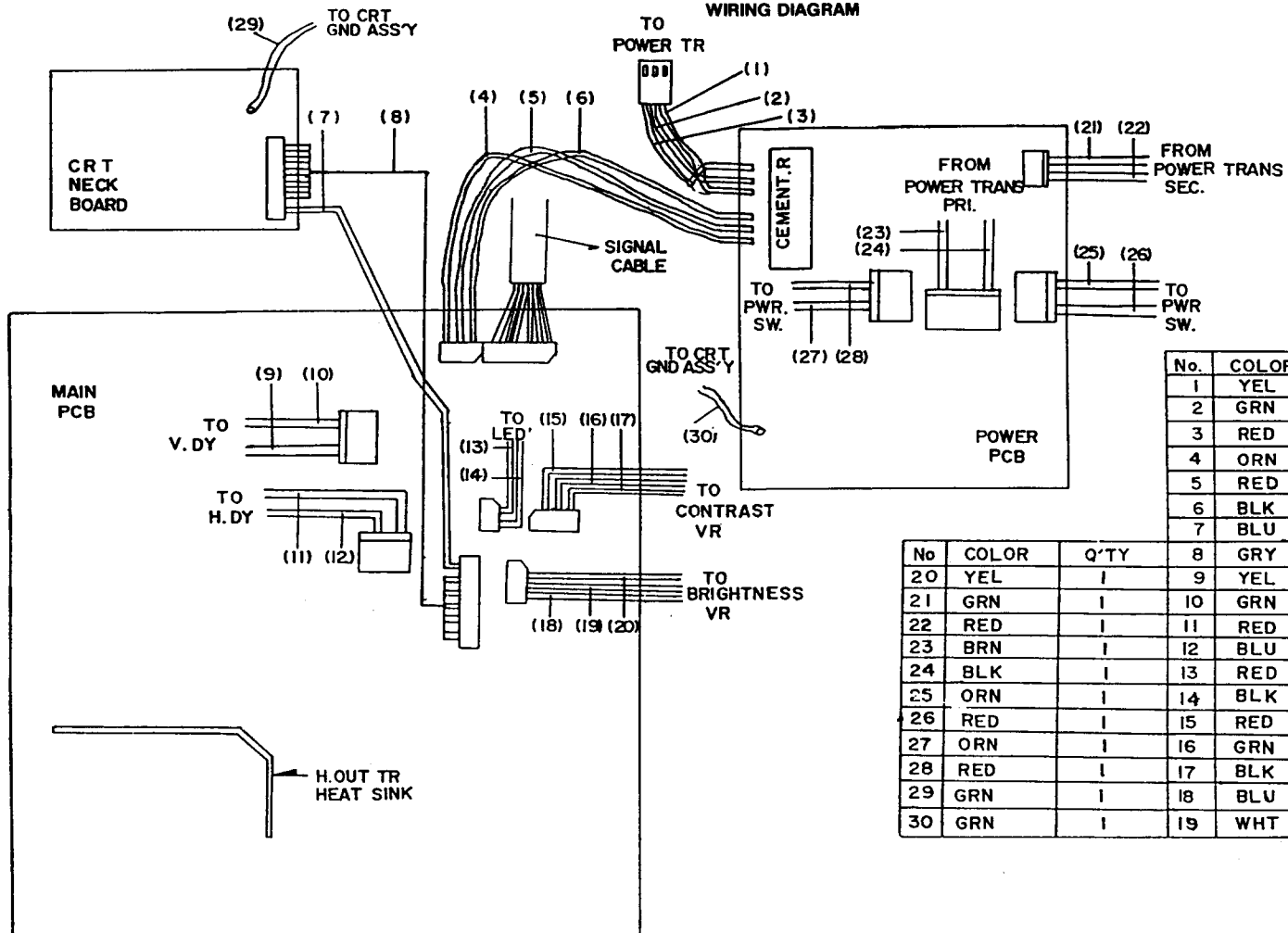
For Service Manuals contact
MAURITRON SERVICES
 8 Cherry Tree Road, Chinnor
 Oxfordshire, OX9 3EY, UK
 Tel: (01844) 351854
 Fax: (01844) 352854

CRT PCB (BOTTOM VIEW)



THE QUALITY OF THIS PAGE IS THE BEST THAT IS AVAILABLE

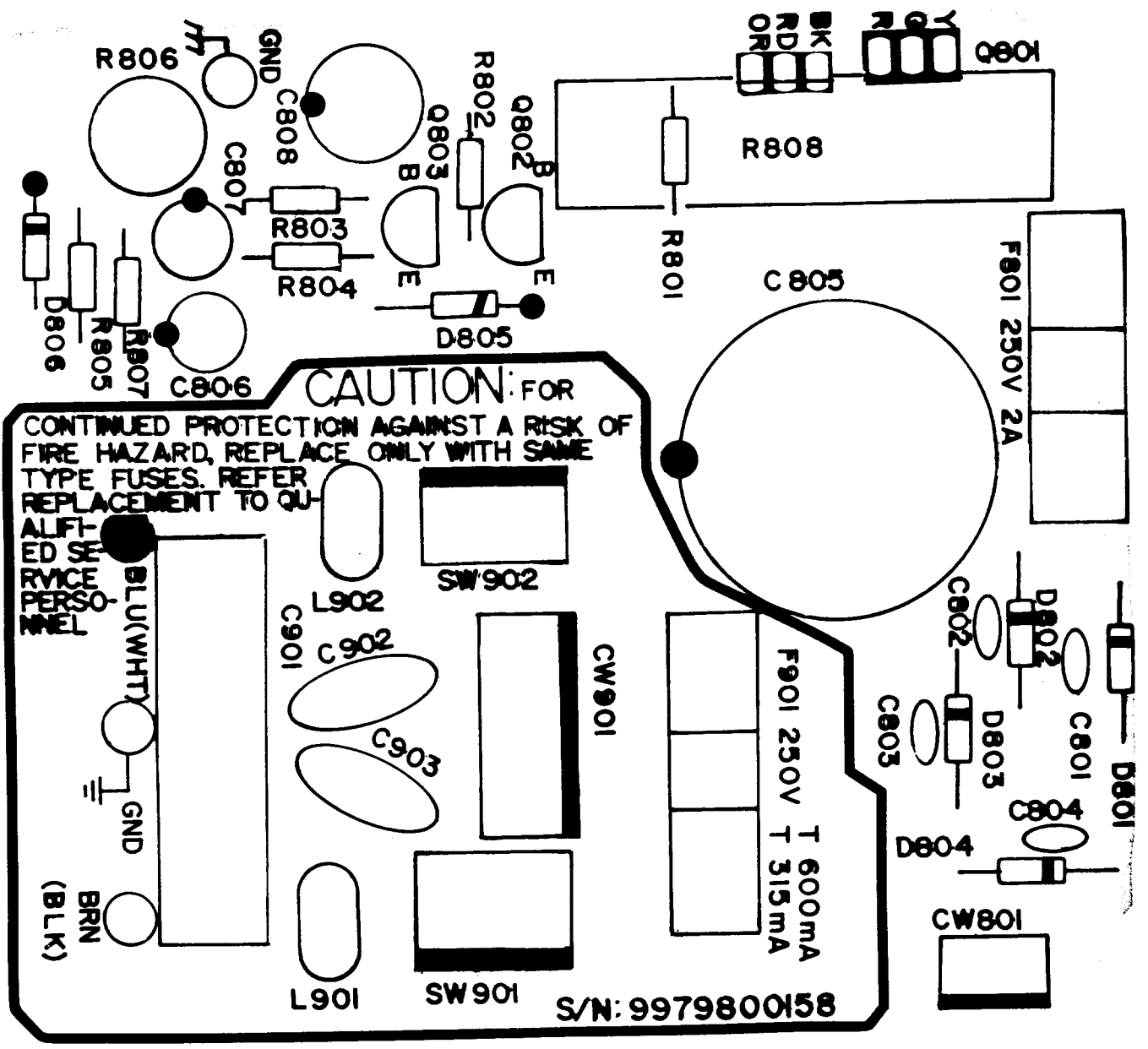
WIRING DIAGRAM



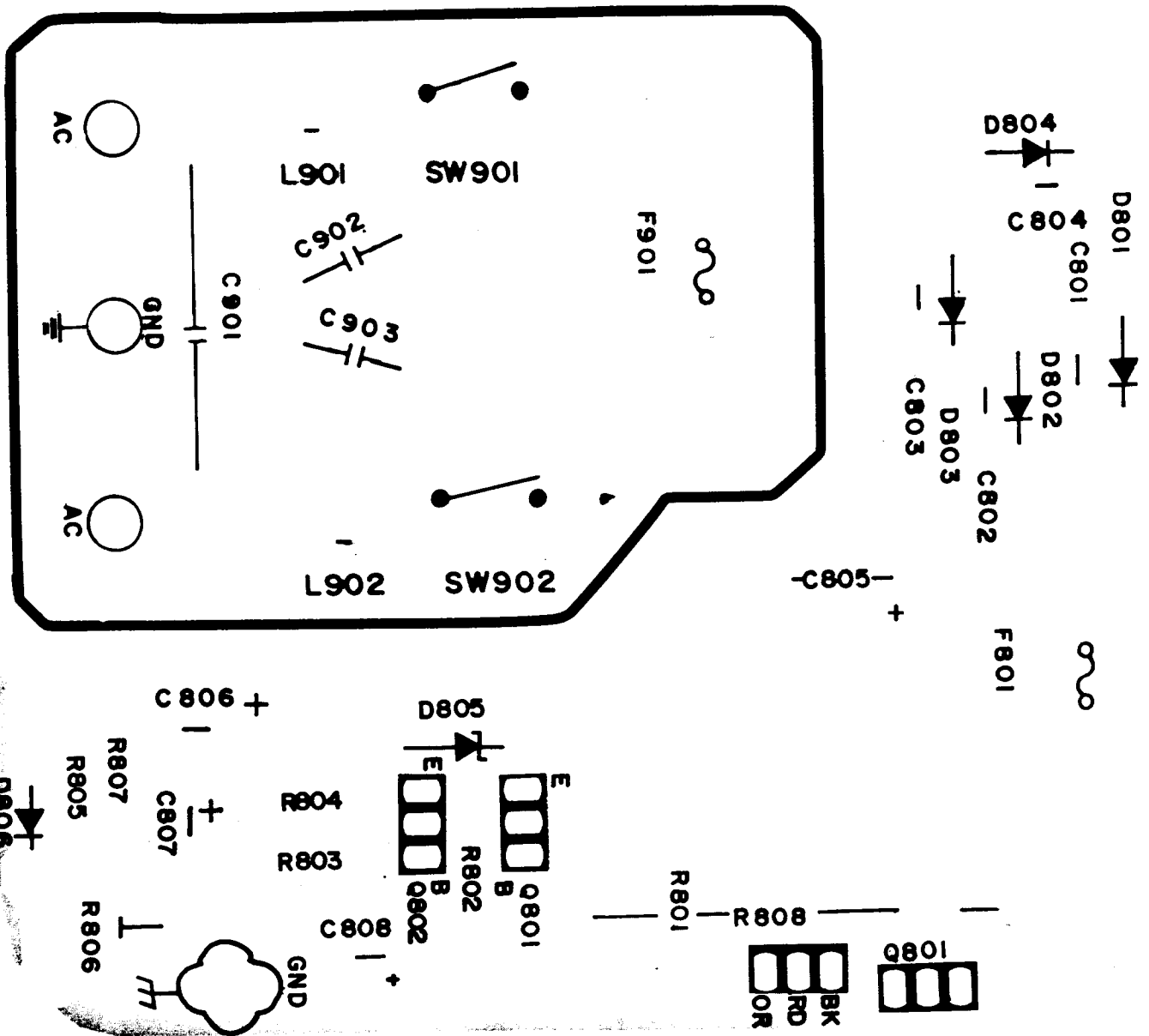
No.	COLOR	Q'TY
1	YEL	1
2	GRN	1
3	RED	1
4	ORN	1
5	RED	1
6	BLK	1
7	BLU	1

No	COLOR	Q'TY	No	COLOR	Q'TY
8	GRY	5	10	GRN	1
20	YEL	1	11	RED	1
21	GRN	1	12	BLU	1
22	RED	1	13	RED	1
23	BRN	1	14	BLK	1
24	BLK	1	15	RED	1
25	ORN	1	16	GRN	1
26	RED	1	17	BLK	1
27	ORN	1	18	BLU	1
28	RED	1	19	WHT	1
29	GRN	1			
30	GRN	1			

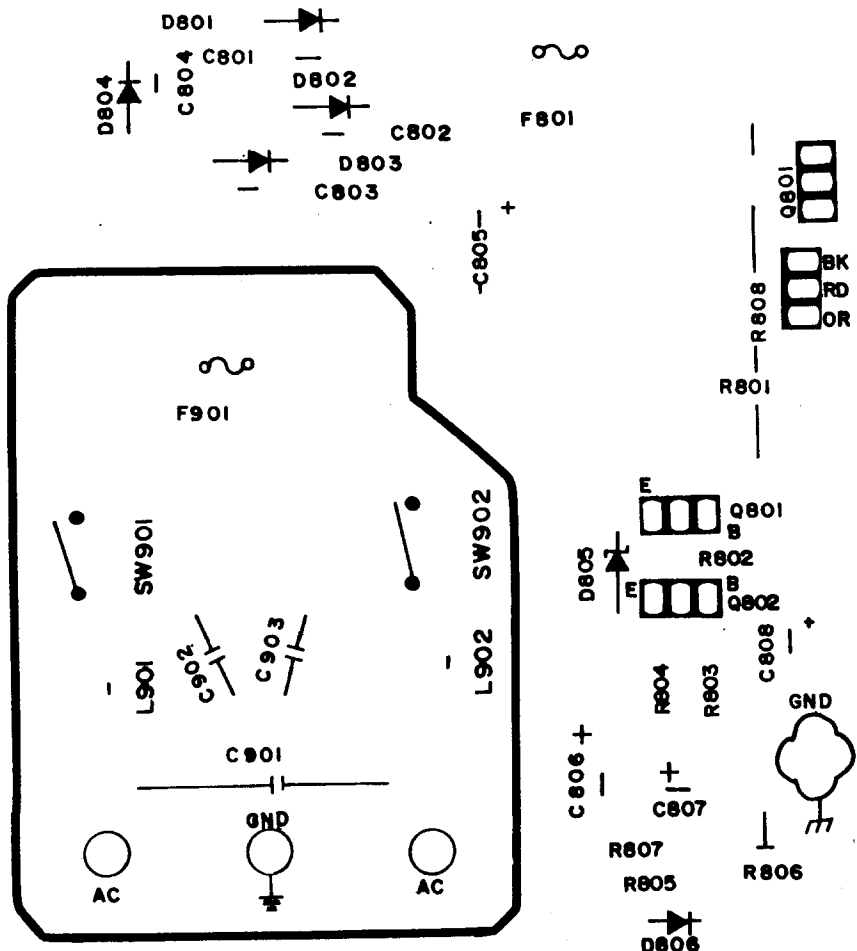
POWER SUPPLY P.C.B. (TOP VIEW)



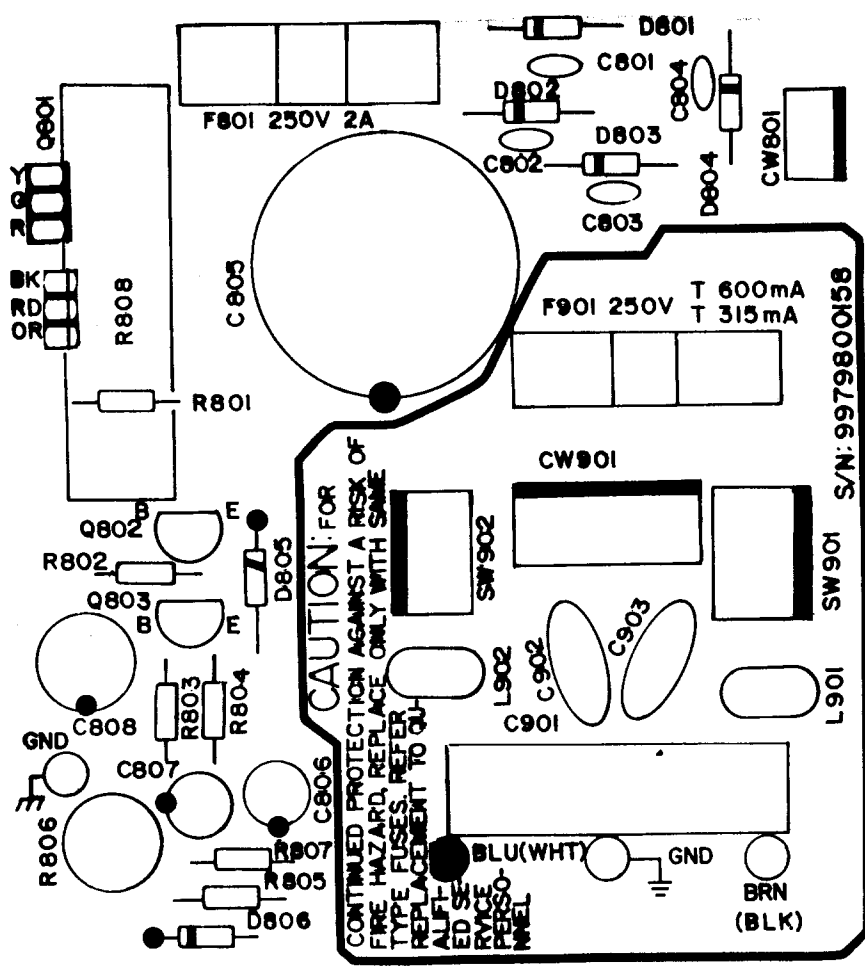
POWER SUPPLY P.C.B. (BOTTOM VIEW)



POWER SUPPLY P.C.B. (BOTTOM VIEW)



POWER SUPPLY P.C.B. (TOP VIEW)



S-12MM/D ELECTRICAL PARTS LIST

Ref. No.	Description	Part No.
IC's		
IC101	IC SN7406	175561
IC501	IC TDA1170N	175562
IC601	IC TDA1180P	175560
Transistors		
Q101	TR KN3904	175551
Q201	TR BF258	175564
Q601, 602, 802	TR KTC1959-Y	175552
Q603	TR BU-806 Darlington	175565
Q801	TR KTD880Y	175550
Q803	TR KTC1815-Y	170447
Diodes		
D101, 201	DZ ZPD5.1	175544
D102, 103, 501, 601, 602, 806	D 1N4148	192505
D502	D 1N4001	175542
D603	D PFR854	175555
D604, 605, 703	D RU-2	175357
D701, 702	D PLR817	175556
D801-804	D 1N4002	175543
D805	DZ ZPD6.2E	175501
D807	LED KLG-208E	175327
Coils		
L201	Coil Peaking 4.7uH	175303
L601	Coil Choke 27uH	175531
L602	Coil Linearity 080-12-003	175532
L603	Coil Width 050-12-002	175533
L901, 902	Coil Choke L-100	175530
Variable Resistors		
R110	VROT 1kΩ	175534
R504	VRSF 200kΩ	174823
R507, 708	VRSF 100kΩ	174824
R511	VRSF 100kΩ CET-117C	174825
R604	VRSF 22kΩ	174826
R626	VRSF 20kΩ	174827
R703	VRSF 2MΩ	174828
R709	VROT 500kΩ	175535
R806	VRSF 1kΩ H1051C	174829
PCB's		
	PCB Main Assembly MM-22	175546
	PCB CRT Assembly	175545/A
	PCB Power Assembly	175547
Description	Ref. No.	Part No.
Resistors (All 1/4W)		
22Ω	R111	174851
33Ω	R614, 803	174852
47Ω	R113, 115	174853
100Ω	R114, 801	10032
120Ω	R102, 104, 622	10034
150Ω	R107	10036
270Ω	R105	10042
330Ω	R804	10044
470Ω	R802	10048
1kΩ	R103, 109, 201, 810	10061
1.2kΩ	R602, 618, 805	10063
1.8kΩ	R513	10067
2.2kΩ	R112, 502, 625	10069
2.4kΩ	R603	174854
2.7kΩ	R501, 807	10068
3.3kΩ	R101, 106, 619	10073
3.9kΩ	R515	10075
4.7kΩ	R601, 607	10077
5.6kΩ	R514, 620	10079
10kΩ	R519, 612, 615	10085
18kΩ	R605, 606	10091
33kΩ	R506	10097
47kΩ	R508, 628	10101
68kΩ	R505, 705	10105
82kΩ	R613, 616	10107
100kΩ	R617	10109
150kΩ	R510	10113
330kΩ	R503	10121
470kΩ	R704	10125
680kΩ	R702, 710	10129
820kΩ	R509	10130
1.2MΩ	R701	10148

Description	Ref. No.	Part No.
Resistors (all 1/2W)		
3.3Ω	R512	176542
330Ω	R203	174834
470Ω	R518	201711
1kΩ	R205	174835
47kΩ	R206, 207	176563
Metal Oxide Resistors		
0.47Ω/1/2W	R623	176533
1Ω/1/2W	R516	174836
2Ω/1/2W	R517	174837
4.7Ω/1/2W	R204, 624	174838
100Ω/1W	R611	174839
120Ω/2W	R108	176551
820Ω/2W	R202	800205
Cement Resistors		
13Ω/10W	R808	174833
Ceramic Capacitors		
33pF	C103	150514
39pF	C502	150490
47pF	C602	150515
470pF	C503	190822
4700pF/400V AC	C902, 903	174840
0.01μF	C104, 201, 501, 801-804	21006
0.01μF/500V	C704, 705	174841
Electrolytic Capacitors		
1μF/160V	C703	174868
4.7μF/16V	C610	1409167
4.7μF/35V	C806	174842
4.7μF/50V	C606	174843
6.8μF/25V	C615	174844
22μF/50V	C807	174845
33μF/16V	C202	174846
47μF/16V	C101	20053
47μF/63V	C204, 702	150476
100μF/16V	C510, 513	20028
100μF/25V	C617, 618	174847
100μF/35V	C514	174848
220μF/16V	C102	20029
470μF/16V	C808	20044
470μF/25V	C603	174849
2200μF/16V	C511	174850
3300μF/35V	C805	174855
Mylar Capacitors		
1000pF/100V	C507, 601	174856
8800pF/630V	C614	174857
0.0033μF/100V	C608	174858
0.01μF/100V	C506, 605, 609	174859
0.01μF/630V	C613	174860
0.022μF/630V	C701	174861
0.1μF/100V	C203, 504, 505, 512, 619	174862
0.18μF/100V	C508	174863
0.22μF/100V	C607	174864
0.3μF/100V	C509	174865
0.68μF/100V	C611	174866
Line Across Capacitors		
0.1μF/250V AC	C901	171658
Ref. No.	Description	Part No.
Miscellaneous		
T701	FBT DBF-1355C CRT Socket BASF 7 Pin	175557 175507
	CRT R12CPW3-DH	175541
	Spark Gap S-21	174830
SG201, 202	Fuse 2A (T)	175811
F801	Fuse 315mA (T)	
F901	Power On/Off Switch	174831
SW001	5289-02A Dip	174832
SW901, 902	Power Transformer TDM-121 MC	175536
T901	D.Y. Assembly 00040	175554
	Connector Signal Assembly	175525

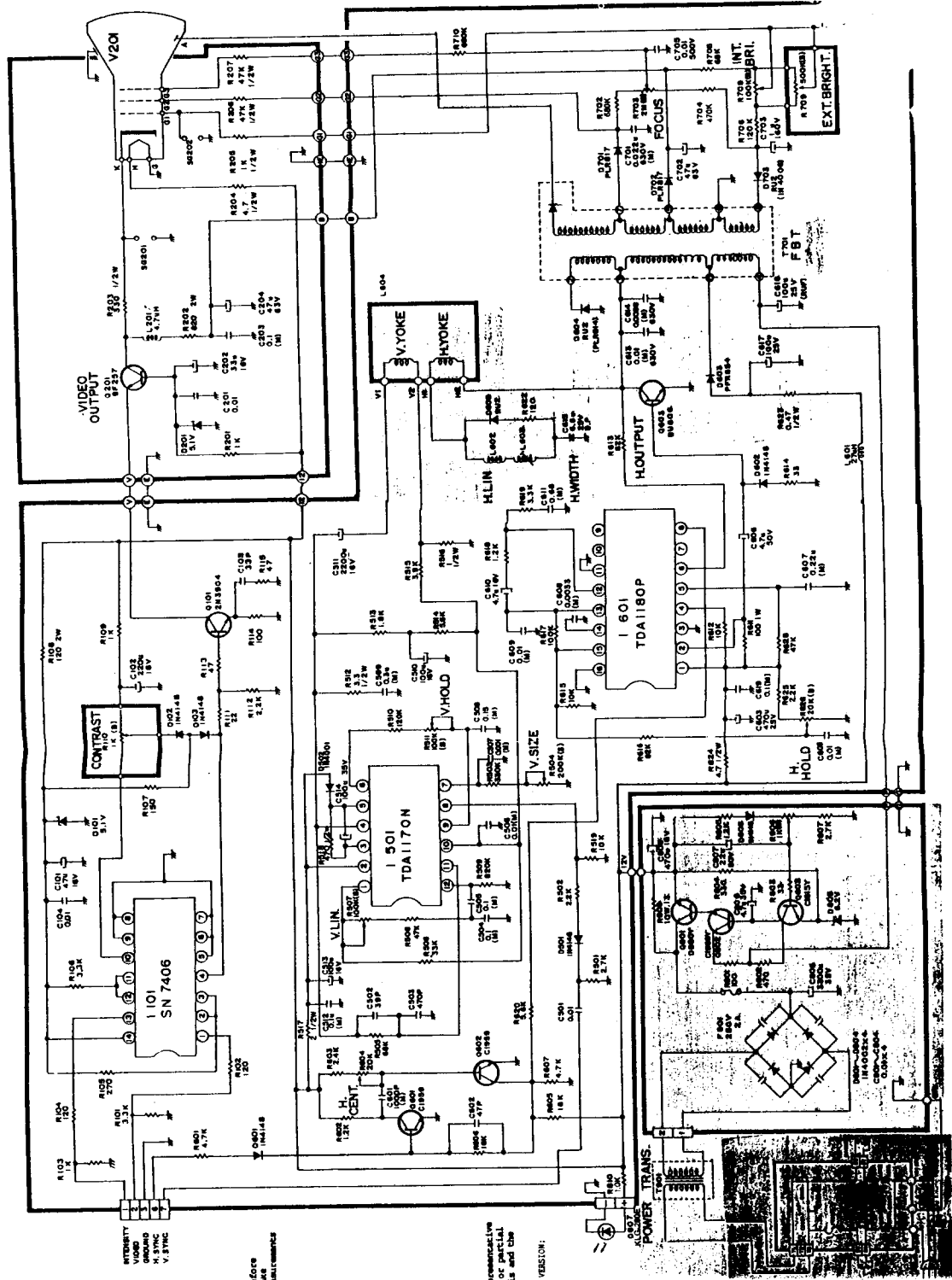
S-12MM/D ELECTRICAL PARTS LIST

Ref. No.	Description	Part No.	Description	Ref. No.	Part No.
IC's					
IC101	IC SN7406	175561		R512	176542
IC501	IC TDA1170N	175562		R203	174834
IC601	IC TDA1180P	175560		R518	201711
Transistors					
Q101	TR KN3904	175551		R205	174835
Q201	TR BF258	175564		R206, 207	176563
Q601, 602, 802	TR KTC1959-Y	175552		Metal Oxide Resistors	
Q603	TR BU-806 Darlington	175565		0.47Ω/½W	176533
Q801	TR KTD880Y	175550		1Ω/½W	174836
Q803	TR KTC1815-Y	170447		2Ω/½W	174837
Diodes					
D101, 201	DZ ZPD5.1	175544		4.7Ω/½W	174838
D102, 103, 501, 601, 602, 806	D 1N4148	192505		100Ω/1W	174839
D302	D 1N4001	175542		200Ω/2W	176551
D603	D PFR854	175555		820Ω/2W	800205
D604, 605, 703	D RU-2	175357		Cement Resistors	
D701, 702	D PLR817	175558		13Ω/10W	174833
D801-804	D 1N4002	175543		Ceramic Capacitors	
D805	DZ ZPD6.2E	175501		33pF	C103
D807	LED KLG-208E	175327		39pF	C502
Coils					
L201	Coil Peaking 4.7μH	175303		47pF	C503
L601	Coil Choke 27μH	175531		4700pF/400V AC	C902, 903
L602	Coil Linearity 080-12-003	175532		0.01μF	C104, 201, 501, 801-804
L603	Coil Width 050-12-002	175533		0.01μF/500V	C704, 705
L901, 902	Coil Choke L-100	175530		Electrolytic Capacitors	
Variable Resistors					
R110	VROT 1kΩ	175534		1μF/160V	C703
R504	VRSF 200kΩ	174823		4.7μF/16V	C610
R507, 708	VRSF 100kΩ	174824		4.7μF/35V	C806
R511	VRSF 100kΩ OET-117C	174825		4.7μF/50V	C806
R604	VRSF 22kΩ	174826		6.8μF/25V	C615
R628	VRSF 20kΩ	174827		22μF/50V	C807
R703	VRSF 2MΩ	174828		33μF/16V	C202
R709	VROT 500kΩ	175535		47μF/16V	C101
R808	VRSF 1kΩ H1051C	174829		47μF/63V	C204, 702
PCB's					
	PCB Main Assembly MM-22	175546		100μF/16V	C510, 513
	PCB CRT Assembly	175545/A		100μF/25V	C817, 818
	PCB Power Assembly	175547		100μF/35V	C314
Resistors (All ½W)					
22Ω	R111	174851		220μF/16V	C102
33Ω	R614, 803	174852		470μF/25V	C808
47Ω	R113, 115	174853		2200μF/16V	C511
100Ω	R114, 801	10032		3300μF/35V	C805
120Ω	R102, 104, 622	10034		Mylar Capacitors	
150Ω	R107	10036		1000pF/100V	C507, 601
270Ω	R105	10042		8800pF/630V	C814
330Ω	R804	10044		0.0033μF/100V	C808
470Ω	R802	10046		0.01μF/100V	C508, 605, 608
1kΩ	R103, 109, 201, 810	10061		0.01μF/630V	C813
1.2kΩ	R802, 618, 905	10063		0.022μF/630V	C701
1.8kΩ	R513	10067		0.1μF/100V	C203, 504, 505, 512, 619
2.2kΩ	R112, 502, 625	10069		0.18μF/100V	C508
2.4kΩ	R603	10067		0.22μF/100V	C807
2.7kΩ	R501, 807	10068		0.3μF/100V	C509
3.3kΩ	R101, 106, 619	10073		0.68μF/100V	C811
3.9kΩ	R515	10075		Line Across Capacitors	
4.7kΩ	R601, 607	10077		0.1μF/250V AC	C901
5.8kΩ	R514, 620	10079		Miscellaneous	
10kΩ	R519, 612, 615	10085		T701	FBT DBF-1355C
18kΩ	R805, 608	10091		SG201, 202	CRT Socket BASF 7 Pin
33kΩ	R506	10097		F801	CRT R12CPW3-DH
47kΩ	R508, 628	10101		F901	Spark Gap S-21
68kΩ	R505, 705	10105		SW001	Fuse 2A (T)
82kΩ	R613, 616	10107		SW001	Fuse 315mA (T)
100kΩ	R617	10109		SW901, 902	Power On/Off Switch
150kΩ	R510	10113		T901	Power Transformer TDM-121 MC
330kΩ	R503	10121			5289-02A Dip
470kΩ	R704	10125			Power Transformer 000-40
680kΩ	R702, 714	10129			D.Y. Assembly 000-40
820kΩ	R509	10130			Connector Signal Assembly
1.2MΩ	R701	10148			

AMSTRAD PLC
FLEET HOUSE, RIVER WAY, HARLOW, ESSEX.
Telephone: 0279 454555

S-12 MM SCHEMATIC DIAGRAM

S/N. 4858806611

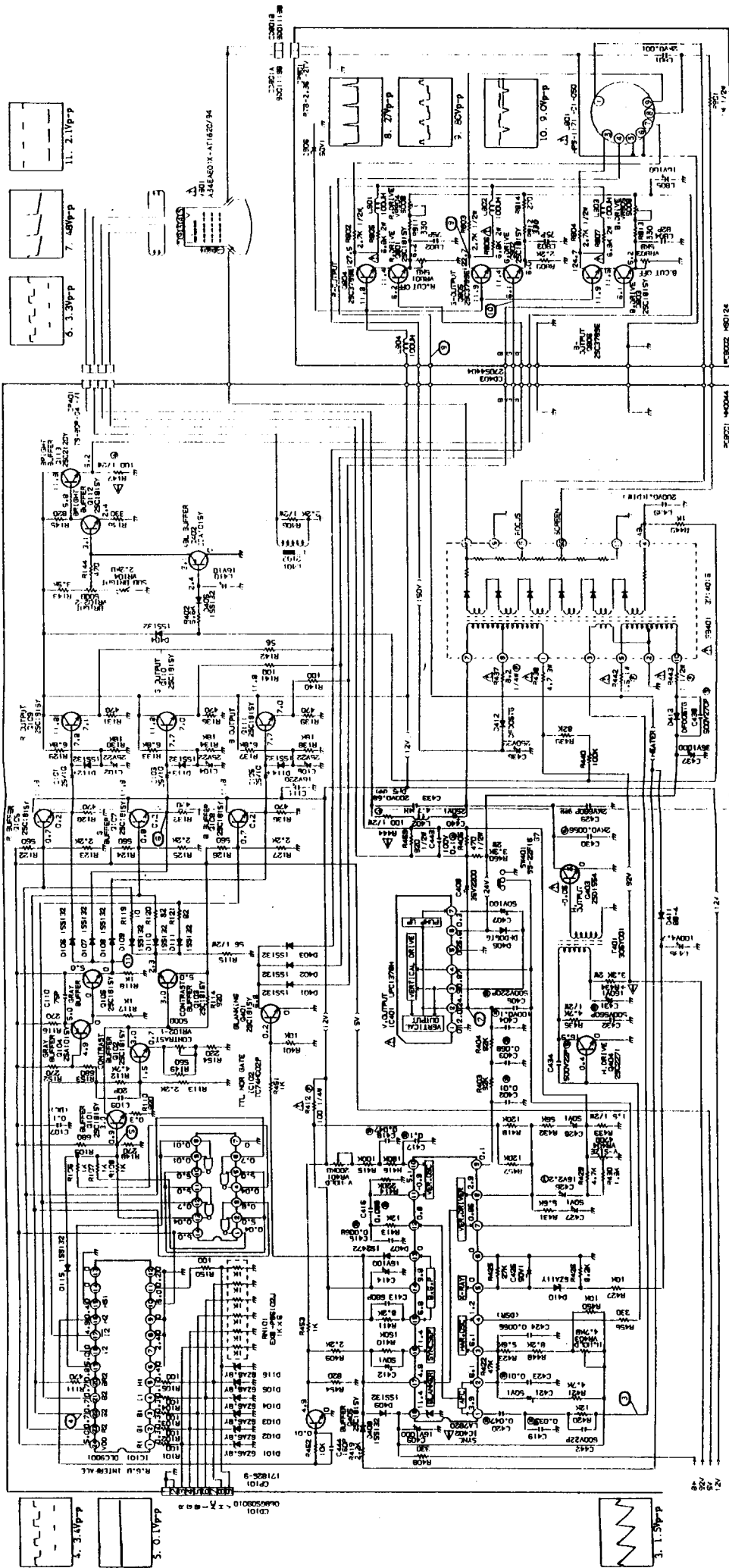


IDENTITY
GROUND
X SYNC
V SYNC

REPLACE WITH CORRECTED PARTS. REPLACE
THESE COMPONENTS ONLY WITH
EQUIVALENTS TO ORIGINAL PARTS.
DO NOT ATTEMPT TO REPAIR OR
REPLACE THESE COMPONENTS.
FOR REPAIRS, CONSULT THE
REPAIR MANUAL FOR THE
APPROPRIATE PARTS LISTING.

* CAUTION - TO THE SERVICE TECHNICIAN - BEFORE
REPAIRING THIS RECEIVER TO THE CUSTOMER TO MAKE
SURE THAT THE RECEIVER IS IN GOOD WORKING ORDER
TO OBSERVE THAT EXPANDED PARTS ARE PROPERLY
LIMITED FROM THE SUPPLY CIRCUIT.

1. All resistance values in ohm
2. Unless other wise noted in schematic
diagram. All capacitors values less
than 1000 pF are in pF.
3. This schematic diagram cover basic or representative
schematic only, there may be some component or partial
schematic difference between actual chassis and the
schematic diagram.
4. X. I. I. USA VERSION: 250V T.O. 6A SET, 704, SEMO VERSION:
250V T.O. 315A



CAUTION: SINCE THESE PARTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONLY THOSE DESCRIBED ON PARTS LIST ONLY.

ATTENTION: USE THESE PARTS MARKED BY Δ START IMMEDIATELY AFTER THE PARTS LIST. THESE PARTS ARE CRITICAL FOR SAFETY. USE ONLY THOSE DESCRIBED ON PARTS LIST ONLY.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.