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**ADJUSTMENT SWITCHES**

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LEFT HAND COIN SLOT IS CONTROLLED BY SW #1

**SW #1**

OFF	1 COIN - 1 PLAY
ON	2 COINS - 1 PLAY

RIGHT HAND COIN SLOT IS CONTROLLED  
BY SW #2 AND 3

SW#2	SW#3	
OFF	OFF	1 COIN - 1 PLAY
ON	OFF	2 COINS - 1 PLAY
OFF	ON	1 COIN - 3 PLAYS
ON	ON	1 COIN - 5 PLAYS

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**NUMBER OF BASES PER GAME**

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**SW#7**

ON	4 BASES
OFF	3 BASES

NOTE: SWITCHES 4,5,6, AND 8  
ARE NOT USED

MO51-00902-A007

## Additional Devices:

2N4401	NPN transistor
T1S-137	PNP transistor
IN4004	Diode
IN4148	Diode
14.31818	Crystal

Pattern Board  
(PC A082-91355-C000)

<u>Chip Number</u>	<u>Function</u>
74LS00	Quad 2 input nand
74LS04	Hex inverter
74LS74	Dual "D" Flip-Flop
74LS157	Quad 2 input multiplexer
74LS161	4 bit binary counter
74LS175	Quad "D" Flip-Flop
74LS257	Quad 2 input multiplexer
74LS367	Hex bus driver
CD4555	Dual binary 1 or 4 decoder
MC14008	4 bit full adder
MC14013	Dual "D" Flip-Flop
MC14068	8 input nand
MC14174	Hex "D" Flip-Flop
MC14175	Quad "D" Flip-Flop
MC14516	Binary up/down counter
MC14539	Dual 4 input multiplexer
MC14572	Multiple gate package

RAM Board  
(PC 082-91356-C000)

74LS08	Quad input and
74LS14	Hex schmitt trigger
74LS166	Parallel to serial shift register
74LS253	Dual 4 input multiplexer
MK4027 (MK4015)	RAM

Audio Amplifier Board  
(PC A082-90903-A000)

2N4403	PNP transistor
TIP 31	NPN transistor
IN4004	Diode

Power Supply  
(PC A082-90411-A000)

<u>Chip Number</u>	<u>Function</u>
LM317	Voltage regulator
LM339	Quad voltage comparator
SG3532	General purpose regulator

Additional Devices:

79M05	Negative five voltage regulator
IN3235	Zener diode
2N3055	NPN transistor

Monitor Interface Board  
(PC 082-91373-B000)

<u>Chip Number</u>	<u>Function</u>
LM339	Quad voltage comparator
LM360	Differential comparator

Additional Devices:

MPS AZ0	Transistor
MPS A70	Transistor

Note: When an IC is a LS, it should be replaced by a LS device (low shchottky)

## SPACE ZAP LOGIC BOARDS

### Game Board (PC A084-90708-A902)

<u>Chip Number</u>	<u>Function</u>
74LS02	Quad 2 input nor
74LS08	Quad 2 input and
74LS32	Quad 2 input or
74LS74	Dual "D" Flip-Flop
74LS133	13 input nand
74LS138	3 to 8 line decoder
74LS139	Dual 2 to 4 line decoder
MC14078	8 input nor
MC14174	Hex "D" Flip-Flop
2114	RAM
2716-8516	PROM 16K
9316	ROM 16K
2720-(0066-117)	I & O custom chip

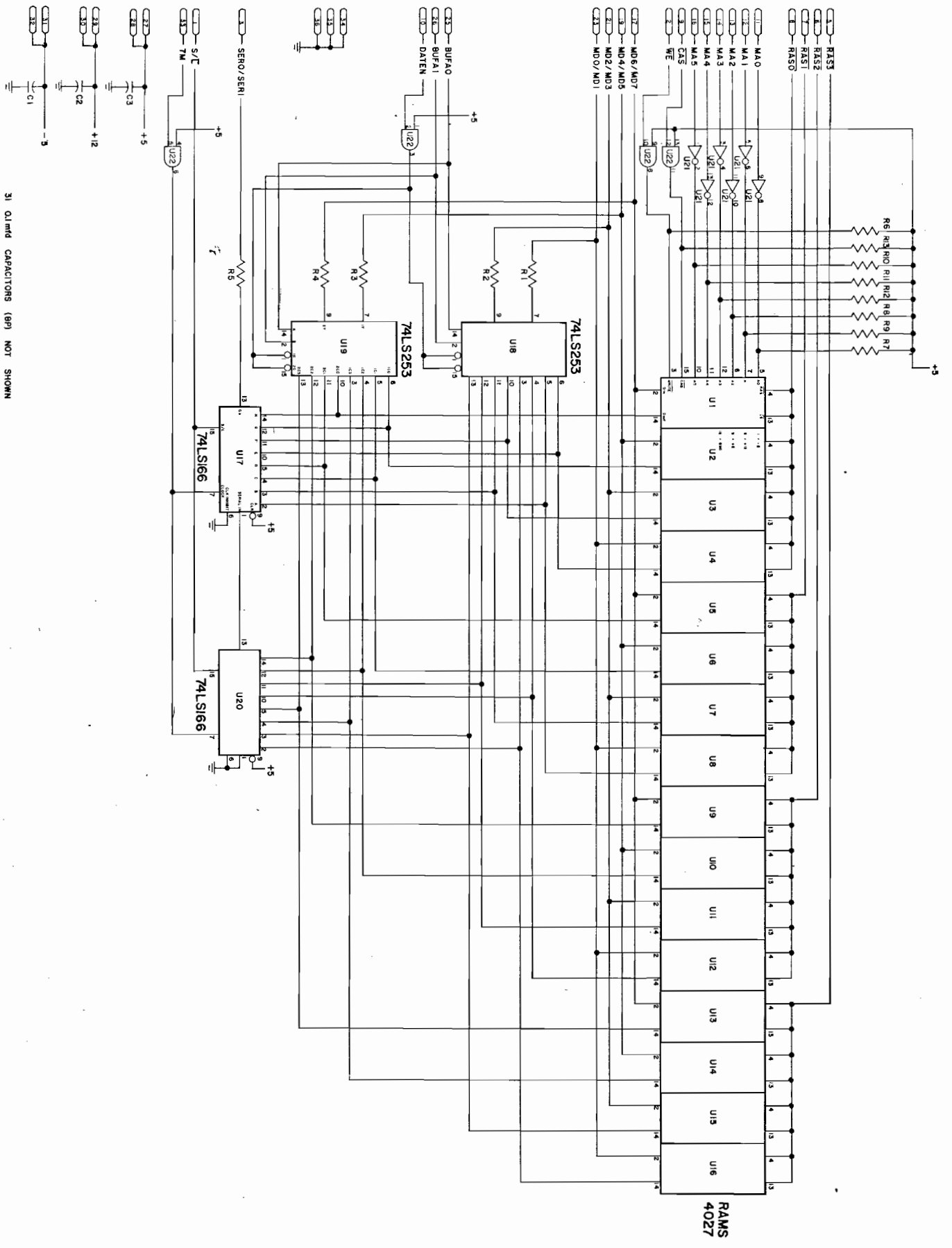
### Additional Devices:

TIP110	NPN transistor
2N4401	NPN transistor
2N4403	PNP transistor
IN4004	Diode

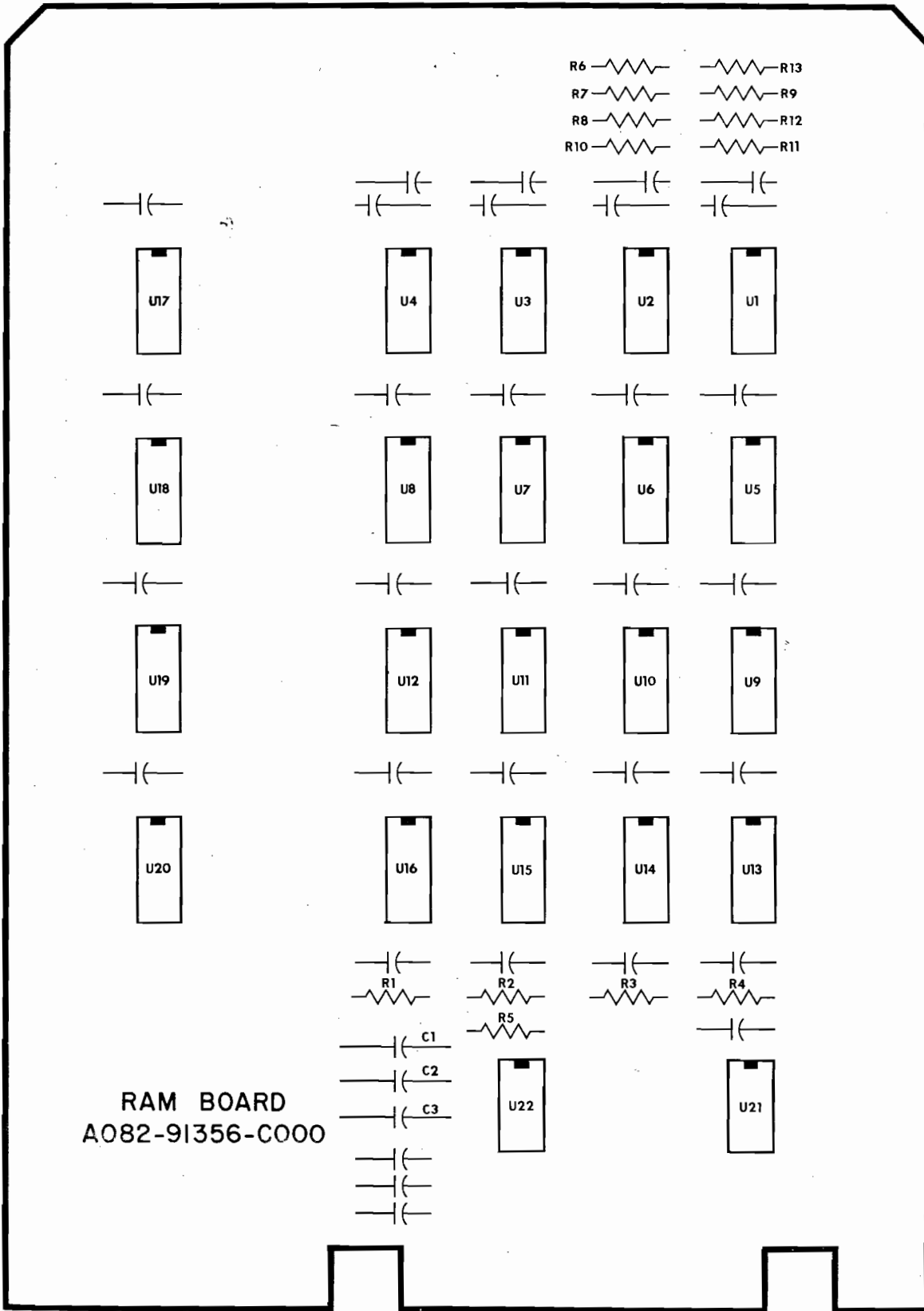
### CPU Board (PC A082-91354-C000)

<u>Chip Number</u>	<u>Function</u>
74LS00	Quad 2 input nand
74LS02	Quad 2 input nor
74LS04	Hex inverter
74LS08	Quad 2 input and
74LS10	Triple 3 input nand
74LS20	Dual 4 input nand
74LS74	Dual "D" Flip-Flop
74LS157	Quad 2 input multiplexer
74LS174	Hex "D" Flip-Flop
74LS175	Quad "D" Flip-Flop
Z80	CPU
2719-(0066-115)	Address custom chip
2721-(0066-116)	Data custom chip
74LS245	Octal bus transceiver
74LS257	Quad 2 input multiplexer
74S74	Dual "D" Flip-Flop
7416	Hex buffer
MC14024	7 stage ripple counter

PIN	DESIGNATION	DESCRIPTION	PIN	DESIGNATION	DESCRIPTION
1	S/L	Screen RAM Video Load Strobe	51	D7	Data Bit 7
2	WE	Write Enable	52	SCREEN	Screen RAM Decode
3	SER1	Serial Data 1	53	RMCO	Refresh Microcycle Control 0
4	SER0	Serial Data 0	54	RMCI	Refresh Microcycle Control 1
5	RAS3	Row Address Strobe 3	55	A0	Address Bit 0
6	RAS2	Row Address Strobe 2	56	A1	Address Bit 1
7	RAS1	Row Address Strobe 1	57	A2	Address Bit 2
8	RAS0	Row Address Strobe 0	58	A3	Address Bit 3
9	CAS	Column Address Strobe	59	A4	Address Bit 4
10	DATEN	Data Write Enable	60	A5	Address Bit 5
11	MA0	Multiplexed Address Bit 0	61	A6	Address Bit 6
12	MA1	Multiplexed Address Bit 1	62	A7	Address Bit 7
13	MA2	Multiplexed Address Bit 2	63	A8	Address Bit 8
14	MA3	Multiplexed Address Bit 3	64	A9	Address Bit 9
15	MA4	Multiplexed Address Bit 4	65	A10	Address Bit 10
16	MA5	Multiplexed Address Bit 5	66	A11	Address Bit 11
17	MD7	Memory Data Bus Bit 7	67	A12	Address Bit 12
18	MD6	Memory Data Bus Bit 6	68	A13	Address Bit 13
19	MD5	Memory Data Bus Bit 5	69	A14	Address Bit 14
20	MD4	Memory Data Bus Bit 4	70	A15	Address Bit 15
21	MD3	Memory Data Bus Bit 3	71	RFSH	Dynamic RAM Refresh
22	MD2	Memory Data Bus Bit 2	72	WAIT	Wait
23	MD1	Memory Data Bus Bit 1	73	BUSACK	Bus Acknowledge
24	MD0	Memory Data Bus Bit 0	74	WR	Write
25	BUFA0	Buffered Address Bit 0	75	BUSREQ	Bus Request
26	BUFA1	Buffered Address Bit 1	76	NMI	Non-maskable Interrupt
27	BUSOFF	Microcycle Data Bus Disable	77	IORQ	Input/Output Request
28	WATCHDOG	Automatic Reset	78	MREQ	Memory Request
29	LIGHTPEN	Lightpen Interrupt	79	HALT	Halt CPU stopped
30	VERTDR	Vertical Sync	80	INT	Interrupt Request
31	HORZDR	Horizontal Sync	81	+5v	Positive 5 volt Power Supply
32	MC0	Microcycle Control 0	82	+5v	Positive 5 volt Power Supply
33	MC1	Microcycle Control 1	83	R-Y	Red minus Video
34	RD	Read	84	B-Y	Blue minus Video
35	M1	Machine Opcode Cycle	85	VIDEO	Composite Video
36	MXD0	Microcycle Data Bus Bit 0	86	+2.5vREF	2.5 volt Chroma Center Reference
37	MXD1	Microcycle Data Bus Bit 1	87	+5v	Positive 5 volt Power Supply
38	MXD2	Microcycle Data Bus Bit 2	88	+5v	Positive 5 volt Power Supply
39	MXD3	Microcycle Data Bus Bit 3	89	Φ	CPU Clock 1.7897725 Mhz
40	MXD4	Microcycle Data Bus Bit 4	90	Φ	Opposite phase CPU Clock 1.7897725 Mhz
41	MXD5	Microcycle Data Bus Bit 5	91	+12v	Positive 12 volt Power Supply
42	MXD6	Microcycle Data Bus Bit 6	92	+12v	Positive 12 volt Power Supply
43	MXD7	Microcycle Data Bus Bit 7	93	CHROMA	3.579545 Mhz Chroma Subcarrier
44	D0	Data Bit 0	94	RESET	Reset
45	D1	Data Bit 1	95	-5v	Negative 5 volt Power Supply
46	D2	Data Bit 2	96	-5v	Negative 5 volt Power Supply
47	D3	Data Bit 3	97	7M	System Clock 7.15909 Mhz
48	D4	Data Bit 4	98	7M	Opposite phase system clock 7.15909 Mhz
49	D5	Data Bit 5	99	GND	System Power and Logic Ground
50	D6	Data Bit 6	100	GND	System Power and Logic Ground

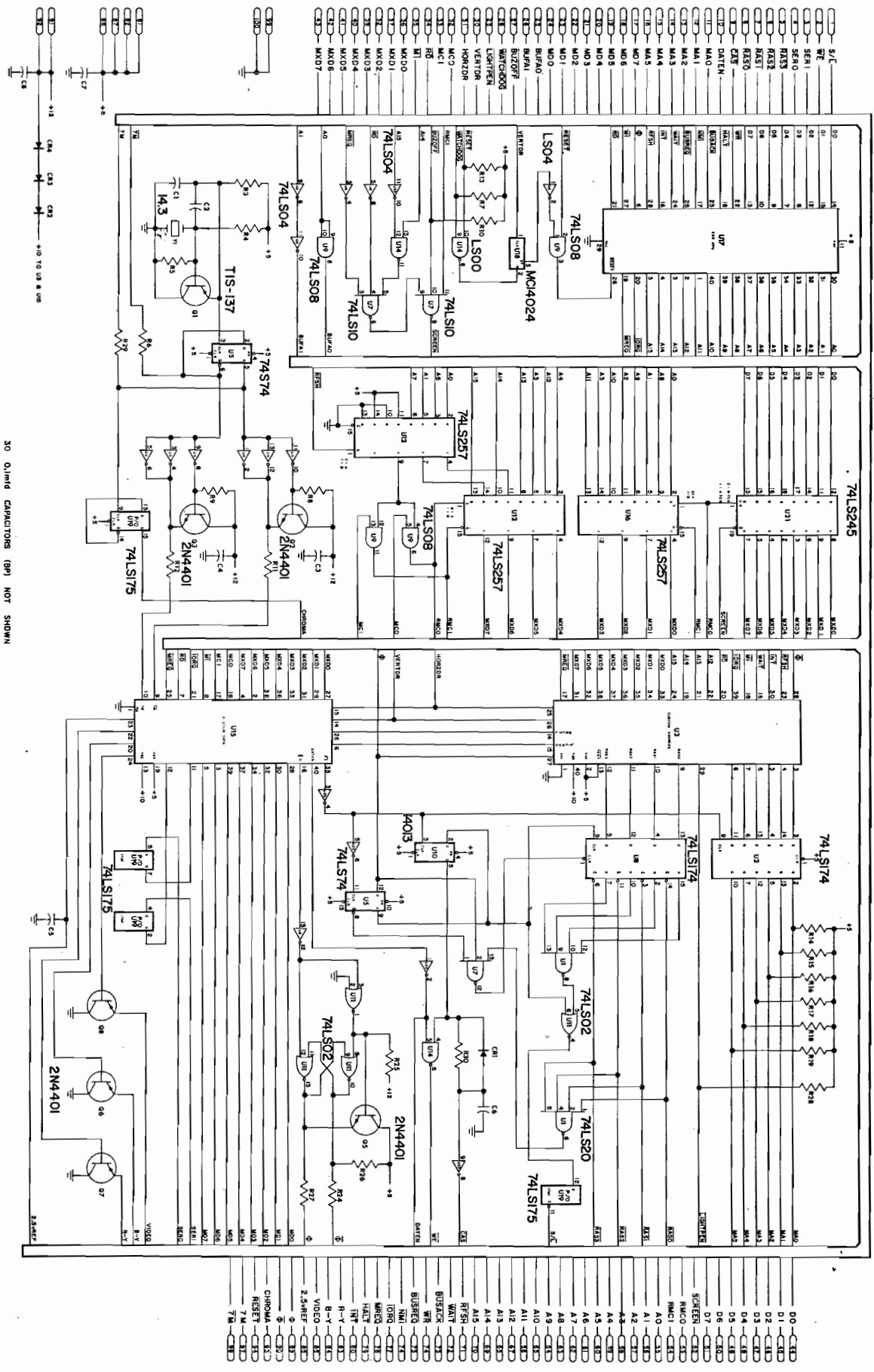


31 0.1µm CAPACITORS (BP) NOT SHOWN

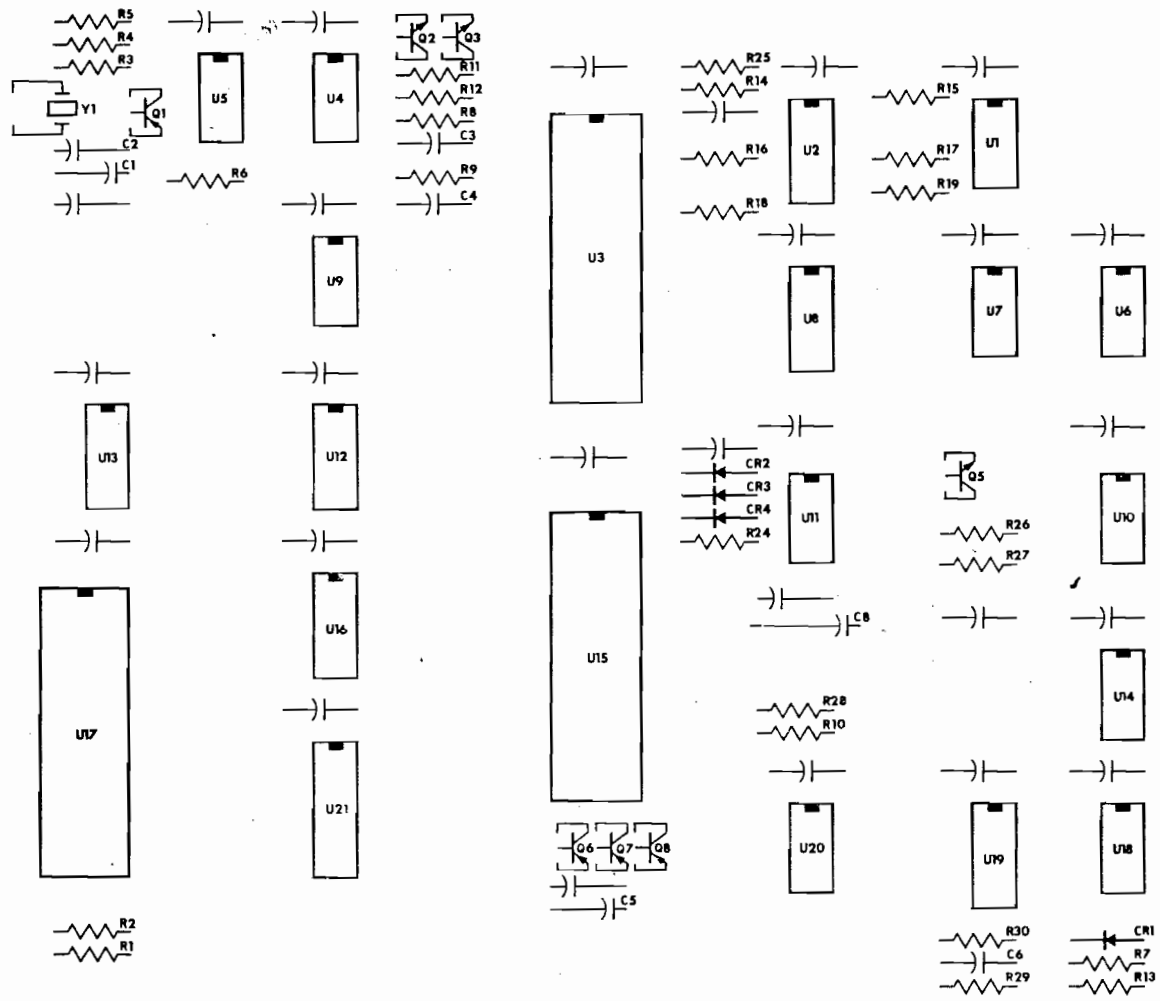


COMPONENT PART NO. M051-00789-A003



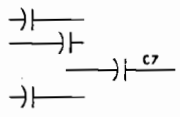


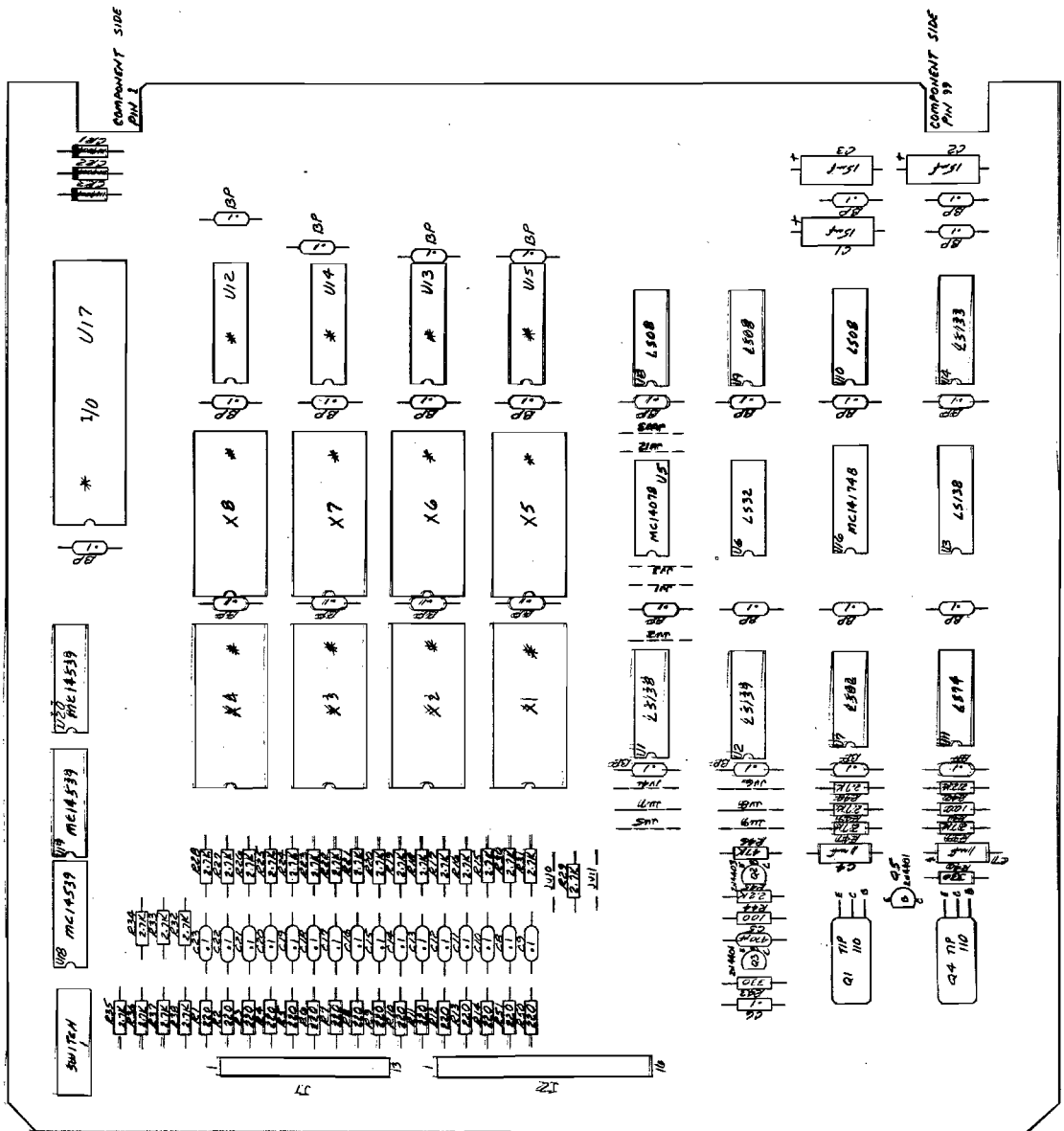
30 0.1μF CAPACITORS (BP) NOT SHOWN



CPU BOARD  
A082-91354-C000

COMPONENT PART NO. M051-00789-A006





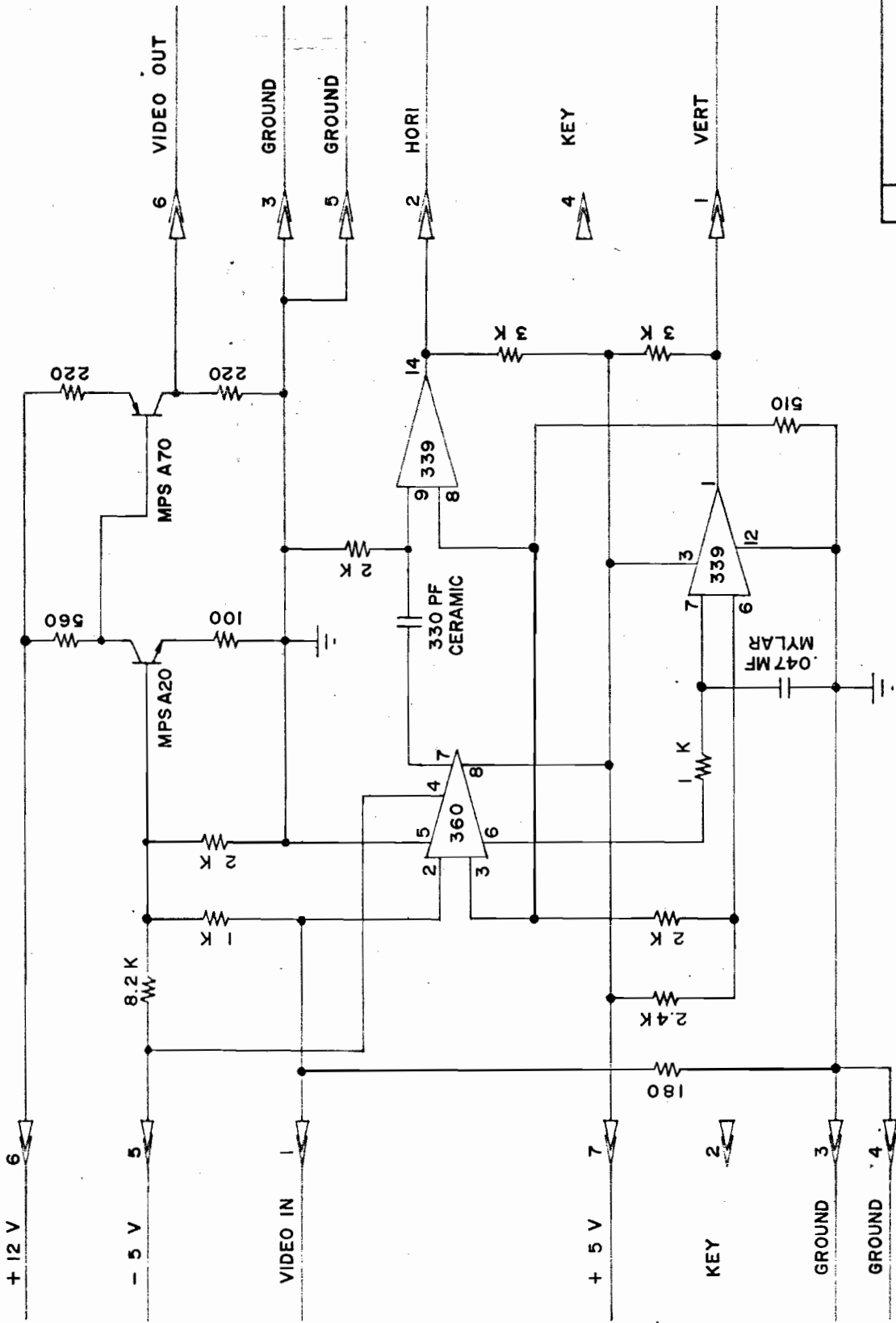
\* - POSITION TAKES A I.C. SOCKET

COMPONENT SIDE

REV	DATE	BY	CHKD	APPV	DESCRIPTION
1	10/1/68	J. W. H.	J. W. H.	J. W. H.	SPACE ZAP BOARD BR
2	10/1/68	J. W. H.	J. W. H.	J. W. H.	COMPONENT BOARD BR
3	10/1/68	J. W. H.	J. W. H.	J. W. H.	1084-90708-1902

MIDWAY MFG. CO.  
 1084-90708-1902





REVISIONS	

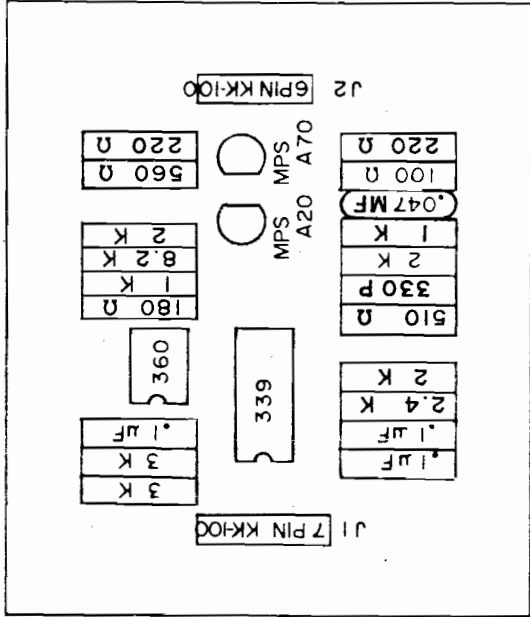
**MIDWAY MFG. CO.**  
FRANKLIN PK. ILL.  
PART NO. A082-91373-B000

USED ON  
NO. REQ'D

SCHEMATIC DIAGRAM  
CCR INT 15" ELECTRO MNTR

MO51-00087-A008  
SCALE  
HEAT TREAT  
MATERIAL  
FINISH

NOTE: RESISTOR UNIT OHM  
DO NOT SCALE DWG.  
DIM. TOLERANCES UNLESS SPECIFIED  
CONCENTRICITY TYP .003  
FRACTIONAL 1/32 CKD.  
DECIMAL .005  
HOLE DIA .002-.000  
DRN C.V.  
DATE 9/8/80




REVISIONS

DRAWING NO. M051-00087-B007

USED ON

NO REQ'D

SCALE

HEAT TREAT

DO NOT SCALE DWG.

DRN

MAT'L

FINISH

DIM. TOLERANCES UNLESS SPECIFIED  
 CONCENTRICITY TIR .003  
 FRACTIONAL . . . . . 1/64  
 DECIMAL . . . . . .005  
 HOLE DIA. . . . . + .002 . . . . . 000

COMPONENT DRAWING

CCR INT 15" ELECTRO MNTR

**MIDWAY MFG. CO.**

FRANKLIN PK. ILL

PART NO.

A082-91373-B000

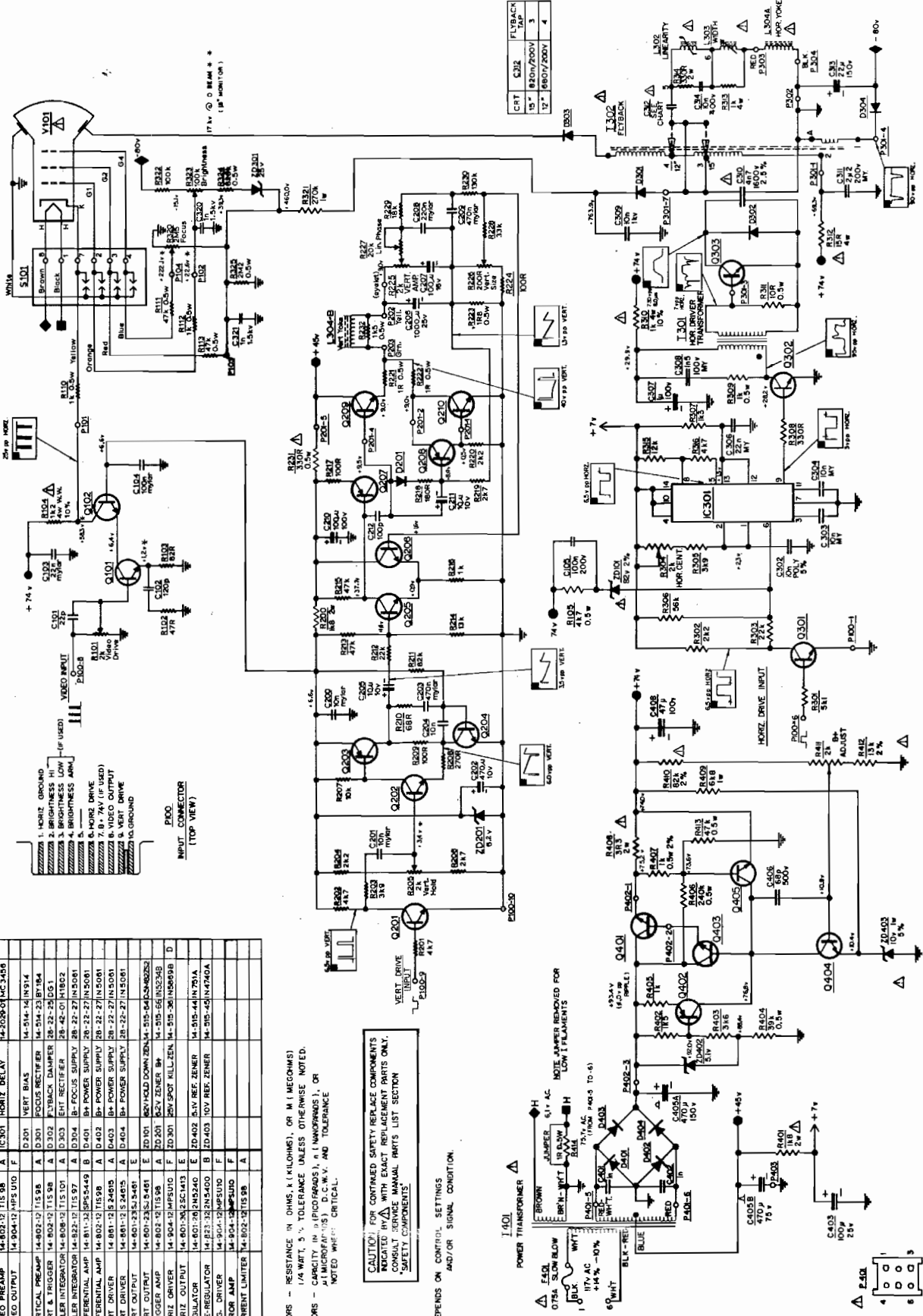
TRANSISTOR BASES		BOTTOM VIEW	
SYM	FUNCTION	TYPE	RELOC. No.
G101	VIDEO PREAMP	14-802-12 1S 98	A
G102	VIDEO OUTPUT	14-904-12 1P5 U10	F
G201	VERTICAL PREAMP	14-802-12 1S 98	A
G202	VERT. & TRIGGER	14-802-12 1S 98	A
G203	MILLER INTEGRATOR	14-808-12 1S 101	A
G204	MILLER INTEGRATOR	14-822-12 1S 97	A
G205	DIFFERENTIAL AMP	14-811-12 1P5 S4-49	B
G206	DIFFERENTIAL AMP	14-802-12 1S 98	A
G207	VERT. DRIVER	14-881-12 1S 24075	A
G208	VERT. DRIVER	14-801-12 1S 24075	A
G209	VERT. OUTPUT	14-601-23 5J 5491	E
G210	VERT. OUTPUT	14-601-23 5J 5491	E
G301	TRIGGER AMP	14-802-12 1S 98	A
G302	HORIZ. DRIVER	14-904-12 1P5 U10	F
G303	HORIZ. DRIVER	14-601-23 5J 5491	E
G401	REGULATOR	14-811-12 1S 97	A
G402	RES. DRIVER	14-823-12 2N 5400	B
G403	RES. DRIVER	14-904-12 1P5 U10	F
G404	CURRENT LIMITER	14-802-12 1S 98	A
G405	CURRENT LIMITER	14-802-12 1S 98	A

RESISTORS - RESISTANCE IN OHMS, K (KILOHMS), OR M (MEG OHMS)  
 1/4 WAT. 5% TOLERANCE UNLESS OTHERWISE NOTED.  
 CAPACITORS - CAPACITY IN P (PICOFARADS), n (NANO FARADS), OR  
 μ (MICROFARADS). D.C.W.V. AND TOLERANCE  
 NOTED WHERE CRITICAL.

CAUTION! FOR CONTRAST SAFETY REPLACE COMPONENTS  
 INDICATED BY Δ WITH EXACT REPLACEMENT PARTS ONLY.  
 CONSULT SERVICE MANUAL PARTS LIST SECTION  
 SAFETY COMPONENTS

\* DEPENDS ON CONTROL SETTINGS  
 AND/OR SIGNAL CONDITION.

V17 SCHEMATIC







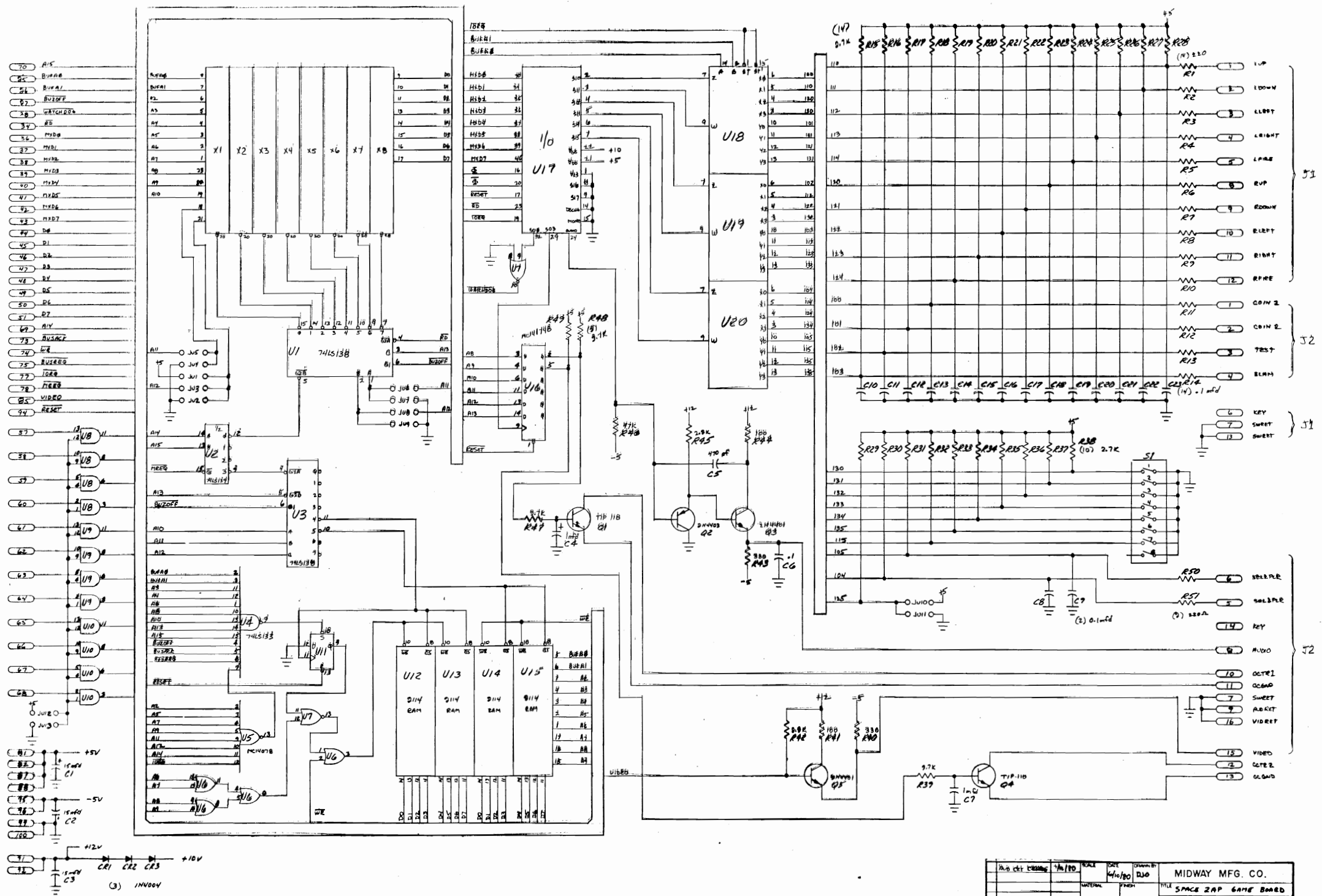
REPLACEMENT PARTS LIST

REF. NO.	PART NUMBER	DESCRIPTION	REF. NO.	PART NUMBER	DESCRIPTION
<b>ELECTRICAL PARTS</b>			<b>COILS &amp; CHOKES</b>		
	1Y25017A01	MONITOR PANEL: complete; KT364LM	L-1	24D68822A08	HORIZ SET
	1Y25017A02	POWER, Audio Panel: complete; KT365LM	L-2	24D68801A67	COMPENSATING: 2000 uh
<b>CAPACITORS</b>			L-3	24D69163A18	HORIZ LINEARITY
C-1	23C65282A41	50 mf 50V Lytic	L-4	24V25000A74	HORIZ WIDTH: inclc C42 & R68
C-2	23C65282A41	50 mf 50V Lytic	L-5	24D68523A15	DEFLECTION YOKE
C-3	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	<b>TRANSISTORS</b>		
C-4	23C65282A41	50 mf 50V Lytic	Q-1	48S137171	1st VIDEO: A6H
C-5	21S180B98	180 pf 10% 500V X5F	Q-2	48S137127	2nd VIDEO: P2S
C-6	23S10255A78	470 mf 16V Lytic	Q-3	48S134919	VIDEO OUTPUT: A1M
C-7	21S180C01	680 pf 10% 500V X5F	Q-4	48S137317	VIDEO DRIVER: A8H
C-8	21S180B85	560 pf 10% 500V X5F	Q-5	48S137115	SYNC SEPERATOR: A5U
C-10	8S10191B67	.22 mf 10% 250V Polyester	Q-6	48S137172	HORIZ OSCILLATOR: A6J
C-11	8S10191A54	.0068 mf 10% 160V Polyester	Q-7	48S137127	HORIZ PULSE SHAPER: P2S
C-12	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	Q-8	48S137093	HORIZ DRIVER: A5F
C-13	21S131625	330 pf 10% X5F	Q-9	48S137203	HORIZ OUTPUT: A6Z
C-15	21S180C41	.0027 mf 10% 500V Z5F (Use 21K121699)	Q-10	48S137173	VERT OSCILLATOR (1): P2W
C-16	23S10229A07	1.0 mf +40-20% 15V Lytic (Use 23C43280A17)	Q-11	48S137171	VERT OSCILLATOR (2): A6H
C-17	8S10191B90	.033 mf 10% 160V Polyester	Q-12	48S137115	VERT DRIVER: A5U
C-18	8S10299A73	.01 mf 10% 100V Poly carb	Q-13	48S134900	VERT OUTPUT: A1C
C-19	8S10299A74	.0082 mf 10% 160V Poly carb	Q-14	48S134952	REGULATOR DRIVER: A2J
C-20	8S10191B98	.01 mf 10% 250V Polyester	Q-15	48S137315	REFERENCE AMP: A8G
C-21	21S180B51	.001 mf 10% 500V X5F	Q-16	48S137368	REGULATOR: A8W
C-22	8S10191B98	.01 mf 10% 160V Polyester	Q-17	48S137172	AUDIO DRIVER: A6J
C-23	21S180C02	10 pf 10% N150	Q-18	48S137168	AUDIO OUTPUT: P2V
C-24	23D65282A40	150 mf 10V Lytic	Q-19	48S137169	5V REGULATOR, Driver: A6G
C-25	21S180B51	.001 mf 10% 500V X5F	Q-20	48S137344	5V REGULATOR: A8U
C-26	8S10212B53	.47 mf 10% 630V Mtlz Poly	Q-21	48S137476	SPOT KILLER: B1E
C-27	8S10212A11	1.0 mf 10% 630V Mtlz Poly	<b>CONTROLS</b>		
C-28	8S10571A06	.01 mf 5% 1200V Poly Prop Foil	R-5	18D68222A34	CONTRAST: 250 Ohm
C-29	8S10571A23	.56 mf 10% 250V Mtlz Prop Foil	R-10	18D66401A44	VIDEO BIAS: 4K
C-30	8S10191A32	.047 mf 10% 250V Polyester	R-17	18D67858A12	FOCUS: 2 meg
C-31	21S180B87	220 pf 10% 500V X5F	R-21	18D68222A35	BRIGHTNESS: 200K
C32	21S180D34	.005 mf 20% 1KV Z5F (Use 21S180D31)	R-34	18D68222A37	HORIZ HOLD: 25K
C-33	8S10212A69	.47 mf 10% 100V Mtlz Poly	R-59	18D66401A44	VERT LINEARITY: 4K
C-34	8S10191A32	.047 10% 250V Polyester	R-65	17D65820A38	VERT SIZE: 15 Ohm
C-35	8S10191B98	.01 mf 10% 250V Polyester	R-74	17D65820A37	REGULATOR ADJUST: 2K
C-36	23S10255A69	4.7 mf 100V Lytic	R-82	18D68222A36	VERT HOLD: 3K
C-37	8S10212A20	2.2 mf 10% 100V Mtlz Poly	R-85	18D68222A34	VOLUME: 250 Ohm
C-38	8S10212A20	2.2 mf 10% 100V Mtlz Poly	<b>RESISTORS</b>		
C-39	8S10191B67	.22 mf 10% 250V Polyester	R-1	6S127633	470 10% 1/2W
C-40	8S10212A10	1.0 mf 10% 100V Mtlz Poly (Use 8S10191A46)	R-2	6S125568	22K 10% 1/2W
C-41	8S10064A06	.01 mf 10% 600V Mylar	R-3	6S127541	56K 10% 1/2W
C-42	21S180A71	470 pf 10% 500V X5F	R-4	6S127633	470 10% 1/2W
C43	23C65807A47	400 mf/125V; 600 mf/50V; 20 mf/200V Lytic	R-6	6S128955	1500 10% 1W
C-44	21S180E60	.01 mf +80-20% 50V Z5V	R-7	6S121847	4700 10% 1/2W
C-47	*23C65807A52	5000 mf 20V Lytic	R-8	6S122445	1800 10% 1/2W
C-49	23S10255A31	470 mf 40V Lytic	R-9	6S119926	2700 10% 1/2W
C-50	23D65282A41	50 mf 50V Lytic	R-11	6S128226	120 10% 1/2W
C-51	23S10255B43	40 mf 100V Lytic	R-12	6S127633	470 10% 1/2W
<b>DIODES &amp; RECTIFIERS</b>			R-13	17S10731A02	7500 5% 5W WW
D-1	48S134921	DIODE, Silicon: D1D; Damper	R-14	6S124797	150 10% 1/2W
D-2	48S134978	DIODE, Silicon: D1K; Pulse Limiter	R-15	6S127516	82 10% 1/2W
D-3	48D67120A11	DIODE, Low Power	R-18	---	Part of CRT socket assembly
D-4	48S137114	RECTIFIER, H. V.: Silicon; D2Y	R-19	---	Part of CRT socket assembly
D-5	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-20	---	Part of CRT socket assembly
D-6	48S137469	DIODE, Silicon: zener; D7G	R-22	6S129296	270K 10% 1/2W
D-7	48S134917	DIODE, Dual: D1C; Detector	R-23	6S10053C67	27K 5% 1/2W
D-8	48D67120A11	DIODE, Low Power	R-24	6S127538	3.3 meg 10% 1/2W
D-9	*48S191A10	RECTIFIER, Silicon: 91A10	R-25	6S121300	27K 10% 1/2W
D-10	48S191A10	RECTIFIER, Silicon: 91A10	R-26	6S127541	56K 10% 1/2W
D-11	48S101A10	RECTIFIER, Silicon: 91A10	R-27	6S129875	2200 10% 1/2W
D-12	48S191A10	RECTIFIER, Silicon: 91A10	R-28	6S125531	180K 10% 1/2W
D-13	48D67120A11	DIODE, Low Power	R-29	6S125531	180K 10% 1/2W
D-14	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-30	6S125892	47K 10% 1/2W
D-15	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-31	6S125534	100K 10% 1/2W
D-16	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-32	6S124506	3300 10% 1/2W
D-17	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-33	6S10053C53	6800 5% 1/2W
D-18	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-35	6S127541	56K 10% 1/2W
D-19	48D67120A11	DIODE, Low Power	R-36	6S125545	390 10% 1/2W
D-20	*48S10641D43	DIODE, Silicon: D4.3	R-37	6S121301	1000 10% 1/2W
D-21	48D67120A11	DIODE, Low Power	R-38	6S10053C33	1000 5% 1/2W
D-22	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-39	6S127516	82 10% 1/2W
D23	48S191A05	RECTIFIER Silicon: 91A05 (Use 48S191A07)	R-40	6S127547	1000 10% 1W
<b>FUSES</b>			R-41	6S127099	220 10% 1/2W
F-1	65S139424	FUSE: 1A-250V	R-42	6S127513	1500 10% 1/2W
F-2	65S139424	FUSE: 1A-250V	R-43	17S10130B07	1500 10% 3W fxd mtl film
<b>INTEGRATED CIRCUITS</b>			R-44	17S744356	2.2 10% 2W WW
IC-1	*51S10732A01	INTEGRATED CIRCUIT: T3F	R-45	6S120141	150K 10% 1W
			R-46	6S127634	33K 10% 1W
			R-47	6S128229	680K 10% 1/2W
			R-48	6S10053D21	4.7 meg 10% 1/2W
			R-49	6S124797	150 10% 1/2W
			R-50	6S10053C45	3300 5% 1/2W
			R-52	6S124506	3300 10% 1/2W
			R-53	6S129874	68 10% 1/2W
			R-54	6S131972	39 10% 1/2W
			R-55	6S10053C65	22K 5% 1/2W
			R-56	6S125535	39K 10% 1/2W
			R-57	6S124506	3300 10% 1/2W
			R-58	6S129793	82K 5% 1/2W
			R-60	6S129875	2200 10% 1/2W
			R-61	6S10053F29	820 10% 1W
			R-62	6S127515	3900 10% 1/2W

## REPLACEMENT PARTS LIST

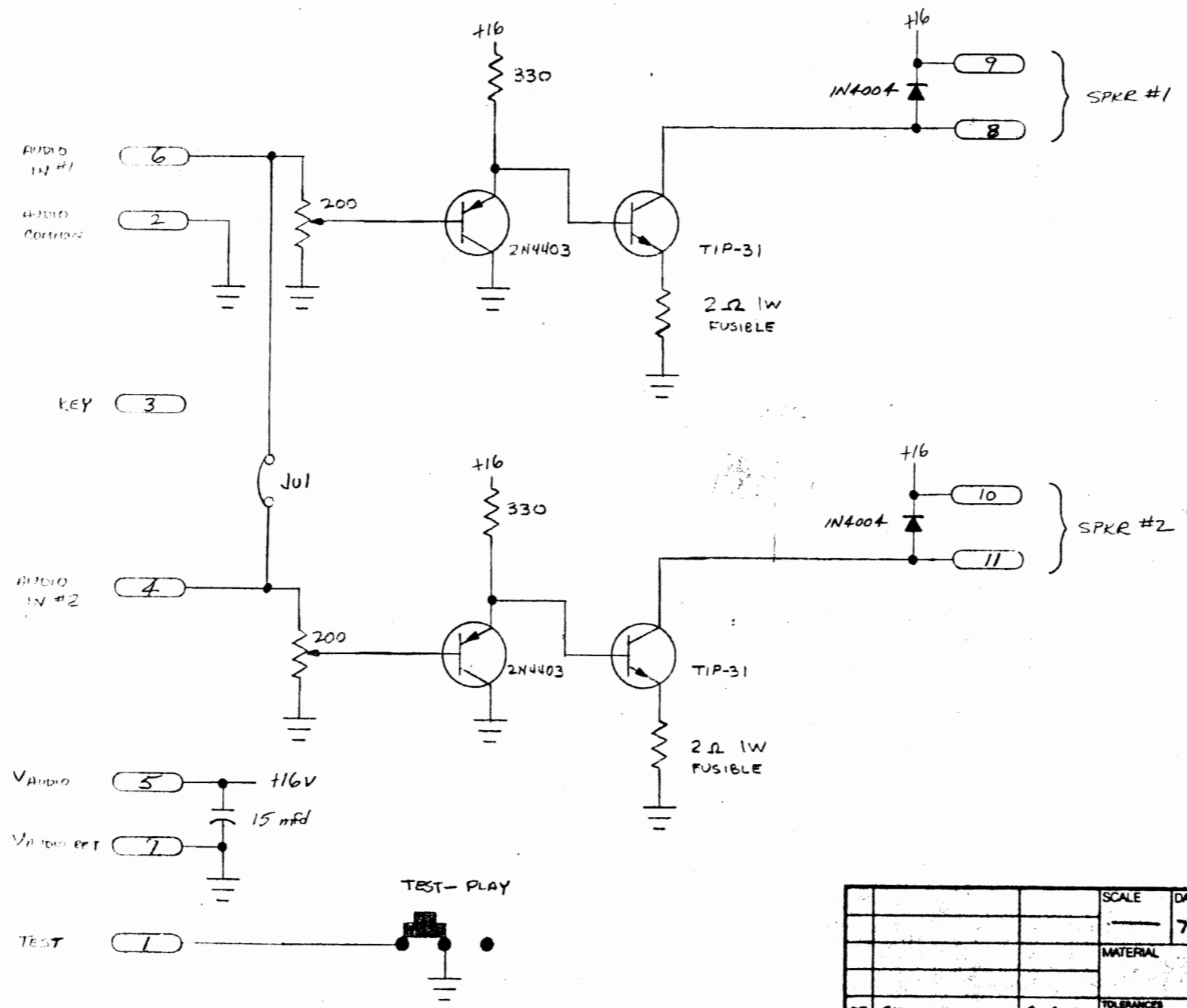
REF. NO.	PART NUMBER	DESCRIPTION	REF. NO.	PART NUMBER	DESCRIPTION
R-63	6S121301	1000 10% 1/2W			
R-64	17S10130C91	10 10% 1/2W (special)			
R-66	6S129064	4700 10% 1W			
R-67	6S122848	18K 10% 1/2W			
R-68	6S124797	150 10% 1/2W			
R-69	17S647132	1200 10% 5W WW (Use 17S136197)			
R-71	6S119926	2700 10% 1/2W			
R-72	6S124551	15K 10% 1/2W			
R-73	6S129875	2200 10% 1/2W			
R-75	6S121301	1000 10% 1/2W			
R-76	6S124506	3300 10% 1/2W			
R-77	6S129221	100 10% 1/2W			
R-78	6S127005	5600 10% 1/2W			
R-79	17S135589	150 10% 10W WW			
R-81	6C66263A08	VARISTOR (Use 6S66263A16)			
R-86	6S127099	220 10% 1/2W			
R-88	6S121301	1000 10% 1/2W			
R-89	---	Part of CRT Socket			
R-90	6S131412	56 10% 1/2W			
R-91	6S10053C39	1800 5% 1/2W			
R-92	6S10053C57	10K 5% 1/2W			
R-95	6S125568	22K 10% 1/2W			
R-96	6S125568	22K 10% 1/2W			
R-97	6S121847	4700 10% 1/2W			
R-98	6S127099	220 10% 1/2W			
R-99	6S128226	120 10% 1/2W			
<b>SWITCHES</b>					
SW-1	40S10624A01	SWITCH, Slide: DPDT (115V-230V)			
<b>TRANSFORMERS</b>					
T-1	25D67440A03	HORIZ DRIVER			
T-2	24D69791A21	H. V. TRANSFORMER: complete			
T-3	25D65840A22	VERT OUTPUT (Use 25D65840B23)			
T-4	*25D68164A31	POWER			
<b>MISCELLANEOUS ELECTRICAL PARTS</b>					
V-1	20WP4	CRT (XM501-10 19VP111)			
	23JEP4	CRT (XM701-10 23VP111)			
			E-1	50V25008A22 65S139451	SPEAKER: 4" PM; incl D22 LAMP: No. 1436
<b>MECHANICAL PARTS</b>					
				9D66133A28	CAP, SS Rect (HV Transformer - PRI/SEC lead)
				42B25158A01 31D70080B04	CLAMP, Metal: Defl Yoke Mtg CONNECTOR, PC panel: 9 contact; on chassis
S-2	*15S10390A06				CONNECTOR, PC panel: 12 contact; less key and contacts (power-audio panel)
P-1	*15S10183A69				CONNECTOR, Plug: 12 contact; less contacts (power)
				*39S10184A63	CONTACT, Plug: for power connector 15S10183A69
				39S10184A22	CONTACT: for S2 connector
				15S10630A01	COVER, nylon: slide switch; SW1
				*7S10609A03	GROMMET, Plastic: PC panel mtg
				26C66745A05	HEAT SINK: Q3
				*26C25198A01	HEAT SINK: Q20
				9C66238A02	HOLDER, Fuse: F1 & F2
				14A562353	INSULATOR, Mica: Transistor socket; Q9, Q13, Q16 & Q20 (Use 14A543810)
				28S10733A01	KEY, Plug: for S2 connector
				2S7051	NUT, hex: 3/8-32; control mtg
				5S10281A03	RIVET, drive pin: nylon; HV transf mtg
				47C66082A03	ROD, Adjustment: width coil; L4
				3S136050	SCREW, tpg: 6-20 x 1/2 clu pan hd; Q9, Q13, Q16 & Q20
				9S10143A41	SOCKET, lamp: E1
				9D67555V27	SOCKET, CRT: incl leads & resistors
				*9D25201A01	SOCKET, HV Rectifier (4): complete; incl 2nd anode lead & cup
				9C63825A01	SOCKET, transistor: Q9, Q13, Q16
				9C63825A02	SOCKET, transistor: Q20
				41D65987A01	SPRING, special: CRT aquadag grnd
				66P65173A47	TOOL, contact removal (S2 connector)
* DENOTES NEW ITEM APPEARING ON ANY LIST FOR FIRST TIME.					

**MOTOROLA PARTS DEPT.**  
**MOTOROLA INC.**  
**1155 HARVESTER RD.**  
**WEST CHICAGO, IL 60185**  
**PHONE (312) 231-4400**

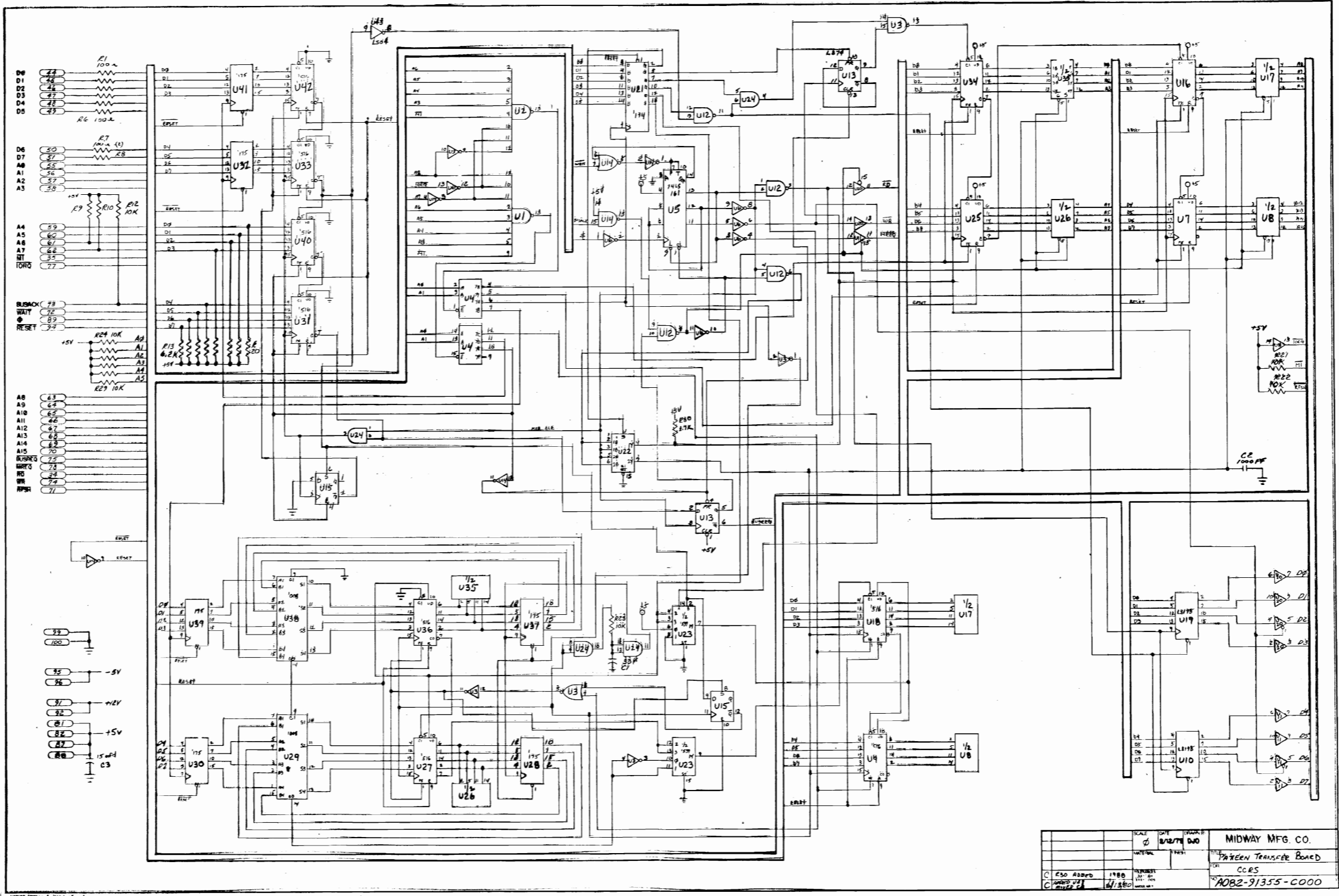


Rev	By	Date	Checked	By	Date
1	WJF	4/10/80	DJO		

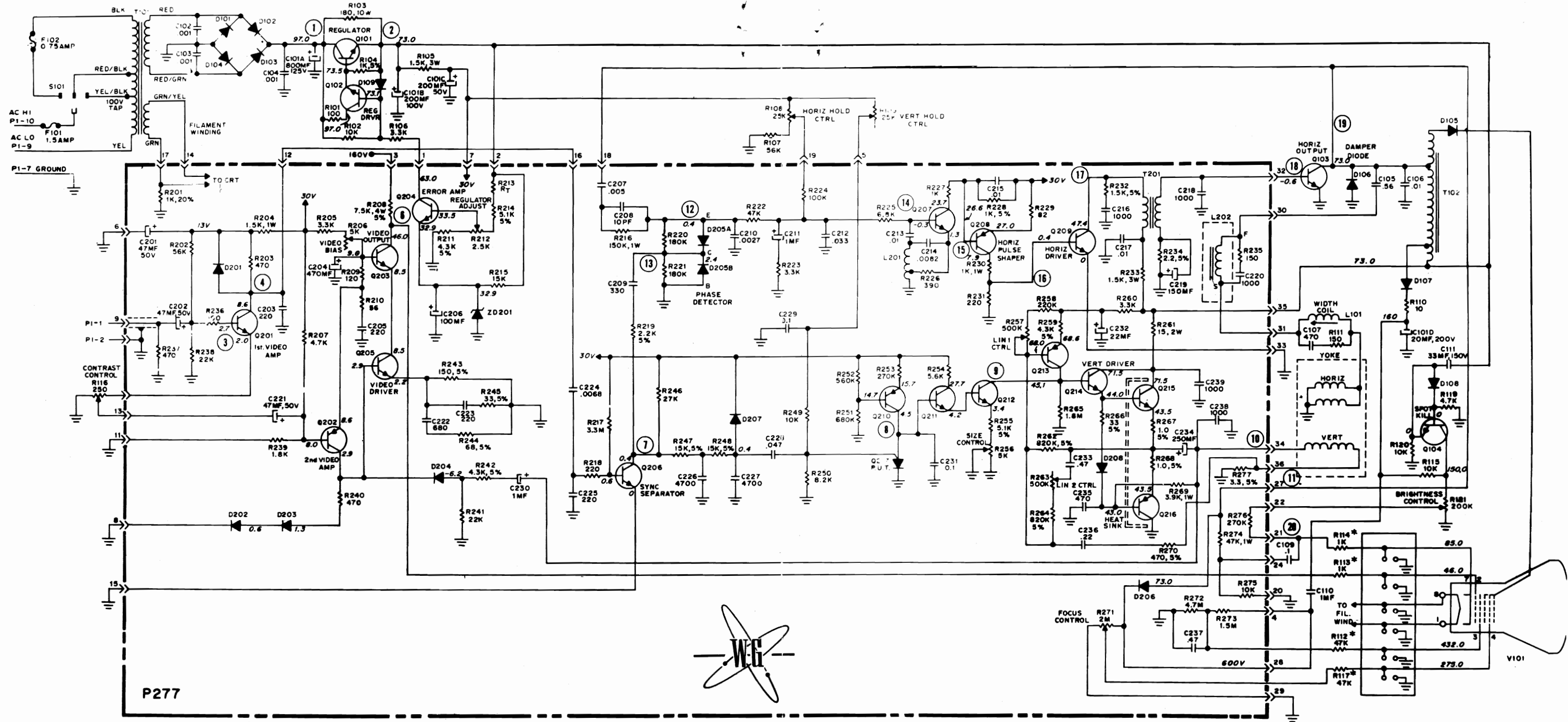
TITLE: SPACE ZAP GAME BOARD  
 PCB: QCR3  
 MFG: M384-90700-11902



		SCALE	DATE	DRAWN BY	<i>Dave Nutting Associates</i>	
			7/10/80	DSO	TITLE	
		MATERIAL		FINISH	AUDIO AMP BOARD	
		TOLERANCES			FOR	
		.XX ± .01			CCRS	
		.XX ± .005			NO	5117
02	Ckt Mod	9-6-80			02	
01		7-23-80				
		ANGULAR:				



SCALE	DATE	DRAWN BY	MIDWAY MFG. CO.
1/8"	8/12/77	DWO	16 BIT PARALLEL TRANSFER BOARD
C 830 Added	1980		CORS
C 830 Deleted	8/1/80		A0B2-91355-C000



P277



# WELLS - GARDNER ELECTRONICS CORPORATION

2701 N. KILDARE AVE. • CHICAGO, ILL. 60639 • ALBANY 2-8220  
TELEX 25-3286

- NOTES:
- VOLTAGE MAY VARY WITH CONTROL SETTING.
  - LINE VOLTAGE MAINTAINED AT 120VAC, 50/60Hz.
  - ALL D.C. VOLTAGES  $\pm 10\%$  MEASURED FROM POINT INDICATED TO CHASSIS USING HIGH IMPEDANCE METER WITH NO SIGNAL INPUT. CONTRAST AND BRIGHTNESS CONTROLS AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.
  - WITH INTERNAL NUMBER INDICATES LOCATION OF WAVE FORM READING.

- NOTES:
- \* INDICATES RESISTORS LOCATED IN PICTURE TUBE LEAD ASSEMBLY.
  - RESISTANCE VALUES IN OHMS, 1/2 WATT, 10% UNLESS OTHERWISE NOTED. K=1,000 M=1,000,000
  - CAPACITANCE VALUES OF 1 OR LESS ARE IN MICROFARADS. ABOVE 1 IN PICOFARADS UNLESS OTHERWISE NOTED.

MODEL No.  
V1001-5734

M051-00087-A005

# REPLACEMENT PARTS LIST

## CHASSIS PARTS

### CAPACITORS

C101A, B, C, D	45X0558-001	800 $\mu$ F/125V, 200 $\mu$ F/100V 200 $\mu$ F/50V, 20 $\mu$ F/200V Electrolytic
C102, 103 104	80X0001-000	.001 $\mu$ F, GMV Z5U Cer. Disc.
★C105	342X5642-049	.56 $\mu$ F, 400V, 10% Polypropylene
★C106	46X0536-001	.01 $\mu$ F, 1200V, 5% Polypropylene
C107	80X0099-006	470 pF, Z5F, 10%
C109	342X1044-040	0.1 $\mu$ F, 400V, 20% Mylar
★C110	46X0540-002	1.0 $\mu$ F, 630V, 10% Polyester Film
C111	45X0515-032	33 $\mu$ F, 150V, Electrolytic

### CONTROLS

R108, 109	40X0585-091	25k Ohm, Horiz. & Vert. Hold
R116	40X0585-090	250 Ohm, Contrast
R121	40X0585-092	200k Ohm, Brightness

### COILS & TRANSFORMERS

★L101	9A2787-001	Coil, Width
★T101	53X0475-001	Transformer, Power
★T102	53X0474-001	Transformer, Flyback

### RESISTORS

R101	340X3101-941	100 Ohm, 10%, 1/2W
R102, 115, 120	340X3103-941	10k Ohm, 10%, 1/2W
★R103	340X0181-341	180 Ohm, 10%, 10W, WW
R104	340X3102-931	1k Ohm, 5%, 1/2W
★R105	340X6152-341	1.5k Ohm, 10%, 3W, WW
R106	340X3332-941	3.3k Ohm, 10%, 1/2W
R107	340X3563-941	56k Ohm, 10%, 1/2W
R110	340X3100-941	10 Ohm, 10%, 1/2W
R111	340X3151-941	150 Ohm, 10%, 1/2W
R119	340X3472-941	4.7k Ohm, 10%, 1/2W

### SEMICONDUCTORS

D101, 102 103, 104	66X0023-009	Rectifier, Silicon 500V 1N444B
★D105	66X0067-001	Rectifier Varo H1802
★D106	66X0068-001	Diode, Damper MR1-1600
D107	66X0053-001	Diode, 350V Amperex BA148
D108, 109	66X0046-001	Diode, Silicon FDH444
★Q101	86X0117-001	Transistor (NPN) 2N5632 Regulator
Q102	86X0071-001	Transistor (NPN) Reg. Driver MPSA06
★Q103	86X0118-001	Transistor (NPN) BU207 Hor. Output
Q104	86X0065-001	Transistor (NPN) D40N5 Spot Kill

### MISCELLANEOUS

★F101	16X0171-001	Fuse Holder
★F102	16X0176-001	Fuse, 1.5 Amp, Slo-Blo 3AG
★	16X0175-001	Fuse, 0.75 Amp, Slo-Blo 3AG
★	13X1201-001	HV Lead & Recept. Assy.
★	28X0789-001	Spring, Dag, Grounding
★	9A2786-001	Deflection Yoke & Clamp
★V101	19VARP4	CRT (19V1001)
or	or	
★V101	22VATP4	CRT (22V1001)
	38A5473-000	2 PDT Small Relay (W/Wires)
	38A5474-000	6 PDT Large Relay (W/Wires)

★ Product Safety Device

# REPLACEMENT PARTS LIST P277 CIRCUIT BOARD ASSY.

### CAPACITORS

C201, 202, 221	45X0524-027	47 $\mu$ F, 50V, Electrolytic
C203, 205, 223, 225	80X0099-057	220 pF, 10%, Z5F, Cer. Disc.
C204	45X0524-053	470 $\mu$ F, 16V, Electrolytic
C206	45X0524-051	100 $\mu$ F, 50V, Electrolytic
C207	80X0099-192	.005 $\mu$ F, 20%, 1KV, Cer. Disc.
C208	80X0099-036	10 pF, 10%, 500V, Cer. Disc.
C209	80X0099-013	330 pF, 10%, 500V, Cer. Disc.
C210	349X4722-109	.0027 $\mu$ F, 10%, Mylar
C211	45X0524-023	1.0 $\mu$ F, 15V, Electrolytic
C212	349X3332-109	.033 $\mu$ F, Mylar
C213	46X0537-002	.01 $\mu$ F, Poly
C214	46X0537-003	.0082 $\mu$ F, Poly
C215	349X1032-109	.01 $\mu$ F, 10%, 100V Mylar
C216, 218, 220, 238, 239	80X0099-076	1000 pF, 10%, 500V, Cer. Disc.
C217	349X1032-209	.01 $\mu$ F, 10%, 200V, Mylar
C219	45X0524-052	150 $\mu$ F, 10V, Electrolytic
C222	80X0099-137	680 pF, 10%, 500V, Cer. Disc.
C224	349X6822-109	.0068 $\mu$ F, 10%, 100V, Mylar
C226, 227	80X0099-056	4700 $\mu$ F, 10%, 500V, Cer. Disc.
C228	349X4732-109	.047 $\mu$ F, 10%, 100V, Mylar
C229	349X1044-109	0.1 $\mu$ F, 20%, 100V, Mylar
C230	45X0515-014	1.0 $\mu$ F, 50V, Electrolytic
C231	349X1042-109	0.1 $\mu$ F, 10%, 100V, Mylar
C232	45X0524-026	22 $\mu$ F, 100V, Electrolytic
C233	349X4742-109	.47 $\mu$ F, 10%, 100V, Mylar
C234	45X0524-025	250 $\mu$ F, 100V, Electrolytic
C235	80X0099-006	470 pF, 10%, Z5F, Cer. Disc.
C236	349X2242-109	.22 $\mu$ F, 10%, 100V, Mylar
C237	46X0540-001	.47 $\mu$ F, 10%, 630V, Polyester Film

### CONTROLS

R206, 256	40X0592-008	5k Ohm, Video Output, Size
R212	40X0585-093	2.5k Ohm, Reg. Adj.
R257, 263	40X0592-004	500k Ohm, Lin 1 & 2
R271	40X0585-094	2M Ohm, Focus

### COILS & TRANSFORMERS

★L201	9A2788-001	Horiz. Osc.
★L202	9A2789-001	Horiz. Lin.
★T201	52X0126-001	Horiz. Driver

### RESISTORS

R201	340X3102-954	1k Ohm, 20%, 1/2W
R202	340X3563-944	56k Ohm, 10%, 1/2W
R203, 237, 240	340X3471-944	470 Ohm, 10%, 1/2W
★R204	340X4152-843	1.5k Ohm, 10%, 1.0W
R205, 223, 260	340X3332-944	3.3k Ohm, 10%, 1/2W
R207	340X3472-944	4.7k Ohm, 10%, 1/2W
★R208	340X7752-733	7.5k Ohm, 5%, 4.0W
R209	340X3121-944	120 Ohm, 10%, 1/2W
R210	340X3560-944	56 Ohm, 10%, 1/2W
R211, 242, 259	340X3432-934	4300 Ohm, 5%, 1/2W
R213	43X0467-001	Thermistor
R214, 255	340X3512-934	5.1k Ohm, 5%, 1/2W
R215	340X3153-944	15k Ohm, 10%, 1/2W
★R216	340X4154-843	150k Ohm, 10%, 1.0W
R217	340X3335-944	3.3M Ohm, 10%, 1/2W
R218, 231	340X3221-944	220 Ohm, 10%, 1/2W
R219	340X3222-934	2.2k Ohm, 5%, 1/2W

★ Product Safety Device

### RESISTORS (Cont'd.)

R220, 221	340X3184-944	180k Ohm, 10%, 1/2W
R222	340X3473-944	47k Ohm, 10%, 1/2W
R224	340X3104-944	100k Ohm, 10%, 1/2W
R225	340X3682-944	6.8k Ohm, 10%, 1/2W
R226	340X3391-944	390 Ohm, 10%, 1/2W
R227	340X3102-944	1k Ohm, 10%, 1/2W
R228	340X3102-934	1k Ohm, 5%, 1/2W
R229	340X3820-944	82 Ohm, 10%, 1/2W
★R230	340X4102-843	1k Ohm, 10%, 1.0W
R232	340X3152-934	1.5k Ohm, 5%, 1/2W
★R233	340X6152-743	1.5k Ohm, 10%, 3.0W
R234	340X5022-333	2.2 Ohm, 5%, 2.0W
R235	340X3151-944	150 Ohm, 10%, 1/2W
R236	340X3101-944	100 Ohm, 10%, 1/2W
R238, 241	340X3223-944	22k Ohm, 10%, 1/2W
R239	340X3182-944	1.8k Ohm, 10%, 1/2W
R243	340X3151-934	150 Ohm, 5%, 1/2W
R244	340X3680-934	68 Ohm, 5%, 1/2W
R245, 266	340X3330-934	33 Ohm, 5%, 1/2W
R246	340X3273-944	27k Ohm, 10%, 1/2W
R247, 248	340X3153-934	15k Ohm, 5%, 1/2W
R249, 275	340X3103-944	10k Ohm, 10%, 1/2W
R250	340X3822-944	8.2k Ohm, 10%, 1/2W
R251	340X3684-944	680k Ohm, 10%, 1/2W
R252	340X3564-944	560k Ohm, 10%, 1/2W
R253, 276	340X3274-944	270k Ohm, 10%, 1/2W
R254	340X3562-944	5.6k Ohm, 10%, 1/2W
R258	340X3224-944	220k Ohm, 10%, 1/2W
★R261	340X5150-843	15 Ohm, 10%, 2.0W
R262, 264	340X3824-934	820k Ohm, 5%, 1/2W
R265	340X3185-944	1.8M Ohm, 10%, 1/2W
R267, 268	340X3010-934	1 Ohm, 5%, 1/2W
R269	340X4392-843	3.9k Ohm, 10%, 1/2W
R270	340X3471-934	470 Ohm, 5%, 1/2W
R272	340X3475-944	4.7M Ohm, 10%, 1/2W
R273	340X3155-944	1.5M Ohm, 10%, 1/2W
★R274	340X4473-843	47k Ohm, 10%, 1.0W
R277	340X3033-934	3.3 Ohm, 5%, 1/2W

### SEMICONDUCTORS

D201, 202, 203, 204, 207, 208	66X0046-001	Diode, Silicon FDH444
D205A, 205B	66X0066-001	Diode, Dual, MSD6102
D206	66X0054-002	Diode, RCA D2102SF
Q201, 205, 206	86X0113-001	Transistor (NPN) 2N3904
Q202, 208	86X0114-001	Transistor (PNP) 2N3906
Q203	86X0071-001	Transistor (NPN)
Q204, 212	86X0071-001	Transistor (NPN) MPSA06
Q207, 211	86X0058-002	Transistor (NPN) MPSA20
Q209	86X0116-001	Transistor Horiz, Driver (NPN) 2N6557
Q210	86X0066-001	Transistor (PNP) MPSA70
Q213	86X0072-001	Transistor (PNP) MPSA56
Q214	86X0073-001	Transistor (NPN) MPSU07
Q215	86X0074-001	Transistor (NPN) 2N5192
Q216	86X0075-001	Transistor (PNP) 2N5195
Q217	86X0070-001	Transistor (P.U.T.) MPU131
ZD201	66X0040-004	Diode, Zener 31V

### MISCELLANEOUS

38A5395-000 Pix Socket & Connector Assy.