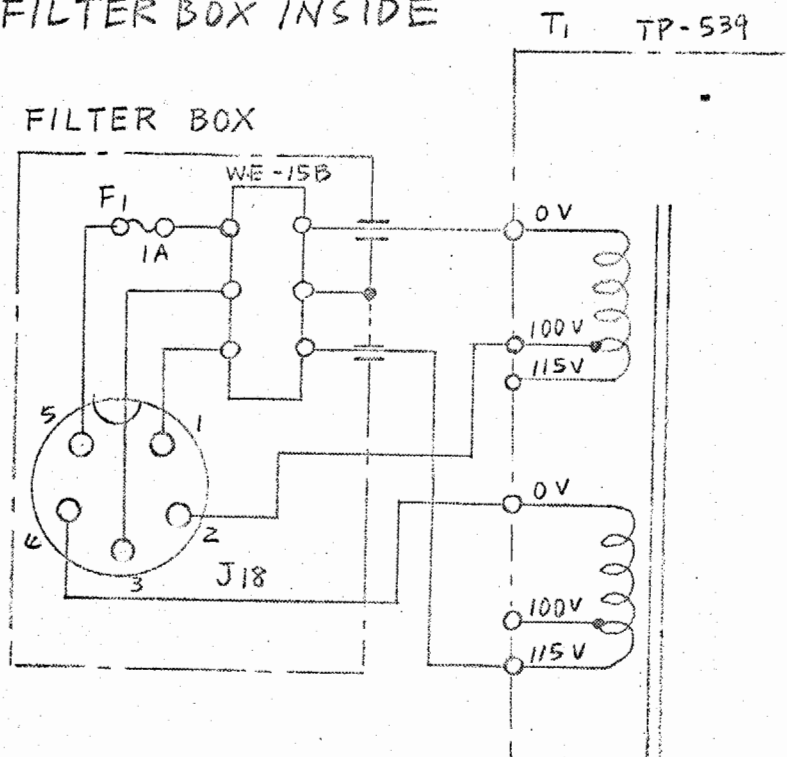
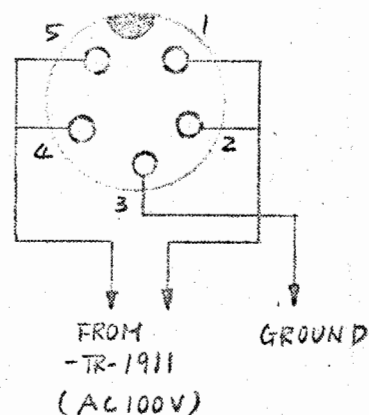
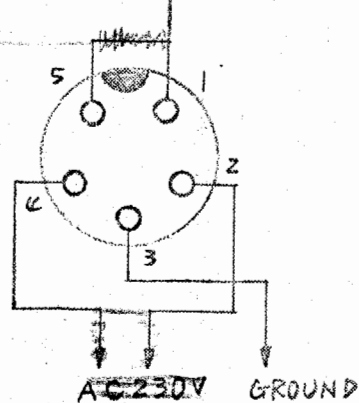


CHANGED LIKE THIS FIGURE THAT
IS FILTER BOX INSIDE



INDICATED POWER SUPPLY CORD LINE



NOTES

UNLESS OTHERWISE INDICATED
ALL RESISTANCE IN OHMS;
CAPACITANCE IN FARADS;
RESISTORS $\frac{1}{4}$ WATT

M -

Improvements Section

J. Orihara



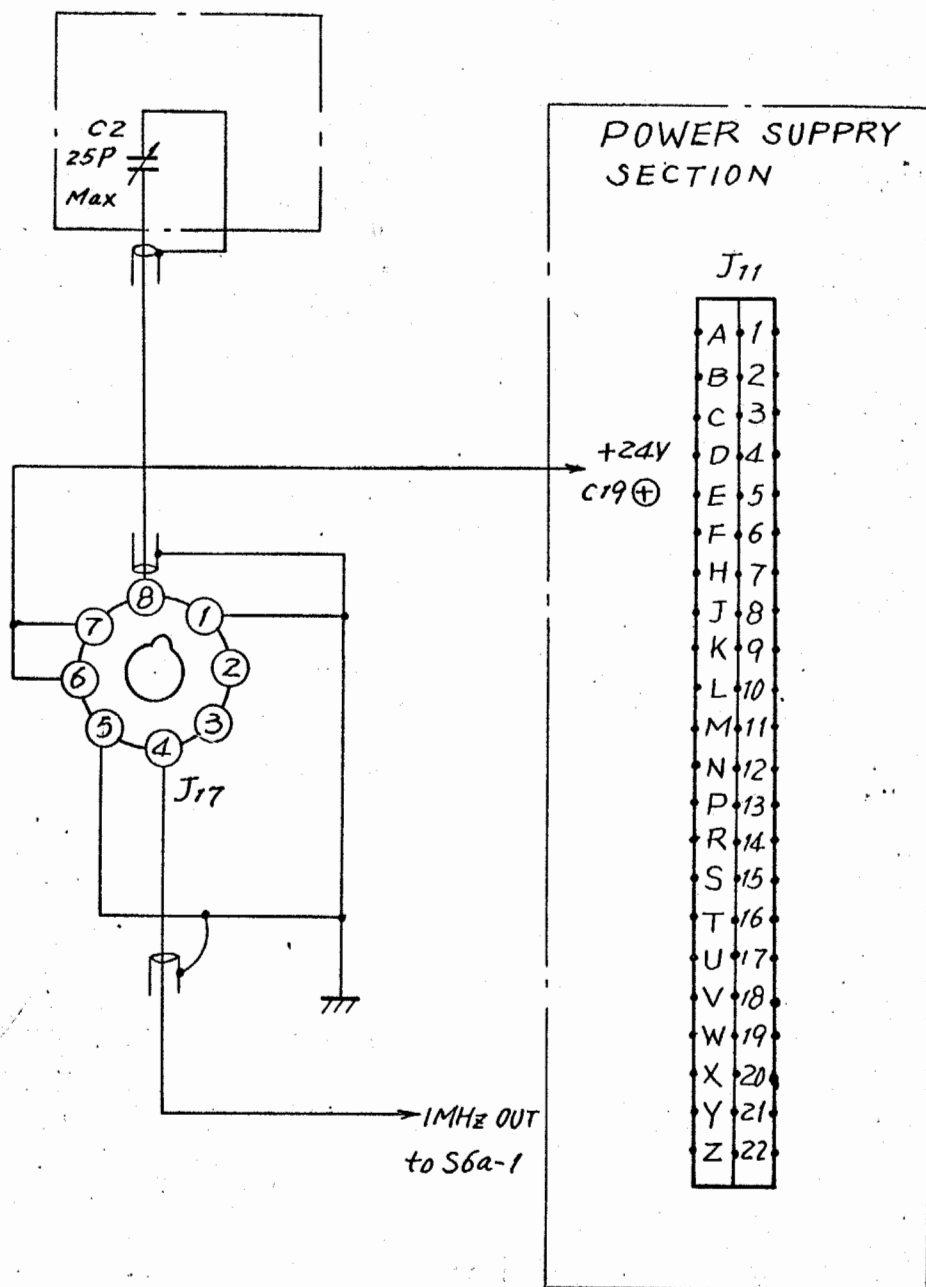


3C90(I)

500MHz SCALER

Copies are held in

Radio Section Laboratory.



M-031124-8



**CRYSTAL OSCILLATOR
CONNECTION**
for -TR-3788/88C

CONTROL SECTION PARTS LIST

Parts No.	Description		
Q1	Transistor Germanium	PNP	2SB426
Q2	Transistor Silicon	NPN	2SD82
Q3	Transistor Silicon	NPN	2SD82
Q4	Transistor Silicon	NPN	2SD82
Q5	Transistor Silicon	NPN	2SD92
D1	Diode Silicon		SB-2
D2	Diode Silicon		SB-2
D3	Diode Silicon		SB-2
D4	Diode Silicon		SB-2
D5	Diode Silicon		HF-SD-1C
D6	Diode Silicon		1S1660
D7	Diode Silicon		1S1660
D8	Diode Silicon		1S1660
D9	Diode Silicon		1S1660
D10	Diode Silicon		HF-SD-1
D11	Diode Silicon		HF-SD-1
D12	Diode Silicon		HF-SD-1
D13	Diode Silicon		HF-SD-1
D14	Diode Silicon		SD-1Z
R1	Resistor variable	200K Ω	with switch (S3)
R2	Resistor fixed Carbon	680 Ω	$\pm 5\%$ 1/4W
R3	Resistor variable	200 Ω	
R4	Resistor fixed Carbon	22 Ω	$\pm 5\%$ 1/4W
R5	Resistor variable	10K Ω	unused for -TR-3787, 3788/A
R6	Resistor fixed Carbon	120K Ω	$\pm 5\%$ 1/4W
R7	Resistor fixed Carbon	120K Ω	$\pm 5\%$ 1/4W
R25	Resistor fixed Carbon	120 Ω	$\pm 5\%$ 2W
C1	Capacitor fixed Electrolytic	3.3 μ F	50WV
C2	Capacitor variable	25PF max.	
C3	Capacitor fixed Electrolytic	47 μ F	10WV
C4	Capacitor fixed Electrolytic	10 μ F	25WV
C5	Capacitor fixed Electrolytic	10 μ F	25WV
C6	Capacitor fixed Electrolytic	47 μ F	10WV
C7	Capacitor fixed Electrolytic	1000 μ F	50WV
C8	Capacitor fixed Ceramic	0.047 μ F	+100,-0% 50WV
C9	Capacitor fixed Electrolytic	1000 μ F	50WV
C10	Capacitor fixed Ceramic	0.047 μ F	+100,-0% 50WV
D15	Diode Silicon		SD-1Z

Parts No.	Description		
C11	Capacitor fixed Electrolytic	100μF	350WV
C12	Capacitor fixed Electrolytic	2200μF	25WV
C13	Capacitor fixed Ceramic	0.047μF +100,-0%	50WV
C14	Capacitor fixed Electrolytic	470μF	50WV
C15	Capacitor fixed Ceramic	0.047μF +100,-0%	50WV
C16	Capacitor fixed Electrolytic	100μF	25WV
C17	Capacitor fixed Electrolytic	100μF	25WV
C18	Capacitor fixed Electrolytic	100μF	10WV
C19	Capacitor fixed Electrolytic	10μF	50WV
C20	Capacitor fixed Electrolytic	47μF	10WV
C21	Capacitor fixed Electrolytic	47μF	25WV
C22	Capacitor fixed Electrolytic	47μF	25WV
F1	Fuse	1A	
FS1	Fuse Holder	Pipe Type Black	
J1	Connector	UG-291/U	
J2	Connector	MCR-6S	
J3	Connector	PBAY-10-2AS2G	
J4	Connector	unused for -TR-3787	
J5	Connector	PBAY-10-2AS2G	
J6	Connector	PBAY-10-2AS2G	
J7	Connector	PBAY-10-2AS2G	
J8	Connector	PBAY-10-2AS2G	
J9	Connector	PBAY-10-2AS2G	
J10	Connector	PBAY-10-2AS2G	
J11	Connector	PBAY-22-2AS2G	
J12	Connector	PBAY-22-2AS2G	
J13	Connector	PBAY-22-2AS2G	
J14	Connector	PBAY-22-2AS2G	
J15	Connector	PBAY-22-2AS2G	
J17	Socket	T-US	
J18	Connector	HS16R-3	
J19	Connector	UG-290/U	
J20	Terminal	B-E	

Parts No.	Description	
N1	Tube Bracket Neon	BNA-8
N2	Tube Neon	NE-2P-TR
N3	Tube Neon	NE-2P-TR
N4	Tube Neon	NE-2P-TR
N5	Tube Neon	NE-2P-TR
S1	Switch Toggle	MSTG-406N
S2	Switch Push Button	VAQ-4
S4	Switch Rotary	MS-26-2-4-5
S5	Switch Slide	SL8-8H 12-4-2
S6	Switch Slide	SL8-8H 12-4-2
T1	Transformer Power	TP-539
X1	Crystal Oscillator	1L/NECO-1000(A) for -TR-3788C 1K/NECO-1000(B) for -TR-3788B KC-632/NECO-1000(D) for -TR-3788A, 3788, 3787
J16AB	3C90 SCALER WA92 AMPLIFIER	

WE15A/B PARTS LIST

WE15A/B-1-1

Parts No.	Description
C1	Capacitor fixed Paper Metallized 0.01 μ F $\pm$ 10% 400V
C2	Capacitor fixed Paper Metallized 0.001 μ F $\pm$ 10%
C3	Capacitor fixed Ceramic 0.0015 μ F +100,-0% 50V
C4	Capacitor fixed Ceramic 0.0015 μ F +100,-0% 50V
L5	Coil CR-158-8H/L82

WG34 PARTS LIST

Parts No.	Description			
Q1	Transistor Silicon	NPN	2SC269	
Q2	Transistor Silicon	NPN	2SC269	
Q3	Transistor Silicon	NPN	2SC269	
Q4	Transistor Silicon	NPN	2SC269	
Q5	Transistor Silicon	NPN	2SC261HB	
Q6	Transistor Silicon	NPN	2SC269	
Q7	Transistor Silicon	NPN	2SC269	
Q8	Transistor Silicon	NPN	2SC269	
Q9	Transistor Silicon	NPN	2SC269	
Q10	Transistor Silicon	NPN	2SC269	
D16	Diode Silicon		1S180	
D17	Diode Silicon		1S180	
D18	Diode Silicon		1S180	
D19	Diode Silicon		1S180	
D20	Diode Silicon		1S180	
D21	Diode Silicon		1S180	
D22	Diode Silicon		1S180	
D23	Diode Silicon		1S180	
R26	Resistor fixed Carbon		22K Ω	1/4W $\pm 5\%$
R27	Resistor fixed Carbon		22K Ω	1/4W $\pm 5\%$
R28	Resistor fixed Carbon		22K Ω	1/4W $\pm 5\%$
R29	Resistor fixed Carbon		22K Ω	1/4W $\pm 5\%$
R30	Resistor fixed Carbon		3.9K Ω	1/4W $\pm 5\%$
R31	Resistor fixed Carbon		1.2K Ω	1/4W $\pm 5\%$
R32	Resistor fixed Carbon		2.7K Ω	1/4W $\pm 5\%$
R33	Resistor fixxd Carbon		2.2K Ω	1/4W $\pm 5\%$
R34	Resistor fixed Carbon		47K Ω	1/4W $\pm 5\%$
R35	Resistor fixed Carbon		47K Ω	1/4W $\pm 5\%$
R36	Resistor fixed Carbon		27K Ω	1/4W $\pm 5\%$
R37	Resistor fixed Carbon		150K Ω	1/4W $\pm 5\%$
R38	Resistor fixed Carbon		10K Ω	1/4W $\pm 5\%$
R39	Resistor fixed Carbon		2.2K Ω	1/4W $\pm 5\%$
R40	Resistor fixed Carbon		27K Ω	1/4W $\pm 5\%$
R41	Resistor fixed Carbon		150K Ω	1/4W $\pm 5\%$
R42	Resistor fixed Carbon		2.2K Ω	1/4W $\pm 5\%$
R43	Resistor fixed Carbon		27K Ω	1/4W $\pm 5\%$
R44	Resistor fixed Carbon		150K Ω	1/4W $\pm 5\%$
R45	Resistor fixxd Carbon		2.2K Ω	1/4W $\pm 5\%$

3E14 PARTS LIST

Parts No.	Description
Q1	Transistor Germanium PNP 2SB189
Q2	Transistor Silicon PNP 2SA495G
Q3	Transistor Silicon NPN 2SC614E
Q4	Transistor Silicon NPN 2SC269
Q5	Transistor Silicon NPN 2SC614
Q6	Transistor Silicon NPN 2SC269
Q7	Transistor Silicon NPN 2SC614
Q8	Transistor Silicon NPN 2SC474
Q9	Transistor Silicon NPN 2SC614
D11	Diode Zener 1S139
D12	Diode Zener 1S139
D13	Diode Zener 1S139
D14	Diode Zener RD-9A
R21	Resistor fixed Carbon 15K Ω 1/4W $\pm 5\%$
R22	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R23	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R24	Resistor fixed Carbon 560 Ω 1/4W $\pm 5\%$
R25	Resistor fixed Carbon 1.8K Ω 1/4W $\pm 5\%$
R27	Resistor fixed Carbon 4.7K Ω 1/4W $\pm 5\%$
R28	Resistor fixed Carbon 15K Ω 1/4W $\pm 5\%$
R29	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R30	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R31	Resistor fixed Carbon 560 Ω 1/4W $\pm 5\%$
R32	Resistor fixed Carbon 1.8K Ω 1/4W $\pm 5\%$
R34	Resistor fixed Carbon 4.7K Ω 1/4W $\pm 5\%$
R35	Resistor fixed Carbon 3.9K Ω 1/4W $\pm 5\%$
R36	Resistor fixed Carbon 4.7K Ω 1/4W $\pm 5\%$
R37	Resistor fixed Carbon 1.5K Ω 1/4W $\pm 5\%$
R38	Resistor fixed Carbon 3.9K Ω 1/4W $\pm 5\%$
R40	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R41	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R42	Resistor fixed Carbon 2.2K Ω 1/4W $\pm 5\%$
R43	Resistor fixed Carbon 1.5K Ω 1/4W $\pm 5\%$
R44	Resistor fixed Carbon 820 Ω 1/4W $\pm 5\%$
R26	Resistor Variable 1K Ω
R33	Resistor Variable 1K Ω
R39	Resistor Variable 5K Ω
R45	Resistor Variable 500 Ω
*	

Parts No.	Description				
C56	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V	
C57	Capacitor fixed Electrolytic	47 μ F	25WV		
C58	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V	
C59	Capacitor fixed Electrolytic	47 μ F	25WV		
C60	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V	
C61	Capacitor fixed Electrolytic	10 μ F	50WV		
C62	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V	
C63	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V	
*					
R46	Resistor fixed Metallic	330 Ω	1/2W	$\pm 1\%$	
R47	Resistor fixed Metallic	47K Ω	1/2W	$\pm 1\%$	
R48	Resistor fixed Metallic	10K Ω	1/2W	$\pm 1\%$	
R49	Resistor fixed Metallic	4.7K Ω	1/2W	$\pm 1\%$	

3B12 PARTS LIST

Parts No.	Description
Q2	Transistor Silicon NPN 2SC269
Q3	Transistor Silicon NPN 2SC269
Q4	Transistor Silicon NPN 2SC269
Q5	Transistor Silicon NPN 2SC269
Q6	Transistor Silicon NPN 2SC269
Q7	Transistor Silicon NPN 2SC269
Q8	Transistor Silicon NPN 2SC269
Q9	Transistor Silicon NPN 2SC269
Q10	Transistor Silicon NPN 2SC269
Q11	Transistor Silicon NPN 2SC269
Q12	Transistor Silicon NPN 2SC269
Q13	Transistor Silicon NPN 2SC269
Q14	Transistor Silicon NPN 2SC269
Q15	Transistor Silicon NPN 2SC474
D21	Diode Silicon 1S953
D22	Diode Silicon 1S953
D23	Diode Silicon 1S953
D24	Diode Silicon 1S953
D25	Diode Silicon 1S953
D26	Diode Silicon 1S953
D27	Diode Silicon 1S953
D28	Diode Silicon 1S953
D29	Diode Silicon 1S953
D30	Diode Silicon 1S953
D31	Diode Silicon 1S953
D32	Diode Silicon 1S953
R37	Resistor fixed Carbon 470Ω 1/4W ±5%
R38	Resistor fixed Carbon 1KΩ 1/4W ±5%
R39	Resistor fixed Carbon 22KΩ 1/4W ±5%
R40	Resistor fixed Carbon 22KΩ 1/4W ±5%
R41	Resistor fixed Carbon 220KΩ 1/4W ±5%
R42	Resistor fixed Carbon 33KΩ 1/4W ±5%
R43	Resistor fixed Carbon 220KΩ 1/4W ±5%
R44	Resistor fixed Carbon 33KΩ 1/4W ±5%
R45	Resistor fixed Carbon 10KΩ 1/4W ±5%
R46	Resistor fixed Carbon 27KΩ 1/4W ±5%
R47	Resistor fixed Carbon 4.7KΩ 1/4W ±5%
R48	Resistor fixed Carbon 47KΩ 1/4W ±5%
R49	Resistor fixed Carbon 3.3KΩ 1/4W ±5%
R50	Resistor fixed Carbon 6.8KΩ 1/4W ±5%

Parts No.		Description			
R51	Resistor fixed Carbon	2.2K Ω	1/4W	$\pm 5\%$	
R52	Resistor fixed Carbon	33K Ω	1/4W	$\pm 5\%$	
R53	Resistor fixed Carbon	1.5K Ω	1/4W	$\pm 5\%$	
R54	Resistor fixed Carbon	6.8K Ω	1/4W	$\pm 5\%$	
R55	Resistor fixed Carbon	1.8K Ω	1/4W	$\pm 5\%$	
R56	Resistor fixed Carbon	39K Ω	1/4W	$\pm 5\%$	
R57	Resistor fixed Carbon	39K Ω	1/4W	$\pm 5\%$	
R58	Resistor fixed Carbon	6.8K Ω	1/4W	$\pm 5\%$	
R59	Resistor fixed Carbon	150K Ω	1/4W	$\pm 5\%$	
R60	Resistor fixed Carbon	6.8K Ω	1/4W	$\pm 5\%$	
R62	Resistor fixed Carbon	100K Ω	1/4W	$\pm 5\%$	
R63	Resistor fixed Carbon	10K Ω	1/4W	$\pm 5\%$	
R64	Resistor fixed Carbon	22K Ω	1/4W	$\pm 5\%$	
R65	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R66	Resistor fixed Carbon	47K Ω	1/4W	$\pm 5\%$	
R67	Resistor fixed Carbon	15K Ω	1/4W	$\pm 5\%$	
R68	Resistor fixed Carbon	150K Ω	1/4W	$\pm 5\%$	
R69	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R70	Resistor fixed Carbon	47K Ω	1/4W	$\pm 5\%$	
R71	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R72	Resistor fixed Carbon	47K Ω	1/4W	$\pm 5\%$	
R73	Resistor fixed Carbon	330 Ω	1/4W	$\pm 5\%$	
R74	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R75	Resistor fixed Carbon	47K Ω	1/4W	$\pm 5\%$	
R76	Resistor fixed Carbon	1K Ω	1/4W	$\pm 5\%$	
R77	Resistor fixed Carbon	10K Ω	1/4W	$\pm 5\%$	
R78	Resistor fixed Carbon	1.5K Ω	1/4W	$\pm 5\%$	
R79	Resistor fixed Carbon	820 Ω	1/4W	$\pm 5\%$	
R80	Resistor fixed Carbon	15K Ω	1/4W	$\pm 5\%$	
C86	Capacitor fixed Ceramic	0.047 μ F	+100, -0%	50V	
C88	Capacitor fixed Electrolytic	33 μ F	35WV		
C89	Capacitor fixed Ceramic	1000PF	+100, -0%	50V	
C90	Capacitor fixed Ceramic	1000PF	+100, -0%	50V	
C91	Capacitor fixed Ceramic	100PF	$\pm 10\%$	50V	
C92	Capacitor fixed Ceramic	100PF	$\pm 10\%$	50V	
C93	Capacitor fixed Electrolytic	0.33 μ F	25WV		
C94	Capacitor fixed Ceramic	1000PF	+100, -0%	50V	
C95	Capacitor fixed Ceramic	100PF	$\pm 10\%$	50V	
C96	Capacitor fixed Ceramic	100PF	$\pm 10\%$	50V	
C87	Capacitor fixed Ceramic	0.047 μ F	+100, -0%	50V	

Parts No.	Description			
C97	Capacitor fixed Ceramic	0.047 μ F	+100, -0%	50V
C98	Capacitor fixed Ceramic	0.047 μ F	+100, -0%	50V
C99	Capacitor fixed Ceramic	0.047 μ F	+100, -0%	50V

3B40 PARTS LIST

Parts No.	Description			
Q1	Transistor Silicon	NPN	2SC269	
Q2	Transistor Silicon	NPN	2SC269	
Q3	Transistor Silicon	NPN	2SC269	
Q4	Transistor Silicon	NPN	2SC269	
Q5	Transistor Silicon	NPN	2SC689	
Q6	Transistor Silicon	NPN	2SC269	
Q7	Transistor Silicon	NPN	2SC269	
Q8	Transistor Silicon	NPN	2SC269	
Q9	Transistor Silicon	NPN	2SC269	
Q10	Transistor Silicon	NPN	2SC269	
Q11	Transistor Silicon	NPN	2SC689	
Q12	Transistor Silicon	NPN	2SC689	
Q13	Transistor Silicon	NPN	2SC269	
Q14	Transistor Silicon	NPN	2SC474	
D21	Diode Silicon		1S953	
D22	Diode Silicon		1S953	
D23	Diode Silicon		1S953	
D24	Diode Silicon		1S953	
D25	Diode Silicon		1S953	
D26	Diode Silicon		1S953	
D27	Diode Silicon		1S953	
D28	Diode Silicon		1S953	
D29	Diode Silicon		1S953	
D30	Diode Silicon		1S953	
D31	Diode Silicon		1S953	
D32	Diode Silicon		1S953	
D33	Diode Silicon		1S953	
D34	Diode Silicon		1S953	
D35	Diode Silicon		1S953	
D36	Diode Silicon		1S953	
D37	Diode Silicon		1S953	
D38	Diode Silicon		1S953	
D39	Diode Silicon		1S953	
D40	Diode Silicon		1S953	
R51	Resistor fixed Carbon	180Ω	1/4W	±5%
R52	Resistor fixed Carbon	180Ω	1/4W	±5%
R53	Resistor fixed Carbon	3.3KΩ	1/4W	±5%
R54	Resistor fixed Carbon	3.3KΩ	1/4W	±5%
R55	Resistor fixed Carbon	100KΩ	1/4W	±5%

Parts No.	Description				
R56	Resistor fixed Carbon	100K Ω	1/4W	$\pm 5\%$	
R57	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R58	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R59	Resistor fixed Carbon	470 Ω	1/4W	$\pm 5\%$	
R60	Resistor fixed Carbon	680 Ω	1/4W	$\pm 5\%$	
R61	Resistor fixed Carbon	470 Ω	1/4W	$\pm 5\%$	
R62	Resistor fixed Carbon	470 Ω	1/4W	$\pm 5\%$	
R63	Resistor fixed Carbon	1K Ω	1/4W	$\pm 5\%$	
R64	Resistor fixed Carbon	680 Ω	1/4W	$\pm 5\%$	
R65	Resistor fixed Carbon	180 Ω	1/4W	$\pm 5\%$	
R66	Resistor fixed Carbon	180 Ω	1/4W	$\pm 5\%$	
R67	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$	
R68	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$	
R69	Resistor fixed Carbon	100K Ω	1/4W	$\pm 5\%$	
R70	Resistor fixed Carbon	100K Ω	1/4W	$\pm 5\%$	
R71	Resistor fixed Carbon	820 Ω	1/4W	$\pm 5\%$	
R72	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R73	Resistor fixed Carbon	470 Ω	1/4W	$\pm 5\%$	
R74	Resistor fixed Carbon	470 Ω	1/4W	$\pm 5\%$	
R75	Resistor fixed Carbon	820 Ω	1/4W	$\pm 5\%$	
R76	Resistor fixed Carbon	1.8K Ω	1/4W	$\pm 5\%$	
R77	Resistor fixed Carbon	22K Ω	1/4W	$\pm 5\%$	
R78	Resistor fixed Carbon	330 Ω	1/4W	$\pm 5\%$	
R79	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R80	Resistor fixed Carbon	4.7K Ω	1/4W	$\pm 5\%$	
R81	Resistor fixed Carbon	1.5K Ω	1/4W	$\pm 5\%$	
R82	Resistor fixed Carbon	150 Ω	1/4W	$\pm 5\%$	
R83	Resistor fixed Carbon	150 Ω	1/4W	$\pm 5\%$	
R84	Resistor fixed Carbon	1K Ω	1/4W	$\pm 5\%$	
R85	Resistor fixed Carbon	1K Ω	1/4W	$\pm 5\%$	
R86	Resistor fixed Carbon	33K Ω	1/4W	$\pm 5\%$	
R87	Resistor fixed Carbon	33K Ω	1/4W	$\pm 5\%$	
R88	Resistor fixed Carbon	820 Ω	1/4W	$\pm 5\%$	
R89	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$	
R90	Resistor fixed Carbon	100K Ω	1/4W	$\pm 5\%$	
R91	Resistor fixed Carbon	220 Ω	1/4W	$\pm 5\%$	
R92	Resistor fixed Carbon	27K Ω	1/4W	$\pm 5\%$	
R93	Resistor fixed Carbon	330K Ω	1/4W	$\pm 5\%$	
R94	Resistor fixed Carbon	470K Ω	1/4W	$\pm 5\%$	
R95	Resistor fixed Carbon	33K Ω	1/4W	$\pm 5\%$	
C101	Capacitor fixed Ceramic	47PF	$\pm 10\%$	50V	
C102	Capacitor fixed Ceramic	47PF	$\pm 10\%$	50V	
C103	Capacitor fixed Ceramic	33PF	$\pm 10\%$	50V	
C104	Capacitor fixed Ceramic	33PF	$\pm 10\%$	50V	
C105	Capacitor fixed Ceramic	100PF	$\pm 10\%$	50V	

Parts No.	Description				
C106	Capacitor fixed Ceramic	47PF	±10%	50V	
C107	Capacitor fixed Ceramic	47PF	±10%	50V	
C108	Capacitor fixed Ceramic	47PF	±10%	50V	
C109	Capacitor fixed Ceramic	33PF	±10%	50V	
C110	Capacitor fixed Ceramic	33PF	±10%	50V	
C111	Capacitor fixed Ceramic	68PF	±10%	50V	
C112	Capacitor fixed Ceramic	68PF	±10%	50V	
C113	Capacitor fixed Ceramic	47PF	±10%	50V	
C114	Capacitor fixed Ceramic	0.047μF	+100,-0%	50V	
C115	Capacitor fixed Mica	470PF	±5%	300V	
C116	Capacitor fixed Ceramic	0.047μF	+100,-0%	50V	

3C10 I PARTS LIST

Parts No.	Description		
IC1	Integrated Circuit		
IC2	Integrated Circuit		
R3	Resistor fixed Carbon	33K Ω	$\pm 5\%$ 1/2W
R4	Resistor fixed Carbon	100K Ω	
R7	Resistor fixed Carbon	150K Ω	$\pm 5\%$ 1/2W
N5	Tube Glow Neon	NE-2QD	
V6	Tube Numerical Indicator	CD61L	

3C40 I PARTS LIST

Parts No.	Description			
IC1	Integrated Circuit			
IC2	Integrated Circuit			
IC3	Integrated Circuit			
R4	Resistor fixed Carbon	33K Ω	$\pm 5\%$	1/2W
R5	Resistor fixed Carbon	100K Ω		
R8	Resistor fixed Carbon	150K Ω	$\pm 5\%$	1/2W
V6	Tube Numerical Indicator	CD-61L		
N7	Tube Glow Neon	NE-2QD		

3D12 PARTS LIST

Parts No.	Description			
IC1	Integrated Circuit			
IC2	Integrated Circuit			
IC3	Integrated Circuit			
IC4	Integrated Circuit			
IC5	Integrated Circuit			
IC6	Integrated Circuit			
IC7	Integrated Circuit			
IC8	Integrated Circuit			
R11	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$
R12	Resistor fixxd Carbon	3.3K Ω	1/4W	$\pm 5\%$
R13	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$
R14	Resistor fixed Carbon	3.3K Ω	1/4W	$\pm 5\%$
C21	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V
C22	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V
C23	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V
C24	Capacitor fixed Ceramic	0.01 μ F	+100,-0%	50V
C25	Capacitor fixed Ceramic	0.047 μ F	+100,-0%	50V
L31	Coil	LV-200	200 μ H	500mA

3D45 PARTS LIST

Parts No.	Description				
IC1	Integrated Circuit				
IC2	Integrated Circuit				
IC3	Integrated Circuit				
IC4	Integrated Circuit				
IC5	Integrated Circuit				
IC6	Integrated Circuit				
IC7	Integrated Circuit				
Q11	Transistor Silicon	NPN	2SC269		
Q12	Transistor Silicon	NPN	2SC269		
Q13	Transistor Silicon	NPN	2SC269		
Q14	Transistor Silieon	NPN	2SC269		
Q15	Transistor Silioon	NPN	2SC269		
D21	Diode Silicon	1S953			
R24	Resistor fixed Carbon	100Ω	1/4W	±5%	
R25	Resistor fixed Carbon	27KΩ	1/4W	±5%	
R26	Resistor fixed Carbon	33KΩ	1/4W	±5%	
R27	Resistor fixed Carbon	1KΩ	1/4W	±5%	
R28	Resistor fixed Carbon	6.8KΩ	1/4W	±5%	
R29	Resistor fixed Carbon	680Ω	1/4W	±5%	
R30	Resistor fixed Carbon	2.7KΩ	1/4W	±5%	
R31	Resistor fixed Carbon	5.6KΩ	1/4W	±5%	
R32	Resistor fixed Carbon	680Ω	1/4W	±5%	
R33	Resistor fixed Carbon	1.8KΩ	1/4W	±5%	
R34	Resistor fixed Carbon	27KΩ	1/4W	±5%	
R35	Resistor fixed Carbon	33KΩ	1/4W	±5%	
R36	Resistor fixed Carbon	1KΩ	1/4W	±5%	
R37	Resistor fixed Carbon	100Ω	1/4W	±5%	
R38	Resistor fixed Carbon	100Ω	1/4W	±5%	
C41	Capacitor fixed Ceramic	0.01μF	+100,-0%	50V	
C42	Capacitor fixed Ceramic	0.01μF	+100,-0%	50V	
C43	Capacitor fixed Ceramic	0.01μF	+100,-0%	50V	
C44	Capacitor fixed Ceramic	0.047μF	+100,-0%	50V	
C45	Capacitor fixed Ceramic	0.047μF	+100,-0%	50V	
C46	Capacitor fixed Ceramic	1000PF	+100,-0%	50V	
L51	Coil	LV-200			

TABLE OF SUBSTITUTES

TYPE NO.	SUBSTITUTES	SUBSTITUTES	NOTE
2SA244	2SA245		
2SA245	2SA246		TR-9905, TR-9906, TR-9916, -TR-3011, -TR-3012, -TR-3013, -TR-3017, -TR-3018, -TR-3019.
2SA245	2N961		TR-9572, -TR-3010, -TR-3014.
2SA245	2N3640	2N2894	TR-9902A.
2SA246	2SA245		
2SA248	2SA249		
2SA448	2N3640	2N2894	
2SA278	2SA17K		
2SA555	2SA495		
2SB23H	2SB26H		
2SB100	2SB264		
2SB103	2SB113		
2SB107A	2SB246		
2SB222	2SB113		TR-9914-Q3.
2SB222	2SB189		TR-9911-Q2, Q3, TR-9012-Q4.
2SB222	2SB330		TR-9914-Q2, Q4, TR-9919.
2SB241	2SB240		
2SB245	2SB246		

TYPE NO.	SUBSTITUTES	SUBSTITUTES	NOTE
2SC15-3	2SC376G		
2SC15-3	2SC32		
2SC100	2SC269		
2SC104A	2SC400		
2SC125S	2SC273		
2SC126	2SC154-A		
2SC134	2SC288		
2SC147A-3	2SD120		
2SC183	2SC154		
2SC184	2SC269		
2SC185	2SC269		
2SC245E	2SD82		
2SC273	2SD149		
2SC291	2SD121-A		
2SC292	2SD121-A		
2SC298	2SD71		-TR-31896, -TR-65A15.
2SC298	2SD73	2SD82	-TR-3666.
2SC299	2SD71		
2SC318-2	2SC641K	2SC269	
2SC318-2	2SC376G		TR-9932, TR-9933, TR-9942, TR-9943.
2SC318-4	2SC641K	2SC269	
2SC318-4	2SC283HB		WEP1, WH64.
2SC318-4	2SC32		WEL4.

TYPE NO.	SUBSTITUTES	SUBSTITUTES	NOTE
2SC318-4	2SD121D		WE12.
2SC318-4	2SC402		Except WE12, WE14, WE21, WH64.
2SC376G	2SC402S		
2SC4018-4	2SC641K	2SC269	
2SC4018-6	2SC641K	2SC269	
2SC402	2SC474		
2SC402-B	2SC376G		
2SC454	2SC641K	2SC269	
2SC474	2SC268A		Except 5838-Q15, 5811-27-Q8, 6G20-Q4, TR-90123-Q10, TR-9932-Q8, TR-9933-Q4, Q8 TR-9942-Q1, Q2.
2SC641K	2SC269		
2SC686	2SC273		
2SD28	2SD73	2SD82	
2SD43	2SC641K	2SC269	
2SD43A	2SC641K	2SC269	
2SD47B	2SD73	2SD82	
2SD47C	2SD73	2SD82	
2SD64	2SC641K	2SC269	
2SD65	2SC641K	2SC269	
2SD71	2SD92		
2SD73	2SC245R	2SD82	
2SD121	2SC708		WE12-Q4, WE17-Q1, Q2 WE22A, WE24, TR-9019, TR-9701A.
2SD121	2SC280		WE12-Q6, 77, WE25-Q1, Q4.

TYPE NO.	SUBSTITUTES	SUBSTITUTES	NOTE
2SD121	2SD120	2SC614	Except WE12-Q1, Q2, WE17-Q1, Q2, WE22A, WE24, WE25-Q1, Q4, TR-9019, TR-9704A
2SD134	2SC376G		
2SD120	2SC614		
2N706	2SC401		
2N709	2SC689		
2N3640	2N2894		
2N7490N	2N2309		
1N34A	SD16		
1N468B	1N705		
1N469B	1N706		
1N960B	1N757		
1T1103	1T1122		
1T1104	1T1161		
3CC12	1S1660		
3F40	3CC12	1S1660	
3SK12	3SK21		
3SK13	3SK21		
3Z56	RD6C		
5F10	6KC12	6LC12	
6KC12	6LC12		
8SH	SD-07		

TYPE NO.	SUBSTITUTES	SUBSTITUTES	NOTE
10D1	SD-1		TR-9009.
10D1	3CC12	1S1660	-TR-3715, -TR-5745/5746.
10D1	SH-1A	SD-1A	-TR-5578 SERIES CONTROL-D2.
10D1	SH-1C	SD-1C	-TR-5578 SERIES CONTROL-D1.
10D2	3CC12	1S1660	-TR-3666.
10D2	SH-1A	SD-1A	WG11.
10D2	SD104		WG12.
10D4	3CC12	1S1660	-TR-5578 SERIES CONTROL-D8.
10D4	SD-07		-TR-5578 SERIES CONTROL-D7.
10DB1A	SH-1A	SD-1A	-TR-5578 SERIES CONTROL-D3.
10DB1A	SD-07		-TR-5578 SERIES CONTROL-D4 ~ D6.
10DB1A	3CC12	1S1660	-TR-5745/5746.
10DB4	SD-07		
RD6A	1S135		
V-323	SV14B		
SD18	SD16		
SD46	1S446		
SD103	SH-1A	SD-1A	
SH-1/1A/ 1B/1C	SD-1/1A/ 1B/1C		Except WG14, WG26, WG19, WG20.
1S180 WG713	WG713 1S953	1S953	

WA92 PARTS LIST

Parts No.	Description
Q1	Transistor Silicon NPN 2SC289
Q2	Transistor Silicon NPN 2SC289
Q3	Transistor Silicon NPN 2SC289
Q4	Transistor Silicon NPN 2SC289
Q5	Transistor Silicon NPN 2SC289
Q6	Transistor Silicon NPN 2SC289
Q7	Transistor Silicon NPN 2SC289
Q8	Transistor Silicon NPN 2SC289
Q9	Transistor Silicon NPN 2SC568
Q10	Transistor Silicon NPN 2SC269
D16	Diode Silicon WG-713
D17	Diode Silicon WG-713
D18	Diode Silicon WG-713
D19	Diode Silicon WG-713
D20	Diode Silicon 1S135
D21	Diode Silicon 1S135
D22	Diode Silicon 1S135
D23	Diode Silicon 1S135
R26	Resistor fixed Carbon 51Ω ±5% 1/2W
R27	Resistor fixed Carbon 51Ω ±5% 1/2W
R28	Resistor fixed Carbon 10KΩ ±5% 1/8W
R29	Resistor fixed Carbon 417KΩ ±5% 1/8W
R30	Resistor fixed Carbon 390Ω ±5% 1/8W
R31	Resistor fixed Carbon 220Ω ±5% 1/8W
R32	Resistor fixed Carbon 560Ω ±5% 1/8W
R34	Resistor fixed Carbon 1.2KΩ ±5% 1/8W
R35	Resistor fixed Carbon 470Ω ±5% 1/8W
R36	Resistor fixed Carbon 220Ω ±5% 1/8W
R37	Resistor fixed Carbon 560Ω ±5% 1/8W
R38	Resistor fixed Carbon 22Ω ±5% 1/3W
R39	Resistor fixed Carbon 1.2KΩ ±5% 1/8W
R40	Resistor fixed Carbon 470Ω ±5% 1/8W
R41	Resistor fixed Carbon 220Ω ±5% 1/8W
R42	Resistor fixed Carbon 560Ω ±5% 1/8W
R43	Resistor fixed Carbon 22Ω ±5% 1/8W
R44	Resistor fixed Carbon 1.2KΩ ±5% 1/8W
R45	Resistor fixed Carbon 390Ω ±5% 1/8W
R46	Resistor fixed Carbon 220Ω ±5% 1/8W

WA92 PARTS LIST

Parts No.	Description			
R47	Resistor fixed Carbon	560 Ω	$\pm 5\%$	1/8W
R48	Resistor fixed Carbon	22 Ω	$\pm 5\%$	1/8W
R49	Resistor fixed Carbon	1.2K Ω	$\pm 5\%$	1/8W
R50	Resistor fixed Carbon	3.9K Ω	$\pm 5\%$	1/8W
R51	Resistor fixed Carbon	6.8K Ω	$\pm 5\%$	1/8W
R52	Resistor fixed Carbon	22 Ω	$\pm 5\%$	1/8W
R53	Resistor fixed Carbon	10 Ω	$\pm 5\%$	1/8W
R54	Resistor fixed Carbon	10 Ω	$\pm 5\%$	1/8W
R55	Resistor fixed Carbon	390 Ω	$\pm 5\%$	1/8W
R56	Resistor fixed Carbon	22 Ω	$\pm 5\%$	1/8W
R57	Resistor fixed Carbon	20 Ω	$\pm 5\%$	1/8W
R58	Resistor fixed Carbon	1.5K Ω	$\pm 5\%$	1/8W
R60	Resistor fixed Carbon	47 Ω	$\pm 5\%$	1/8W
R61	Resistor fixed Carbon	47 Ω	$\pm 5\%$	1/8W
R62	Resistor fixed Carbon	47 Ω	$\pm 5\%$	1/8W
R63	Resistor fixed Carbon	47 Ω	$\pm 5\%$	1/8W
R64	Resistor fixed Carbon	47 Ω	$\pm 5\%$	1/8W
C81	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV
C82	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV
C83	Capacitor fixed Tantalum	47 μ F		10V
C84	Capacitor fixed Electrolytic	330 μ F		10V
C85	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV
C86	Capacitor fixed Ceramic	1000PF		500WV
C89	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV
C90	Capacitor fixed Electrolytic	330 μ F		10V
C91	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV
C92	Capacitor fixed Ceramic	1000PF		500WV
C95	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV
C96	Capacitor fixed Electrolytic	330 μ F		10V
C97	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV
C98	Capacitor fixed Ceramic	1000PF		500WV
C101	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV
C102	Capacitor fixed Electrolytic	330 μ F		10V
C103	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV
C104	Capacitor fixed Ceramic	1000PF		500WV
C107	Capacitor fixed Tantalum	150 μ F		16V
C108	Capacitor fixed Ceramic	10PF	$\pm 10\%$	50WV
C109	Capacitor fixed Ceramic	1000PF		500WV
C110	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV

WA92 PARTS LIST

Parts No.	Description				
C111	Capacitor fixed Ceramic	0.0068 μ F	+100,-0%	50WV	
C112	Capacitor fixed Electrolytic	47 μ F		10V	
C113	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C114	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C115	Capacitor fixed Electrolytic	47 μ F		25V	
C116	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C117	Capacitor fixed Electrolytic	47 μ F		25V	
C118	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C119	Capacitor fixed Electrolytic	47 μ F		25V	
C120	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C121	Capacitor fixed Electrolytic	47 μ F		25V.	
C122	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C123	Capacitor fixed Electrolytic	47 μ F		25V	
C124	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C126	Capacitor fixed Ceramic	0.0022 μ F	+100,-0%	50WV	
C127	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
C128	Capacitor fixed Tantalum	47 μ F		10WV NP	
C129	Capacitor fixed Ceramic	0.022 μ F	+100,-0%	50WV	
J131	Connector	MSS-LP-1.5(R)			
C130	Capacitor fixed Ceramic	2PF	+1%	50WV	
C131	Capacitor fixed Ceramic	3PF	+1%	50WV	
C132	Capacitor fixed Ceramic	2PF	+1%	50WV	
C133	Capacitor fixed Ceramic	2PF	+1%	50WV	
C134	Capacitor fixed Ceramic	5PF	+1%	50WV	