KENWOOD

OSCILLATOR

AG-252

SERVICE MANUAL

KENWOOD CORPORATION

WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

CONTENTS

ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.
The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the unit sufficiently (more than 30 minutes) before starting.
Before calibrating the unit, check the power supply voltage.

TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

Test Equipment	Model	Maker
Multi meter	45	Fluke
Sine-Wave generator	SG-502	Tektronix
Oscilloscope	CS-4025	KENWOOD
Frequency counter	FC-758	KENWOOD
600 Ω termination		

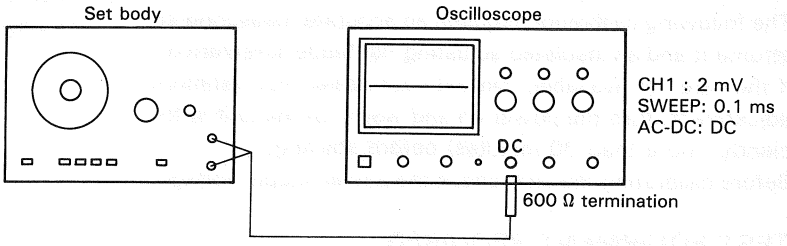
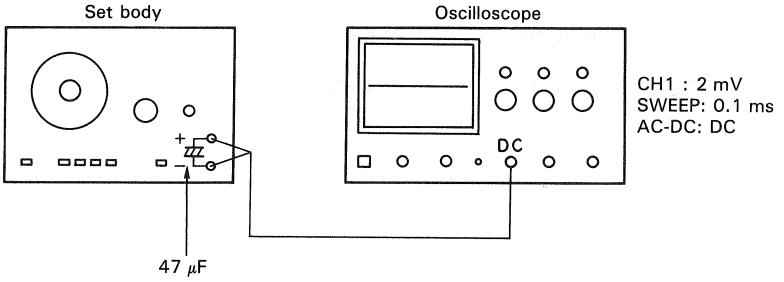
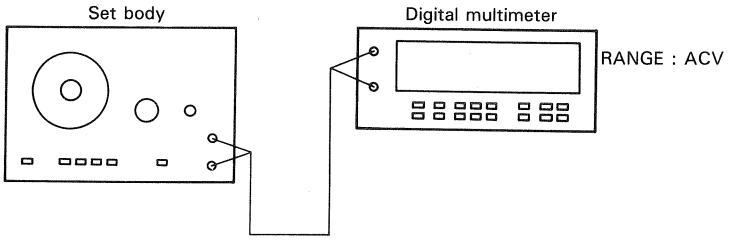
PREPARATION FOR ADJUSTMENT

Control Settings

The control settings listed below must be used for each adjustment procedure.
Exceptions to these settings will be noted as they occur.
After completing a adjustment, return the controls to the following settings.

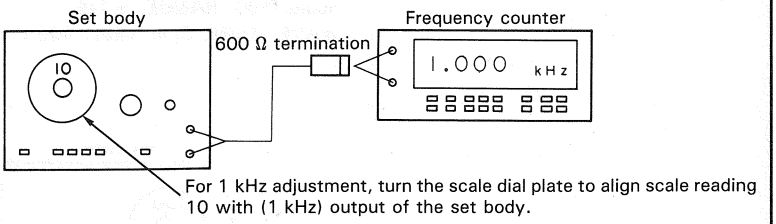
NAME OF KNOBS	POSITION
FREQUENCY	10
ATTENUATOR (dB)	0
AMPLITUDE	MAX
RANGE	× 100
WAVE FORM	~

ADJUSTMENT

Item	Adjustment VR (TC)	Procedure
Output amplitude offset	VR5	ATT : 0 dB, AMPLITUDE: MAX. Scale: 10, RANGE: × 100 WAVE FORM: Sine wave, 600 Ω terminated  ● Adjust so that the oscilloscope voltage reading is 0 V.
Offset	VR1	Same as above, except that the 600 Ω termination is not used.  1) Set AMPLITUDE to MAX. 2) Connect a 47 μF capacitor across the OUTPUT jacks of the set body (use care of the polarity). 3) Adjust so that the oscilloscope voltage reading is 0 V.
Output level	VR3	 1) Remove the 47 μF (chemical capacitor) and connect a digital multimeter to the jacks. 2) Adjust so that the output voltage reads 11.00 V.

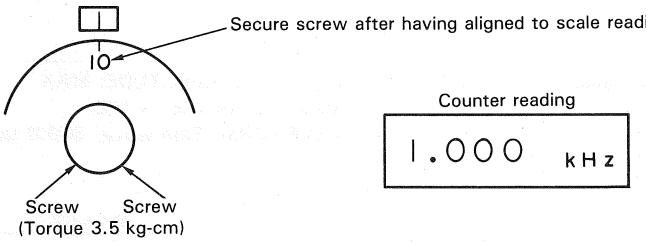
ADJUSTMENT

Item	Adjustment VR (TC)	Procedure
1 kHz frequency 10 kHz frequency	TC3 TC4	

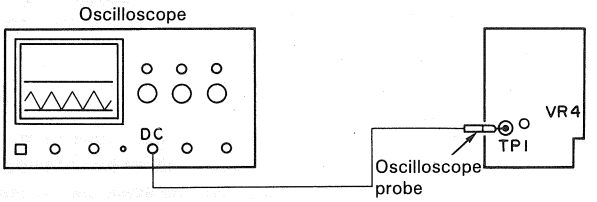


For 1 kHz adjustment, turn the scale dial plate to align scale reading 10 with (1 kHz) output of the set body.

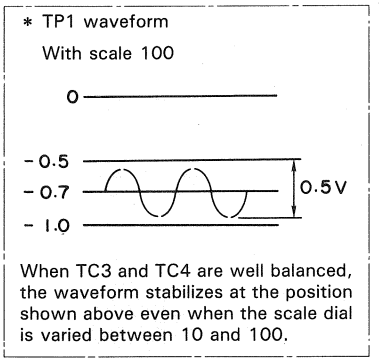
1) Turn the scale dial so that the frequency counter reads 1.000 kHz. (Ignore the reading of the scale dial plate.)
2) Taking care not to vary the frequency reading, turn the scale dial plate (by loosening the scale dial retaining screw) until the scale reading becomes 10.



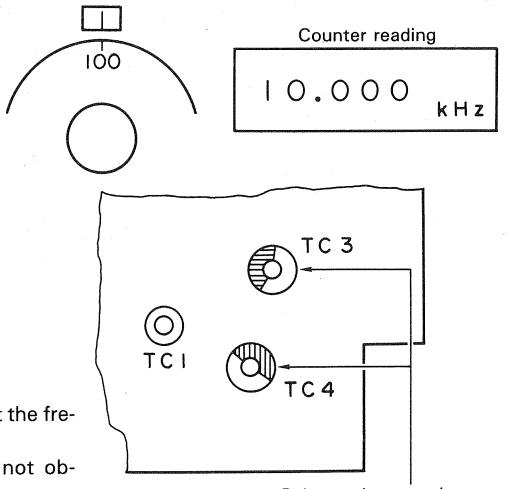
3) After securing the dial scale plate retaining screw, turn the scale dial to read 100. Then, connect the oscilloscope probe to TP1 and perform adjustment while observing the oscilloscope waveform.



4) Adjust TC3 and TC4 while balancing them so that the frequency counter reads 10.000 kHz/
* Adjust the waveform at TP1 to about −0.7 V.



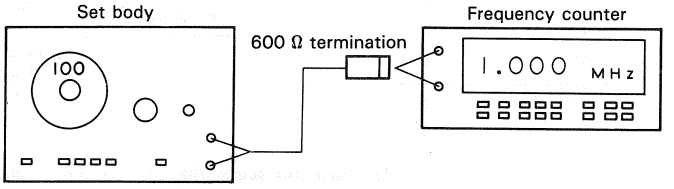
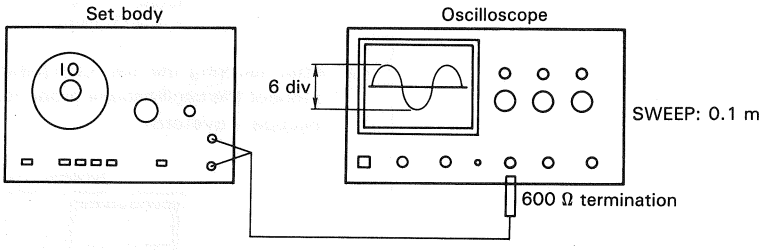
When TC3 and TC4 are well balanced, the waveform stabilizes at the position shown above even when the scale dial is varied between 10 and 100.



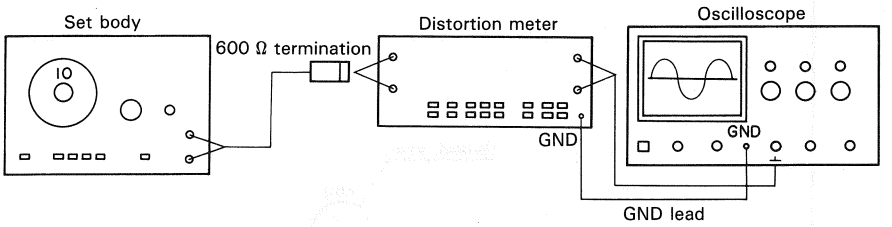
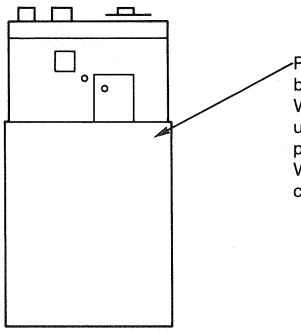
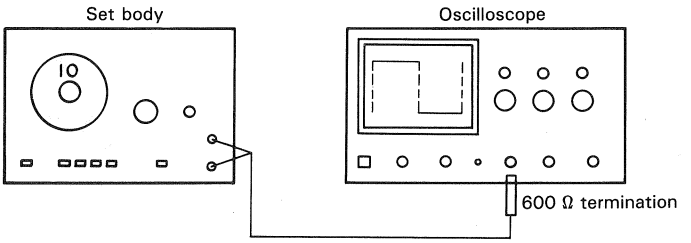
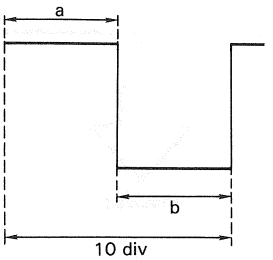
Balance them so that the rotation angles are about half turns.

5) Set the scale dial to 10 and check that the frequency counter reads 1,000 kHz.
6) If the correct frequency reading is not obtained, repeat steps 1) ~ 4) again.

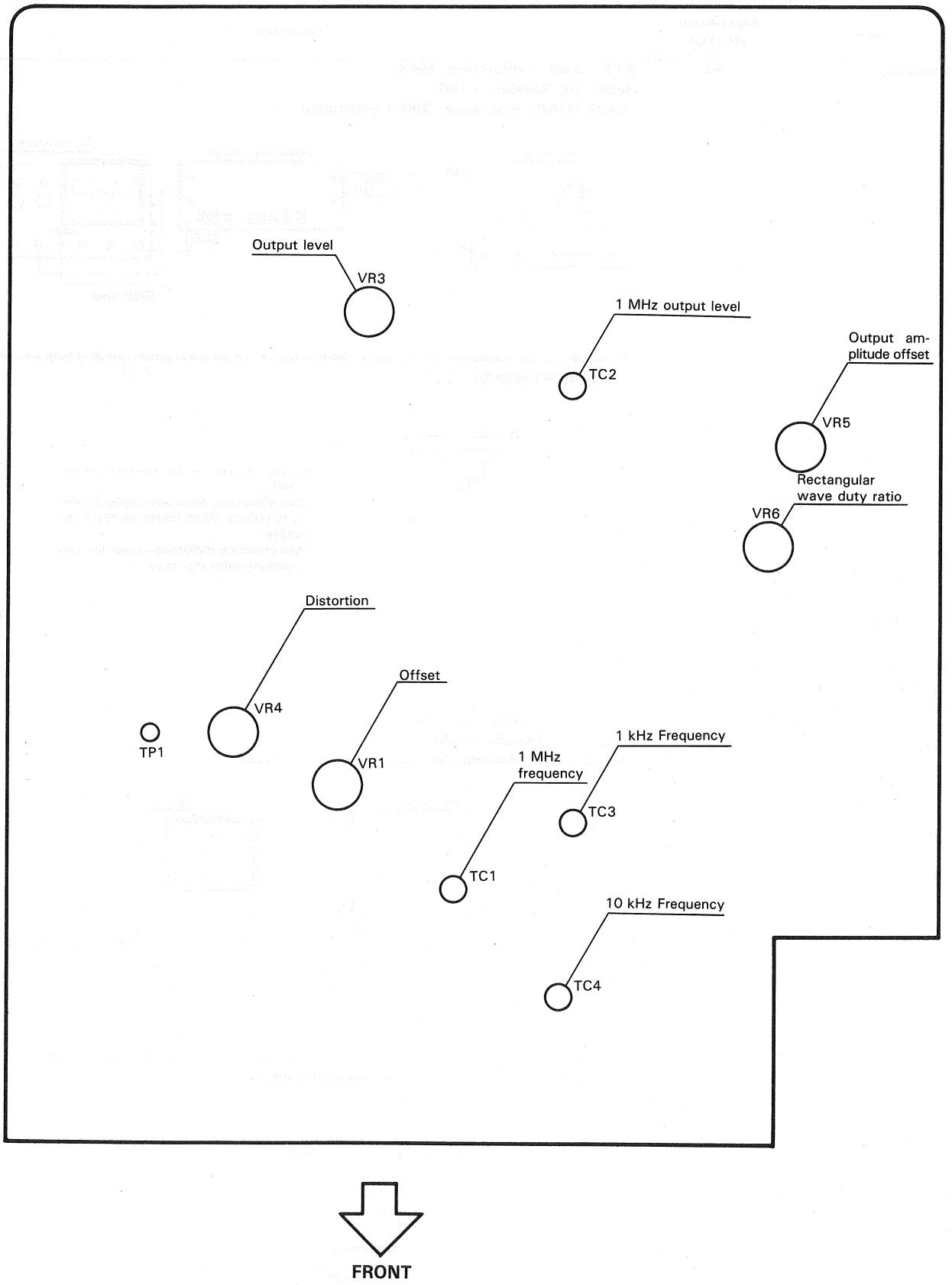
ADJUSTMENT

Item	Adjustment VR (TC)	Procedure
1 MHz frequency	TC1	ATT : 0 dB, AMPLITUDE: MAX. Scale: 100, RANGE: × 10k WAVE FORM: Sine wave, 600 Ω terminated  Adjust so that the frequency counter reading is 1.0000 MHz.
1 MHz output level	TC2	ATT : 0 dB, AMPLITUDE: MAX. Scale: 10, RANGE: × 100 WAVE FORM: Sine wave, 600 Ω terminated  1) Apply 1 kHz sine wave to fill 6 divisions on the oscilloscope screen. (If an amplitude of 6 divisions cannot be obtained, adjust the ATT and variable controls of the oscilloscope.) 2) Then, turn the scale dial on the set body to scale 100 and set RANGE to × 10k to output 1 MHz. (Do not operate the controls on the oscilloscope.) 3) Adjust so that the amplitude on the oscilloscope screen becomes 5.8 divisions.

ADJUSTMENT

Item	Adjustment VR (TC)	Procedure
Distortion	VR4	ATT : 0 dB, AMPLITUDE: MAX. Scale: 10, RANGE: ×100 WAVE FORM: Sine wave, 600 Ω terminated  ● Adjust to the optimum point while observing the distortion meter reading and oscilloscope display waveform.  Position the case so that it covers the set by half. When adjusting, place your hand on the unit to reduce noise factor as much as possible. When checking distortion, cover the set completely with the case.
Rectangular wave duty ratio	VR6	ATT : 0 dB, AMPLITUDE: MAX. Scale: 10, RANGE: ×100 WAVE FORM: Rectangular wave, 600 Ω terminated  1) Display a cycle of waveform by operating the controls of the oscilloscope. 2) Adjust so that a and b of the waveform are equal. 

ADJUSTMENT


Output level
VR3
1 MHz output level
TC2
Output amplitude offset
VR5
Rectangular wave duty ratio
VR6
Distortion
VR4
Offset
VR1
TP1
1 MHz frequency
TC1
1 kHz Frequency
TC3
10 kHz Frequency
TC4
FRONT

PARTS LIST

AG-252 UNIT

Y73-1080-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	A01-1229-02	CASE
	A01-1230-02	CHASSIS
	A13-0948-13	FRAME,SIDE
	A21-1178-22	DECORATIVE PANEL
	A22-0885-02	SUB PANEL
	A83-0009-12	REAR PANEL
	B01-0705-03	ESCUTCHEON
	B20-0935-14	DIAL SCALE
	B42-3699-04	SERIAL NO. PLATE
	B63-0024-00	INSTRUCTION MANUAL;ENG./JAP.
	C02-0201-15	VARIABLE CAPACITOR
	E18-0365-05	AC SELECTOR WITH 6X30MM FUSE
	E18-0366-15	AC SELECTOR WITH 5X20MM FUSE
	E21-0669-03	PAIR TERMINAL
	E21-0671-03	TERMINAL,BLACK
	E21-0672-03	TERMINAL,WHITE
	E29-0506-04	SHORTING BAR
	E30-1644-15	BS POWER CORD
	E30-1818-05	JIS POWER CORD SET
	E30-1819-05	CEE POWER CORD SET
	E30-1820-05	UL/CSA POWER CORD SET
	E30-1821-05	SAA POWER CORD SET
	E31-2928-05	WIRE ASS'Y;GND
	E38-0136-15	WIRE ASS'Y;P1 TO SYNC
	E38-0137-15	WIRE ASS'Y;P8 TO OUTPUT
	F05-2012-05	FUSE(6X30MM) 0.2A
	F05-2015-05	FUSE(5X20MM) T200MA/250V
	F05-3011-05	FUSE(6X30MM) 0.3A
	F10-1638-03	SHIELD PLATE
	H10-2851-02	FOAMED STYRENE PAD(FRONT)
	H10-2852-02	FOAMED STYRENE PAD(REAR)
	H20-1709-14	VINYL COVER
	H53-0020-04	CARTON BOX
	J02-0363-04	RUBBER FOOT,REAR
	J02-0525-13	RUBBER FOOT,FRONT
	J02-0528-04	TILT STAND
	J11-0510-04	CABLE CLAMP
	J19-1620-05	CORD KEEP
	J30-0633-04	SPACER
	J61-0408-05	WIRE WRAPPING BAND
	K01-0544-05	HANDLE
	K21-0908-04	KNOB,AMPLITUDE
	K21-0912-03	KNOB,FREQUENCY
	K21-0914-03	KNOB,ATTENUATOR
	K27-0504-04	BUTTON;GRAY,USED 6 PIECES
	K27-0506-04	BUTTON;ORANGE
	L01-9954-15	POWER TRANSFORMER
	N09-0726-05	SCREW,SEMS PAN HD M4X10
	N09-0739-05	SCREW,SEMS BINDING TAPTITE 3X8
	N09-0742-04	SCREW,SEMS M3X8
	N09-0777-05	SCREW,SEMS M4X6
	N10-2030-41	NUT, HEX M3
	N17-1030-41	LOCK WASHER M3
	N19-0720-05	PLAIN WASHER D=11.8MM,T=1MM
	N30-2606-41	SCREW, PAN HD M2.6X6
	N30-3010-41	SCREW, PAN HD M3X10
	N88-2008-41	SCREW, FLAT HD TAPTITE 2X8
	N88-3008-41	SCREW, FLAT HD TAPTITE 3X8
	N89-3008-41	SCREW, BINDING TAPTITE 3X8
	W02-2026-05	V.C UNIT
	X65-1390-00	OVERALL UNIT
	X67-1060-00	ACCESSORY CORD(CA-48)

OVERALL UNIT

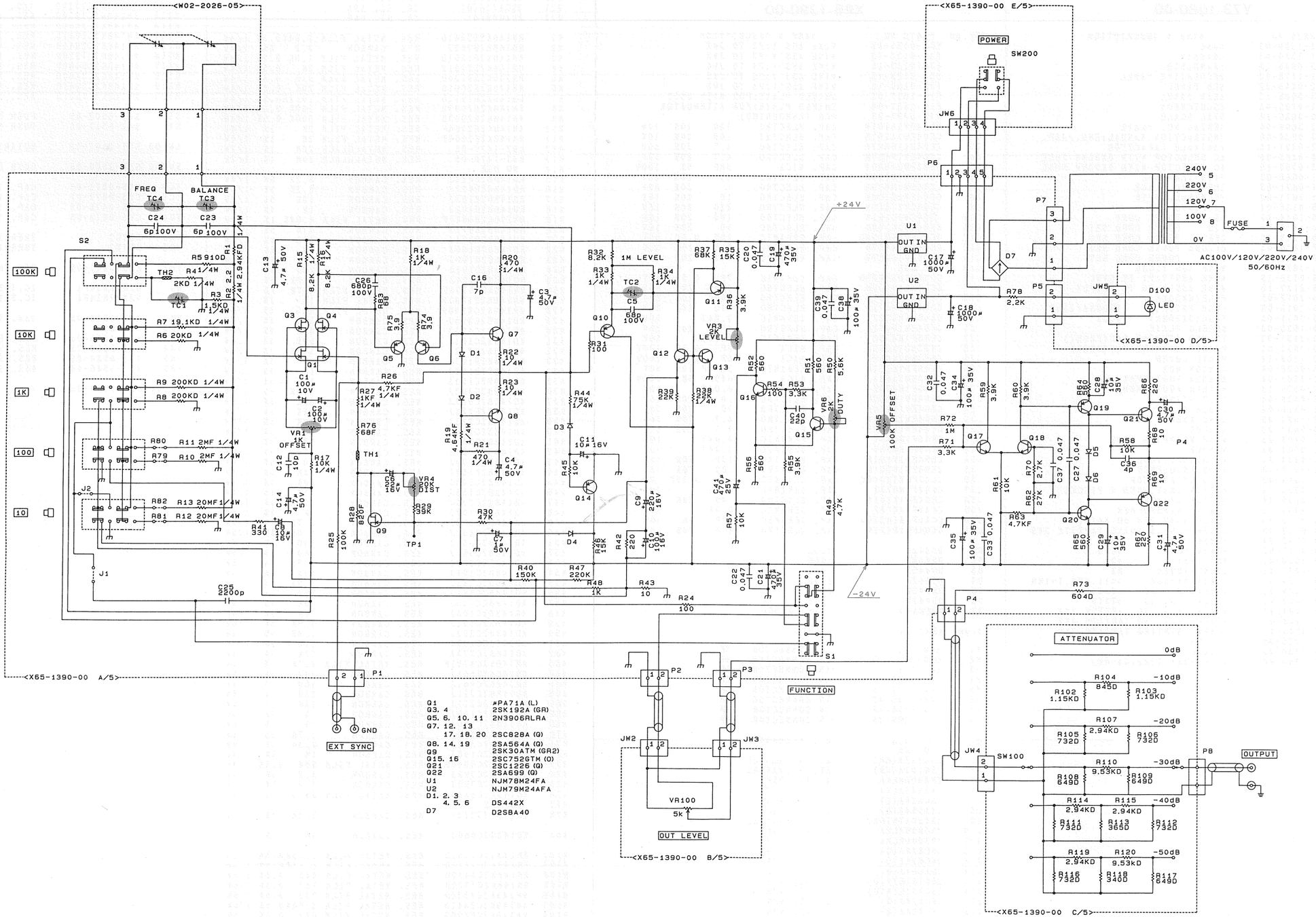
X65-1390-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	E38-0131-15	WIRE ASS'Y;P2 TO JW2			
	E38-0132-15	WIRE ASS'Y;P3 TO JW3			
	E38-0133-15	WIRE ASS'Y;P4 TO JW4			
	E38-0135-15	WIRE ASS'Y;P6 TO JW6			
	E38-0159-15	WIRE ASS'Y;P5 TO JW5			
	F10-1636-03	SHIELD PLATE;FOR MAIN UNIT			
	F10-1637-04	SHIELD PLATE;FOR ATTENUATOR			
	J25-5397-23	PCB (UNMOUNTED)			
C1	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C2	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C3	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C4	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C5	CM93BD2A680J	CAP. MICA	68P	5%	100V
C6	CE04EW1C220M	CAP. ELECTRO	22	20%	16V
C7	CE04EW1H010M	CAP. ELECTRO	1	20%	50V
C8	CE04EW1C100M	CAP. ELECTRO	10	20%	16V
C9	CE04EW1C221M	CAP. ELECTRO	220	20%	16V
C10	CE04EW1C101M	CAP. ELECTRO	100	20%	16V
C11	CE04EW1C100M	CAP. ELECTRO	10	20%	16V
C12	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C13	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C14	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C15	NO USE				
C16	CC45FCH1H070D	CAP. CERAMIC	7P	0.5P	50V
C17	CE04EW1H102M	CAP. ELECTRO	1000	20%	50V
C18	CE04EW1H102M	CAP. ELECTRO	1000	20%	50V
C19	CE04EW1V471M	CAP. ELECTRO	470	20%	35V
C20	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C21	CE04EW1V471M	CAP. ELECTRO	470	20%	35V
C22	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C23	CM93BD2A060D	CAP. MICA	6P	0.5P	100V
C24	CM93BD2A060D	CAP. MICA	6P	0.5P	100V
C25	CK45FB1H222K	CAP. CERAMIC	2200P	10%	50V
C26	CM93BD2A681J	CAP. MICA	680P	5%	100V
C27	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C28	CE04EW1V100M	CAP. ELECTRO	10	20%	35V
C29	CE04EW1V100M	CAP. ELECTRO	10	20%	35V
C30	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C31	CE04EW1H4R7M	CAP. ELECTRO	4.7	20%	50V
C32	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C33	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C34	CE04EW1V101M	CAP. ELECTRO	100	20%	35V
C35	CE04EW1V101M	CAP. ELECTRO	100	20%	35V
C36	CC45FCH1H040C	CAP. CERAMIC	4P	0.25P	50V
C37	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C38	CE04EW1V101M	CAP. ELECTRO	100	20%	35V
C39	CK45F1H473Z	CAP. CERAMIC	0.047		50V
C40	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C41	CE04EW1E471M	CAP. ELECTRO	470	20%	25V
D1	DS442X	DIODE			
D2	DS442X	DIODE			
D3	DS442X	DIODE			
D4	DS442X	DIODE			
D5	DS442X	DIODE			
D6	DS442X	DIODE			
D7	D2SBA40	DIODE,BRIDGE			
D100	AR4133S	LED;RED			
P1	E40-3237-05	PIN CONNECTOR	2P		
P2	E40-3237-05	PIN CONNECTOR	2P		
P3	E40-3237-05	PIN CONNECTOR	2P		
P4	E40-3237-05	PIN CONNECTOR	2P		
P5	E40-3237-05	PIN CONNECTOR	2P		
P6	E40-3240-05	PIN CONNECTOR	5P		
P7	E40-3238-05	PIN CONNECTOR	3P		
P8	E40-3299-05	PIN CONNECTOR	2P		
Q1	UPA71A(L)	FET, N-CHANNEL			
Q2	NO USE				
Q3	2SK192A(GR)	FET, N-CHANNEL			
Q4	2SK192A(GR)	FET, N-CHANNEL			
Q5	2N3906RLRA	TR, SI, PNP			
Q6	2N3906RLRA	TR, SI, PNP			
Q7	2SC828A(Q)	TR. SI, NPN			
Q8	2SA564A(Q)	TR. SI, PNP			
Q9	2SK30ATM(GR2)	FET, N-CHANNEL			
Q10	2N3906RLRA	TR, SI, PNP			
Q11	2N3906RLRA	TR, SI, PNP			
Q12	2SC828A(Q)	TR. SI, NPN			
Q13	2SC828A(Q)	TR. SI, NPN			
Q14	2SA564A(Q)	TR. SI, PNP			
Q15	2SC752GTM(O)	TR. SI, NPN			
Q16	2SC752GTM(O)	TR. SI, NPN			
Q17	2SC828A(Q)	TR. SI, NPN			
Q18	2SC828A(Q)	TR. SI, NPN			
Q19	2SA564A(Q)	TR. SI, PNP			

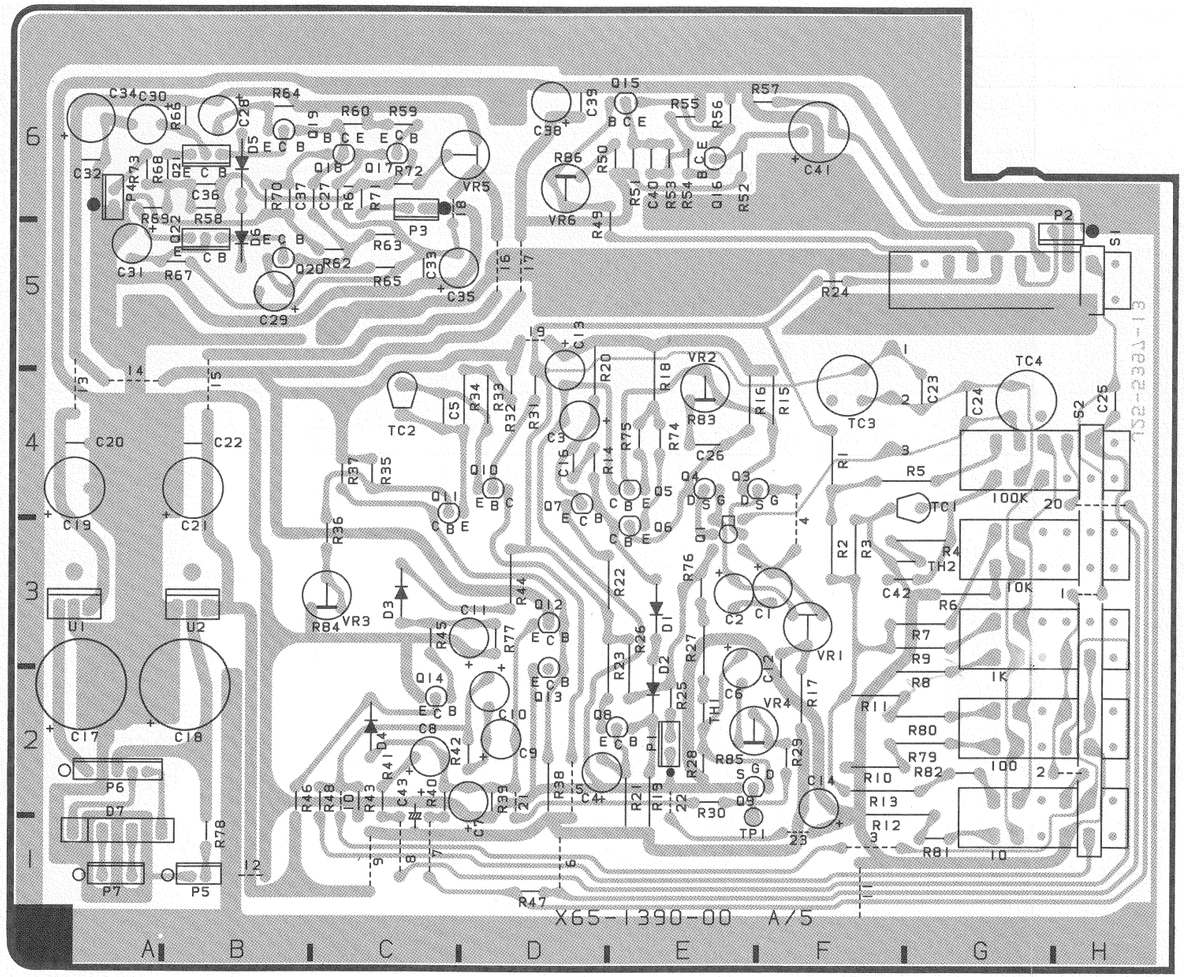
PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
Q20	2SC828A(Q)	TR. SI, NPN
Q21	2SC1226(Q)	TR. SI, NPN
Q22	2SA699(Q)	TR. SI, PNP
R1	RN14BK2E2941D	RES. METAL FILM 2.94K 0.5% 1/4W
R2	RD14BB2E2R2J	RES. CARBON 2.2 5% 1/4W
R3	RN14BK2E1501D	RES. METAL FILM 1.5K 0.5% 1/4W
R4	RN14BK2E2001D	RES. METAL FILM 2K 0.5% 1/4W
R5	RN14BK2E9100D	RES. METAL FILM 910 0.5% 1/4W
R6	RN14BK2E2002D	RES. METAL FILM 20K 0.5% 1/4W
R7	RN14BK2E1912D	RES. METAL FILM 19.1K 0.5% 1/4W
R8	RN14BK2E2003D	RES. METAL FILM 200K 0.5% 1/4W
R9	RN14BK2E2003D	RES. METAL FILM 200K 0.5% 1/4W
R10	RN14BK2E2004F	RES. METAL FILM 2M 1% 1/4W
R11	RN14BK2E2004F	RES. METAL FILM 2M 1% 1/4W
R12	R92-1470-05	RES. METALGLACE 20M 1% 1/2W
R13	R92-1470-05	RES. METALGLACE 20M 1% 1/2W
R14	NO USE	
R15	RD14BB2E822J	RES. CARBON 8.2K 5% 1/4W
R16	RD14BB2E822J	RES. CARBON 8.2K 5% 1/4W
R17	RD14BB2E103J	RES. CARBON 10K 5% 1/4W
R18	RD14BB2E102J	RES. CARBON 1K 5% 1/4W
R19	RN14BK2E4641F	RES. METAL FILM 4.64K 1% 1/4W
R20	RD14BB2E471J	RES. CARBON 470 5% 1/4W
R21	RD14BB2E471J	RES. CARBON 470 5% 1/4W
R22	RD14BB2E100J	RES. CARBON 10 5% 1/4W
R23	RD14BB2E100J	RES. CARBON 10 5% 1/4W
R24	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R25	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R26	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R27	RN14BK2E1001F	RES. METAL FILM 1K 1% 1/4W
R28	RN14BK2C8200F	RES. METAL FILM 820 1% 1/6W
R29	RD14BB2C393J	RES. CARBON 39K 5% 1/6W
R30	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R31	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R32	RD14BB2C822J	RES. CARBON 8.2K 5% 1/6W
R33	RD14BB2E102J	RES. CARBON 1K 5% 1/4W
R34	RD14BB2E102J	RES. CARBON 1K 5% 1/4W
R35	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R36	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R37	RD14BB2C683J	RES. CARBON 68K 5% 1/6W
R38	RD14BB2E223J	RES. CARBON 22K 5% 1/4W
R39	RD14BB2C223J	RES. CARBON 22K 5% 1/6W
R40	RD14BB2C154J	RES. CARBON 150K 5% 1/6W
R41	RD14BB2C331J	RES. CARBON 330 5% 1/6W
R42	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R43	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R44	RD14BB2E753J	RES. CARBON 75K 5% 1/4W
R45	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R46	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R47	RD14BB2C224J	RES. CARBON 220K 5% 1/6W
R48	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R49	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R50	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R51	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R52	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R53	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R54	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R55	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R56	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R57	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R58	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R59	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R60	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R61	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R62	RD14BB2C273J	RES. CARBON 27K 5% 1/6W
R63	RN14BK2C4701F	RES. METAL FILM 4.7K 1% 1/6W
R64	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R65	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R66	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R67	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R68	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R69	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R70	RD14BB2C272J	RES. CARBON 2.7K 5% 1/6W
R71	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R72	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
R73	RN14BK2C6040D	RES. METAL FILM 604 0.5% 1/6W
R74	RD14BB2C3R9J	RES. CARBON 3.9 5% 1/6W
R75	RD14BB2C3R9J	RES. CARBON 3.9 5% 1/6W
R76	RN14BK2C68R0F	RES. METAL FILM 68.0 1% 1/6W
R77	NO USE	
R78	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R83	RD14BB2C680J	RES. CARBON 68 5% 1/6W
R102	RN14BK2C1151D	RES. METAL FILM 1.15K 0.5% 1/6W
R103	RN14BK2C1151D	RES. METAL FILM 1.15K 0.5% 1/6W
R104	RN14BK2C8450D	RES. METAL FILM 845 0.5% 1/6W
R105	RN14BK2C7320D	RES. METAL FILM 732 0.5% 1/6W
R106	RN14BK2C7320D	RES. METAL FILM 732 0.5% 1/6W
R107	RN14BK2C2941D	RES. METAL FILM 2.94K 0.5% 1/6W
R108	RN14BK2C6490D	RES. METAL FILM 649 0.5% 1/6W
R109	RN14BK2C6490D	RES. METAL FILM 649 0.5% 1/6W
R110	RN14BK2C9531D	RES. METAL FILM 9.53K 0.5% 1/6W
R111	RN14BK2C7320D	RES. METAL FILM 732 0.5% 1/6W
R112	RN14BK2C7320D	RES. METAL FILM 732 0.5% 1/6W
R113	RN14BK2C3650D	RES. METAL FILM 365 0.5% 1/6W
R114	RN14BK2C2941D	RES. METAL FILM 2.94K 0.5% 1/6W
R115	RN14BK2C2941D	RES. METAL FILM 2.94K 0.5% 1/6W
R116	RN14BK2C7320D	RES. METAL FILM 732 0.5% 1/6W
R117	RN14BK2C6490D	RES. METAL FILM 649 0.5% 1/6W
R118	RN14BK2C3400D	RES. METAL FILM 340 0.5% 1/6W
R119	RN14BK2C2941D	RES. METAL FILM 2.94K 0.5% 1/6W
R120	RN14BK2C9531D	RES. METAL FILM 9.53K 0.5% 1/6W
S1	S40-6503-05	PUSH SWITCH
S2	S42-5511-05	PUSH SWITCH
SW100	S01-2502-05	ROTARY SWITCH
SW200	S40-2506-05	PUSH SWITCH
TC1	C05-0472-05	CAP. TRIMMER 6PF TO 50PF
TC2	C05-0472-05	CAP. TRIMMER 6PF TO 50PF
TC3	C05-0478-05	CAP. TRIMMER 1.4PF TO 10PF
TC4	C05-0478-05	CAP. TRIMMER 1.4PF TO 10PF
TH1	SDT02	THERMISTOR
TH2	SDT02	THERMISTOR
TP1	E23-0401-05	PIN TERMINAL
U1	NJM78M24FA	IC,3-TERMINAL REGULATOR
U2	NJM79M24FA	IC,3-TERMINAL REGULATOR
VR1	R12-1545-05	RES. SEMI FIXED 1KB
VR2	NO USE	
VR3	R12-1546-05	RES. SEMI FIXED 2KB
VR4	R12-3550-05	RES. SEMI FIXED 20KB
VR5	R12-5530-05	RES. SEMI FIXED 100KB
VR6	R12-1546-05	RES. SEMI FIXED 2KB
VR100	R01-2523-05	V.R.

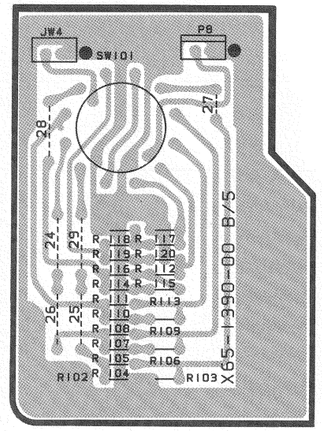
SCHEMATIC DIAGRAM

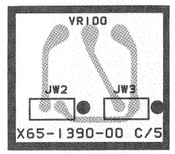


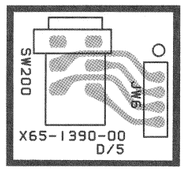
P.C. BOARD

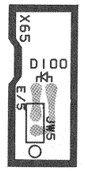


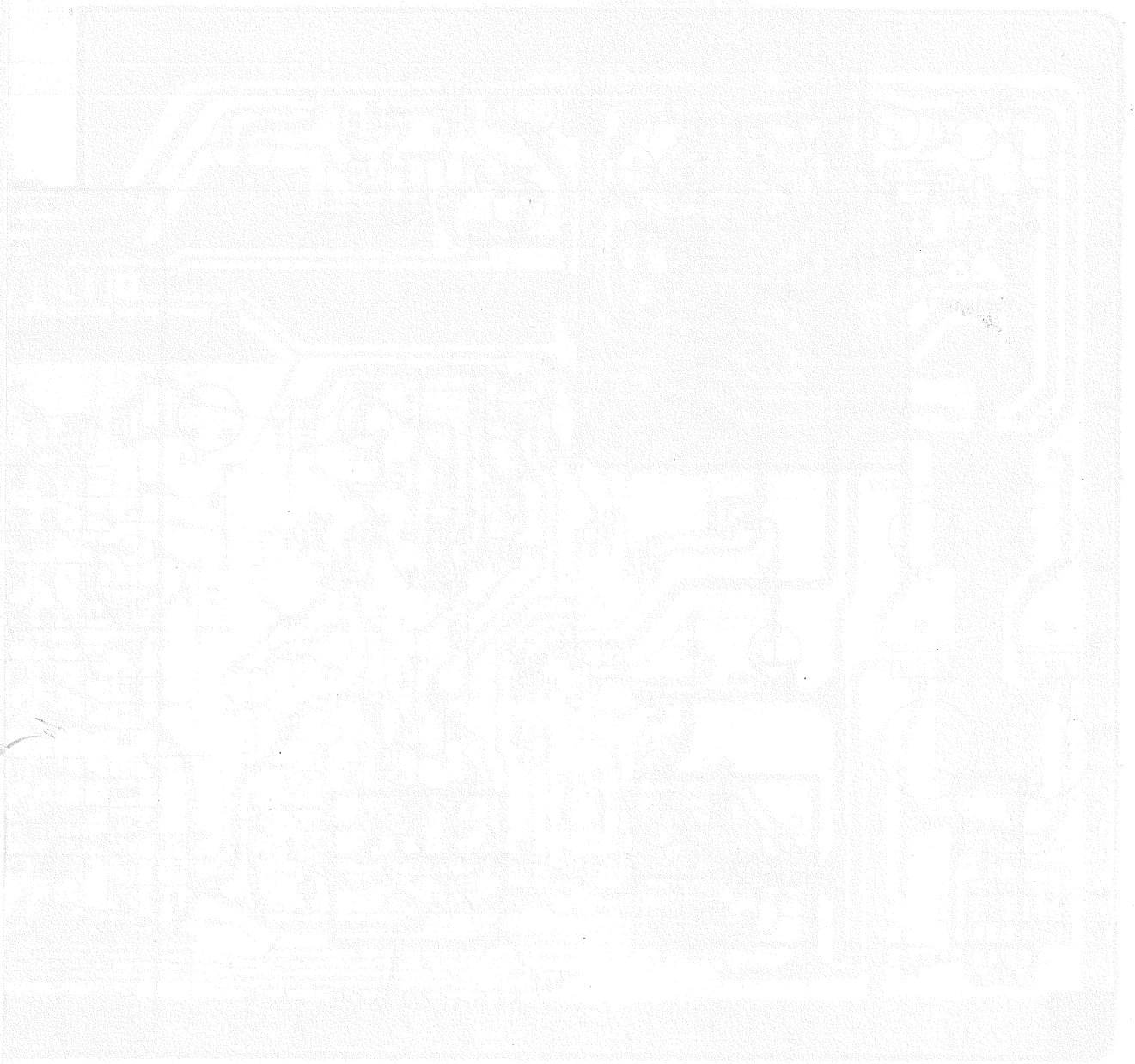
Pattern Side View











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