SERVICE MANUAL

expert

TA-930
Stereo Receiver

SPECIFICATIONS

FM SECTION

Tuning Range:	87.5 – 108 MHz
Usable Sensitivity (IHF)	
Mono:	2 μV
Stereo:	4 μV
50 dB Quieting Sensitivity	
Mono:	4 μV
Stereo:	40 μV
Signal-to-Noise Ratio (Mono):	74 dB
Frequency Response:	40 – 15,000 Hz (± 2 dB)
Harmonic Distortion	
Mono:	0.15%
Stereo:	0.3%
Capture Ratio:	1.5 dB
Adjacent Channel Selectivity (±200 kHz)	
Minimum:	15 dB
Spurious Response Ratio:	75 dB
Image Rejection:	55 dB
IF Rejection:	66 dB
AM Suppression Ratio:	50 dB
Muting Threshold:	0.9 – 15 μV
Stereo Separation	
1,000 Hz:	45 dB
100 – 10,000 Hz:	38 dB
Stereo Threshold:	15 μV
SCA Rejection Ratio:	60 dB
Sub-carrier Suppression:	60 dB

AM SECTION

Tuning Range MW:	515 – 1,620 kHz
Usable Sensitivity MW:	20 μV
Image Rejection (MW):	45 dB
IF Rejection (MW):	40 dB
Harmonic Distortion:	0.5%

AUDIO SECTION

Power Output:	30 watts per channel, minimum continuous both channels driven into 8 ohms from 40 Hz to 20 kHz with no more than 0.3% total harmonic distortion.
Total Harmonic Distortion:	Less than 0.3% at rated power into 8 ohms (40 Hz to 20 kHz)
Intermodulation Distortion:	Less than 0.3% at rated power into 8 ohms (70 Hz : 7 kHz = 4 : 1)
Powerband Width:	40 Hz – 20 kHz
Residual Noise:	0.5 mV
Damping Factor:	30 at 8 ohms
Input Sensitivity/Impedance	
Phono:	2.5 mV/47 kohms
AUX:	150 mV/47 kohms
Tape Play:	150 mV/47 kohms
Maximum Input Level:	100 mV (Phono)
Signal-to-Noise Ratio (IHF A)	
Phono:	64 dB
AUX, Tape:	84 dB
Tone Controls	
Bass:	± 8 dB at 100 Hz
Treble:	± 8 dB at 10 kHz
Loudness Control:	+ 8 dB at 100 Hz
(–30 dB Volume Level)	+ 4 dB at 10 kHz
Low Filter:	30 Hz (–6 dB/oct.)
Output Level	
Tape-Rec.:	150 mV
Headphones:	350 mV
Speaker Impedance:	4 – 16 ohms

GENERAL

Power Consumption:	120 watts
Power Supply:	220V AC, 50 Hz
Dimensions:	442(W) x 385(D) x 130(H) mm
Weight (Net):	8.8 kg (19.4 lbs.)

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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PARTS LIST

Part No.	Description	Symbol No.	Q'ty a set
INTEGRATED CIRCUITS & TRANSISTORS			
LA1231	IC	IC101	1
HA1197	IC	IC103	1
LA3350SS	IC	IC102	1
2SC929 (D), (E)	Transistor	Q101	1
2SC1327 (S), (T)	Transistor	Q152, 153	2
2SC828 (Q), (R)	Transistor	Q151	1
2SB616 (Q), (R)	Transistor	Q303, 304	2
2SD586 (Q), (R)	Transistor	Q301, 302	2
2SB647 (C), (D)	Transistor	Q307, 308	2
2SD667 (C), (D)	Transistor	Q305, 306, 311, 312	4
2SC798 (F), (G)	Transistor	Q313, 314	2
2SC828A (Q), (R)	Transistor	Q309, 310	2
2SD667A (C), (D)	Transistor	Q201, 202	2
2SD234 (O), (Y) or 2SC1398 (P), (Q), (R)	Transistor	Q203	1
2SC1328 (S), (T)	Transistor	Q401–406, 501–504	10
DIODES			
1S188AM	Germanium Diode	D101, 102	2
W03B or 1N400Z or V06B	Silicon Diode	D301–312, 205	13
GP-20B	Silicon Diode	D201–204	4
DS-442 or 1S1555	Silicon Diode	D151	1
HZ36-2	Zener Diode	ZD201	1
HZ12-C-3	Zener Diode	ZD202	1
HZ12-B-2	Zener Diode	ZD301, 302	2
GL9PR2	L.E.D.	LED151	1
CONTROLS			
EWK-CPA323BF5	Potentiometer	VR403 (VOL)	1
EWK-G4A323375	Potentiometer	VR404 (BAL)	1
EWK-G4A323B54	Potentiometer	VR402 (BAS)	1
EWK-G4A323B15	Potentiometet	VR401 (TRE)	1
20KΩB, 8φ	Carbon Trimmer	SVR101	1
5KΩB, 8φ	Carbon Trimmer	SVR151	1
1KΩB, 8φ	Carbon Trimmer	SVR1, 152, 301 302	4
COILS & TRANSFORMERS			
141015	FM IFT	T101	1
141016	FM IFT	T102	1
FSN1067	AM IFT	T1	1
140025	AM IFT	T2	1
140031	AM IFT	T3	1
135006	MW OSC Coil	L2	1
180003	Inductor	L103	1
180004	Choke	L101, 102	2
104001	Coil	L301, 302	2
122022	Loopstick Antenna	L1	1
NPT-0335S	Power Transformer		1
SWITCHES			
ESB-7097	AC ON/OFF Switch	S8	1
ESB-75329	Push SW		1
SW-3655009	Rotary Slide Switch	S1	1
CONNECTORS & TERMINALS			
HLJ-0279-01-020	Headphone Jack		1
N41287	8-pin Jack		1
1784T0301-11	Speaker Terminal		1
B2-703N-01	DIN ANT Socket		1
D2-713N-01	Co-axial Socket		1
VB-0027	Ground Terminal		1
S-N5053	Fuse Clip		18
1L4P	Strip Terminal		1
D5-710N-00	DIN Jack		1
N41670	RCA 4-pin Jack		1
FUSES, METERS & LAMPS			
1A, 5φ x 20	Fuse	Fu307, 308	2
2A, 5φ x 20	Fuse	FU901, 303, 304	3
3.15A, 5φ x 20	Fuse	Fu301, 302	2
4A, 5φ x 20	Fuse	Fu902, 903	2
EMT-226	Signal Meter	M1	1
EMT-227	Tuning Meter	M2	1

Part No.	Description	Symbol No.	Q'ty a set
BF310-50020A	Lamp	L901–903	3
FILTERS			
SFE-10.7ML	Ceramic Filter	F1, 2	2
184001	Filter	L151, 152	2
RESISTORS			
1/2W, 56Ω	Carbon Resistor	R309, 310	2
1/2W, 330Ω	Carbon Resistor	R305–308	4
1/2W, 3.3KΩ	Carbon Resistor	R317–320, 311, 312	6
1/2W, 3.9KΩ	Carbon Resistor	R205	1
1W, 10Ω	Carbon Resistor	R329–332	4
1W, 68Ω	Carbon Resistor	R202	1
1W, 330Ω	Carbon Resistor	R335, 336	2
3W, 270Ω	Carbon Resistor	R201	1
3W, 0.47Ω	Wire-wound Resistor	R301–304	4
CAPACITORS			
SC 0.001μF	Ceramic	C2, 8, 102	3
SC 0.01μF	Ceramic	C10, 11, 101, 103	4
SC 0.022μF	Ceramic	C1, 3, 7, 104	4
SC 0.04μF	Ceramic	C4	1
MC 0.047μF	Ceramic	105–109, 112, 113, 115	8
500V 0.01μF	Ceramic	C209–213	5
FC12PF (D)	Ceramic	C65	1
FC 15PF (D)	Ceramic	C62	1
FC 30PF (K)	Ceramic	C419, 420	2
FC 35PF (K)	Ceramic	C311, 312	2
FC 100PF (K)	Ceramic	C519, 520	2
FC 150PF (K)	Ceramic	C423, 424	2
FC 200PF (K)	Ceramic	C321, 322, 517, 518	4
FC 330PF (K)	Ceramic	C116	1
FC 500PF (K)	Ceramic	C309, 310	2
ECN-C4A 103M	Paper, 0.01μF	C901, 902	2
50V 350PF (J)	Polystyrene (±5%)	C6	1
50V 1500PF (K)	Polystyrene (±10%)	C152	1
50V 0.027μF (M)	Mylar (±20%)	C307, 308	2
50V 0.047μF (M)	Mylar (±20%)	C14	1
50V 0.068μF (M)	Mylar (±20%)	C16	1
50V 0.1μF (M)	Mylar (±20%)	C303–306	4
50V 0.033μF (K)	Mylar (±10%)	C157, 158	2
50V 0.047μF (K)	Mylar (±20%)	C153	1
50V 0.001μF (J)	Mylar (±5%)	C409, 410, 509 510	4
50V 0.0033μF (J)	Mylar (±5%)	C507, 508	2
50V 0.015μF (J)	Mylar (±5%)	C511, 512	2
50V 0.039μF (J)	Mylar (±5%)	C411–414	4
50V 0.068μF (J)	Mylar (±5%)	C425, 426	2
50V 0.12μF (J)	Mylar (±5%)	C401, 402	2
10TW 100μF	Electrolytic	C405, 406, 417, 418	4
16TW 33μF	Electrolytic	C505, 506	2
16TW 10μF	Electrolytic	C9, 17	2
16TW 22μF	Electrolytic	C15	1
16TW 100μF	Electrolytic	C151, 165	2
16TW 220μF	Electrolytic	C206, 208	2
25TW 3.3μF	Electrolytic	C13	1
25TW 4.7μF	Electrolytic	C12	1
25TW 47μF	Electrolytic	C313, 314, 317, 318	4
35TW 47μF	Electrolytic	C513, 514	2
42TW 6800μF	Electrolytic	C201, 202	2
50TW 0.47μF	Electrolytic	C114, 155	2
50TW 1μF	Electrolytic	C110	1
50TW 4.7μF	Electrolytic	C111	1
50TW47μF	Electrolytic	C315, 316	2
50TW 220μF	Electrolytic	C205, 207, 209, 501, 502	5
63TW 470μF	Electrolytic	C203	1
50TW 0.22μF	Alum. Electrolytic	C154	1
50TW 0.33μF	Alum. Electrolytic	C156	1
25TW 4.7μF	Electrolytic, Low Noise	C407, 408, 415, 416, 421, 422, 515, 516, 119	9
50TW 1μF	Electrolytic, Low Noise	C161–164, 319, 320, 403, 404, 503, 504	10

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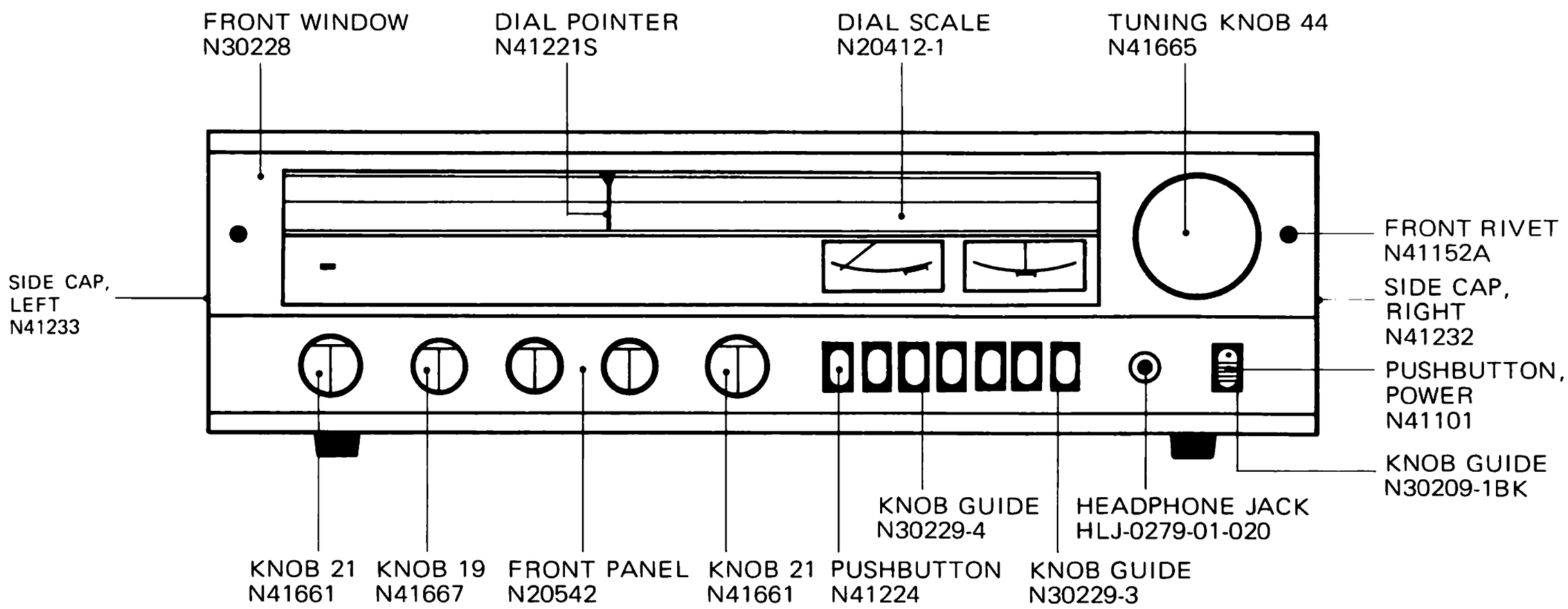
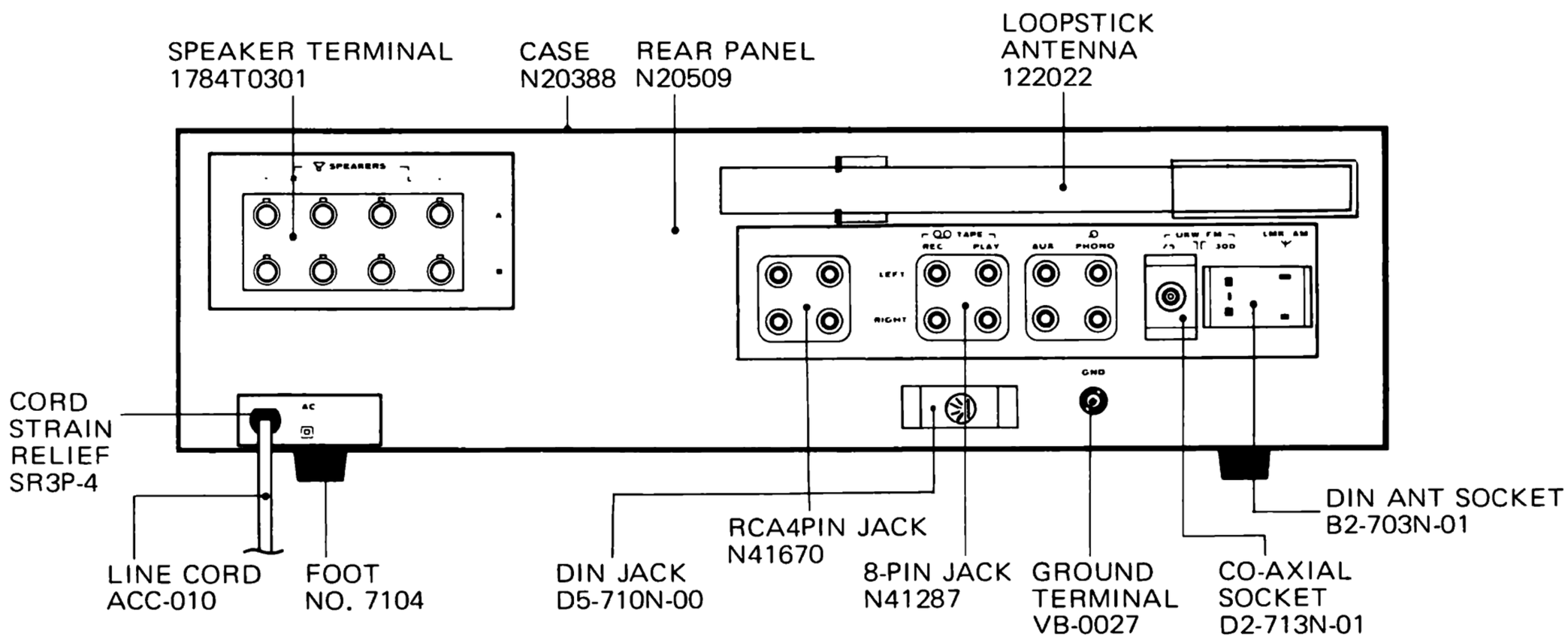
Part No.	Description	Symbol No.	Q'ty a set
50TW 3.3μF	Electrolytic, Low Noise	C159, 160	2
APPEARANCE PARTS			
N20542	Front Panel		1
N20388	Case		1
N20509	Rear Panel		1
N41232	Side Cap, Right		1
N41233	Side Cap, Left		1
N41221-S	Dial Pointer		1
N41281-S	Pushbutton, Power		1
N30209-1BK	Knob Guide		1
N30229-3	Knob Guide		1
N30229-4	Knob Guide		1
N41224	Pushbutton		7
N41665	Tuning Knob 44		1
N41661	Knob 21	VOLUME	1
N41666	Knob 21	FUNCTION	1
N41667	Knob 19	Audio Controls	3
N30228	Front Window		1
N20412-1	Dial Scale		1
No. 7104	Foot		4

Part No.	Description	Symbol No.	Q'ty a set
N41152A	Front River		2
ACC–010	Line Cord		1
SR3P-4	Cord Strain Relief		1
MISCELLANEOUS			
FM5002A	FM ANT		1
FB127 U 16	FM/AM Tuning Unit		1
MP-50	Mica	2SB616	4
50K	Insulator	2SD586	8
No. 18	Mica		1
No. 24B	Insulator	2SC1398	1
OM-153	Instruction Book		
PACKING MATERIAL			
N41668	Carton		1
N20389	Pad, Right		1
N20390A	Pad, Left		1
N41321	Pad, Top		1
N41424	Pad D		1
N41318	Poly. Bag	for Unit	1
N40487	Poly. Bag	for Inst. Book	1

Note: 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.
3. Resistors not detailed in parts list are all carbon type, ¼ watt, With regard to the value, refer to the schematic diagram.





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ALIGNMENT PROCEDURE (TUNER)

Note:
1. Signal input must be kept as low as possible to avoid AGC and limiting action.
2. FM-RF alignment on lower side can not be adjusted since a fixed coil is employed.
3. Do not try to adjust filters (L151, 152) since their alignment needs special instruments.

Step	Signal Generator		Dial Setting	Output indicator, connection	Adjust	Adjust for
	Connection	Setting				
AM-IF ALIGNMENT						
1.	Set the function selector to MW.					
2.	(A)	470 kHz 400 Hz (Mod.) 30% (Dev.)	Point of non-inter-ference	Connect V.T.V.M. to the TAPE REC jack	T1 (IFT) T2 (IFT) T3 (IFT)	Maximum Output
MW-RF ALIGNMENT						
3.	Set the function selector to MW.					
4.	(A)	600 kHz 400 Hz (Mod.) 30% (Dev.)	600 kHz	Connect V.T.V.M. to the TAPE REC jack	L2 (MW OSC coil) L1 (MW ANT coil)	Maximum Output
5.	(A)	140 kHz 400 Hz (Mod.) 30% (Dev.)	1400 kHz	Connect V.T.V.M. to the TAPE REC jack	TC102 (MW OSC trimmer) TC101 (MW ANT trimmer)	Maximum Output
6.	Repeat steps (4) and (5).					
AM SIGNAL METER ALIGNMENT						
7.	Set the function selector to MW.					
8.	(A)	1000 kHz 80 dB. 400 Hz (Mod.) 30% (Dev.)	1000 kHz	SIGNAL Meter	SVR1	Needle deflection as shown in Fig. 1
FM-IF ALIGNMENT						
9.	Set the function selector to FM.					
10.	No signal	—	Point of non-inter-ference	FM TUNING meter	T101 (FM DISCRI IFT)	Center position of the meter scale.
11.	(B)	98 MHz 60 dB. 1 kHz (Mod.) 100% (Dev.)	98 MHz	Connect distortion meter to the TAPE REC jack	T102 (FM DISCRI IFT) Te1 (FM IFT)	Minimum Distortion
FM-RF ALIGNMENT						
12.	(B)	106 MHz 60 dB. 1 kHz (Mod.) 100% (Dev.)	106 MHz	Connect V.T.V.M. to the TAPE REC jack	TC3 (FM OSC trimmer) TC1 (FM ANT trimmer) TC2 (FM RF trimmer)	Maximum Output
FM SIGNAL METER ALIGNMENT						
13.	(B)	98 MHz 80 dB. Mod ... off	98 MHz	SIGNAL meter	SVR101	Needle deflection as shown in Fig. 2

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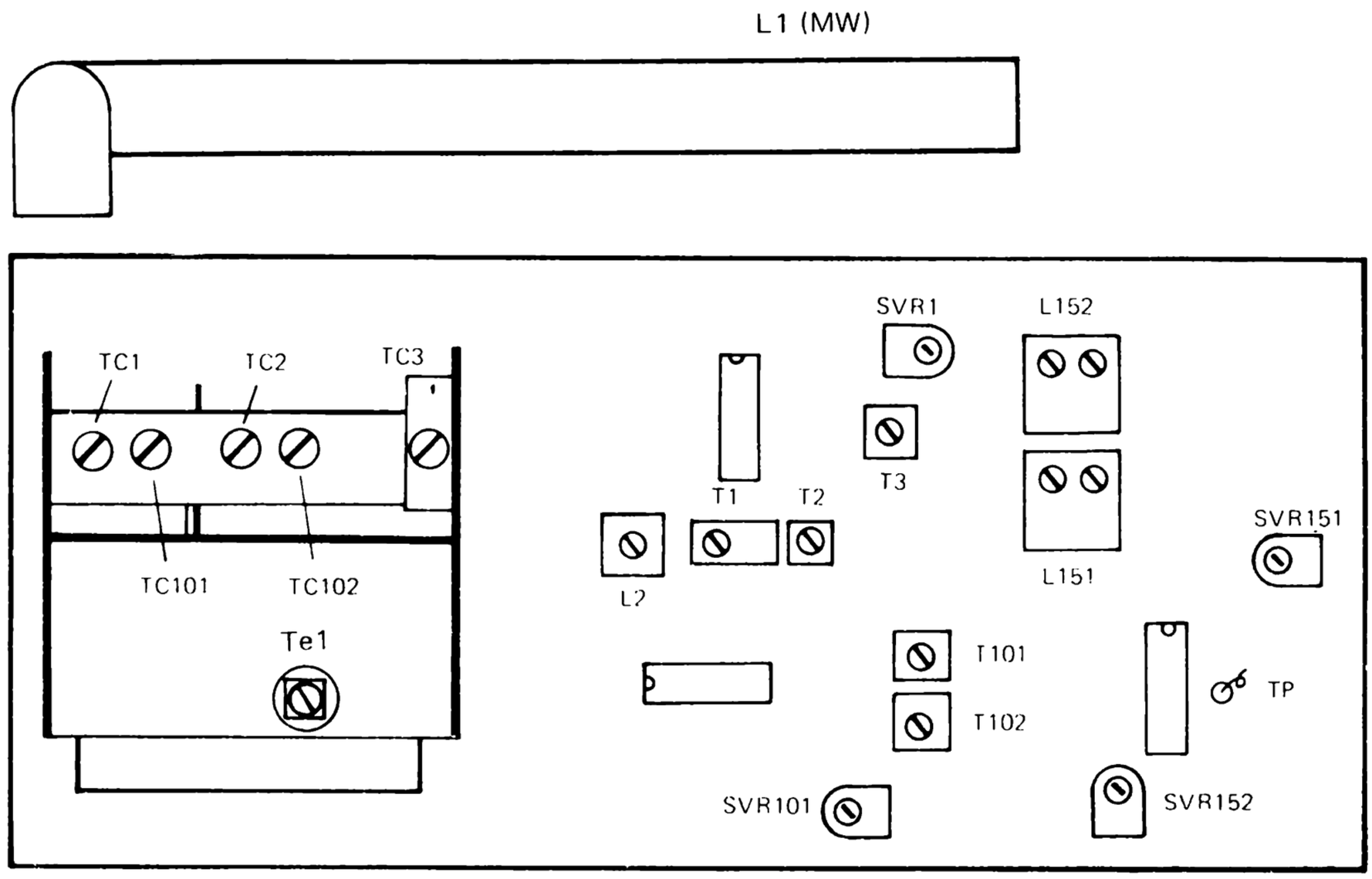
Step	Signal Generator		Dial Setting	Output indicator, connection	Adjust	Adjust for
	Connection	Setting				
FM MPX PILOT ALIGNMENT						
14.	Push the FM MUTING button.					
15.	No signal	—	Point of non-interference	Connect frequency counter to TP and ground.	SVR151	19kH ± 10Hz
FM STEREO SEPARATION ALIGNMENT						
16.	Release the FM MUTING button.					
17.	(C)	98 MHz 60 dB. 1 kHz (stereo mod. L or R) 30% (Dev.)	98 MHz	Connect V.T.V.M. to the TAPE REC jack right channel or left channel.	SVR152	Left mod. ... minimum right output Right mod. ... minimum left output

ALIGNMENT COMPONENT VIEW (TUNER)
(COMPONENT SIDE)



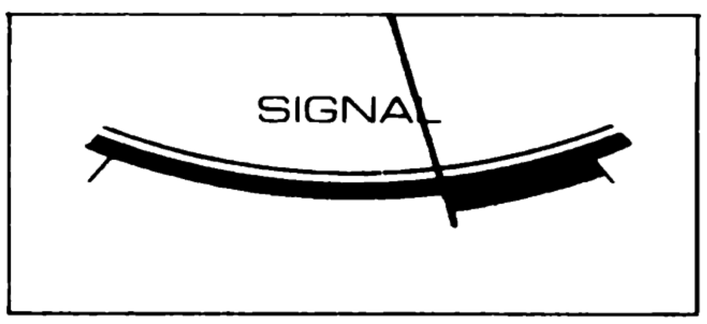


Fig. 1

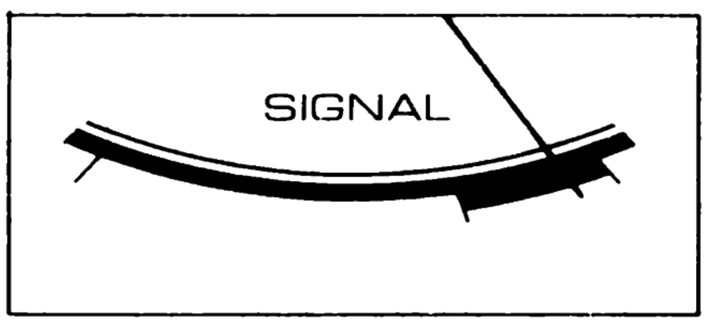


Fig. 2

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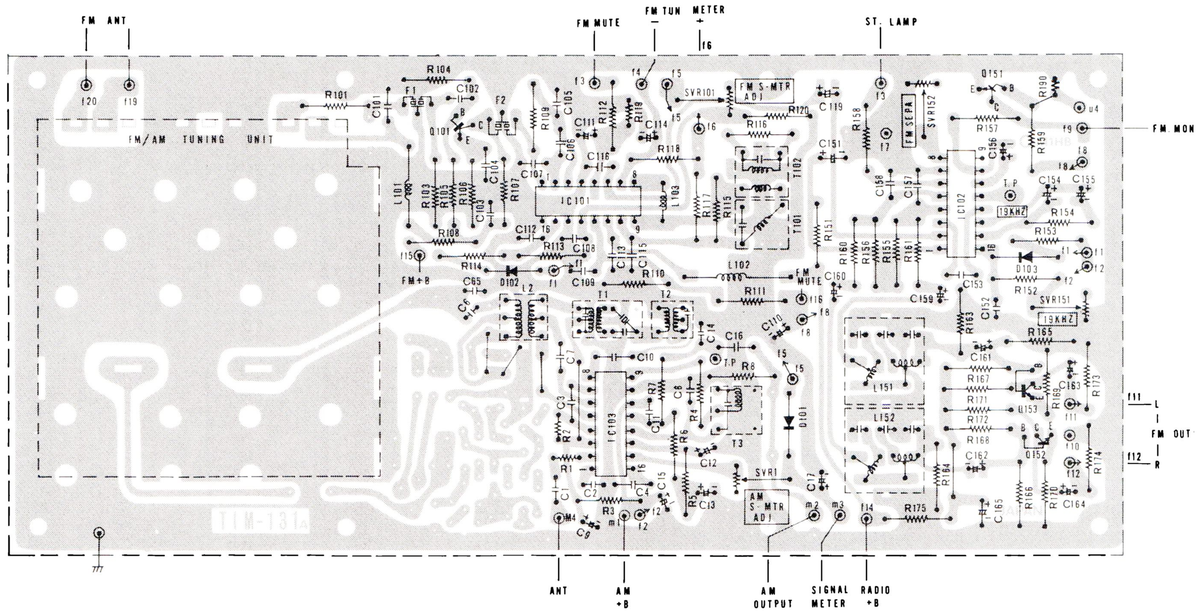
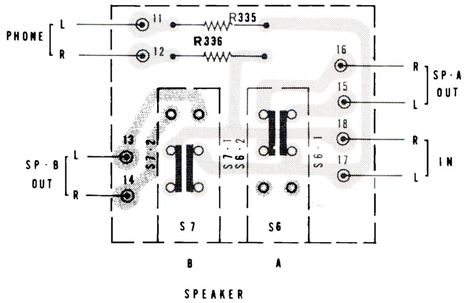
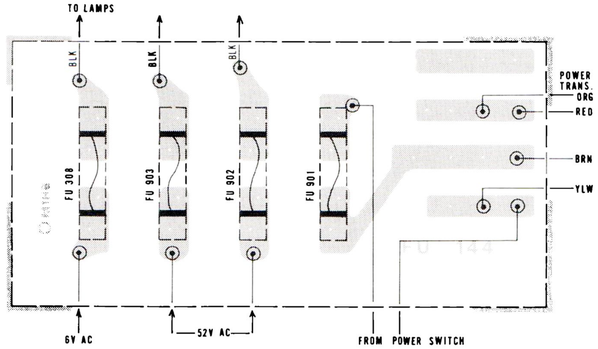
TUNER BOARD (TIM-131A) (FOIL SIDE)



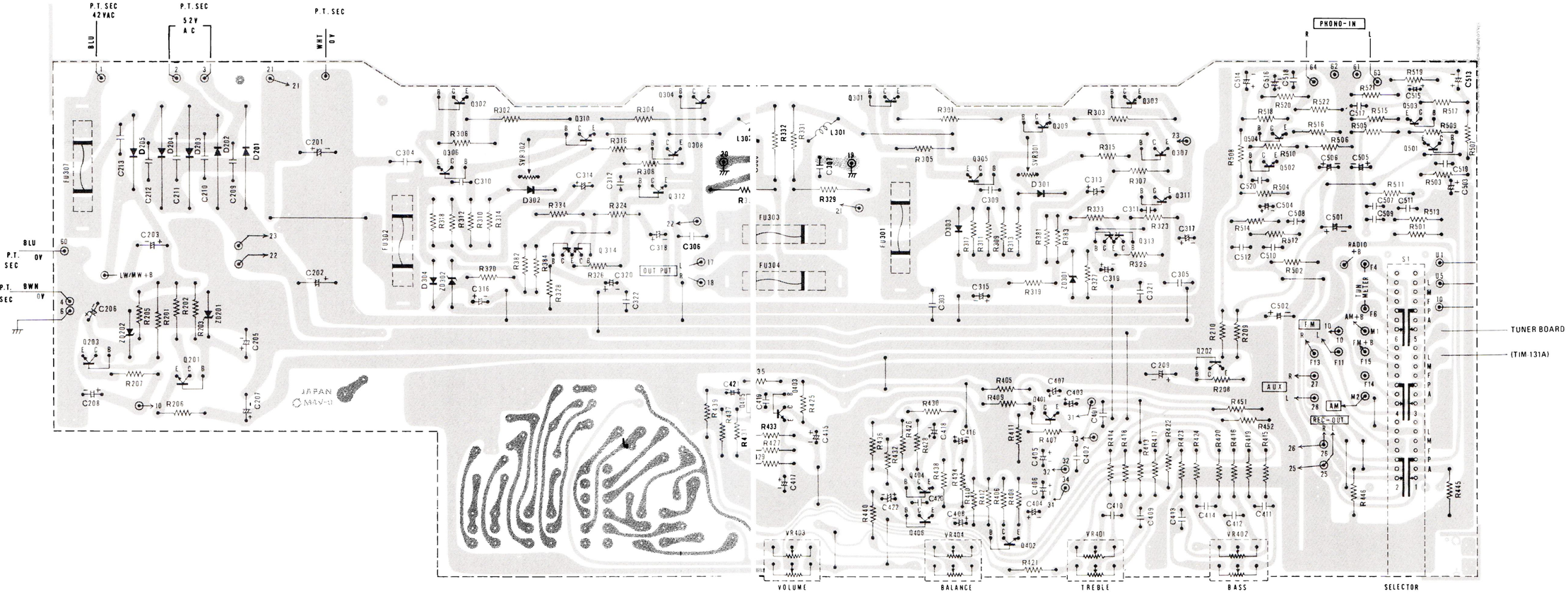
SWITCH BOARD (SSW-130) (FOIL SIDE)



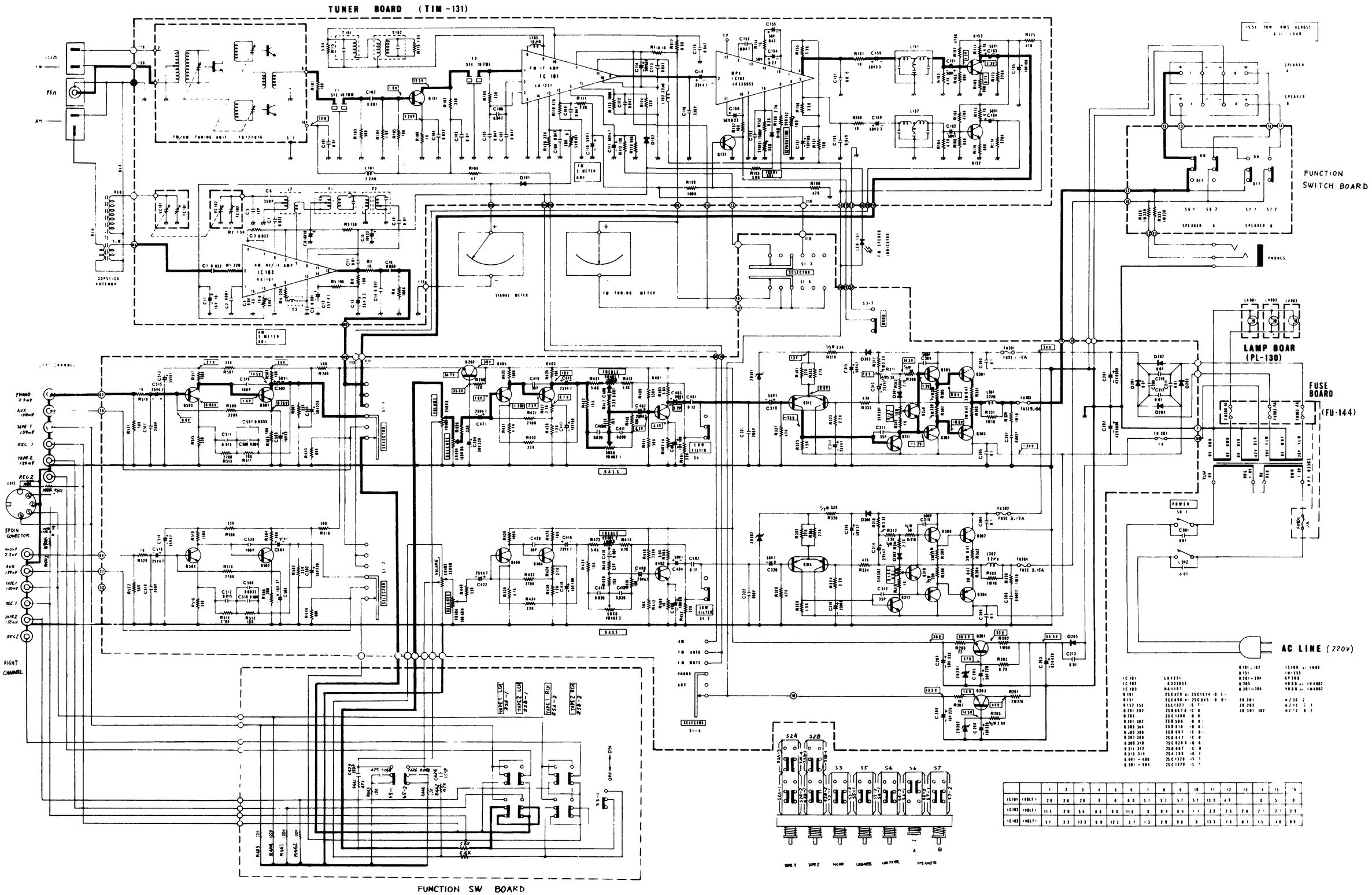
FUSE BOARD (FU-144A) (FOIL SIDE)



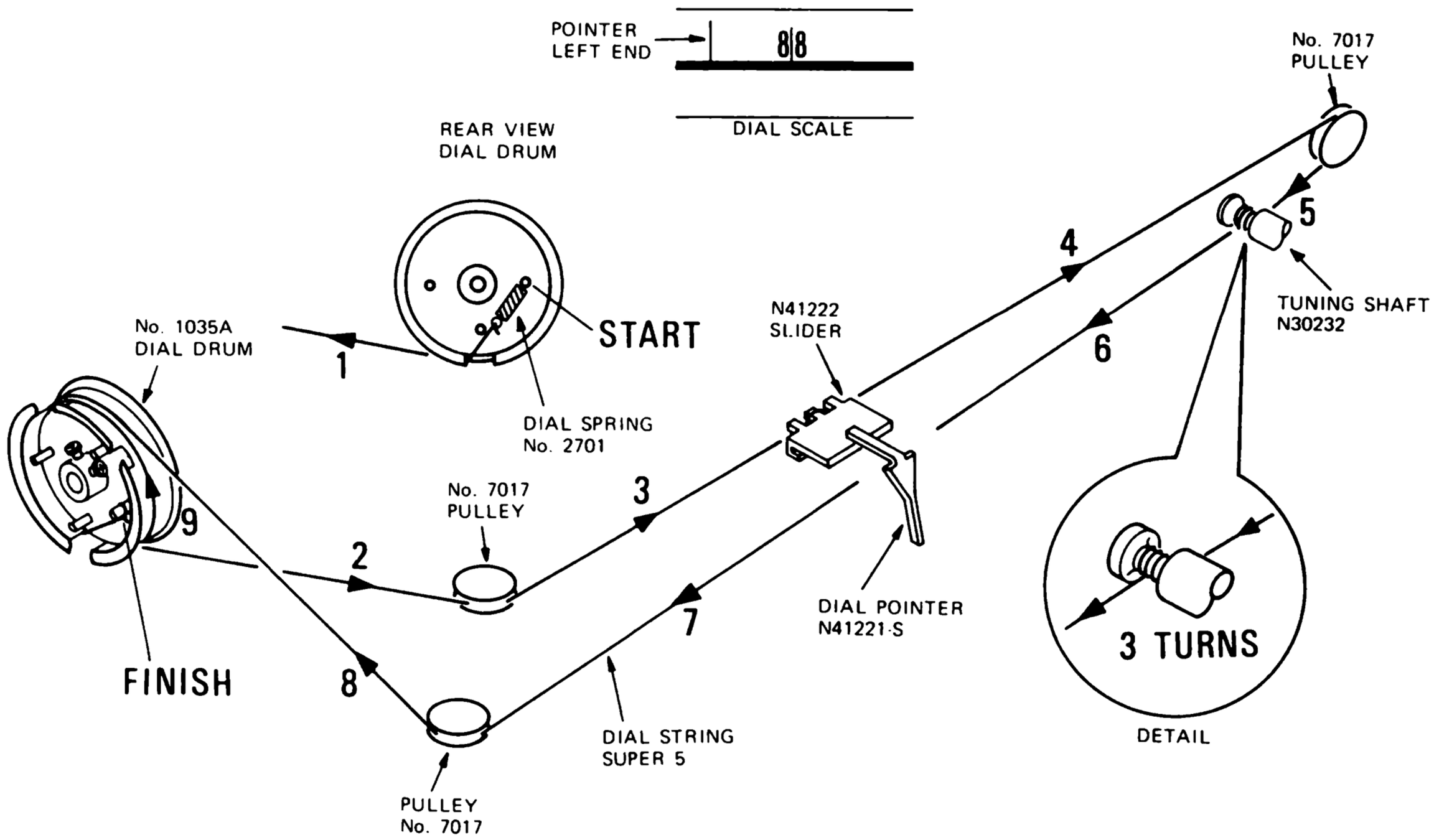
MAIN BOARD (MPA-130B-1) (FOIL SIDE)



SCHEMATIC DIAGRAM



STRINGING DIAGRAM



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