



SECTION 3

SERVICE MANUAL

MODEL GX-F51

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

I. SPECIFICATIONS

TRACK SYSTEM	4 Track 2 Channel Stereo System
TAPE	Philips Type Cassette
TAPE SPEED	4.76 cm/s \pm 1.0% (1-7/8 ips. \pm 1.0%)
HEADS	Twin Field Super GX head for recording/playback \times 1 Erase head \times 1
MOTORS	FG servo D.C. motor for direct capstan drive \times 1 D.C. motor for reel drive \times 1
WOW & FLUTTER	0.10% WTD (DIN) 0.035% WRMS
TAPE WINDING TIME	90 sec. using a C-60 cassette tape
FREQUENCY RESPONSE	Normal: 20 to 17,000 Hz \pm 3 dB (-20 VU) CrO ₂ : 20 to 18,000 Hz \pm 3 dB (-20 VU) Metal: 20 to 19,000 Hz \pm 3 dB (-20 VU)
FREQUENCY RANGE	Normal: 15 to 18,000 Hz CrO ₂ : 15 to 20,000 Hz Metal: 15 to 21,000 Hz
SIGNAL TO NOISE RATIO	Metal: Better than 60 dB (measured via tape with peak recording level) Dolby B-type NR switch ON: Improves up to 5 dB at 1 kHz, 10 dB above 5 kHz Dolby C-type NR switch ON: Improves up to 15 dB at 500 Hz, 20 dB at 1 kHz to 10 kHz
HARMONIC DISTORTION	1 kHz, 3rd harmonic distortion Metal: Less than 0.8%
INPUT	MIC: 0.25 mV (input impedance 5.0 kohms) Required microphone impedance: 600 ohms Line: 70 mV (input impedance: 47 kohms)
OUTPUT	Line: 410 mV at 0 VU Required load impedance: 2.0 kohms Phone: 1.3 mW/8 ohms at 0 VU
DIN	Input: 2.0 mV Output: 410 mV Required impedance: more than 20 kohms
POWER REQUIREMENTS	100V, 50/60 Hz for Japan 120V, 60 Hz for USA and Canada 220V, 50 Hz for Europe except UK 240V, 50 Hz for UK and Australia 110V/120V/220V/240V, 50/60 Hz switchable for other countries.
POWER CONSUMPTION	U, C, A Model: 24W J Model: 22W
DIMENSIONS	440(W) \times 100(H) \times 345(D) mm (17.3 \times 3.9 \times 13.6")
WEIGHT	6.1 kg (13.4 lbs)

* For improvement purposes, specifications and design are subject to change without notice.

* "Dolby" and the Double D symbol are trademarks of Dolby Laboratories.
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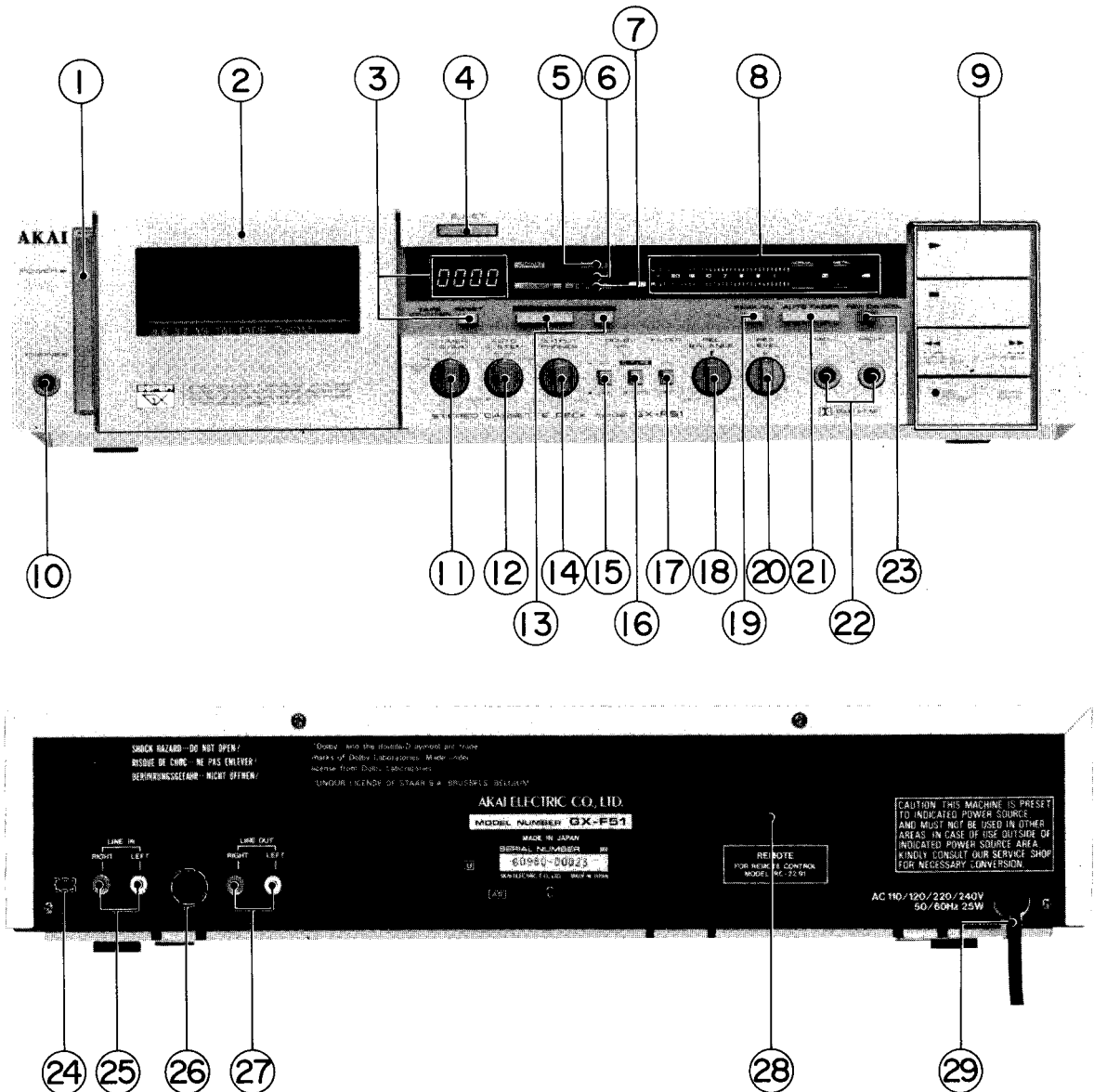


Fig. 1 Controls

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. POWER SWITCH 2. CASSETTE RECEPTACLE 3. FLD TAPE COUNTER and RESET BUTTON 4. EJECT BUTTON 5. TAPE POSITION INDICATORS 6. AUTO TAPE TUNING INDICATORS 7. DOLBY B and DOLBY C INDICATORS 8. FLD BAR METER with MAXIMUM INPUT LEVEL INDICATORS 9. OPERATING BUTTONS
PLAY (▶) BUTTON with INDICATOR
STOP (■) BUTTON
REWIND (◀◀) BUTTON
FAST FORWARD (▶▶) BUTTON
RECORDING (REC)/PAUSE BUTTON with INDICATOR
AUTO MUTE BUTTON 10. HEADPHONE (PHONES) JACK 11. TIMER START SELECTOR 12. AUTO SYSTEM SELECTOR 13. TUNING and REFERENCE (REF) BUTTONS | <ol style="list-style-type: none"> 14. OUTPUT/HEADPHONE (PHONES) CONTROL 15. DOLBY NR SWITCH 16. DOLBY NR SELECTOR 17. MPX FILTER SWITCH 18. RECORDING (REC) BALANCE CONTROL (LEFT and RIGHT) 19. PEAK/VU SELECTOR 20. RECORDING (REC) LEVEL CONTROL 21. AUTO FADER BUTTON 22. MICROPHONE JACKS (MIC-L: left, MIC-R: right) 23. RECORDING (REC) CANCEL BUTTON 24. LINE/DIN SELECTOR
(Some models do not have this facility.) 25. LINE IN JACKS 26. DIN JACK
(Some models are not equipped with this facility.) 27. LINE OUT JACKS 28. REMOTE JACK 29. POWER CORD |
|---|--|

III. PRINCIPAL PARTS LOCATION

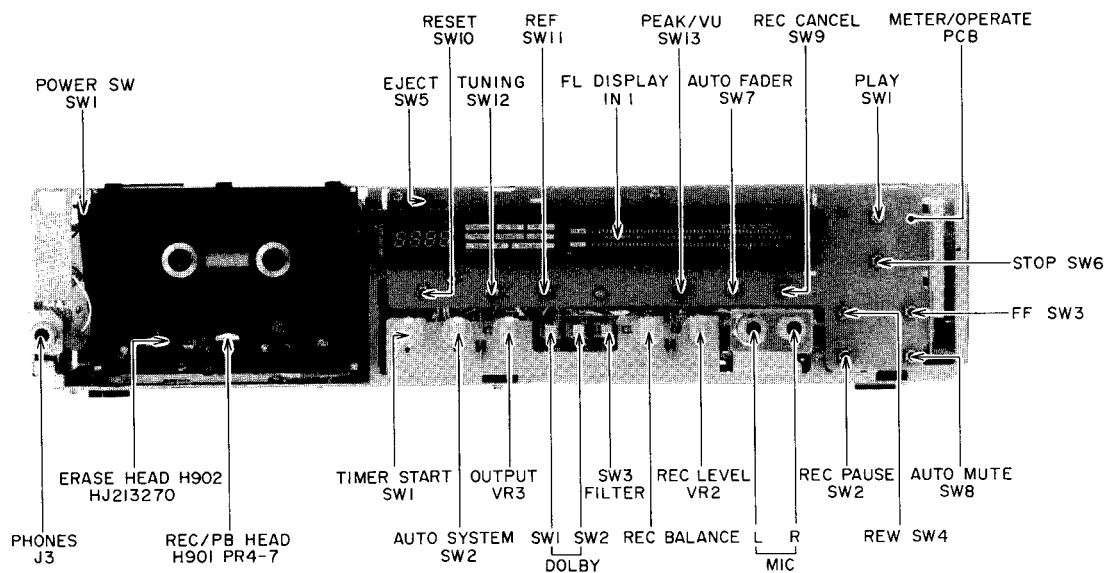


Fig. 2 Front View

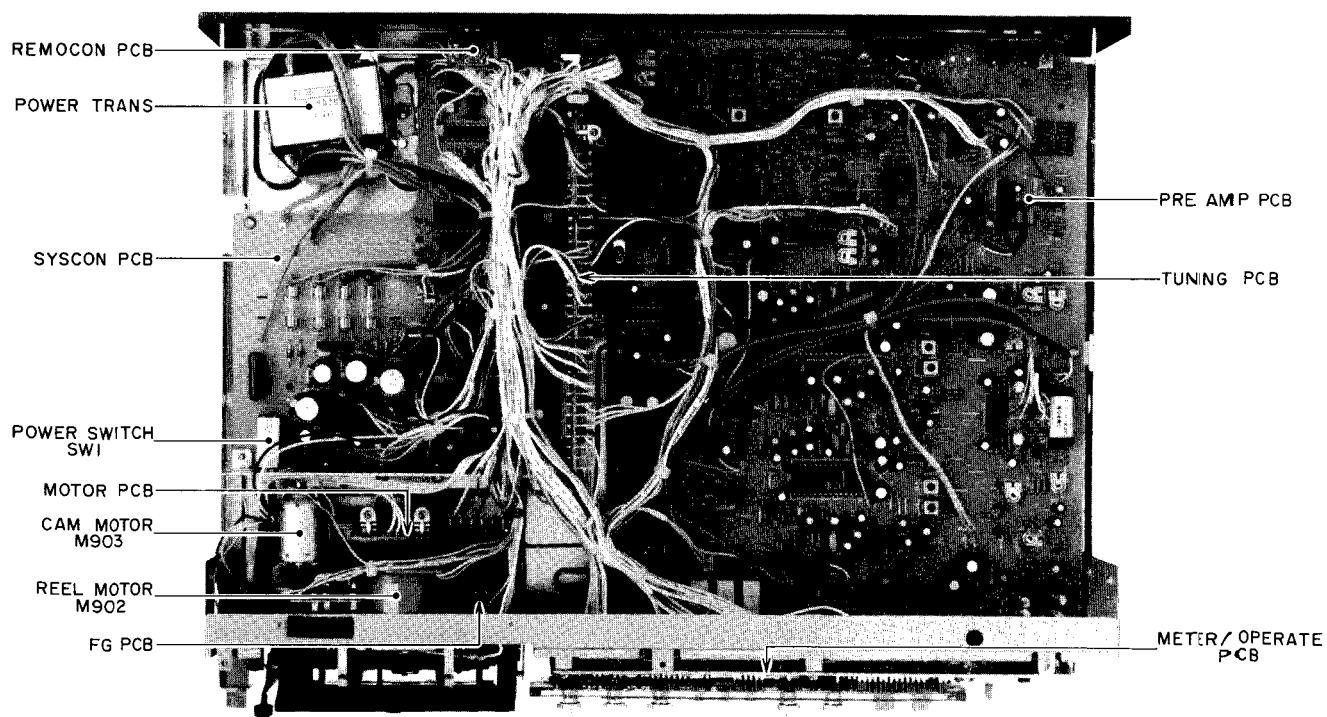


Fig. 3 Top View

IV. VOLTAGE CONVERSION

Refer to Section 2-IV (GX-F31)

V. MECHANICAL ADJUSTMENT

Refer to Section 2-V (GX-F31)

VI. HEAD ADJUSTMENT

Refer to Section 2-VI (GX-F31)

VII. AMPLIFIER ADJUSTMENT

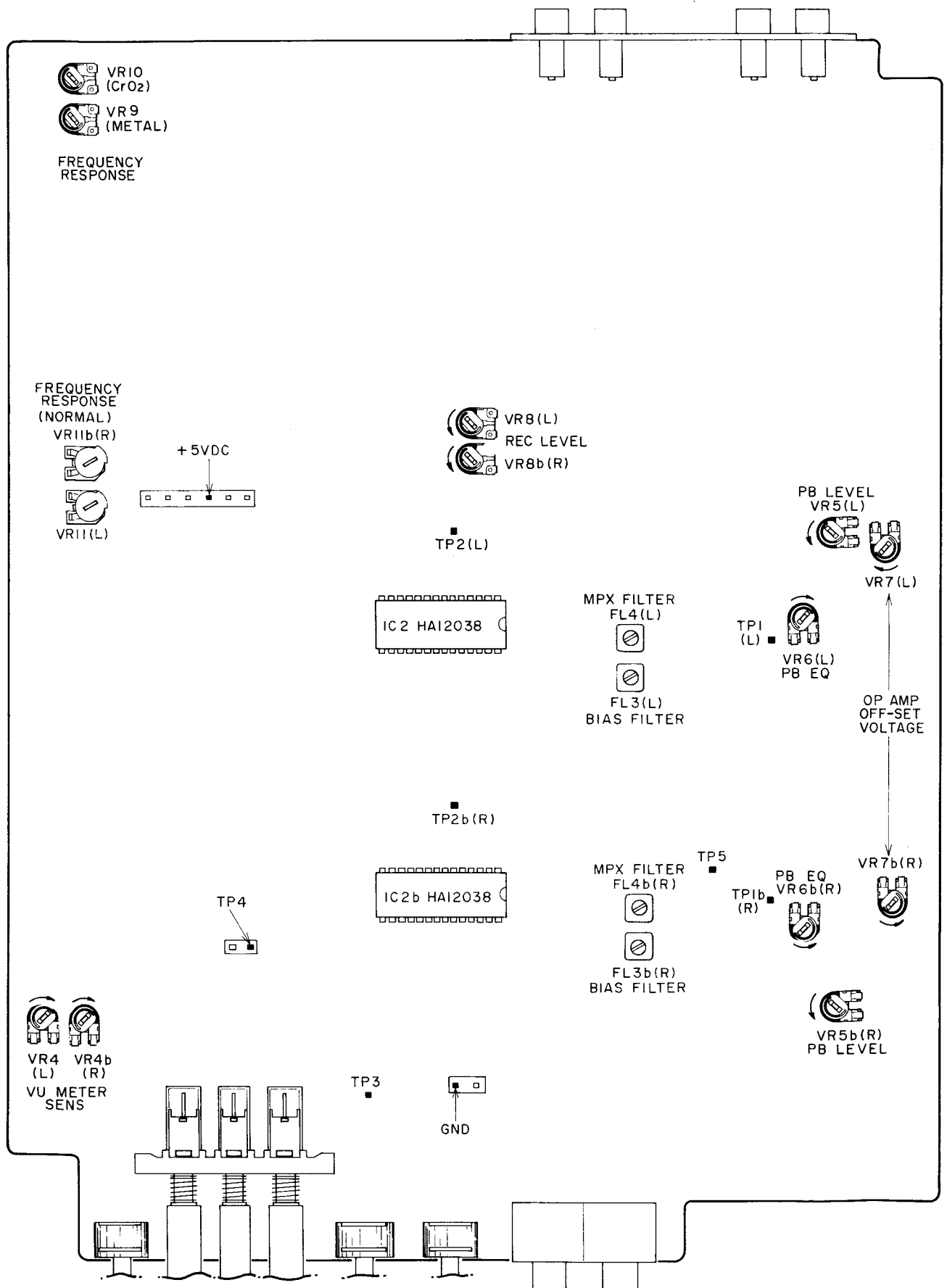


Fig. 4 Pre Amp P.C Board

Step	Adjustment Item	Test Tape Supply Signal	Mode	Adjustment Parts	Result	Remarks
1	OP Amp Off-Set Voltage		STOP	VR7 Pre Amp PCB	TP1 0 ± 0.1 VDC	
2	PB Level	333 Hz Test Tape (TF-101CL)	PB	VR5 Pre Amp PCB	-5.5 ± 0.5 dBm (410 mV)	
3	PB EQ	10 kHz Test Tape (TF-106CH)	PB	VR6 Pre Amp PCB	-22.5 ± 1.5 dBm	
4	Normal Position Frequency Response	Normal Blank Tape 1 kHz, 10 kHz -25.5 dBm	REC/PB	VR11 Pre Amp PCB	1 kHz to 10 kHz flat response	
5	CrO ₂ Position Frequency Response	CrO ₂ Blank Tape 1 kHz, 10 kHz -25.5 dBm	REC/PB	VR10 Pre Amp PCB	1 kHz to 10 kHz flat response	
6	Metal Position Frequency Response	Metal Blank Tape 1 kHz, 10 kHz -25.5 dBm	REC/PB	VR9 Pre Amp PCB	1 kHz to 10 kHz flat response	
7	REC Level	Normal Blank Tape 1 kHz, -5.5 dBm	REC/PB	VR8 Pre Amp PCB	-5.5 ± 0.3 dBm (410 mV)	
8	MPX Filter	19 kHz from oscillator	REC	FL4 Pre Amp PCB	Minimum Output	MPX Filter ON
9	Bias Filter	No Signal Input	REC	FL3 Pre Amp PCB	Minimum Output	Set REC Volume to maximum
10	VU Meter Sensitivity	1 kHz, -5.5 dBm from oscillator	REC	VR4 Pre Amp PCB	0 dB (VU) indication	

- NOTES:**
- Output volume should be at maximum.
 - Dolby NR Switch to OFF Position.
 - Except for Step 8 set Dolby Filter Switch to OFF Position.
 - Use the following cassette measuring tapes:
 - Normal Tape : Maxell UD C-60
 - CrO₂ Tape : TDK SA C-60
 - Metal Tape : TDK MA-C C-60

For your reference:

Confirmation of Dolby level

- Set to REC/PAUSE.
- Input a signal of 400 Hz and adjust the input level so that the level of pin ④ of Dolby I.C (HA-12038) will be 580 mV when Dolby NR is OFF.
- Check that the level of TP-2 is 580 mV.

VIII. TUNING CIRCUIT ADJUSTMENT

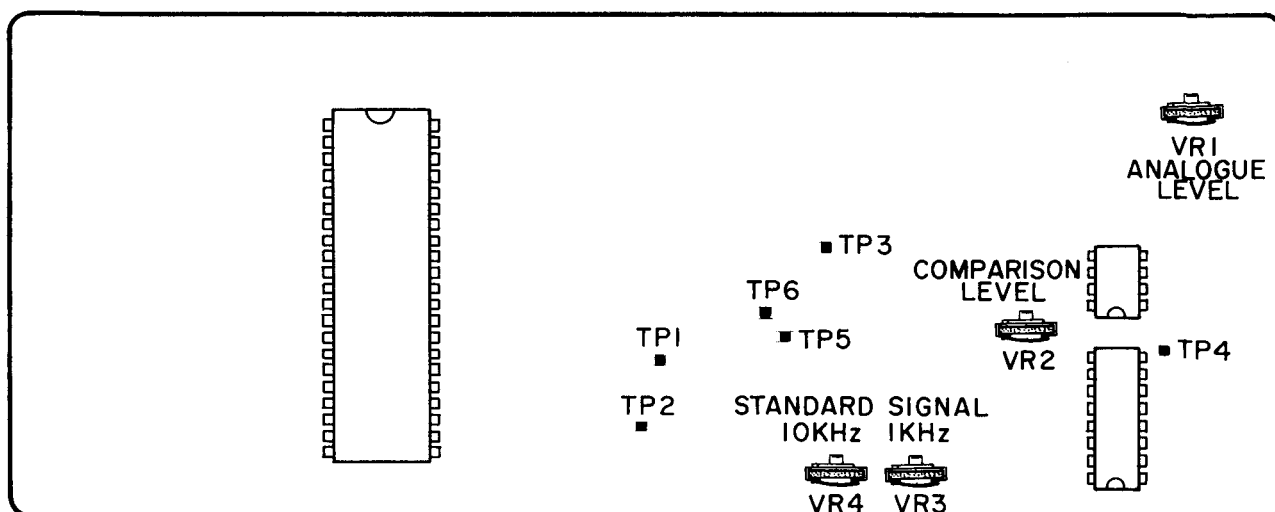


Fig. 5 Tuning P.C Board

- 1) Standard Signal (1 kHz) output Adjustment
 - a. Set to REC/PAUSE.
 - b. Apply +5V DC to TP3 of the Pre Amp PCB.
 - c. Input square wave of 3Vp-p or more, 1057 ± 10 Hz, into TP-1 of the tuning PCB.
 - d. Adjust VR3 of the tuning PCB so that the level of TP4 of Pre Amp PCB will be -25.5 ± 0.1 dBm.
- 2) Standard Signal (10 kHz) Output Adjustment
 - a. Set to REC/PAUSE.
 - b. Apply +5V DC to TP3 of Pre Amp PCB.
 - c. Input square wave of 3Vp-p or more, 9941 ± 100 Hz, into TP2 of the tuning PCB.
 - d. Adjust VR4 of the tuning PCB so that the level of TP4 of Pre Amp PCB will be -24.0 ± 0.1 dBm.
- 3) A/D Converter Analogue Level Adjustment
 - a. Set to PLAY mode without inserting a tape.
 - b. Input a signal of 1 kHz into TP5 of Pre Amp PCB and adjust the input level so that TP4 of Pre Amp PCB will be -25.5 dBm.
 - c. Adjust VR1 of the tuning PCB so that the level of TP3 of the tuning PCB will be 3.49 ± 0.05 V DC.
- 4) A/D Converter Comparison Level Adjustment
 - a. Connect TP5 and TP6 of the tuning PCB to GND.
 - b. Adjust VR2 of the tuning PCB so that the level of TP4 of the tuning PCB will be 3.70 ± 0.05 V DC.

NOTE: A digital voltmeter should be used for the measurement of DC voltage and an AC voltmeter (mV meter) for the measurement of AC voltage, and the input impedance should be 10M ohm or more.

IX. DC RESISTANCE OF HEADS

GX-F51

Description	Name	DC Resistance
REC/PB Head	PR4-7	650 ohms \pm 10%
Erase Head	HJ213270	3.5 ohms

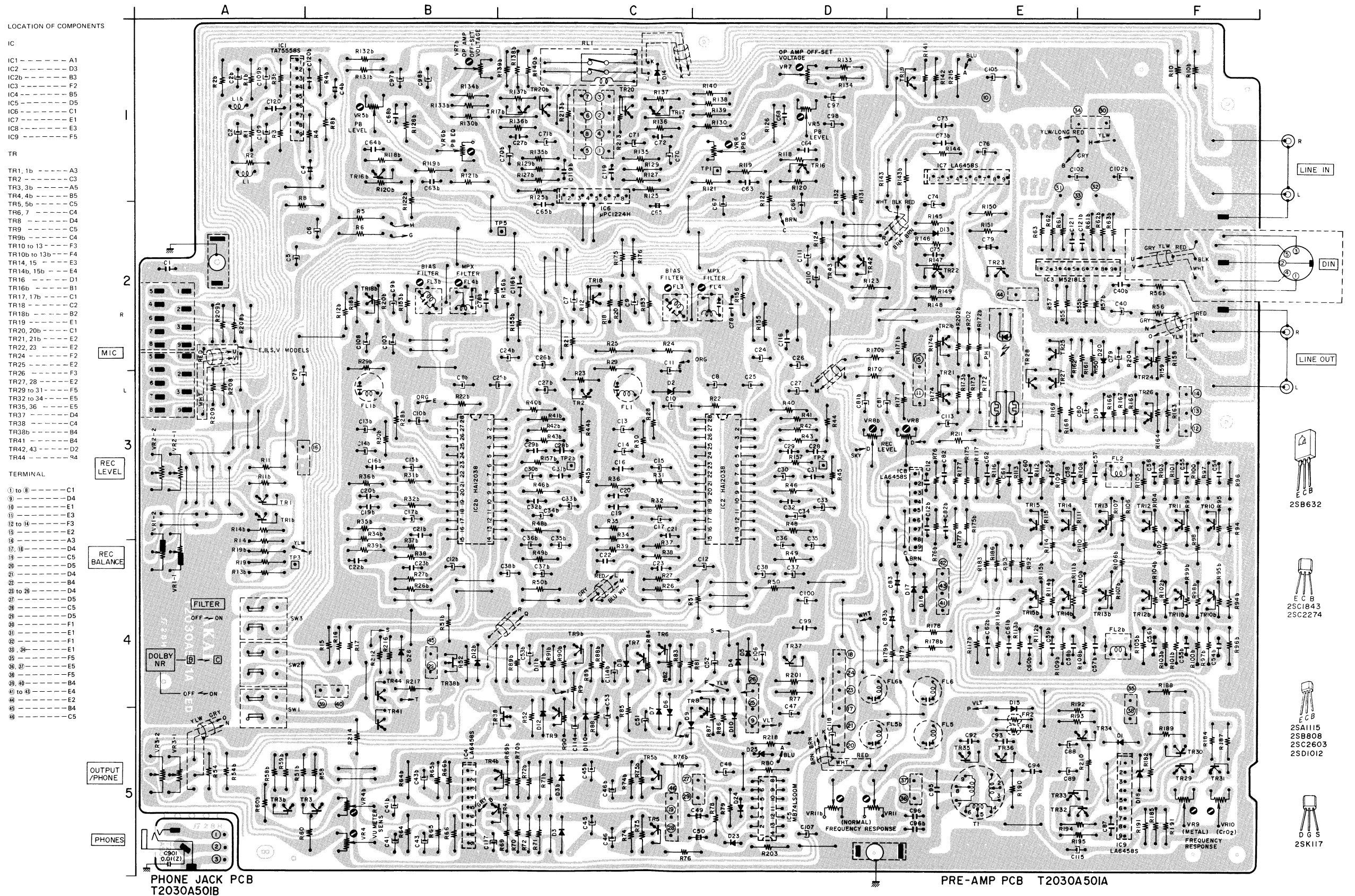
X. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

P.C Board Title	P.C Board Number
Pre Amp P.C Board	T2030A501A
Phone Jack P.C Board	T2030A501B
Tuning P.C Board	T2030C5040
Syscon P.C Board	T2030B502A
Switch P.C Board	T2030B502B
Remocon P.C Board	T2030B502C
Meter/Operate P.C Board	T2030B5030
Motor P.C Board	T3103C726A
Potention P.C Board	M3103C726B
FG P.C Board	M3103C7130
Filter P.C Board	T2029D5040
Detector P.C Board	T2029D5030
Micro SW P.C Board	T2029D5020

2. COMPOSITION OF VARIOUS P.C BOARDS

1) PRE AMP P.C BOARD T2030A501A (2ED) and PHONE JACK P.C BOARD T2030A501B



LOCATION OF COMPONENTS

IC

- IC1 ----- A1
- IC2 ----- D3
- IC3 ----- B3
- IC4 ----- F2
- IC5 ----- D5
- IC6 ----- C1
- IC7 ----- E1
- IC8 ----- E3
- IC9 ----- F5

TR

- TR1, 1b ----- A3
- TR2 ----- C3
- TR3, 3b ----- A5
- TR4, 4b ----- B5
- TR5, 5b ----- C5
- TR6, 7 ----- C4
- TR8 ----- D4
- TR9 ----- C5
- TR9b ----- C4
- TR10 to 13 ----- F3
- TR10b to 13b ----- F4
- TR14, 15 ----- E3
- TR14b, 15b ----- E4
- TR16 ----- D1
- TR16b ----- B1
- TR17, 17b ----- C1
- TR18 ----- C2
- TR18b ----- B2
- TR19 ----- E1
- TR20, 20b ----- C1
- TR21, 21b ----- E2
- TR22, 23 ----- E2
- TR24 ----- F2
- TR25 ----- E2
- TR26 ----- F3
- TR27, 28 ----- E2
- TR29 to 31 ----- F5
- TR32 to 34 ----- E5
- TR35, 36 ----- E5
- TR37 ----- D4
- TR38 ----- C4
- TR38b ----- B4
- TR41 ----- B4
- TR42, 43 ----- D2
- TR44 ----- B4

TERMINAL

- ① to ⑧ ----- C1
- ⑨ ----- D4
- ⑩ ----- E1
- ⑪ ----- E3
- ⑫ to ⑭ ----- F3
- ⑮ ----- E2
- ⑯ ----- A3
- ⑰, 18 ----- D4
- ⑱ ----- C5
- ⑲ ----- D5
- ⑳ to 26 ----- D4
- 27 ----- D5
- 28 ----- C5
- 29 ----- D5
- 30 ----- F1
- 31 ----- E1
- 32 ----- F1
- 33, 36 ----- E1
- 34 ----- F5
- 35 ----- E5
- 36 ----- F5
- 37 to 43 ----- B4
- 44 to 48 ----- E4
- 49 ----- E2
- 50 ----- B4
- 51 ----- C5

MIC

REC LEVEL

REC BALANCE

OUTPUT /PHONE

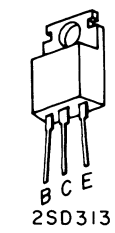
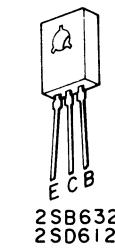
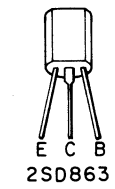
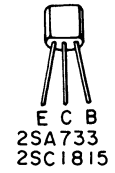
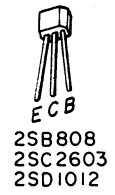
PHONES

PHONE JACK PCB
T2030A501B

PRE-AMP PCB
T2030A501A

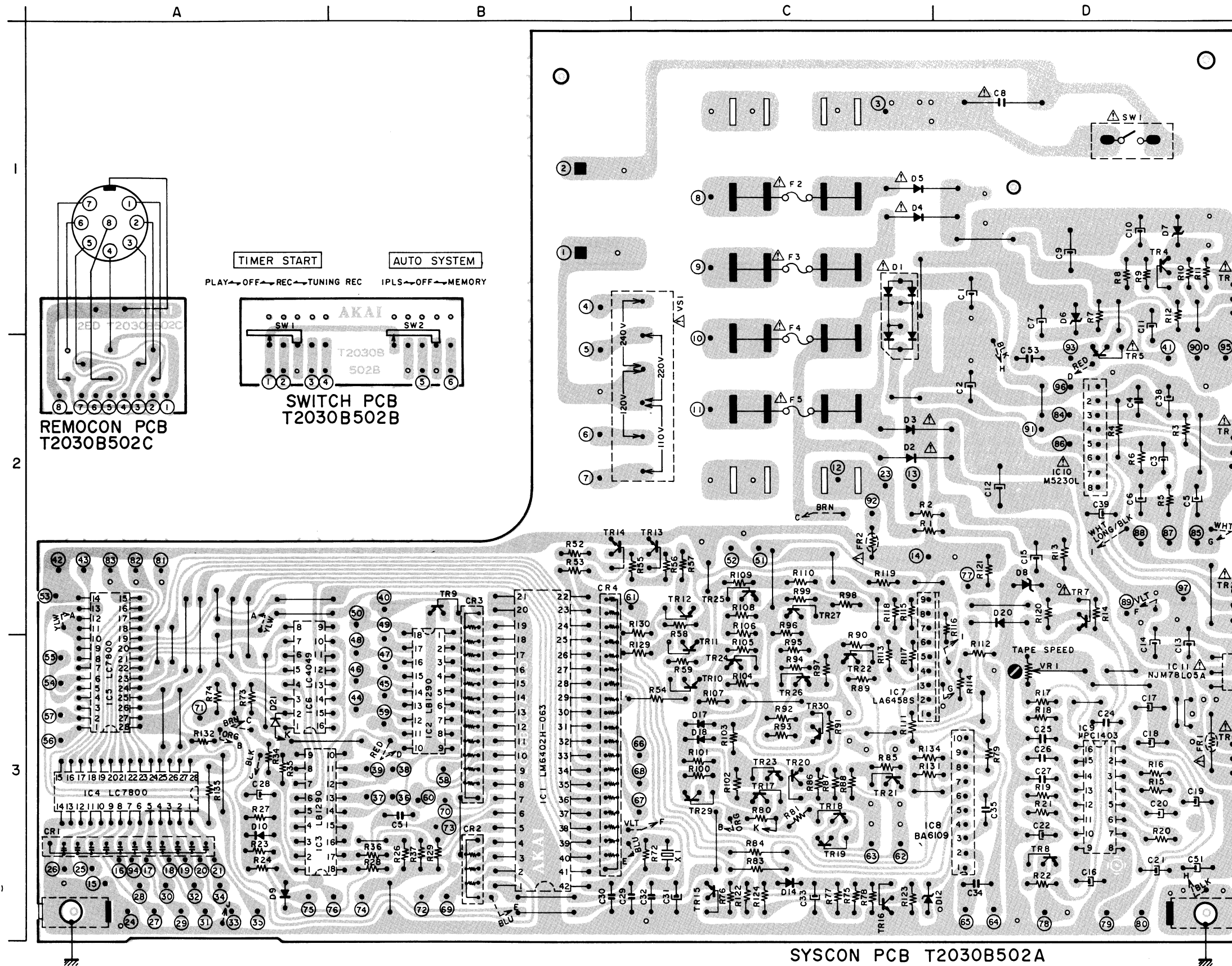
- TR1, 17, 19 to 21, 42 ----- 2SD1012V(G, H)
- TR2 to 6, 9, 16, 22 to 29, 31, 34, 41, 44 ----- 2SC2603(E, F)
- TR7, 8, 30 ----- 2SA1115(E, F)
- TR18 ----- 2SC1843(E, F)
- TR32 ----- 2SB632K(E, F)
- TR33 ----- 2SC1843(P, F)
- TR35 to 37 ----- 2SC2274(K, E)
- TR38 ----- 2SK117(GR, BL)
- T43 ----- 2SB808V(F, G)
- 2SA1115
- 2SB808
- 2SC2603
- 2SD1012
- DGS
- 2SK117

2) SYSCON P.C BOARD T2030B502A (3ED), SWITCH P.C BOARD T2030B502B and REMOCON P.C BOARD T2030B502C (2ED)



- TR1---2SB632K(E,F)
- TR2,3---2SD612K(E,F)
- TR4,8---2SC1815(BL,GR)
- TR5---2SD863(E,F)
- TR6---2SB632K(E,F)
- TR7---2SD313HP(E,F)
- TR9 to 17 24 to 27, 29
- 2SC2603(E,F)
- TR18 to 21---2SB808V(G,H)
- TR22,23---2SD1012V(G,H)
- TR30---2SA733A(P,Q)

- IC 1---LM6402H-063
- IC 2,3---LB1290
- IC 4,5---LC7800
- IC 6---LC4049
- IC 7---LA6458S
- IC 8---BA6109
- IC 9---µPC1043
- IC 10---M5230L
- IC 11---NJM78L05A



U MODEL
POWER

LOCATION OF COMPONENTS

TR

- TR1, 2 ----- D2
- TR3, 4 ----- D1
- TR5 ----- D2
- TR6 ----- D3
- TR7 ----- D2
- TR8 ----- D3
- TR9 ----- B2
- TR10, 11 ----- C3
- TR12, 13 ----- C2
- TR14 ----- B2
- TR15 to 24 ----- C3
- TR25 ----- C2
- TR26 ----- C3
- TR27 ----- C2
- TR29, 30 ----- C3

IC

- IC1, 2 ----- B3
- IC3 to 6 ----- A3
- IC7 ----- C3
- IC8, 9 ----- D3
- IC10 ----- D2
- IC11 ----- D3

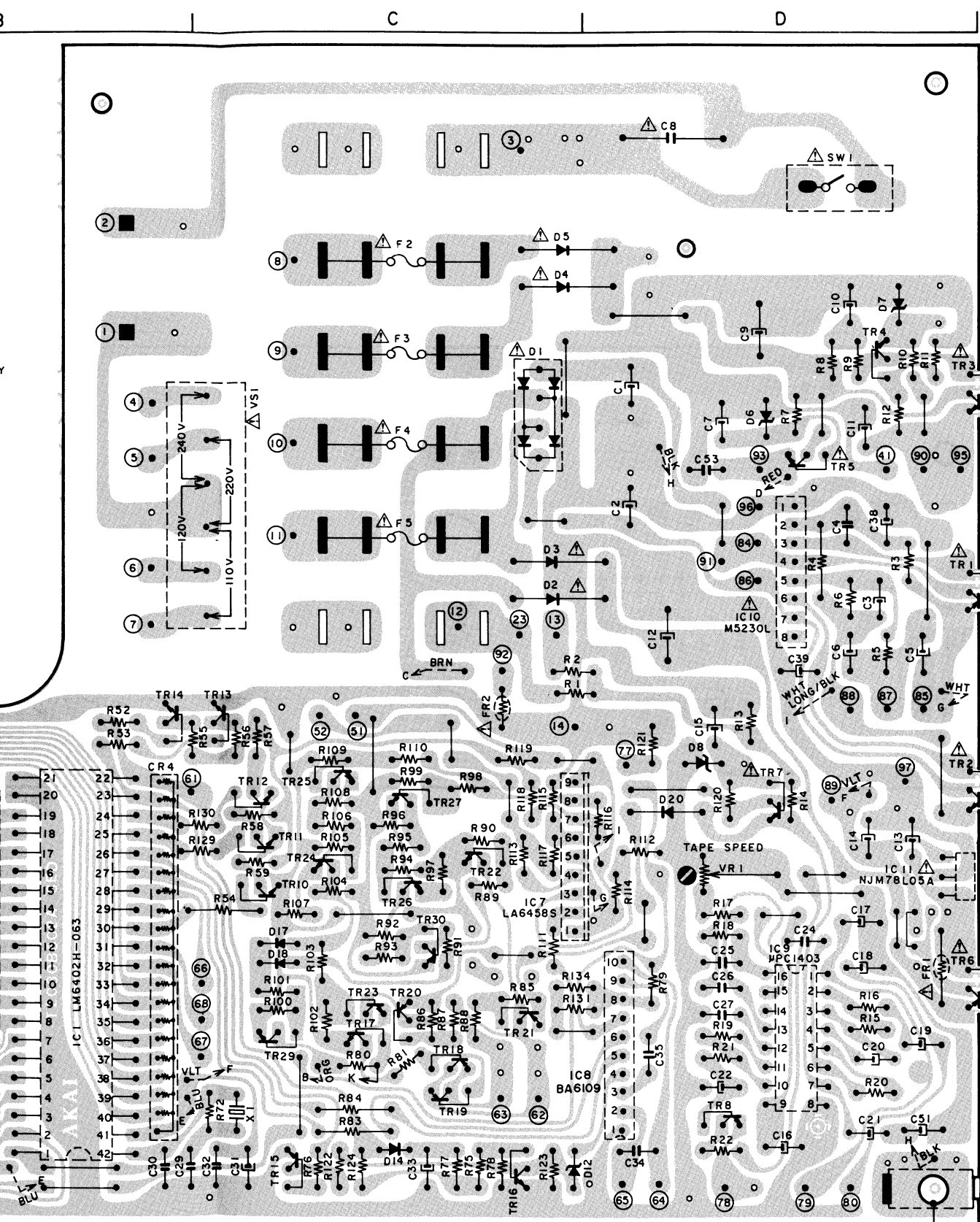
TERMINAL

- ①, ② ----- B1
- ③ ----- C1
- ④ ----- B1
- ⑤ to ⑦ ----- B2
- ⑧, ⑨ ----- C1
- ⑩ to ⑭ ----- C2
- ⑮ to ⑳ ----- A3
- ㉑ ----- C2
- ㉒ to ㉓ ----- A3
- ㉔ to ㉕ ----- B3
- ㉖ ----- B2
- ㉗ ----- D2
- ㉘, ㉙ ----- A2
- ㉚ to ㉛ ----- B3
- ㉜, ㉝ ----- B2
- ㉞, ㉟ ----- D3
- ㊱ to ㊲ ----- B3
- ㊳ ----- A3
- ㊴ to ㊵ ----- B3
- ㊶, ㊷ ----- A3
- ㊸ ----- D2
- ㊹ to ㊺ ----- D3
- ㊻ to ㊼ ----- A2
- ㊽ ----- C2
- ㊾ ----- D2
- ㊿ ----- A3
- ① to ② ----- D2
- ③ to ④ ----- D2
- ⑤ to ⑥ ----- D2
- ⑦ to ⑧ ----- D2
- ⑨ to ⑩ ----- D2
- ⑪ to ⑫ ----- D2
- ⑬ to ⑭ ----- D2
- ⑮ to ⑯ ----- D2
- ⑰ to ⑱ ----- D2
- ⑲ to ⑳ ----- D2
- ㉑ to ㉒ ----- D2
- ㉓ to ㉔ ----- D2
- ㉕ to ㉖ ----- D2
- ㉗ to ㉘ ----- D2
- ㉙ to ㉚ ----- D2
- ㉛ to ㉜ ----- D2
- ㉝ to ㉞ ----- D2
- ㉟ to ㊱ ----- D2
- ㊱ to ㊲ ----- D2
- ㊳ to ㊴ ----- D2
- ㊵ to ㊶ ----- D2
- ㊷ to ㊸ ----- D2
- ㊹ to ㊺ ----- D2

WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL, NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

SYSCON PCB T2030B502A

ON P.C BOARD T2030B502C (2ED)



SYSCON PCB T2030B502A

COMPONENTS. FOR CONTINUED SAFETY,
REPLACE ONLY WITH MANUFACTURER'S
EQUIVALENTS. CRITIQUES DE SÛRETÉ. POUR
REPARER L'APPAREIL, NE REMPLACER LES
COMPOSANTS CRITIQUES QUE PAR LA SÛRETÉ
DES ÉLÉMENTS FABRIQUÉS PAR LE FABRICANT

U MODEL

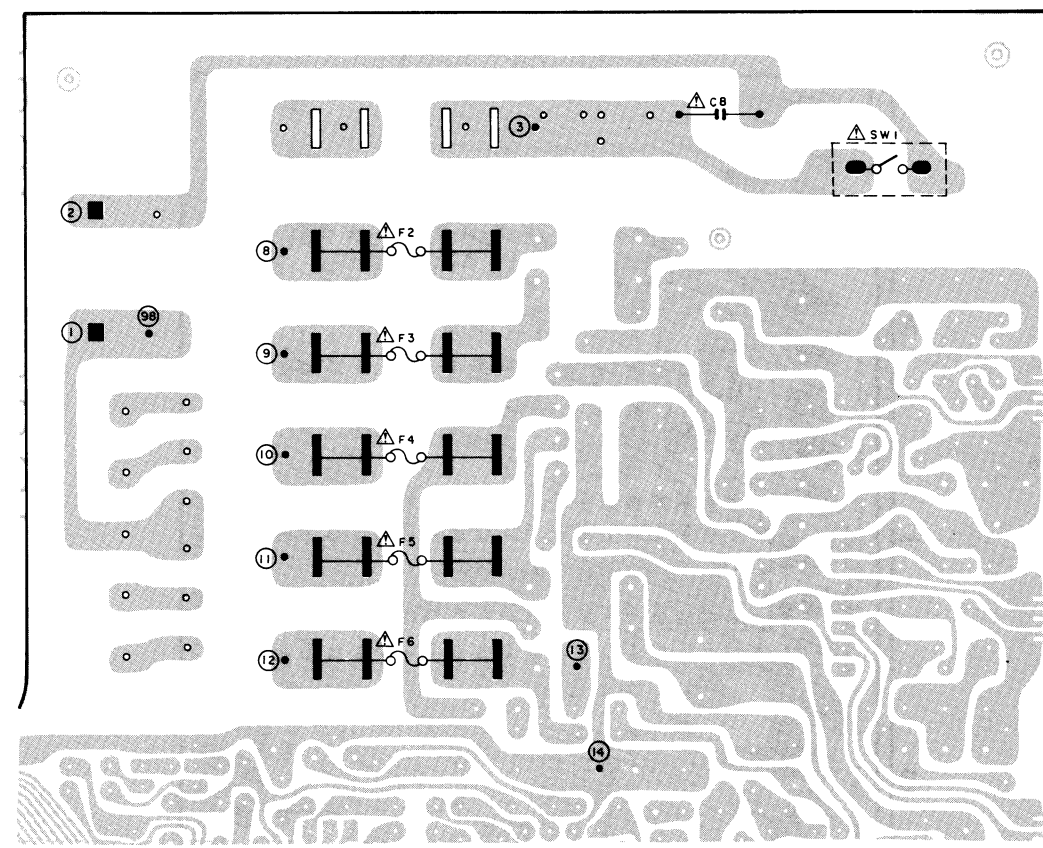
POWER

LOCATION OF COMPONENTS

- TR
- TR1, 2 ----- D2
 - TR3, 4 ----- D1
 - TR5 ----- D2
 - TR6 ----- D3
 - TR7 ----- D2
 - TR8 ----- D3
 - TR9 ----- B2
 - TR10, 11 ----- C3
 - TR12, 13 ----- C2
 - TR14 ----- B2
 - TR15 to 24 ----- C3
 - TR25 ----- C2
 - TR26 ----- C3
 - TR27 ----- C2
 - TR29, 30 ----- C3
- IC
- IC1, 2 ----- B3
 - IC3 to 6 ----- A3
 - IC7 ----- C3
 - IC8, 9 ----- D3
 - IC10 ----- D2
 - IC11 ----- D3

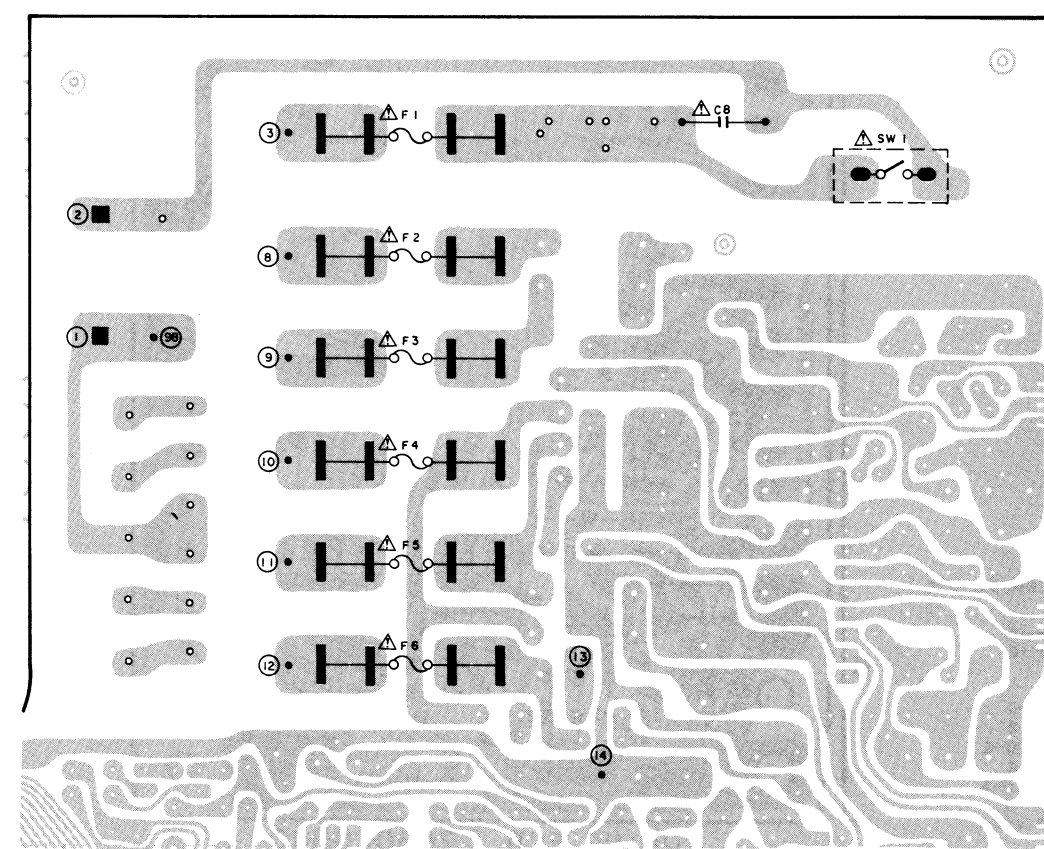
TERMINAL

- ①, ② ----- B1
- ③ ----- C1
- ④ ----- B1
- ⑤ to ⑦ ----- B2
- ⑧, ⑨ ----- C1
- ⑩ to ⑭ ----- C2
- ⑮ to ⑳ ----- A3
- ㉑ ----- C2
- ㉒ to ㉓ ----- A3
- ㉔ ----- B2
- ㉕ ----- D2
- ㉖, ㉗ ----- A2
- ㉘ to ㉙ ----- B3
- ㉚, ㉛ ----- B2
- ㉜ to ㉝ ----- A3
- ㉞ to ㉟ ----- B3
- ㊱ ----- B2
- ㊲, ㊳ ----- C3
- ㊴, ㊵ ----- D3
- ㊶ to ㊷ ----- B3
- ㊸ ----- A3
- ㊹ to ㊺ ----- B3
- ㊻, ㊼ ----- A3
- ㊽ ----- D2
- ㊾ to ㊿ ----- D3
- ① to ③ ----- A2
- ④ to ⑥ ----- D2
- ⑦ ----- C2
- ⑧ ----- D2
- ⑨ ----- A3
- ⑩ to ⑫ ----- D2



J,C,A,E,V,S MODEL

POWER

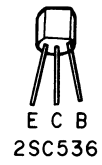
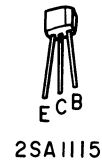


B MODEL

POWER

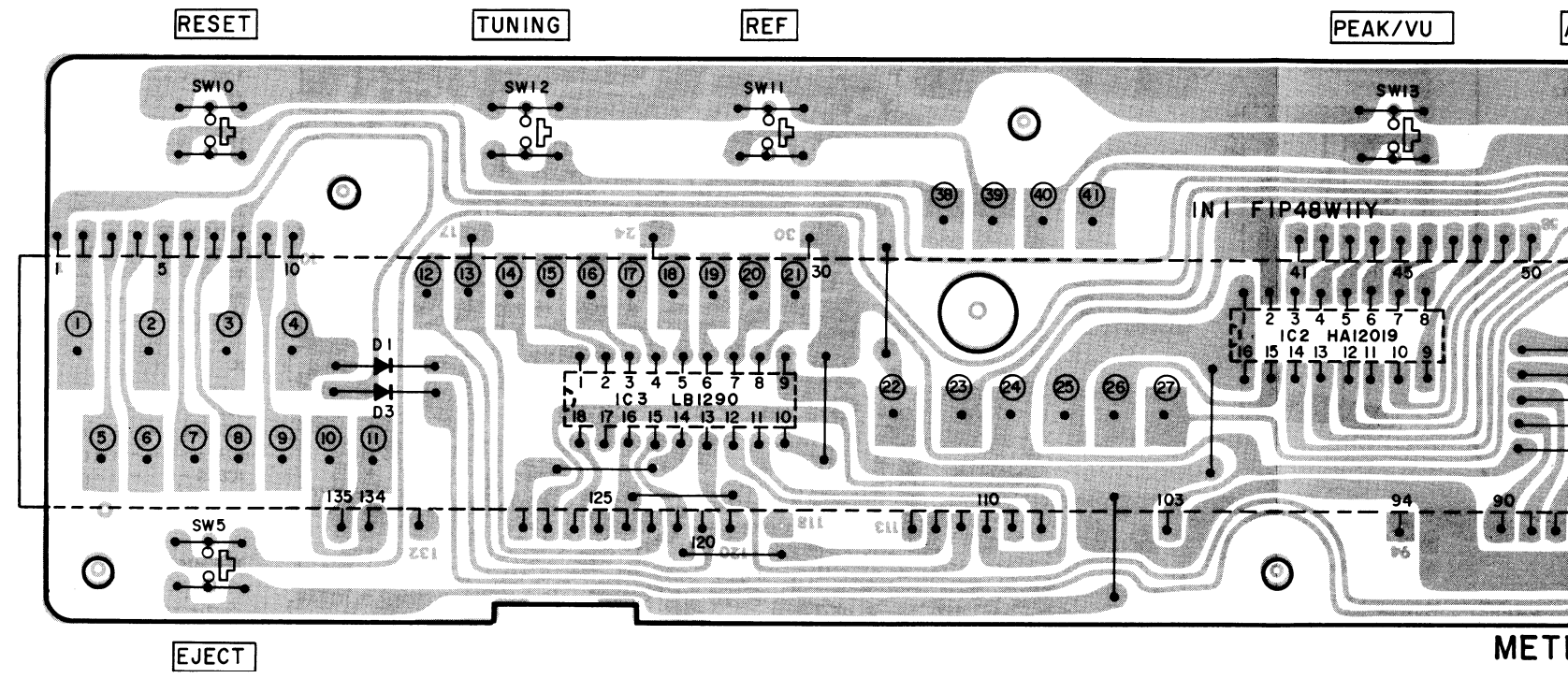
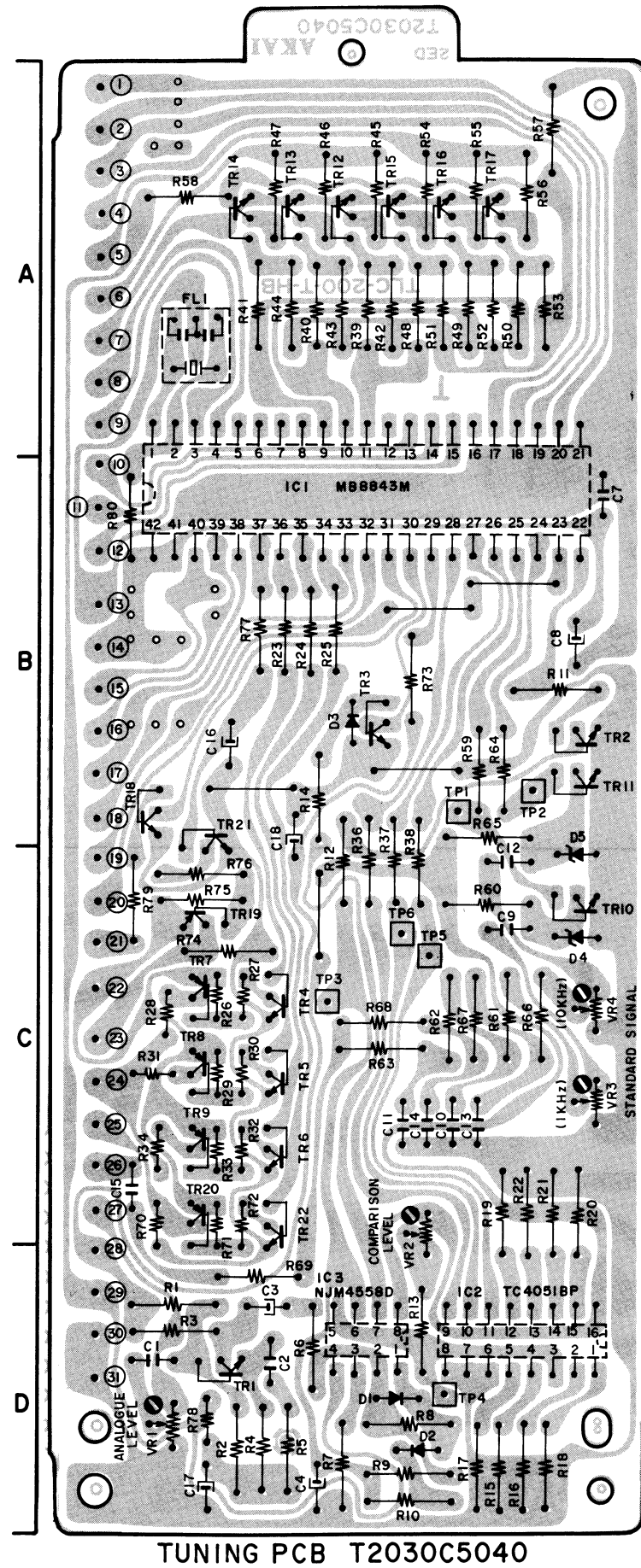
3) TUNING P.C BOARD T2030C5040 (2ED)

4) METER/OPERATE P.C BOARD T2030B5030

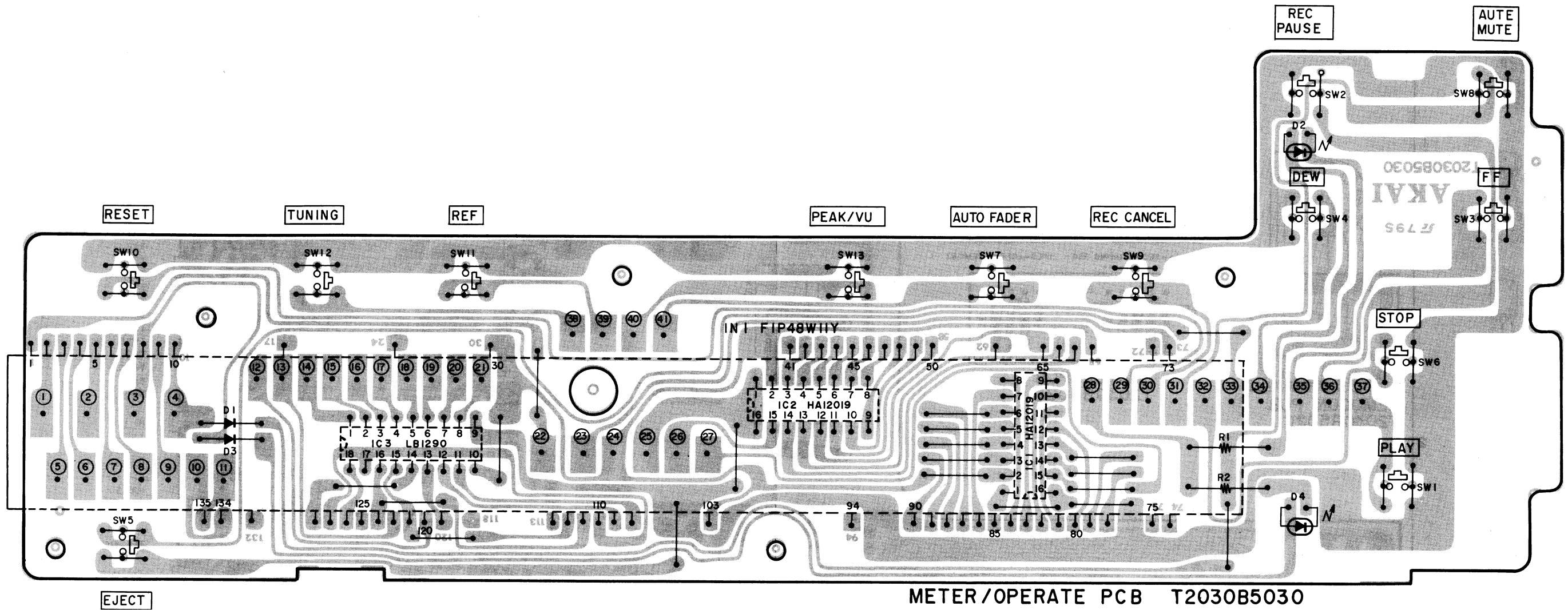


TR1 to 6, 10 to 18, 21, 22
2SC536K-NP (E,F)
TR7 to 9, 19, 20
2SA1115 (E,F)

LOCATION OF COMPONENTS
IC
IC1 — B
IC2,3 — D
TR
TR1 — D
TR2,3 — B
TR4 to 10 — C
TR11 — B
TR12 to 17 — A
TR18 — B
TR19 to 22 — C

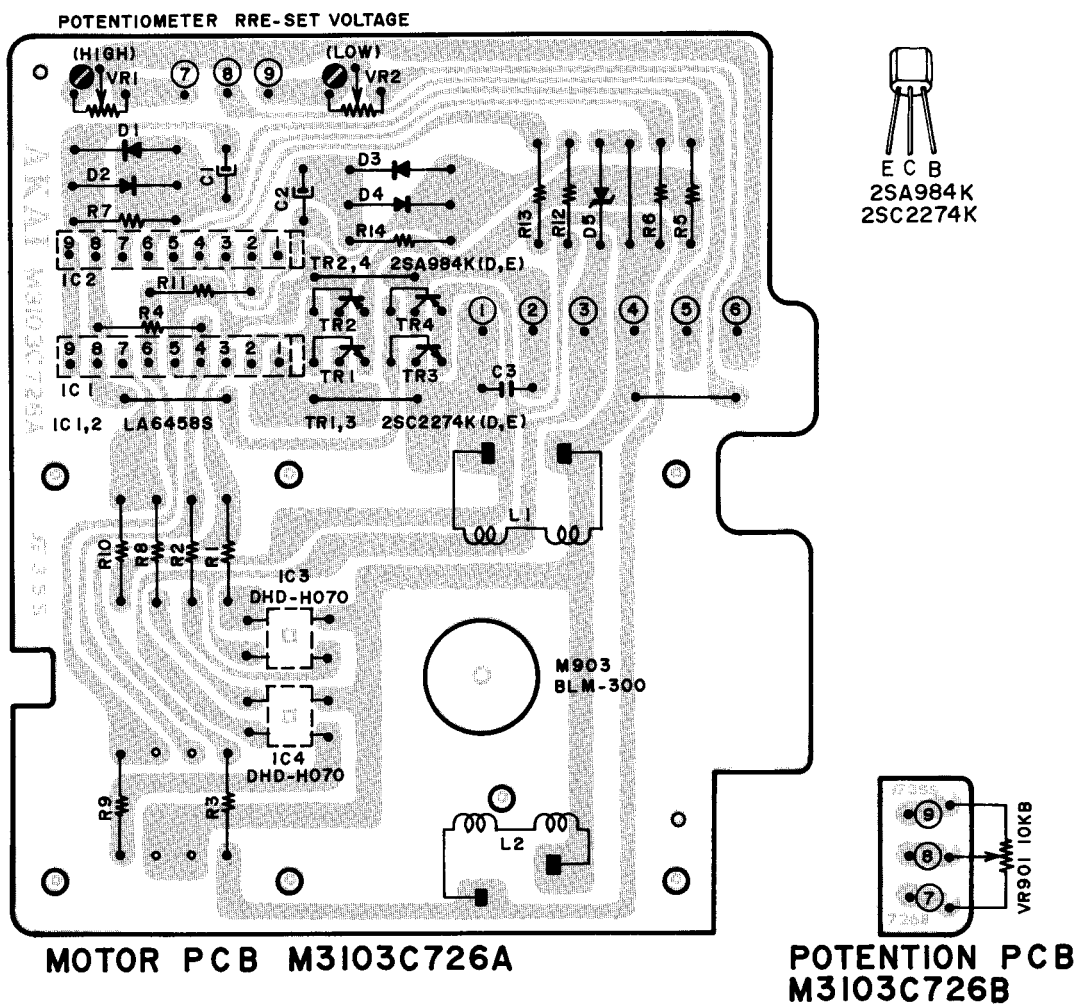


4) METER/OPERATE P.C BOARD T2030B5030

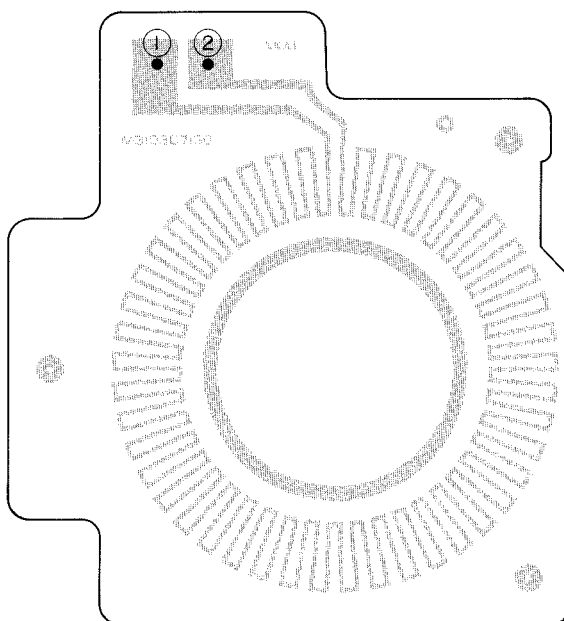


METER/OPERATE PCB T2030B5030

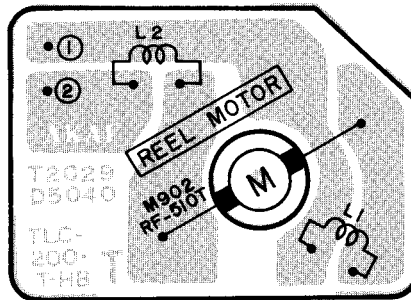
5) MOTOR P.C BOARD M3103C726A and POTENTION P.C BOARD M3103C726B



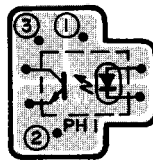
6) FG P.C BOARD M3103C7130



7) FILTER P.C BOARD T2029D5040



8) DETECTOR P.C BOARD T2029D5030



9) MICRO SW P.C BOARD T2029D5020

