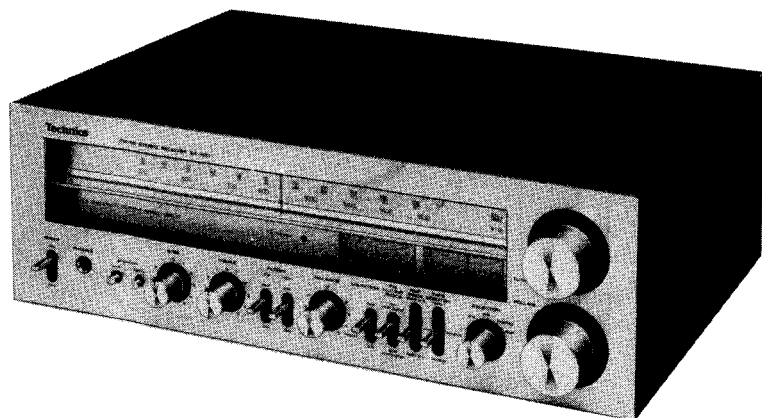


Service Manual

FM/AM STEREO RECEIVER

SA-400

(X), (XA), (XAL), (XGH), (XG)
(XSD), (XSW), (XGF), (XE)

* Cabinet colour and configuration of ventilation holes differ according to area.

- * The models SA-400(X) and SA-400(XA) are available in Asia, Latin America, Middle East and Africa only.
- * The model SA-400(XAL) is available in Australia only.
- * The model SA-400(XGH) is available in Holland only.
- * The model SA-400(XG) is available in European only.
- * The model SA-400(XSD) is available in Scandinavia only.
- * The model SA-400(XSW) is available in Swiss only.
- * The model SA-400(XGF) is available in France only.
- * The model SA-400(XE) is available in United Kingdom only.

TECHNICAL SPECIFICATIONS

Specifications are subject to change without notice for further improvement.

[DIN 45 500]

AMPLIFIER SECTION

1 kHz continuous power output both channels driven	2 x 52 W (4Ω), 2 x 48 W (8Ω)
40 Hz ~ 16 kHz continuous power output both channels driven	2 x 45 W (4Ω), 2 x 45 W (8Ω)
20 Hz ~ 20 kHz continuous power output both channels driven	2 x 45 W (8Ω)
Power bandwidth both channels driven, -3 dB	10 Hz ~ 30 kHz (4Ω)
Total harmonic distortion rated power at 1 kHz	0.04% (4Ω, 8Ω)
rated power at 40 Hz ~ 16 kHz	0.04% (4Ω, 8Ω)
rated power at 20 Hz ~ 20 kHz	0.04% (8Ω)
half power at 20 Hz ~ 20 kHz	0.025% (8Ω)
half power at 1 kHz	0.009% (8Ω)
-26 dB power at 1 kHz	0.04% (4Ω)
50 mW power at 1 kHz	0.2% (4Ω)
Intermodulation distortion rated power at 250 Hz: 8 kHz = 4:1, 4 Ω	0.04%
rated power at 60 Hz: 7 kHz = 4:1, SMPTE, 8Ω	0.04%
Residual hum & noise	0.6mV
Damping factor	16 (4Ω), 32 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47 kΩ
AUX	150 mV/33 kΩ
PLAYBACK (TAPE 1), REC/PLAY input	180 mV/39 kΩ
PLAYBACK (TAPE 2)	150mV/33 kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
S/N	
rated power at 4Ω	PHONO 70 dB (IHF, A: 78 dB) AUX 88 dB (IHF, A: 95 dB)
-26 dB power at 4Ω	PHONO 65 dB, AUX 75 dB
50 mW power at 4Ω	PHONO 60 dB, AUX 62 dB
Frequency response	PHONO RIAA standard curve ±0.2 dB AUX 20 Hz ~ 20 kHz, ±0.5 dB
Tone controls	BASS 10 Hz ~ 40 kHz, -1 dB TREBLE 50 Hz, +10 dB ~ -10 dB 10 kHz, +10 dB ~ -10 dB
LOW filter	100 Hz, -6 dB/oct.
HIGH filter	7 kHz, -6 dB/oct.
Loudness control (volume at -30 dB)	50 Hz, +9 dB
Output voltage	REC OUT (TAPE 1, 2) 150 mV REC/PLAY output 30 mV
Channel balance (250 Hz ~ 6300 Hz), AUX	±1.0 dB
Channel separation at 1 kHz, AUX	55 dB
Headphones output level and impedance	440 mV/330Ω
Load impedance	MAIN or REMOTE 4 ~ 16Ω MAIN + REMOTE 8 ~ 16Ω

FM TUNER SECTION

Frequency range	88 ~ 108 MHz
Antenna impedance	300Ω (balanced), 75Ω (unbalanced)
Sensitivity (±40 kHz deviation)	1.9μV (300Ω), 1.3μV (75Ω)
S/N 30 dB	1.7μV (300Ω), 1.2μV (75Ω)
S/N 26 dB	1.5μV (300Ω), 0.9μV (75Ω)
S/N 20 dB	1.9μV (IHF '58)
IHF usable sensitivity	22μV (75Ω)
IHF S/N 46 dB stereo quieting sensitivity	
Total harmonic distortion	MONO 0.15% STEREO 0.3%
S/N (±40kHz deviation)	MONO 60 dB (IHF: 75 dB) STEREO 56 dB (IHF: 70 dB)
Frequency response	20Hz ~ 15 kHz, +1 dB 20 Hz ~ 14 kHz, ±1.5 dB
Alternate channel selectivity	70 dB
Capture ratio	1.2 dB
Image rejection at 98 MHz	70 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	55 dB
Stereo separation	1 kHz 45 dB, 10 kHz 35 dB
Leak carrier	19 kHz -33 dB (-40dB, IHF) 38 kHz -48 dB (-50dB, IHF)
Limiting point	1.2μV
Bandwidth	IF amplifier 180 kHz FM demodulator 1000 kHz
Channel balance (250 Hz ~ 6300 Hz)	±1.5 dB

AM TUNER SECTION

Frequency range	525 ~ 1605 kHz
Sensitivity (S/N 20 dB)	30μV, 300μV/m
Selectivity	30 dB
Image rejection at 1000 kHz	45 dB
IF rejection at 1000 kHz	40 dB

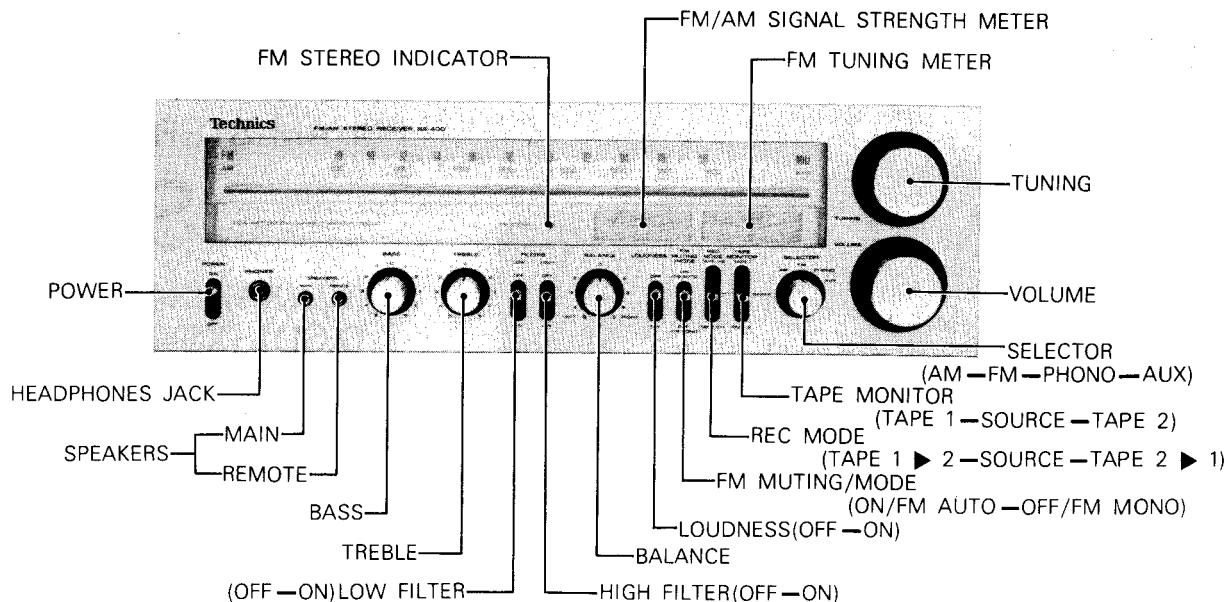
GENERAL

Power consumption	450 W
Power supply (50 Hz/60 Hz)	110V/120V/220V/240V
Dimensions (W x H x D)	430 x 145 x 260 mm (16 1/2" x 5 3/4" x 10 1/4")
Weight	8.2 kg (18.1 lb.)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

LOCATION OF CONTROLS (Front Panel)



TECHNISCHE DATEN [DIN 45 500]

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

VERSTÄRKERTEIL

RMS-Dauertonleistung bei 1 kHz	2 x 52 W (4 Ω)
beide Kanäle zusammen angesteuert	2 x 48 W (8 Ω)
RMS-Dauertonleistung bei 40 Hz ~ 16 kHz	2 x 45 W (4 Ω)
beide Kanäle zusammen angesteuert	2 x 45 W (8 Ω)
RMS-Dauertonleistung bei 20 Hz ~ 20 kHz	2 x 45 W (8 Ω)
beide Kanäle zusammen angesteuert	2 x 45 W (8 Ω)
Leistungsbandbreite	10 Hz ~ 30 kHz
beide Kanäle zusammen angesteuert, -3 dB	(4 Ω)
Harmonische Verzerrungen	
Nennausgangsleistung bei 1 kHz	0,04% (4 Ω, 8 Ω)
Nennausgangsleistung bei 40 Hz ~ 16 kHz	0,04% (4 Ω, 8 Ω)
Nennausgangsleistung bei 20 Hz ~ 20 kHz	0,04% (8 Ω)
Halber Ausgangsleistung bei 20 Hz ~ 20 kHz	0,025% (8 Ω)
Halber Ausgangsleistung bei 1 kHz	0,009% (8 Ω)
-26 dB Ausgangsleistung bei 1 kHz	0,04% (4 Ω)
50 mW Ausgangsleistung bei 1 kHz	0,2% (4 Ω)
Intermodulationsverzerrung	
Nennausgangsleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,04%
Nennausgangsleistung bei 60 Hz: 7 kHz = 4:1, 8 Ω	0,04%
Hum & Noise	0,6 mV
Dämpfungsfaktor	16 (4 Ω), 32 (8 Ω)
Eingangsempfindlichkeit & Impedanz	
PHONO	2,5 mV/47 kΩ
AUX	150 mV/33 kΩ
PLAYBACK (TAPE 1), REC/PLAY Eingang	180 mV/39 kΩ
PLAYBACK (TAPE 2)	150 mV/33 kΩ
PHONO Maximale Eingangsspannungen (1 kHz RMS)	150 mV
Fremdspannungsabstand	
Nennausgangsleistung bei 4 Ω PHONO 70 dB (IHF, A: 78 dB)	
AUX 88 dB (IHF, A: 95 dB)	
-26 dB Ausgangsleistung bei 4 Ω PHONO	65 dB
AUX 75 dB	
50 mW Ausgangsleistung bei 4 Ω PHONO	60 dB
AUX 62 dB	
Frequenzgang PHONO	RIAA Standardkurve ±0,2 dB
AUX	20 Hz ~ 20 kHz, ±0,5 dB
Klangregler BÄSSE	10 Hz ~ 40 kHz, -1 dB
HÖHEN	50 Hz, +10 dB ~ -10 dB
Tiefenfilter	100 Hz, -6 dB/oct.
Höhenfilter	7 kHz, -6 dB/oct.
Gehörgerechte Lautstärkekorrektur (Lautstärke bei -30 dB)	50 Hz, +9 dB
Ausgangsspannungen REC OUT (TAPE 1, 2)	150 mV
REC/PLAY Aufnahme	30 mV
Kanalabweichung (250 Hz ~ 6300 Hz), AUX	±1,0 dB
Kanaltrennung bei 1 kHz, AUX	55 dB
Kopfhörerpegel und Ausgangsimpedanz	440 mV/330 Ω

Endimpedanz	MAIN oder REMOTE	4 ~ 16 Ω
	MAIN und REMOTE	8 ~ 16 Ω

UKW-TUNERTEIL

Empfangsbereich	88 ~ 108 MHz
Antennenanschluss	300 Ω (symmetrisch), 75 Ω (asymmetrisch)
Empfindlichkeit (±40 kHz Hub)	
30 dB Fremdspannungsabstand	1,9 μV (300 Ω), 1,3 μV (75 Ω)
26 dB Fremdspannungsabstand	1,7 μV (300 Ω), 1,2 μV (75 Ω)
20 dB Fremdspannungsabstand	1,5 μV (300 Ω), 0,9 μV (75 Ω)
IHF Empfindlichkeit	1,9 μV (IHF '58)
46 dB Fremdspannungsabstand Empfindlichkeit, IHF	22 μV (75 Ω), STEREO
Harmonische Verzerrung	MONO 0,15%
	STEREO 0,3%
Fremdspannungsabstand (±40 kHz Hub)	
MONO	60 dB (IHF: 75 dB)
STEREO	56 dB (IHF: 70 dB)
Frequenzgang	20 Hz ~ 14 kHz, ±1,5 dB
	20 Hz ~ 14 kHz, ±1,5 dB
Selektivität	70 dB
Gleichwellen-Selektion	1,2 dB
Spiegelselektion bei 98 MHz	70 dB
ZF-Festigkeit bei 98 MHz	90 dB
Unselektivitätsfestigkeit bei 98 MHz	80 dB
AM-Unterdrückung	55 dB
Stereo Übersprechdämpfung	1 kHz 45 dB, 10 kHz 35 dB
Trägerrest	19 kHz -33 dB (-40 dB, IHF)
	38 kHz -48 dB (-50 dB, IHF)
Begrenzung, Einsatzpunkt	1,2 μV
Bandbreite ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB

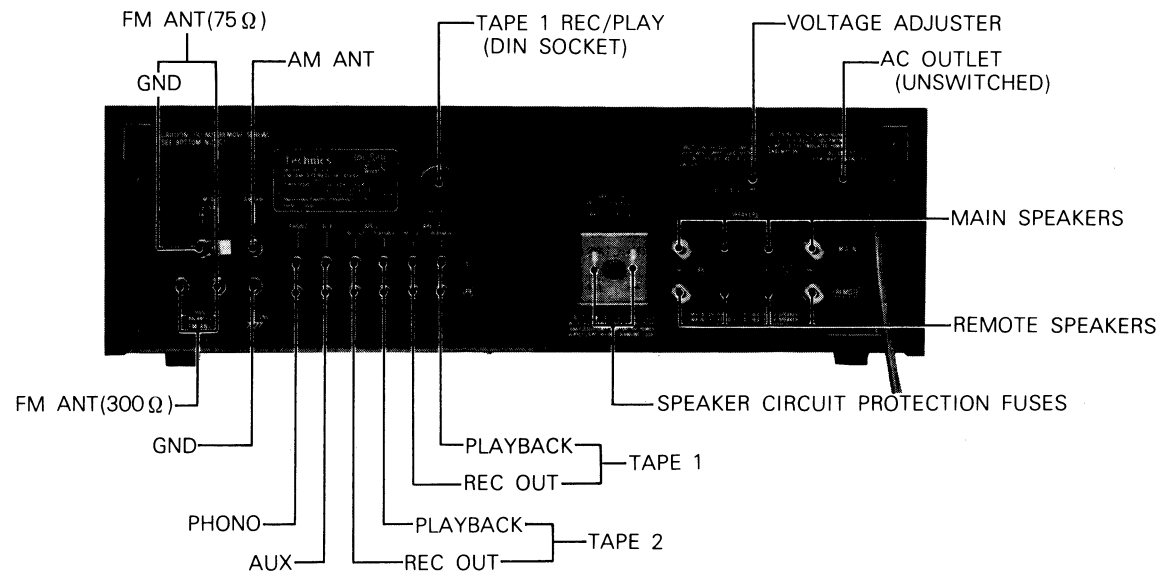
AM-TUNERTEIL

Empfangsbereich	525 ~ 1605 kHz
Empfindlichkeit	
(20 dB Fremdspannungsabstand)	30 μV, 300 μV/m
Selektivität	30 dB
Spiegelselektion bei 1000 kHz	45 dB
ZF-Festigkeit bei 1000 kHz	40 dB

ALLGEMEINE DATEN

Leistungsaufnahme	450 W
Netzspannung umschaltbar (50 Hz/60 Hz)	110V/120V/220V/240V
Abmessungen (B x H x T)	430 x 145 x 260 mm
Gewicht	8,2 kg

■ LOCATION OF CONTROLS (Rear Panel)



* This photo shows only the products for (XA).

* The products for other destinations except (XA) are not equipped with AC outlet.

CARACTERISTIQUES TECHIQUES

[DIN 45 500]

SECTION AMPLIFICATEUR

Puissance RMS (continue) à 1 kHz
pour l'ensemble des canaux excités

2 x 52 W (4Ω)
2 x 48 W (8Ω)

Puissance RMS (continue) à 40 Hz ~ 16 kHz
pour l'ensemble des canaux excités

2 x 45 W (4Ω)
2 x 45 W (8Ω)

Puissance RMS (continue) à 20 Hz ~ 20 kHz
pour l'ensemble des canaux excités

2 x 45 W (8Ω)

Largeur de bande de puissance
pour l'ensemble des canaux excités, -3 dB

10 Hz ~ 30 kHz (4Ω)

Distorsion harmonique totale

pour la puissance mesurée à 1 kHz 0.04% (4Ω, 8Ω)

pour la puissance mesurée à 40 Hz ~ 16 kHz 0.04% (4Ω, 8Ω)

pour la puissance mesurée à 20 Hz ~ 20 kHz 0.04% (8Ω)

pour la demi-puissance mesurée à 20 Hz ~ 20 kHz 0.025% (8Ω)

pour la demi-puissance mesurée à 1 kHz 0.009% (8Ω)

pour une puissance mesurée de -26 dB, 1 kHz 0.04% (4Ω)

pour une puissance mesurée de 50 mW, 1 kHz 0.2% (4Ω)

Distorsion d'intermodulation

pour la puissance mesurée à 250 Hz: 8 kHz=4:1, 4Ω 0.04%

pour la puissance mesurée à 60 Hz: 7 kHz=4:1, 8Ω 0.04%

Tension résiduelle de bruit

0.6mV

Facteur d'amortissement

16 (4Ω), 32 (8Ω)

Sensibilité & impédance d'entrée

PHONO 2.5 mV/47 kΩ

AUX 150 mV/33 kΩ

PLAYBACK (TAPE 1), REC/PLAY entrée 180 mV/39 kΩ

PLAYBACK (TAPE 2) 150 mV/33 kΩ

Voltage d'entrée maximum (PHONO, 1 kHz, RMS)

150 mV

Rapport signal/bruit

pour la puissance nominale, 4Ω

PHONO 70 dB (IHF, A: 78 dB)

AUX 88 dB (IHF, A: 95 dB)

pour une sortie de -26 dB, 4Ω PHONO 65 dB AUX 75 dB

pour une sortie de 50 mW, 4Ω PHONO 60 dB AUX 62 dB

Réponse de fréquence

PHONO Courbe standard RIAA ±0.2 dB

AUX 20 Hz ~ 20 kHz, ±0.5 dB

10 Hz ~ 40 kHz, -1 dB

Régage de la tonalité

BASS (graves) 50 Hz, +10 dB ~ -10 dB

TREBLE (aigus) 10 kHz, +10 dB ~ -10 dB

Filtre de grave

100 Hz, -6 dB/oct.

Filtre d'aigu

7 kHz, -6 dB/oct.

Correction physiologique (volume à -30 dB)

50 Hz, +9 dB

Tension de sortie REC OUT (TAPE 1, 2)

150 mV

REC/PLAY (sortie)

30 mV

Equilibrage de canaux (250 Hz ~ 6300 Hz), AUX

±1.0 dB

Ecart canaux à 1 kHz, AUX 55 dB
Niveau des écouteurs et impédance de sortie 440 mV/330Ω
Impédance de charge PRINCIPALE ou ELOIGNEE 4 ~ 16Ω
PRINCIPALE + ELOIGNEE 8 ~ 16Ω

SECTION TUNER FM

Gamme reçue 88 ~ 108 MHz
Impédance d'antenne 300Ω (symétrique) 75Ω (asymétrique)
Sensibilité (± 40 kHz déviation)
Signal/bruit 30 dB 1.9 μV (300Ω), 1.3 μV (75Ω)
Signal/bruit 26 dB 1.7 μV (300Ω), 1.2 μV (75Ω)
Signal/bruit 20 dB 1.5 μV (300Ω), 0.9 μV (75Ω)
IHF Sensibilité 1.9 μV (IHF '58)
IHF Sensibilité pour 46 dB 22 μV (75Ω), STEREO

Distorsion harmonique totale MONO 0.15%
STEREO 0.3%

Signal/bruit (± 40 kHz déviation) MONO 60 dB (IHF: 75 dB)
STEREO 56 dB (IHF: 70 dB)

Réponse de fréquence 20 Hz ~ 15 kHz, +1 dB
20 Hz ~ 14 kHz, ±1.5 dB

Sélectivité alternée par canal 70 dB
Taux de capture 1.2 dB
Réjection de fréquence image à 98 MHz 70 dB
Réjection FI à 98 MHz 90 dB
Réjection de réception non sélective à 98 MHz 80 dB
Suppression AM 55 dB
Séparation stéréophonique 1 kHz 45 dB, 10 kHz 35 dB
Courant porteur de dispersion 19 kHz -33 dB (-40 dB, IHF)
38 kHz -48 dB (-50 dB, IHF)
Point limite 1.2 μV
Largeur de bande Amplificateur FI 180 kHz
Démodulateur FM 1000 kHz
Equilibrage de canaux (250 Hz ~ 6300 Hz) ±1.5 dB

SECTION TUNER AM

Gamme reçue 525 ~ 1605 kHz
Sensibilité (Rapport S/B 20 dB) 30 μV, 300 μV/m
Sélectivité 30 dB
Réjection de fréquence image à 1000 kHz 45 dB
Réjection FI à 1000 kHz 40 dB

GENERALITES

Consommation 450 W
Alimentation (50 Hz/60 Hz) 110V/120V/220V/240V
Dimensions (L x H x Pr) 430 x 145 x 260 mm
Poids 8.2 kg

■ ALIGNMENT INSTRUCTIONS

ENGLISH

Notes: 1. Loudness switch OFF 2. Band selector switch AM/FM (FM, RF FM-IF) 3. FM muting/mode switch OFF/FM MONO 4. Speaker switch ON 5. Tape monitor switch SOURCE		6. Filter switch OFF 7. Maintain line voltage at rated voltage. 8. Output of signal generator should be no higher than necessary to obtain an output reading.			
SIGNAL GENERATOR		DIAL SETTING	INDICATOR (AC VTVM or SCOPE) (DISTORTION METER)	ADJUSTMENT POINTS	REMARKS
CONNECTION	FREQUENCY				
AM ALIGNMENT					
High side through 0.001 μF to AM antenna trimmer terminal. Common to chassis.	455kHz (30% Mod. with 400Hz) (For United Kingdom to 470kHz)	Point of non-interference	Connect VTVM or scope to TP201 , through 0.1 μF	T201 (1st IFT) Z201 (2nd IFT)	●Adjust for maximum output.
Fashion loop of several turns of wire and radiate signal into loop of receiver	600kHz (30% Mod. with 400Hz)	600kHz	Connect VTVM or scope to speaker terminals of receiver.	L202 (OSC Coil) L201 (ANT Coil)	●Adjust for maximum output. Adjust L201 by moving coil bobbin along ferrite core.
Fashion loop of several turns of wire and radiate signal into loop of receiver	1500kHz (30% Mod.) with 400Hz)	1500kHz	Connect VTVM or scope to speaker terminals of receiver.	CT5 (OSC Trimmer) CT4 (ANT Trimmer)	●Adjust for maximum output. ●Repeat steps (2) and (3).
FM-IF ALIGNMENT					
	No Signal	Point of non-interference.	Tuning meter of set.	T101 (DISCRI IFT) (A) Orange Core	●FM muting/mode switch to ON/FM AUTO. ●Adjust for center position of tuning meter.
FM-RF ALIGNMENT					
Connect to FM 300 Ω antenna terminal through FM dummy antenna.	90MHz (100% Mod. with 400Hz)	90MHz	Connect scope to speaker terminals of receiver.	L5 (OSC Coil) L3 (RF-DET Coil) L1 (ANT Coil)	●FM muting/mode switch to OFF/FM MONO. ●Adjust for maximum amplitude and symmetrical curve. (Refer to fig. 4).
Connect to FM 300 Ω antenna terminal through FM dummy antenna.	106MHz (100% Mod. with 400Hz)	106MHz	Connect scope to speaker terminals of receiver.	CT3 (OSC Trimmer) CT2 (RF DET Trimmer) CT1 (ANT Trimmer)	●Adjust for maximum amplitude and symmetrical curve. ●Repeat steps (5) and (6).
FM MONO DISTORTION ALIGNMENT					
Connect to FM 300 Ω antenna terminal through FM dummy antenna. Apply 60 dB to set.	100MHz (100% Mod. with 400Hz)	100MHz	Connect distortion meter to speaker terminals of receiver.	T101 (DISCRI IFT) (B)- Green Core	●Adjust for minimum distortion of left output. ●Repeat steps (4) and (7).
FM MUTING LEVEL ALIGNMENT					
Connect to FM 300 Ω antenna terminal through FM dummy antenna. Apply 16dB(6.3 μV) to set.	100MHz (100% Mod. with 400Hz)	100MHz	Connect VTVM or scope to speaker terminals.	VR102	●FM muting/mode switch to "ON/FM AUTO". ●Adjust so that output can be obtained.
FM SIGNAL METER ALIGNMENT					
1 Apply 100MHz FM signal of 100dB (400Hz 30% modulation) to FM 300 Ω antenna terminal through FM dummy antenna. 2 Tuning at 100MHz.			3 Adjust VR101 for about 4.7 point of signal meter indication.		
FM MPX PILOT ALIGNMENT					
Using a frequency counter			Using alternate system		
1 100MHz Non-modulated mono signal applied to set. (Apply 60dB) 2 FM muting/mode switch to "ON/FM AUTO" 3 Connect frequency counter to TP301 through resistor (100k Ω) 4 Adjust VR301 to 19kHz, ±30Hz.			1 Apply stereo signal from generator or stereo station to receiver. 2 Adjust VR301 until stereo indicator lights up. Cement arm of VR301 as shown in fig. 5.		
Notes: 1. Stereo modulator ● Connect stereo modulator output to EXT MOD terminal of signal generator. 					

ABGLEICHANWEISUNGEN

DEUTSCH

(Für Deutschland)

Anmerkungen: 1. Loudness-Schalter OFF 2. Bereichsschalter AM (AM Abgleich), FM (FM Abgleich) 3. FM Muting/mode-Schalter OFF/FM MONO 4. Lautsprecher-Schalter ON			5. Tape/Monitor-Umschalter SOURCE 6. Filter-Schalter OFF 7. Die Netzspannung auf ihren Sollwert einstellen. 8. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.			
AM/UKW MESSENDER		SKALENZEI- GEREIN- STELLUNG DES TUNER	ANZEIGE (Wechselstrom Röhrenvoltmeter oder Oszillograph bzw. Klirrfaktor-Meßgerät)	ABGLEICH- PUNKTE	BEMERKUNGEN	
ANSCHLUSS	FREQUENZ					
AM-ABGLEICH						
1	Heißes Ende des Meßsenders über einen 0.001µF Kondensator an den AM Antenneneingang schließen. Kaltes Ende an Masse.	455kHz (400Hz Modul., 30%)	Kein Empfang	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	T201 (1. IFT) Z201 (2. IFT) • Auf max. Ausgang abgleichen.	
2	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	600kHz (400Hz Modul., 30%)	600kHz	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	L202 (Osc. Spule) L201 (Ant. Spule) • Auf max. Ausgang abgleichen. • L201 wird abgeglichen, indem die Spule am Ferritstab entlanggeschoben wird.	
3	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	1500kHz (400Hz Modul., 30%)	1500kHz	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	CT5 (Osc. Trimmer) CT4 (Ant. Trimmer) • Auf max. Ausgang abgleichen. • Schritt (2) und (3) sind zu wiederholen.	
UKW ZF-ABGLEICH						
4		Kein Signal	Kein Empfang	Abstimmmanzeige.	T101 (Diskriminator IFT) [A] • FM Muting-Schalter auf ON stellen. • Den Abstimmungsanzeiger auf den zentrum Wert einstellen.	
UKW HF-ABGLEICH						
5	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	87.5MHz (400Hz Modul., 100%)	87.5MHz (Frequenz Min.)	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	L5 (Osc. Spule) • FM Muting-Schalter auf OFF stellen. • Auf max. Ausgang abgleichen.	
6	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	90MHz (400Hz Modul., 100%)	90MHz	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	L3 (Det. Spule) L1 (Ant. Spule) • Auf max. Amplitude bei entsprechender Linearität abgleichen. (Vgl. Abb. 4)	
7	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	106MHz (400Hz Modul., 100%)	106MHz	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	CT3 (Osc. Trimmer) CT2 (Det. Trimmer) CT1 (Ant. Trimmer) • Auf max. Amplitude bei entsprechender Linearität abgleichen. (Vgl. Abb. 4) • Schritt (5), (6) und (7) sind zu wiederholen.	
ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO						
8	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	100MHz (400Hz Modul., 100%)	100MHz	Klirrfaktor-Meßbrücke über den Lautsprecher schließen.	T101 (Diskriminator IFT) [B] • Auf min. Verzerrung auf der Klirrfaktor-Meßbrücke abgleichen. • Schritt (4) und (8) sind zu wiederholen.	
UKW-MUTING-ABGLEICH						
9	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. Meßsender auf 16 dB (6.3µV) einstellen.	100MHz (400Hz Modul., 100%)	100MHz	Röhrenvoltmeter oder Oszillograph über den Lautsprecher schließen.	VR102 • Muting-Schalter auf "ON" stellen. • So einstellen, daß ein Ausgang zu vernehmen ist.	
UKW-FELDSTÄRKEANZEIGE-ABGLEICH						
10	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. Meßsender für 100 dB (1HF) (ca. 100mV) einstellen.	100MHz (400Hz Modul., 30%)	100MHz	Feldstärkeanzeige	VR101 • VR101 auf ca. "4.7" der Feldstärkeanzeige einstellen.	
UKW-STEREO-DEKODER-ABGLEICH						
Unter Verwendung eines Zählers			Alternativ-Meßmethode			
11	1. Unmoduliertes Mono-Signal 100 MHz in das Gerät speisen. 2. FM Muting-Schalter auf "ON /FM AUTO" stellen. 3. Zähler über einen Widerstand 100K ohm an TP301 schließen. 4. VR301 auf 19kHz ±30Hz einstellen.			1. Stereosignal entweder von einem Stereogenerator oder einem Sender einspeisen. 2. VR301 so einstellen, bis die Stereolampe auf leuchtet. Schleifer von VR301 sichern, wie in Abb. 5 gezeigt.		
KANALTRENNUNG-ABGLEICH						
Anmerkungen: 1. Stereo-Modulator Ausgang des Stereo-Modulators an den Eingang EXT MOD des Meßsenders schließen. Eingebauter Oszillator 1kHz/Pilotton-Modulation 10% 2. UKW Meßsender Auf etwa 100MHz einstellen. Ausgangspegel 72dB (1HF). Modulation FM 3. Bereichsschalter FM 4. Muting/Mode-Schalter ON/FM AUTO						
ANSCHLUSS DES UKW MESSENDERS		STEREO MODULATOR MODE oder MOD. RATE	ANZEIGE (Röhrenvoltmeter oder Oszillograph)		ABGLEICH- PUNKTE	ANMERKUNGEN
12	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	L (und R) Modulation 30%	Röhrenvoltmeter oder Oszillograph über Tiefpassfilter an den Tuner-Ausgang schließen. Vgl. Abb. 6.		VR302	• Auf min. Ausgang rechter (und linker) abgleichen.

INSTRUCTIONS D'ALIGNEMENT

FRANÇAIS

Notes: 1. Commutateur de physiologique (loudness) OFF 2. Sélecteur de gamme AM (Alignement AM) FM (Alignement FM) 3. Commutateur de silencieux OFF/FM MONO 4. Commutateur d'enceintes ON 5. Commutateur de contrôle auditif SOURCE (relâchée) 6. Commutateur de filter OFF 7. Conserver la tension du secteur à la tension nominale. 8. Le signal du générateur ne doit pas être plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.					
AM/FM GENERATEUR		AIGUILLE SUR LE CADRAN	INDICATEUR (C.A. VOLTMETRE ELECTRONIQUE OSCILLOSCOPE OU DISTORSIONMETRE)	POINTS DE REGLAGE	OBSERVATIONS
BRANCHMENT	FREQUENCE				
ALIGNEMENT AM					
Côté chaud, à travers 0.001µF, sur le trimmer de l'antenne AM, commun an shâssis	455kHz (modulé à 30% par 400Hz)	Point sans signal	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de l'ampli-tuner	T201 (1 transfo FI) Z201 (2 transfo FI)	• Réglez au maximum de signal de sortie.
Faire une boucle de quelques tours et rayonner le signal dans le cadre du l'ampli-tuner	600kHz (modué à 30% par 400Hz)	600kHz	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de i'ampli-tuner	L202 (bobine OSC) L201 (bobine ANT)	• Réglez au maximum de signal de sortie. Réglez L201 en déplaçant la bobine le long du noyau de ferrite.
Faire une boucle de quelques tours et rayonner le signal dans le cadre du l'ampli-tuner.	1500kHz (modulé à 30% par 400Hz)	1500kHz	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de l'ampli-tuner	CT5 (trimmer OSC) CT4 (trimmer ANT)	• Réglez au maximum de signal de sortie. • Recommencez les étapes (2) et (3).
ALIGNEMENT FI-FM					
	Sans signal	point sans signal	Indicateur d'accord de l'appareil	T101 (Transfo Fi discr.) [A]	• Commutateur de silencieux sur ON. • Réglez pour atteindre position médiane sur l'indicateur d'accord.
ALIGNEMENT RF-FM					
Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	90MHz (modulé à 100% par 400Hz)	90MHz	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de l'ampli-tuner	L5 (bobine OSC) L3 (bobine DET) L1 (bobine ANT)	• Commutateur de silencieux sur OFF. • Régler au max imum d'amplitude et de symétrie. (Voir fig. 1)
Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	106MHz (modulé à 100% par 400Hz)	106MHz	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de l'ampli-tuner	CT3 (trimmer OSC) CT2 (trimmer DET) CT1 (trimmer ANT)	• Régler au max imum d'amplitude et de symétrie. (Voir fig. 1) • Recommencez les étapes (5) et (6)
REGLAGE DE LA DISTORSION FM EN MONO					
Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	100MHz (modulé à 100% par 400Hz)	100MHz	Branchez un distorsio mètre sur les bornes de haut-parleur de l'appareil.	T101 (Transfo Fi discr.) [B]	• Réglez au minimum d'indication du distorsio-mètre. Recommencez les étapes (4) et (7).
REGLAGE DU SEUIL DU SILENCIEUX D'ACCORD					
Branchez sur la prise d'antenne FM à travers une antenne fictive FM. Niveau de sortie du générateur 16 dB (6.3µV).	100MHz (modulé à 100% par 400Hz)	100MHz	Branchez un voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur de l'ampli-tuner	VR102	• Commutateur de silencieux sur "ON" • Régler pour obtenir une lecture en sortie.
REGLAGE DE L'INDICATEUR D'ACCORD FM					
Branchez sur la prise d'antenne FM à travers une antenne fictive FM. Niveau de sortie du générateur 100 dB (100mV).	100MHz (modulé à 100% par 400Hz)	100MHz	Indicateur d'intensité	VR101	• Réglez VR101 pour obtenir env. "4.7" points sur l'échelle d'intensité.
ALIGNEMENT DU PILOTE MULTIPLEX FM					
Avec un fréquencesmètre			Par un autre système		
1. Signal mono 100 MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "ON/FM AUTO" 3. Branchez le fréquencesmètre sur TP301 à travers une résistance de 100kΩ. 4. Réglez VR301 sur 19kHz ±30Hz.			1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la réception d'un émetteur. 2. Réglez VR301 jusqu'à ce que l'indicateur de stéréophonie s'allume. Collez le curseur de VR301 comme indiqué sur la fig. 2.		
REGLAGE DE LA SEPARATION DES CANAUX					
Notes: 1. Modulateur stéréo Branchez sa sortie sur la prise EXT. MOD. du générateur. OSC interne 1kHz Modulation du signal pilote 10% 2. Générateur de signal Fréquence env. 100MHz, niveau de sortie 72dB (1HF), genre de modulation sur FM. 3. Commutateur de gamme FM 4. Commutateur de silencieux ON/FM AUTO					
BRANCHEMENT DU GENERATEUR DE SIGNAL	MODE DU MODULATEUR STEREO ET TAUX DE MODULATION	INDICATEUR (VOLTMETRE ELECTRO-NIQUE OU OSCILLOSCOPE)	POINTS DE REGLAGE	OBSERVATIONS	
Borne d'antenne FM à travers antenne fictive.	Gauche (et droite) à 30% de modulation.	Sur les bornes de haut-parleur à travers un filtre passe-bas, voir fig. 3.	VR302	• Réglez au minimum de sortie droite (et gauche)	

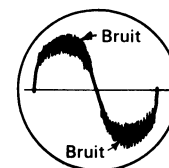


Fig. 1

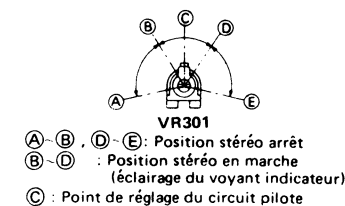


Fig. 2

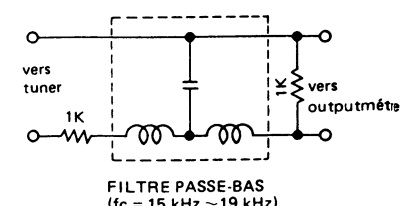
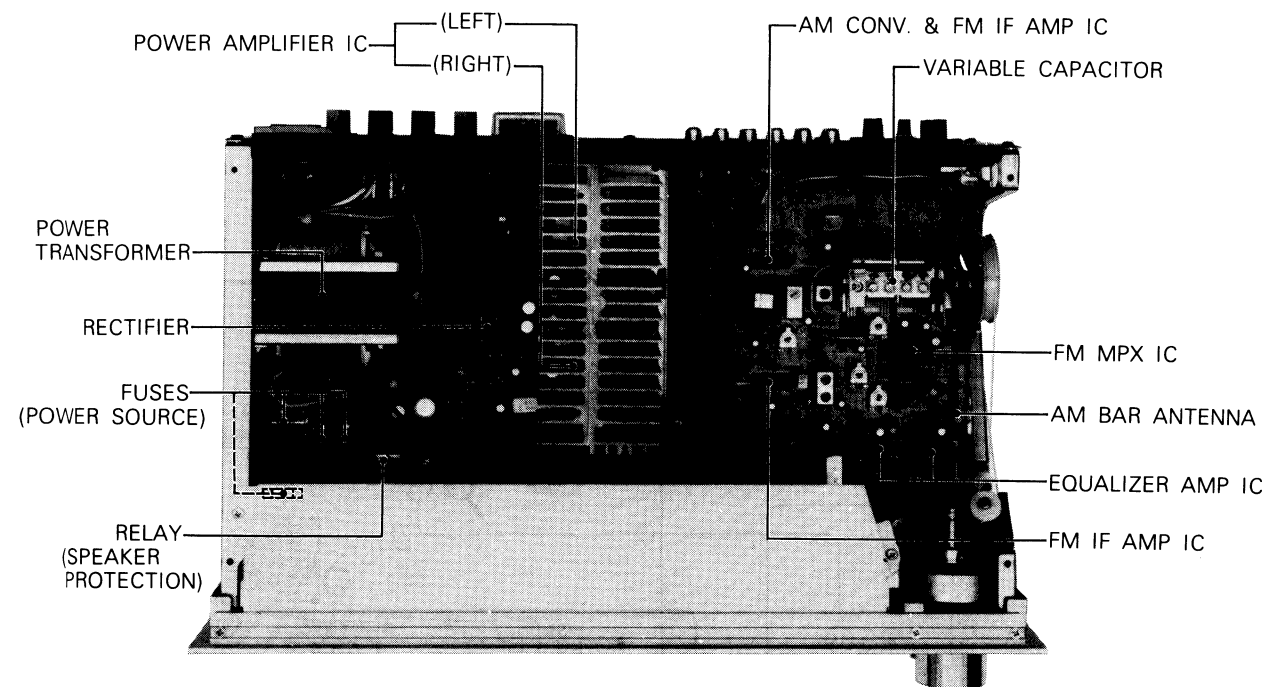


Fig. 3

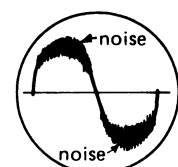
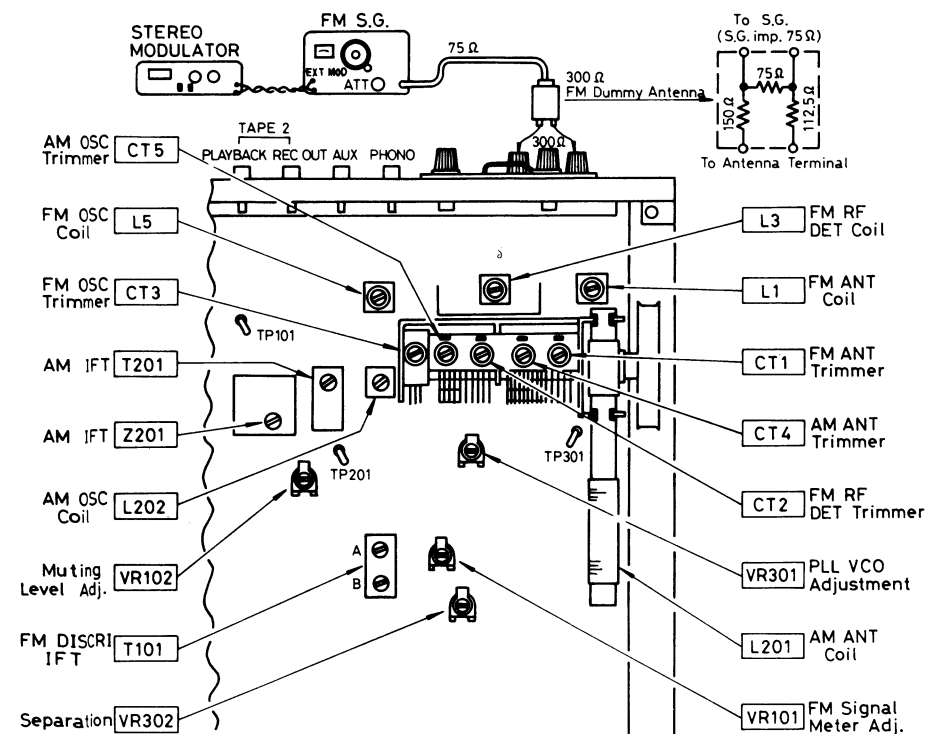
■ PRINTED CIRCUIT BOARD VIEW



■ **NOTE**

The unit is provided with the speaker circuit protection fuses at the right and left channels respectively. The fuse is to prevent the power IC from destruction, should the speaker terminals be short-circuited. Accordingly, if the unit fails to function upon completion of the speaker connections, check the speaker circuit protection fuses first of all for possible blowing.

■ ALIGNMENT POINTS



(SINE WAVE)
Fig. 4 (Abb. 4)

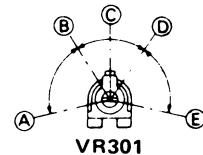


Fig. 5 (Abb. 5)

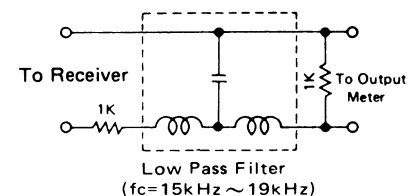
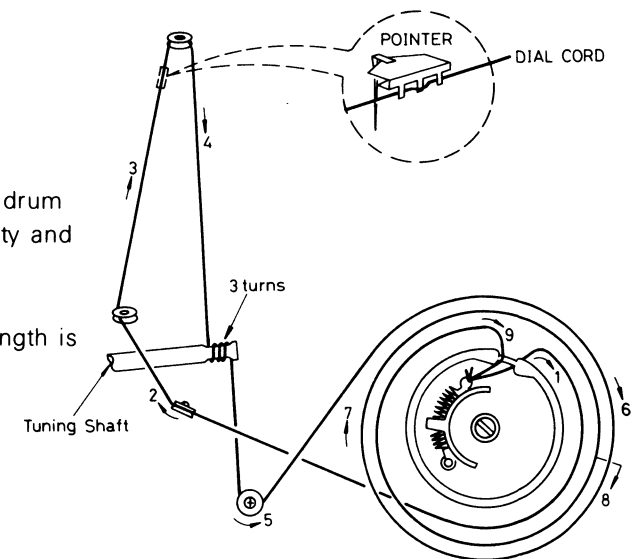


Fig. 6 (Abb. 6)

■ DIAL CORD INSTALLATION GUIDE

- For threading a fresh cord, proceed as follows.
 1. Prepare a fresh cord more than 200cm($78\frac{3}{4}$ ") in length.
 2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
 3. Direct the cord in the order from 1 to 9.
 4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
 5. Fix the knot of the cord with the bond.



■ TO REMOVE CABINET

1. Remove the four cabinet mounting screws (nos 1~4 screws in fig. 7).
2. Sliding it toward **(A)** direction and lifting it upward **(B)** direction as shown in fig. 7.
3. When the cabinet is installed, insert the metal fitting of cabinet (as shown in fig. 8) into the space between the front panel and light reflector.

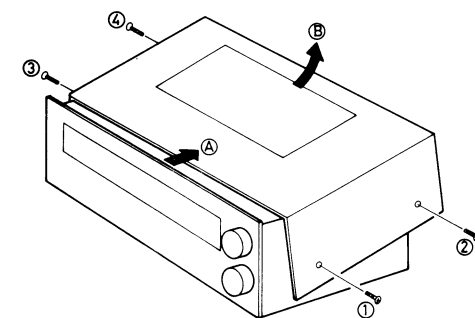


Fig. 7

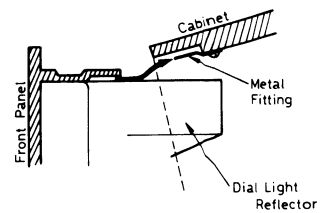


Fig. 8

■ THE UNIT CAN USE TWO DIFFERENT PARTS IN VOLTAGE ADJUSTER

1. When using the part number ESE37200, connect as shown in fig. 9.
2. When using the part number SSR53S, connect as shown in fig. 10.

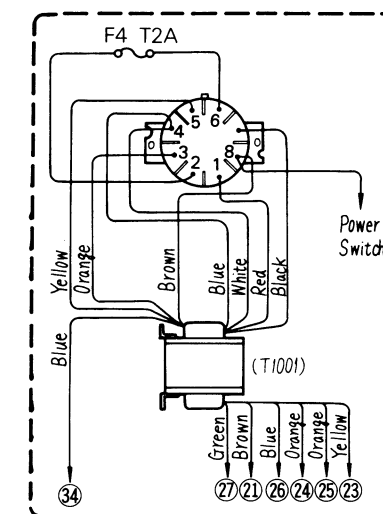
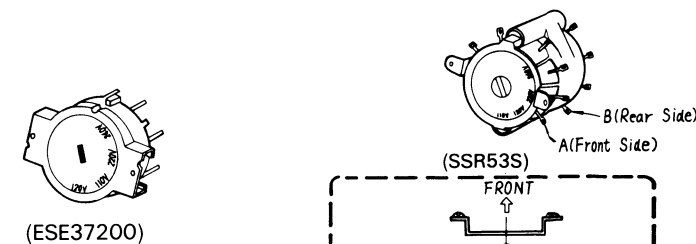


Fig. 9

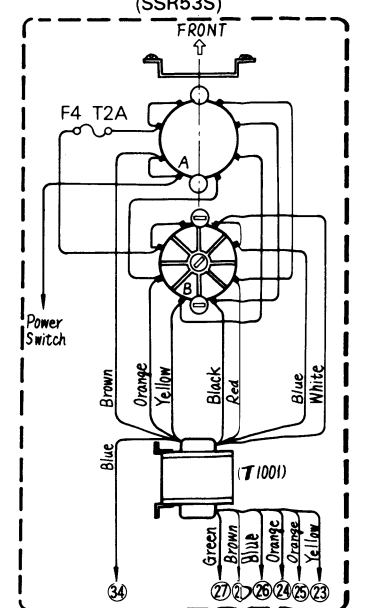
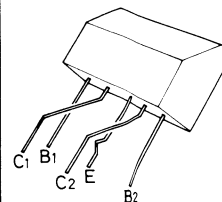
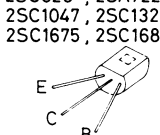
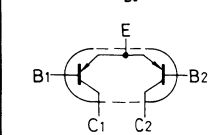
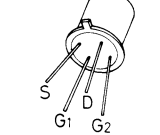
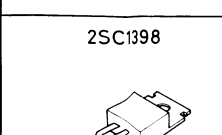
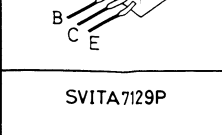
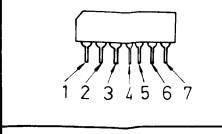
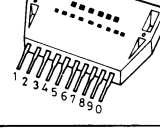
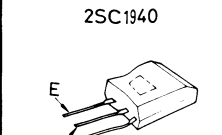


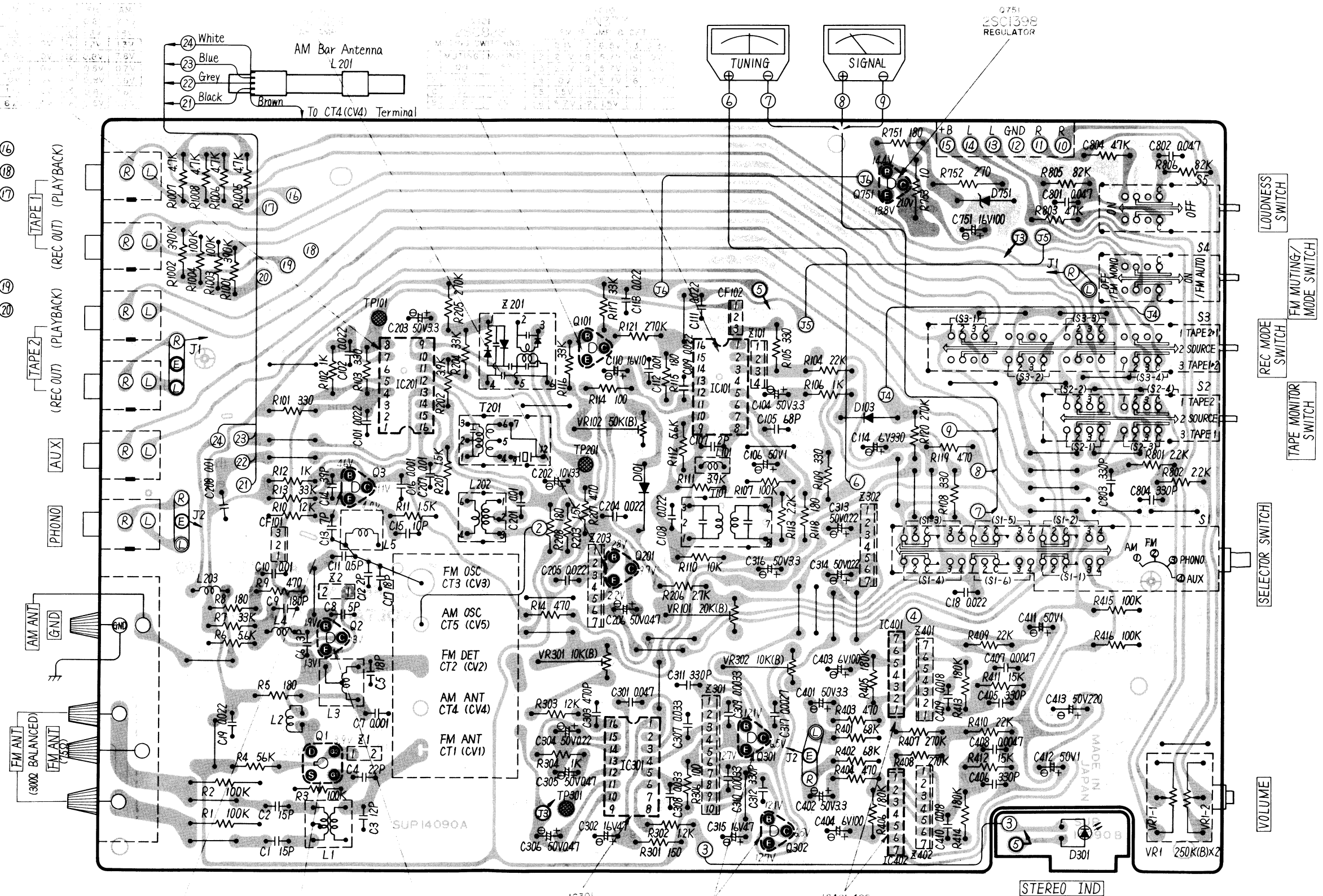
Fig. 10

FM/AM TUNER AND EQUALIZER CIRCUIT BOARD

Earth (Ground) Lines

TERMINAL GUIDE OF TRANSISTOR AND IC

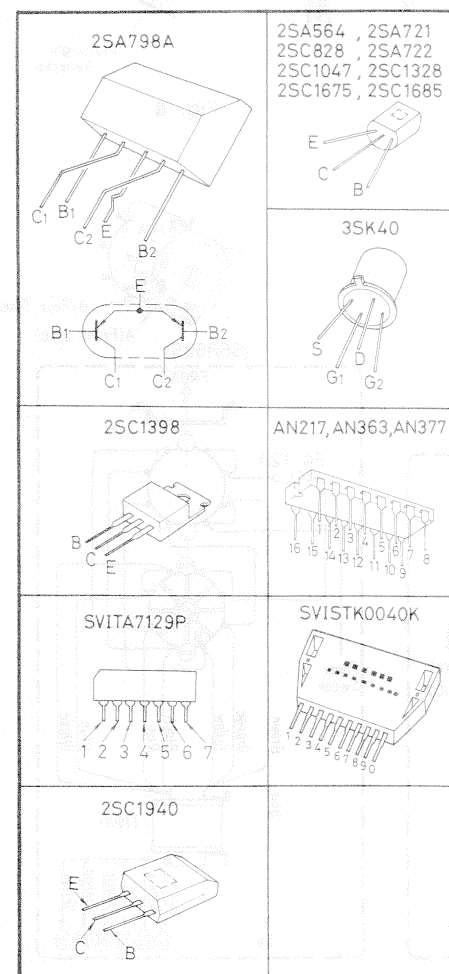
2SA798A 	2SA564, 2SA721 2SC828, 2SA722 2SC1047, 2SC1328 2SC1675, 2SC1685 
3SK40 	AN217, AN363, AN377 
2SC1398 	SVITA7129P 
SVITA7129P 	SVISTK0040K 
2SC1940 	



FM/AM TUNER AND EQUALIZER CIRCUIT BOARD

Earth (Ground) Lines

TERMINAL GUIDE OF TRANSISTOR AND IC



IC201
AN217
AM CONV &
FM 1st, 2nd IF AMP

FM	AM	FM	AM
1 0V	0V	9 0.8V	7.7V
2 1.2V	0V	10 1.3V	1.5V
3 1.2V	0V	11 1.2V	1.3V
4 6.4V	0V	12 0.8V	7.8V
5 1.1V	0V	13 0.5V	0.7V
6 0V	0V	14 0.8V	1.6V
7 1.1V	0V	15 0.8V	7.8V
8 6.2V	0V	16 0.5V	0.7V

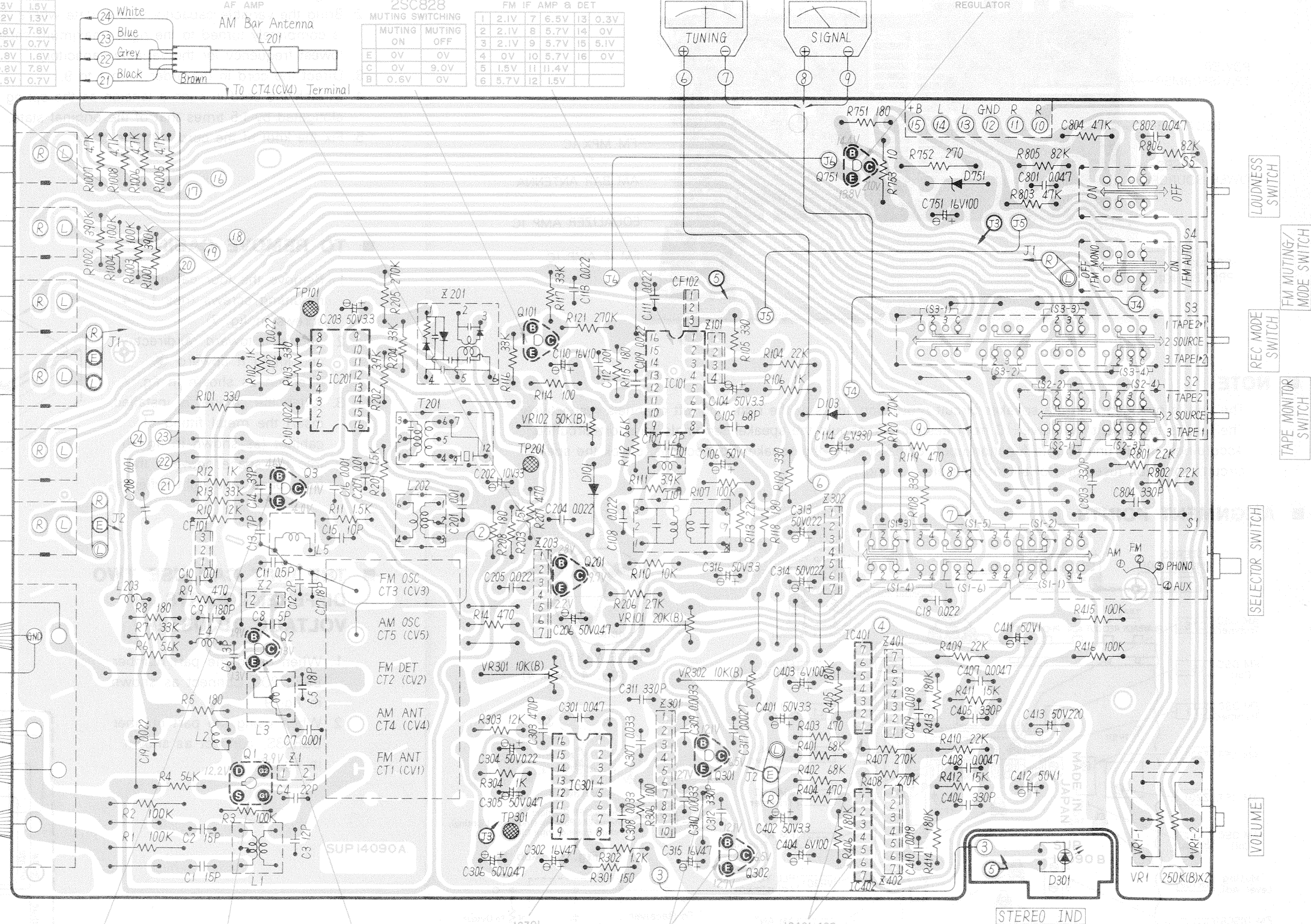
Q201
2SC828
AF AMP

Q101
2SC828
MUTING SWITCHING

MUTING ON	MUTING OFF
E 0V	0V
C 0V	9.0V
B 0.6V	0V

IC101
AN377
FM IF AMP & DET

1 2.1V	7 6.5V	13 0.3V
2 2.1V	8 5.7V	14 0V
3 2.1V	9 5.7V	15 5.1V
4 0V	10 5.7V	16 0V
5 1.5V	11 11.4V	
6 5.7V	12 1.5V	

Q751
2SC1398
REGULATOR

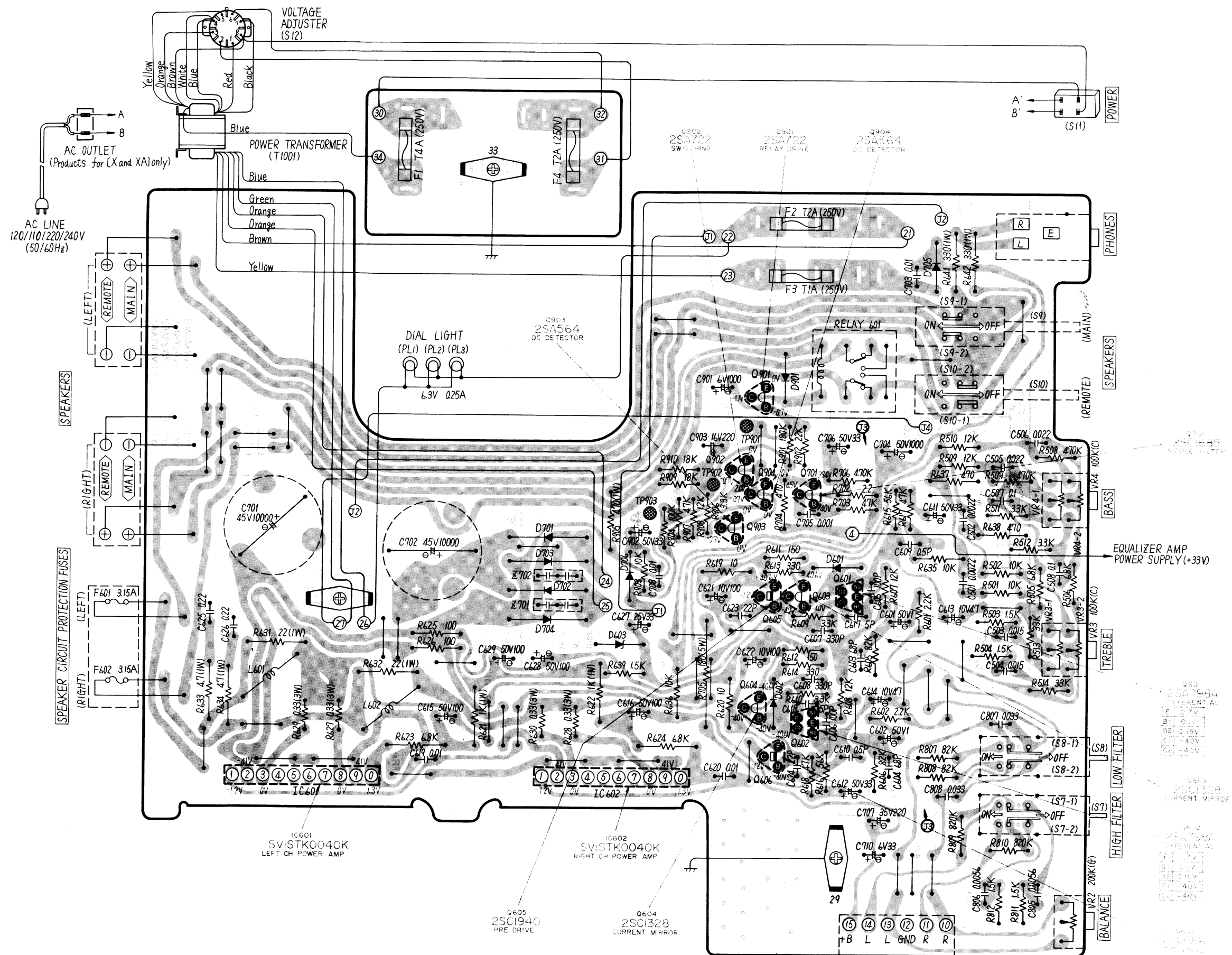
IC301
AN363
FM MPX

1 11.7V	7 0V	13 1.9V
2 3.1V	8 1.4V	14 1.9V
3 5.0V	9 1.7V	15 1.9V
4 11.9V	10 1.9V	16 3.3V
5 11.9V	11 1.9V	
6 13.0V	12 1.5V	

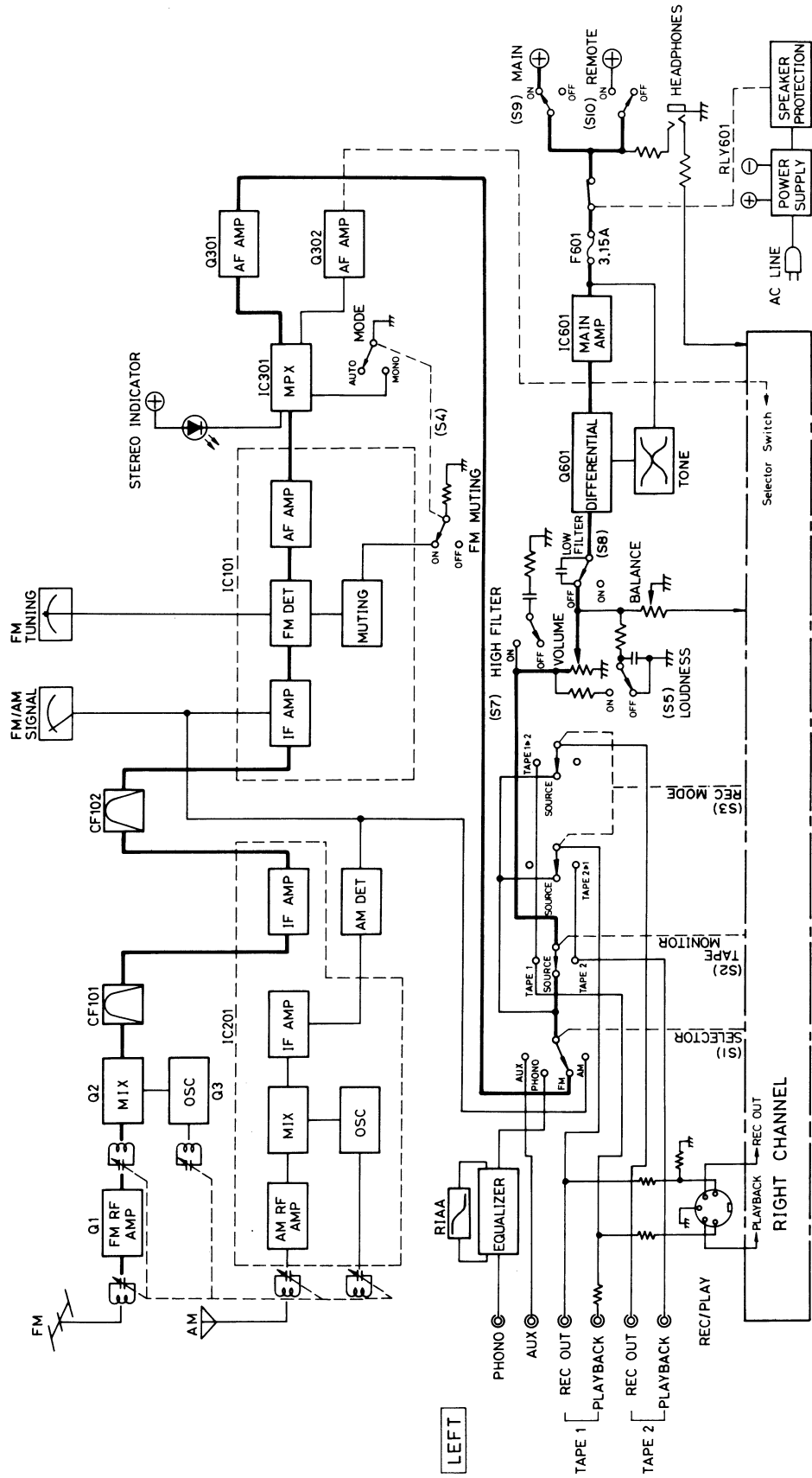
IC401, 402
SVTA7129P
EQUALIZER AMP

1 2.2V	5 0.75V
2 0.7V	6 12V
3 0.1V	7 33V
4 0V	

11



■ BLOCK DIAGRAM



■ REPLACEMENT PARTS LIST Electric Parts

NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. ■ indicates that only parts specified by the manufacturer
be used for safety.

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
INTEGRATED CIRCUITS				
IC101	AN377	IC: FM IF Amplifier & FM Detector	1	○
IC201	AN217-BB	IC: FM IF Amplifier & AM Converter	1	
IC301	AN363	IC: FM Multiplex	1	
IC401, 402	SVTA7129P	IC: Equalizer Amplifier	2	
IC601, 602	SVISTK0040K	IC: Power Amplifier	2	
TRANSISTORS				
Q1	3SK40-M	Transistor, FM RF Amplifier	1	
Q2	2SC1047-C	Transistor, FM Mixer (Use in ranks C or D)	1	
Q3	2SC1675-L1	Transistor, FM Local Oscillator	1	
Q101, 201	2SC1328-T	Transistor, Muting & AM AF Amplifier (Use in ranks S, T or U)	2	
Q301, 302	2SA902S-F	Transistor, FM AF Amplifier (Use in ranks F or G)	2	
Q601, 602	2SA798A-G2	Transistor, Differential Amplifier (Use in ranks F2 or G2)	2	
Q603, 604	2SC1328-T	Transistor, Current Mirror (Use in ranks S, T or U)	2	
Q605, 606	2SC1940-K	Transistor, Pre Driver (Use in ranks K or L)	2	
Q701	2SC1685-T	Transistor, Ripple Filter (Use in ranks S or T)	1	
Q751	2SC1398-Q	Transistor, Regulator (Use in ranks P, Q or R)	1	
Q901, 902	2SA902S-F	Transistor, Relay Drive & Power Muting (Use in ranks F or G)	2	
Q903, 904	2SA666A1-R	Transistor, Speaker Protection (Use in ranks P, Q or R)	2	
DIODES				
D101	SVDBK262E	Diode, Meter Detector	1	
D103	OA99	Diode, Switching	1	
D301	LN25RP	Light Emitting Diode, Stereo Indicator	1	
D601, 602	MA27B	Diode, Current Mirror	2	
D603	SVDMZ324	Diode, 24V Zener	1	
D701, 702, 703, 704	SVDS3V20	Rectifier	4	
D705, 706	SM112	Rectifier	2	
D751	SVDMZ414	Diode, 14V Zener	1	
D901	SM112	Relay Diode (Pulse Killor)	1	
COILS and TRANSFORMERS				
L1	SLA4P25	Coil, FM Antenna	1	
L2	RLQY25S2	Coil, Choke	1	
L3	SLD4P13	Coil, FM RF Detector	1	

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
L4	RLQY15G5	Coil, Choke	1	○ ○
L5	SLO4P31	Coil, FM Local Oscillator	1	
L101	SLQX180-2	Coil, Choke	1	
L201	SLF2C11	Coil, AM Bar Antenna	1	
L202	SLO2C3-P	Coil, AM Local Oscillator	1	
L203	SLOX101-2D	Coil, Choke	1	
L601, 602	SLQY15G-3P	Coil, Power Amplifier Output	2	
T101	SLI4D513-3	Transformer, FM IF Detector	1	
T201	SLI7D101-M	Transformer, AM IF (455kHz)	1	
T301	SLI7D103-M	Transformer, AM IF (470kHz)	1	
T1001	SLT5Q79-W	Transformer, Power Source	1	
T1001(XAL, XE)	SLT5Q81-W	Transformer, Power Source	1	
COMPONENT COMBINATIONS				
Z1	EXRPI02Z223S	Component Combination, 22kΩ & 0.001μF	1	
Z2	EXRPI03P102S	Component Combination, 1kΩ & 0.01μF	1	
Z101	EXF3SL04C	Component Combination, 0.01μF(X3)	1	
Z201	SLI9F101-Z	Component Combination, AM Detector	1	
Z203	EXBH85005K	Component Combination, Resistors	1	
Z301	EXBH8007K	Component Combination, Resistors	1	
Z302	EXA6YD04C	Component Combination, 3.9kΩ(X2)	1	
Z401, 402	EXA6SD01C	Component Combination, Equalizer	2	
Z701, 702	EXRF5203ZS	Component Combination, 0.01μF(X2)	2	
CERAMIC FILTERS				
CF101, 102	SVFEI07MS8-A	Ceramic Filter, Red, 10.7MHz	each 2	
	SVFEI07MS8-B	Ceramic Filter, Blue, 10.67MHz		
	SVFEI07MS8-C	Ceramic Filter, Orange, 10.73MHz		
	SVFEI07MS8-D	Ceramic Filter, Black, 10.64MHz		
	SVFEI07MS8-E	Ceramic Filter, White, 10.76MHz		
(Use pair ranks as same as CF101 and CF102.)				
VARIABLE RESISTORS				
VR1	EWFMKA031BF5	Volume Control, 250kΩ(B)	1	
VR2	EVHGFAPF25G25	Balance Control, 200kΩ(G)	1	
VR3, 4	EWKB9AF25C15	Bass & Treble Control, 100kΩ(C)	2	
VR101	EVLS3AA00B24	Meter Adjustment, 20kΩ(B)	1	
VR102	EVLS3AA00B54	Muting Level Adjustment, 50kΩ(B)	1	
VR301	EVTSS3MA00B14	PLL VCO Adjustment, 10kΩ(B)	1	
VR302	EVLS3AA00B14	Separation Adjustment, 10kΩ(B)	1	
VARIABLE CAPACITOR				
CV1~CV5 (CT1~CT5)	ECVC751K144A	Variable Capacitor, with Trimmer	1	
LAMPS				
PL1, 2, 3	XAMR62S	Lamp, Dial (6.3V 0.25A)	3	
FUSES				
F1	XBA2C40TRO	Fuse, 4A.T(250V), Power Source	1	
F2, 4	XBA2C20TRO	Fuse, 2A.T(250V), Power Source	2	
F3	XBA2C10TRO	Fuse, 1A.T(250V), Power Source	1	
F601, 602	XBA2C31SSO	Fuse, 3.15A(250V), Speaker Circuit	2	

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
RELAY				
RLY601	SSY19-1	Relay, Speaker Protection	1	
SWITCHES				
S1	ESRM164F25E	Switch, Selector	1	
S2	SSL117	Switch, Tape Monitor	1	○
S3	SSL115	Switch, Recording Mode	1	○
S4, 5, 7, 8	SSL123	Switch, Muting/Mode, Loudness, Low & High Filter	4	
S9, 10	SSH223S	Switch, Speakers	1	
S11	ESL21191	Switch, Power Source	1	
S12	ESE37200	Switch, Voltage Adjustment(See page 8)	1	○
	SSR53S	Switch, Voltage Adjustment(See page 8)	1	

NOTES:
Guide letters of Resistor and Capacitor indicate:

Resistors

ERG Carbon
ERO Metal film
ERF Non-flammable

Capacitors

ECC Ceramic
ECQM Polyester
ECE Electrolytic

ECK Ceramic
ECQS Polystyrene
ECE Non-Polar Electrolytic

Ref. No.	Part No.
RESISTORS	
R1, 2 Except for (XAL)	ERD50TJ104
R3	ERD25TJ104
R4	ERD25TJ563
R5	ERD25TJ181
R6	ERD25TJ562
R7	ERD25TJ333
R8	ERD25TJ181
R9	ERD25TJ471
R10	ERD25TJ123
R11	ERD25TJ152
R12	ERD25TJ102
R13	ERD25TJ333
R14	ERD25TJ471
R101	ERD25TJ102
R102	ERD25TJ102
R103	ERD25TJ331
R104	ERD25TJ223
R105	ERD25TJ331
R106	ERD25TJ102
R107	ERD25TJ104
R108, 109	ERD25TJ331
R110	ERD25TJ103
R111	ERD25TJ392
R112	ERD25TJ562
R113	ERD25TJ222
R114	ERD25TJ104
R115	ERD25TJ181
R116, 117	ERD25TJ333
R118	ERD25TJ181
R119	ERD25TJ471
R120, 121	ERD25TJ274

Ref. No.	Part No.
R201	ERD25TJ152
R202	ERD25TJ392
R203	ERD25TJ152
R204	ERD25TJ333
R205	ERD25TJ274
R206	ERD25TJ272
R207	ERD25TJ471
R208	ERD25TJ181
R301	ERD25TJ151
R302	ERD25TJ122
R303	ERD25TJ123
R304	ERD25TJ102
R306	ERD25TJ101
R401, 402	ERO25CKG6802
R403, 404	ERD25TJ471
R405, 406	ERO25CKG1803
R407, 408	ERO25CKG2703
R409, 410	ERD25TJ223
R411, 412	ERD25TJ153
R413, 414	ERD25TJ184
R415, 416	ERD25TJ104
R501, 502	ERD25TJ103
R503, 504	ERD25TJ152
R505, 506	ERD25TJ682
R507, 508	ERD25TJ474
R509, 510	ERD25TJ123
R511, 512	ERD25TJ332
R513, 514	ERD25TJ333
R601, 602	ERD25TJ222
R605, 606	ERD25TJ823

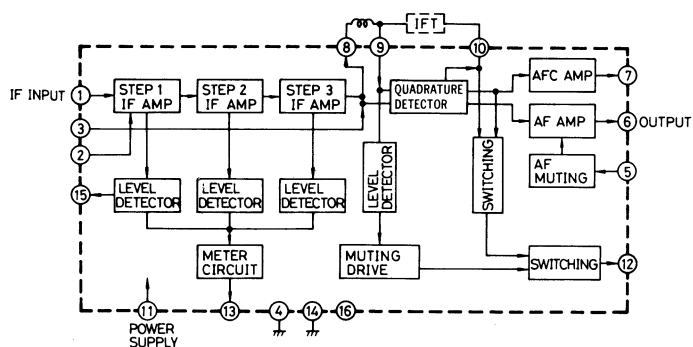
Ref. No.	Part No.
R607, 608	ERD25TJ123
R609, 610	ERD25TJ332
R611, 612	ERD25TJ151
R613, 614	ERD25TJ331
R615, 616	ERD25TJ563
R617, 618	ERD25TJ473
R619, 620	ERD14FJ100
R621, 622	ERG1ANJ102
R623, 624	ERD12FJ682
R625, 626	ERD14FJ101
R627, 628	ERF3RKR33
R629, 630	ERF3RKR33
R631, 632	ERG1ANJ220
R633, 634	ERX1ANJ47
R635, 636	ERD14FJ103
R637, 638	ERD14FJ471
R639	ERD14FJ152
R641, 642	ERG1ANJ331
R702	ERD18FAJ2R2
R703	ERD25TJ473
R704	ERD14FJ471
R705	ERF5SJ181
R706	ERD25TJ474
R751	ERD25TJ181
R752	ERD12FJ271
R753	ERD12FJ100
R801, 802	ERD25TJ222
R803, 804	ERD25TJ473
R805, 806	ERD25TJ823
R807, 808	ERD25TJ823
R809, 810	ERD25TJ824
R811, 812	ERD25TJ152
R901	ERD25TJ184

Ref. No.	Part No.
R902	ERD25TJ223
R903	ERD25TJ103
R904	ERD25TJ104
R905	ERG1ANJ471
R906	ERD25TJ332
R907	ERD25TJ472
R908	ERD25TJ123
R909, 910	ERD25TJ183
R1001, 1002	ERD25TJ394
R1003, 1004	ERD25TJ104
R1005~1008	ERD25TJ472

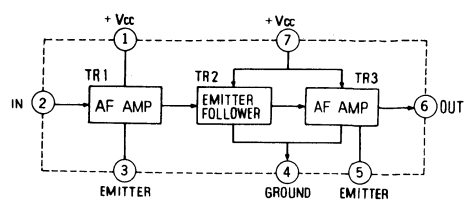
Ref. No.	Part No.
CAPACITORS	
C1, 2	ECCD1H150KC
C3	ECCD1H120KC
C4	ECCD1H220KC
C5	ECCD1H180KR
C6	ECCD1H030CC
C7	ECCD1H102MDA
C8	ECCD1H050CC
C9	ECCD1H181K
C10	ECCD1H103ZF
C11	ECCD1H0R5CC
C12	ECCD1H020CC
C13	ECCD1H070DC
C14	ECCD1H390KC
C15	ECCD1H100KC
C16	ECCD1H102MDA
C17	ECCD1H180KR
C18, 19	ECCD1H223ZF
C51,52(XAL)only	ECKDHS101MB
C101, 102	ECCD1H223ZF
C104	ECEA2AS3R3
C105	ECCD1H680K
C106	ECEA2AS010
C107	ECCD1H020CC
C108, 109	ECCD1H223ZF
C110	ECEA1HS100
C111	ECCD1H223ZF
C112	ECCD1H103ZF
C113	ECCD1H223ZF
C114	ECEA1AS331
C201	ECCD1H103MD
C202	ECEA1CS330
C203	ECEA2AS3R3
C204, 205	ECQM1H223KZ
C206	ECEA2ASR47
C207, 208	ECCD1H103ZF
C251 (XAL)only	ECKDHS102MD
C301	ECQM1H473KZ
C302	ECEA1ES470
C303	ECQS05471JZ

Ref. No.	Part No.
C304	ECEA502R22
C305	ECEA502R47
C306	ECEA50MR47R
C307, 308	ECQM1H333JZ
C309, 310	ECQM1H332KZ
C311, 312	ECKD1H331KB
C313, 314	ECEA502R22
C315	ECEA1ES470
C316	ECEA2AS3R3
C317	ECQM1H272KZ
C401, 402	ECEA50M3R3R
C403, 404	ECEA1AS101
C405, 406	ECKD1H331KB
C407, 408	ECQM1H472JZ
C409, 410	ECQM1H183JZ
C411, 412	ECEA50M1R
C413	ECEA1HS221
C501, 502	ECQM1H222KZ
C503, 504	ECQM1H153KZ
C505, 506	ECQM1H223KZ
C507, 508	ECQM1H104 KZ
C601, 602	ECEA50M1R
C603, 604	ECCD1H680K
C605, 606	ECCD1H101K
C607, 608	ECKD1H331KB
C609, 610	ECCD1H0R5CC
C611, 612	ECEA1JS330
C613, 614	ECEA1AS470
C615, 616	ECEA1HS101
C617, 618	ECCD1H050C
C619, 620	ECKD1H103MD
C621, 622	ECEA1AS101
C623, 624	ECCD1H220K
C625, 626	ECQM1H224KZ
C627	ECEA1VS330
C628, 629	ECEA1HS101
C701, 702	ECEA1HS103Y
C703	ECKD1H103ZF
C704	ECEA1HS102
C705	ECKD1H102ZF
C706	ECEA1JS330
C707	ECEA1VS221
C708	ECKD1H103ZF
C710	ECEA1CS330
C752	ECEA1ES101
C801, 802	ECQM1H473KZ
C803, 804	ECKD1H331KB
C805, 806	ECQM1H562KZ
C807, 808	ECQM1H333KZ
C901	ECEA0JS102
C902	ECEA50Z3R3
C903	ECEA16N220V

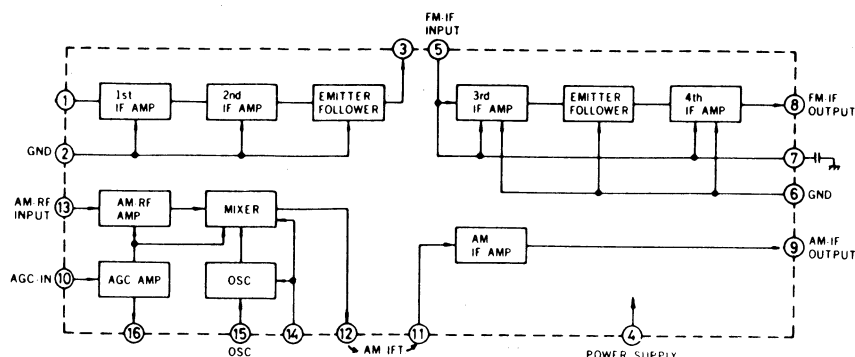
■ BLOCK DIAGRAM OF INTEGRATED CIRCUITS



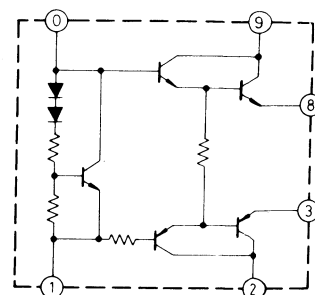
IC101 (AN377)
FM IF Amplifier & Detector



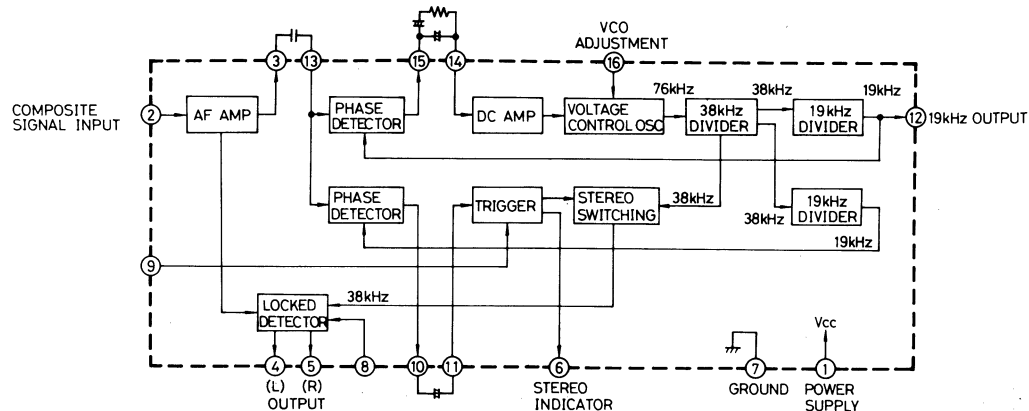
IC401, 402 (SVITA7129P)
Equalizer Amplifier



IC201 (AN217)
FM IF Amplifier & AM Converter

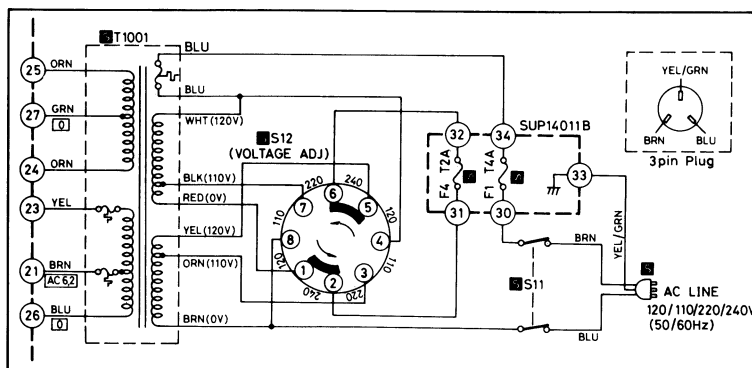


IC601, 602 (SVISTK0040K)
Power Amplifier



IC301 (AN363) FM Multiplex

■ POWER SOURCE CIRCUITRY OF PRODUCT FOR AUSTRALIA (XAL) ONLY



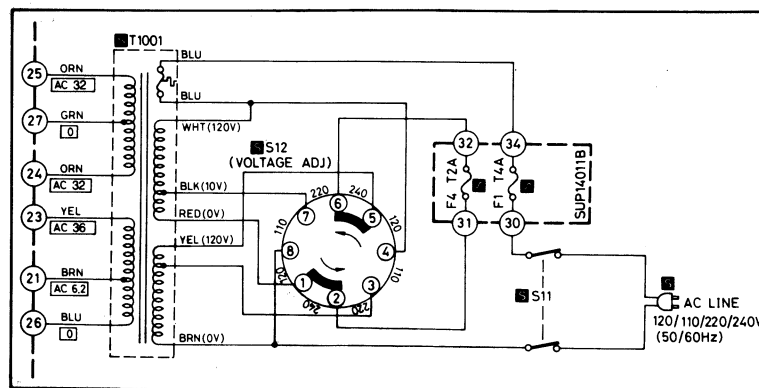
Schematic Diagram • Model SA-400 (X,XA)

Notes:

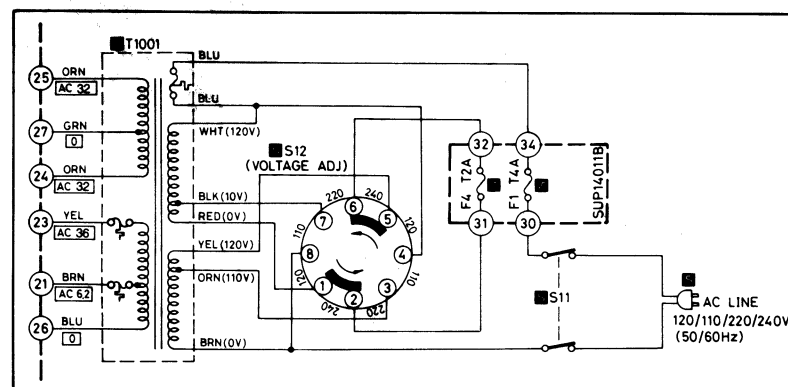
1. **S1-1~S1-6:** Selector switch in **"AM"** position.
① AM ↔ ② FM ↔ ③ PHONO ↔ ④ AUX
2. **S2-1~S2-4:** Tape monitor switch in **"SOURCE"** position.
① TAPE 2 ↔ ② SOURCE ↔ ③ TAPE 1
3. **S3-1~S3-4:** Recording mode switch in **"SOURCE"** position.
① TAPE 2 ► 1 ↔ ② SOURCE ↔ ③ TAPE 1 ► 2
4. **S4:** FM muting/mode switch in **"ON/AUTO"** position.
5. **S5:** Loudness switch in **"OFF"** position.
6. **S7-1, S7-2:** High-filter switch in **"OFF"** position.
7. **S8-1, S8-2:** Low-filter switch in **"OFF"** position.
8. **S9-1, S9-2:** Main speaker switch in **"ON"** position.
9. **S10-1, S10-2:** Remote speaker switch in **"OFF"** position.
10. **S11:** Power source switch in **"ON"** position.
11. **S12:** Voltage adjustment switch in **"240V"** position.
120V ↔ 110V ↔ 220V ↔ 240V
12. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
☐ Not apply signal to set and muting switch to OFF condition.
() AM signal reception.
┌) FM muting to ON condition.
<) FM stereo signal reception.
13.  AF signal lines.  FM signal lines.  AM signal lines.
14. **S** indicates that only parts specified by the manufacturer be used for safety.
15. This schematic diagram may be modified at any time with the development of new technology.

■ POWER SOURCE CIRCUITRY OF OTHER PRODUCTS

- **Products for European(XG), France(XGF), Holland(XGH), Swiss(XSW), and Scandinavia(XSD) only.**

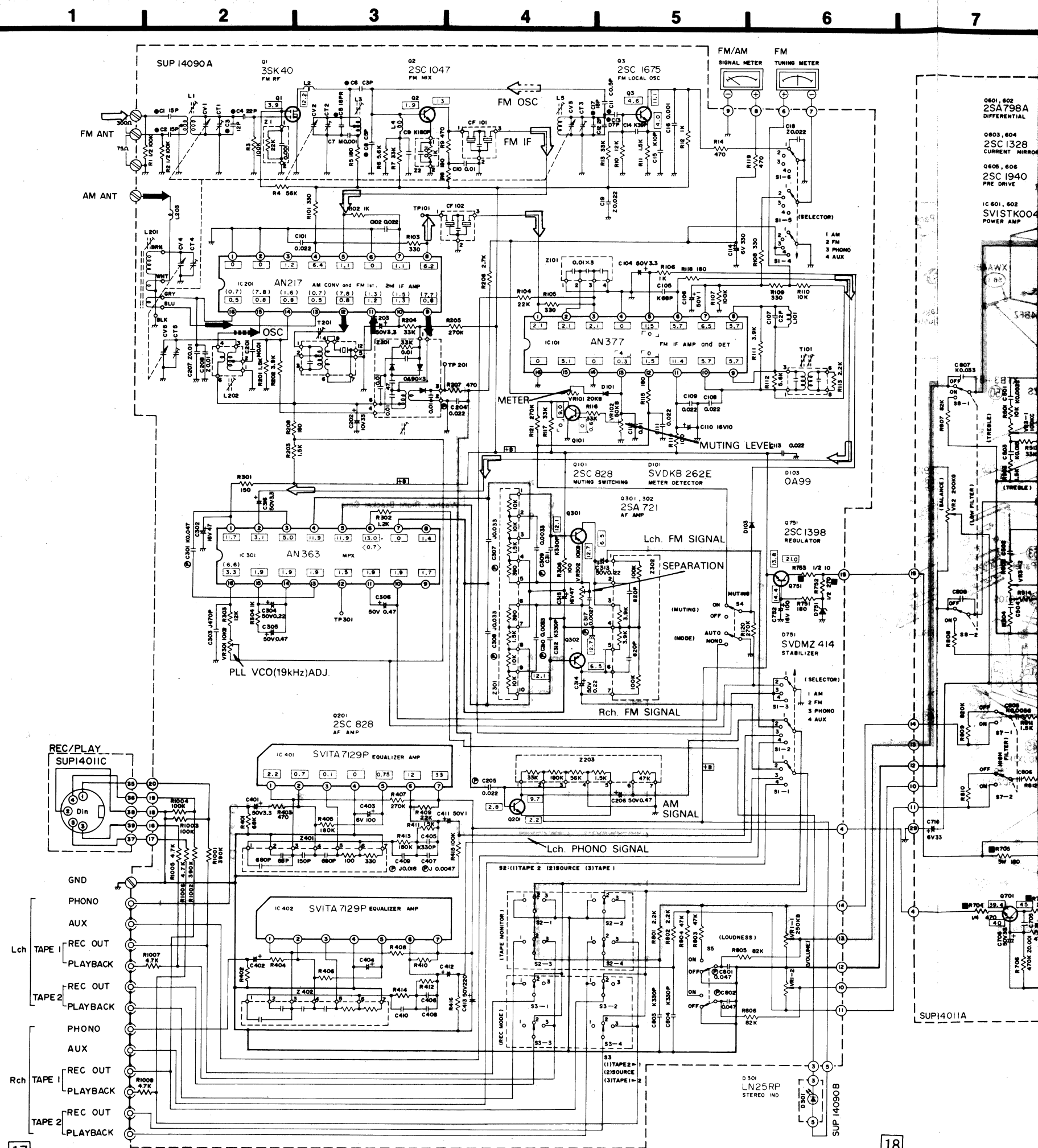
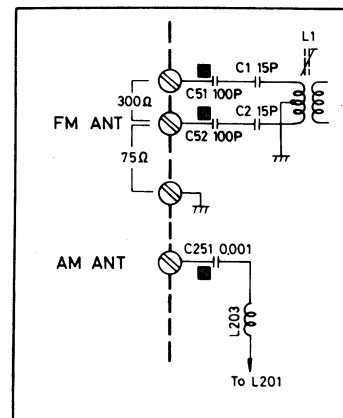


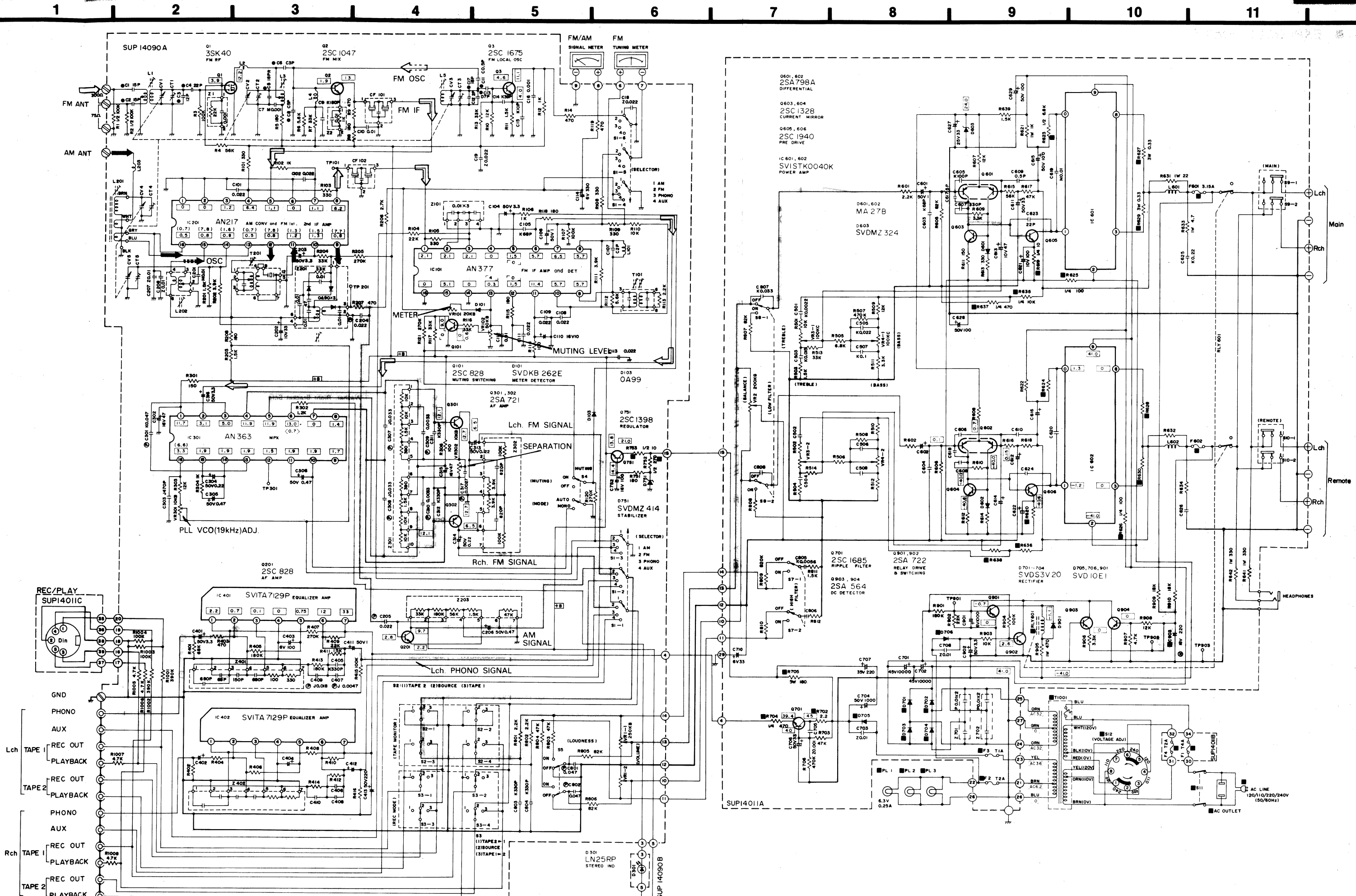
- Products for United Kingdom(XE) only



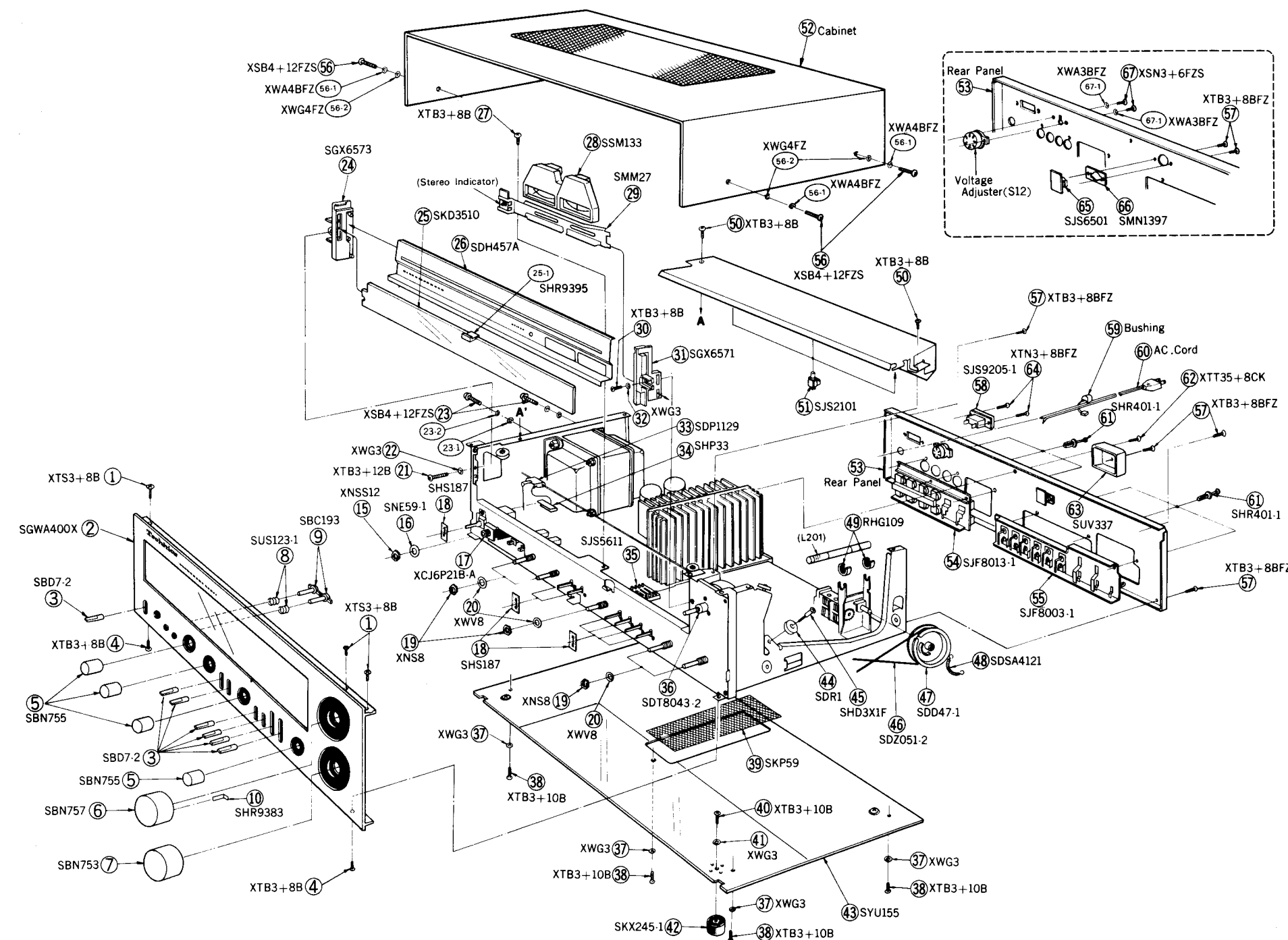
■ ANTENNA CAPACITORS

- Product for Australia(XAL) only





EXPLODED VIEWS



REPLACEMENT PARTS LIST

- NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. ■ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
CABINET and CHASSIS PARTS				
1	XTS3+8B	Screw, Front Panel M'tg	3	
2	SGWA400X	Panel, Front Ass'y	1	○
3	SBD7-2	Knob, Lever Switches	7	
4	XTB3+8B	Screw, Front Panel M'tg	2	
5	SBN755	Knob, Bass, Treble, Balance & Selector	4	
6	SBN757	Knob, Tuning	1	
7	SBN753	Knob, Volume	1	
8	SUS123-1	Spring, Speaker Push Switches	2	
9	SBC193	Button, Speaker Switches	2	
10	SHR9383	Spacer, Tuning Knob	1	
15	XNSS12	Nut, Headphones Jack M'tg	1	
16	SNE59-1	Washer, Headphones Jack	1	
17	XCJ6P21B-A	Jack, Headphones	1	
18	SHS187	Shading Cloth, Lever Switches	7	○
19	XNS8	Nut, Volumes & Selector M'tg	5	
20	XWV8	Washer, Volumes & Selector	5	
21	XTB3+12B	Screw, Dial Scale Left Bracket M'tg	1	
22	XWG3	Washer, Left Bracket Screw	1	
23	XSB4+12FZS	Screw, Power Transformer M'tg	4	
23-1	XWG4FZ	Washer	4	
23-2	XWA4BFZ	Washer, Spring	4	
24	SGX6573	Bracket, Dial Scale Left Side	1	
25	SKD3510	Scale, Dial	1	*
25-1	SHR9395	Bracket, Dial Scale	1	
26	SDH457A	Plate, Dial	1	*○
27	XTB3+8B	Screw, Meter Bracket M'tg	1	
28	SSM133	Meter, Signal & Tuning	1	
29	SMM27	Bracket, Meter	1	*○
30	XTB3+8B	Screw, Dial Scale Right Bracket M'tg	1	
31	SGX6571	Bracket, Dial Scale Right Side	1	
32	XWG3	Washer, Right Bracket Screw	1	
33	SDP1129	Pointer, Dial	1	*
34	SHP33	Sheet, Pointer Slider	1	○
35	SJS5611	Connector, 6pin	1	
36	SDT8043-2	Shaft, Tuning	1	*
37	XWG3	Washer, Bottom Board Screw	7	
38	XTB3+10B	Screw, Bottom Board M'tg	7	
39	SKP59	Ventilation Plate	1	
40	XTB3+10B	Screw, Feet M'tg	4	
41	XWG3	Washer, Feet Screw	4	
42	SKX245-1	Foot, Set	4	
43	SYU155	Bottom Board	1	*○
44	SDR1	Pulley, Dial Cord	4	
45	SHD3X1F	Screw, Pulley M'tg	4	*
46	SDZ051-2	Cord, Dial 200cm (78-3/4")	1roll	
47	SDD47-1	Drum, Variable Capacitor	1	
48	SDSA4121	Spring, Dial Cord	1	
49	RHG109	Rubber Cushion, AM Bar Antenna	2	
50	XTB3+8B	Screw, Reflection Cover M'tg	2	
51	SJS2101	Holder, Dial Lamp	3	○
52(XSW.XSD)only	SKA10150W	Cabinet, Black Wooden	1	○
52(XE)only	SKA10151W	Cabinet, Brown Wooden	1	○
52	SKA10170W	Cabinet, Black Wooden	1	○
53(XA.X)	SGP1350-1A	Rear Panel	1	○
53(XAL)	SGPA400L	Rear Panel, SGP1350-2A with Name Plate (SGT16670)	1	○
53(XG.XGF.XGH.XE)	SGP1350A	Rear Panel	1	○
53(XSD.XSW)	SGPA400D	Rear Panel, SGP1350A with Name Plate (SGT16550)	1	○
54	SJF8013-1	Terminal, Speakers & Speaker Fuses	1	
55	SJF8003-1	Terminal, Input & Antenna	1	
56	XSB4+12FZS	Screw, Cabinet M'tg	4	
56-1	XWA4BFZ	Washer, Spring	4	
56-2	XWG4FZ	Washer	4	
57	XTB3+8BFZ	Screw, Rear Panel & Fuse Cover M'tg	8	
58(XA.X)only	SJS9205-1	Socket, AC Outlet	1	
59(XE)only	SHR129	Bushing, AC Cord	1	
59(XAL)only	SHR131	Bushing, AC Cord	1	
59	SHR127	Bushing, AC Cord	1	
60(XE)only	RJA452C	AC Cord, Power Source	1	○
60(XAL)only	QFC1207M	AC Cord, Power Source	1	○
60(XSW)only	SJA61	AC Cord, Power Source	1	
60	SJA97	AC Cord, Power Source	1	
61	SHR401-1	Latch, Speakers & Input Terminal M'tg	6	
62	XTT35+8CK	Screw, Heat Sink M'tg	1	
63	SUV337	Cover, Speaker Fuses	1	*
64(XA.X)only	XTN3+8BFZ	Screw, AC Outlet M'tg	2	
65	SJS6501	Socket, DIN (TAPE DECK, REC/PLAY)	1	
66	SMN1397	Bracket, DIN Socket	1	*
67	XSN3+6FZS	Screw, Voltage Adjuster M'tg	2	
67-1	XWA3BFZ	Washer, Spring	2	

ACCESS

PACKING

■ REPLACEMENT PARTS LIST

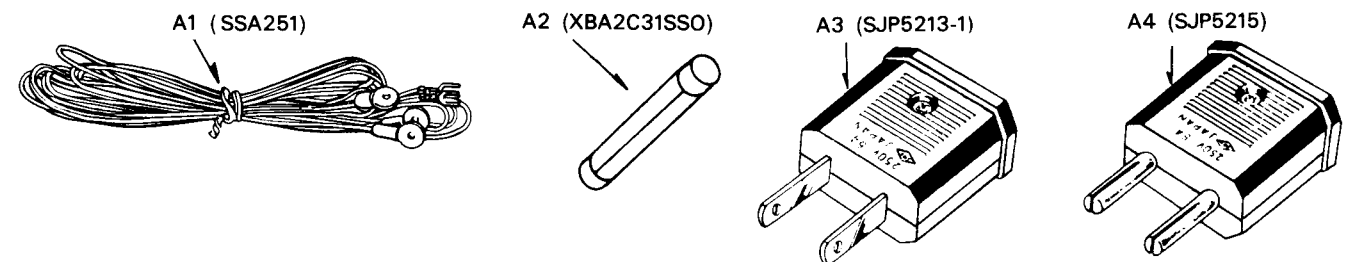
- NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. ■ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
CABINET and CHASSIS PARTS				
1	XTS3+8B	Screw, Front Panel M'tg	3	○
2	SGWA400X	Panel, Front Ass'y	1	
3	SBD7-2	Knob, Lever Switches	7	
4	XTB3+8B	Screw, Front Panel M'tg	2	
5	SBN755	Knob, Bass, Treble, Balance & Selector	4	
6	SBN757	Knob, Tuning	1	
7	SBN753	Knob, Volume	1	
8	SUS123-1	Spring, Speaker Push Switches	2	
9	SBC193	Button, Speaker Switches	2	
10	SHR9383	Spacer, Tuning Knob	1	
15	XNSS12	Nut, Headphones Jack M'tg	1	
16	SNE59-1	Washer, Headphones Jack	1	
17	XCJ6P21B-A	Jack, Headphones	1	
18	SHS187	Shading Cloth, Lever Switches	7	○
19	XNS8	Nut, Volumes & Selector M'tg	5	
20	XWV8	Washer, Volumes & Selector	5	
21	XTB3+12B	Screw, Dial Scale Left Bracket M'tg	1	
22	XWG3	Washer, Left Bracket Screw	1	
23	XSB4+12FZS	Screw, Power Transformer M'tg	4	
23-1	XWG4FZ	Washer	4	
23-2	XWA48FZ	Washer, Spring	4	
24	SGX6573	Bracket, Dial Scale Left Side	1	
25	SKD3510	Scale, Dial	1	*
25-1	SHR9395	Bracket, Dial Scale	1	
26	SDH457A	Plate, Dial	1	*○
27	XTB3+8B	Screw, Meter Bracket M'tg	1	
28	SSM133	Meter, Signal & Tuning	1	
29	SMM27	Bracket, Meter	1	*○
30	XTB3+8B	Screw, Dial Scale Right Bracket M'tg	1	
31	SGX6571	Bracket, Dial Scale Right Side	1	
32	XWG3	Washer, Right Bracket Screw	1	
33	SDP1129	Pointer, Dial	1	*
34	SHP33	Sheet, Pointer Slider	1	○
35	SJS5611	Connector, 6pin	1	
36	SDT9043-2	Shaft, Tuning	1	*
37	XWG3	Washer, Bottom Board Screw	7	
38	XTB3+10B	Screw, Bottom Board M'tg	7	
39	SKP59	Ventilation Plate	1	
40	XTB3+10B	Screw, Feet M'tg	4	
41	XWG3	Washer, Feet Screw	4	
42	SKX245-1	Foot, Set	4	
43	SYU155	Bottom Board	1	*○
44	SDR1	Pulley, Dial Cord	4	
45	SHD3X1F	Screw, Pulley M'tg	4	*
46	SDZ051-2	Cord, Dial 200cm (78-3/4")	1roll	
47	SDD47-1	Drum, Variable Capacitor	1	
48	SDSA4121	Spring, Dial Cord	1	
49	RHG109	Rubber Cushion, AM Bar Antenna	2	
50	XTB3+8B	Screw, Reflection Cover M'tg	2	
51	SJS2101	Holder, Dial Lamp	3	○
52(XSW,XSD)only	SKA10150W	Cabinet, Black Wooden	1	○
52(XE)only	SKA10151W	Cabinet, Brown Wooden	1	○
52	SKA10170W	Cabinet, Black Wooden	1	○
53(XA,X)	SGP1350-1A	Rear Panel	1	○
53(XAL)	SGPA400L	Rear Panel, SGP1350-2A with Name Plate (SGT16670)	1	○
53(XG,XGF,XGH,XE)	SGP1350A	Rear Panel	1	○
53(XSD,XSW)	SGPA400D	Rear Panel, SGP1350A with Name Plate (SGT16550)	1	○
54	SJF8013-1	Terminal, Speakers & Speaker Fuses	1	○
55	SJF8003-1	Terminal, Input & Antenna	1	○
56	XSB4+12FZS	Screw, Cabinet M'tg	4	
56-1	XWA48FZ	Washer, Spring	4	
56-2	XWG4FZ	Washer	4	
57	XTB3+8BFZ	Screw, Rear Panel & Fuse Cover M'tg	8	
58(XA,X)only	SJS9205-1	Socket, AC Outlet	1	
59(XE)only	SHR129	Bushing, AC Cord	1	
59(XAL)only	SHR131	Bushing, AC Cord	1	
59	SHR127	Bushing, AC Cord	1	
60(XE)only	RJA452C	AC Cord, Power Source	1	○
60(XAL)only	QFC1207M	AC Cord, Power Source	1	○
60(XSW)only	SJA61	AC Cord, Power Source	1	
60	SJA97	AC Cord, Power Source	1	
61	SHR401-1	Latch, Speakers & Input Terminal M'tg	6	
62	XTT35+8CK	Screw, Heat Sink M'tg	1	
63	SUV337	Cover, Speaker Fuses	1	*
64(XA,X)only	XTN3+8BFZ	Screw, AC Outlet M'tg	2	
65	SJS6501	Socket, DIN (TAPE DECK, REC/PLAY)	1	
66	SMN1397	Bracket, DIN Socket	1	*
67	XSN3+6FZS	Screw, Voltage Adjuster M'tg	2	
67-1	XWA3BFZ	Washer, Spring	2	

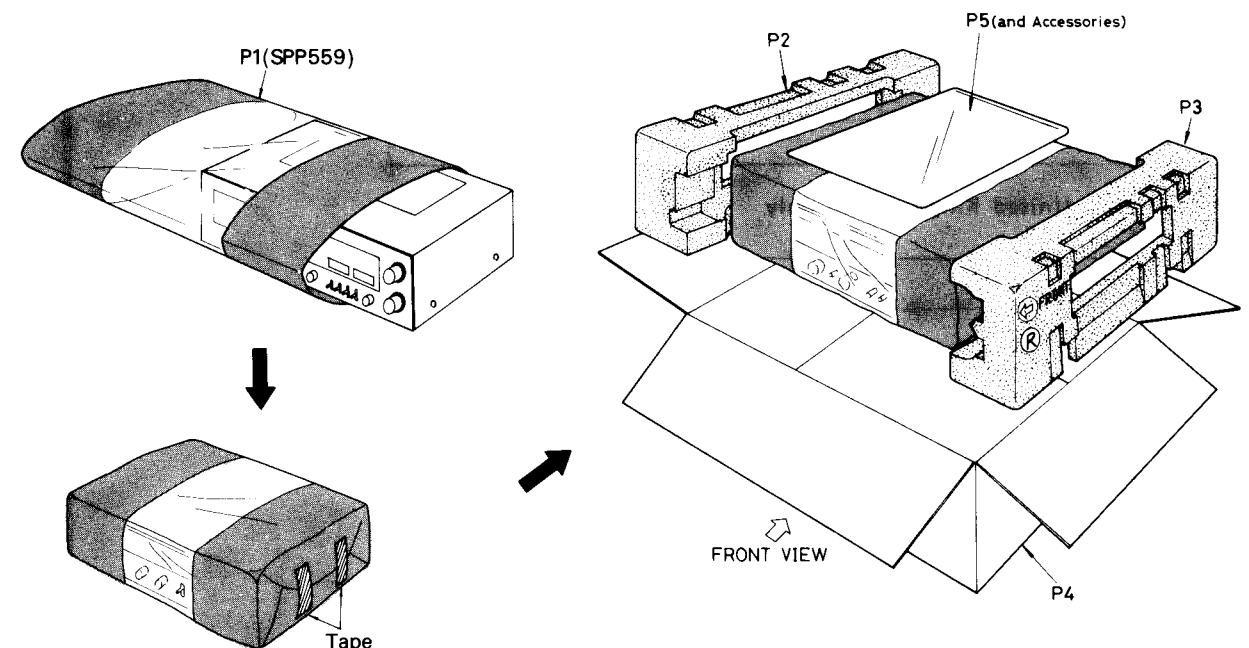
Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
ACCESSORIES				
A1	SSA251	Cord, FM Feeder	1	
A2	XBA2C31SSO	Fuse, 3.15A (250V) Speaker Circuit	2	
A3(XA,X)only	SJP5213-1	Plug Adapter, AC Power	1	
A4(XA,X)only	SJP5215	Plug Adapter, AC Power	1	
PACKING PARTS				
P1	SPP559	Polyethylene Bag	1	
P2(XE,XSW)only	SPS1591-1	Pad, Left Side	1	○
P2	SPS1591	Pad, Left Side	1	○
P3(XE,XSW)only	SPS1593-1	Pad, Right Side	1	○
P3	SPS1593	Pad, Right Side	1	○
P4(XGF)	SPG1497	Carton Box	1	○
P4(XSW,XE)	SPG1493	Carton Box	1	○
P4(XA,X,XGH,XG,XAL)	SPG1491	Carton Box	1	○
P5(XA,X,XAL,XE)	SQF1893	Instructions Book, Printed Matter	1	○
P5(XG,XSW,XGH,XGF)	SQF1891	Instructions Book, Printed Matter	1	○

- Notes: * (X) and (XA) are available in Asia, Latin America, Middle East and Africa only.
- * (XAL) is available in Australia only.
- * (XGH) is available in Holland only.
- * (XG) is available in European only.
- * (XSD) is available in Scandinavia only.
- * (XSW) is available in Swiss only.
- * (XGF) is available in France only.
- * (XE) is available in United Kingdom only.

■ ACCESSORIES



■ PACKINGS



For additional information, please refer to the service manual for Model No. SA-400 (X, XA, XAL, XGH, XG, XSD, XSW, XGF, XE).

Notes: * This information included only the changes of the **SA-400 (X, XA, XAL, XGH, XG, XSD, XSW, XGF, XE)** service manual (ORDER NO. SD7804-1332).
 * When servicing model **SA-400**, this information and **SA-400 (X, XA, XAL, XGH, XG, XSD, XSW, XGF, XE)** (ORDER NO. SD7804-1332) service manual should be used together.

Modification-1

■ TO REMOVE CABINET (Page 8)

1. Remove the two cabinet mounting screws (nos ①, ② screws in fig. 7-1).
2. Remove the four cabinet mounting screws (nos ① ~ ④ screws in fig. 7).
3. Sliding it toward (A) direction and lifting it upward (B) direction as shown in fig. 7.
4. When the cabinet is installed, insert the metal fitting of cabinet (as shown in fig. 8) into the space between the front panel and light reflector.

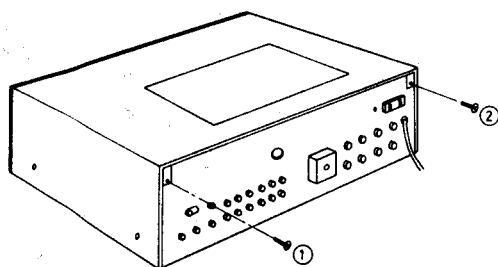


Fig. 7-1

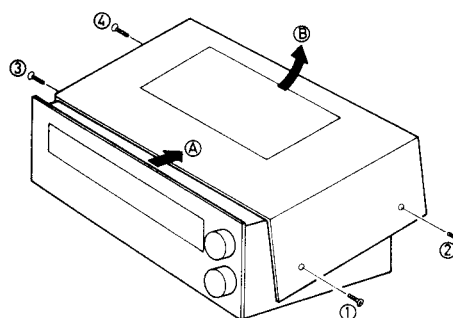


Fig. 7

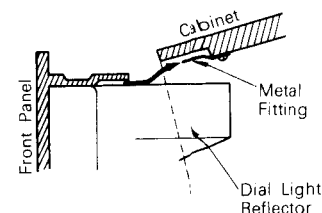


Fig. 8

Modification-2

■ REPLACEMENT PARTS LIST OF FUSES & REAR PANEL (Page 14 & Page 21)

Ref. No.	Change of Part No.		Part Name & Description	Per Set	Remarks
	OLD	NEW			
FUSES					
F601, 602 (XA,X)only	XBA2C31SSO	XBA2C31SSO	Fuse, 3.15A(250V) Speaker Circuit	2	
F601, 602 (other areas)	XBA2C31SSO	XBA2C25SSO	Fuse, 2.5A(250V) Speaker Circuit	2	
REAR PANEL					
53 (XA,X)	SGP1350-1A	SGP1350-1A	Rear Panel	1	C
53 (XAL)	SGPA400L	SGPA400L1	Rear Panel, SGP1350-2E with Name Plate(SGT16670)	1	C
53 (XG,XGF,XGH,XE)	SGP1350A	SGP1350E	Rear Panel	1	C
53 (XSD,XSW)	SGPA400D	SGPA400D1	Rear Panel SGP1350E with Name Plate(SGT16550)	1	C
ACCESSORIES					
A2 (XA,X)only	XBA2C31SSO	XBA2C31SSO	Fuse, 3.15A(250V) Speaker Circuit	2	
A2 (other areas)	XBA2C31SSO	XBA2C25SSO	Fuse, 2.5A(250V) Speaker Circuit	2	

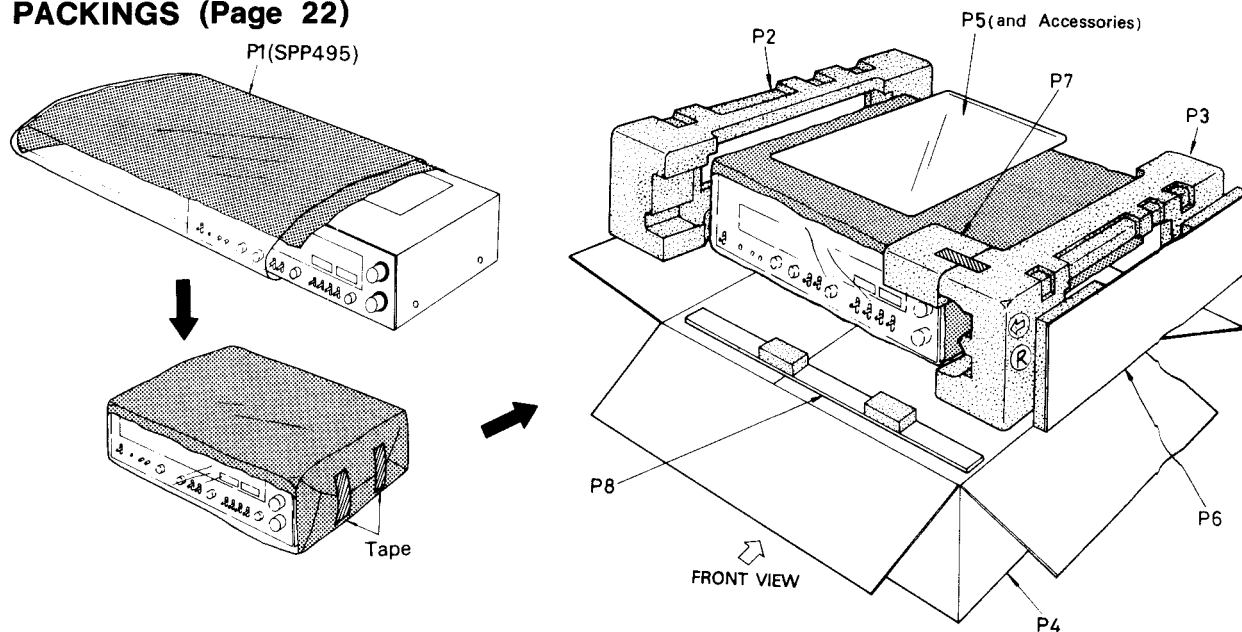
Modification-3

■ PACKING PARTS LIST (Page 22)

Ref. No.	Part No.	Part Name & Description	Per Set	Remarks
PACKING PARTS				
P1	SPP495	Polyethylene Bag	1	
P2(XE,XSW)only	SPS1591-1	Pad, Left Side	1	○
P2	SPS1591	Pad, Left Side	1	○
P3(XE,XSW)only	SPS1593-1	Pad, Right Side	1	○
P3	SPS1593	Pad, Right Side	1	○
P4(XGF)	SPG1497	Carton Box	1	○
P4(XE)	SPG1493	Carton Box	1	○
P4(XA,X,XGH,XG XSW,E,XAL)	SPG1491	Carton Box	1	○
P5(XA,X,XAL,XE)	SQF1893-1	Instructions Book, Printed Matter	1	○
P5(XG,XSW,E,XGH,XGF)	SQF1891-1	Instructions Book, Printed Matter	1	○
P6(XE,XSW)only	SPS1655	Pad, Right Side	1	○
P6	SPS1657	Pad, Right Side	1	○
P7	SPS1653	Pad, Right Front Side	1	○
P8(XE,XSW)only	SPS1649	Pad, Bottom Side	1	○
P8	SPS1651	Pad, Bottom Side	1	○

Modification-4

■ PACKINGS (Page 22)



Modification-5

■ OTHERS

- Set for Scandinavia indicates **(D)** insted of **(XSD)**, this changes is from April, 1978.

The model SA-400 (XSD) is available in Scandinavia only.



The model SA-400 (D) is available in Scandinavia only.

- Correction of dimensions (General of technical Specifications)

$430(W) \times 145(H) \times 260(D) \text{ mm}$ } Correction → $430(W) \times 142(H) \times 300(D) \text{ mm}$
 $(16 \frac{15}{16} " \times 5 \frac{23}{32} " \times 10 \frac{1}{4} ")$ } → $(16 \frac{15}{16} " \times 5 \frac{19}{32} " \times 11 \frac{13}{16} ")$