

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-210

[EX],[EH],[XA],[XL]

Free service manuals

Gratis service manuals

SA-210(K)

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[EX],[EH]

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- * The colors of this model included silver and black.
- * The black type model is provided with (K) in the Service Manual.

Areas

- * [EX] is available in Switzerland and Scandinavia.
- * [EH] is available in Holland.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XL] is available in Australia.

Specifications (Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

40 Hz~20 kHz continuous power output both channels driven	2 × 25W (4Ω) 2 × 25W (8Ω)
40 Hz~16 kHz continuous power output both channels driven	2 × 25W (4Ω) 2 × 25W (8Ω)
1 kHz continuous power output both channels driven	2 × 27W (4Ω) 2 × 27W (8Ω)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.8% (4Ω) 0.5% (8Ω)
rated power at 40 Hz~16 kHz	0.8% (4Ω) 0.5% (8Ω)
rated power at 1 kHz	0.5% (4Ω) 0.5% (8Ω)
half power at 1 kHz	0.05% (8Ω)
-26 dB power at 1 kHz	0.1% (4Ω)
50 mW power at 1 kHz	0.12% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.8%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.5%
Power bandwidth	
both channels driven, -3 dB	10 Hz~30 kHz (4Ω)
Damping factor	15 (4Ω), 30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
TAPE/AUX	150 mV/18kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
TAPE/AUX (Volume at max)	5 Hz~70 kHz (-3 dB)
Tone controls	
BASS	50 Hz, +10 dB~ -10 dB
TREBLE	20 kHz, +10 dB~ -10 dB

S/N

rated power (4Ω)	
PHONO	70 dB (IHF, A: 73 dB)
TAPE/AUX	88 dB (IHF, A: 95 dB)
-26 dB power (4Ω)	
PHONO	64 dB
TAPE/AUX	66 dB
50 mW power (4Ω)	
PHONO	62 dB
TAPE/AUX	62 dB
Loudness control (volume at -30 dB) (built in)	50 Hz, +5 dB
Output voltage and impedance	
TAPE REC OUT	150 mV
Channel balance, TAPE/AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, TAPE/AUX 1 kHz	55 dB
Headphones output level and impedance	420 mV/330Ω
Load impedance	4Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Frequency response	20 Hz~15 kHz, +1 dB~-2 dB
Alternate channel selectivity	±400 kHz 70 dB
Capture ratio	1 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB

Technics

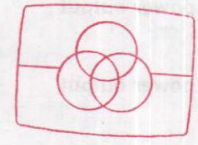
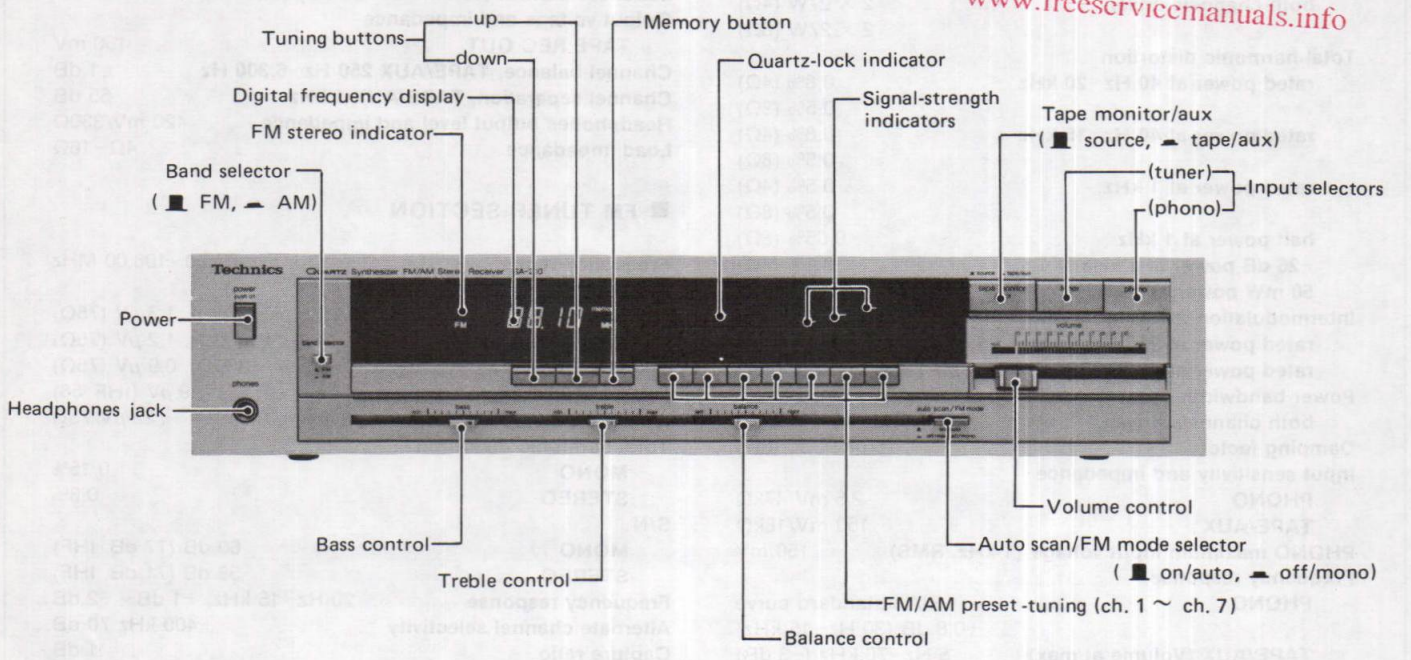
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

AM suppression	50 dB	Sensitivity (S/N 20 dB)	20 μ V, 300 μ V/m
Stereo separation		Selectivity	55 dB
1 kHz	40 dB	Image rejection at 1,000 kHz	40 dB
10 kHz	30 dB	IF rejection at 1,000 kHz	60 dB
Carrier leak		■ GENERAL	
19 kHz	-33 dB (-35 dB, IHF)	Power consumption	220W
38 kHz	-50 dB (-50 dB, IHF)	Power supply	
Channel balance (250 Hz~6,300 Hz)	\pm 1.5 dB	For United Kingdom and Australia	AC 50 Hz/60 Hz, 240V
Limiting point	1.2 μ V	For continental Europe	AC 50 Hz/60 Hz, 220V
Bandwidth		For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
IF amplifier	180 kHz	Dimensions (W×H×D)	430 × 97 × 243 mm
FM demodulator	1000 kHz		(16-15/16" × 3-13/16" × 9-9/16")
Antenna terminals	300 Ω (balanced) 75 Ω (unbalanced)	Weight	5.1 kg (11.2 lb.)
■ AM TUNER SECTION			
Frequency range	522~1611 kHz (9 kHz-step) 530~1620 kHz (10 kHz-step)		

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■ LOCATION OF CONTROLS



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QUARTZ Synthesizer FM/AM Stereo Receiver

SA-210/SA-210(K)

- This booklet contains the specifications and adjusting procedures for SA-210, written Germany, French and Spanish.
- File this manual together with the SA-210 service manual (Order No. SD83022407C8).
- Diese Broschüre enthält die technischen Daten und die Beschreibungen der Justiermethoden für SA-210 in deutscher, französischer und spanischer Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für SA-210 (Bestell-Nr. SD83022407C8) auf.
- Cette brochure contient les spécifications et les procédures de réglage pour le SA-210, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du SA-210 (N° d'ordre: SD83022407C8).
- Este librito contiene las especificaciones y procedimientos de ajuste para SA-210, escritas en alemán, francés y español.
- Guardar este manual juntamente con el manual de servicio de SA-210 (Pedido N°. SD83022407C8).

DEUTSCH

TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 40 Hz ~ 20 kHz	
beide Kanäle angesteuert	2 × 25W (4 Ω) 2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle angesteuert	2 × 25W (4 Ω) 2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle angesteuert	2 × 27W (4 Ω) 2 × 27W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 40 Hz ~ 20 kHz	0,8% (4 Ω) 0,5% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,8% (4 Ω) 0,5% (8 Ω)
Nennleistung bei 1 kHz	0,5% (4 Ω) 0,5% (8 Ω)
halbe Nennleistung bei 1 kHz	0,05% (8 Ω)
-26 dB Leistung bei 1 kHz	0,1% (4 Ω)
50 mW Leistung bei 1 kHz	0,12% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,8%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle angesteuert bei -3 dB	10 Hz ~ 30 kHz (4 Ω) 15 (4 Ω), 30 (8 Ω)
Dämpfungsfaktor	15 (4 Ω), 30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tape/Aux	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
Tape/Aux (max. Lautstärke)	5 Hz ~ 70 kHz (-3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ -10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ -10 dB

Geräuschabstand

Nennleistung (4 Ω)	
Phono	70 dB (nach IHF, A: 73 dB)
Tape/Aux	88 dB (nach IHF, A: 95 dB)
-26 dB Leistung (4 Ω)	
Phono	64 dB
Tape/Aux	66 dB
50 mW Leistung (4 Ω)	
Phono	62 dB
Tape/Aux	62 dB
Gehörriichtige Lautstärkekorrektur (Loudness)	
(bei -30 dB Ausgangsleistung) (eingebaut)	50 Hz, +5 dB
Ausgangsspannung und -impedanz	
Tape Aufnahme (TAPE REC OUT)	150 mV
Kanalabweichung (Tape/Aux, 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Tape/Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	4 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,9 μV (300 Ω), 1,3 μV (75 Ω)
S/R 26 dB	1,7 μV (300 Ω), 1,2 μV (75 Ω)
S/R 20 dB	1,5 μV (300 Ω), 0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,9 μV (nach IHF '58)
Stereumschaltsschwelle bei 46 dB nach IHF	22 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ -2 dB)
Trennschärfe bei Störsender	±400 kHz 70 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	75 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	82 dB
MW-Unterdrückung	50 dB

Übersprechdämpfung				■ MW-TUNERTEIL	
1 kHz		40 dB		Wellenbereiche	522 ~ 1611 kHz (9 kHz-step) 530 ~ 1620 kHz (10 kHz-step)
10 kHz		30 dB		Eingangsempfindlichkeit (S/R 20 dB)	20 µV, 300 µV/m
Trägerrest				Trennschärfe	55 dB
19 kHz	-33 dB (-35 dB nach IHF)			Spiegelfrequenz-Dämpfung bei 1000 kHz	40 dB
38 kHz	-50 dB (-50 dB nach IHF)			ZF-Dämpfung bei 1000 kHz	60 dB
Kanalabweichung (250 Hz ~ 6300 Hz)		±1,5 dB		■ ALLGEMEINE DATEN	
Begrenzereinsatz		1,2 µV		Leistungsaufnahme	220 W
Bandbreite				Netzspannung	
ZF-Verstärker		180 kHz		Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
UKW-Demodulator		1000 kHz		Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Antennenanschluß		300 Ω (symmetrisch) 75 Ω (unsymmetrisch)		Abmessungen (B×H×T)	430 × 97 × 243 mm
				Gewicht	5,1 kg

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

● Stellungen und zu benutzende Geräte						
1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM) 2. AM (MW)-Meßsender (AM-SG) 3. Bereichsschalter AM 4. AM (MW) Wellenverteilungs-Wahlschalter auf Position "9kHz" stellen.			5. Netzspannung auf ihren Sollwerthalten. 6. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung. 7. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.			
Nr.	AM (MW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHVERFAHREN
	ANSCHLUSS	FREQUENZ				
MW-HF-ABGLEICH						
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	612kHz (400Hz Modul., 30%)	612kHz	Oszilloskop oder Wechselstrom-Voltmeter über den Lautsprecher schließen	L201 (Ant. Spule)	1. Auf max. Ausgang abgleichen 2. Den Ferritkern von L201 mit einem Schraubendreher justieren.
2		1503kHz (400Hz Modul., 30%)	1503kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (1) und (2) wiederholen, bis die Frequenz genau mit der Skalanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

● Stellungen und zu benutzenden Geräte			* Vorbereitung des UKW-Meßoszillators (UKW-MO)			
1. UKW-Meßsender (FM-SG) 2. Verzerrungsmesser 3. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM) 4. Signalfrequenzmesser (meßbar für 19kHz und 108MHz) 5. Bereichsschalter FM 6. Den UKW-Betriebsartenschalter auf die "mono"-position stellen. 7. Die anderen Einstellungen sind gleich wie beider MW-Justierung. 8. Stereo-Modular (oder Trennmesser)			1. Die Normal-Eingangsleistung dieses Gerätes beträgt 60dB (1mV), 400Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6dB oder mehr (IHF) betragen; d. h. wenn die Eingangsleistung 60dB beträgt, muß der MO-Ausgang 66dB betragen.)			
Nr.	FM (UKW) MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHVERFAHREN
	ANSCHLUSS	FREQUENZ				
ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO						
3	FM-SG an den FM-Antennenanschluß entsprechend Abb. 17. (60dB an den Antennenanschluß legen.)	100.1MHz (400Hz Modul., 100%)	100.1MHz	Ein Gleichstromröhren-voltmeter zwischen TP203 und TP204 über eine Drosselspule verbinden. (Siehe Abb. 17)	T202 (Diskriminator FT)	1. Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich beträgt.
4		100.1MHz (400Hz Modul., 100%)	100.1MHz	Klirrfaktor-Meßbrücke über den Lautsprecher schließen	T203 (Diskriminator FT)	1. T203 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.

UKW-STEREO-DEKODER-ABGLEICH

UNTER VERWENDUNG EINES ZAHLES

ALTERNATIV-MEB METHODE

1. Unmoduliertes Mono-Signal 100.1MHz in das Gerät speisen.
2. FM muting/mode-Schalter auf "on/FM auto" stellen.
3. Zähler über einen Widerstand 100k ohm an **TP301** schließen.
4. **VR301** auf 19 kHz ± 30 Hz 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. 19 gezeigt.

FRANÇAIS

CARACTERISTIQUES

(Sujet à changement sans préavis.)

(DIN 45 500)

SECTION AMPLIFICATEUR

Puissance de sortie continue de 40 Hz~20 kHz,
les deux canaux en circuit

	2 x 25W (4 Ω)
	2 x 25W (8 Ω)

Puissance de sortie continue de 40 Hz~16 kHz,
les deux canaux en circuit

	2 x 25W (4 Ω)
	2 x 25W (8 Ω)

Puissance de sortie continue à 1 kHz
les deux canaux en circuit

	2 x 27W (4 Ω)
	2 x 27W (8 Ω)

Distorsion harmonique totale
à puissance nominale (40 Hz~20 kHz)

	0,8% (4 Ω)
	0,5% (8 Ω)

à puissance nominale (40 Hz~16 kHz)

	0,8% (4 Ω)
	0,5% (8 Ω)

à puissance nominale (1 kHz)

	0,5% (4 Ω)
	0,5% (8 Ω)

à demi-puissance (1 kHz)
puissance de -26 dB à 1 kHz
puissance de 50 mW à 1 kHz

	0,05% (8 Ω)
	0,1% (4 Ω)
	0,12% (4 Ω)

Distorsion d'intermodulation
à puissance nominale a 250 Hz: 8 kHz=4:1, 4 Ω
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8 Ω

	0,8%
	0,5%

Réponse de fréquences
les deux canaux en circuit, -3 dB

	10 Hz~30 kHz (4 Ω)
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Coefficient d'amortissement

	15 (4 Ω), 30 (8 Ω)
--	------------------------------------

Sensibilité et impédance d'entrée

PHONO	2,5 mV/47k Ω
BANDE/AUX (TAPE/AUX)	150 mV/18k Ω

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

	150 mV
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Signal/Bruit
à puissance nominale (4 Ω)

PHONO	70 dB (IHF, A: 73 dB)
BANDE/AUX (TAPE/AUX)	88 dB (IHF, A: 95 dB)

puissance de -26 dB (4 Ω)

PHONO	64 dB
BANDE/AUX (TAPE/AUX)	66 dB

puissance de 50 mW (4 Ω)

PHONO	62 dB
BANDE/AUX (TAPE/AUX)	62 dB

Réponse de fréquence
PHONO

	Courbe nominale RIAA
	$\pm 0,8$ dB (30 Hz~15 kHz)

BANDE/AUX (TAPE/AUX) (volume au maximum)

	5 Hz~70 kHz (-3 dB)
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Réglage de la tonalité
BASSES (BASS)

	50 Hz, +10 dB~ -10 dB
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AIGUS (TREBLE)

	20 kHz, +10 dB~ -10 dB
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Compensateur physiologique (volume à -30 dB) (incorporé)

	50 Hz, +5 dB
--	--------------

Tension de sortie et impédance
SORTIE ENREGISTREMENT/BANDE

	150 mV
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(TAPE REC OUT)

Equilibrage des canaux, TAPE/AUX 250 Hz~6 300 Hz ± 1 dB
Séparation des canaux, TAPE/AUX 1 kHz 55 dB
Niveau de sortie des casques et impédance 420 mV/330 Ω
Impédance de charge 4 Ω ~16 Ω

SECTION SYNTONISATEUR FM

Gamme de fréquence 87,50~108,00 MHz

Sensibilité

S/B 30 dB	1,9 μ V (300 Ω), 1,3 μ V (75 Ω)
S/B 26 dB	1,7 μ V (300 Ω), 1,2 μ V (75 Ω)
S/B 20 dB	1,5 μ V (300 Ω), 0,9 μ V (75 Ω)

Sensibilité utilisable IHF 1,9 μ V (IHF '58)

Sensibilité stéréo au seuil de 46 dB, IHF 22 μ V/75 Ω

Distorsion harmonique totale

MONO	0,15%
STEREO	0,3%

Signal/Bruit

MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)

Réponse de fréquence 20 Hz~15 kHz, +1 dB~ -2 dB

Sélectivité alternée par canal ± 400 kHz 70 dB

Taux de capture 1 dB

Rejection d'image à 98 MHz 55 dB

Rejection FI à 98 MHz 75 dB

Rejection de réponse parasite à 98 MHz 82 dB

Suppression AM 50 dB

Séparation stéréophonique

1 kHz	40 dB
10 kHz	30 dB

Fuite de porteuse

19 kHz	-33 dB (-35 dB, IHF)
38 kHz	-50 dB (-50 dB, IHF)

Equilibrage de canaux (250 Hz~6,300 Hz) $\pm 1,5$ dB

Point de limite 1,2 μ V

Largeur de bande

Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz

Bornes d'antenne 300 Ω (symétrique)

75 Ω (asymétrique)

SECTION SYNTONISATEUR AM

Gamme de fréquence 522~1611 kHz (9 kHz-step)

530~1620 kHz (10 kHz-step)

Sensibilité (S/B 20 dB) 20 μ V, 300 μ V/m

Sélectivité 55 dB

Réjection d'image à 1,000 kHz 40 dB

Réjection FI à 1,000 kHz 60 dB

DIVERS

Consommation 220W

Alimentation

Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensions (LxHxPr) 430 x 97 x 243 mm

Poids 5,1 kg

MEDICIONES Y AJUSTES

Note: Bobina AM OSC (L202) y AM IFT (T201) han sido ya ajustados.

AJUSTE DE AM

• Puesta y Uso de equipo

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Voltímetros electrónicos de CA y CC (VTVA). 2. Generador de señales AM (AM-SG) 3. Poner selector FM-AM en posición "AM". 4. Poner selector de asignación AM en posición "9kHz step". | <ol style="list-style-type: none"> 5. Mantener voltaje de línea a voltaje nominal. 6. La salida de generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida. 7. Para el ajuste use un destornillador no metálico. |
|--|--|

Nº.	AM GENERADOR DE SEÑALES		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
AJUSTE RF-AM						
1	Conector AM-SG a terminal de antena AM a través de capacitor 200pF. Cumún a chasis. (Entrada débil)	612kHz (Mod. 30% (con 400Hz))	612kHz	Conectar VTVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	L201 (Bobina ANT AM)	<ol style="list-style-type: none"> 1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L201 con destornillador.
2		1503kHz (Mod. 30% (con 400Hz))	1503kHz	Conectar VTVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	CT201 (Trimer de ANT AM)	<ol style="list-style-type: none"> 1. Ajustar para salida máxima. 2. Repetir pasos (1) y (2) hasta que la frecuencia se adapte correctamente a la escala del cuadrante.

AJUSTE DE FM

• Equipo usado

1. Generador de señales FM (FM-SG)
2. Analizador de distorsion.
3. Osciloscopio.
4. Voltímetros electrónicos de CA y CC (VTVM).
5. Frecuencímetro (19kHz y 108MHz medibles).
6. Poner selector FM-AM en posición "FM"
7. Poner el interruptor de modalidad FM en la posición "MONO".
8. Otras puestas son las mismas que en ajuste AM.

*** Preparación de generador de señales FM (FM-SG)**

1. La entrada standard del aparato es 60dB (1mV), 400Hz, modulación 100% (Debido a atenuación usando cables coaxiales La salida SG ha de ser 6dB más. Es decir, cuando la entrada 60dB, la salida de SG ha de ser 66dB.)

Nº.	FM GENERADOR DE SEÑALES		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
AJUSTE DE DISTORSION FM MONO						
3	Conectar SG-FM a terminal de antena FM refiriendo a Fig. 17. (Aplicar 60dB a terminal de antena)	100.10MHz (Mod. 100% con 400Hz)	100.10MHz	Conector VTVM CC entre terminal TP203 y TP204 a través de bobina de choque. (Referira Fig. 17).	T202 (Discr. IFT)	<ol style="list-style-type: none"> 1. Ajustar núcleo de T202 de manera que voltaje medido en modalidad de señal se 0mV en gama de 300mV.
4		100.10MHz (Mod. 100% con 400Hz)	100.10MHz	Conectar osciloscopio a terminal "speaker" (altavoz)	T203 (Discr. IFT)	<ol style="list-style-type: none"> 1. Ajustar núcleo de T203 de manera que distorsión de canales derecho e izquierdo se minimice.

AJUSTE DE V.C.O. MPX de FM

Nº.	USANDO UN FRECUENCIMETRO		USANDO SISTEMA ALTERNATIVO	
	5	<ol style="list-style-type: none"> 1. Señal mono no modulada de 100.10MHz 60dB aplicada al aparato. 2. Interruptor de modalidad/sinlenciador FM a "auto FM". 3. Conectar frecuencímetro a TP301 a través de resistor (100kΩ). (Vea la Fig. 18.) 4. Ajustar VR301 a 19kHz ± 30Hz. 	<ol style="list-style-type: none"> 1. Aplicar una señal estereofónica al aparato o recibir una emisión estereofónica. 2. Ajustar VR301 y fijar el contacto deslizante de VR301 en el medio de la gama-ON del indicador estereofónico. (Vea la Fig. 19.) 	

MESURAGES ET RÉGLAGES

Nota: La bobine de l'oscillateur de la modulation d'amplitude (L202) et le transformateur de fréquence intermédiaire de modulation d'amplitude (T201) ont déjà été ajustés et ne nécessitent plus de réglage.

REGLAGE DE AM

● Réglage et équipement utilisé

1. Voltmètres électronique de courant alternatif et de courant continu (VTVM)
2. Générateur du signal AM (AM-SG)
3. Sélecteur de gamme AM
4. Régler le sélecteur d'attribution AM sur la position "9kHz step"
5. Conserver la tension du secteur à la tension nominale.
6. Le signal du générateur ne doit pas être plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.
7. Utiliser un tournevis non-métallique pour la réglage.

AM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE	
BRANCHEMENT	FREQUENCE					
REGLAGE DE RF-AM						
1	Raccorder le générateur de signaux AM (modulation d'amplitude) à la borne d'antenne AM par l'intermédiaire d'un condensateur de 200 pF, en se référant à la Fig. 7. (Entrée faible)	612kHz (modulé à 30% par 400Hz)	612kHz	Branchez un c.a. voltmètre électronique ou un oscilloscope sur les bornes de haut-parleur.	L201 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
2		1503kHz (modulé à 30% par 400Hz)	1503kHz		CT201 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (1) et (2) jusqu'à ce que la fréquence s'aligne correctement avec l'affichage du cadran.

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REGLAGE DE FM

● Réglage et équipement utilisé

1. Générateur du signal FM (FM-SG)
2. Jauge de distorsion.
3. Oscilloscope.
4. Voltmètres électronique de courant alternatif et de courant continu (VTVM).
5. Compteur de fréquence (19kHz et 108MHz mesurable).
6. Sélecteur d'entrée sur la position "FM".
7. Placer le sélecteur de mode FM sur la position "mono".
8. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).

* Préparatif du générateur de signaux à Modulation de Fréquence (FM-SG)

1. L'entrée normale de l'appareil est de 60dB (1mV). 400Hz, modulation de 100% , (Du fait de l'atténuation, utiliser des câbles coaxiaux. La sortie du générateur de signaux devra être de plus de 60dB (IHF). C'est-à-dire que lorsque l'entrée est de 60dB, la sortie du générateur de signaux devra être de 66dB).

FM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE	
BRANCHEMENT	FREQUENCE					
REGLAGE DE LA DISTORSION FM EN MONO						
3	Raccorder de générateur de signaux FM à la borne d'antenne FM en se référant à la Fig. 17. (Appliquer 60dB à la borne d'antenne.)	100.1MHz (modulé à 100% par 400Hz)	100.1MHz	Brancher le voltmètre électronique a.c.c. aux bornes TP203 et TP204 (Voir la Fig. 17)	T202 (Transfor FI discri.)	1. Régler e noyau T202 de telle sorte que le voltage mesuré dans le mode sans signal, soit de 0mV dans la gamme des 300mV.
4		100.1MHz (modulé à 100% par 400Hz)	100.1MHz	Branchez un distortion mètre sur les bornes de haut-parleur de appareil	T203 (Transfor FI discri.)	1. Régler le noyau T203 de telle sorte que la distortion des canaux droit et gauche soit la plus faible.
REGLAGE PILOTE MULTIPLEX FM						
AVEC UN ERÉQUENCÉMÈTRE			PAR UN OUTRE SYSTÈME			
5	1. Signal mono 100.1MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "on/FM auto". 3. Branchez le fréquencemètre sur TP301 à travers une. 4. Régler VR301 sur 19kHz ± 30Hz.			1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la réception d'un émetteur. 2. Régler VR301 jusque à ce que l'indicateur de stéréophonie s'allume. Collez le curseur le VR301 comme indiqué sur la fig. 19.		

ESPAÑOL

ESPECIFICACIONES (Estas especificaciones están sujetas a cualquier cambio sin previo aviso.)

(DIN 45 500)

SECCION AMPLIFICADOR

Potencia continua de 40 Hz~20 kHz en ambos canales	2 × 25W (4Ω) 2 × 25W (8Ω)
Potencia continua de 40 Hz~16 kHz en ambos canales	2 × 25W (4Ω) 2 × 25W (8Ω)
Potencia continua de 1 kHz en ambos canales	2 × 27W (4Ω) 2 × 27W (8Ω)
Distorsión armónica total	
potencia de régimen a 40 Hz~20 kHz	0,8% (4Ω) 0,5% (8Ω)
potencia de régimen a 40 Hz~16 kHz	0,8% (4Ω) 0,5% (8Ω)
potencia de régimen a 1 kHz	0,5% (4Ω) 0,5% (8Ω)
mitad de potencia a 1 kHz	0,05% (8Ω)
-26 dB de potencia a 1 kHz	0,1% (4Ω)
50 mW de potencia a 1 kHz	0,12% (4Ω)
Distorsión por intermodulación	
potencia de régimen a 250 Hz: 8 kHz=4:1, 4Ω	0,8%
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Ancho de banda de potencia con ambos canales, -3 dB	10 Hz~30 kHz (4Ω)
Factor de amortiguamiento	15 (4Ω), 30 (8Ω)
Sensibilidad e impedancia de entrada	
TOCADISC. (PHONO)	2,5 mV/47kΩ
GRAB./AUX. (TAPE/AUX)	150 mV/18kΩ
Voltaje máximo de entrada de PHONO (1 kHz, RMS)	150 mV
Relación de señal a ruido	
potencia de régimen (4Ω)	
TOCADISC. (PHONO)	70 dB (IHF, A: 73 dB)
GRAB./AUX. (TAPE/AUX)	88 dB (IHF, A: 95 dB)
-26 dB de potencia (4Ω)	
TOCADISC. (PHONO)	64 dB
GRAB./AUX. (TAPE/AUX)	66 dB
50 mW de potencia (4Ω)	
TOCADISC. (PHONO)	62 dB
GRAB./AUX. (TAPE/AUX)	62 dB
Respuesta de frecuencia	
TOCADISC. (PHONO)	curva RIAA estándar ±0,8 dB (30 Hz~15 kHz)
GRAB./AUX. (TAPE/AUX) (volumen al máximo)	5 Hz~70 kHz (-3 dB)
Controles de tono	
BAJOS (BASS)	50 Hz, +10 dB~-10 dB
AGUDOS (TREBLE)	20 kHz, +10 dB~-10 dB
Control de sonoridad (volumen a -30 dB) (incorporado)	50 Hz, +5 dB
Voltaje e impedancia de salida	
GRAB. SAL. GRAB.(TAPE REC OUT)	150 mV
Equilibrio de canales, TAPE/AUX 250 Hz~6 300 Hz	±1 dB
Separación de canales, TAPE/AUX 1 kHz	55 dB
Impedancia y nivel de salida de los auriculares	420 mV/330Ω
Impedancia de carga	4Ω~16Ω

SECCION PARA SINTONIZADOR FM

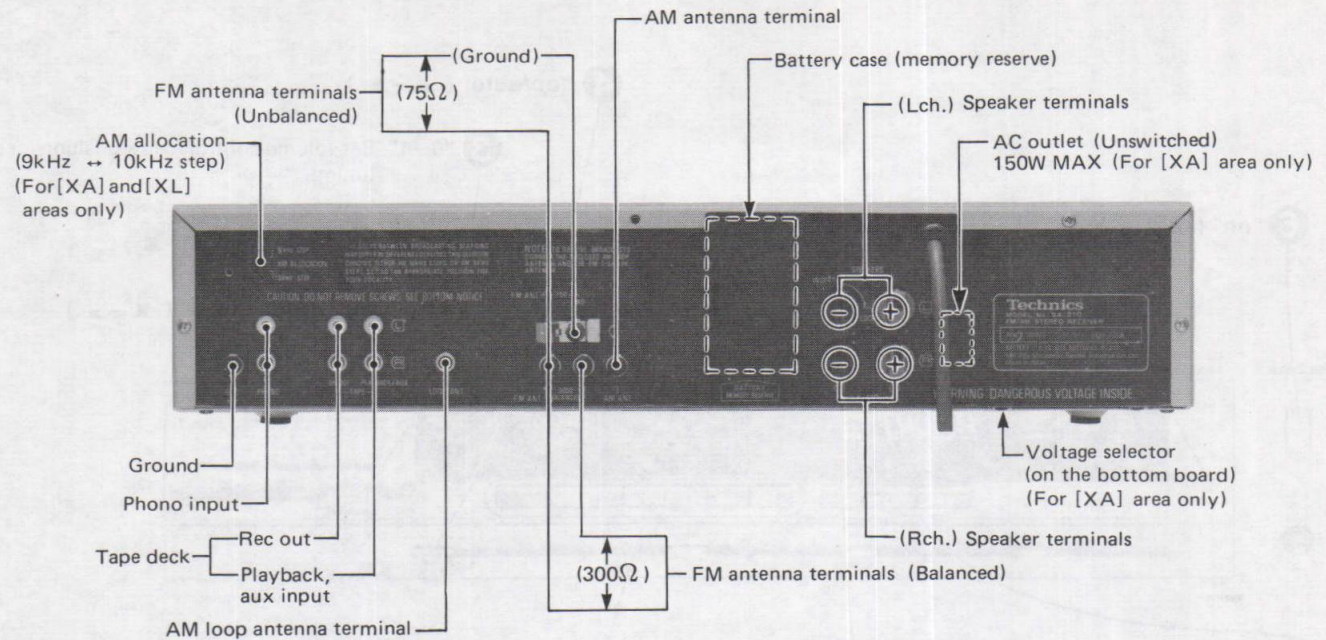
Gama de frecuencias	87,50~108,00 MHz
Sensibilidad	
Señal a ruido 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
Señal a ruido 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
Señal a ruido 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilidad utilizable IHF	1,9 μV (IHF '58)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω
Distorsión armónica total	
MONO. (MONO)	0,15%
ESTEREO (STEREO)	0,3%
Relación de señal a ruido	
MONO. (MONO)	60 dB (77 dB, IHF)
ESTEREO (STEREO)	58 dB (71 dB, IHF)
Respuesta de frecuencia	20 Hz~15 kHz, +1 dB~-2 dB
Selectividad alternada de canal	±400 kHz 70 dB
Relación de captura	1 dB
Rechazo de imagen a 98 MHz	55 dB
Rechazo de F.I. a 98 MHz	75 dB
Rechazo de respuesta espuria a 98 MHz	82 dB
Supresión AM	50 dB
Separación estereofónica	
1 kHz	40 dB
10 kHz	30 dB
Fuga de onda portadora	
19 kHz	-33 dB (-35 dB, IHF)
38 kHz	-50 dB (-50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,5 dB
Punto de limite	1,2 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	300Ω (equilibrado) 75Ω (no equilibrado)

SECCION PARA SINTONIZADOR AM

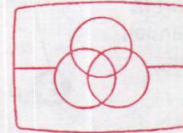
Gama de frecuencias	522~1611 kHz (9 kHz-step) 530~1620 kHz (10 kHz-step)
Sensibilidad (Relación de señal a ruido de 20 dB)	20 μV, 300 μV/m
Selectividad	55 dB
Rechazo de imagen a 1.000 kHz	40 dB
Rechazo de F.I. a 1.000 kHz	60 dB

GENERAL

Consumo de energía	220W
Alimentación de energía	
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros países	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensiones (An.×Al.×Prof.)	430 × 97 × 243 mm
Peso	5,1 kg



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
- * [XA] area is provided with voltage selector and AC outlet.
- * 240V (50/60Hz) for Australia.
- * 220V (50/60Hz) for Continental Europe.
- * 110V/120V/220V/240V (50/60Hz) for other [XA] area.
- * [XA] and [XL] areas are provided with AM allocation switch.
- * Phono input capacitance is about 150pF.



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PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again

Note:

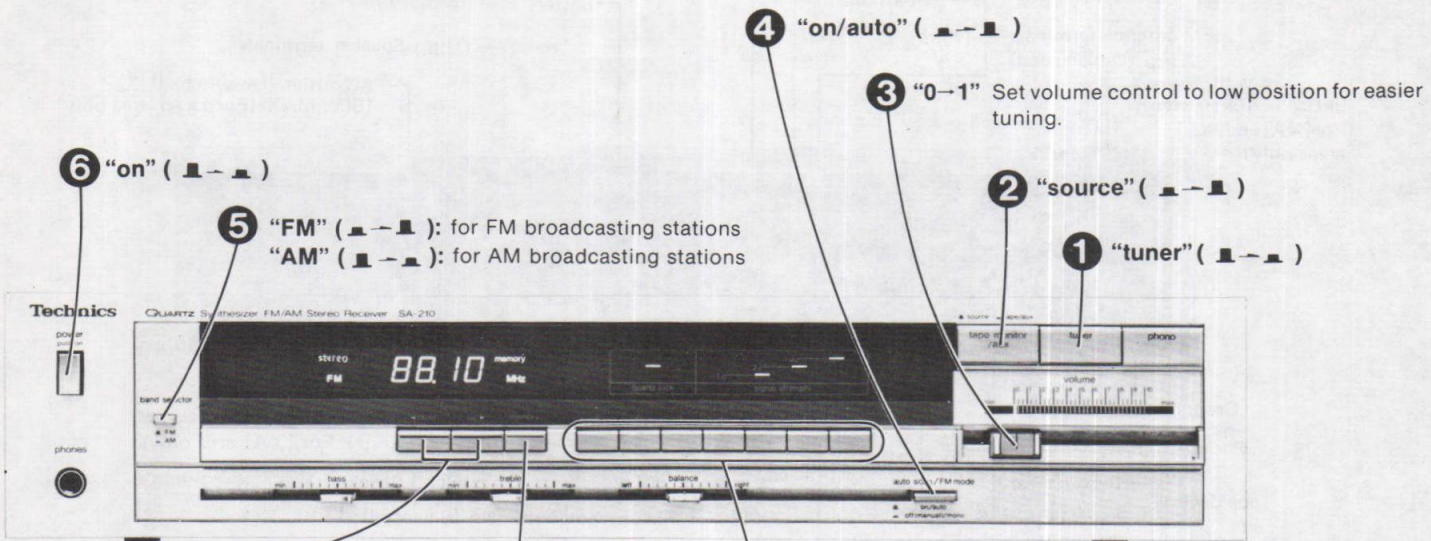
When the protection circuitry functions the unit will not operate unless the power is first turned off and then on again.

BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of the power supply capacitors (C702, C703, 4700 μ F) with a resistor (about 10 Ω , 5W) to discharge the charged voltage. Do not short both ends of C702 and C703 with a screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Consumed current	50 Hz	120 ~ 420mA	110 ~ 410 mA	60 ~ 210mA	50 ~ 200mA
	60 Hz	110 ~ 410 mA	100 ~ 400 mA	50 ~ 200 mA	40 ~ 190mA

HOW TO PRESET RADIO BROADCAST FREQUENCIES



7 Press one of the tuning buttons.

(The broadcast station will automatically be selected.)

Note:

If automatic selection can not be made, set the automatic-scan/FM mode selector to the "off (manual)/mono" position and then tune manually.

8 Press the memory button.

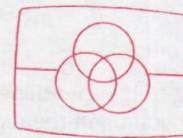
(The memory indicator will illuminate for about 5 seconds.)

9 While the memory indicator is illuminated, press the preset-tuning button (1~7) which you want to use for that station.

When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.

Note:

If the memory indication illumination stops before you press the button, once again repeat step (8) and then step (9).



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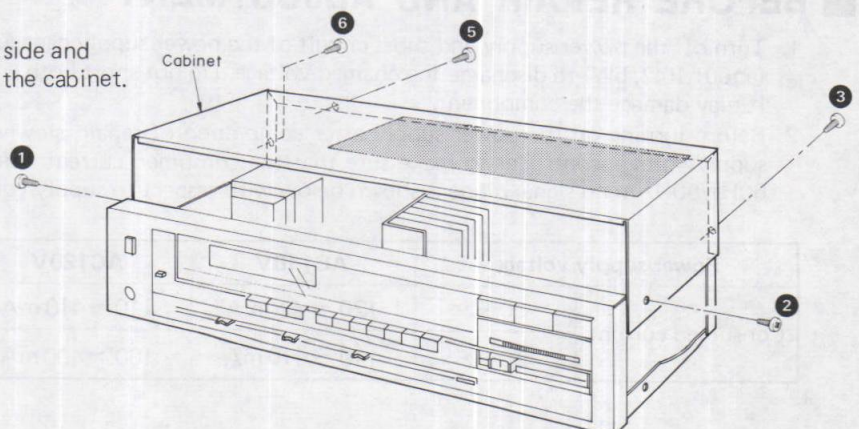
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DISASSEMBLY INSTRUCTIONS

How to remove the cabinet

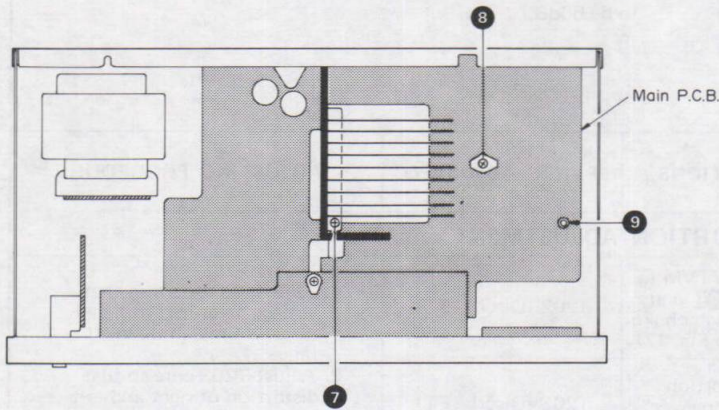
1. Remove the 2 setscrews (Fig. 1: ① ②) on the side and 3 setscrews (Fig. 1: ③, ⑤, ⑥) on the back of the cabinet.
2. Remove the cabinet upward.



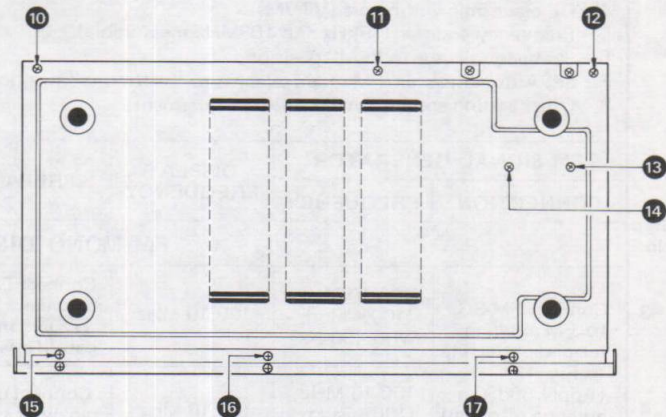
[Fig. 1]

● How to remove the bottom board

1. Remove the 2 setscrews (Fig. 2: 7 8) and lock pin (Fig. 2: 9) which secure the main P.C.B. from inside the set.
2. Remove the 8 setscrews (Fig. 3: 10 ~ 17) of the bottom board.
3. Remove the bottom board.



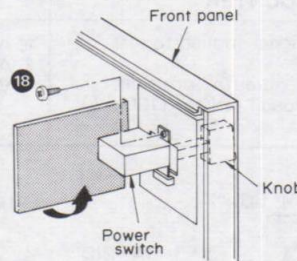
[Fig. 2]



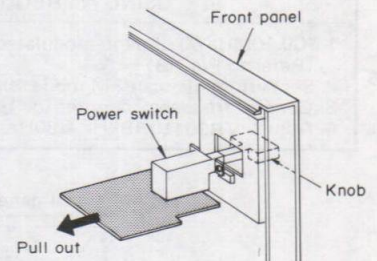
[Fig. 3]

● How to remove the power switch.

1. Remove the setscrew (Fig. 4: 18) of the power switch.
2. Next, lay down the power switch P.C.B. as shown in Fig. 5, and remove the power switch from the front panel.



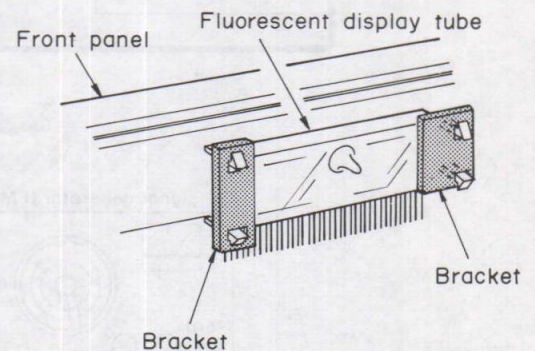
[Fig. 4]



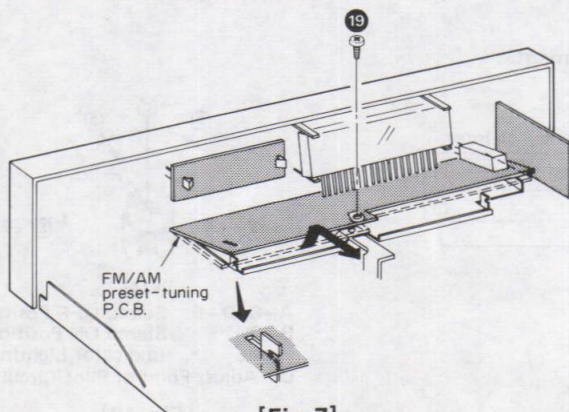
[Fig. 5]

● How to remove the front panel

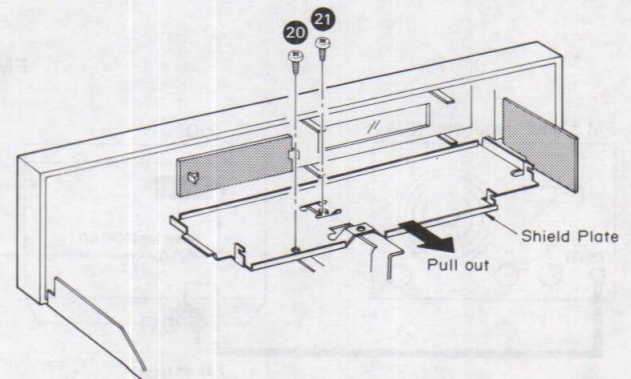
1. Remove the cabinet.
2. Remove the 2 brackets (Fig. 6) of the fluorescent display tube.
3. Remove the setscrew (Fig. 7: 19) of the FM/AM preset-tuning P.C.B., and then detach the FM/AM preset-tuning P.C.B.
4. Remove the 2 setscrews (Fig. 8: 20 21) of the shield plate, and then detach the shield plate.
5. Remove the 3 input selector knobs by pushing them from inside the front panel by use of a screwdriver or the like. (Refer to Fig. 9)
6. Remove the 3 setscrews (Fig. 3: 15 ~ 17) which secure the front panel from the bottom.
7. Next, release the side claws of the front panel to pull out the front panel toward you. (Fig. 10)



[Fig. 6]



[Fig. 7]



[Fig. 8]

FM ADJUSTMENT

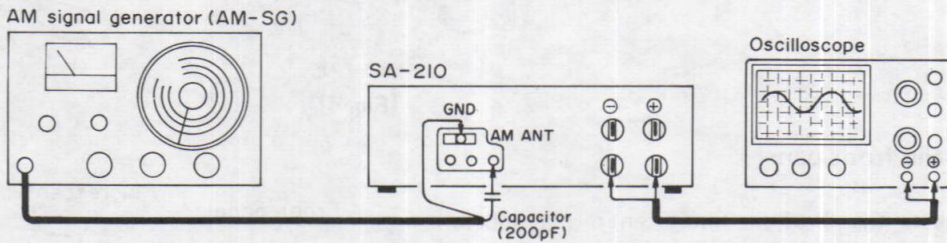
*** Setting and Equipment used**

1. FM signal generator (FM-SG)
2. Oscilloscope.
3. Distortion analyser.
4. DC electronic voltmeters (VTVM).
5. Frequency counter (19kHz and 108MHz measurable).
6. Set band selector to "FM" position.
7. Set Automatic-scan/FM mode select to "off/mono" position.
8. Other setting are the same as in AM adjustment.

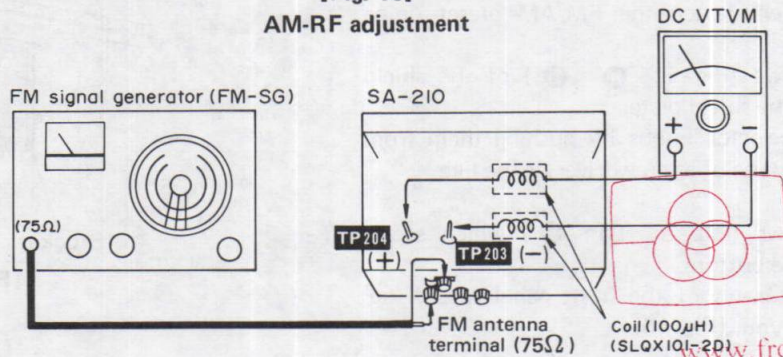
*** Preparation of FM signal generator (FM-SG)**

1. The standard input of the set is 60dB(1mV), 400Hz 100% modulation.
(Because of attenuation, using coaxial cables. SG output must be 6dB plus (IHF). That is, when input 60dB, SG output is to be 66dB.)

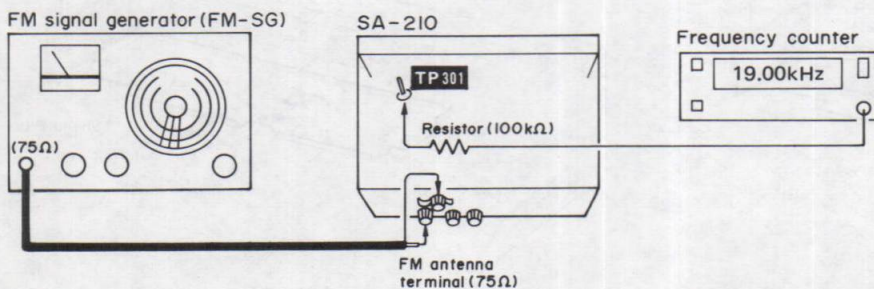
Step No.	FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
FM MONO DISTORTION ADJUSTMENT						
3	Connect FM-SG to FM antenna terminal referring to Fig. 17. (Apply 60dB to antenna terminal)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect DC VTVM to between TP203 and TP204 through choke coil. (Refer to Fig. 17)	T202 (Discri. IFT)	1. Adjust T202 core so that voltage measured in signal mode is 0mV in 300mV range. 2. Adjust T203 core so that distortion of right and left channels are minimized.
4		100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect distortion analyser to "speaker" terminal of the set.	T203 (Discri. IFT)	
FM MPX PILOT (VCO) ADJUSTMENT						
USING A FREQUENCY COUNTER				USING ALTERNATE SYSTEM		
5	1. 100.10MHz 60 dB Non-modulated mono signal applied to set. (Refer to Fig. 18) 2. Set Automatic-scan/FM mode selector to "on/auto" position. 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust VR301 to 19kHz ± 30Hz.			1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust VR301 until stereo indicator lights up. Cement arm of VR301 as shown in Fig. 19.		



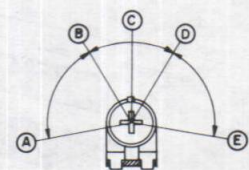
[Fig. 16] AM-RF adjustment



[Fig. 17] FM-IF adjustment



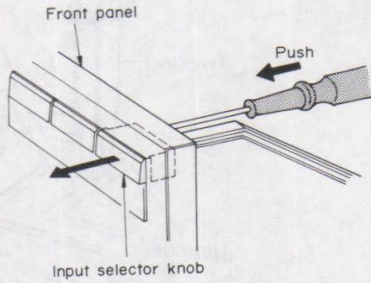
[Fig. 18] FM MPX PILOT (VCO) adjustment



VR301
A-B, D-E Stereo OFF Position.
B-D Stereo ON Position.
(indicator Lighting)
C Adjust Point of Pilot Circuit.

[Fig. 19]

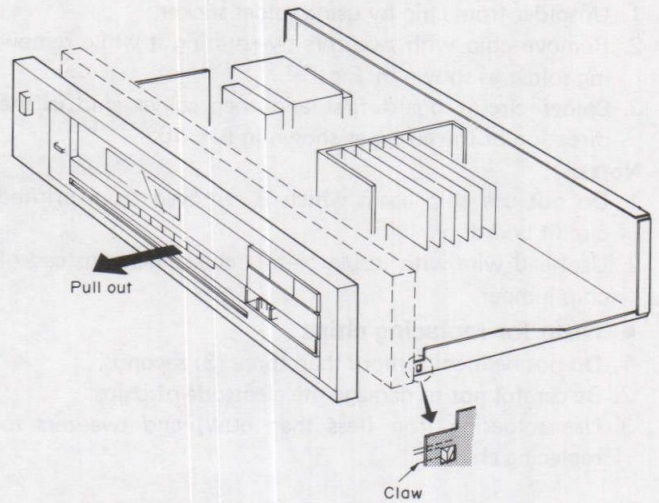
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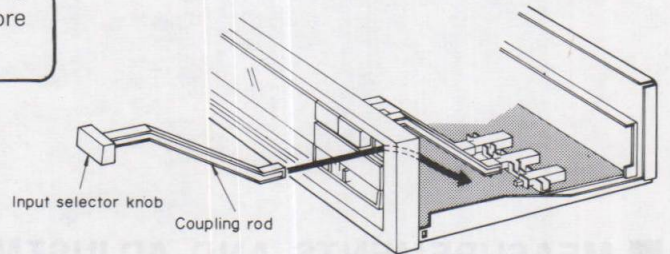
[Fig. 9]

NOTE

To set the input selector knob, fit the knob to the coupling rod as in Fig. 11, and set it through the front panel before attaching it to the switch.



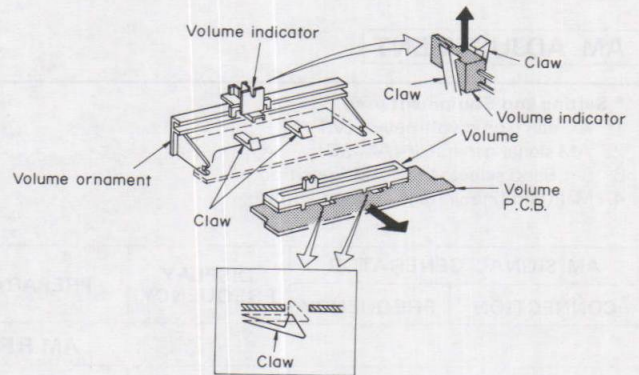
[Fig. 10]



[Fig. 11]

● How to remove the volume P.C.B. and volume indicator

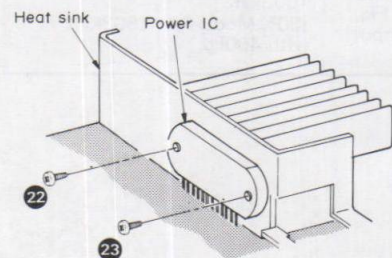
1. The volume P.C.B. is secured with the 2 claws projected from the volume ornament. So, release the claws with a screwdriver, and pull out the volume P.C.B. as shown in Fig. 12.
2. When removing the volume indicator, release the 2 claws which secure the volume indicator, and then remove the indicator upward. In this case, do not bend the claws excessively.



[Fig. 12]

● How to remove the power amplifier IC

1. Remove the cabinet and bottom board.
2. Unsolder of power IC.
3. Remove the 2 setscrews (Fig. 13: 22 23) used to secure the power IC on the heat sink, and then pull the power IC.
4. When mounting the power IC, apply silicone compound or equivalent heat diffuser to the rear side of power IC, and then follow the steps 1~4 reversely.



[Fig. 13]

• How to replace chips (resistors)

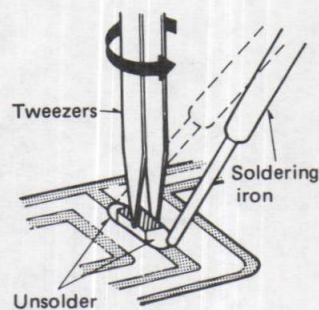
1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 14.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 15.

Notes:

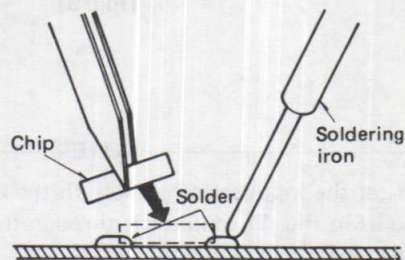
1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.

• Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.



[Fig. 14]



[Fig. 15]

MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L202) and AM IFT (T201) have been already adjusted, and require no adjustment.

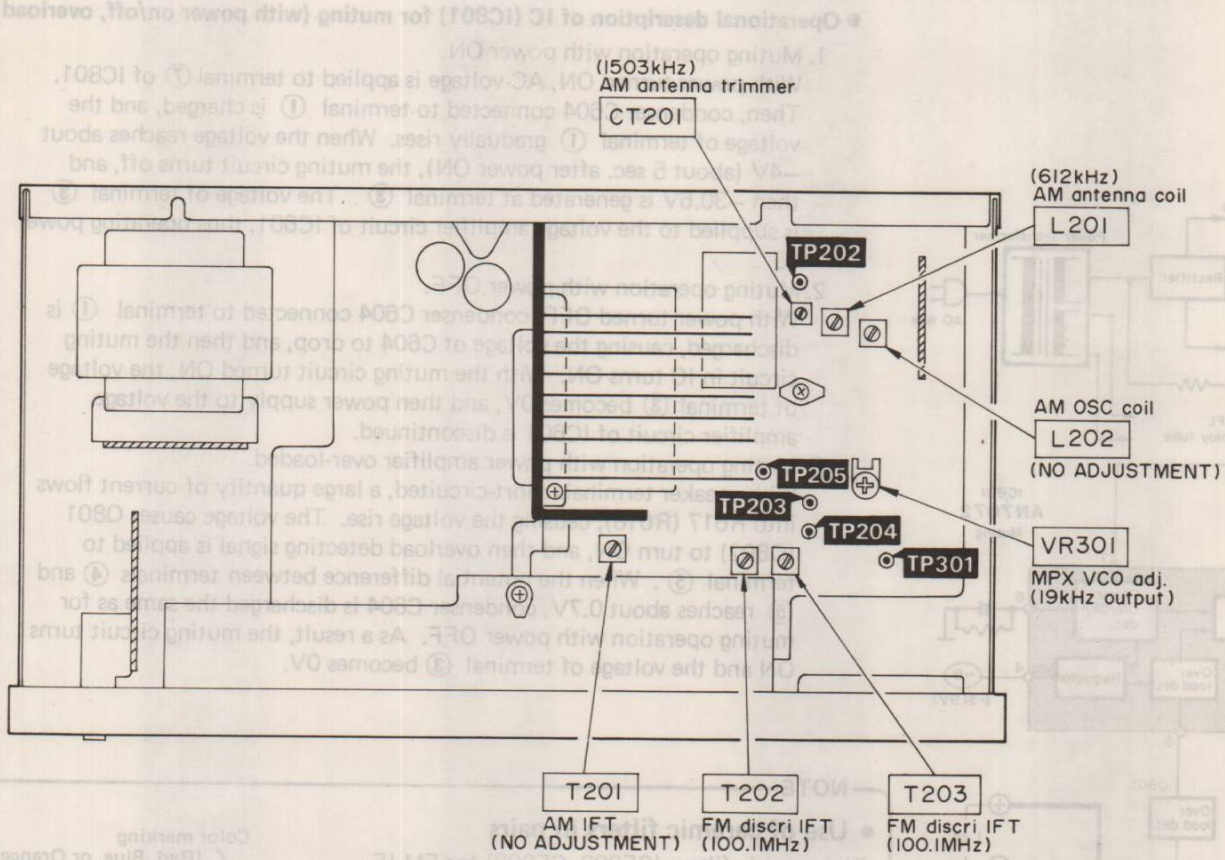
AM ADJUSTMENT

* Setting and Equipment used

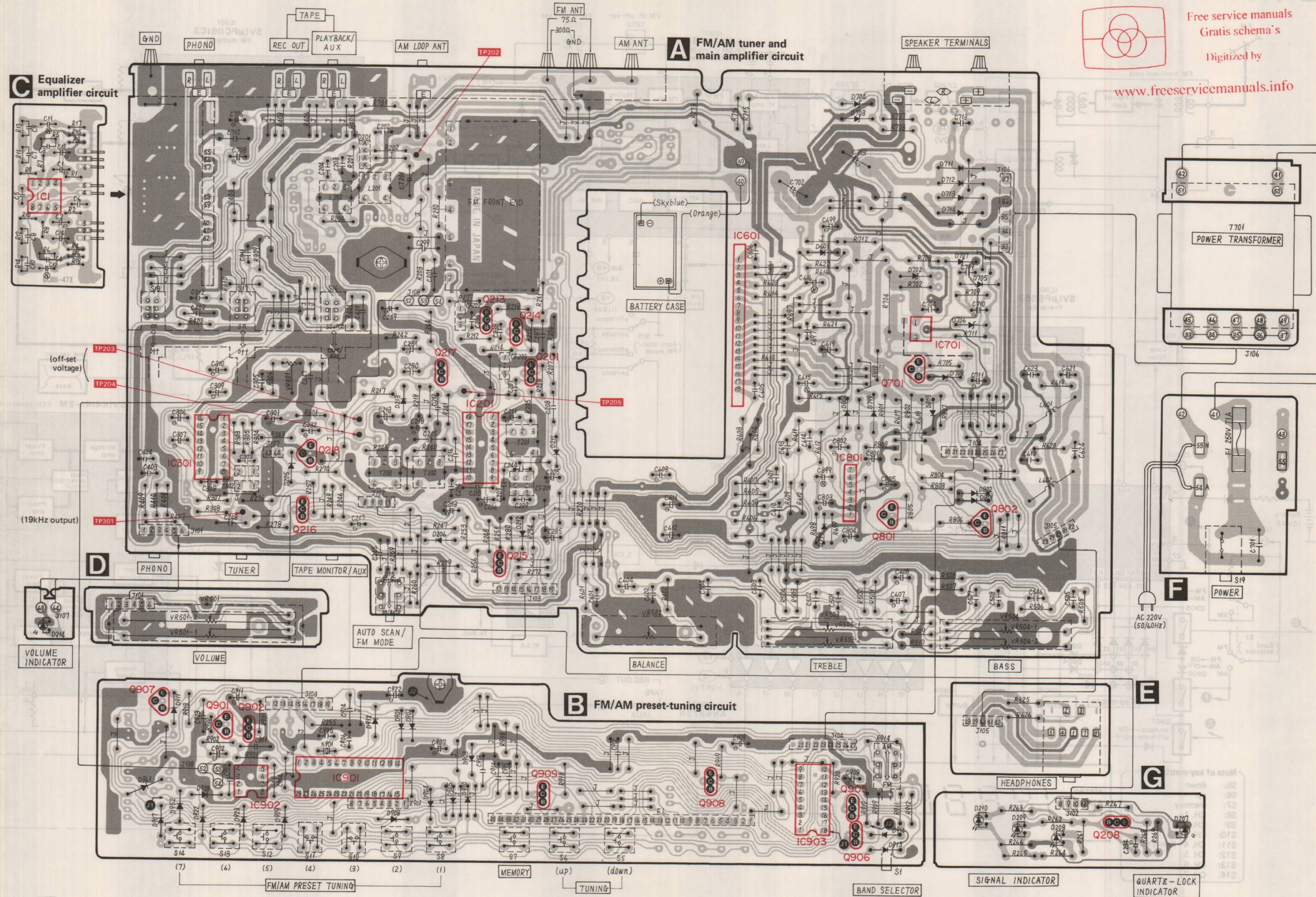
1. AC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Set Band selector to "AM" position.
4. Maintain line voltage at rated voltage.
5. Output of signal generator should be no higher than necessary to obtain an output reading.
6. Use a non-metal screwdriver for the adjustment.
7. Set AM allocation selector to "AM 9kHz step" position. (For [XA], [XL] areas only)

AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE	
CONNECTION	FREQUENCY					
AM-RF ADJUSTMENT						
1	Connect AM-SG to AM antenna terminal through 200pF capacitor referring to Fig. 16. (Weak input)	612kHz (30% Mod. with 400Hz)	612kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L201 by screwdriver.
2		1503kHz (30% Mod. with 400Hz)	1503kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (1) and (2) until the frequency correctly matches the frequency display.

● Adjustment points



■ PRINTED CIRCUIT BOARD



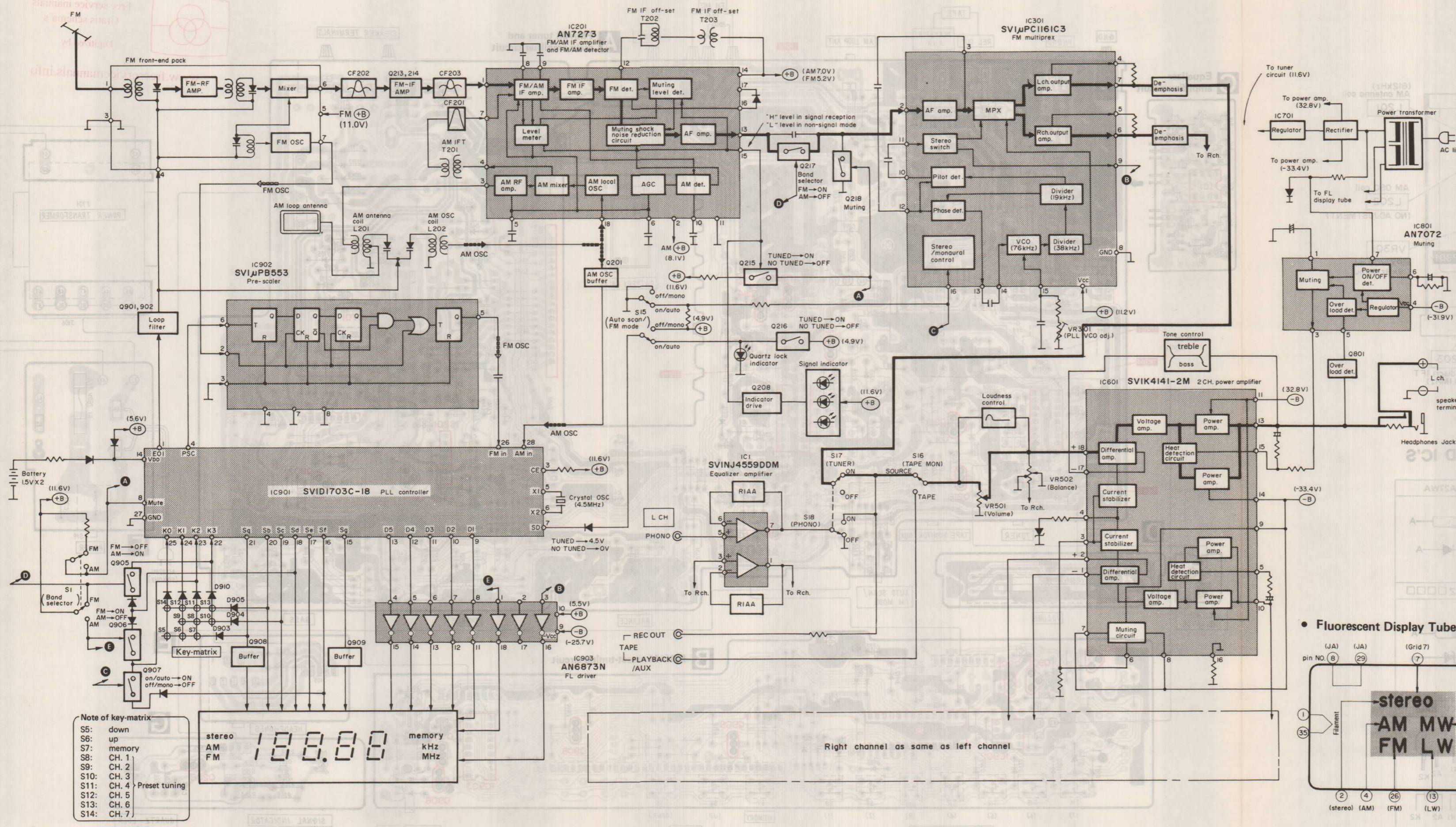
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■ TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

	AN6873N AN7273A SVID1703C018 SVIµ PB553C-E SVINJ4559DDM SVIµ PC1161C3	18pin 28pin 8pin 16pin	MA150TA 	MA27WA
	SVIK4141-2M LN224RP AN7072N		2SD636 	SVDMZ □□□□
	2SA564A, 2SA992, 2SC829, 2SC945, 2SC1685 LN346GR, LN846RP, LN446YP, AN7812		SVDS2V20, SVDSR1K2 	SVDKV1236Z

1. Voltage in
2. GND
3. Voltage out

BLOCK DIAGRAM



Operational description of IC (IC801) for muting (with power on/off, overload)

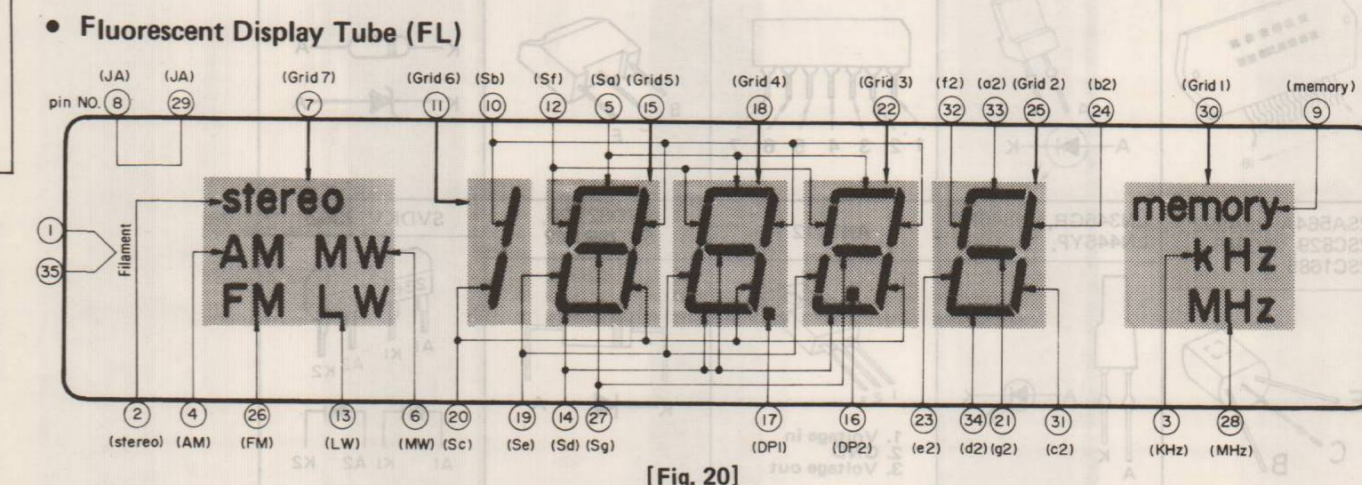
- Muting operation with power ON.** With power turned ON, AC voltage is applied to terminal ⑦ of IC801. Then, condenser C604 connected to terminal ① is charged, and the voltage of terminal ① gradually rises. When the voltage reaches about -4V (about 5 sec. after power ON), the muting circuit turns off, and then -30.6V is generated at terminal ③. The voltage of terminal ③ is supplied to the voltage amplifier circuit of IC601, thus operating power IC.
- Muting operation with power OFF.** With power turned OFF, condenser C604 connected to terminal ① is discharged, causing the voltage of C604 to drop, and then the muting circuit in IC turns ON. With the muting circuit turned ON, the voltage of terminal ③ becomes 0V, and then power supply to the voltage amplifier circuit of IC601 is discontinued.
- Muting operation with power amplifier over-loaded.** With speaker terminals short-circuited, a large quantity of current flows into R617 (R618), causing the voltage rise. The voltage causes Q801 (Q802) to turn ON, and then overload detecting signal is applied to terminal ⑤. When the potential difference between terminals ④ and ⑤ reaches about 0.7V, condenser C604 is discharged the same as for muting operation with power OFF. As a result, the muting circuit turns ON and the voltage of terminal ③ becomes 0V.

NOTE

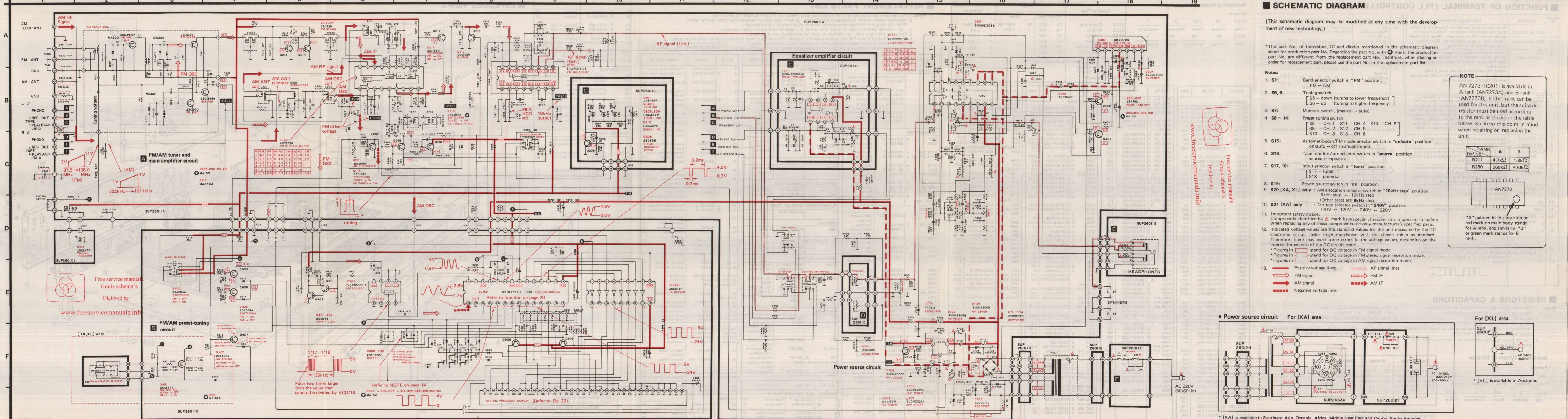
Use of ceramic filters in pairs
The ceramic filters (CF202, CF203) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair. At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.

RANK (color)	D907	D908	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	○	10.73 MHz
Blue	○	○	10.67 MHz

Notes: ○ Mark Diode is used.
X Mark Diode is not used.



[Fig. 20]



SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

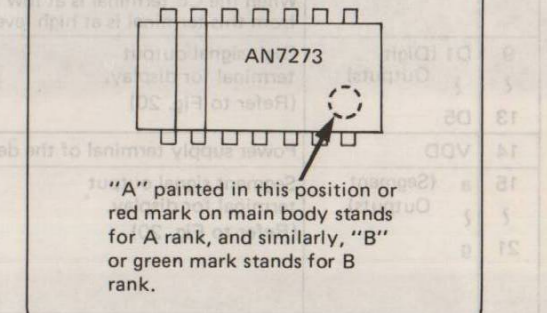
*The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with **A** mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.

- Notes:**
- S1:** Band selector switch in "FM" position. FM → AM
 - S5, 6:** Tuning switch [S5 - down (tuning to lower frequency)] [S6 - up (tuning to higher frequency)]
 - S7:** Memory switch. (manual ↔ auto)
 - S8 ~ 14:** Preset tuning switch. [S8 - CH. 1 S11 - CH. 4 S14 - CH. 6] [S9 - CH. 2 S12 - CH. 5] [S10 - CH. 3 S13 - CH. 6]
 - S15:** Automatic-scan/FM mode selector switch in "on/auto" position. on/auto ↔ off (manual/mono)
 - S16:** Tape monitor/aux selector switch in "source" position. source ↔ tape/aux
 - S17, 18:** Input selector switch in "tuner" position. [S17 - tuner] [S18 - phono]
 - S19:** Power source switch in "on" position.
 - S20 [XA, XL] only:** AM allocation selector switch in "10kHz step" position. 9kHz step ↔ 10kHz step (Other areas are 9kHz step.)
 - S21 [XA] only:** Voltage selector switch in "240V" position. 110V ↔ 120V ↔ 240V ↔ 220V

NOTE

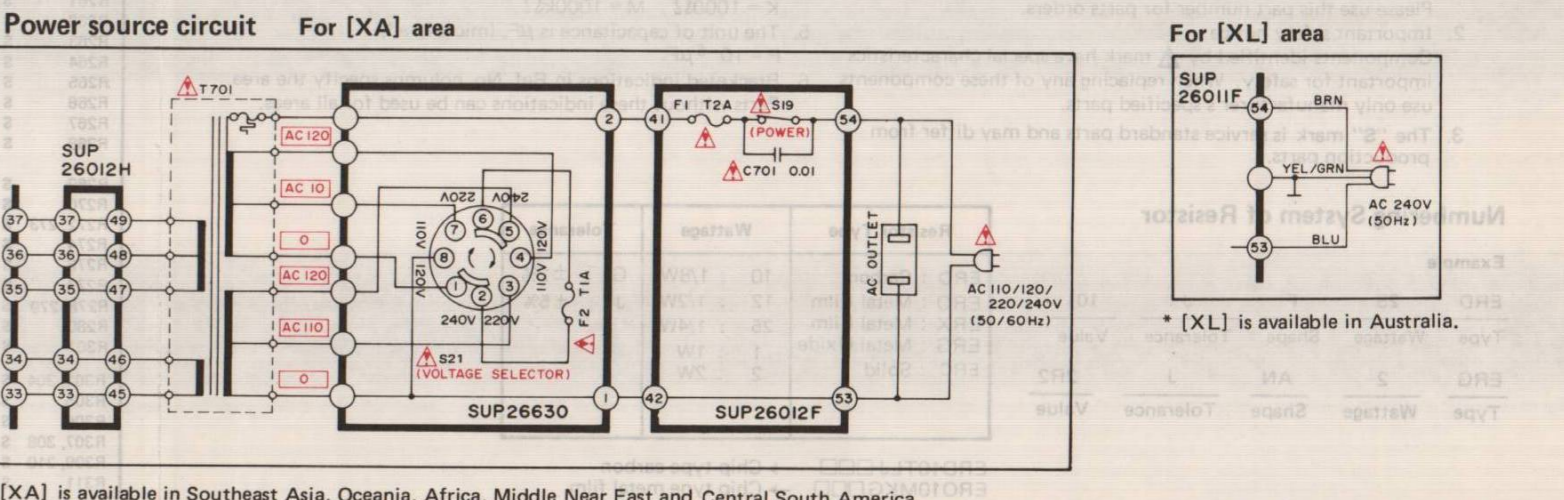
AN 7273 (IC201) is available in A rank (AN7273A) and B rank (AN7273B). Either rank can be used for this unit, but the suitable resistor must be used according to the rank as shown in the table below. So, keep this point in mind when repairing or replacing the unit.

RANK	Ref. No.	A	B
	R211	4.7kΩ	1.8kΩ
	R280	560kΩ	470kΩ



- Important safety notices:** Components identified by **Δ** mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
- 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.
 - * Figures in **□** stand for DC voltage in FM signal mode.
 - * Figures in **<** stand for DC voltage in FM stereo signal reception mode.
 - * Figures in **()** stand for DC voltage in AM signal reception mode.

- Positive voltage lines
 - FM signal
 - AM signal
 - Negative voltage lines
 - AF signal lines
 - FM IF
 - AM IF



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FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

Table with 3 columns: Terminal No., Terminal, Description of terminal. Includes terminals E01, E02, CE, X1, X2, SD, MUT, D1, D5, VDD, a, g, K3, K0.

Numbering System of Capacitor

Table showing capacitor numbering systems: ECKD, ECEA, ECEA, ECEA. Columns include Voltage, ECEA Type, Other, Tolerance.

RESISTORS

Large table listing resistors with columns: Ref. No., Part No., Value. Includes various resistor types and values.

CAPACITORS

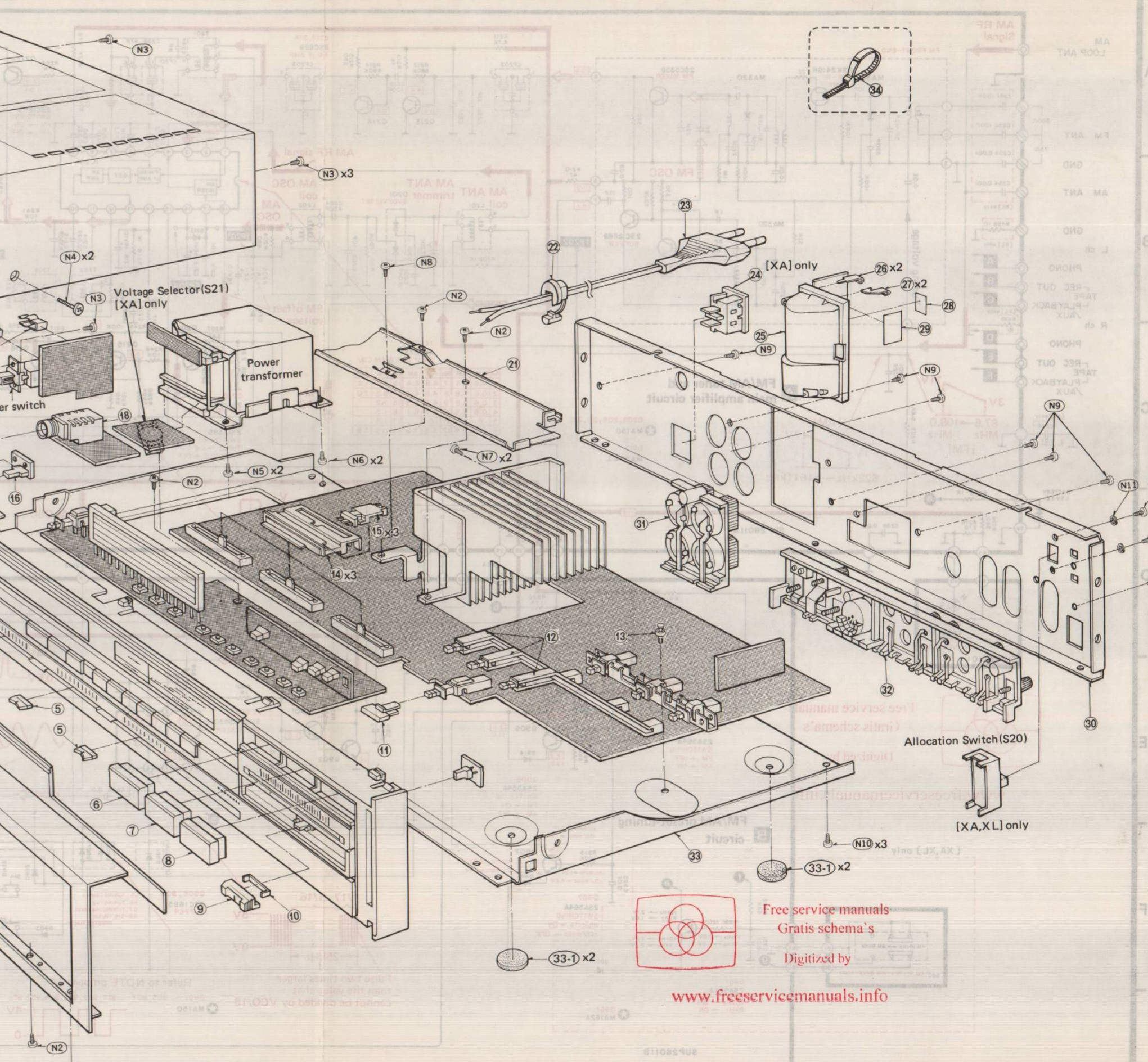
Large table listing capacitors with columns: Ref. No., Part No., Value. Includes various capacitor types and values.

REPLACEMENT PARTS LIST

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order. 2. Important safety notice: Components identified by Δ mark have special characteristics important for safety.

Main replacement parts list table with columns: Ref. No., Part No., Description. Includes integrated circuits, transformers, resistors, transistors, diodes, capacitors, and cabinet parts.

EXPLODED VIEWS



RESISTORS & CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders. 2. Important safety notice: Components identified by Δ mark have special characteristics important for safety.

Table showing resistor numbering systems: ERD, ERG, ERG. Columns include Resistor Type, Wattage, Tolerance, Value.

Table showing capacitor numbering systems: ERD, ERG, ERG. Columns include Resistor Type, Wattage, Tolerance, Value.

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order. 2. Important safety notice: Components identified by Δ mark have special characteristics important for safety.

Table showing cabinet and chassis parts with columns: Ref. No., Part No., Description & Pcs. Includes screws, fuses, and cabinet parts.