ORDER NO. HAD84082870C9

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

Stereo tuner

ST-G5

Color

(K)...Black Type
(S)...Silver Type

Color	Area
(K)(S)	[EX]... Switzerland and Scandinavia.
(K)(S)	[EH]... Holland.
(K)(S)	[XA]... Asia, Latin America, Africa, Middle Near East and Oceania.
(K)(S)	[XL]... Australia.
(K)(S)	[PA]... Far East PX.
(K)(S)	[PE]... European Military.
(K)(S)	[PC]... European Audio Club.

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
	87.525~108.00 MHz (+25 kHz shift)
Sensitivity	0.95 μV (IHF, usable)
S/N 30 dB	0.95 μV (75Ω)
S/N 26 dB	0.85 μV (75Ω)
S/N 20 dB	0.75 μV (75Ω)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO (normal)	0.03%
STEREO (normal)	0.04%
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	5 Hz~18 kHz, +0.2 dB~ −0.5 dB
Alternate channel selectivity	
normal ±400 kHz	55 dB
super narrow ±200 kHz	25 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	75 dB
IF rejection at 98 MHz	100 dB
Spurious response rejection at 98 MHz	100 dB
AM suppression	55 dB
Stereo separation	
1 kHz	60 dB
10 kHz	45 dB
Carrier leak	
19 kHz	−65 dB (−70 dB, IHF)
38 kHz	−48 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.0 dB
Limiting point	0.75 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
(For Europe, South Africa and Australia)	
	522~1611 kHz (9 kHz-step)
	530~1620 kHz (10 kHz-step)
(For Saudi Arabia and others)	
	531~1620 kHz (9 kHz-step)
	530~1620 kHz (10 kHz-step)
Sensitivity (S/N 20 dB)	20 μV, 290 μV/m
Selectivity (±9 kHz)	55 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ GENERAL

Output voltage	0.3V (0.6 V IHF)
Power consumption	9W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 53 × 245 mm
	(16-30/32" × 2-3/32" × 9-21/32")
Weight	2.4 kg
	(5.3 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

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

Technics

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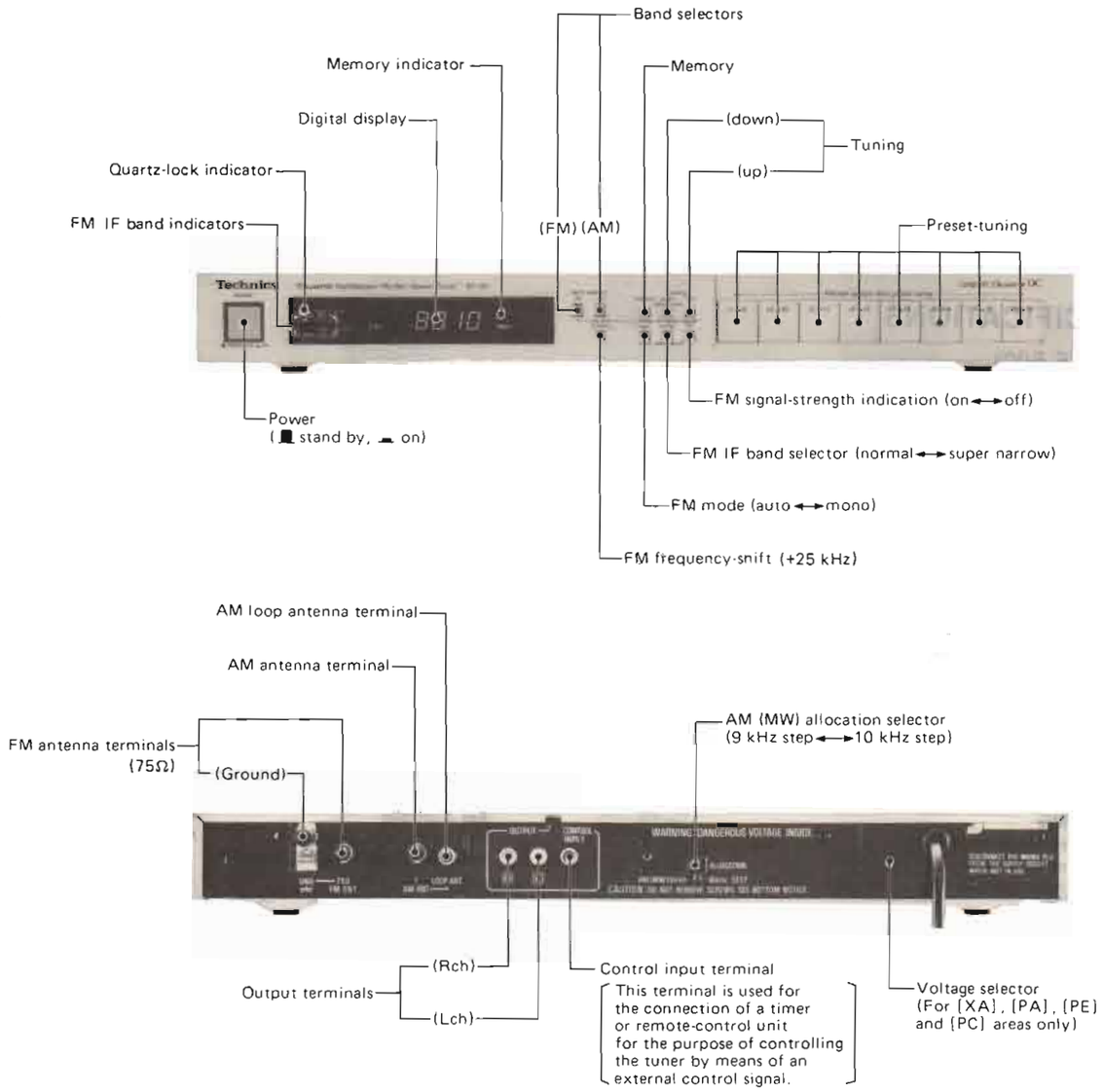
■ CONTENTS

■ LOCATION OF CONTROLS



* The power supply for this unit varied depending upon the areas.
Also, the parts used for power supply are different.
So, refer to the circuit diagram and the replacement parts list;
* 220V (50/60 Hz) for Continental Europe.
* 240V (50/60 Hz) for Australia.
* 110V/120V/220V/240V (50/60 Hz) for other areas.

QUARTZ Synthesizer
FM/AM Stereo Tuner

ST-G5

FRANÇAIS

- This booklet includes the specifications and adjustment of Model ST-G5 (Order No. HAD84082870C9) written in Franch and Spanish.
- File this booklet together with the service manual of Model ST-G5.

- Cette brochure comprend les spécifications et la mise au point du Modèle ST-G5 (Nº d'Ordre HAD84082870C9) écrites en francais et en espagnol.
- Classer cette brochure en meme temps qu'avec le manuel de service du Modele ST-G5.

- Este librito incluye las especificaçiones y ajuste de Model ST-G5 (Pedido Nº HAD84082870C9) escritas en francés y español.
- Guardar este librito juntamente con el manual servico de Modelo ST-G5.

FRANÇAIS

■ CARACTERISTIQUES

(DIN 45 500)

■ SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,00 MHz
	87,525~108,00 MHz (+25 kHz shift)
Sensibilité	0,95 μV (IHF utilisable)
S/B 30 dB	0,95 μV (75Ω)
S/B 26 dB	0,85 μV (75Ω)
S/B 20 dB	0,75 μV (75Ω)
Sensibilité stéréo au seuil de 46 dB, IHF	22 μV/75Ω
Distorsion harmonique totale	
MONO (normal)	0,03%
STEREO (normal)	0,04%
Signal/Bruit	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Réponse de fréquence	5 Hz~18 kHz, +0,2 dB~ −0,5 dB
Sélectivité alternée par canal	
normal ±400 kHz	55 dB
super narrow ±200 kHz	25 dB
Taux de capture	1,0 dB
Rejection d'image à 98 MHz	75 dB
Rejection FI à 98 MHz	100 dB
Rejection de réponse parasite à 98 MHz	100 dB
Suppression AM	55 dB
Séparation stéréophonique	
1 kHz	60 dB
10 kHz	45 dB
Fuite de porteuse	
19 kHz	−65 dB (−70 dB, IHF)
38 kHz	−48 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1,0 dB
Point de limite	0,75 μV
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence	
(Pour l'Europe, l'Afrique du Sud et l'Australie)	
	522~1611 kHz (9 kHz par palier)
	530~1620 kHz (10 kHz par palier)
(Pour l'Arabie Saoudite et les autres pays)	
	531~1620 kHz (9 kHz par palier)
	530~1620 kHz (10 kHz par palier)
Sensibilité (S/B 20 dB)	20 μV, 290 μV/m
Sélectivité (±9 kHz)	55 dB
Réjection d'image à 999 kHz	40 dB
Réjection FI à 999 kHz	60 dB

■ DIVERS

Tension de sortie	0,3 V (0,6 V IHF)
Consommation	9W
Alimentation	
Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 53 × 245 mm
Poids	2,4 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

(Sujet à changement sans préaris)

■ MESURAGES ET REGLAGES

Nota: La bobine oscillatrice de modulation d'amplitude (L203) a déjà été ajustée et ne nécessite pas de réglage.

REGLAGE DE AM

*** Réglage et équipement utilisé**
1. Voltmètres électronique de courant alternatif (EVM).
2. Générateur de signaux AM (AM-SG)
3. Sélecteur de gamme . . . . . AM
4. Conserver la tension de ligue sur la tension nominale.
5. La sortie du signal du générateur ne doit pas être plus élevée qu'il n'est nécessaire pour obtenir une lecture en sortie.
6. Utiliser un tournevis non-métallique pour la réglage.

Nº	GENERATEUR DE SIGNAUX AM BRANCHEMENT	GENERATEUR DE SIGNAUX AM FREQUENCE	FREQUENCE D'AFFICHAGE	PREPARATIFS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE IF-AM					
1	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée puissante) (Se référer à la Fig. 1.)	450kHz (modulé à 30% par 400Hz)	Fréquence de non-interférence	C.A. voltmètre électronique ou oscilloscope aux bornes de sortie de l'appareil.	T201 (1 er transfo. FI AM) T203 (2 ème transfo. FI AM)	1. Régler la fréquence d'entrée et les points de réglage de telle sorte que la sortie devienne maximale.
	REGLAGE DE RF-AM					
2	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible) (Se référer à la Fig. 1.)	612kHz (modulé à 30% par 400Hz)	612kHz	Brancher le voltmètre électronique à courant alternatif ou l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	L202 (Bobine Ant.)	1. Régler au maximum du signal de sortie. 2. Régler le fil de L202 à l'aide d'un tournevis.
3		1503kHz (modulé à 30% par 400Hz)	1503kHz		CT201 (Trimmer Ant.)	1. Régler au maximum du signal de sortie. 2. Refaire les étapes (2) et (3) jusqu'á ce que la fréquence s'aligne correctement avec l'affichage de la fréquence.

REGLAGE DE FM

*** Réglage et équipement utilisé**
1. Générateur de signaux FM (FM-SG)
2. Analyseur de distorsion.
3. Oscilloscope.
4. Voltmètres électronique de courant continu (EVM).
5. Compteur de fréquences (19kHz et 108MHz mesurables).
6. Sélecteur de gammes sur la position "FM".
7. Placer le sélecteur de mode FM sur la position "mono".
8. Placer le sélecteur de gammes IF FM sur la position "normal".

*** Préparatifs pour le générateur de signaux FM (FM-SG).**
1. Appliquer la sortie du générateur de signaux à la borne de l'antenne de l'appareil par l'antenne fictive FM de 75M.
2. L'entrée standard de l'appareil est de 60 dB (1mV), 400 Hz, 100% de modulation (à cause de l'utilisation de l'antenne fictive, la sortie du générateur de signaux doit être de plus 12 dB (4μV) (IHF). Ce qui signifie que quand l'entrée est de 60 dB (1mV), la sortie du générateur de signaux doit être de 72 dB (4mV)).
3. Raccorder le modulateur stéréo à FM-SG.

Nº	GENERATEUR DE SIGNAUX FM BRANCHEMENT	GENERATEUR DE SIGNAUX FM FREQUENCE	FREQUENCE D'AFFICHAGE	PREPARATIFS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE LA DISTORSION FM EN MONO					
4	Branchez le générateur de signaux à la borne d'antenne FM à travers une antenne fictive FM de 75Ω. (Appliquer 60 dB (1 mV) à la borne d'antenne.) Fig. 2	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	Brancher le voltmètre électronique à C.C. aux bornes TP101 et TP102 par une bobine d'arrêt. (Voir la Fig. 2)	T101 (Transfor. FI discri.)	1. Régler le noyau T101 de telle sorte que la tension mesurée dans le signal de mode soit de 0mV dans la gamme des 300mV.
5				Branchez un analyseur de distorsion sur les bornes de sortie.	T102 (Transfor. FI discri.)	1. Régler le noyau T102 de telle sorte que la distortion des canaux droit et gauche soit minimisée.
	RÉGLAGE MULTIPLEX FM (de l'osc. commandé par variation de tension)					
6	AVEC UN FRÉQUENCEMÈTRE 1. Signal mono de 100.10MHz 60dB non modulé appliqué à l'appareil. 2. Commutateur de mode FM sur "auto". 3. Branchez le fréquencemètre sur TP301 par l'intermédiaire d'une condensateur (50V 1μF). (Voir Fig. 3.) 4. Régler VR301 sur 19kHz ±30Hz.			EN UTILISANT UN SYSTÈME ALTERNATIF 1. Appliquer un signal stéréophonique provenant du générateur ou de la station stéréo au tuner. 2. Ajuster VR301 et jusqu'à ce que l'indicateur stéréo s'éclaire. Mastiquer le bras de VR301 comme il est montré à la Fig. 4.		

Nº	GENERATEUR DE SIGNAUX FM BRANCHEMENT	GENERATEUR DE SIGNAUX FM FREQUENCE	FREQUENCE D'AFFICHAGE	PREPARATIFS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE L'ANNULATION DU SIGNAL PILOTE (19kHz)					
7	Raccorder le générateur de signaux FM à la borne d'antenne FM, en se référant à la Fig. 5. (Appliquer 60 dB à la borne d'antenne.)	100.10MHz (0% signal pilote 10% modulé à 100% par 400Hz)	100.10MHz	Brancher le voltmètre électronique à C.C. la entre TP302 et la masse.	L301 VR302 (Annulation du signal pilote de 19kHz)	1. Régler au minimum du signal de sortie.
	REGLAGE DU COURANT PORTEUR DE DISPERSION DE SORTIE					
8	Raccorder le générateur de signaux FM à la borne d'antenne FM, en se référant à la Fig. 6. (Appliquer 60 dB à la borne d'antenne.)	100.10MHz (0% signal pilore 10% modulé à 100% par 400Hz)	100.10MHz	Oscilloscope sur bornes de sortirne. **(Note)** Le courant porteur de dispersion est fortement affecté par la déviation de la fréquence reçue. Aussi, est-il important de régler correctement la fréquence du générateur de signaux FM (FM-SG).	VR303 (Courant porteur de dispersion de sortie)	1. Ajuster VR303 de telle sorte que la forme d'onde de sortie soit telle que celle montrée à la Fig. 6-1. **(Nota)** La Fig. 6-2 représente une forme d'onde provoquée du fait d'un réglage incorrect de VR303. La Fig. 6-3 représente une forme d'onde crée e par un réglage inapproprié de L301 ou VR302.
	REGLAGE DE LA DISTORSION STEREO					
9	Raccorder le générateur de signaux FM à la borne d'antenne FM. (Appliquer 60 dB à la borne d'antenne) (Signal stéréo pilote à 10% de modulation)	100.10MHz (modulé à 90% par 400Hz) (Mode G ou D.)	100.10MHz	Brancher l'analyseur de distorsion bornes de sortie (OUTPUT) de l'appareil par un fietre passe-bas. (fc = 15kHz ~ 19kHz).	T1 (IFT)	Ajuster le noyau T1 de telle sorte que la distorsion des canaux de droite et de gauche soit réduite au minimum.
	REGLAGE LA SEPARATION DES CANAUX					
10	Raccorder le générateur de signaux FM à la borne d'antenne FM (Signal stéréo pilote à 10% de modulation)	100.10MHz (modulé à 90% par 1kHz) (Mode G ou D.)	100.10kHz	Brancher le voltmètre électronique à C.A. aux bornes de sortie de l'appareil par un filtre passe-bas. (fc = 15kHz ~ 19kHz).	VR304 (Separation)	Régler VR304 de telle sorte droite soitur minimale quand la commande d'accord stéréophonique est sur le mode gauche (modulation du canal gauche) et que la sortie gauche soit minimale sur le de mode droite.
	AJUSTEMENT DU NIVENU D'INTENSITE DES SIGNAUX					
11	Raccorder le générateur de signaux FM à la borne d'antenne FM. (Appliquer 54 dB à la borne d'antenne.)	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	———	VR501 (Niveau d'intensité des signaux)	1. Régler VR501 de façon à ce que 54 dB soit indique. 2. S'assurer que le niveau d'intensité des signaux soit de 22 ~ 38 dB lorsque l'entrée est de 30 dB.

ESPAÑOL

■ ESPECIFICACIONES

(DIN 45 500)

■ SECCION PARA SINTONIZADOR FM

Gama de frecuencias	87,50~108,00 MHz 87,525~108,00 MHz (+25 kHz shift)
Sensibilidad	0,95 μV (IHF, utilizable)
Señal a ruido 30 dB	0,95 μV (75Ω)
Señal a ruido 26 dB	0,85 μV (75Ω)
Señal a ruido 20 dB	0,75 μV (75Ω)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω
Distorsión armónica total	
MONO. (MONO) (normal)	0,03%
ESTEREO (STEREO) (normal)	0,04%
Relación de señal a ruido	
MONO. (MONO)	70 dB (78 dB, IHF)
ESTEREO (STEREO)	65 dB (70 dB, IHF)
Respuesta de frecuencia	5 Hz~18 kHz, +0,2 dB~ −0,5 dB
Selectividad alternada de canal	
normal ±400 kHz	55 dB
super narrow ±200 kHz	25 dB
Relación de captura	1,0 dB
Rechazo de imagen a 98 MHz	75 dB
Rechazo de F.I. a 98 MHz	100 dB
Rechazo de respuesta espuria a 98 MHz	100 dB
Supresión AM	55 dB
Separación estereofónica	
1 kHz	60 dB
10 kHz	45 dB
Fuga de onda portadora	
19 kHz	−65 dB (−70 dB, IHF)
38 kHz	−48 dB (−50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,0 dB
Punto de límite	0,75 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	75Ω (no equilibrado)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias	
(Para paises europeos, Africa del Sur y Australia)	522~1611 kHz (9 kHz pasos) 530~1620 kHz (10 kHz pasos)
(Para Arabia Saudita y demás paises)	531~1620 kHz (9 kHz pasos) 530~1620 kHz (10 kHz pasos)
Sensibilidad (Relación de señal a ruido de 20 dB)	20 μV, 290 μV/m
Selectividad (±9 kHz)	55 dB
Rechazo de imagen a 999 kHz	40 dB
Rechazo de F.I. a 999 kHz	60 dB

■ GENERAL

Voltaje de salida	0,3V (0,6 V IHF)
Consumo de energia	9W
Alimentación de energia	
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros paises	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensiones (An.×Al.×Prof.)	430 × 53 × 245 mm
Peso	2,4 kg

Nota:
La distorsión armónica total se mide con el analizador de espectro digital (sistema H.P. 3045).

(Estas especificasciones están sujetas a cualquier cambio sin previo eviso.)

■ MEDICIONES Y AJUSTES

Nota: La bobina de OSC AM (L203) ha sido ya ajustada y no requiere ajuste.

AJUSTE DE AM

*** Puesta y equipos usados.**
1. Voltímetros electrónicos (EVM) de CA.
2. Generador de señales AM (AM-SG).
3. Poner selector de banda en posición "AM".
4. Mantener el voltaje de línea a voltaje nominal.
5. La salida del generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida.
6. Para el ajuste, usar un destornillador no metálico.

Nº	GENERADOR DE SEÑALES AM CONEXION	GENERADOR DE SEÑALES AM FRECUENCIA	A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	AJUSTE IF-AM					
1	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF. Común a chasis. (Entrada potente) (Referir a la Fig. 1)	450kHz (Mod. 30% con 400Hz)	Frecuencia de no interferencia.	Conectar EVM de CA u osciloscopio a terminales "OUTPUT".	T201 (Primer IFT AM) T202 (Segundo IFT AM)	1. Ajustar frecuencia de entrada y los puntos de ajuste de manera que la salida se convierta en máxima.

	GENERADOR DE SEÑALES AM		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE RF-AM					
2	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF. Común a chasis. (Entrada débil) (Referir a la Fig. 1.)	612kHz (Mod. 30% con 400Hz)	612kHz	Conectar EVM de CA u oscilloscopio a terminales "OUTPUT" (salida).	L202 (Bobina ANT)	1. Ajustar para salida máxima. 2. Ajustar el cable de L202 con destornillador.
3		1503kHz (Mod. 30% con 400Hz)	1503kHz	Conector EVM de CA u osciloscopio a terminales "OUTPUT" (salida).	CT201 (Trimer de ANT)	1. Ajustar para salida máxima. 2. Repetir pasos (2) y (3) hasta que la frecuencia se adapte correctamente a la escala del cuadrante.

AJUSTE DE FM

*** Puesta y equipos usados**
1. Generador de señales FM (FM-SG).
2. Analizador de distorsión.
3. Osciloscopio
4. Voltimetros electrónicos (EVM) de CC.
5. Frecuencímetro (19kHz y 108MHz medibles)
6. Poner selector de banda en posición "FM".
7. Poner el interruptor de modalidad FM en la posición "MONO".
8. Poner selector de banda FM IF en la posición "normal".

*** Preparación de generador de señales FM (FM-SG)**
1. Aplicar salida SG a terminal de antena del aparato a través de antena ficticia de FM de 75Ω.
2. La entrada standard del aparato es 60 dB (1 mV), modulación 100%, 400Hz (Por el uso de antena ficticia, la salida de SG ha de ser 12 dB (4μV) más (IHF). Es decir, cuando la entrada es 60 dB (1mV), salida de SG ha de ser 72 dB (4mV).
3. Conectar el modulador estereofónico a FM-SG.

	GENERADOR DE SEÑALES FM		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE DE DISTORSION FM MONO					
4	Conectar FM-SG a terminal de antena FM a través de antena ficticia FM de 75Ω. (Aplicar 60 dB (1 mV) a terminal de antena).	100,10MHz (Mod. 100% con 400Hz)	100,10MHz	Conector EVM de CC entre terminal **TP101** y **TP102** a través de bobina de choque. (Referir a Fig. 2).	T101 (Discri. IFT)	1. Ajustar núcleo de T101 de manera que voltaje medido en modalidad de señal sea 0mV en gama de 300mV. 2. Ajustar núcleo de T102 de manera que distorsión de canales derecho e izquierdo se minimice.
5		100,10MHz (Mod. 100% con 400Hz)	100,10MHz	Conectar el analizador de distorsión a terminales "OUTPUT" del aparato.	T102 (Discri. IFT)	
	AJUSTE DE V.C.O. MPX de FM					
	USANDO UN FRECUENCIMETRO			USANDO SISTEMA ALTERNATIVO		
6	1. Señal mono no modulada de 100,10MHz, 60dB aplicada al aparato. 2. Interruptor de modalidad FM a "auto". 3. Conectar frecuencímetro a **TP301** a través de resistor (50V). (Ver la Fig. 3) 4. Ajustar VR301 a 19kHz ± 30Hz.			1. Aplicar una señal estereofónica del generador o una emisión estereofónica al sintonizador. 2. Ajustar VR301 hasta que se encienda el indicador de estéreo. Cementar el brazo de VR301 como se muestra en la Fig. 4. (Ver la Fig. 4).		
	AJUSTE DE ANULADOR PILOTO (19kHz)					
7	Conectar FM-SG a terminal de antena FM refiriendo a Fig. 5 (Aplicar 60 dB a terminal de antena)	100,10MHz (Piloto 0%, Mod. 10% con 400Hz)	100,10MHz	Conectar EVM de CA y osciloscopio entre **TP302** y tierra.	L301 (Anulador piloto 19kHz) VR302 (Anulador piloto 19kHz)	1. Ajustar para salida mínima.
	AJUSTE DE PORTADORA DE FUGA DE SALIDA					
8	Conectar FM-SG a terminal de antena FM refiriendo a Fig. 6. (Aplicar 60dB a terminal de antena)	100,10MHz (Piloto 0% Mod. 10% con 400Hz)	100,10MHz	Conectar osciloscopio a terminales "OUTPUT" (salida). **(Nota)** La portadora de fuga queda grandemente afectada por la desviación de la frecuencia recibida. Por lo tanto, es importante ajustar correctamente la frecuencia del generador de señales de FM (FM-SG).	VR303 (Portadora de fuga de salida)	1. Ajustar VR303 de manera que la forma de onda de salida sea como se muestra en la Fig. 6-1. **(Nota)** La Fig. 6-2 es la forma de onda causada debido a ajuste inadecuado de VR303. La Fig. 6-3 es la forma de onda causada debido a ajuste inadecuado de L301 o VR302.

	GENERADOR DE SEÑALES FM		A FREQUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE DE DISTORSION DE ESTEREO					
9	Conectar FM-SG a terminal de antena FM (Aplicar 60dB a terminal de antena) (Señal estereofónica de Mod. Piloto 10%)	100,10MHz (Mod. 90% con 400Hz) (Modalided L (izq.) o R (der.))	100,10MHz	Conectar analizador de distorsión a terminales "OUTPUT" (salida) del aparato a través de filtro pasabajos. (fc = 15kHz ~ 19kHz)	T1 (IFT) (Transformador de FI)	Ajustar núcleo T1 de manera que se minimice la distorsión de canales derecho e izquierdo.
	AJUSTE DE SEPARACIÓN					
10	Conectar FM-SG a terminal de antena FM. (Señal estereofónica de Mod. Piloto 10%)	100,10MHz (Mod. 90% con 1kHz) (Modalided L (izq.) o R (der.))	100,10MHz	Conectar EVM de CA a terminales "OUTPUT" (salida) del aparato a través de filtro pasabajos. (fc = 15kHz ~ 19kHz)	VR304 (Separación)	Ajustar VR304 de manera que se minimice la salida R (der) cuando el modulador estereofónico está en modalidad L (modulación de canal izq.) y que la salida L (izq.) se minimice en modalidad R (der.)
	AJUSTE DE NIVEL DE INTENSIDAD DE SEÑAL					
11	Conectar FM-SG a terminal de antena FM. (Aplicar 54dB a terminal de antena.)	100,10MHz (Mod. 100% con 400Hz)	100,10MHz	———	VR501 (Nivel de intensidad de señal)	1. Ajustar VR501 de manera que se indiquen 54dB. 2. Asegurarse de que el nival de intensidad de señal sea 22 ~ 38dB cuando la entrada es 30dB.

Printed in Japan
840805300 Ⓗ YK/IM

■ HOW TO PRESET RADIO BROADCAST FREQUENCIES

This unit can be used to preset as many as 16 radio broadcast frequencies: FM/AM random presetting. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

• Memory presetting

There are two types of memory presetting: automatic and manual. Select whichever is preferred.

• Before memory presetting

Each button is used to preset two stations.

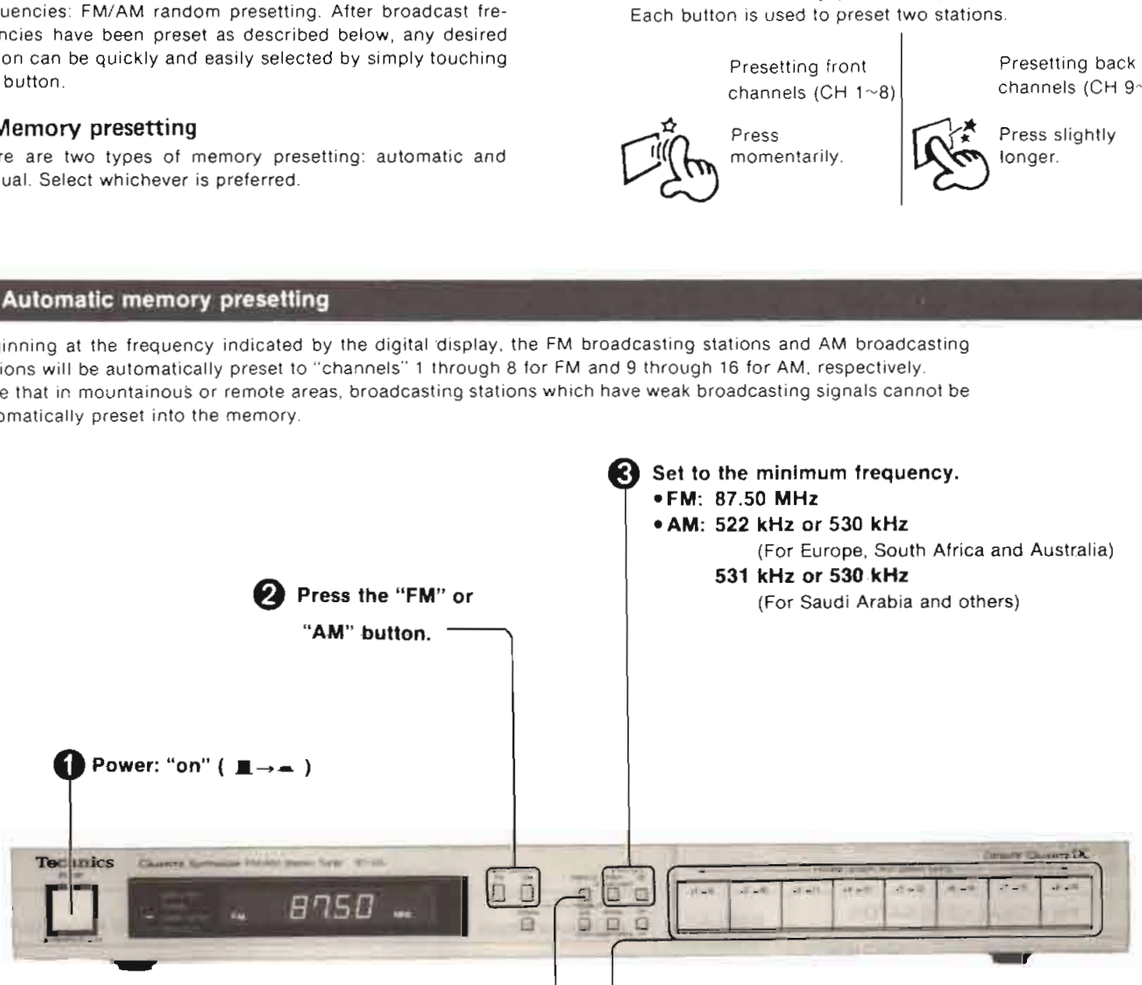
Automatic memory presetting

Beginning at the frequency indicated by the digital display, the FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 8 for FM and 9 through 16 for AM, respectively.
Note that in mountainous or remote areas, broadcasting stations which have weak broadcasting signals cannot be automatically preset into the memory.

❶ Power: "on" (■→▬)

❷ Press the "FM" or "AM" button.

❸ Set to the minimum frequency.
- **FM: 87.50 MHz**
- **AM: 522 kHz or 530 kHz**
  (For Europe, South Africa and Australia)
  531 kHz or 530 kHz
  (For Saudi Arabia and others)



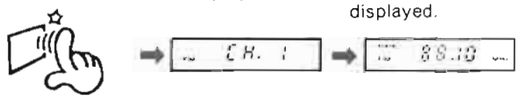
❹ Press. When the frequency indication begins to change, release.

(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)

❺ Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

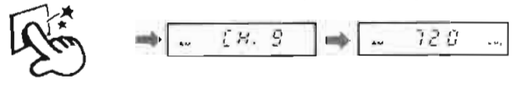
To check the front channels (CH1~8):

Press momentarily. → Channel number is displayed. → Frequency stored in the memory is displayed.



To check the back channels (CH 9~16):

Press slightly longer. → Release the button when the channel number is displayed. → Frequency stored in the memory is displayed.



Manual memory presetting

Stations can be freely preset to any desired channel.

❶ Power: "on" (■→▬)

❷ Press the "FM" or "AM" button.

❸ Press the appropriate tuning button to tune to the desired broadcast.

- **Auto tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

- **Manual tuning**
  Press the button momentarily (the frequency will change each time the button is pressed) and tune to the desired station.

❹ Press momentarily, and then release.
(The memory indicator will illuminate for approximately 4 seconds.)

Note:
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.
In order to stop the automatic selection, press either the "up" button or the "down" button.

❺ While the memory indicator is illuminated, press the button of the desired channel.

- **To preset channels 1 through 8:**

Press the button momentarily, and then release.

- **To preset channels 9 through 16:**

Press the button slightly longer, and then release.

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

Note:
1. If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

❻ Enter the name (call sign, etc.) of the preset broadcasting station on the file sheet.
This completes the procedures for presetting radio broadcast frequencies. The other preset-tuning buttons can be preset in the same way by following steps (2) through (5).

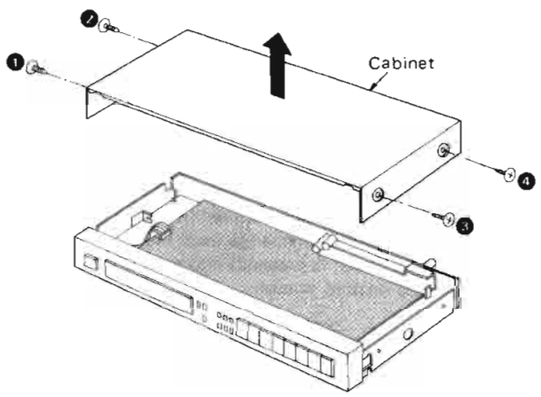
■ BEFORE REPAIR

The power switch of this unit is located on the secondary side of the power transformer. Be sure to disconnect the power cord from the socket before servicing. Also, do the following before repair of digital circuits.

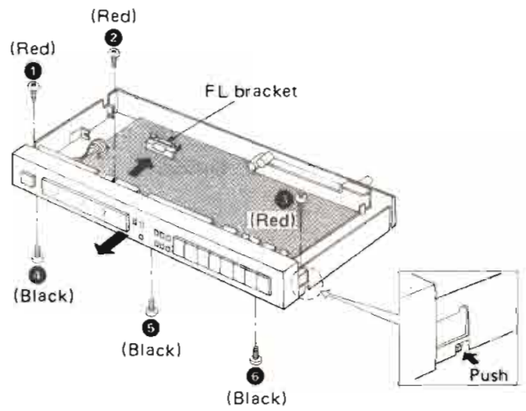
(1) Disconnect the power cord from the socket.
(2) Using a 10Ω, 1W resistor, short circuit electrolytic "gold" capacitors C904 and C905 momentarily to discharge them.

■ DISASSEMBLY INSTRUCTIONS

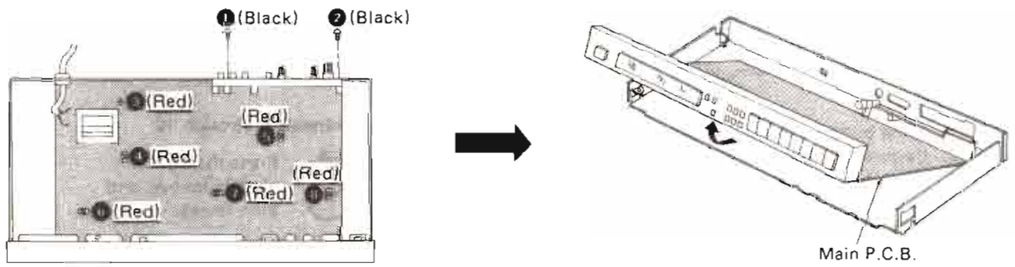
Ref. No. 1	How to remove the cabinet
Procedure 1	• Remove the 4 screws (❶ ~ ❹)



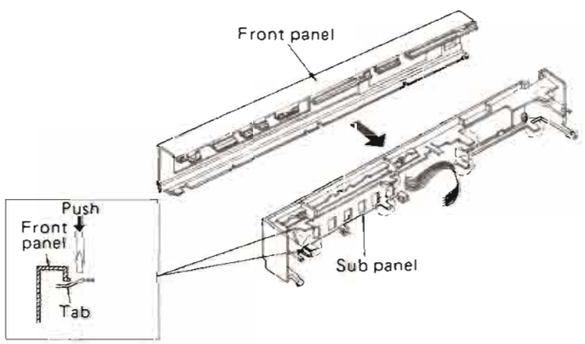
Ref. No. 2	How to remove the front panel
Procedure 1 → 2	• Remove the 6 screws (❶ ~ ❻)

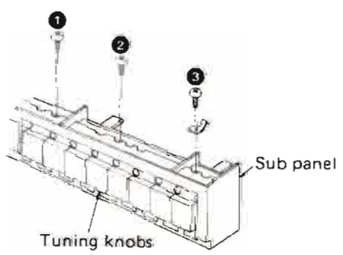


Ref. No. 3	How to remove the main P.C.B.
Procedure 1 → 2 → 3	• Remove the 8 screws (❶ ~ ❽) • Slightly pull the front panel toward you and remove the main P.C.B.



Ref. No. 4	How to remove the front sub-panel and tuning knobs
Procedure 1 → 2 → 4	• Push the 8 tabs aside • Remove the 3 screws (❶ ~ ❸)





■ MEASUREMENTS AND ADJUSTMENTS

Note: **AM OSC coil (L203) have been already adjusted, and require no adjustment.**

AM ADJUSTMENT

* **Setting and Equipment used**
1. AC electronic voltmeters (EVM).
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.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200 pF capacitor. Common to chassis. (Powerful input) (Refer to Fig. 1)	450 kHz (30% Mod. with 400 Hz)	Frequency of non-interference	Connect AC EVM or scope to "OUTPUT" terminals.	T201 (AM 1st IFT) T202 (AM 2nd IFT)	1. Adjust the input frequency and adjustment points so that the output becomes maximum.
	AM-RF ADJUSTMENT					
2	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input) (Refer to Fig. 1)	612 kHz (30% Mod. with 400 Hz)	612 kHz	Connect AC EVM or scope to "OUTPUT" terminals.	L202 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L202 by screwdriver.
3		1503 kHz (30% Mod. with 400 Hz)	1503 KHz	Connect AC EVM or scope to "OUTPUT" terminals.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (2) and (3) until the frequency correctly matches the frequency display.

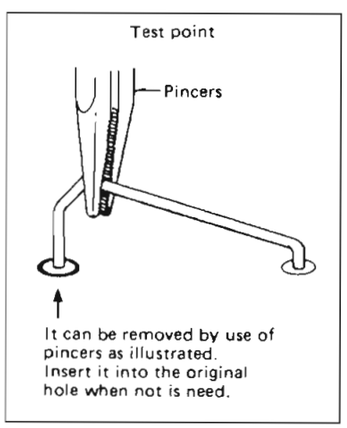
FM ADJUSTMENT

* **Setting and Equipment used**
1. FM signal generator (FM-SG).
2. Distortion analyser
3. Oscilloscope
4. DC electronic voltmeters (EVM).
5. Frequency counter (19 kHz and 108 MHz measurable).
6. Set band selector to "FM" position.
7. Set FM mode selector to "mono" position.
8. Set FM IF band selector to "normal" position.

* **Preparation of FM signal generator (FM-SG)**
1. Apply SG output to antenna terminal of the set through 75Ω FM dummy antenna.
2. The standard input of the set is 60 dB (1 mV), 400Hz, 100% modulation [Because of using dummy antenna, SG output must be 12 dB (4μV) plus (IHF). That is, when input 60 dB (1 mV), SG output is to be 72 dB (4 mV)].
3. Connect stereo modulator to FM-SG.

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM MONO DISTORTION ADJUSTMENT					
4	Connect FM-SG to FM antenna terminal referring to Fig. 2. (Apply 60 dB to antenna terminal.)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect DC EVM between **TP101** and **TP102** through choke coil. (Refer to Fig. 2)	T101 (Discri. IFT)	1. Adjust T101 core so that voltage measured in signal mode is 0 mV in 300 mV range. 2. Adjust T102 core so that distortion of right and left channels are minimized.
5		100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect distortion analyser to "OUTPUT" terminals.	T102 (Discri. IFT)	
	FM MPX V.C.O. ADJUSTMENT					
6	USING A FREQUENCY COUNTER 1. 100.10 MHz, 60 dB Non-modulated mono signal applied to set. 2. FM mode switch to "auto" position. 3. Connect frequency counter to **TP301** through capacitor (50V 1μF) referring to Fig. 3. 4. Adjust **VR301** to 19 kHz ± 30 Hz.			USING ALTERNATE SYSTEM 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. 4		

	FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
	PILOT CANCEL (19 kHz) ADJUSTMENT					
7	Connect FM-SG to FM antenna terminal referring to Fig. 5. (Apply 60 dB to antenna terminal.)	100.10 MHz (0% Pilot 10% Mod. with 400 Hz)	100.10 MHz	Connect AC EVM and scope to between TP302 and ground.	L301 (Pilot cancel 19 kHz) VR302 (Pilot cancel 19 kHz)	1. Adjust for minimum output.
	OUTPUT LEAK CARRIER ADJUSTMENT					
8	Connect FM-SG to FM antenna terminal referring to Fig. 6. (Apply 60 dB to antenna terminal.)	100.10 MHz (0% Pilot 10% Mod. with 400 Hz)	100.10 MHz	Connect scope to "OUTPUT" terminals. **Note:** Leak carrier is greatly affected by the deflection of received frequency. So, it is important to correctly set the frequency of FM signal generator (FM-SG).	VR303 (Output leak carrier)	1. Adjust VR303 so that output wave-form is as shown in Fig. 6-1. **Note:** Fig. 6-2 is the wave-form caused due to improper adjustment of VR303. Fig. 6-3 is the wave-form caused due to improper adjustment of L301 or VR302.
	STEREO DISTORTION ADJUSTMENT					
9	Connect FM-SG to FM antenna terminal. (Apply 60 dB to antenna terminal.) (Pilot 10% Mod. stereo signal.)	100.10 MHz (90% Mod. with 400 Hz) (L or R mode)	100.10 MHz	Connect distortion analyser to "OUTPUT" terminals of the set through low-pass filter. (fc = 15 kHz ~ 19 kHz)	T1 (IFT)	Adjust T1 core so that distortion of right and left channels are minimized.
	SEPARATION ADJUSTMENT					
10	Connect FM-SG to FM antenna terminal. (Pilot 10% Mod. stereo signal.)	100.10 MHz (90% Mod. with 1 kHz (L or R mode)	100.10 MHz	Connect AC EVM to "OUTPUT" terminals of the set through low-pass filter. (fc = 15 kHz ~ 19 kHz)	VR304 (Separation)	Adjust VR304 so that R output is minimized when stereo modulator is in L (L ch. modulation) mode and that L output is minimized in R mode.
	SIGNAL STRENGTH LEVEL ADJUSTMENT					
11	Connect FM-SG to FM antenna terminal. (Apply 54 dB to antenna terminal.)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	———	VR501 (Signal strength level)	1. Adjust VR501 so that 54 dB is indicated. 2. Make sure that the signal strength level is 22 ~ 38 dB when the input is 30 dB.



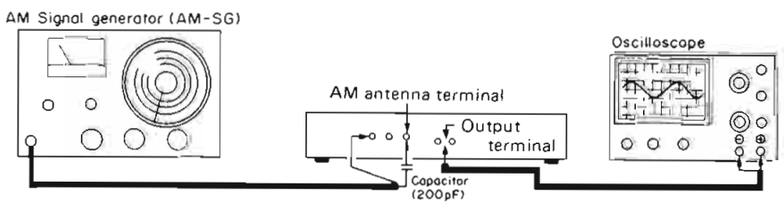


Fig. 1 (Adjustment of AM)

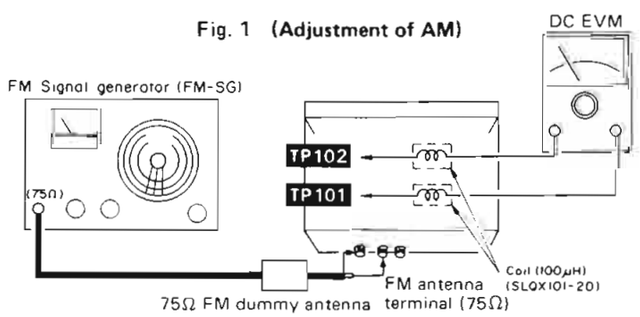


Fig. 2 (Adjustment of FM off-set)

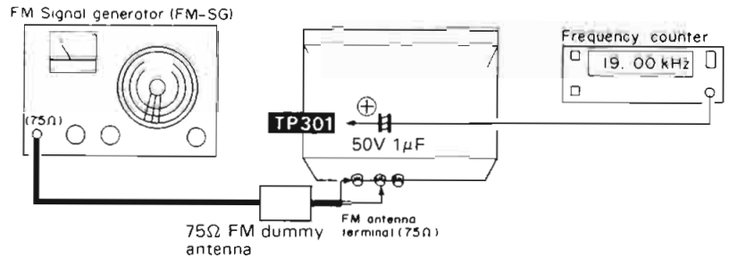


Fig. 3 (Adjustment of FM MPX VCO)

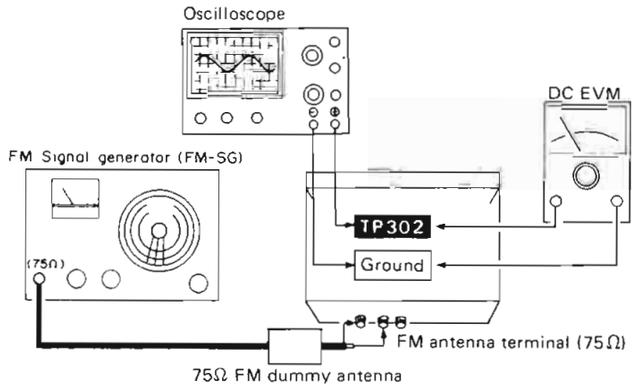
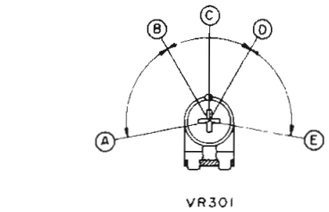


Fig. 5 (Adjustment of pilot cancel)



Ⓐ–Ⓑ, Ⓓ–Ⓔ : Stereo OFF position.
Ⓑ–Ⓓ : Stereo ON position. (indicator lighting)
Ⓒ : Adjust point of pilot circuit

Fig. 4 (Adjustment of FM MPX VCO)

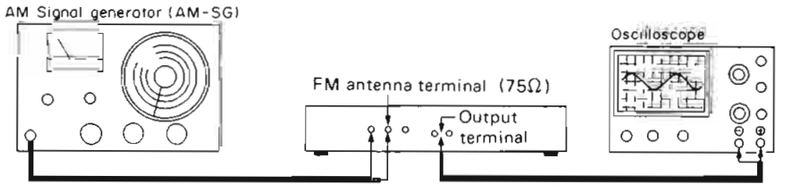


Fig. 6 (Adjustment of output leak carrier)

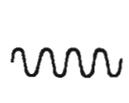


Fig. 6–1

Fig. 6–2

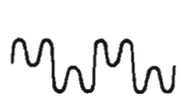
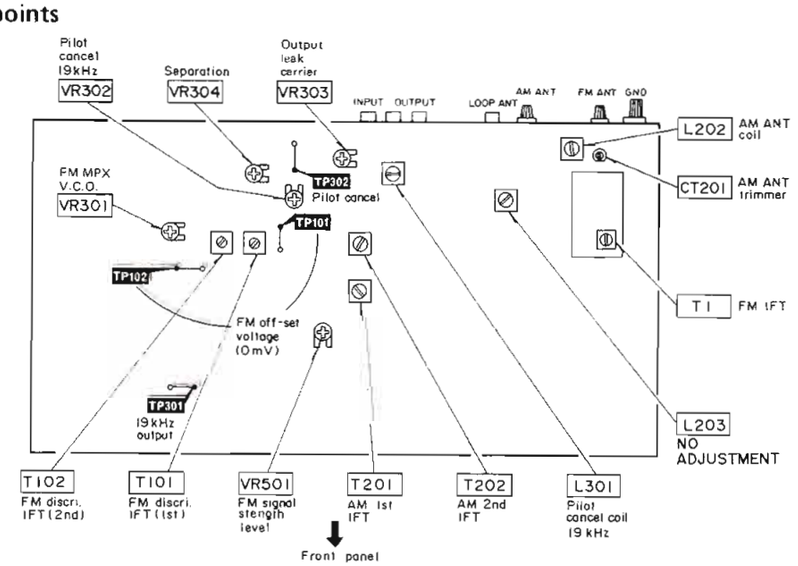
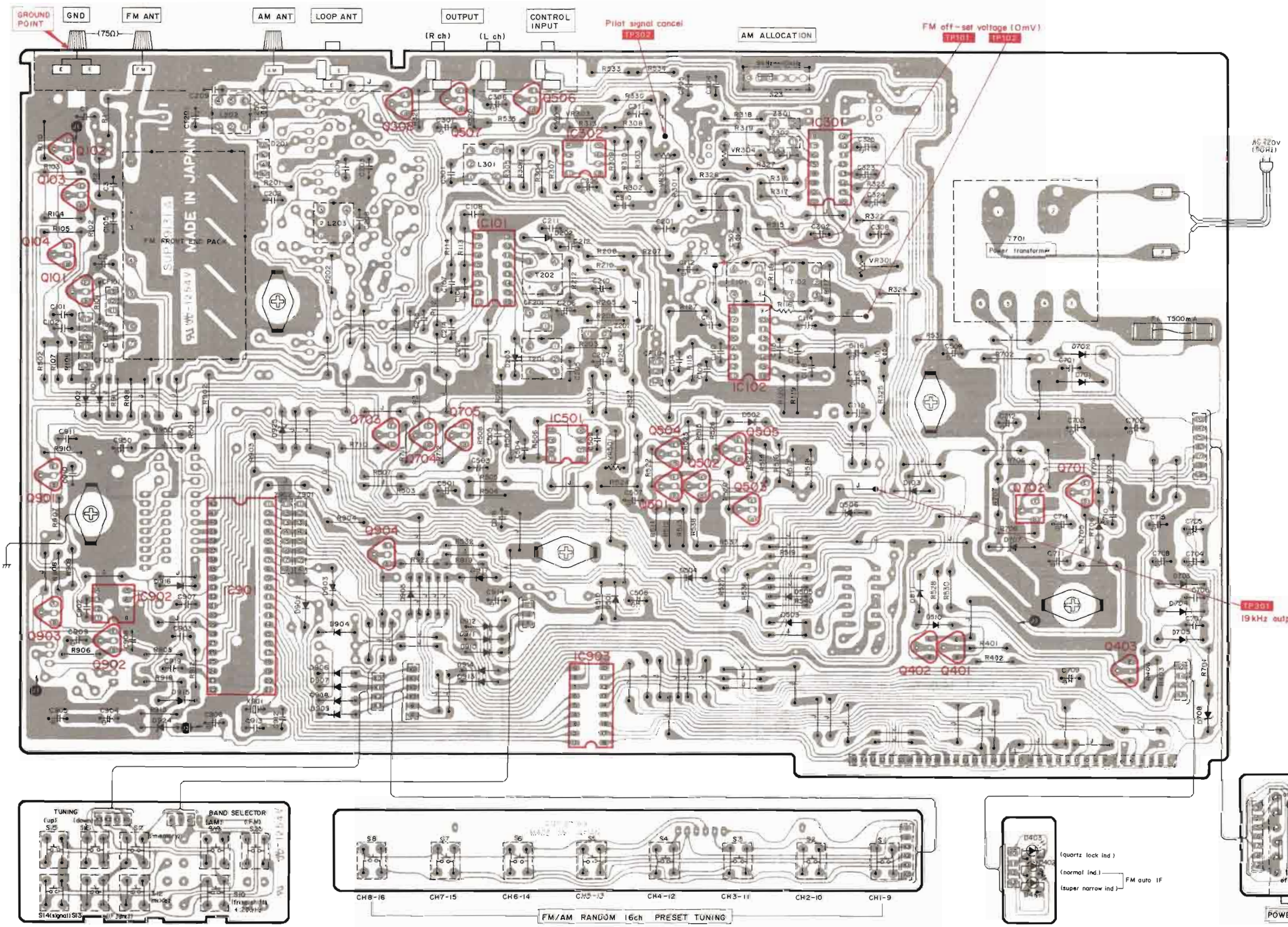


Fig. 6–3

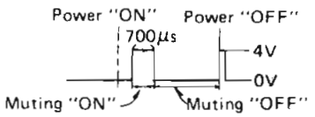
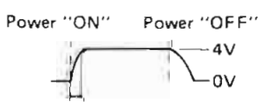
- Adjustment points

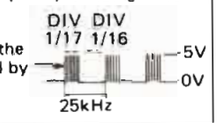
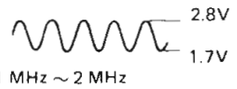


■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



■ FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

Pin No.	Mark	Description of terminal
1	Sa	Segment signal output terminal for display. (Refer to Fig. 7)
2	Sb	
3	Sc	
4	Sd	
5	Se	
6	Sf	
7	Sg	
8	K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source. 
9	K1	
10	K2	
11	K3	
12	D6	Digit signal output terminal for display. (Refer to Fig. 7)
13	D5	
14	D4	
15	D3	
16	D2	
17	D1	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level. 
18	MT	
19	X2	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
20	X1	
21	VDD	Power supply terminal of the device.
22	E01	Not used in this unit.
23	GND	Ground terminal.
24	E02	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
25	CE	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D6) terminals are off, but the memory is held.  The device does not operate during this period.
26	SD	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
27	FM	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler.

Pin No.	Mark	Descripiton of terminal
28	PSC	Reference signal for pre-scaler This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (27) until the content of the inside swallow counter is 0. The frequency dividing radio of prescaler is 1/17. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16. Pulse two times larger than the value that cannot be divided by VCO/16. 
29	INT	This is the interrupt demand signal input terminal. The signal from the control input terminal is put into this terminal, demanding for interruption, then the flow of program will be unconditionally shifted to the address No. 1.
30	AM	Input terminal for AM OSC output.  1 MHz ~ 2 MHz
31	Dp	2-bit input/output. Dp (31) is decimal point indication output terminal for digital indication. Lamp (32) is not used in this unit.
32	Lamp	
33	IF	4-Bit output port. IF (33) is normal/super narrow output terminal. 5V in super narrow and 0V in normal. FM (35) is FM/AM output terminal; 5V in FM and 0V in AM. LW (34) and AM (36) not used in this unit.
34	LW	
35	FM	
36	AM	
37	OFF	This is 4-bit input/output port. MONO terminal (38) is the auto/mono changeover output terminal, which is 5V in auto, and 0V in mono. 37 (OFF), 39 (SDC) and 40 (D) not used in this unit.
38	MONO	
39	SDC	
40	D	
41	COMP	1-bit input port. Comparison voltage input terminal, regulating the duty pulses to let it folllow the signal voltage.
42	VDP	Variable duty pulse at 1.34 kHz is delivered to compare it with signal voltage.

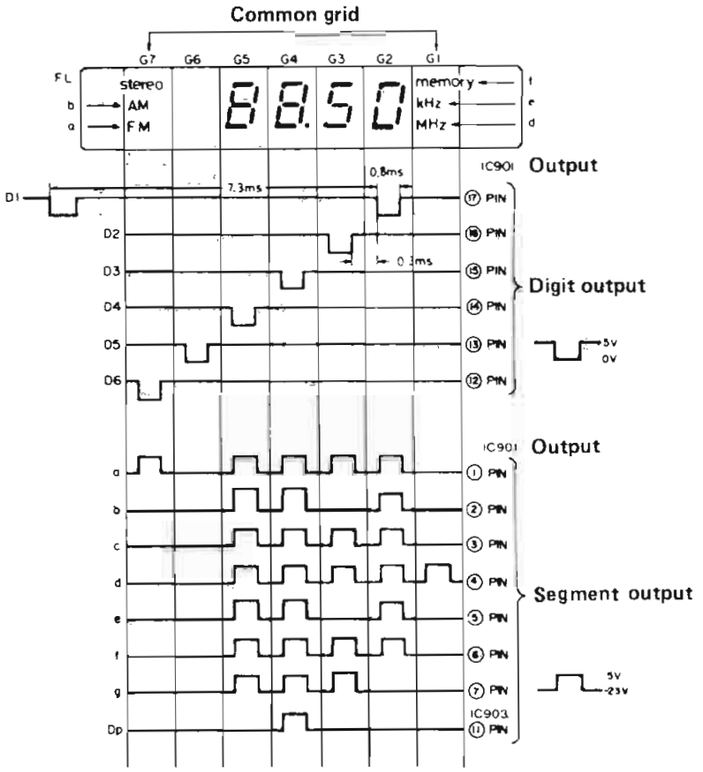
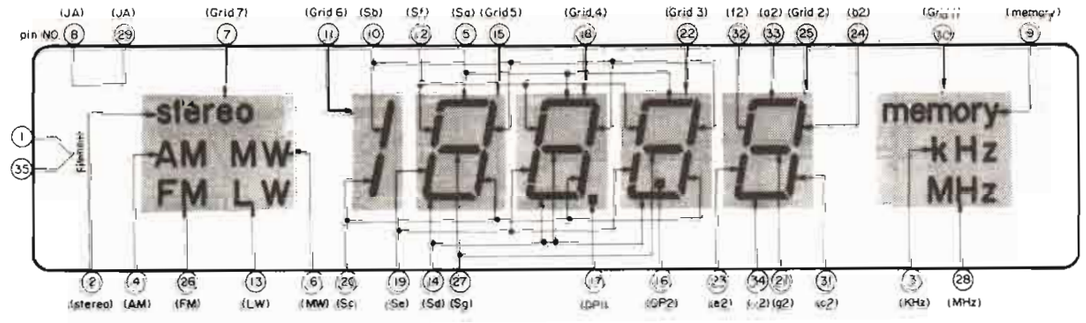
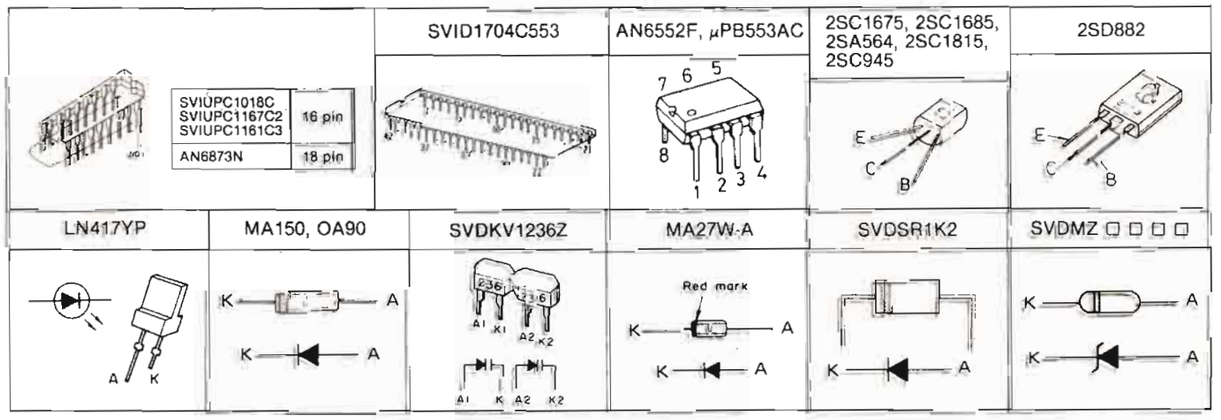


Fig. 7

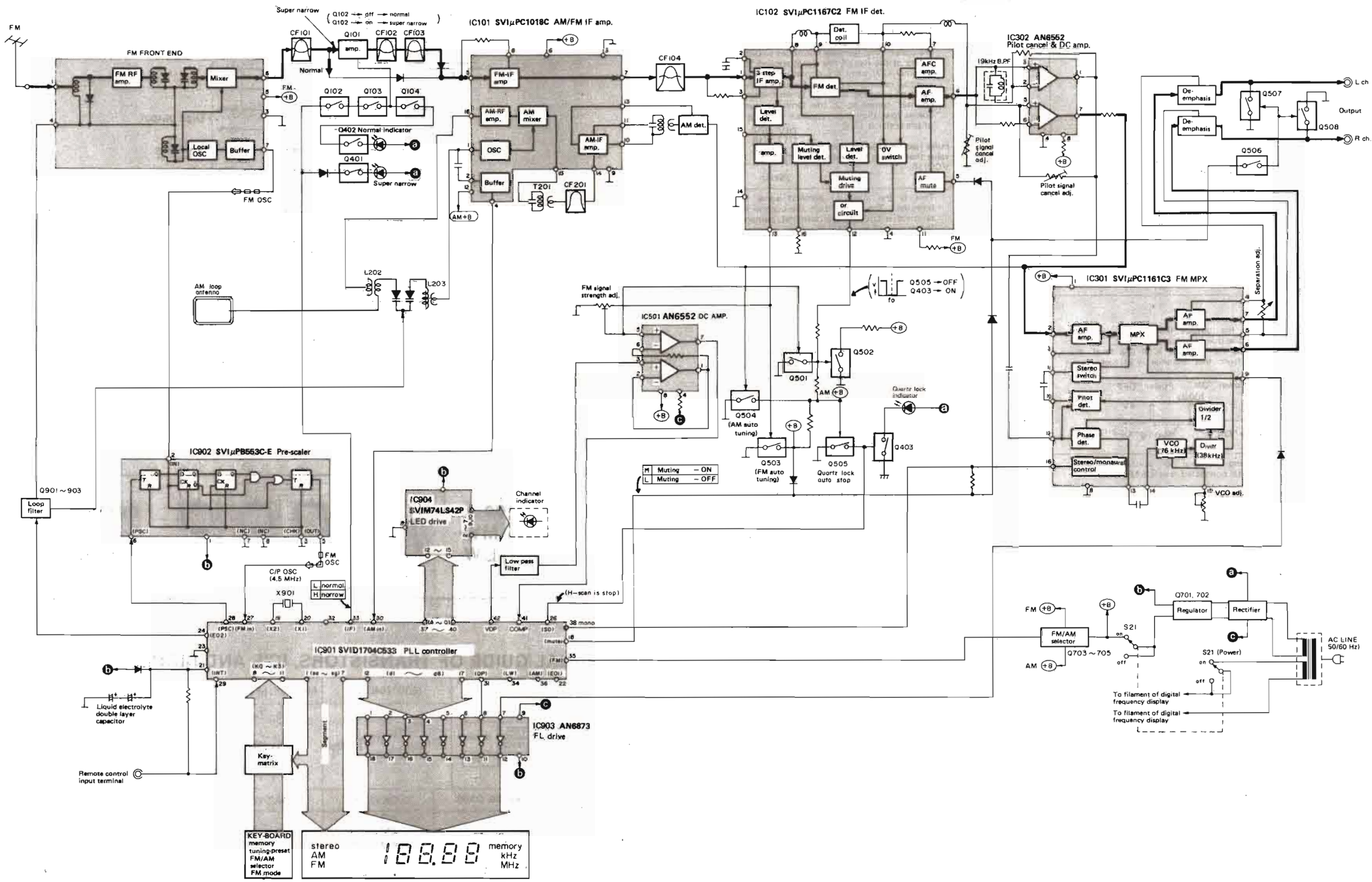
- **Digital frequency display tube (FL)**

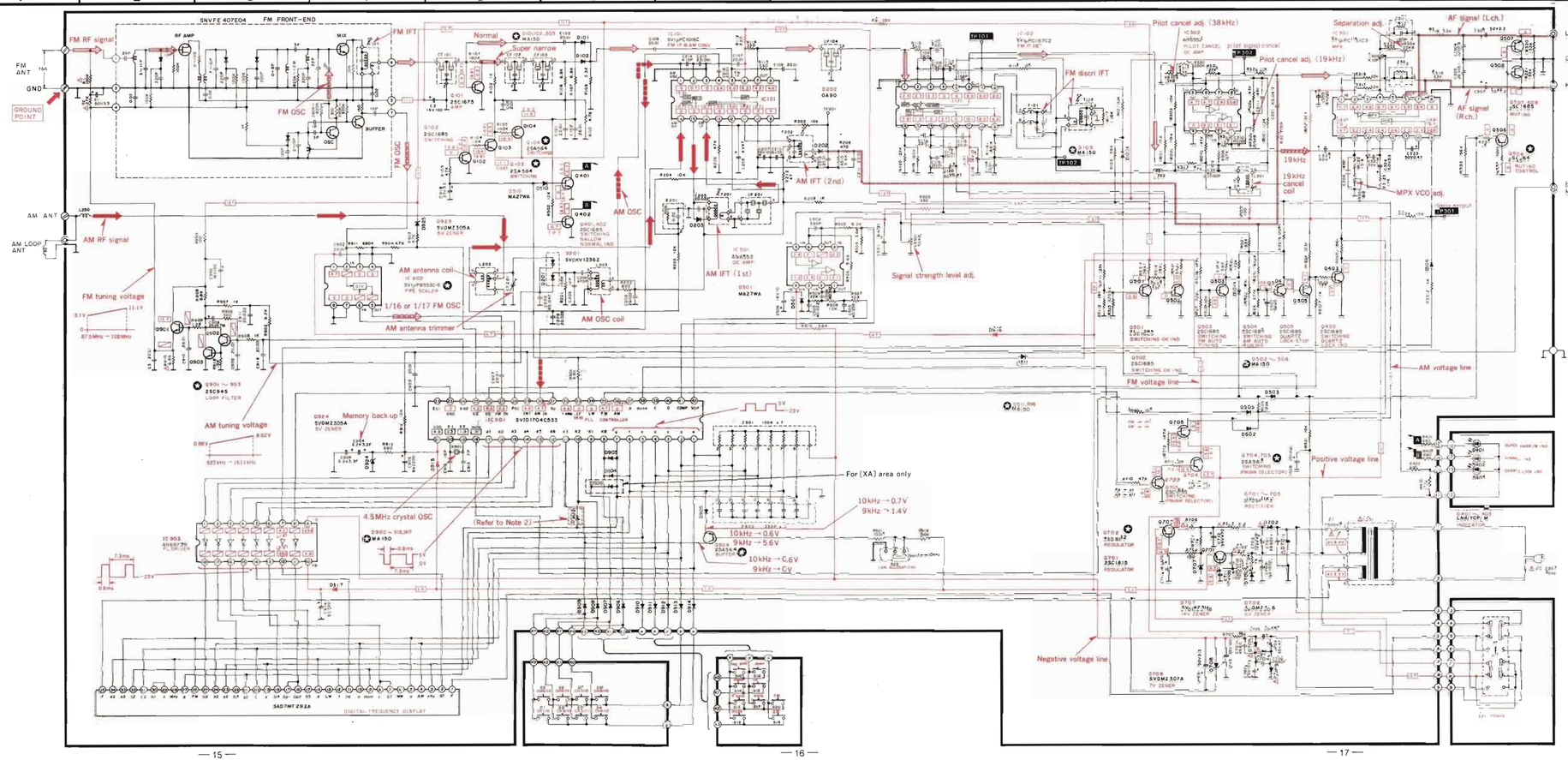


■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES



■ BLOCK DIAGRAM





■ SCHEMATIC DIAGRAM

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

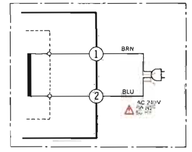
* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part please use the part No. in the replacement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

Note1:

1. **S1 ~ S8** : Preset tuning switch. 1 ~ 16 CH
2. **S10** : FM frequency shift switch. (off ⟷ +25 kHz)
3. **S12** : FM mode switch. (auto ⟷ mono)
4. **S13** : FM IF band selector switch. normal ⟷ super narrow
5. **S14** : FM signal-strength indicator switch. off ⟷ on
6. **S15** : Tuning (up) switch. [up : tuning to higher frequency]
7. **S16** : Tuning (down) switch. [down : tuning to lower frequency]
8. **S17** : Memory switch. (manual ⟷ auto)
9. **S19** : AM selector switch.
10. **S20** : FM selector switch.
11. **S21** : Power source switch in "**on**" position.
12. **S23** : AM (MW) allocation switch in "**10 kHz step**" position. 9 kHz step ⟷ 10 kHz step
13. **S24** : Voltage selector switch. [XA], [PA], [PE] and [PC] only: 110V ⟷ 120V ⟷ 220V ⟷ 240V
14. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis 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 (monaural) reception mode.
    * Figures in ( ) stand for DC voltage in FM stereo signal reception mode.
    * Figures in < > stand for DC voltage in AM signal reception mode.
    * Figures in { } stand for DC voltage in super narrow condition mode
15. Positive voltage line, FM signal, AM signal, AF signal lines, FM OSC, AM OSC
16. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

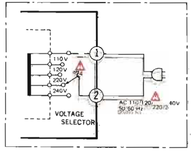
Power source circuit

● **For [XL] area**



* **[XL] --- Australia**

● **For [XA], [PA], [PE] and [PC] areas**



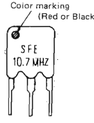
* **[XA] --- Asia, Latin America, Africa, Middle Near East and Oceania.**
* **[PA] --- Far East PX.**
* **[PE] --- European Military.**
* **[PC] --- European Audio Club.**

Note 2:

● **Use of ceramic filters in pairs**

The ceramic filters(CF101 ~ CF104) for FM-IF unit are available in two 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 diode (D902) for use as different diodes must be used depending on each rank of the ceramic filters.



RANK (Color)	D902	CENTER FREQUENCY
Black	○	10.66 MHz
Red	X	10.70 MHz

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

■ RESISTORS AND CAPACITORS

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 ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is OHM (Ω). K = 1000Ω M = 1000kΩ
5. The unit of capacitance is MICROFARAD (μF) P = 10^{-6} μF

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type		Wattage		Tolerance
ERD	: Carbon	25 : 1/4W S1 : 1/2W		J : ± 5%

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Peculiarity use	Value	Special use	

Capacitor Type		Voltage				Tolerance	
		ECEA Type		Other			
ECEA	: Electrolytic	0J : 6.3V		1H : 50V DC		C : ± 0.25pF	
ECCD	: Ceramic	1A : 10V		2H : 500V DC		J : ± 5%	
ECKD	: Ceramic	1C : 16V		2R3 : 2.3V DC		K : ± 10%	
ECOM	: Polyester	1E : 25V				Z : +80%, −20%	
ECQP	: Polypropylene	1H : 50V					
EECW	: Liquid electrolyte double layer capacitor	50 : 50V 25 : 25V 1V : 35V					

Ref. No.	Part No.	Value
RESISTORS		
R1 Ⓢ	ERD25TJ104	100K
R2 Ⓢ	ERD25TJ273	27K
R3 Ⓢ	ERD25FJ151	150
R101 Ⓢ	ERD25TJ184	180K
R102 Ⓢ	ERD25FJ102	1K
R103 Ⓢ	ERD25FJ473	47K
R104 Ⓢ	ERD25FJ103	10K
R105 Ⓢ	ERD25TJ104	100K
R106, 107 Ⓢ	ERD25FJ682	6.8K
R108 Ⓢ	ERD25FJ332	3.3K
R109 Ⓢ	ERD25TJ563	56K
R110 Ⓢ	ERD25FJ472	4.7K
R112 Ⓢ	ERD25FJ821	820
R113 Ⓢ	ERD25FJ561	560
R114, 115 Ⓢ	ERD25TJ331	330
R116 Ⓢ	ERD25FJ682	6.8K
R117 Ⓢ	ERD25FJ182	1.8K
R118 Ⓢ	ERD25TJ153	15K
R119 Ⓢ	ERD25TJ184	180K
R120 Ⓢ	ERD25TJ223	22K
R127 Ⓢ	ERD25FJ103	10K
R128 [EGA] Ⓢ	ERD25TJ183	18K
R130 [EGA] Ⓢ	ERD25TJ122	1.2K
R201 Ⓢ	ERD25TJ104	100K
R202 Ⓢ	ERD25FJ821	820K
R203 Ⓢ	ERD25TJ333	33K
R204, 205 Ⓢ	ERD25FJ103	10K
R206 Ⓢ	ERD25TJ473	47K
R207 Ⓢ	ERD25TJ153	15K
R208 Ⓢ	ERD25FJ471	470
R209 Ⓢ	ERD25FJ102	1K
R210 Ⓢ	ERD25FJ562	5.6K
R212 Ⓢ	ERD25FJ470	47
R301, 302 Ⓢ	ERD25FJ103	10K
R303 Ⓢ	ERD25FJ103	10K
R304, 305 Ⓢ	ERD25TJ473	47K
R306 Ⓢ	ERD25FJ682	6.8K
R307 Ⓢ	ERD25TJ123	12K
R308 Ⓢ	ERD25TJ473	47K
R309 Ⓢ	ERD25TJ273	27K
R310 Ⓢ	ERD25FJ822	8.2K
R313 Ⓢ	ERD25TJ333	33K
R315 ⚠ Ⓢ	ERD25FJ101	100
R316, 317 Ⓢ	ERD25TJ223	22K
R318, 319 Ⓢ [PA, PE, PC]	ERD25FJ272	2.7K
R318, 319 Ⓢ [other]	ERD25FJ332	3.3K
R320, 321 Ⓢ [PA, PE, PC]	ERD25TJ104	100K

Ref. No.	Part No.	Value
RESISTORS		
R320, 321 Ⓢ [other]	ERD25TJ333	33K
R322 Ⓢ	ERD25TJ153	15K
R323 Ⓢ	ERD25FJ102	1K
R324 Ⓢ	ERD25FJ103	10K
R325 Ⓢ	ERD25FJ101	100
R326 Ⓢ	ERD25TJ273	27K
R327 Ⓢ	ERD25FJ822	8.2K
R330 Ⓢ	ERD25TJ224	220K
R401, 402 Ⓢ	ERD25FJ681	680
R405 Ⓢ	ERD25FJ681	680
R406 Ⓢ	ERD25TJ153	15K
R907 Ⓢ	ERD25FJ102	1K
R908 Ⓢ	ERD25FJ682	6.8K
R909 Ⓢ	ERD25TJ123	12K
R910 Ⓢ	ERD25FJ682	6.8K
R911 Ⓢ	ERD25TJ684	680K
R912 Ⓢ	ERD25FJ103	10K
R913 Ⓢ	ERD25FJ681	680
R918 Ⓢ	ERD25FJ103	10K
R919 Ⓢ	ERD25TJ104	100K
R921 Ⓢ	ERD25TJ104	100K
R950 Ⓢ	ERD25FJ101	100

Ref. No.	Part No.	Value
RESISTORS		
R704 Ⓢ	ERD25FJ102	1K
R705 Ⓢ	ERD25FJ101	100
R706 ⚠ Ⓢ	ERD25FJ2R2	2.2
R707 ⚠	ERDS1FJ102	1K
R708 Ⓢ	ERD25FJ101	100
R710 Ⓢ	ERD25TJ473	47K
R711 Ⓢ	ERD25FJ103	10K
R712 Ⓢ	ERD25TJ473	47K
R902 Ⓢ	ERD25FJ822	8.2K
R903, 904 Ⓢ	ERD25FJ472	4.7K
CAPACITORS		
C1	ECEA1HU3R3	3.3
C2	ECEA1CU101	100
C3	ECKD1H103ZF	0.01
C101, 102 Ⓢ	ECKD1H103ZF	0.01
C103, 104 Ⓢ	ECKD1H103ZF	0.01
C105, 106 Ⓢ	ECKD1H103ZF	0.01
C107, 108 Ⓢ	ECKD1H103ZF	0.01
C109, 110 Ⓢ	ECKD1H103ZF	0.01
C111 Ⓢ	ECKD1H101K	100 P
C112	ECEA1HU010	1
C114, 115 Ⓢ	ECKD1H103ZF	0.01
C116	ECEA1CU100	10
C117, 118 Ⓢ	ECKD1H103ZF	0.01
C119 Ⓢ	ECKD1H103ZF	0.01
C120	ECEA1HU R47	0.47
C201, 202 Ⓢ	ECQM1H473JZ	0.047
C203 Ⓢ	ECCD1H120KC	12P
C204 Ⓢ	ECQP1H471JZ	470P
C205 Ⓢ	ECKD1H223ZF	0.022
C206	ECEA0JU470	47
C207	ECEA1CU100	10
C208, 209 Ⓢ	ECKD1H223ZF	0.022
C210	ECEA1CU330	33
C211, 212 Ⓢ	ECKD1H103ZF	0.01
C214 Ⓢ	ECCD1H150KC	15P

Ref. No.	Part No.	Value
CAPACITORS		
C215 Ⓢ	ECKD1H102ZF	0.001
C216 Ⓢ	ECKD1H103ZF	0.01
C301	ECQP1562JZ T	5600P
C302	ECEA1CU221	220
C303 Ⓢ	ECCD1H100KC	10P
C304, 305 Ⓢ [PA, PE, PC]	ECQM1H273JZ	0.027
C304, 305 Ⓢ [other]	ECQM1H153JZ	0.015
C306, 307 Ⓢ	ECEA1HU2R2	2.2
C308 Ⓢ	ECQP1471JZ	470 P
C310 Ⓢ	ECQM1H223JZ	0.022
C311 Ⓢ	ECCD1H470K	47 P
C323 Ⓢ	ECEA1HU010	1
C324 Ⓢ	ECEA1HU3R3	3.3
C325 Ⓢ	ECEA1HUR47	0.47
C326 Ⓢ	ECEA1HU010	1
C501 Ⓢ	ECEA1HU330	33
C502 Ⓢ	ECKD1H391KB	390 P
C503	ECQM1H393K-Y	0.039
C504 Ⓢ	ECQM1H823JZ	0.082
C505 Ⓢ	ECQM1H223JZ	0.022
C506, 507	ECEA1CU100	10
C508	ECEA1HU2R2	2.2
C701	ECKD2H681KB	680 P
C702	ECEA1EU471	470
C703	ECEA1CU102	1000
C704	ECEA1VU470	47
C705	ECEA1HU470	47
C706, 707	ECKD2H681KB	680 P
C708	ECEA1EU101	100
C709	ECEA1HU3R3	3.3
C710 Ⓢ	ECKD1H102ZF	0.01
C711	ECEA1AU101	100
C712	ECEA1VU471	470
C714	ECEA1CU471	470
C715	ECEA1VU101	100
C902, 903 Ⓢ	ECKD1H102ZF	0.01
C904, 905	EECW2R3A3R3	3.3 F
C906	ECEA0JU222	2200
C907, 908 Ⓢ	ECKD1H103ZF	0.01
C909	ECEA25M47R	47
C910 Ⓢ	ECKD1H103ZF	0.01
C911 Ⓢ	ECKD1H2232F	0.022
C912 Ⓢ	ECCD1H180KC	18 P
C913 Ⓢ	ECCD1H070CC	7 P
C914	ECEA0JU221	220
C918	ECEA1EU3R3	3.3
C919 Ⓢ	ECKD1H1022F	0.001
C950	ECEA1CU101	100

■ 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 ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Ⓚ marked parts are used for black only, while ○marked parts are for silver type only.
4. Part other than Ⓚ and ○marked are used for both black and silver type.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
6. The "Ⓢ" mark is service standard parts and may differ from production parts.
7. The parenthesized numbers in the column of description stand for the quantity per set.

Area	
[EX]...	Switzerland and Scandinavia.
[EH]...	Holland.
[XA]...	Asia, Latin America, Africa, Middle Near East and Oceania.
[XL]...	Australia.
[PA]...	Far East PX.
[PE]...	European Military.
[PC]...	European Audio Club.

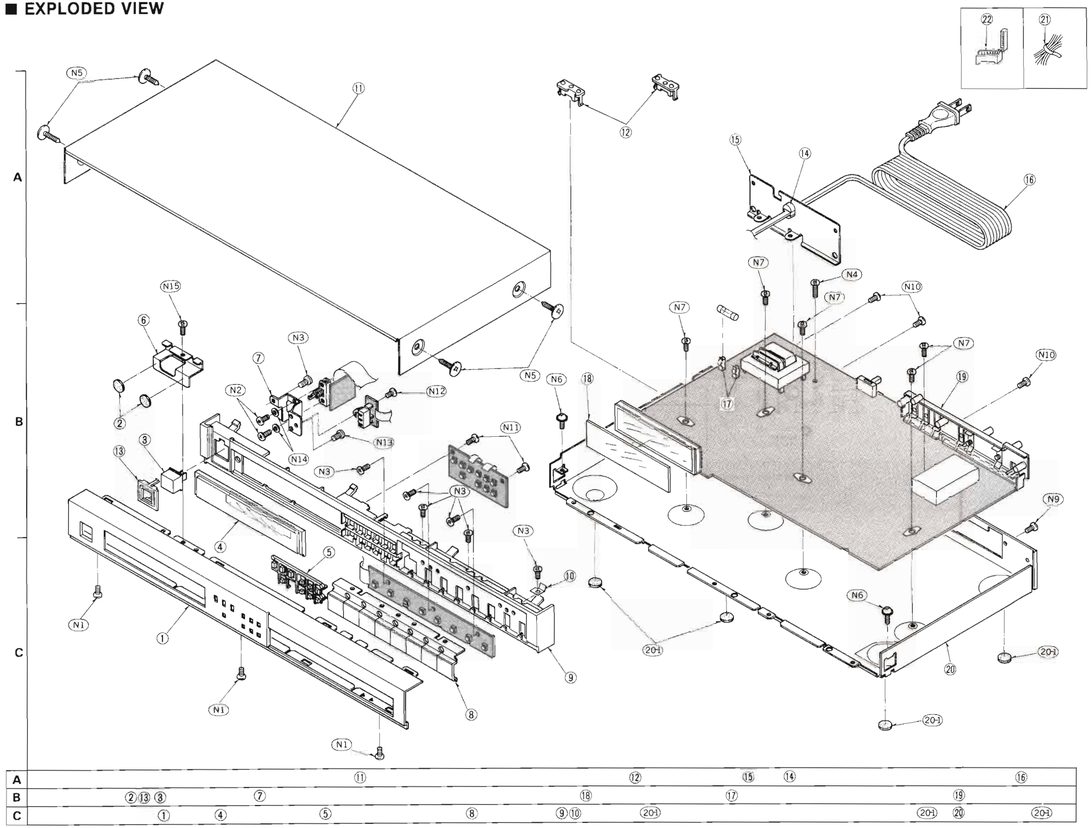
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	SV⅛PC1018C	Integrated Circuit
IC102	SV⅛PC1167C2	Integrated Circuit
IC301	SV⅛PC1161C3	Integrated Circuit
IC302, 501	AN6552F	Integrated Circuit
IC901	SVID1704C533	Integrated Circuit
IC902	⅛PB553AC	Integrated Circuit
IC903	AN6873N	Integrated Circuit
TRANSISTORS		
Q101 Ⓢ	2SC1675L1	Transistor
Q102, 401 – 403 Ⓢ; 501 – 505, 507, 508, 703	2SC1685-QNC	Transistor
Q103, 104, 506, Ⓢ; 704, 705, 904	2SA1127-S	Transistor (Product Part No. is 2SA564)
Q701	2SC1815-Y	Transistor
Q702	2SD793-P	Transistor
Q901 – 903 Ⓢ	2SC1815GR	Transistor (Product Part No. is 2SD882)
DIODES		
D101 – 103, 203, Ⓢ; 502 – 506, 511, 903 – 917	MA162A	Diode
D908 [XA] only Ⓢ	MA162A	Diode
D201	SVDKV1236Z	Diode
D202 Ⓢ	20A90	Diode
D501, 510	MA27W-A	Diode
D701 – 705 ⚠	SVDSR1K2	Rectifier
D706	SVDMZ306C	Diode
D707	SVDMZ314B	Diode
D708	SVDMZ307A	Diode
D902 Ⓢ	MA162A	Diode
D924, 925	SVDMZ305A	Diode
D401 – 403	LN4179P	LED
COILS		
L101, 302	SLQX101-3M	Choke
L202	SLA2C5-P	AM Antenna
L203	SLQ0C29R-P	AM OSC
L250 [EX, EH] only	SLQY15G5-O	Choke
L301	SLM1C57-Z	19kHz, Cancel
TRANSFORMERS		
T101	SLI4C541-Z	FM IFT
T102	SLI4C543-Z	FM IFT
T201	SLI2C127-M	AM IFT
T202	SLI2C413	AM IFT
T701 [EX, EH] ⚠; T701 [XA, PA, PE, PC] ⚠	SLT5K135 / SLT5K153	Power Source / Power Source
T701 [XL] ⚠	SLT5J203	Power Source

Ref. No.	Part No.	Description
CERAMIC FILTERS		
CF101	SVFE107MM-A (Red); SVFE107MM-D (Black)	FM, 10.7MHz; FM, 10.65MHz (Black)
CF102, 103	SVFE107MZ2-A (Red); SVFE107MZ2-D (Black)	FM, 10.7MHz; FM, 10.65MHz (Black)
CF104	SVFE107ML-A (Red); SVFE107ML-D (Black)	FM, 10.7MHz; FM, 10.65MHz (Black)
CF201	SVFSFP450HC (Use pair ranks as same as CF101, CF102, CF103 and CF104)	AM, 450kHz
CRYSTAL		
X901	SV049U452-T	4.5MHz Counter OSC
VARIABLE RESISTORS		
VR301	EVN/5AA00B53	MPX VCO, 5kΩ (B)
VR302, 501	EVN58AA00B54	19kHz Cancel, 50kΩ (B)
VR303	EVN58AA00B14	38kHz Cancel, 10kΩ (B)
VR304	EVN58AA00B25	Separation, 200kΩ (B)
VARIABLE CAPACITOR		
CT201	SVCT203T110F	AM Antenna
FRONT END		
	SNVFE407E04	Front End Pack (PCB Ass'y)
FLUORESCENT DISPLAY TUBE		
FL	SAD7MT29ZA	Frequency
COMPONENT COMBINATIONS		
Z201	EXRP203Z104T	Component Combination
Z301, 302	EXRP181K473T	Component Combination
Z901	EXBP87104K	Component Combination
Z902	EXFP7331MW	Component Combination
FUSE		
F1	XBA2C05TR0	250V, T 500mA
SWITCHES		
S10, 12 – 17, 19, 20	SSG13	Selector
S21	SSH183	Power
S22 Except [EX, EH, XL] ⚠	SSR187	Voltage Selector

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1 Ⓢ	SGWTG5-SE	Front Panel Ass'y	(1)
1 Ⓢ	SGWTG5-KE	Front Panel Ass'y	(1)
2	SHG399-1	Spacer, FL	(2)
3	SBC627	Button, Power SW.	(1)
4 ○ [PA, PE]	SGU393-3	Transparent Plate, FL	(1)
4 ○ [other]	SGU393-1	Transparent Plate, FL	(1)
4 Ⓚ	SGU393-2	Transparent Plate, FL	(1)
5	SBC561-8T	Button, Selector	(1)
6	SUW189-1	Bracket, FL	(1)
7	SUW2862	Bracket, Power SW.	(1)
8 ○	SBC631-1	Button, Preset	(1)
8 Ⓚ	SBC631-2	Button, Preset	(1)
9 ○	SGX7613-2	Grille	(1)
9 Ⓚ	SGX7613-3	Grille	(1)
10	SUS745	Bracket, Earth	(1)
11 ○	SKCTG5L-SE	Cabinet Ass'y	(1)
11 Ⓚ	SKCTG5L-KE	Cabinet Ass'y	(1)
12	SHE129-1	Spacer, P.C.B	(2)
13	SGX7611-4	Spacer, Front Panel	(1)
13	SGX7611-5	Spacer, Front Panel	(1)
14	SHR127	Bushing, AC Cord	(1)
15 [EX, EH, XL]	SGP3110-1	Sub Rear Panel	(1)
15 [other]	SGP3130	Sub Rear Panel	(1)
16 [XL] ⚠	RJA79ZA-K	AC Cord, Power Source	(1)
16 [PA, PE] ⚠	RJA52YA-K	AC Cord, Power Source	(1)
16 [other] ⚠	SJA138-3	AC Cord, Power Source	(1)
17	SJT347	Grip, Fuse	(2)
18	SDU258	Filter, FL	(1)
19	SJF8709N	Terminal Board, In/Out	(1)
20 [EX]	SGPTG5-SE	Rear Panel Ass'y (w/Feet)	(1)
20 [EH]	SGPTG5-SH	Rear Panel Ass'y (w/Feet)	(1)
20 [XA]	SGPTG5-SX	Rear Panel Ass'y (w/Feet)	(1)
20 [XL]	SGPTG5-SL	Rear Panel Ass'y (w/Feet)	(1)
20 [other]	SGPTG5-SP	Rear Panel Ass'y (w/Feet)	(1)

Ref. No.	Part No.	Description	
SCREWS and WASHERS			
N1 Ⓢ	XTB3 + 8BFZ	Tapping, ⌀3×8	(2)
N2 Ⓢ	XSN3 + 8S	⌀3×8	(2)
N3 Ⓢ	XTB3 + 8BFN	Tapping, ⌀3×8	(6)
N4	XTB3 + 14BFYR	Tapping, ⌀3×14	(1)
N5 ⚠	⅛NE2095-4	Cabinet	(4)
N5 ⚠ Ⓢ	SNE2095-5	Cabinet	(4)
N6	XTW3 + 8HFYR	Tapping, ⌀3×8 (With Washer)	(2)
N7	XTB3 + 8BFYR	Tapping, ⌀3×8	(5)
N9 Ⓢ	XTB3 + 8BFZ	Tapping, ⌀3×8	(2)
N10 Ⓢ	XTB3 + 10BFZ	Tapping, ⌀3×10	(2)
N11 Ⓢ	XTB3 + 8BFN	Tapping, ⌀3×8	(2)
N12 Ⓢ	XTB3 + 8BFZ	Tapping, ⌀3×8	(1)
N13 Ⓢ	XTB3 + 8BFN	Tapping, ⌀3×8	(1)
N14 Ⓢ	SWA2B	⌀3	(2)
N15	XTB3 + 8BFYR	Tapping, ⌀3×8	(1)
ACCESSORIES			
A1	SJP2129-5	Connection Cord, Pin Pin	(1)
A2	SSA267-1	Loop Antenna, FM	(1)
A3 ⚠ [XA, PC] only	SJP5213-1	Plug	(1)
A3 ⚠ [PA, PE] only	SJP9215	Plug	(1)
A5 [PA, PE]	SQF12119	Instruction Book	(1)
A5 [other]	SQF12118	Instruction Book	(1)
A6	SSA605-1	Loop Antenna	(1)
A7	SMA231	Holder, Loop Antenna	(1)
A8	SMA233-1	Holder, Loop Antenna	(1)
PACKING PARTS			
P1	SPG4909	Carton Box	(1)
P1 Ⓚ	SPG4907	Carton Box	(1)
P2	SPS3493	Pad, Front	(1)
P3	SPS3495	Pad, Rear	(1)
P4	SPP697	Polyethylene Sheet	(1)
P4 Ⓚ	SPP657	Polyethylene Sheet	(1)

■ EXPLODED VIEW



Printed in Japan
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