

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

Free service manuals
Gratis schema's

Digitized by

www.freeservicemanuals.info

Tuner

ST-Z400

Color

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



Color	Area
(K)(S)	[EX]...Scandinavia and Switzerland.
(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.
(S)	[Ei]... Italy.

SPECIFICATION (DIN 45 500)

FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	
S/N 30 dB	1.0 μ V (75 Ω)
S/N 26 dB	0.9 μ V (75 Ω)
S/N 20 dB	0.8 μ V (75 Ω)
IHF usable sensitivity	0.95 μ V (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μ V/75 Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	69 dB (75 dB, IHF)
STEREO	64 dB (70 dB, IHF)
Frequency response	5 Hz~18 kHz, +0.5 dB~ -1.5 dB
Alternate channel selectivity	
normal \pm 400 kHz	60 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	55 dB
Stereo separation	
1 kHz	45 dB
10 kHz	30 dB
Carrier leak	
19 kHz	-40 dB (-45 dB, IHF)
38 kHz	-40 dB (-45 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	\pm 1 dB
Limiting point	1.0 μ V

Bandwidth

IF amplifier

180 kHz

FM demodulator

1000 kHz

Antenna terminals

75 Ω (unbalanced)

AM TUNER SECTION

Frequency range	522~1611 kHz (9 kHz step)
	530~1620 kHz (10 kHz step)
Sensitivity (S/N 20 dB) at 999 kHz	20 μ V, 300 μ V/m
Selectivity (\pm 9 kHz) at 999 kHz	55 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

GENERAL

Output voltage	0.4V
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 × 240 mm (16-15/16" × 2-3/32" × 9-7/16")
Weight	2.1 kg (4.6 lb.)

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

Technics

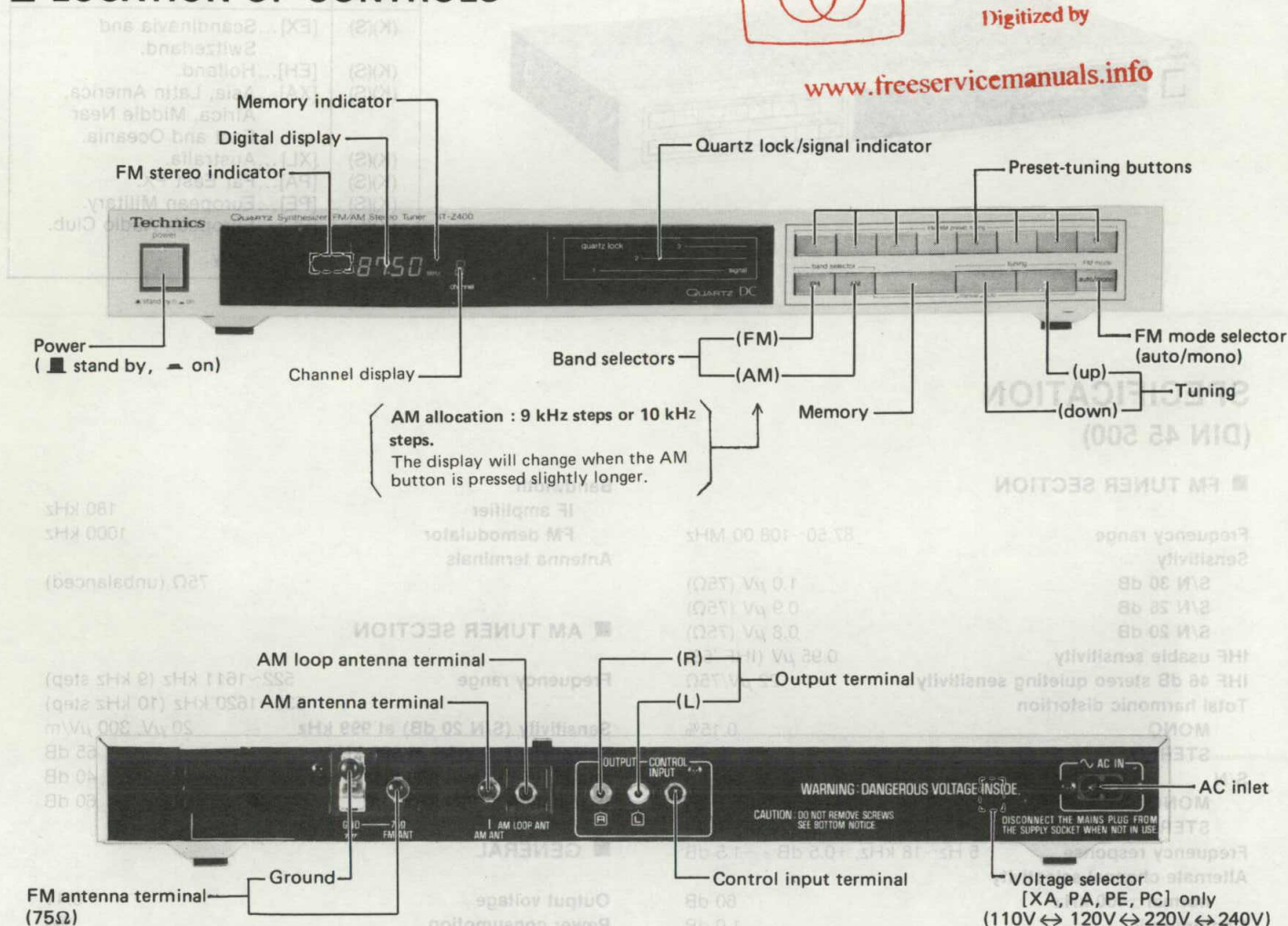
Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

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

CONTENTS

	Page		Page
LOCATION OF CONTROLS	2	FUNCTION OF TERMINAL (PLL controller IC901)	10
HOW TO PRESET RADIO BROADCAST FREQUENCIES	3, 4	BLOCK DIAGRAM	11, 12
DISASSEMBLY INSTRUCTIONS	5	SCHEMATIC DIAGRAM	13 ~ 15
BEFORE REPAIR	5	LIQUID CRISTAL DISPLAY (LCD)	16
MEASUREMENTS AND ADJUSTMENTS	6, 7	RESISTORS AND CAPACITORS	17
CIRCUIT BOARD AND WIRING	8, 9	REPLACEMENT PARTS LIST	18
CONNECTION DIAGRAM	8, 9	EXPLODED VIEW	19, 20

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-Z400

DEUTSCH

- This booklet includes the specifications and adjustment of Model ST-Z400 (Order No. HAD84062810C9) written in German, French and Spanish.
- File this booklet together with the service manual of Model ST-Z400.
- Dieses Büchlein umfaßt die technischen Daten und Justierungsanleitungen von Modell ST-Z400 (Bestell Nr. HAD84062810C9) in den Sprachen Deutsch, Französisch und Spanisch.
- Bewahren Sie dieses Büchlein zusammen mit dem Service-Handbuch von Modell ST-Z400 auf.
- Cette brochure comprend les spécifications et la mise au point du Modèle ST-Z400 (N° d'Ordre HAD84062810C9) écrites en allemand, en français et en espagnol.
- Classer cette brochure en meme temps qu'avec le manuel de service du Modele ST-Z400.
- Este librito incluye las especificaciones y ajuste de Modelo ST-Z400 (Pedido N° HAD84062810C9) escritas en alemán, francés y español.
- Guardar este librito juntamente con el manual servicio de Modelo ST-Z400.

DEUTSCH

■ TECHNISCHE DATEN

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,0 µV (75 Ω)
S/R 26 dB	0,9 µV (75 Ω)
S/R 20 dB	0,8 µV (75 Ω)
Nutzempfindlichkeit nach IHF	0,95 µV (nach IHF '58)
Stereoumschaltsschwelle bei 46 dB nach IHF	22 µV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	69 dB (75 dB nach IHF)
Stereo	64 dB (70 dB nach IHF)
Frequenzgang	5 Hz ~ 18 kHz (+0,5 dB ~ -1,5 dB)
Trennschärfe bei Störsender	
normal ±400 kHz	60 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	90 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	80 dB
MW-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	45 dB
10 kHz	30 dB
Trägerrest	
19 kHz	-40 dB (-45 dB nach IHF)
38 kHz	-40 dB (-45 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1 dB

Begrenzereinsatz	1,0 µV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz

Antennenanschluß	75 Ω (unsymmetrisch)
------------------	----------------------

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9-kHz-Schritte)
	530 ~ 1620 kHz (10-kHz-Schritte)
Eingangsempfindlichkeit (S/R 20 dB) bei 999 kHz	20 µV, 300 µV/m
Trennschärfe (±9 kHz) bei 999 kHz	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	40 dB
ZF-Dämpfung bei 999 kHz	60 dB

■ ALLGEMEINE DATEN

Ausgangsspannung	0,4 V
Leistungsaufnahme	9W
Netzspannung	
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 53 × 240 mm
Gewicht	2,1 kg

(Die technischen Daten können infolge von Verbesserungen ohne Ankündigung geändert werden.)

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM-OSC-Spule (L203) und AM ZFT (T201) sind bereits justiert und benötigen daher keine Justierung.

AM (MW)-EINSTELLUNG

* Einstellungen und zu benutzende Geräte

1. Elektronisches Voltmeter für Wechsel- und Gleichstrom (EVM).
2. AM (MW)-Meßsender (AM-SG).
3. FM/AM-Wahlschalter in die "AM"-Position stellen. (9 kHz-Schritt)
4. Netzspannung auf ihrem Sollwert halten.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

AM (MW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHsverfahren
ANSCHLUSS	FREQUENZ				
AM (MW)-HF-ABGLEICH					
AM-MO über 200 pF-Kondensator an den AM-Antennenanschluß anschließen. Erdung an chassis. (Schwacher Eingang.)	612 kHz (400 Hz Modulat., 30%)	612 kHz	Wechselstrom-Voltmeter oder Oszillograph über den Ausgang "OUTPUT" anschließen.	L202 (Ant. Spule)	1. Auf max. Ausgang abgleichen. 2. Den Ferritkern von L202 mit einem Schraubendreher justieren.
	1503 kHz (400 Hz Modulat., 30%)	1503 kHz		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

* Einstellungen und zu benutzende Geräte

1. UKW-Meßsender (FM-SG)
2. Stereo-Modulator
3. Oszillograph
4. Elektronische Voltmeter für Wechsel- und Gleichstrom (EVM).
5. Signalfrequenzmesser (meßbar für 19 kHz und 108 MHz).
6. Tiefpaßfilter ($f_c = 15 \text{ kHz} \sim 19 \text{ kHz}$).
7. FM/AM-Wahlschalter in die "FM"-Position stellen.
8. Den UKW-Betriebsartenschalter in die "mono"-Position stellen.

* Vorbereitung am UKW-Messender (FM-SG)

1. SG-Ausgang über 75-Ohm-UKW-Kunstantenne an den Antenneneingang des Gerätes anschließen.
2. Der normale Eingang des Gerätes beträgt 60 dB (1 mV), 400 Hz, 100% Modulation. Wegen Verwendung der Kunstantenne muß der Signalausgang 12 dB (4 µV) plus (ZHF) sein: d.h. beim Eingang von 60 dB (1 mV) soll der Signalausgang 72 dB 4 mV sein.)

FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHsverfahren
ANSCHLUSS	FREQUENZ				
UKW-ZF-ABGLEICH					
Meßsender über eine 75Ω-UKW-Kunstantenne an den UKW-Antenneneingang anschließen. (60 dB (1 mV) in den Antenneneingang leiten.)	100,1 MHz (400 Hz Modul., 100%)	100,1 MHz	Ein Gleichstrom-Voltmeter (EVM) an TP101 (–) und TP102 (+) über eine Drosselspule verbinden. (Siehe Abb. 1)	T101 (Diskriminator ZFT)	Den Kern von T101 so justieren, daß die gemessene Spannung im signallosen Zustand 0 mV im 300 mV Bereich beträgt.

UKW-STEREO-DEKODER-ABGLEICH

UNTER VERWENDUNG EINES ZÄHLERS		ALTERNATIVE MESSMETHODE	
4	1. Unmoduliertes Mono-Signal 100,1 MHz in das Gerät speisen. 2. UKW-Betriebsart-Schalter auf "auto" stellen. 3. Zähler über einen Widerstand von 100kOhm an TP301 anschließen. (Vgl. Abb. 2) 4. VR301 auf $19 \text{ kHz} \pm 30 \text{ Hz}$ einstellen.	1. Stereosignal entweder von einem Meßsender, oder einem Stereosender in den Tuner speisen. 2. VR301 so einstellen, daß die Stereolampe aufleuchtet. Schleifer von VR301 sichern, wie in Abb. 3 gezeigt.	

TERNUNGS-ABGLEICH

5	Meßsender über eine UKW-Kunstantenne an den UKW-Antenneneingang anschließen. (Stereo-Pilotsignal 10% moduliert.)	100,1 MHz (400 Hz Modul., 100%) L oder R-Betriebsart.)	100,1 MHz	Wechselstrom-Voltmeter über Tiefpaßfilter ($f_c = 15 \sim 19 \text{ kHz}$) an Ausgangsanschlüsse (OUTPUT) des Gerätes schließen.	VR302	1. Den UKW-Betriebsartenschalter in die "auto"-Position stellen. 2. VR302 auf minimale Anzeige des R-Ausgangs bei Stereo-modulator in L- (L-Kanalmodulation) Modus, und auf minimale Anzeige des L-Ausgangs in R-Modus abgleichen.
---	--	---	-----------	--	-------	---

FRANÇAIS

CARACTERISTIQUES

(DIN 45 500)

SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,00 MHz	Equilibrage de canaux (250 Hz~6,300 Hz)	±1 dB
Sensibilité		Point de limite	1,0 µV
S/B 30 dB	1,0 µV (75Ω)	Largeur de bande	
S/B 26 dB	0,9 µV (75Ω)	Amplificateur FI	180 kHz
S/B 20 dB	0,8 µV (75Ω)	Démodulateur FM	1000 kHz
Sensibilité utilisable IHF	0,95 µV (IHF '58)	Bornes d'antenne	75Ω (asymétrique)
Sensibilité stéréo au seuil de 46 dB, IHF	22 µV/75Ω		
Distorsion harmonique totale			
MONO	0,15%		
STEREO	0,3%		
Signal/Bruit			
MONO	69 dB (75 dB, IHF)		
STEREO	64 dB (70 dB, IHF)		
Réponse de fréquence	5 Hz~18 kHz, +0,5 dB~-1,5 dB		
Sélectivité alternée par canal			
normal ±400 kHz	60 dB		
Taux de capture	1,0 dB		
Rejection d'image à 98 MHz	55 dB		
Rejection FI à 98 MHz	90 dB		
Rejection de réponse parasite à 98 MHz	80 dB		
Suppression AM	55 dB		
Séparation stéréophonique			
1 kHz	45 dB		
10 kHz	30 dB		
Fuite de porteuse			
19 kHz	-40 dB (-45 dB, IHF)		
38 kHz	-40 dB (-45 dB, IHF)		

SECTION SYNTONISATEUR AM

Gamme de fréquence	522~1611 kHz (par palier 9 kHz)
	530~1620 kHz (par palier 10 kHz)
Sensibilité (S/B 20 dB) à 999 kHz	20 µV, 300 µV/m
Sélectivité (±9 kHz) à 999 kHz	55 dB
Réjection d'image à 999 kHz	40 dB
Réjection FI à 999 kHz	60 dB

DIVERS

Tension de sortie	0,4 V
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 × 240 mm
Poids	2,1 kg
(Sujet à changement sans avertissement préalable.)	

MESURAGES ET RÉGLAGES

Nota: La bobine oscillatrice de modulation d'amplitude (L203) et le transformateur de fréquence intermédiaire de modulation d'amplitude (T201) ont déjà été ajustés et ne nécessitent pas de réglages.

RÉGLAGE DE MA

* Réglage et équipement utilisé					
1. Voltmètres électroniques de courant alternatif et de courant continu (EVM).					
2. Générateur de signaux MA (AM-SG).					
3. Régler le sélecteur FM-MA sur la position "AM" (étape de 9 kHz).					
4. Conserver la tension du secteur à 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 le réglage.					
GÉNÉRATEUR DE SIGNAUX MA		FRÉQUENCE D'AFFICHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
BRANCHEMENT	FRÉQUENCE				
RÉGLAGE DE MA-HF					
Brancher le générateur de signaux MA à la borne de l'antenne MA par un condensateur de 200pF. Commun au châssis. (Entrée faible)	612 kHz (Modulé à 30% par 400 Hz)	612 kHz	Voltmètre électronique C.A. ou oscilloscope sur bornes de sortie de l'appareil.	L202 (Bobine d'antenne)	1. Régler au maximum du signal de sortie. 2. Régler le noyau en ferrite de L202 à l'aide d'un tournevis.
	1503 kHz (Modulé à 30% par 400 Hz)	1503 kHz		CT201 (Trimmer d'antenne)	1. Régler au maximum du signal de sortie. 2. Répéter les étapes (1) et (2) jusqu'à ce que la fréquence s'aligne correctement avec l'affichage de la fréquence.

RÉGLAGE DE FM

* Réglage et équipement utilisé		* Préparatifs pour le générateur de signaux FM (FM-SG).			
1. Générateur de signaux FM (FM-SG).		1. Alimenter la sortie du générateur de signaux à la borne de l'antenne de l'appareil, par l'antenne fictive FM de 75Ω.			
2. Modulateur stéréophonique.		2. L'entrée standard de l'appareil est de 60 dB (1 mV), 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 (1 mV), la sortie du générateur de signaux doit être de 72 dB (4mV)].			
3. Oscilloscope.					
4. Voltmètres électroniques de courant alternatif et de courant continu (EVM).					
5. Compteur de fréquence (19 kHz et 108 MHz mesurables).					
6. Filtre passe-bas (bobine de champ: 15 kHz ~ 19 kHz).					
7. Régler le sélecteur FM-MA sur la position "FM".					
8. Régler le commutateur de mode sur la position "mono".					
GÉNÉRATEUR DE SIGNAUX FM		FRÉQUENCE D'AFFICHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
BRANCHEMENT	FRÉQUENCE				
RÉGLAGE DE FM-IF (FRÉQUENCES INTERMÉDIAIRE)					
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.)	100,1 MHz (Modulé à 100% par 400 Hz)	100,1 MHz	Brancher le voltmètre électronique à C.C. entre TP101 (—) et TP102 (+) à travers une bobine d'arrêt.) (Voir la Fig. 1)	T101 (Transfor. de FI discr.)	Régler le noyau T101 de telle sorte que la tension mesurée dans le mode de signal, soit de 0 mV dans la plage des 300 mV.
RÉGLAGE DE V.C.O. DE L' (OSCILLATEUR COMMANDÉ PAR VARIATION DE TENSION) MULTIPLEX FM					
AVEC UN FRÉQUENCEMÈTRE			EN UTILISANT UN SYSTÈME ALTERNATIF		
1. Signal mono de 100,1 MHz, 60 dB non modulé appliqué à l'appareil. (Fig. 2)			1. Appliquer un signal stéréophonique provenant du générateur ou d'une station stéréo au dispositif d'accord.		
2. Commutateur de mode FM sur "auto".			2. Ajuster VR301 jusqu'à ce que l'indicateur stéréophonique s'éclaire. Cimentier le bras de VR301 , comme il est montré à la Fig. 3.		
3. Branchez le fréquencemètre sur TP301 par l'intermédiaire d'une résistance (100kΩ).					
4. Régler VR301 sur 19 kHz ± 30 Hz.					
RÉGLAGE DE LA SÉPARATION DES CANAUX					
Raccorder la générateur de signaux FM à la borne d'antenne FM à travers l'antenne fictive FM de 75Ω. (Signal stéréo pilote à 10% de modulation.)	100,1 MHz (Modulé à 90% par 1 kHz) (Mode gauche ou droite.)	100,1 MHz	Brancher le voltmètre électronique à C.A. aux bornes de sortie de l'appareil par l'intermédiaire d'un filtre passe-bas, (bobine de champ = 15 kHz ~ 19 kHz)	VR302 (Séparation)	1. Régler le commutateur de mode FM sur "auto". 2. Ajuster VR302 de telle sorte que la sortie de droite soit minimisée lorsque le modulateur stéréophonique est sur la gauche (modulation du canal de gauche) et que la sortie de gauche soit minimisée sur la mode de droite.

ALISTE DE AM

* Puestas y equipos usados					
1. Voltímetros electrónicos de CA y CC (EVM).					
2. Generador de señales AM (AM-SG).					
3. Poner selector FM-AM en posición "AM" (posición 9 kHz).					
4. Mantener voltaje de línea a voltaje nominal.					
5. La salida de 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.					
GÉNÉRATEUR DE SIGNAUX AM		FRECUENCIA	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
CONEXION					
AJUSTE RF-AM					
1 Conectar AM-SG a terminal de antena AM a través de capacitor 200 pF. Conectar a chasis (Entrada débil)	612 kHz (Mod. 30% con 400 Hz)	CA y osciloscopio a terminales de "OUTPUT".	L202 (Bobina ANT.)	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L202 con destornillador.	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L202 con destornillador.
	1503 kHz (Mod. 30% con 400 Hz)				

ESPAÑOL

■ ESPECIFICACIONES

(DIN 45 500)

■ SECCION PARA SINTONIZADOR FM

Gama de frecuencias	87,50~108,00 MHz	Equilibrio de canales 250 Hz~6 300 Hz	±1 dB
Sensibilidad		Punto de limite	1,0 μV
Señal a ruido 30 dB	1,0 μV (75Ω)	Ancho de banda	
Señal a ruido 26 dB	0,9 μV (75Ω)	Amplificador FI	180 kHz
Señal a ruido 20 dB	0,8 μV (75Ω)	Demodulador FM	1000 kHz
Sensibilidad utilizable IHF	0,95 μV (IHF '58)	Bornes de antena	
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω		75Ω (no equilibrado)

Distorsión armónica total
MONO. (MONO) 0,15%
ESTEREO (STEREO) 0,3%

Relación de señal a ruido
MONO. (MONO) 69 dB (75 dB, IHF)
ESTEREO (STEREO) 64 dB (70 dB, IHF)

Respuesta de frecuencia 5 Hz~18 kHz, +0,5 dB~-1,5 dB

Selectividad alternada de canal
normal ±400 kHz 60 dB

Relación de captura 1,0 dB

Rechazo de imagen a 98 MHz 55 dB

Rechazo de F.I. a 98 MHz 90 dB

Rechazo de respuesta espuria a 98 MHz 80 dB

Supresión AM 55 dB

Separación estereofónica

1 kHz 45 dB

10 kHz 30 dB

Fuga de onda portadora

19 kHz -40 dB (-45 dB, IHF)

38 kHz -40 dB (-45 dB, IHF)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias 522~1611 kHz (9 kHz pasos)
530~1620 kHz (10 kHz pasos)

Sensibilidad (Relación de señal a ruido de 20 dB) a 999 kHz
20 μV, 300 μV/m

Selectividad (±9 kHz) a 999 kHz 55 dB

Rechazo de imagen a 999 kHz 40 dB

Rechazo de F.I. a 999 kHz 60 dB

■ GENERAL

Voltaje de salida 0,4V

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 × 240 mm

Peso 2,1 kg

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

■ MEDICIONES Y AJUSTES

Nota: La bobina de OSC AM (L203) y AM IFT (T201) han sido ya ajustadas y no requieren ajuste.

AJUSTE DE AM

* Puesta y equipos usados

1. Voltímetros electrónicos de CA y CC (EVM).
2. Generador de señales AM (AM-SG).
3. Poner selector FM-AM en posición "AM". (Posición 9 kHz)
4. Mantener voltaje de línea a voltaje nominal.
5. La salida de 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.

GENERADOR DE SEÑALES AM		A FRECUEN- CIA DE PRESEN- TACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
CONEXION	FRECUENCIA				
AJUSTE RF-AM					
Conectar AM-SG a terminal de antena AM a través de capacitor 200 pF. Común a chasis. (Entrada débil)	612 kHz (Mod. 30% con 400 Hz)	612 kHz	Conectar EVM de CA y osciloscopio a terminales de "OUTPUT".	L202 (Bobina ANT.)	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L202 con destornillador.
	1503 kHz (Mod. 30% con 400 Hz)	1503 kHz		CT201 (Trimer de ANT.)	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

* Reglaje y equipos usados

1. Generador de señales FM (FM-SG).
2. Modulador estereofónico.
3. Osciloscopio.
4. Voltímetros electrónicos de CA y CC (EVM).
5. Frecuencímetro (19 kHz y 108 MHz medibles).
6. Filtro pasabajos (frec : 15 kHz ~ 19 kHz).
7. Poner selector FM-AM en posición "FM".
8. Poner el interruptor de modalidad FM en la posición "MONO".

* 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%, 400 Hz (Por el uso de antena ficticia, la salida de SG ha de ser 12 dB (4μV) más (IHF). Es decir, cuando entrada es 60 dB (1 mV), salida de SG ha de ser 72 dB (4 mV).
3. Conectar el modulador estereofónico a FM-SG.

No.	GENERADOR DE SEÑALES FM		A FRECUEN- CIA DE PRESEN- TACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
AJUSTE DE FI-FM						
3	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).	100,1 MHz (Mod. 100% con 400 Hz)	100,1 MHz	Conectar EVM CC entre terminal TP101 (-) y TP102 (+) a través de bobina de choque. (Ver Fig. 1)	T101 (Discr. IFT)	Ajustar núcleo de T101 de manera que voltaje medido en modalidad de señal sea 0 mV en gama de 300 mV.
AJUSTE DE V.C.O. MPX DE FM						
USANDO UN FRECUENCIMETRO				USANDO SISTEMA ALTERNATIVO		
4	1. Señal mono no modulada de 100,1 MHz, 60 dB aplicada al aparato. (Fig. 2) 2. Interruptor de modalidad FM a "auto". 3. Conectar frecuencímetro a TP301 a través de resistor (100kΩ). (Vea la Fig. 2) 4. Ajustar VR301 a 19 kHz ± 30 Hz.			1. Aplicar una señal estereofónica al sintonizador desde el generador o una emisora esereofónica. 2. Regular VR301 hasta que se encienda el indicador de estéreo. Sujetar el brazo de VR301 como se muestra en la Fig. 3.		
AJUSTE DE SEPARACIÓN						
5	Conectar SG-FM a terminal de antena FM a través de antena ficticia FM de 75Ω. (Señal estereofónica de Mod. Piloto 10%)	100,1 MHz (Mod. 90% con modalidad L (izq.) o R (der.) de 1 kHz)	100,1 MHz	Conectar EVM CA a terminales "OUTPUT" (salida) del aparato a través de filtro pasabajos. (fc = 15 ~ 19 kHz)	VR302 (Separación)	1. Poner el interruptor de modalidad FM en "auto". 2. Ajustar VR302 de manera que se minimice la salida R cuando el modulador estereofónico está en modalidad L (modulación de canal izq.) y que la salida L se minimice en modalidad R (der.).

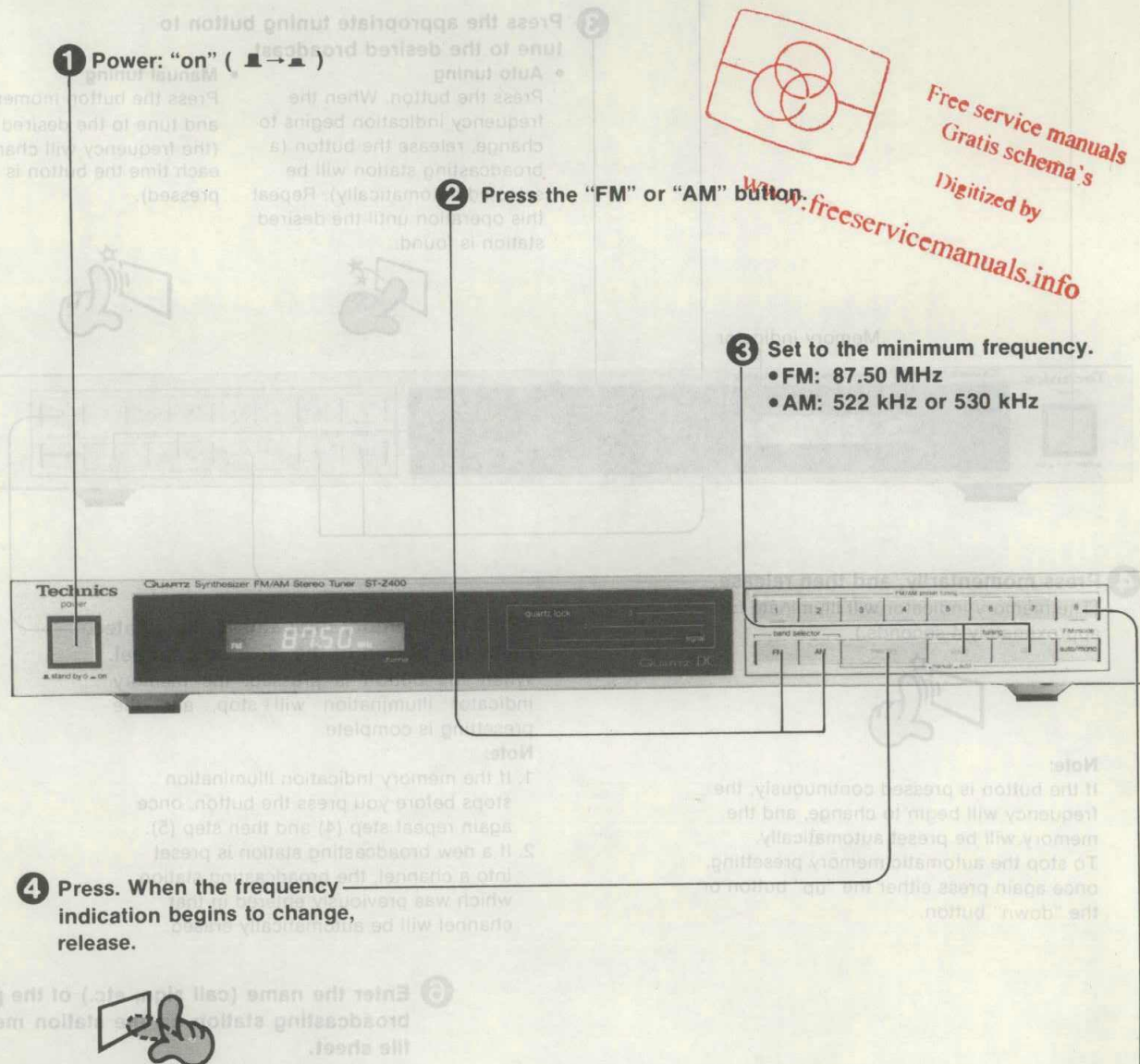
HOW TO PRESET RADIO BROADCAST FREQUENCIES

This unit can be used to preset as many as 16 radio broadcast frequencies: 8 FM and 8 AM. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

Automatic memory presetting

Beginning at the frequency indicated by the digital display, the broadcasting stations will be automatically preset to "channels" 1 through 8.

Note that in mountainous or remote areas, broadcasting stations which have weak broadcasting signals cannot be automatically preset into the memory.



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


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

Notes:

1. In areas where there are less than 8 FM stations, the remaining channels (through channel 8) will be left empty. The empty channels can be filled by using manual memory presetting.
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.

Manual memory presetting

Stations can be freely preset to any desired channel.

1 Power: "on" ()

2 Press the "FM" or "AM" button.

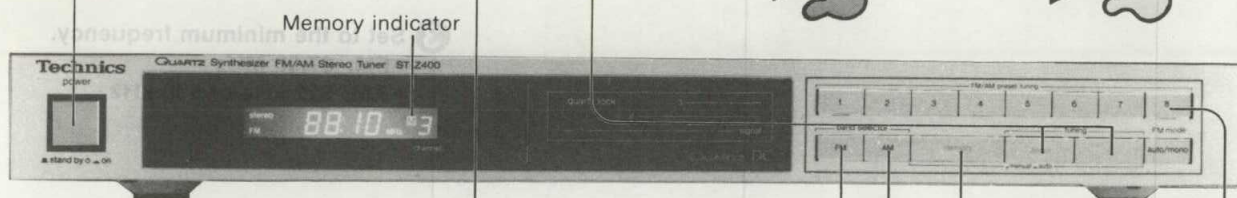
3 Press the appropriate tuning button to tune to the desired broadcast.

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



4 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. To stop the automatic memory presetting, once again press either the "up" button or the "down" button.

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

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

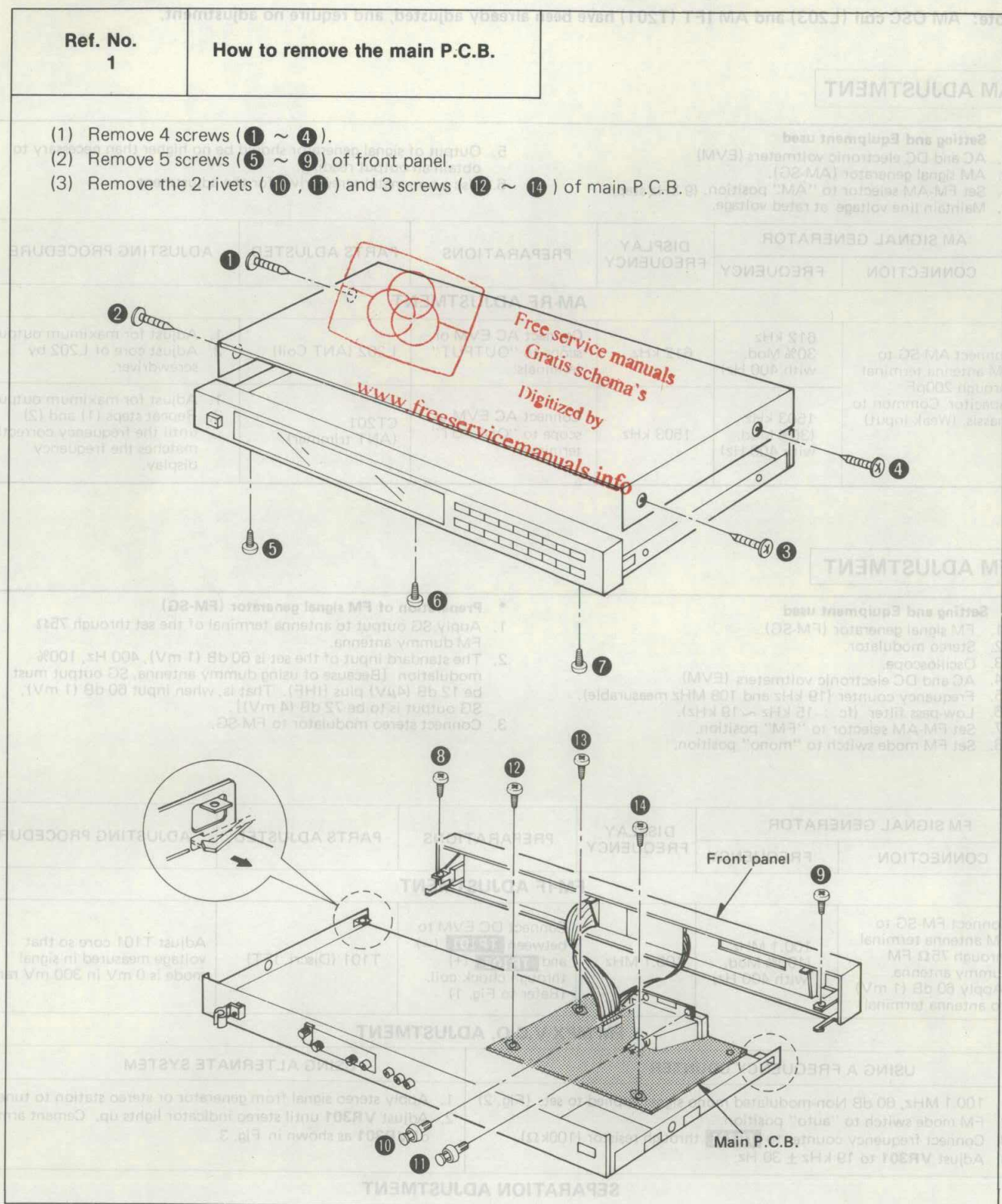
Note:

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.

6 Enter the name (call sign, etc.) of the preset broadcasting station on the station memory 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).

DISASSEMBLY INSTRUCTIONS



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 10 Ω , 1W resistor, short circuit electrolytic "gold" capacitors C902 and C903 momentarily to discharge them.

MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L203) and AM IFT (T201) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

* Setting and Equipment used

1. AC and DC electronic voltmeters (EVM)
2. AM signal generator (AM-SG).
3. Set FM-AM selector to "AM" position. (9 kHz step)
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		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
CONNECTION	FREQUENCY				
AM-RF ADJUSTMENT					
Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	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.
	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 (1) and (2) until the frequency correctly matches the frequency display.

FM ADJUSTMENT

* Setting and Equipment used

1. FM signal generator (FM-SG).
2. Stereo modulator.
3. Oscilloscope.
4. AC and DC electronic voltmeters (EVM)
5. Frequency counter (19 kHz and 108 MHz measurable).
6. Low-pass filter (f_c : 15 kHz ~ 19 kHz).
7. Set FM-AM selector to "FM" position.
8. Set FM mode switch to "mono" position.

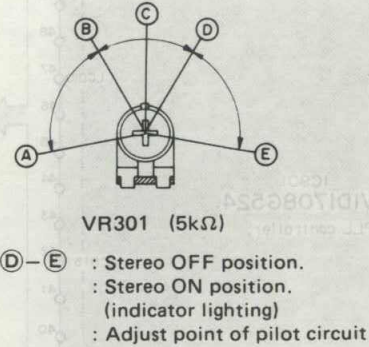
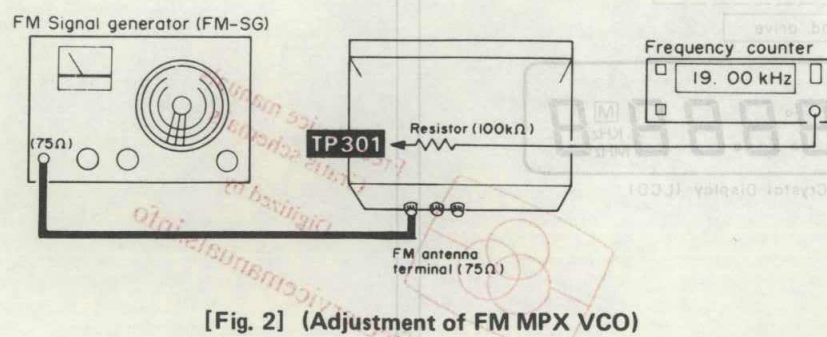
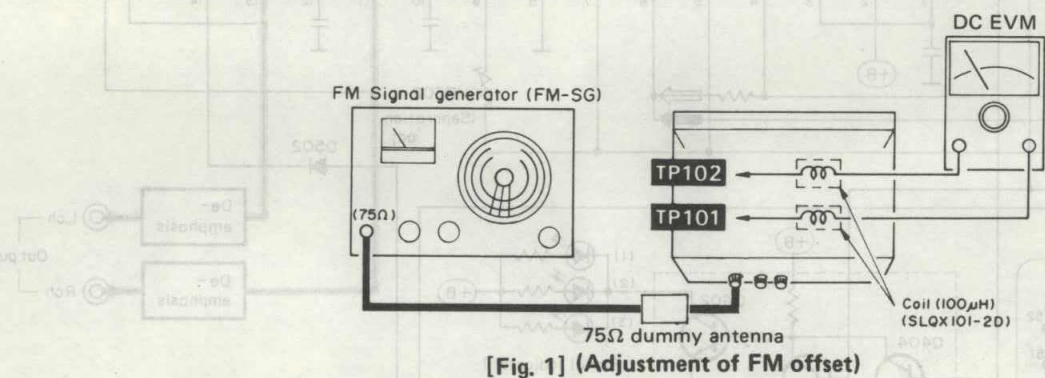
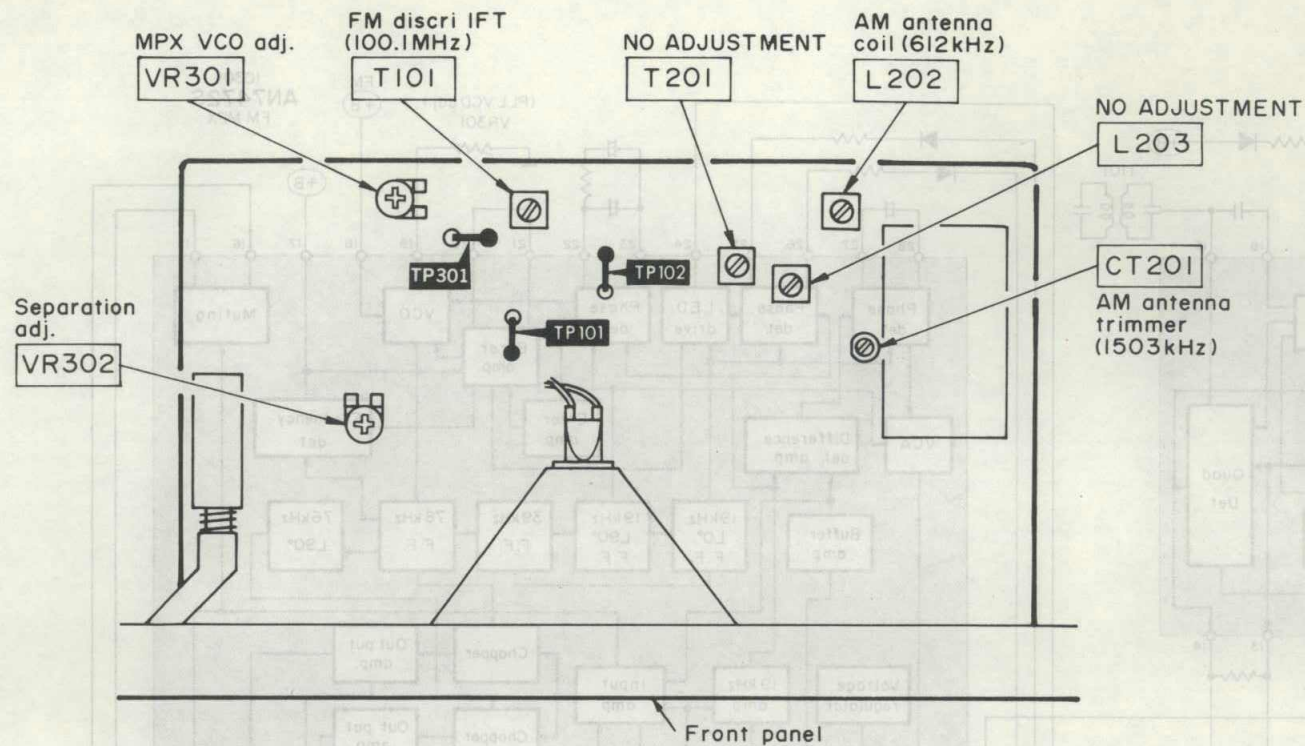
* Preparation of FM signal generator (FM-SG)

1. Apply SG output to antenna terminal of the set through 75 Ω FM dummy antenna.
2. The standard input of the set is 60 dB (1 mV), 400 Hz, 100% modulation [Because of using dummy antenna, SG output must be 12 dB (4 μ V) 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.

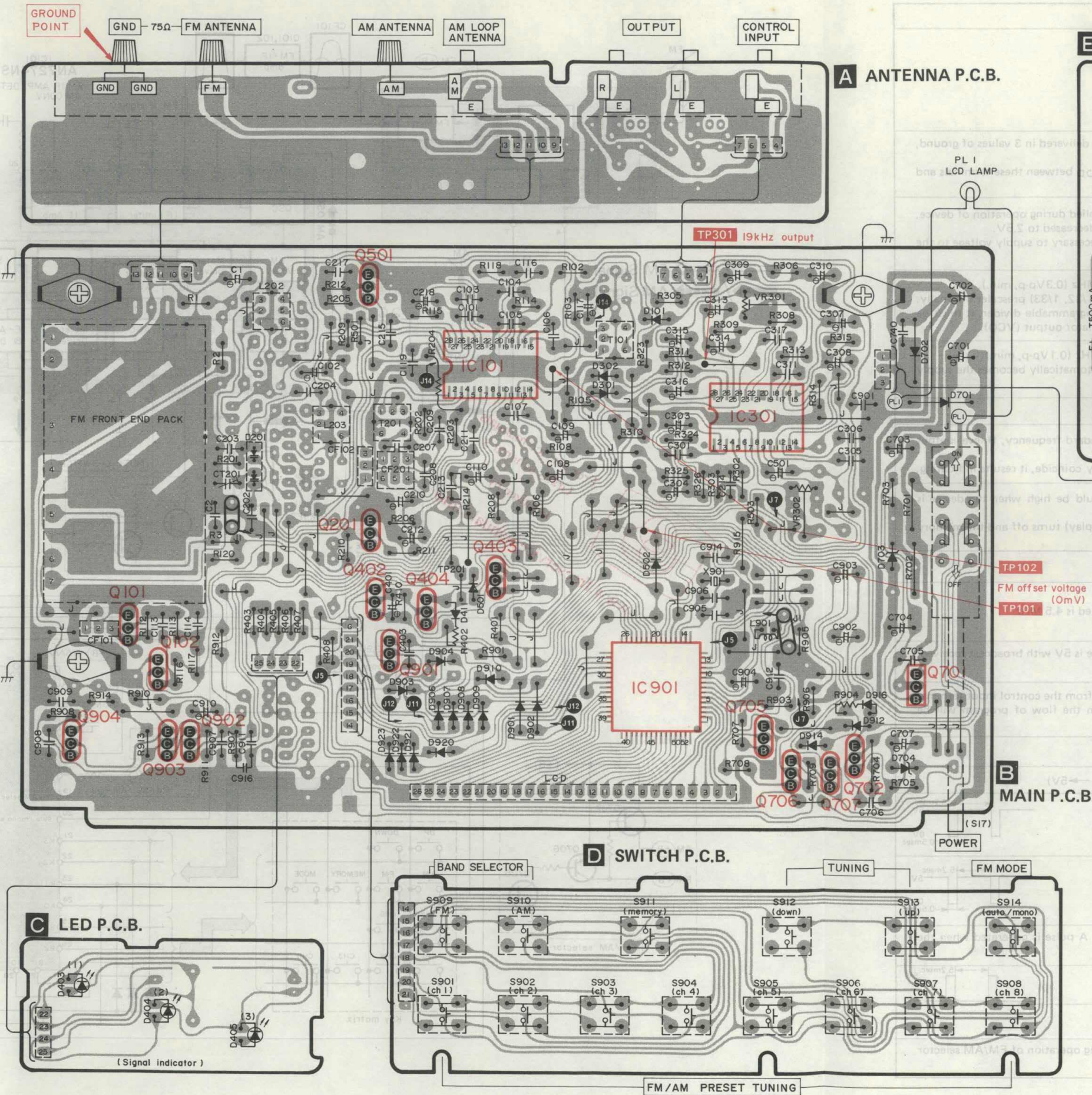
FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
CONNECTION	FREQUENCY				
FM-IF ADJUSTMENT					
Connect FM-SG to FM antenna terminal through 75Ω FM dummy antenna. (Apply 60 dB (1 mV) to antenna terminal)	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect DC EVM to between TP101 (–) and TP102 (+) through chock coil. (Refer to Fig. 1)	T101 (Discr. IFT)	Adjust T101 core so that voltage measured in signal mode is 0 mV in 300 mV range.
FM MPX V.C.O. ADJUSTMENT					
USING A FREQUENCY COUNTER			USING ALTERNATE SYSTEM		
1. 100.1 MHz, 60 dB Non-modulated mono signal applied to set. (Fig. 2) 2. FM mode switch to "auto" position. 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust VR301 to 19 kHz ± 30 Hz.			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. 3.		
SEPARATION ADJUSTMENT					
Connect FM-SG to FM antenna terminal through 75Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.1 MHz (90% Mod. with 1 kHz L or R mode)	100.1 MHz	Connect AC EVM to "OUTPUT" terminals of the set through low-pass filter. (fc = 15 kHz ~ 19 kHz)	VR302 (Separation)	1. Set the FM mode switch to "auto". 2. Adjust VR302 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.

● Adjustment locations

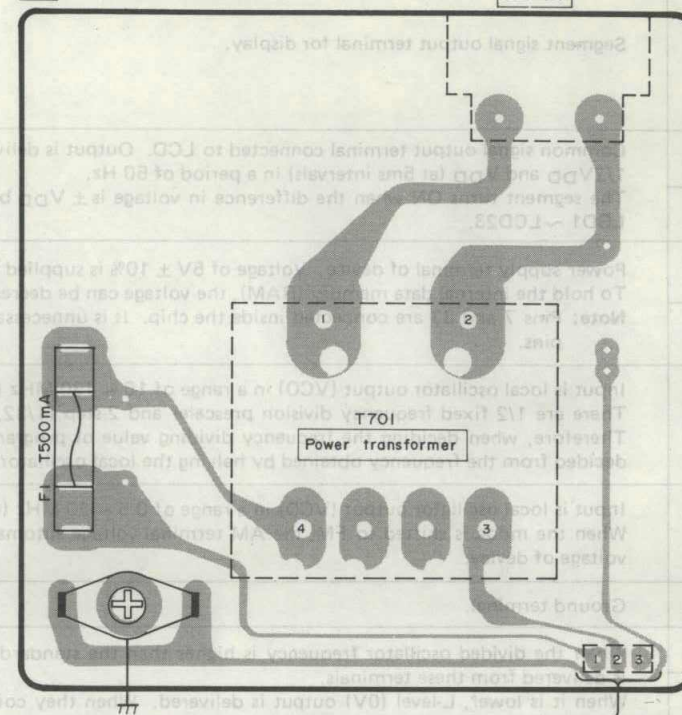
Note: AM OSC coil (L203) and AM IFT (T201) have been already adjusted, and require no adjustment.



■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



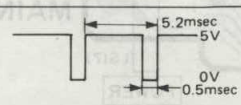
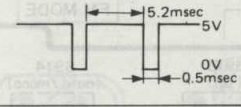
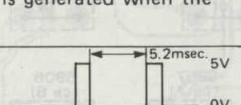
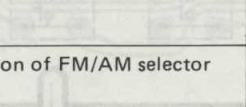
E POWER P.C.B.



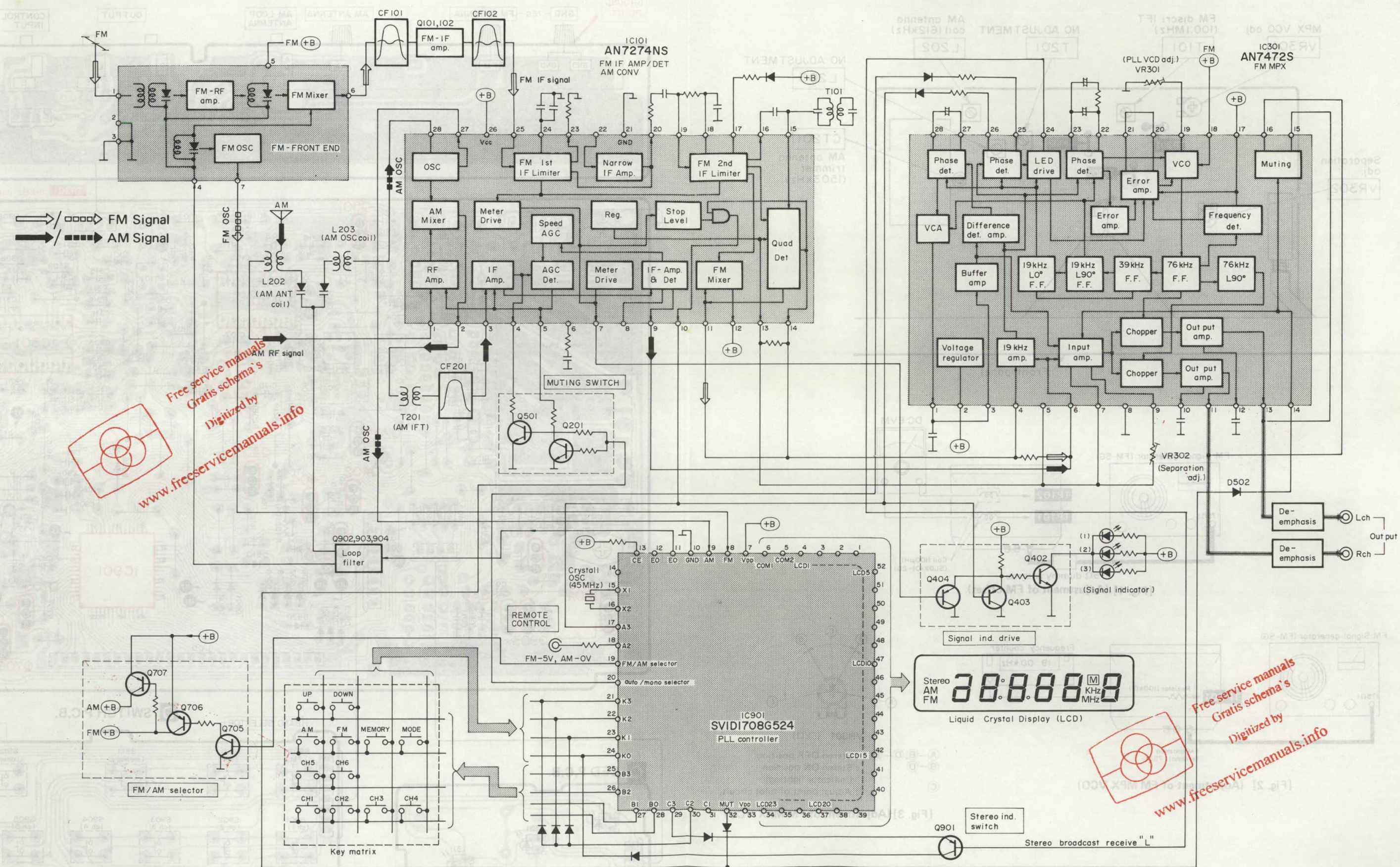
● Terminal guide of transistors, IC's and diodes

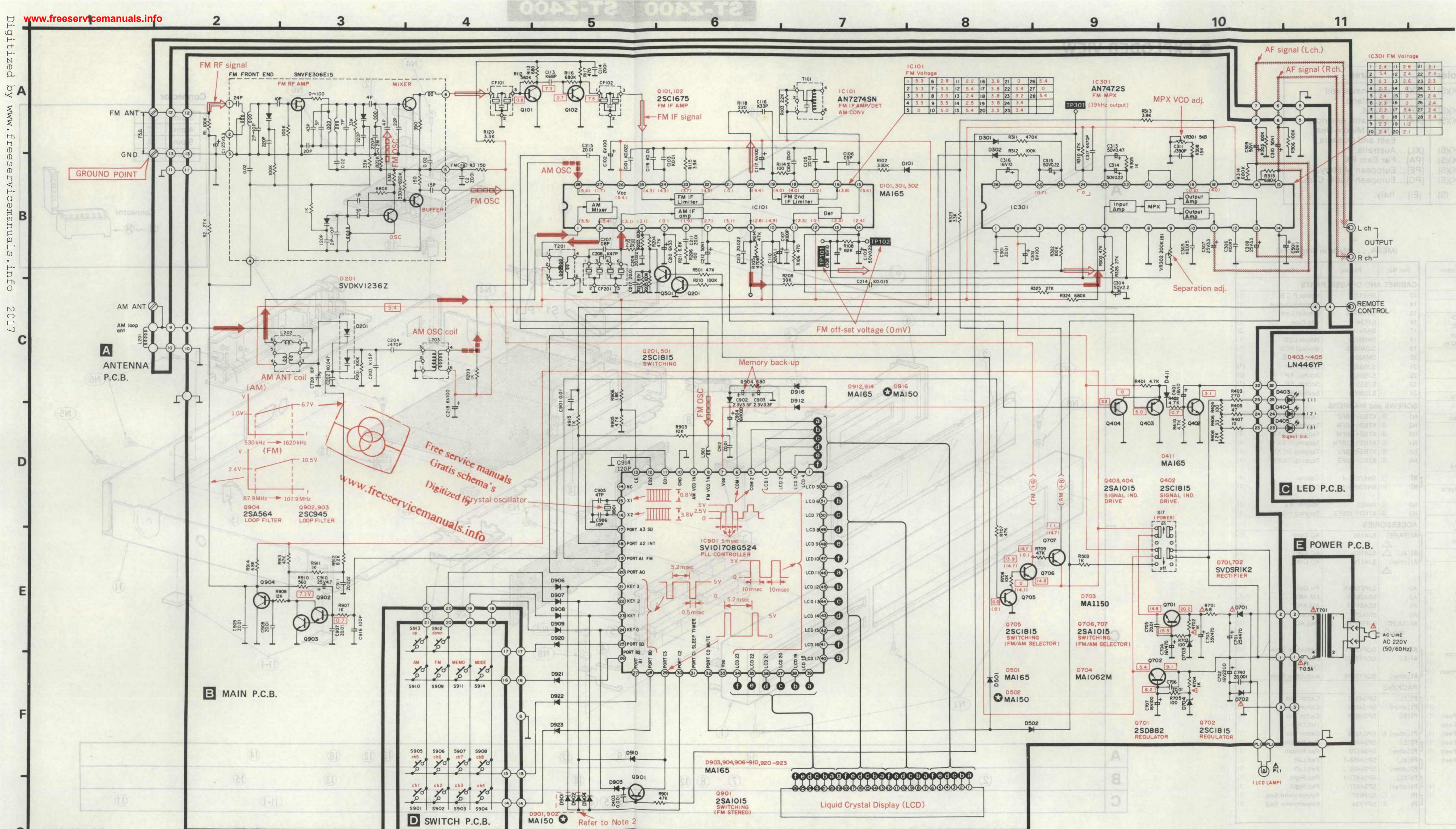
AN7274NS, AN7472S	2SA564A, 2SC945 2SA1015, 2SC1675 2SC1815, 2SC1685	2SD793
LN446YP	SVDKV1236Z	MA165
MA162A	MA4150M, MA4162M	SVID1708G524

■ FUNCTION OF TERMINAL (PLL controller IC901)

Pin No.	Mark	Description of terminal
1 2 4 34 52	LCD4 LCD1 LCD23 LCD5	Segment signal output terminal for display.
5	COM2	Common signal output terminal connected to LCD. Output is delivered in 3 values of ground, $1/2V_{DD}$ and V_{DD} (at 5ms intervals) in a period of 50 Hz. The segment turns ON when the difference in voltage is $\pm V_{DD}$ between these terminals and LCD1 ~ LCD23.
6	COM1	
7	V_{DD}	Power supply terminal of device. Voltage of $5V \pm 10\%$ is supplied during operation of device. To hold the internal data memory (RAM), the voltage can be decreased to 2.5V. Note: Pins 7 and 33 are connected inside the chip. It is unnecessary to supply voltage to the pins.
33	V_{DD}	
8	FM	Input is local oscillator output (VCO) in a range of 10 ~ 130 MHz (0.3Vp-p, min.). There are 1/2 fixed frequency division prescaler and 2-step (1/32, 1/33) prescaler internally. Therefore, when deciding the frequency dividing value of programmable divider, it must be decided from the frequency obtained by halving the local oscillator output (VCO).
9	AM	Input is local oscillator output (VCO) in a range of 0.5 ~ 20 MHz (0.1Vp-p, min.). When the mode is shifted to FM, the AM terminal voltage automatically becomes the supply voltage of device.
10	GND	Ground terminal.
11	E01	When the divided oscillator 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.
12	E02	
13	CE	Device selection signal input terminal. The signal level should be high when the device is operated, and low when not operated. With this terminal shifted to low level, LCD (liquid crystal display) turns off and the memory is held.
14	NC	Not used in this unit.
15	X1	Connecting terminal for crystal oscillator. The crystal connected is 4.5 MHz.
16	X2	
17	A3 (SD)	Terminal to put in stop signal during auto tuning. The voltage is 5V with broadcast received, and 0V without broadcast received.
18	A2	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.
19	A1	FM/AM output terminal. (FM \rightarrow 5V, AM \rightarrow 0V)
20	A0	Auto/mono changeover output terminal. (auto \rightarrow 0V, mono \rightarrow 5V)
21 24	K3 K0	Input terminal for key return signal from external key matrix. 
25 28	B3 B0	Output terminal for key return signal to external key matrix. 
29	C3	Terminal for FM IF ceramic filter frequency compensation. A pulse is generated when the voltage of terminal 13 rises. 
30	C2	Output terminal for key return signal to let the stereo indicator light up. 
31	C1	Nut used in this unit.
32	C0	Muting signal output terminal. Muting signal is delivered during operation of FM/AM selector switch and tuning switch. (4V during muting)

■ BLOCK DIAGRAM





SCHEMATIC DIAGRAM

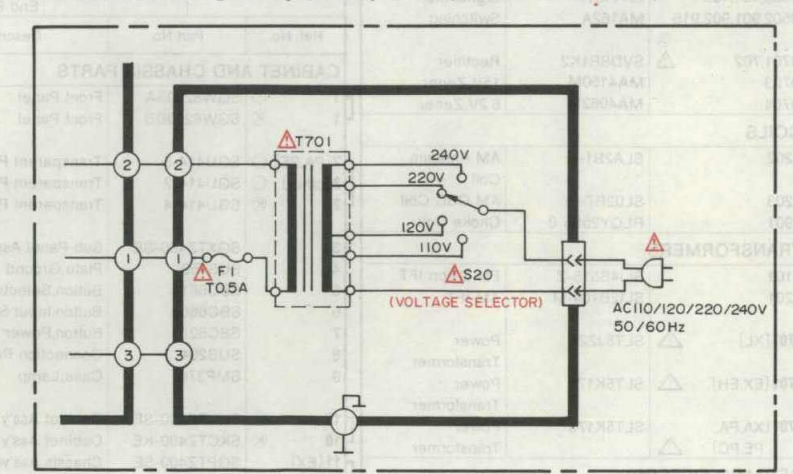
(This schematic diagram may be modified at any time with the development of new technology.)

- * The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No., with the 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.
- * This is the basic circuit diagram of this unit.
- Note that part of the circuit is subject to change depending on the areas.

- Note 1:**
- S17 : Power source switch in "on" position.
 - S20 [XA, PA, PE, PC] : Voltage selector switch in "220V" position. 110V ↔ 120V ↔ 220V ↔ 240V
 - S901 ~ S908 : Preset tuning switch.
 - * With it momentarily pushed (less than 0.4 sec.) and released, the 1 ~ 8 CH are received.
 - * With it continuously pushed (0.4 sec. or more) and released, the 9 ~ 16 CH are received.
 - S909 : FM selector switch.
 - S910 : AM selector switch.
 - S911 : Memory set switch. (manual ↔ auto memory)
 - S912 : Tuning (down) switch.
 - [down: tuning to lower frequency]
 - S913 : Tuning (up) switch.
 - [up: tuning to higher frequency]
 - S914 : FM mode switch. (stereo ↔ mono)
 10. 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 (no signal) reception mode.
 - * Figures in stand for DC voltage in AM signal reception mode.
 - * Figures in () stand for DC voltage in FM signal reception mode.
 11. Positive voltage lines
 12. 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.

Change in power supply circuit

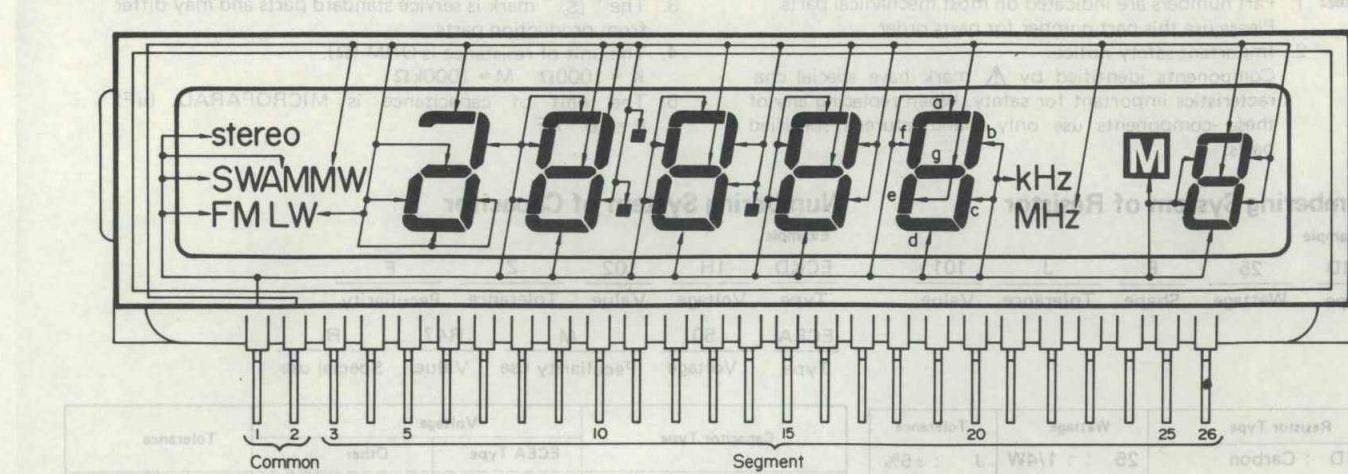
Product for [XA], [PA], [PE], [PC] areas only



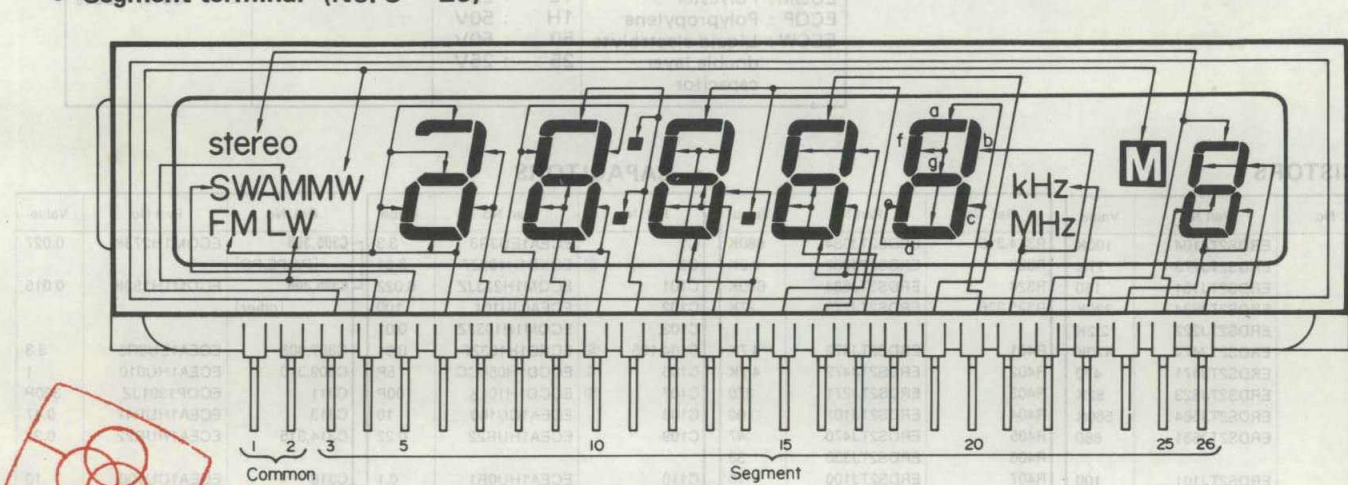
- [XA] : Asia, Latin America, Africa, Middle Near East and Oceania.
- [PA] : Far East PX.
- [PE] : European Military.
- [PC] : European Audio Club.

LIQUID CRISTAL DISPLAY (LCD)

- Common terminal (No. 1, 2)



- Segment terminal (No. 3 ~ 26)



Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the diodes (D901, D902) for use as different diodes must be used depending on each rank of the ceramic filters.

RANK (Color)	D901	D902	CENTER FREQUENCY
Black	○	×	10.65 MHz
Red	×	×	10.70 MHz
White	×	○	10.76 MHz

Note: ○ Mark Diode is used.
× 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 Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

3. The "S" mark is service standard parts and may differ from production parts.
4. The unit of resistance is OHM (Ω).
K = 1000 Ω M = 1000k Ω
5. The unit of capacitance is MICROFARAD (μ F)
P = 10⁻⁶ μ F

Numbering System of Resistor

Example	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W S2 : 1/4W	J : \pm 5%

Numbering System of Capacitor

Example	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance	
ECEA Type	Other	Value	Special use	
ECEA : Electrolytic	0J : 6.3V	1H : 50V DC	C : \pm 0.25pF	
ECCD : Ceramic	1A : 10V	2H : 500V DC	J : \pm 5%	
ECKD : Ceramic	1C : 16V	2R3 : 2.3V DC	K : \pm 10%	
ECQM : Polyester	1E : 25V		Z : \pm 80%, -20%	
ECQP : Polypropylene	1H : 50V			
EECW : Liquid electrolyte double layer capacitor	50 : 50V 25 : 25V			

RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1	ERDS2TJ104	100K	R314,315	ERDS2TJ684	680K	C1	ECEA1EU3R3	3.3
R2	ERDS2TJ273	27K	R323	ERDS2TJ332	3.3K	C2	ECKD1H103ZF	0.01
R3	ERDS2TJ151	150	R324	ERDS2TJ684	680K	C101	ECQM1H223JZ	0.022
R102	ERDS2TJ334	330K	R325,326	ERDS2TJ273	27K	C102	ECEA0JU101	100
R103	ERDS2TJ222	2.2K				C103	ECQM1H103JZ	0.01
R105	ERDS2TJ474	470K	R401	ERDS2TJ472	4.7K	C104,105	ECKD1H103ZF	0.01
R106	ERDS2TJ471	470	R402	ERDS2TJ472	4.7K	C106	ECCD1H050CC	5P
R108	ERDS2TJ823	82K	R403	ERDS2TJ271	270	C107	ECCD1H101K	100P
R112	ERDS2TJ564	560K	R404	ERDS2TJ101	100	C108	ECEA1CU100	10
R113	ERDS2TJ681	680	R405	ERDS2TJ470	47	C109	ECEA1HUR22	0.22
			R406	ERDS2TJ330	33			
R114	ERDS2TJ101	100	R407	ERDS2TJ100	10	C110	ECEA1HU0R1	0.1
R115	ERDS2TJ392	3.9K	R408	ERDS2TJ122	1.2K	C113	ECCD1H680K	68P
R116	ERDS2TJ684	680K	R410	ERDS2TJ472	4.7K	C114	ECKD1H103ZF	0.01
R117	ERDS2TJ471	470	R501	ERDS2TJ473	4.7K	C116	ECCD1H330K	33P
R119	ERDS2TJ221	220				C117	ECEA0JU101	100
R120	ERDS2TJ332	3.3K	R503	ERDS2TJ102	1K	C119	ECQM1H103JZ	0.01
R201	ERDS2TJ104	100K	R701	ERD25FJ6R8	6.8	C202	ECQM1H473JZ	0.047
R202	ERDS2TJ222	2.2K	R702	ERD25FJ102	1K	C203	ECCD1H150KC	15P
R203	ERDS2TJ124	120K	R703	ERDS2TJ101	100	C204	ECQP1471JZ	47P
R204	ERDS2TJ473	47K	R704	ERD25FJ102	1K	C207	ECCD1H080CC	80P
			R705	ERDS2TJ101	100			
R205	ERDS2TJ104	100K	R707	ERDS2TJ473	47K	C208	ECCD1H470K	47P
R206	ERDS2TJ101	100	R708	ERDS2TJ103	10K	C209	ECCD1H223ZF	0.022
R208	ERDS2TJ393	39K	R709	ERDS2TJ393	39K	C210	ECEA0JU330	33
R209	ERDS2TJ102	1K	R901	ERDS2TJ473	47K	C211	ECKD1H103ZF	0.01
R210	ERDS2TJ104	100K				C212	ECEA0JU102	100
R211	ERDS2TJ682	6.8K	R903	ERDS2TJ103	10K	C213	ECCD1H223ZF	0.022
R212	ERDS2TJ823	82K	R904	ERDS2TJ681	680	C214	ECQM1H153JZ	0.015
R214	ERDS2TJ473	47K	R905	ERDS2TJ472	4.7K	C215	ECCD1H103ZF	0.01
R302	ERDS2TJ104	100K	R906	ERDS2TJ182	1.8K	C217	ECCD1H103ZF	0.01
R303	ERDS2TJ473	47K	R907	ERDS2TJ102	1K	C218	ECEA0JU101	100
R305,306	ERDS2TJ104	100K	R908	ERDS2TJ123	12K	C301	ECCD1H103ZF	0.01
			R910	ERDS2TJ561	560	C303	ECEA0JU101	100
R308	ERDS2TJ153	15K	R911	ERDS2TJ102	1K	C304	ECEA1CU100	10
R309	ERDS2TJ102	1K	R912	ERDS2TJ822	8.2K			
R310	ERDS2TJ473	47K	R913	ERDS2TJ473	47K			
R311	ERDS2TJ474	470K						
R312	ERDS2TJ104	100K	R914	ERDS2TJ682	6.8K			
R313	ERDS2TJ392	3.9K	R915	ERD25FJ102	1K			

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.
When replacing any of these components, use only manufacturer's specified parts.
3. \odot - marked parts are used for black only, while \circ - marked parts are for silver type only.
4. Part other than \odot and \circ - marked are use 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 "S" 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.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7274NS	FM IF Amp.
IC301	AN7472S	FM/AM Detector
IC901	SVID1708G524	Micro-Computer

TRANSISTORS		
Q101,102	2SC1675-L	FM IF Amp
Q201,402,501,705	2SC1815-G	Switching,Signal Ind.
Q403,404,706,707,901	2SA1015-Y	Signal Ind.
Q701	2SD793-Q	Drive Switching, Regulator
		(Product Part No. is 2SD882-Q)
Q702	2SC1815-Y	Regulator
Q902,903	2SC945-Q	Loop Filter
Q904	2SA722-S	Loop Filter
		(Product Part No. is 2SA564A)

DIODES		
D101,301,302,411,501,903,904	MA165	Switching
906~910,912,914,920~923		
D201	SVDKV1236Z	Variable Capacitance
D403,404,405	LN446YP	Signal Ind.
D502,901,902,916	MA162A	Switching
D701,702	SVDSR1K2	Rectifier
D703	MA4150M	15V Zener
D704	MA4062M	6.2V Zener

COILS		
L202	SLA2B1-P	AM Antenna
L203	SL02B7-P	Coil
L901	RLQY25SS-0	AM OSC Coil

TRANSFORMERS		
T101	SL4B515-Z	FM Discr IFT
T201	SL2B104-M	AM IFT
T701 (XL)	SLT5J227	Power Transformer
T701 (EX,EH)	SLT5K171	Power Transformer
T701 (XA,PA,PE,PC)	SLT5K173	Power Transformer

CERAMIC FILTERS		
CF101,102	SVFE107MM-A (Red)	FM,10.70MHz
	SVFE107MM-D (Black)	FM,10.65MHz
	SVFE107MM-E (White)	FM,10.75MHz
CERAMIC FILTERS		
CF201	SVFSFZ450F7L	AM 450kHz

Ref. No.	Part No.	Description
CRYSTAL		
X901	SVQ49U452-T	4.5MHz
VARIABLE RESISTORS		
VR301	EVN75AA00B53	MPX VCO
		Adj.5k Ω (B)
VR302	EVN58AA00B25	Separation
		Adj.200k Ω (B)
VARIABLE CAPACITOR		
CT201	SVCTZ03T110F	AM ANT Trimmer
LAMP		
PL1	XAMS15S150	LCD Lamp
FUSE		
F1	XBA2C05TR0	250V,500mA
SWITCHES		
S17	SSH1069	Power
S20(XA,PA,PE,PC)	SSR187	Voltage Selector
		only
S901~914	SSG13	Key-Board
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9150	Liquid Crystal Display
FM FRONT END		
	SNVFE306E15	FM Front End Pack

Ref. No.	Part No.	Description
CABINET AND CHASSIS PARTS		
1	SGW82005A	Front Panel
1	SGW82005B	Front Panel
2(PA,PE)	SGU414-3	Transparent Plate
2(other)	SGU414-2	Transparent Plate
2	SGU414-4	Transparent Plate
3	SGXTZ400-SE	Sub Panel Ass'y
4	SUS759	Plate,Ground
5	SBC661A	Button,Selector
6	SBC660A	Button,Input Selector
7	SBC627	Button,Power
8	SUB201	Connection Rod,Power
9	SMP376	Case,Lamp
10	SKOTZ400-SE	Cabinet Ass'y
10	SKOTZ400-KE	Cabinet Ass'y
11(EX)	SGPTZ400-SE	Chassis Ass'y(W/Feet)
11(EH)	SGPTZ400-SH	Chassis Ass'y(W/Feet)
11(XA,PC)	SGPTZ400-SX	Chassis Ass'y(W/Feet)
11(XL)	SGPTZ400-SL	Chassis Ass'y(W/Feet)
11(PA,PE)	SGPTZ400-SP	Chassis Ass'y(W/Feet)
11(E)	SGPTZ400-SJ	Chassis Ass'y(W/Feet)
11-1	SHS2481	Foot
12	SJS9230	Socket,AC Inlet

Ref. No.	Part No.	Description
CRYSTAL		
X901	SVQ49U452-T	4.5MHz
VARIABLE RESISTORS		
VR301	EVN75AA00B53	MPX VCO
		Adj.5k Ω (B)
VR302	EVN58AA00B25	Separation
		Adj.200k Ω (B)
VARIABLE CAPACITOR		
CT201	SVCTZ03T110F	AM ANT Trimmer
LAMP		
PL1	XAMS15S150	LCD Lamp
FUSE		
F1	XBA2C05TR0	250V,500mA
SWITCHES		
S17	SSH1069	Power
S20(XA,PA,PE,PC)	SSR187	Voltage Selector
		only
S901~914	SSG13	Key-Board
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9150	Liquid Crystal Display
FM FRONT END		
	SNVFE306E15	FM Front End Pack

Ref. No.	Part No.	Description
CABINET AND CHASSIS PARTS		
1	SGW82005A	Front Panel
1	SGW82005B	Front Panel
2(PA,PE)	SGU414-3	Transparent Plate
2(other)	SGU414-2	Transparent Plate
2	SGU414-4	Transparent Plate
3	SGXTZ400-SE	Sub Panel Ass'y
4	SUS759	Plate,Ground
5	SBC661A	Button,Selector
6	SBC660A	Button,Input Selector
7	SBC627	Button,Power
8	SUB201	Connection Rod,Power
9	SMP376	Case,Lamp
10	SKOTZ400-SE	Cabinet Ass'y
10	SKOTZ400-KE	Cabinet Ass'y
11(EX)	SGPTZ400-SE	Chassis Ass'y(W/Feet)
11(EH)	SGPTZ400-SH	Chassis Ass'y(W/Feet)
11(XA,PC)	SGPTZ400-SX	Chassis Ass'y(W/Feet)
11(XL)	SGPTZ400-SL	Chassis Ass'y(W/Feet)
11(PA,PE)	SGPTZ400-SP	Chassis Ass'y(W/Feet)
11(E)	SGPTZ400-SJ	Chassis Ass'y(W/Feet)
11-1	SHS2481	Foot
12	SJS9230	Socket,AC Inlet

Color	Area
(K)(S)	[EX]...Scandinavia and Switzerland.
(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.
(S)	[EI]... Italy.

(MESA . . . Made in Singapore)

Ref. No.	Part No.	Description
CABINET AND CHASSIS PARTS		
13	SHE170	Holder,P.C.B.
14	SJF8709N	Terminal,Output
15	SUW1959	Bracket,Earth
16	SJT347	Clip,Fuse
17	SHR415	Pin,Lamp Case
18	SHR9732	Holder,LCD
19	SUW2873	Bracket,PCB
20	SMX854	Spacer,PCB
21	SJS5327	Socket,3P
22	SJS5421	Socket,4P
23	SJS5519	Socket,5P
24	SJS5903	Socket,9P
SCREWS AND WASHERS		
N1	XTB3+8BFZ	Tapping, ϕ 3X8
N2	XTB3+8BFN	Tapping, ϕ 3X8
N3	XTB3+8BFN	Tapping, ϕ 3X8
N4	XTB3+12BFN	Tapping, ϕ 3X12
N5	XTB3+8BFZ	Tapping, ϕ 3X8
N6	XTB3+8BFZ	Tapping, ϕ 3X8
N7	SNE2095-4	Cabinet
N7	SNE2095-5	Cabinet
N8	XWG3	Washer, ϕ 3
N9	XTN3+10BFZ	Tapping, ϕ 3X10

ACCESSORIES			
A1(PA,PE)	SJA168	AC Cord	(1)
A1(XL)	SJA163	AC Cord	(1)
A1(other)	SJA171	AC Cord	(1)
A2	SJP2129-5	Pin Cord	(1)
A3	SSA267-1	FM ANT	(1)
A4	SSA611-1	AM ANT	(1)
A5	SMA231	Holder	(1)
A6(XA,PC) only	SJP5213-1	Plug,AC	(1)
A7(PA,PE)	SQF12071	Instruction Book	(1)
A7(EI)	SQF12207	Instruction Book (MESA)	(1)
A7(OTHER)	SQF12069	Instruction Book	(1)